



MADRIX 3 Script Help and Manual

[Software User Guide]

MADRIX Version: 3.5a

MADRIX Script Version: 2.15

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//PART A

What is New

1 What is New

Overview

The current MADRIX Script version is 2.15.

There are a lot of new features within MADRIX and therefore also in MADRIX Script.

News For Script Engine Version 2.15 (MADRIX 3.5)

New General Functions:

- »[SetChromaKey](#)

News For Script Engine Version 2.14 (MADRIX 3.4)

New General Functions:

- »[SetDmxFaderValue](#)
- »[GetDefaultShape](#)
- »[RenderShape](#)

New General Structure:

- »[shape](#)

New Functions For The Main Output Macro:

- »[CueSetGroupPreset](#)

- » [CueGetGroupPreset](#)
- » [GetGroupCount](#)
- » [GetGroupIdByIndex](#)
- » [GetGroupDefaultValue](#)
- » [GetGroupDefaultValueByIndex](#)
- » [GetGroupDisplayColor](#)
- » [GetGroupDisplayColorByIndex](#)
- » [GetGroupDisplayName](#)
- » [GetGroupDisplayNameByIndex](#)
- » [SetGroupValue](#)
- » [SetGroupValueByIndex](#)
- » [GetGroupValue](#)
- » [GetGroupValueByIndex](#)
- » [SetGroupFlashMode](#)
- » [SetGroupFlashModeByIndex](#)
- » [GetGroupFlashMode](#)
- » [GetGroupFlashModeByIndex](#)
- » [ToggleGroupFlashMode](#)
- » [ToggleGroupFlashModeByIndex](#)
- » [SetGroupFadeTime](#)
- » [GetGroupFadeTime](#)
- » [SetGroupPreset](#)
- » [CallGroupPreset](#)

New Filters / Effects (FX):

- » [FILTER_KALEIDOSCOPE_6x](#)

- »[FILTER_KALEIDOSCOPE_8x](#)
- »[FILTER_KALEIDOSCOPE_12x](#)

New Functions And Constants For MADRIX Effects:

- »[ChaserCallCurrentStep](#)
- »[ChaserCallNextStep](#)
- »[ChaserCallPreviousStep](#)
- »[ChaserGetCurrentStep](#)
- »[ChaserGetStepCount](#)
- »[ChaserGetLoopCount](#)
- »[ChaserGetLoopProgress](#)
- »[ChaserGetLoopTime](#)
- »[ChaserGetPlaybackState](#)
- »[ChaserGetStepDescription](#)
- »[ChaserGetStepFadeTime](#)
- »[ChaserGetStepFadeType](#)
- »[ChaserGetStepProgress](#)
- »[ChaserGetStepTime](#)
- »[ChaserGetStepWaitTime](#)
- »[ChaserInvert](#)
- »[ChaserMoveStepDown](#)
- »[ChaserMoveStepUp](#)
- »[ChaserPause](#)
- »[ChaserPlay](#)
- »[ChaserSetLoopCount](#)
- »[ChaserSetNextStep](#)
- »[ChaserSetPreviousStep](#)
- »[ChaserSetStepDescription](#)
- »[ChaserSetStepFadeTime](#)
- »[ChaserSetStepFadeType](#)

- » [ChaserSetStepWaitTime](#)
- » [ChaserStop](#)
- » [ChaserSwapSteps](#)

- » [PLAYBACK_FADING](#)
- » [PLAYBACK_PAUSED](#)
- » [PLAYBACK_PLAYING](#)
- » [PLAYBACK_STOPPED](#)

New Functions And Constants For MADRIX Effects that use Shapes:

- » [SetRenderingMode](#)
- » [GetRenderingMode](#)
- » [SetShapeRotation](#)
- » [GetShapeRotation](#)
- » [SetShapeOrigin](#)
- » [GetShapeOrigin](#)

- » [RENDERING_MODE_SIMPLE](#)
- » [RENDERING_MODE_EXTENDED](#)
- » [RENDERING_MODE_BLOBBY](#)

- » [SHAPE_TYPE_HEART_OUTLINED](#)
- » [SHAPE_TYPE_HEART_OUTLINED_IMPLODE](#)
- » [SHAPE_TYPE_HEART_OUTLINED_EXPLODE](#)
- » [SHAPE_TYPE_HEART_FILLED](#)
- » [SHAPE_TYPE_HEART_FILLED_IMPLODE](#)
- » [SHAPE_TYPE_HEART_FILLED_EXPLODE](#)
- » [SHAPE_TYPE_CROSS_OUTLINED](#)

- »[SHAPE_TYPE_CROSS_OUTLINED_IMPLODE](#)
- »[SHAPE_TYPE_CROSS_OUTLINED_EXPLODE](#)
- »[SHAPE_TYPE_CROSS_FILLED](#)
- »[SHAPE_TYPE_CROSS_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_CROSS_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_CROSS_STRAIGHT_OUTLINED](#)
- »[SHAPE_TYPE_CROSS_STRAIGHT_OUTLINED_IMPLODE](#)
- »[SHAPE_TYPE_CROSS_STRAIGHT_OUTLINED_EXPLODE](#)
- »[SHAPE_TYPE_CROSS_STRAIGHT_FILLED](#)
- »[SHAPE_TYPE_CROSS_STRAIGHT_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_CROSS_STRAIGHT_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_STAR_OUTLINED](#)
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- »[SHAPE_TYPE_STAR_OUTLINED_EXPLODE](#)
- »[SHAPE_TYPE_STAR_FILLED](#)
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- »[SHAPE_TYPE_STAR_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_TRIANGLE_OUTLINED](#)
- »[SHAPE_TYPE_TRIANGLE_OUTLINED_IMPLODE](#)
- »[SHAPE_TYPE_TRIANGLE_OUTLINED_EXPLODE](#)
- »[SHAPE_TYPE_TRIANGLE_FILLED](#)
- »[SHAPE_TYPE_TRIANGLE_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_TRIANGLE_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_3D_HEART_UNFILLED](#)
- »[SHAPE_TYPE_3D_HEART_UNFILLED_IMPLODE](#)
- »[SHAPE_TYPE_3D_HEART_UNFILLED_EXPLODE](#)
- »[SHAPE_TYPE_3D_HEART_FILLED](#)
- »[SHAPE_TYPE_3D_HEART_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_3D_HEART_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_3D_STAR_UNFILLED](#)
- »[SHAPE_TYPE_3D_STAR_UNFILLED_IMPLODE](#)

- »[SHAPE_TYPE_3D_STAR_UNFILLED_EXPLODE](#)
- »[SHAPE_TYPE_3D_STAR_FILLED](#)
- »[SHAPE_TYPE_3D_STAR_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_3D_STAR_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_3D_CROSS_UNFILLED](#)
- »[SHAPE_TYPE_3D_CROSS_UNFILLED_IMPLODE](#)
- »[SHAPE_TYPE_3D_CROSS_UNFILLED_EXPLODE](#)
- »[SHAPE_TYPE_3D_CROSS_FILLED](#)
- »[SHAPE_TYPE_3D_CROSS_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_3D_CROSS_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_3D_CROSS_STRAIGHT_UNFILLED](#)
- »[SHAPE_TYPE_3D_CROSS_STRAIGHT_UNFILLED_IMPLODE](#)
- »[SHAPE_TYPE_3D_CROSS_STRAIGHT_UNFILLED_EXPLODE](#)
- »[SHAPE_TYPE_3D_CROSS_STRAIGHT_FILLED](#)
- »[SHAPE_TYPE_3D_CROSS_STRAIGHT_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_3D_CROSS_STRAIGHT_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_PYRAMID_UNFILLED](#)
- »[SHAPE_TYPE_PYRAMID_UNFILLED_IMPLODE](#)
- »[SHAPE_TYPE_PYRAMID_UNFILLED_EXPLODE](#)
- »[SHAPE_TYPE_PYRAMID_FILLED](#)
- »[SHAPE_TYPE_PYRAMID_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_PYRAMID_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_RANDOM_STATIC](#)
- »[SHAPE_TYPE_RANDOM_IMPLODE](#)
- »[SHAPE_TYPE_RANDOM_EXPLODE](#)
- »[SHAPE_TYPE_RANDOM_OUTLINED](#)
- »[SHAPE_TYPE_RANDOM_OUTLINED_STATIC](#)
- »[SHAPE_TYPE_RANDOM_OUTLINED_IMPLODE](#)
- »[SHAPE_TYPE_RANDOM_OUTLINED_EXPLODE](#)
- »[SHAPE_TYPE_RANDOM_UNFILLED](#)
- »[SHAPE_TYPE_RANDOM_UNFILLED_STATIC](#)

- »[SHAPE_TYPE_RANDOM_UNFILLED_IMPLODE](#)
- »[SHAPE_TYPE_RANDOM_UNFILLED_EXPLODE](#)
- »[SHAPE_TYPE_RANDOM_FILLED](#)
- »[SHAPE_TYPE_RANDOM_FILLED_STATIC](#)
- »[SHAPE_TYPE_RANDOM_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_RANDOM_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_2D_RANDOM](#)
- »[SHAPE_TYPE_2D_RANDOM_STATIC](#)
- »[SHAPE_TYPE_2D_RANDOM_IMPLODE](#)
- »[SHAPE_TYPE_2D_RANDOM_EXPLODE](#)
- »[SHAPE_TYPE_2D_RANDOM_OUTLINED](#)
- »[SHAPE_TYPE_2D_RANDOM_OUTLINED_STATIC](#)
- »[SHAPE_TYPE_2D_RANDOM_OUTLINED_IMPLODE](#)
- »[SHAPE_TYPE_2D_RANDOM_OUTLINED_EXPLODE](#)
- »[SHAPE_TYPE_2D_RANDOM_FILLED](#)
- »[SHAPE_TYPE_2D_RANDOM_FILLED_STATIC](#)
- »[SHAPE_TYPE_2D_RANDOM_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_2D_RANDOM_FILLED_EXPLODE](#)
- »[SHAPE_TYPE_3D_RANDOM](#)
- »[SHAPE_TYPE_3D_RANDOM_STATIC](#)
- »[SHAPE_TYPE_3D_RANDOM_IMPLODE](#)
- »[SHAPE_TYPE_3D_RANDOM_EXPLODE](#)
- »[SHAPE_TYPE_3D_RANDOM_UNFILLED](#)
- »[SHAPE_TYPE_3D_RANDOM_UNFILLED_STATIC](#)
- »[SHAPE_TYPE_3D_RANDOM_UNFILLED_IMPLODE](#)
- »[SHAPE_TYPE_3D_RANDOM_UNFILLED_EXPLODE](#)
- »[SHAPE_TYPE_3D_RANDOM_FILLED](#)
- »[SHAPE_TYPE_3D_RANDOM_FILLED_STATIC](#)
- »[SHAPE_TYPE_3D_RANDOM_FILLED_IMPLODE](#)
- »[SHAPE_TYPE_3D_RANDOM_FILLED_EXPLODE](#)

- »[ORIGIN_CENTER](#)
- »[ORIGIN_FRONT](#)
- »[ORIGIN_BACK](#)
- »[ORIGIN_LEFT](#)
- »[ORIGIN_RIGHT](#)
- »[ORIGIN_TOP](#)
- »[ORIGIN_BOTTOM](#)
- »[ORIGIN_TOP_LEFT](#)
- »[ORIGIN_TOP_RIGHT](#)
- »[ORIGIN_BOTTOM_LEFT](#)
- »[ORIGIN_BOTTOM_RIGHT](#)
- »[ORIGIN_FRONT_LEFT](#)
- »[ORIGIN_FRONT_RIGHT](#)
- »[ORIGIN_BACK_LEFT](#)
- »[ORIGIN_BACK_RIGHT](#)
- »[ORIGIN_FRONT_TOP](#)
- »[ORIGIN_FRONT_BOTTOM](#)
- »[ORIGIN_BACK_TOP](#)
- »[ORIGIN_BACK_BOTTOM](#)
- »[ORIGIN_FRONT_TOP_LEFT](#)
- »[ORIGIN_FRONT_TOP_RIGHT](#)
- »[ORIGIN_FRONT_BOTTOM_LEFT](#)
- »[ORIGIN_FRONT_BOTTOM_RIGHT](#)
- »[ORIGIN_BACK_TOP_LEFT](#)
- »[ORIGIN_BACK_TOP_RIGHT](#)

- »[ORIGIN_BACK_BOTTOM_LEFT](#)
- »[ORIGIN_BACK_BOTTOM_RIGHT](#)

New Functions For SCE Bounce:

- »[SetBorder](#)
- »[GetBorder](#)
- »[SetPixelBorder](#)
- »[GetPixelBorder](#)
- »[SetOuterGlow](#)
- »[GetOuterGlow](#)
- »[SetPixelOuterGlow](#)
- »[GetPixelOuterGlow](#)
- »[SetInnerGlow](#)
- »[GetInnerGlow](#)
- »[SetPixelInnerGlow](#)
- »[GetPixelInnerGlow](#)

New Functions For SCE Explosions:

- »[SetOuterGlow](#)
- »[GetOuterGlow](#)
- »[SetPixelOuterGlow](#)
- »[GetPixelOuterGlow](#)
- »[SetInnerGlow](#)
- »[GetInnerGlow](#)
- »[SetPixelInnerGlow](#)
- »[GetPixelInnerGlow](#)

New Functions For SCE Fill Drops:

- »[SetBorder](#)
- »[GetBorder](#)
- »[SetPixelBorder](#)
- »[GetPixelBorder](#)
- »[SetOuterGlow](#)
- »[GetOuterGlow](#)
- »[SetPixelOuterGlow](#)
- »[GetPixelOuterGlow](#)
- »[SetInnerGlow](#)
- »[GetInnerGlow](#)
- »[SetPixelInnerGlow](#)
- »[GetPixelInnerGlow](#)

New Functions For SCE Fill Random:

- »[SetBorder](#)
- »[GetBorder](#)
- »[SetPixelBorder](#)
- »[GetPixelBorder](#)
- »[SetOuterGlow](#)
- »[GetOuterGlow](#)
- »[SetPixelOuterGlow](#)
- »[GetPixelOuterGlow](#)
- »[SetInnerGlow](#)
- »[GetInnerGlow](#)
- »[SetPixelInnerGlow](#)
- »[GetPixelInnerGlow](#)

New Functions For SCE Fill Snake:

- » [SetBorder](#)
- » [GetBorder](#)
- » [SetPixelBorder](#)
- » [GetPixelBorder](#)
- » [SetOuterGlow](#)
- » [GetOuterGlow](#)
- » [SetPixelOuterGlow](#)
- » [GetPixelOuterGlow](#)
- » [SetInnerGlow](#)
- » [GetInnerGlow](#)
- » [SetPixelInnerGlow](#)
- » [GetPixelInnerGlow](#)

New Functions For SCE Noise:

- » [SetBorder](#)
- » [GetBorder](#)
- » [SetPixelBorder](#)
- » [GetPixelBorder](#)
- » [SetOuterGlow](#)
- » [GetOuterGlow](#)
- » [SetPixelOuterGlow](#)
- » [GetPixelOuterGlow](#)
- » [SetInnerGlow](#)
- » [GetInnerGlow](#)
- » [SetPixelInnerGlow](#)
- » [GetPixelInnerGlow](#)

New Functions For SCE Shapes:

- » [SetOuterGlow](#)
- » [GetOuterGlow](#)
- » [SetPixelOuterGlow](#)
- » [GetPixelOuterGlow](#)
- » [SetInnerGlow](#)
- » [GetInnerGlow](#)
- » [SetPixelInnerGlow](#)
- » [GetPixelInnerGlow](#)

New Functions For SCE Simple Shape:

- » [SetOuterGlow](#)
- » [GetOuterGlow](#)
- » [SetPixelOuterGlow](#)
- » [GetPixelOuterGlow](#)
- » [SetOuterGlowInterpolationType](#)
- » [GetOuterGlowInterpolationType](#)
- » [SetInnerGlow](#)
- » [GetInnerGlow](#)
- » [SetPixelInnerGlow](#)
- » [GetPixelInnerGlow](#)
- » [SetInnerGlowInterpolationType](#)
- » [GetInnerGlowInterpolationType](#)
- » [SetProportion](#)
- » [GetProportion](#)
- » [SetDiagonals](#)
- » [GetDiagonals](#)

New Functions For SCE Swarm:

- » [SetOuterGlow](#)
- » [GetOuterGlow](#)
- » [SetPixelOuterGlow](#)
- » [GetPixelOuterGlow](#)
- » [SetInnerGlow](#)
- » [GetInnerGlow](#)
- » [SetPixelInnerGlow](#)
- » [GetPixelInnerGlow](#)

New Functions For M2L Drops:

- » [SetToneRangeMin](#)
- » [GetToneRangeMin](#)
- » [SetToneRangeMax](#)
- » [GetToneRangeMax](#)

New Functions For M2L Tubes:

- » [SetToneRangeMin](#)
- » [GetToneRangeMin](#)
- » [SetToneRangeMax](#)
- » [GetToneRangeMax](#)

New Functions For M2L Single Tone Spectrum:

- » [SetToneRangeMin](#)
- » [GetToneRangeMin](#)
- » [SetToneRangeMax](#)

- »[GetToneRangeMax](#)

New Functions For M2L Shapes:

- »[SetToneRangeMin](#)
- »[GetToneRangeMin](#)
- »[SetToneRangeMax](#)
- »[GetToneRangeMax](#)

News For Script Engine Version 2.11 (MADRIX 3.3)

New Effects:

- »[SCE Clouds](#)
- »[SCE Noise](#)

New Functions For SCE Counter:

- »[SetExtrusion](#)
- »[GetExtrusion](#)
- »[SetPixelExtrusion](#)
- »[GetPixelExtrusion](#)

New General Functions:

- »[WriteTextClear](#)
- »[GetTimeSunrise](#)
- »[GetTimeSunriseCity](#)
- »[GetTimeSunset](#)

- »[GetTimeSunsetCity](#)

New Functions For Storage Place Macro:

- »[SetSpeedPitch](#)
- »[GetSpeedPitch](#)

New Functions For The Main Output Macro:

- »[SetFilterColor](#)
- »[GetFilterColor](#)
- »[CuelistCurrentCue](#)
- »[CuelistCount](#)
- »[CuelistCueAllOccupied](#)
- »[CuelistNew](#)
- »[CuelistProgress](#)
- »[CueAdd](#)
- »[CueDelete](#)
- »[CueDeleteAll](#)
- »[CueDeleteCurrent](#)
- »[CueSetDescription](#)
- »[CueGetDescription](#)
- »[CueSetDate](#)
- »[CueGetDateYear](#)
- »[CueGetDateMonth](#)
- »[CueGetDateDay](#)
- »[CueSetDateWeekday](#)
- »[CueGetDateWeekday](#)
- »[CueSetDateString](#)
- »[CueGetDateString](#)
- »[CueSetTimeCode](#)

- »[CueGetTimeCodeHour](#)
- »[CueGetTimeCodeMinute](#)
- »[CueGetTimeCodeSecond](#)
- »[CueGetTimeCodeFrame](#)
- »[CueSetTimeCodeString](#)
- »[CueGetTimeCodeString](#)
- »[CueSetDuration](#)
- »[CueGetDurationHour](#)
- »[CueGetDurationMinute](#)
- »[CueGetDurationSecond](#)
- »[CueGetDurationFrame](#)
- »[CueSetDurationString](#)
- »[CueGetDurationString](#)
- »[CueSetFollow](#)
- »[CueGetFollowCue](#)
- »[CueSetStorage](#)
- »[CueGetStorage](#)
- »[CueSetPlace](#)
- »[CueGetPlace](#)
- »[CueSetFadeType](#)
- »[CueGetFadeType](#)
- »[CueGetFadeTypeString](#)
- »[CueSetFadeTime](#)
- »[CueGetFadeTime](#)
- »[CueGetFadeTimeString](#)
- »[CueSetFadeColor](#)
- »[CueGetFadeColor](#)

Deprecated Functions:

- Several functions have been renamed. Corresponding, previous functions have been deprecated. More information is provided throughout this user guide when applicable.

News For Script Engine Version 2.7 (MADRIX 3.2)

New Effects:

- »[SCE Counter](#)
- »[SCE Fire](#)
- »[SCE Screen Capture](#)

New Functions And Constants For SCE Metaballs:

- »[SetMotionType](#)
- »[GetMotionType](#)
- »[SetInfluence](#)
- »[GetInfluence](#)
- »[SetSeparation](#)
- »[GetSeparation](#)

- »[MOTION_TYPE_RANDOM](#)
- »[MOTION_TYPE_SWARM](#)

New Functions For Color Table:

- »[ColorTableSwapColors](#)

- »[ColorTableInvert](#)

New Functions For Image Table:

- »[ImageListInvert](#)

News For Script Engine Version 2.3 (MADRIX 3.1)

New GUI Elements for MAS Script:

- »[ctrlbutton5](#)
- »[ctrlbutton6](#)
- »[ctrledit5](#)
- »[ctrledit6](#)

New Effect:

- »[SCE Fill Drops](#)

New Effect:

- »[SCE Fill Snake](#)

New Effect:

- »[SCE Fill Solid](#)

New Effect:

- »[SCE Swarm](#)

New Effect:

- »[S2L Level Color Scroll](#)

New Effect:

- »[S2L Level Shape](#)

New Effect:

- » [M2L Color Scroll](#)

New Functions For SCE Simple Shape:

- » [SetBorder](#)
- » [GetBorder](#)
- » [SetPixelBorder](#)
- » [GetPixelBorder](#)

New Functions For M2L Color Table:

- » [M2LColorTableSetColorFade](#)
- » [M2LColorTableGetColorFade](#)
- » [M2LColorTableToggleColorFade](#)

New Functions And Constants For SCE Capture:

- » [SetFilteringMode](#)
- » [GetFilteringMode](#)

- » [FILTERING_MODE_NEAREST_NEIGHBOR](#)
- » [FILTERING_MODE_LINEAR](#)

New Functions And Constants For SCE Image:

- » [SetFilteringMode](#)
- » [GetFilteringMode](#)

- » [FILTERING_MODE_NEAREST_NEIGHBOR](#)
- » [FILTERING_MODE_LINEAR](#)

New Functions And Constants For SCE Ticker / Scrolling Text:

- »[SetFilteringMode](#)
- »[GetFilteringMode](#)

- »[FILTERING_MODE_NEAREST_NEIGHBOR](#)
- »[FILTERING_MODE_LINEAR](#)

New Functions And Constants For SCE Video

- »[SetFilteringMode](#)
- »[GetFilteringMode](#)

- »[FILTERING_MODE_NEAREST_NEIGHBOR](#)
- »[FILTERING_MODE_LINEAR](#)

News For Script Engine Version 2.1 (MADRIX 3.0)

- MADRIX 3.0 includes a large number of (technical) improvements. That is why large parts of MADRIX Script 2.1 were updated as well.
- Throughout the Script documentation you will find a lot of updates and changes.
- Previous macros and scripts written for MADRIX 2.X might not work anymore for MADRIX 3.X. Please use the provided migration hints to update your scripts and macros!
- Migration hints are provided in the corresponding topics.

//PART B

*MADRIX Script
(Introduction)*

2 MADRIX Script (Introduction)

2.1 Basics

2.1.1 Getting Started

Introduction

- MADRIX Script is the scripting language of MADRIX. It is built into MADRIX.
- This document is for all those who want to develop and modify light effects with the help of MADRIX Script. This does not require any programming knowledge although such knowledge can be helpful.

Examples

With MADRIX Script you could do the following, for example:

- Displaying the current time using SCE Ticker / Scrolling Text.
- Increasing and decreasing the size of shapes according to the audio input level.
- Automatically activating or deactivating a Blackout at certain times.
- Setting different Layer filters for different Layers according to automatic parameters.

Overview

4 Locations

There are 4 possibilities to use MADRIX Script.

- **MAS Script Effect**

The first option to create a new effect from scratch.

Learn more »[MAS Script Effect](#)

- **Macros for Effects**

The second option involves modifying the settings of an MADRIX Effect. This includes all SCE, S2L, M2L, and MAS effects.

Learn more »[Macros for Effects](#)

- **Storage Place Macro**

Fourth, you can use Storage Place macros to influence every single Storage Place individually.

Learn more »[Storage Place Macro](#)

- **Main Output Macro**

The third possibility controls the Main Output directly.

Learn more »[Main Output Macro](#)

MAS Script Effect — Create Your Own Effects

MADRIX offers endless possibilities to create a light show. However, there are a lot more things that you are maybe not able to do with the current stock effects. The script effect, called **MAS Script Effect**, provides the possibility to program your own, original effects.

Macros For Effects — Control Running Effects

Macros are also written in MADRIX Script, but are part of an effect. With macros it is possible to control effects (or Layers) and change their outcome. For example, render parts of an effect transparent or change the color with a gray filter.

Main Output Macro — Control Your Final Output

Whereas the MAS Script Effect is an individual effect in itself and while macros can be used to manipulate single effects or Layers, the Main Output Macro affects the final output of MADRIX towards your LEDs.

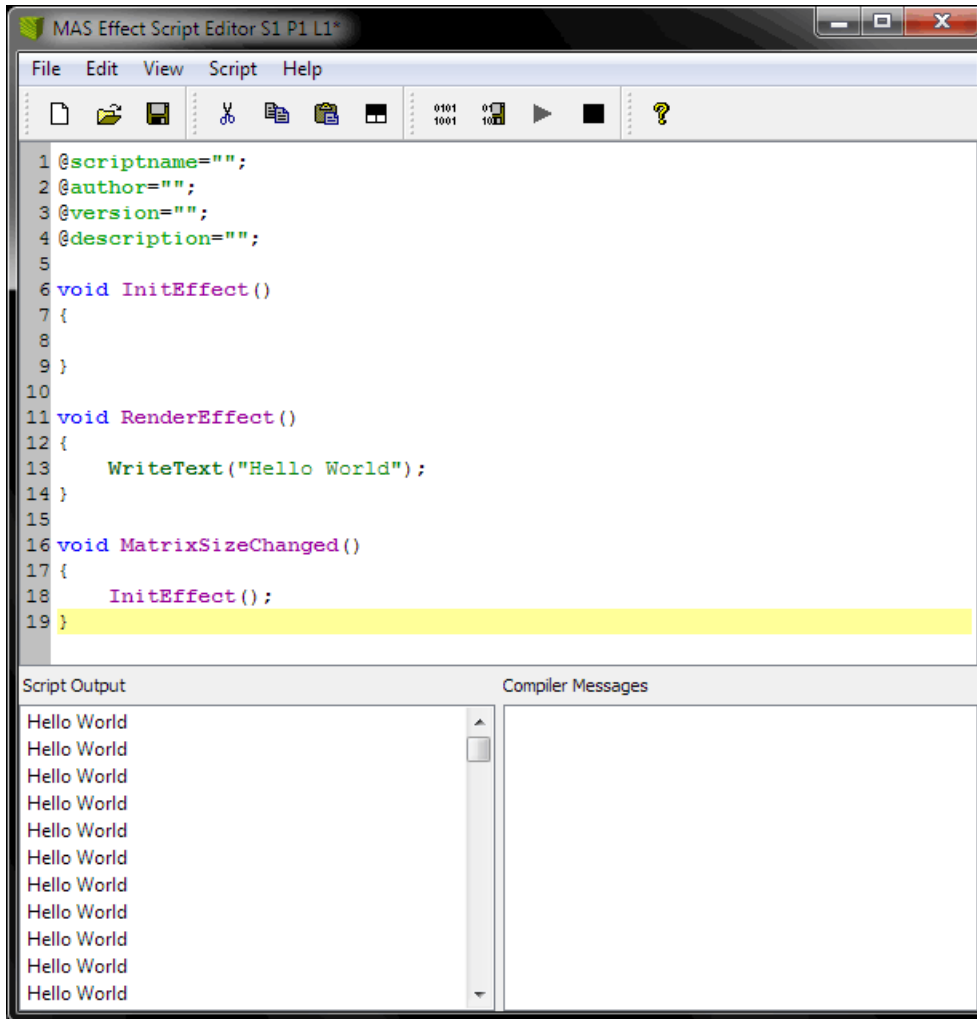
Storage Place Macro — Control Individual Storage Place Including All Layers

The Storage Place Macro allows you to use a macro that affects your individual Storage Place including all of its Layers.

2.1.2 The Script/Macro Editor

Introduction

The Script/Macro Editor is the tool to control and manage macros and scripts.



- **Menu** - Includes several submenus to perform various actions of the Script/Macro Editor.
- **Toolbar** - Includes various shortcuts to quickly execute the most common actions, such as Save, Load, or Compile.
- **Text Field** - The text field to enter source code and functions takes up the largest part of the Script/Macro Editor.

- **Script Output** - Provides a display to put out messages from the script itself.
 - Go to **Edit > Clear Script Output** or **Edit > Clear Script Output / Compiler Messages** to delete messages that are not needed anymore.
- **Compiler Messages** - Provides information of the Script/Macro Editor and displays errors or other messages.
 - Go to **Edit > Clear Compiler Messages** or **Edit > Clear Script Output / Compiler Messages** to delete messages that are not needed anymore.

Overview

Creating, Loading, and Saving Scripts

- Go to **File > New** to create a new template, which is the basis of a new script or macro. Or use the toolbar shortcut.
- Go to **File > Open...** to load an existing script or macro from an external file. Or use the toolbar shortcut.
- Go to **File > Save** or **File > Save As...** to store a script or macro on your harddisk or any other storage medium. Or use the toolbar shortcut.
- Go to **File > Close** to close the Script/Macro Editor. Or use the window shortcut.

Compiling and Executing Scripts

Before a script or macro can run, it needs to be compiled. While compiling the script, it is analyzed and translated into the format MADRIX understands internally.

- Go to **Script > Compile** to compile the current source code. Or use the toolbar shortcut. After the script was compiled successfully, it will be executed automatically. If the compilation fails, the script cannot be executed. An error message will be displayed. Just double-click on the message and the cursor will jump to the referred position. In addition, the line number is printed with each compiler message.
- Go to **Script > Compile And Save...** to create a crypted, secured macro or script. Or use the toolbar shortcut.
- Go to **Script > Start Script** to start a script or macro once it has been compiled and stopped again. Or use the toolbar shortcut.
- Go to **Script > Stop Script** to halt the execution of a script. Or use the toolbar shortcut.

File Types

*.mas	<p>MADRIX Script File</p> <p>A script for the MAS Script Effect.</p>
*.macs	<p>Encrypted MADRIX Script File</p> <p>A compiled and encrypted script for the MAS Script Effect. This is a script which does not contain any source code, but only the runtime code. This means that with the help of compiled scripts it is possible to share scripts, but to let the source code remain a secret at the same time. Because a compiled script does not contain any source code, only the script's meta data will be displayed in the window when you load such a kind of file. <u>You (or others) will not be able to edit the code.</u></p>
*.mms	<p>MADRIX Effect Macro</p> <p>A Macro for an effect, a Storage Place Macro, or a Main Output Macro.</p>
*.mcm	<p>MADRIX Crypted Effect Macro</p> <p>A compiled and encrypted Macro for an effect, a Storage Place Macro, or a Main Output Macro. This is a macro which does not contain any source code, but only the runtime code. This means that with the help of compiled macros it is possible to share macros, but to let the source code remain a secret at the same time. Because a compiled script does not contain any source code, only the script's meta data will be displayed in the window when you load such a kind of file. <u>You (or others) will not be able to edit the code.</u></p>

2.1.3 Writing A Script

Introduction

- In general, a script or macro consists of many instructions, which you enter in the corresponding Script/Macro editor.
- The result is called source code, macro, or script.

The First Example

- A first example of a MADRIX Script can be seen below for the MAS Script Effect.
- You can simply copy and paste the source code and execute it.
- The example repeatedly writes a certain text line in the Script Output of the editor.

1) Please open the Script Editor of the MAS Script Effect. Simply copy the whole example into the Editor (and replace the existing code):

```
@scriptname=" ";
@author=" ";
@version=" ";
@description=" ";

void InitEffect()
{

}

void RenderEffect()
{
    WriteText("Hello World");
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

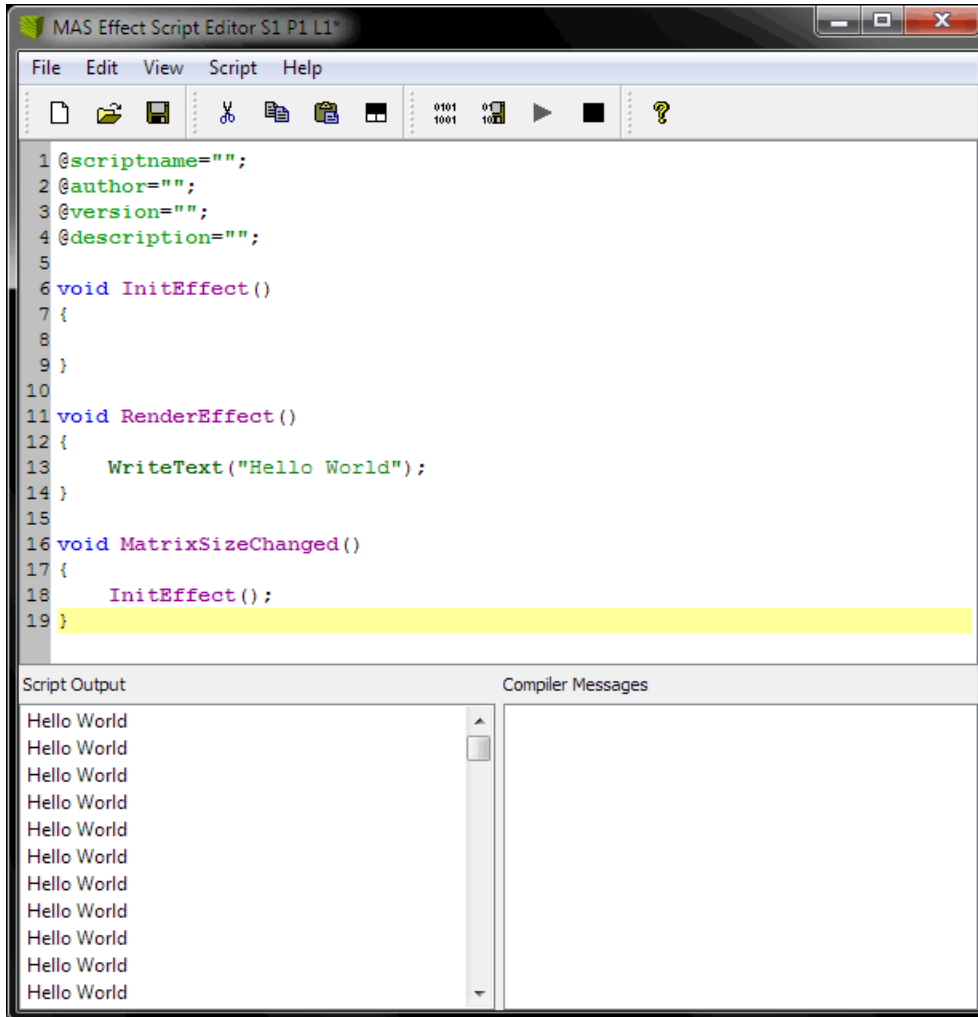
2) Compile the script (go to **Script > Compile**).

3) The function *WriteText(string text)* writes a given character string into the Script Output of the Script Editor. In this case it is "Hello World".

4) You should see this message in the Script Output.

2.1.4 Syntax Highlighting

Overview



- The Script/Macro Editor supports syntax highlighting: as you can see from the screenshot above, MADRIX Script highlights code according to a color scheme.
- Highlighting will help you to read the source code, to distinguish different types of phrases (e.g., comments, data types, etc.), to quickly recognize functions, and to find errors.
- In addition, code structuring is enhanced since every line is automatically indented like the last line.

<code>@scriptname,</code> <code>SetFilter</code>	Represents functions that can only be used in certain areas of MADRIX Script (for example, Storage Place Macro).
<code>void</code>	Represents data types.
<code>FILTER_BLUR</code>	Represents global variables and constants.
<code>Filter, WriteText</code>	Represents functions that can be used in all areas of MADRIX Script (MAS Script Effect, Macros for Effects, Storage Place Macro, Main Output Macro)
<code>"Hello World"</code>	Represents written text for output.

2.1.5 Identifiers

- Identifiers are the names of functions or variables.
- They start with a letter or an underline (_). Other letters, underlines, or numbers can follow afterwards.
- The exception to this are all characters that do not belong to the English alphabet, e.g. 'ä' or 'é'.
- There is no restriction for the length of an identifier.
- Furthermore, there is a distinction between capitalized letters and the use of small letters. For example, Name and name are two different identifiers.

- Examples for valid identifiers: textFunc, _testVar2, new, NEW, New_12340
- Examples for invalid identifiers: 12help, 1234, grösser, straÙe

2.1.6 Functions

Working With Functions

- A script/macro in MADRIX Script consists of a set of functions.
- Some of these functions are required and called by MADRIX.
- Others may be used to split the script into smaller parts.
- Functions form small parts of a script and hold a number of statements.
- They can be called from other parts of the script in order to execute their statements.
- Having statements used outside of functions is not allowed in MADRIX Script.

Creating Functions

Functions consist of a head and a body. The head describes the name of the function, its parameters, and its return value. Whereas, the body includes a block of statements, like this one:

```
void function(int p)
{
    if(p * p > 2)
        do something;
        do something more;
}
```

The first data type, stated in front of the function, describes the kind of value the function returns and it may be of any known data type. In the case above, no value is returned by the function and therefore *void* is declared. The actual name of the function can be any name that follows the rules of identifiers in MADRIX Script as was discussed above. But it has to be unique. It is not allowed to have several functions with the same name or with the name of global variables or constants.

The parameter list following the name of the function may be left empty, but it is necessary to keep the brackets (). Different parameters are separated by comma. A parameter can take on any data type possible. Here are three examples for function declarations:

```
void setPixel(int point[])
{
    do something
}

int[] CreatePoint(int x, int y)
```

```
{
    do something
}

string getTag()
{
    do something
}
```

Passing Parameters In MADRIX Script

Parameter are always passed via copy by value (The exception are »[arrays](#)). This means that a parameter may be used as another local variable of a function. Changing the value of a variable does not change the variable the caller has provided.

Note: A reference is created for arrays. Hence, changing an array results also in changing the array of the caller.

```
void testFunc(int i, int ia[])
{
    i = 5;
    for(int n = 0; n < i; n++)
    {
        ia[n] = n * n;
    }
}

void RenderEffect()
{
    int testArray[];
    int len = 2;
    testFunc(len, testArray);
}
```

In *testFunc* the parameter *i* is set to 5 and the array that is passed is filled with several values. After the return of the function in *RenderEffect*, the array is now filled with the values set in *testFunc*. Whereas the variable *len* has not changed and still has a value of 2.

Note: Passed parameters are always copied to a function, while this is not the case with arrays.

Returning A Value

To return a value, the return statement must be used followed by an expression. The given expression must result in the same or at least a compatible data type of the declared function's type. It must be the last statement of any function which returns a value unequal to *void*. In addition, *return* can be used to leave a function early. For void functions *return* will be used without an expression. Here are some examples:

```
int[] CreatePoint(int x, int y)
{
    int res[] = {x, y};
    return(res);
}

string getTag()
{
    date d = GetDate();
    switch(d.weekday)
    {
        case 0: return("Sunday"); break;
        case 1: return("Monday"); break;
        case 2: return("Tuesday"); break;
        case 3: return("Wednesday"); break;
        case 4: return("Thursday"); break;
        case 5: return("Friday"); break;
        case 6: return("Saturday"); break;
    }
    return("unknown day");
}
```

Functions Called By MADRIX

- Each macro or script includes a number of predefined functions called by MADRIX.
- If a function is not needed by a script, it is not necessary to implement it. A message is printed out if one of them is missing. This is not an error, but only an information for the developer of the script.

- Please note that each component of the MADRIX Script language (MAS Script Effect, Macros, Main Output Macro, Storage Place Macro) may include a different combination of these five functions as this is just an overview:

```
void InitEffect()  
void RenderEffect()  
void PreRenderEffect()  
void PostRenderEffect()  
  
void MatrixSizeChanged()
```

- More information is available in the corresponding chapters.

Learn more »[MAS Script Effect](#)

Learn more »[Macros for Effects](#)

Learn more »[Storage Place Macro](#)

Learn more »[Main Output Macro](#)

Further Information

- There are a lot of functions which can be used in MADRIX Script for different functionality (e.g., to draw objects the matrix, get the data of the sound analysis, or mathematical functions).
- Learn more »[List Of Functions \(Alphabetical Order\)](#)

2.1.7 Data Types And Variables

- In MADRIX Script variables may be used to store different data.
- Each variable will be defined with a certain data type.
- This data type describes the kind of values the variable can store and the operations which are possible with the variable.

Here is a small example to get a feeling for variables. The following source code renders a yellow pixel on a random position each time *RenderEffect* is called.

```
@scriptname="SetRandomPixel";  
@author="inoage";  
@version="";
```

```
@description="";

void InitEffect()
{
}

void RenderEffect()
{
    color col = {255, 255, 0, 0};
    int px,py;
    px = random(0,GetMatrixWidth()-1);
    py = random(0,GetMatrixHeight()-1);
    SetPixel(col, px, py);

    //a color variable called 'col' is declared and its values are set to yellow (RGB)
    //two variables of type int are declared to store the coordinates of a pixel
    //coordinates for x and y inside the matrix are chosen by chance
    //the pixel is drawn on the matrix
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

2.1.7.1 Using Variables

Introduction

In order to use a variable it must be declared first. This is done by stating the data type of the variable and a name, followed by a semicolon. Furthermore, it is possible to initialize them during the declaration using an equal sign. This means that a particular value can be assigned to the variable already during initialization. Here are some examples:

```
int i;
float f;

int k = 4;
string text = "Hello World";
int width = GetMatrixWidth();
```

A structure is initialized with a list of expressions separated by comma and written in curly brackets.

```
color white = {255, 255, 255, 255, 0};
color red = {255};
date d = {24, 11, 1980};
```


If not all elements of a structure are initialized, the rest will be set to 0.

Constants

It is also possible to declare a variable as a constant. Those variables cannot be changed while the script is running and must be initialized during their declaration. They may be used to simplify the reading of the script code. For example, there is a global constant called *PI*. To declare a variable as a constant use the keyword *const*

```
const int width = 10;
const int maxPixel = 20 * width;
```

Global And Local Variables

A variable exists within the block in which it has been defined. This may be a function or a block like it is described in statements. It does not exist outside this area. A variable *i*, which was defined in the function *RenderEffect*, does not exist in any other function. Whenever such a block is entered, due to a function call, a loop or something different, the variable is re-initialized. Because of that, a local variable loses its assigned value between two calls of the function.

Global variables on the other hand are available within the whole script, beginning with when they are defined. They can be used to hold data during the run of a script. Global variables do also exist between two calls of *RenderEffect*. If the script needs to hold data between to runs, global variables are the correct way to do this.

```
int g_iPos = 0;
void RenderEffect()
{
    SetPixel(WHITE, g_iPos, 0);
    g_iPos = (g_iPos + 1) % GetMatrixWidth();
}
```

g_iPos is increased by 1 each time the script is called. It is used to determine the new position of a pixel set to white.

```
void InitEffect()
{
    g_iPos = 0;
}

int g_iPos = 0;

void RenderEffect()
{
    SetPixel(WHITE, g_iPos, 0);
    g_iPos = (g_iPos + 1) % GetMatrixWidth();
}
```

```
}
```

This script will fail since *g_iPos* is unknown in function *InitEffect*. It has been declared after this function. In this way, only *RenderEffect* can use it.

Saving Data

Effects in MADRIX can be stored in a single file or in a whole MADRIX Setup file. Furthermore, it is possible to change a Storage Place to show another effect. If a script effect is reloaded with a compiled and running script, *InitEffect* is called and the script starts from the beginning. Sometimes it is useful that a script does not start from its beginning (for example, a black matrix) but from the same state where it was when it has been stored or the Storage Place has been changed.

The values of global variables do not only remain between two calls of a script, but may be stored when the effect is saved, too. Therefore, the variable should be declared as *persistent*.

```
persistent int g_iPos;
```

Whenever the script is saved, the content of *g_iPos* is also saved. It is loaded again, when the script is loaded. This loading procedure is executed **after** *InitEffect* has been called. Even if the variable is originally initialized in *InitEffect*, it will contain the saved data after *InitEffect* has been called, nevertheless.

More Information

In MADRIX Script several constants are defined by default. They may be used to make the source code more legible. The summary contains an [»overview with all available global variables and constants.](#)

2.1.7.2 Using Data Types

Primitive Data Types

Overview

Variables offer the possibility to store data. The kind of data depends on the data type. MADRIX Script supports the following primitive data types:

Data Type	Sample Values	Description
int	3, -345, 234, 0	32 bit data type. It stores integral numbers between -2 million and +2 million.
float	0.0, -12.45, 3.1415	32 bit data type. It stores floating point numbers.
string	"Hello World", "-3"	Stores character strings of variable length.
bool	true (1), false (0)	Used for implicit use of logical values and comparisons.

Data Type Bool

The data type *bool* is only used internally and cannot be used to declare a variable. This data type only has two possible values, *true* or *false*. It is used for logical operations or for different statements like the [»if_statement](#). For example, the following expression results in a *bool* data type and *false* as its value.

```
3 > 4
int i = 3 > 4 //results in 0
int i = 3 < 4 //results in 1

//usually it is used like this
if(3 > 4)
{
    do something
}
```

True And False

As stated above, a boolean expression results only in *true* or *false*.

Furthermore, the keywords **TRUE** and **FALSE** are used within MADRIX Script as function parameters or return values. Those parameters or functions are of the type *int*. In such cases **TRUE** and **FALSE** represent 1 and 0, respectively. They can be used in upper case (*TRUE / FALSE*) and lower case (*true / false*).

Non-Primitive Data Types (Structures)

Complex data types, so-called structures, consist of different elements. The elements of a structure are accessed by their names in the following way: *nameOfVariable.nameOfElement*. For example, *col.r*, if *col* is a variable of data type *color*. The following table is an overview of the structures MADRIX Script provides.

Structure	Elements	Description
color	<ul style="list-style-type: none"> ▪ int r ▪ int g ▪ int b ▪ int w ▪ int a 	<p><i>color</i> stores a color value.</p> <p>There are 5 channels (red, green, blue, white, alpha) with values between 0 and 255.</p> <p>Example: color c = {255, 255, 0, 0}; Member examples: c.r, c.g, c.b, c.w, c.a</p> <p>Learn more »List Of Global Variables And Constants</p> <p>»Script Example</p>
date	<ul style="list-style-type: none"> ▪ int day ▪ int weekday ▪ int month ▪ int year 	<p><i>date</i> stores a date.</p> <p>Values for <i>day</i> include 1 to 31 for a single day of the month. Values for <i>weekday</i> include: 0 = Sunday, 1 = Monday, ..., 6 = Saturday. Values for <i>month</i> include 1 to 12 for every single month of the year. Vales for <i>year</i> include year dates.</p> <p>Example: date d = {24, 11, 1980}; Member examples: d.day, d.weekday, d.month, d.year</p> <p>»Script Example</p>

<p>time</p>	<ul style="list-style-type: none"> ▪ int hour ▪ int min ▪ int sec 	<p><i>time</i> stores a certain time.</p> <p>Valid values are: hours: 0 .. 23, minutes: 0 .. 59, seconds: 0 .. 59.</p> <p>Example: time t = {12, 05, 00}; Member examples: t.hour, t.min, t.sec</p> <p>»Script Example</p>
<p>font</p>	<ul style="list-style-type: none"> ▪ int height ▪ int width ▪ int escapement ▪ int orientation ▪ int weight ▪ int italic ▪ int underline ▪ int strikeOut ▪ int charset ▪ int outprecision ▪ int clipprecision ▪ int quality ▪ int pitch ▪ int family ▪ string fontname 	<p><i>font</i> stores a specific font face.</p> <p><i>height</i> specifies the size of the font and requires an <i>integer</i> value.</p> <p><i>width</i> specifies the wideness of the font and requires an <i>integer</i> value.</p> <p><i>escapement</i> specifies the desired rotation angle in tenths of a degree and requires an <i>integer</i> value.</p> <p><i>orientation</i> should be set to the same value as <i>escapement</i> and requires an <i>integer</i> value.</p> <p><i>weight</i> specifies the weight of the font. Valid values are: FONT_WEIGHT_DONTCARE FONT_WEIGHT_THIN FONT_WEIGHT_EXTRALIGHT FONT_WEIGHT_LIGHT FONT_WEIGHT_NORMAL FONT_WEIGHT_MEDIUM FONT_WEIGHT_SEMIBOLD FONT_WEIGHT_BOLD FONT_WEIGHT_EXTRABOLD FONT_WEIGHT_HEAVY</p> <p><i>italic</i> specifies the sloping of the font and requires an <i>integer</i> value: 0 (off) or 1 (on).</p> <p><i>underline</i> draws a line under the font and requires an <i>integer</i> value: 0 (off) or 1 (on).</p> <p><i>strikeOut</i> draws a line through the middle of the font and requires an <i>integer</i> value: 0 (off) or 1 (on).</p> <p><i>charset</i> specifies the character set of the font. Valid values are: CHARSET_ANSI CHARSET_DEFAULT CHARSET_SYMBOL CHARSET_SHIFTJIS CHARSET_HANGEUL CHARSET_HANGUL CHARSET_GB2312 CHARSET_CHINESEBIG5 CHARSET_OEM CHARSET_JOHAB CHARSET_HEBREW CHARSET_ARABIC CHARSET_GREEK</p>

		<p>CHARSET_TURKISH CHARSET_VIETNAMESE CHARSET_THAI CHARSET_EASTEUROPE CHARSET_RUSSIAN CHARSET_MAC CHARSET_BALTIC</p> <p><i>outprecision</i> specifies how closely the output must match the requested height, weight, and other attributes of a font. Valid values are: PRECIS_OUT_DEFAULT PRECIS_OUT_STRING PRECIS_OUT_CHARACTER PRECIS_OUT_STROKE PRECIS_OUT_TT PRECIS_OUT_DEVICE PRECIS_OUT_RASTER PRECIS_OUT_TT_ONLY PRECIS_OUT_OUTLINE PRECIS_OUT_SCREEN_OUTLINE PRECIS_OUT_PS_ONLY</p> <p><i>clipprecision</i> specifies how to clip characters that are partially outside the clipping region. Valid values are: PRECIS_CLIP_DEFAULT PRECIS_CLIP_CHARACTER PRECIS_CLIP_STROKE PRECIS_CLIP_MASK PRECIS_CLIP_LH_ANGLES PRECIS_CLIP_TT_ALWAYS PRECIS_CLIP_DFA_DISABLE PRECIS_CLIP_EMBEDDED</p> <p><i>quality</i> specifies the quality of the font. Valid values are: QUALITY_DEFAULT QUALITY_DRAFT QUALITY_PROOF QUALITY_NONANTIALIASED QUALITY_ANTIALIASED QUALITY_CLEARTYPE QUALITY_CLEARTYPE_NATURAL</p> <p><i>pitch</i> specifies the pitch of the font. Valid values for are: PITCH_DEFAULT PITCH_FIXED PITCH_VARIABLE PITCH_MONO_FONT</p> <p><i>family</i> specifies the font family that describes the font in a general way. Valid values are: FONT_FAMILY_DONTCARE FONT_FAMILY_ROMAN FONT_FAMILY_SWISS</p>
--	--	---

		<p>FONT_FAMILY_MODERN FONT_FAMILY_SCRIPT FONT_FAMILY_DECORATIVE</p> <p><i>fontname</i> requires a <i>string</i>. For example "Arial".</p> <p>»Script Example</p>
--	--	--

<p>shape</p>	<ul style="list-style-type: none"> ▪ int renderingMode ▪ int shapeAlignment ▪ int shapeRotation ▪ int blendingMode ▪ int originType ▪ float border ▪ float innerGlow ▪ float outerGlow ▪ int innerGlowInterpolation ▪ int outerGlowInterpolation ▪ float proportion ▪ float diagonalLength 	<p><i>shape</i> stores specific information for shapes.</p> <p>Valid values for <i>renderingMode</i> are: RENDERING_MODE_EXTENDED RENDERING_MODE_SIMPLE</p> <p>Valid values for <i>shapeAlignment</i> are: LOOKAT_FRONT LOOKAT_BACK LOOKAT_LEFT LOOKAT_RIGHT LOOKAT_TOP LOOKAT_BOTTOM LOOKAT_RANDOM</p> <p>Valid values for <i>shapeRotation</i> are: ROTATION_CCW_0 ROTATION_CCW_90 ROTATION_CCW_180 ROTATION_CCW_270 ROTATION_CW_0 ROTATION_CW_90 ROTATION_CW_180 ROTATION_CW_270</p> <p><i>blendingMode</i> is only available for RENDERING_MODE_EXTENDED. Valid values are: BLENDING_MODE_NONE BLENDING_MODE_ALPHA</p> <p>Valid values for <i>originType</i> are: ORIGIN_CENTER ORIGIN_FRONT ORIGIN_BACK ORIGIN_LEFT ORIGIN_RIGHT ORIGIN_TOP ORIGIN_BOTTOM ORIGIN_TOP_LEFT ORIGIN_TOP_RIGHT ORIGIN_BOTTOM_LEFT ORIGIN_BOTTOM_RIGHT ORIGIN_FRONT_LEFT ORIGIN_FRONT_RIGHT ORIGIN_BACK_LEFT ORIGIN_BACK_RIGHT ORIGIN_FRONT_TOP ORIGIN_FRONT_BOTTOM ORIGIN_BACK_TOP ORIGIN_BACK_BOTTOM ORIGIN_FRONT_TOP_LEFT ORIGIN_FRONT_TOP_RIGHT ORIGIN_FRONT_BOTTOM_LEFT ORIGIN_FRONT_BOTTOM_RIGH ORIGIN_BACK_TOP_LEFT ORIGIN_BACK_TOP_RIGHT</p>
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		<p>ORIGIN_BACK_BOTTOM_LEFT ORIGIN_BACK_BOTTOM_RIGHT</p> <p><i>border</i> is only available for RENDERING_MODE_EXTENDED. Valid values range from 0.01 to 1.00.</p> <p><i>innerGlow</i> is only available for RENDERING_MODE_EXTENDED. Valid values range from 0.01 to 1.00.</p> <p><i>outerGlow</i> is only available for RENDERING_MODE_EXTENDED. Valid values range from 0.01 to 1.00.</p> <p>Valid values for <i>innerGlowInterpolation</i> are: INTERPOLATION_TYPE_LINEAR INTERPOLATION_TYPE_EASE_BOUNCE_IN INTERPOLATION_TYPE_EASE_BOUNCE_OUT INTERPOLATION_TYPE_EASE_BOUNCE_INOUT INTERPOLATION_TYPE_EASE_CIRC_IN INTERPOLATION_TYPE_EASE_CIRC_OUT INTERPOLATION_TYPE_EASE_CIRC_INOUT INTERPOLATION_TYPE_EASE_CUBIC_IN INTERPOLATION_TYPE_EASE_CUBIC_OUT INTERPOLATION_TYPE_EASE_CUBIC_INOUT INTERPOLATION_TYPE_EASE_SINE_IN INTERPOLATION_TYPE_EASE_SINE_OUT INTERPOLATION_TYPE_EASE_SINE_INOUT INTERPOLATION_TYPE_EASE_EXPO_IN INTERPOLATION_TYPE_EASE_EXPO_OUT INTERPOLATION_TYPE_EASE_EXPO_INOUT</p> <p>Valid values for <i>outerGlowInterpolation</i> are: See <i>innerGlowInterpolation</i></p> <p><i>proportion</i> is only available for RENDERING_MODE_EXTENDED and for SHAPE_TYPE_CROSS_STRAIGHT, SHAPE_TYPE_STAR, SHAPE_TYPE_3D_CROSS_STRAIGHT, and SHAPE_TYPE_3D_STAR. Valid values range from 0.01 to 1.00.</p> <p><i>diagonalLength</i> is only available for RENDERING_MODE_EXTENDED and for SHAPE_TYPE_CROSS, SHAPE_TYPE_STAR, SHAPE_TYPE_3D_CROSS, and SHAPE_TYPE_3D_STAR. Valid values range from 0.01 to 1.00.</p>
--	--	---

2.1.7.3 Conversion Between Data Types

Introduction

If there are different data types within an expression, they must be converted into the same type. MADRIX Script does those conversions implicitly, but in most times a warning will be displayed in the **Compiler Messages** section of the Script Editor. It is also possible to do those conversions explicitly writing the destination data type in brackets before the expression, like this:

```
int i = (int)GetBpmPitch(); //if the Pitch was 6.2, i is now 6
string s = (string)i; //s now consists of the characters "42"
```

GetBpmPitch() returns a *float* value which has to be converted into *int* before it can be assigned to *i*. Be aware that the positions after the decimal point are abridged. Afterwards, the numeric value is assigned to *i*.

The following table shows an overview over possible conversions:

	int	float	string	structure	bool expressions
int	-	Converts the value to float.	Converts the value to string: e. g. 12 = "12".	N/A	Is true if the value is not 0.
float	Converts the value to int. The decimal part is truncated without rounding off.	-	Converts the value to string: e. g. 12.34 = "12.34"	N/A	Is true if the value is not 0.
string	If the string is a number, the string is converted into an integer value, otherwise it results in 0.		-	N/A	Is true if string is not empty.
structure	N/A			Conversion between different structures: N/A.	N/A

Implicit Conversions With Math Expressions

- If one of the two operands of a math expression is of the type float and the other is of the type int, the int value is converted to float and the expression results in the data type float.
- If one of the two operands of a math expression is of the type string, the other operand is converted into a string and the expression results in a string.

- If the conversion is not possible according to the table above, the compiler prints an error and you have to correct the expression.

Here are some examples of expressions and their results:

Expression	Result	Explanation
<code>int i = 3 / 4 * 2</code>	0	<code>3 / 4</code> is an <i>integer</i> operation and results in <code>0</code> . Hence, the whole expression results in <code>0</code> .
<code>3 / 4.0 * 2</code>	1.5	Because <code>4.0</code> is a float value, <code>3</code> will be converted into float, too. In this way, <code>3 / 4.0</code> results in <code>0.75</code> . Then, <code>2</code> is also converted into float since the other operand is of the type float. And the result is therefore <code>1.5</code> .
<code>string test = "It is " + 9 + " o'clock."</code>	"It is 9 o'clock."	Since the first operand is a string, <code>9</code> is also converted into a string and concatenated with the first string.
<code>string test = 2 + 3 + "40"</code>	"540"	<code>2</code> and <code>3</code> are both integer and will be added up due to an integer operation. The second operation has a string as operand and therefore the other operand will be converted into a string and both are concatenated together.

2.1.7.4 Arrays

Basics

Many programming languages provide arrays, vectors, lists or any other data type to store dynamic data. Dynamic data is not known yet when the program is written. For such tasks MADRIX Script provides dynamic arrays. They are declared like variables, followed by `[]`.

```
int    aiIntArray[];      //a 1-dimensional array of integer values
date   adDateArray[];    //a 1-dimensional array of dates
float  aafFloatArray[][]; //a 2-dimensional array of float values
```

It is also possible to initialize arrays using a list of values. These are described by values separated with commas and written in curly brackets.

```
//initialize an array with 5 integer values
int aiIntArray[] = {2, 3, 4, 5, 6};
```

The operator [expression] provides access to the elements of an array. The expression must result in an *integer* or compatible value. The lowest index of an array is 0. This means the first entry of an array is always indexed with 0; an array does not start with 1, but 0. When an element is accessed, the array grows automatically in order to provide the requested element. It is not necessary nor possible to request the size of an array explicitly. Here is an example to access an array with *integer* values.

```
int aiIntArray[];
aiIntArray[0] = 10;
aiIntArray[1] = 20;
aiIntArray[2] = aiIntArray[3];
```

After the last access the array will have a length of 4 because 3 was the last accessed element. The initial value of an element is "0" or an empty string or false. The length-attribute of an array tells the current size of an array, which is the number of currently provided elements.

The Length Or Size Of Arrays

Each array has a *length*-attribute. It can be accessed through the "."-operator which is also used to access elements from a structure.

```
int l = aiIntArray.length; //store length of the array in l
```

Note: The length of an array is defined by the highest index that was used to request an element.

Multi-Dimensional Arrays

Up to this point, one-dimensional arrays were introduced. But multi-dimensional arrays are also possible. To declare a multi-dimensional array, a "[" must be added to its declaration for each dimension. Up to now, the only limit to the number of possible dimensions is set by the resources of the computer on which the script/macro is running. It is also possible to initialize arrays using a list of elements for each dimension. Here are some examples:

```
int aaArray[][]; //a 2-dimensional array
int aaaArray3[][][]; //a 3-dimensional array

//initializes the array with two dimensions and three values each
int aaArry2[][] = {{2, 3, 4}, {6, 7, 8}};
```

```
//a 2-dimensional array of color elements
color aaCArray[][] = {
    { {0, 0, 0, 0, 255}, {255, 255, 255}, {255, 255} },
    { {255           }, {255, 255, 255} },
    { {0, 255           }, {255, 255, 255} } };
```

The operator *[expression]* accesses a single element of an array, which for a multi-dimensional array may be another array. In order to access a single element, the applicable index must be used. For example, the 5th element must be accessed with the index 4, while the first entry has the index 0. The same is true for the attribute *length*. It returns the length of the currently accessed array. Here are two examples:

```
int aaArray[][];
int aArray1[] = {1, 2, 3, 4, 5, 6}; //intialize the array

aaArray[0] = aArray1; //assign aArray1 to the first element of aaArray
aaArray[0][aArray1.length] = aField1.length + 1;
aaArray[1][0] = 1;
aaArray[1][2] = 2;
```

Explanation: At the end of this example *aaArray* consists of two arrays of *int* values. The first one has a length of 7 and the second one a length of 3 (due to the access of the element with the index 2). These lengths can be received by reading the *length* attributes.

```
WriteText("Number of arrays in aaArray: " + aaArray.length);
WriteText("Number of elements in aaArray[0]: " + aaArray[0].length);
WriteText("Number of elements in aaArray[1]: " + aaArray[1].length);
```

Memory Management Of Arrays

Although the memory for arrays is dynamic, you have to think of it beforehand. Think about the following example:

```
int aiArray[][];
aiArray[10000][10000] = 1;
```

After the assignment, the array has indeed a size of 10.000 x 10.000 elements of *int* values. An *int* value needs four bytes and $10.000 * 10.000 * 4 = 4.0000.0000$ bytes, add up to around 382 megabytes (MB) of memory. So please pay attention when using very big arrays.

Full Example

This example just plays with the arrays and its content. It is just to show how to work with arrays and to get a feeling for them. A better example is given in the chapter »[Loops](#)

```
void InitEffect()
{
    SetBpm(600);
}

void RenderEffect()
{
    int aaArray[][];
    int aArray1[] = {1, 2, 3, 4, 5, 6}; //intialize the array

    aaArray[0] = aArray1; //assign aArray1 to first element of aaArray
    aaArray[0][aArray1.length] = aArray1.length + 1;
    aaArray[1][0] = 1;
    aaArray[1][2] = 2;

    WriteText("Number of arrays in aaArray: " + aaArray.length);
    WriteText("Number of elements in aaArray[0]: " + aaArray[0].length);
    WriteText("Number of elements in aaArray[1]: " + aaArray[1].length);

    WriteText("Element of aaArray[0][0]: " + aaArray[0][0]);
    WriteText("Element of aaArray[0][1]: " + aaArray[0][1]);
    WriteText("Element of aaArray[0][2]: " + aaArray[0][2]);
    WriteText("Element of aaArray[0][3]: " + aaArray[0][3]);
    WriteText("Element of aaArray[0][4]: " + aaArray[0][4]);
    WriteText("Element of aaArray[0][5]: " + aaArray[0][5]);

    WriteText("Element of aaArray[1][0]: " + aaArray[1][0]);
    WriteText("Element of aaArray[1][1]: " + aaArray[1][1]);
    WriteText("Element of aaArray[1][2]: " + aaArray[1][2]);
}
```

2.1.7.5 Strings And String Operations

Introduction

MADRIX Script provides several functions to manipulate strings, find substrings, and to perform many more operations.

Operations On Strings

Assigning Data Types

It is possible to assign *integer*, *float*, and *strings* to another *string* as shown in the following example:

```
string s;  
string t;  
s = t;  
s = "Hello world";  
s = 5;  
s = 3.5;
```

Furthermore, it is possible to assign single characters of a *string* to a character of another *string* like shown below:

```
string s, t;  
s = "New";  
t = "new";  
  
s = t;  
s[0] = t[0];
```

Furthermore, it is possible to assign a double-quoted *string* to a character of a *string*. But the assigned *string* must have exactly one character. Here is an example:

```
string s;  
s[0] = "T";  
s[1] = "1";  
s[2] = ".";
```

The following lines are invalid and will result in a compiler error since the given *strings* contain more or less than one character:

```
s[0] = "New"; //given string has three character but not one  
s[0] = "";   //given string is empty
```

Comparing Two Strings

As it is possible to compare two numbers using the compare operators, it is also possible to compare two *strings*. The following table provides an overview of the possible operations.

Operator	Description
<code>str1 == str2</code>	Checks for the equality of two strings.
<code>str1 != str2</code>	Checks for the inequality of two strings.
<code>str1 < str2</code>	Checks if the first string is less than the second string.
<code>str1 <= str2</code>	Checks if the first string is less or equal to the second string.
<code>str1 > str2</code>	Checks if the first string is greater than the other string.
<code>str1 >= str2</code>	Checks if the first string is greater or equal to the other string.

Please note: It is not possible to compare arrays of *strings*.

Like in the case of assignments, it is also possible to compare single characters of a *string* against a double-quoted *string* with exactly one character:

```
if(s[0] == "A") ...
else if(s[0] == "!") ...
...
```

It is also possible to compare single characters of a *string* against *integer* numbers:

```
if(s[0] == 1) ...
else if(s[0] == 2) ...
```

This also works for the switch/case statements. But the "1" as a label of a case means the same as the 1. So the following two case labels mean the same and this would result in a compiler error:

```
string s = "1";
switch(s[0])
{
    case "1": do something; break;
    case 1:   do something else; break;
    case "A": do something; break;
    //is also valid to check for letters and other characters
    ...
}
```


Using Strings Within Switch/Case Statements

Another possibility is to use double-quoted *strings* of one character for of labels. The following theoretical example demonstrates this:

```
string s = "New";
for(int i = 0; i < s.length; ++i)
{
    switch(s[i])
    {
        case "A": do something; break;
        case "B": do something else; break;
        case "!": do something; break;
    }
}
```

Functions For Strings

Function	Description
int findstring (int startIndex, string text, string substring)	This functions looks for the <i>substring</i> in the given text. The search starts at the given <i>startIndex</i> . The first character has an index of 0. The function starts its search at a specified position of the entire <i>text</i> using <i>startIndex</i> and returns an index that describes the position at which the <i>substring</i> begins. If the substring is not found, <i>-1</i> is returned.
string substring (string text, int startIndex, int count)	The function extracts <i>count</i> characters from the given <i>text</i> starting with <i>startIndex</i> . If <i>count</i> is <i>-1</i> , all characters of the string starting at <i>startIndex</i> are returned. c
int rfindstring (int startIndex, string text, string substring)	This functions looks for the <i>substring</i> in the given text from its end to the beginning. The function starts its search at a specified position of the entire <i>text</i> using <i>startIndex</i> and returns an index that describes the position at which the <i>substring</i> begins. If the substring was not found, <i>-1</i> is returned.
int startswith (string text, string substring)	This function checks if the <i>text</i> string starts with the given <i>substring</i> . If <i>text</i> starts with <i>substring</i> , <i>true</i> is returned, otherwise <i>false</i> .
int endswith (string text, string substring)	This function checks if the <i>text</i> string ends with the given <i>substring</i> . If <i>text</i> ends with <i>substring</i> , <i>true</i> is returned, otherwise <i>false</i> .
int isalnum (string text)	Returns <i>true</i> if the given string contains only characters and figures and its length is greater then 0, otherwise <i>false</i> is returned.

int isalpha (string text)	Returns <i>true</i> if the given string contains only characters and its length is greater than 0, otherwise <i>false</i> is returned.
int isnum (string text)	Returns <i>true</i> if the given text represents a number. This may be an integer number or a <i>floating</i> point number (e.g. 1.3). Otherwise it returns <i>false</i> .
void tolower (string text)	Converts each character of the given <i>string</i> into a lower-case character.
void toupper (string text)	Converts each character of the given <i>string</i> into an upper-case character.
void strip (string text)	Removes leading and ending white spaces like space, tabulator, line feeds and so on from the given <i>string</i> .
int strcmp (string str1, string str2)	Compares two given strings with each other. If they are equal, <i>0</i> is returned. <i>-1</i> is returned if <i>str1</i> is less than <i>str2</i> . A value of <i>1</i> is returned if <i>str1</i> is bigger than <i>str2</i> .
void replace (string src, string old, string new)	Replaces any appearances of <i>old</i> within <i>src</i> with <i>new</i> .
void tokenize (string src, string delimiter, string reslist[])	Separates the string <i>src</i> into smaller pieces delimited by characters within <i>delimiter</i> . The result is returned in <i>reslist</i> . See below for further details.

Tokenizing Strings

The function [tokenize\(\)](#) enables you to tokenize a string. The single tokens will be delimited by the characters within the second parameter. Each character identifies a single delimiter. The following examples show the usage of the function and the results.

```
string s = "Have a wonderful,nice day".
string res[];
tokenize(s, " ,", res);
```

```
string s = "one two,three";
string res[];
tokenize(s, " ," , res);
```

Explanation:

- The variable *res* of the first example will be filled with the following five values: {Have; a; wonderful; nice; day}
- The *res* variable of the second example will be filled with the following two values: {one two; three}
- The result of the second example will contain only two entries. "one two" is only one entry since the tokens of the second example are only delimited by coma but not by space.

Splitting Strings With White Spaces

There is a constant called `WHITE_SPACES` which can be used as *delimiter* in order to split a text by any white spaces like tabulator, new line, or space.

```
string s = "Have a wonderful, nice day".
string res[];
tokenize(s, WHITE_SPACES, res);

//or another example which also uses the comma as delimiter
tokenize(s, WHITE_SPACES + ",", res);
```

Examples

Substring

This example extracts a part from a *string*. Insert the source code into the function *RenderEffect*. As the result "World" should be displayed in the output window of the Script Editor.

```
string txt = "Hello World";
string subText = substring(txt, 6, 5); //retrieves "World" from txt
WriteText(subText);
```

Description

2.1.8 Expressions

Introduction

- Expressions are used to calculate values.
- Additionally, they can be assigned to variables or given as parameters to functions.
- If an expression is followed by a semicolon, it is called an expression statement.
- There are different operators available to write expressions.

Operands For An Expression

An expression is formed of operands and operators. The number of operands depends on the operator. There are unary operators, which use only one operand, such as "-". And there are binary operators, which need two operands, like "+".

Operands of an expression can be function calls, variables, constant values like "5" or another expression within brackets, like $(3 + 5)$.

Assignment Operator

To assign any value to a variable the assignment operator "=" is used in the following way:

```
variable = expression;
```

The *expression* after the "=" may be any complex expression. But it has to be compatible with the given variable after [»the conversion rules](#) of MADRIX Script.

```
float f = cos(0.5);  
float f2 = f;
```

Math Operations

'++'/'--' Operator

The ++ and -- operators are unary operators and only defined for usage with variables of the type *int*. They are used like this:

```
i++;  
i--;
```

They increment/decrement the variable by one. This operator is known from C/C++. This programming language offers two possible ways of using them, as suffix and as prefix operators (*i++* and *++i*). In MADRIX Script they are currently only available as suffix operators (*i++*) and they work in that way. Such a suffix operator results in the current value of the given variable and afterwards increments/decrements it.

```
int i = 4;  
i = i++ * 2;
```

In the end, *i* is 8. In the first line, 4 is assigned to the integer value *i*. In the second line, the expression *i++* results in 4. The multiplication therefore is "4 * 2" which results in 8. This value is assigned to *i* and therefore, *i* = 8.

'-' Operator

The "-" operator is also available as unary operator and negates the value of the given operand. It supports *int*- and *float*-values.

```
-4;  
-i;  
-(3 * 5);
```

The "+" operator may also be used as unary operator, but it does not make sense because it does not change the result of an expression.

Binary Operations

The operators +, -, * and / support *int* and *float* values and cause a usual arithmetical addition, subtraction, multiplication, and division of the two operands.

```
i = 4 + 4 * 5;  
i = (4 + 4) * 5;  
i = 4 / 5;
```

Operator precedence rules are considered. **Note** that operations with *integer* values result in *integer* values and are done as *integer* operations. So $3 / 4$ does not result in 0.75 as may be expected, but in 0. To get a result of 0.75, at least one of the operators must be a *float* value. An example would be $3.0 / 4$, where the 4 is also converted into a *float*-value.

Concatenating Strings

The "+" operator can also be used to concatenate strings together.

```
string s = "Hallo " + "Welt";
```

If one of the two operands is of the type *string*, the other one is converted and the two strings are concatenated together.

```
int i = 4;  
string s = 4 + "th run";
```

This example results in "4th run". **Note** that the following example may be misinterpreted since the first part of the expression is of the type *integer* and will result in an *integer*. It is then converted and concatenated into one string.

```
string s = 3 + 4 + "th run";
```

The resulting string is "7th run" and not, as perhaps expected "34th run".

Modulo Operation

The modulo operation calculates the *integer* remainder of an *integer* division. The operator in MADRIX Script for modulo operations is %.

```
10 % 2;
```

The operator % is only defined for *int* values.

Additional Assignment Operations

To have less code and increase readability, there are additional assign operators: +=, -=, *=, /=, %=.

```
i += 3 + 4
```

is the same as

```
i = i + (3 + 4)
```

and so on.

The resulting source code is much more easy to read.

Operations Of Comparison

With operations of comparison you can test two expressions for a certain relation. Possible comparisons (and operators) are "less than" (<), "less equal" (<=), "more than" (>), "more equal" (>=), "equal" (==) and "not equal" (!=). Make sure that you can distinguish the meaning of a single equal sign (assignment operator) and a double equal sign (comparison operator). Operators of comparison always return a *bool* value, the comparison is either *true* or *false*.

```
i > 4  
3 < j
```

Logical Operations

The '!' Operator

The !-operator is an unary operator, which logical negates the value of the given expression. *false* becomes *true* and vice versa.

```
!3
!(3 > 4)
!"Hallo Welt"
```

'And'/'Or' Operator

The and and or-operators are logical operators. They need operands of the data type *bool* and always result in a *bool* value. In MADRIX Script the and-operator is expressed via "&&" and the or-operator is declared with "||".

Unlike C/C++, in MADRIX Script both operands are always evaluated. So, even if the first operand of an "&&" - operator results in *false*, this means that the whole expression will be *false*. But the second operand will be calculated, too. Here some examples for using those operators:

```
int i = i || j
int i = (3 < 4) || (4 > 3)
```

Those operations are usually used within statements, which require to make a decision like the »[if_statement](#) as described later on.

Using Operands Of Different Data Types

Operands are automatically converted, e.g. from *bool* to *int*, when making an assignment (see also »[Conversion Between Data Types](#)).

```
int i = GetMatrixWidth() > GetMatrixHeight();
int j = (2 * sin(PI) * i) + (2 * cos(PI) * !i);
```


In the first line, the resulting *bool*-value of the ">"-operator is implicitly converted into *int* and results in 0 or 1. In the second line, the 2 in both expression parts is converted to *float* since the *sin* and the *cos* functions result in *float*. The same holds true for the operands *i* and *!i*.

Full Example

The following example for the MAS Script Effect uses different expressions to calculate the coordinates on which the next pixel is to be set. It also calculates the color of the next pixel.

```
int g_point[];
persistent color g_color;
void InitEffect()
{
    g_point[0] = 0;
    g_point[1] = 0;
    color c = {random(0, 255), random(0, 255), random(0, 255), random(0, 255)};
    g_color = c;
    SetBpm(600);
}

void RenderEffect()
{
    //calculate the color for the next pixel
    g_color.r += (int)(255.0 * (0.5 + 0.5 * sin(g_point[0] * g_point[0])));
    g_color.g += (int)(255.0 * (0.5 + 0.5 * cos(g_point[0] * g_point[1])));
    g_color.b += (int)(255.0 * (0.5 + 0.5 * sin(g_point[0] - g_point[1])));
    g_color.w += (int)(255.0 * (0.5 + 0.5 * sin(g_point[0] + g_point[1])));

    //make sure, colors are only between 0 and 255
    g_color.r %= 256;
    g_color.g %= 256;
    g_color.b %= 256;
    g_color.w %= 256;

    setPixel(g_point);
    //setup the next point, x++
    //if x > MatrixWidth x = 0 and y++
    //if y > MatrixHeight y = 0
    g_point[0] = (g_point[0] + 1) % GetMatrixWidth();
    g_point[1] = ((int)(g_point[0] == 0) * 1 +
                 g_point[1]) % GetMatrixHeight();
}

void setPixel(int pt[])
{
    SetPixel(g_color, pt[0], pt[1]);
}
```

2.1.9 Statements

Introduction

There are different statements available in a script, for example the if-statement or the call statement to call functions. Those will be described later on in this chapter. Another statement is the expression statement. A statement is an expression statement if it is followed by a semicolon. For example:

```
i = i + 1;  
InitEffect();
```

Using Blocks

A block is started and finished (opened and closed) with the help of curly brackets. Blocks may be used to group different statements together. There are also different statements which require a block if more than one statement should be executed. For example the *while* or the *if* statement are good examples.

2.1.9.1 'If' And 'Else If' Statements

'If' Construct

Very often it is necessary to make decisions within a script/macro. You could for example want to use red as your background color every day if it is after 9 a.m. Or for example, it could be your wish to clear the matrix and change the color if the matrix has been filled up completely. Therefore, in MADRIX Script the keywords *if* and *else* exist. The may be used like this:

```
if(condition)  
    statement  
else  
    statement
```

The first statement is executed if the given condition is *true* or unequal to 0. Otherwise the second statement, stated after *else*, is executed.

Statement may include a single statement or a block of statements and the *else*-part is optional. Here are some examples for the *if*-statement:

```
if(x % 2 == 0)  
{
```

```
    col.r = 0;
    SetPixel(col, x, y);
}
else
{
    col.r = 255;
    SetPixel(col, x, y);
}

if(testPixel(x, y) != 0)
{
    SetPixel(WHITE, x, y);
}

if(x + 2 > y)
    y++;
```

It is important to consider that an *else* always refers to the last *if*-statement. However, blocks may be used to make the intention clear. To give you a demonstration, please consider the following example. It may be interpreted wrong since *i* will be incremented if the *j > i*-condition fails and not if the *i > 3*-condition fails, as is implied by the given *else*.

```
if(i > 3)
    if(j > i)
        j = i;
else
    i++;
```

To let the compiler create the correct code, use blocks:

```
if(i > 3)
{
    if(j > i)
        j = i;
}
else
    i++;
```

'Else If' Construct

Else if is an additional structure to implement decisions. It may be used like this:

```
if(condition)
    statement
else if (condition)
    statement
```

Like described above, *else* is always followed by a statement. And *if* is such a statement. Then, it is logical that an *else* can be directly followed by an *if*. The *else if* structure is very useful to make code with lot a lot of decisions more readable. It enables you to check for different conditions, which shall only be checked if the previous condition was passed successfully. Here is an example which selects another color for different days. Simply copy it and paste it in the function *RenderEffect*.

```
date t = GetDate();
color c;
if(t.day < 11)
    c.r = 255;
else if(t.day <= 21)
    c.g = 255;
else if(t.day <= 31)
    c.b = 255;
else
    c = WHITE;
Clear(c);
```

Full Example

The following example for the MAS Script Effect renders a blinking cross onto the matrix. Instead of using random colors, predefined colors will be used. During each call of *RenderEffect*, the color will be chosen.

```
color colCross = {0, 255, 255, 255};
int g_iCol;

void InitEffect()
{
    g_iCol = 0;
    SetBpm(300);
}

void RenderEffect()
{
    int x, y;
    if(g_iCol == 0)
    {
        colCross.r = 255;
        g_iCol = 1;
    }
    else if(g_iCol == 1)
    {
        colCross.r = 155;
        g_iCol = 2;
    }
    else
    {
        colCross.r = 0;
        g_iCol = 0;
    }
}
```

```

for(int x = 0; x < GetMatrixWidth(); x++)
  for(int y = 0; y < GetMatrixHeight(); y++)
  {
    if(x == y)
      SetPixel(colCross, x, y);
    else if(GetMatrixWidth() - x-1 == y)
      SetPixel(colCross, x, y);
    else
      SetPixel(BLACK, x, y);
  } //for[each line]
}

```

2.1.9.2 'Switch' Statements

Introduction

If it is required to compare an integer variable with a lot of different values, using of the *if*-statement may be very impractical. In this case the *switch*-statement may help. It has the following syntax:

```

switch(expression)
{
  case label1:
    list of statements
  case label2:
    list of statements
  default:
    list of statements
}

```

The expression must result in *int* or a compatible data type which can be converted implicitly. The *default*-label is optional. The label must result in a constant value. It is possible to use *integer* values like "0" or "12", constant variables, or double-quoted strings like "A". After the colon, one or more statements may follow. But blocks are also allowed. Moreover, each label has to be unique.

Labels are not an independent block of source code, but a marker where the code execution should be continued if the *expression* has the corresponding value. So after execution of the statements for *label 1* the statements of *label 2* will be executed and so on. In order to avoid that behavior, use the keyword *break*. If the expression does not match any of the given labels, the execution will be continued with the *default*-label.

The following sample code writes the name of the current day into the message window of the editor.

```

date d = GetDate();
switch(d.weekday)
{
  case 0: WriteText("Sunday"); break;
  case 1: WriteText("Monday"); break;
  case 2: WriteText("Tuesday"); break;
  case 3: WriteText("Wednesday"); break;
}

```

```

    case 4: WriteText("Thursday"); break;
    case 5: WriteText("Friday"); break;
    case 6: WriteText("Saturday"); break;
}

```

Now, we are also able to shorten the usage of the *if*-statement from the last example for the MAS Script Effect in the following way:

```

color colCross = {0, 255, 255, 255};
int g_iCol;

void InitEffect()
{
    g_iCol = 0;
    SetBpm(300);
}

void RenderEffect()
{
    int x, y;
    switch(g_iCol)
    {
        case 0:
            colCross.r = 255;
            g_iCol = 1;
            break;
        case 1:
            colCross.r = 155;
            g_iCol = 2;
            break;
        default:
            colCross.r = 0;
            g_iCol = 0;
            break;
    } //switch[current color]
    for(int x = 0; x < GetMatrixWidth(); x++)
    {
        for(int y = 0; y < GetMatrixHeight(); y++)
        {
            if(x == y)
                SetPixel(colCross, x, y);
            else if(GetMatrixWidth() - x-1 == y)
                SetPixel(colCross, x, y);
            else
                SetPixel(BLACK, x, y);
        } //for[each line]
    }
}

```

Using Constant Variables

As mentioned earlier, it is possible to use variables declared as constants, but it is necessary that the compiler is able to compute the value during compilation time. Here is an example with a valid as well as an invalid case label.

```
const int label1 = 1;
const int label2 = GetMatrixWidth();

switch(<something>) {
    case label1:    do something
                    break;
    case label2: do something else
                    break;
}
```

The first label (label1) is a valid case label since the compiler is able to compute the value of 1 during compilation time. The second label (label2) is invalid since it is computed during runtime and therefore it is not a constant value for the compiler, even though it is not possible to change its value later on.

The following examples are all valid case labels since the compiler can compute their values:

```
const int label1 = 2 + 4;
const int label2 = label1 + 3;
const int label3 = label2;
```

Using Double-Quoted Strings

It is also possible to use double-quoted strings for case labels. But they have to have the length of 1. Here is an example:

```
void writeText(string s)
{
    for(int i = 0; i < s.length; i++)
    {
        switch(s[i])
        {
            case "A": do something; break;
            case "B": do something with b; break;
            ...
        }
    }
}
```

2.1.9.3 'For' And 'While' Loops

Introduction

Loops are used in programming languages to repeat tasks. For example, every pixel should be set to a green color. Loops run as often as a given condition is true. MADRIX Script offers two possible forms of loops, the *for*-loop and the *while*-loop. Both are similar to the loops in the programming language C.

'While'-Loop

The *while*-loop is built in this way:

```
while(condition)
    statement
```

The *statement* may be a single expression statement. If more than one statement needs to be executed, a block is needed, as shown in the following example:

```
int x = 0;
while(x < 10)
{
    SetPixel(WHITE, x, 0);
    x++;
}
```

'For'-Loop

The *for*-loop is built like this:

```
for(initialization; condition; expression)
    statement
```

This is the same as:

```
initialization;
while(condition)
{
    statement;
    expression;
}
```


The *initialization*-part may contain the declaration of a new variable or an expression. It is executed the first time the loop runs. There may be different initializations separated by comma. Newly declared variables only exist within the *for*-loop. After *initialization*, the *condition* is checked. If it is unequal to 0, the given statement is executed. (In this respect, a value of 0 represents *false*. But a while loop will only be executed, if the condition is true. And true is represented by a value of 1, which in turn is unequal to 0.)

The *condition*-part contains an expression. As long as the given expression is not 0 or *false*, the given statement is executed. If the *condition*-part is empty as discussed beneath, it will be interpreted as *true*.

The *expression* in the *expression*-part is executed each time before running the *statement* and before checking the *condition*. But not the first time. There may be different expressions separated by comma.

It is possible to leave different parts of the *for*-loop empty. But semicolons are necessary, nevertheless. This may be used to implement the initialization outside the loop. Here are three examples for *for*-loops. The first one is an endless loop:

```
for( ; ;)  
{  
    do anything;  
}
```

```
for(int x = 0; x < GetMatrixWidth(); x++)  
    for(int y = 0; y < GetMatrixHeight(); y++)  
        SetPixel(WHITE, x, y);
```

```
for(int x = 0; x < GetMatrixWidth(); x++)  
{  
    if(x % 2)  
        DrawPixelLine(WHITE, x, 0, x, GetMatrixHeight());  
    else  
        DrawPixelLine(BLACK, x, 0, x, GetMatrixHeight());  
}
```

Controlling Loops: 'Break' And 'Continue'

There are two possibilities to control a loop. First, it is possible to interrupt the execution of a loop (break). Furthermore, there is a way to skip the rest of the statements of the loop and to go to its beginning (continue).

'Break'

With the keyword *break* a loop can be quit immediately. For example:

```
int x = 0;
while(x < 10)
{
    if(i >= GetMatrixWidth())
        break; //leave loop now!

    SetPixel(WHITE, x, 0);
    x++;
}
```

The execution of the script is continued after the loop. No other statement within the loop is executed after *break*.

'Continue'

With the keyword *continue* it is possible to skip the rest of the statements within a loop and to start anew. For example:

```
int x = 0;
while(x < 10)
{
    if(x % 2 == 0)
        continue;
    SetPixel(WHITE, x++, 0);
}
```

Examples

'While' Loop

The following example for the MAS Script Effect draws parts of a cosinus curve onto the matrix while changing the background color.

```
void InitEffect()
{
    SetBpm(300);
}

void RenderEffect()
{
    color col = {200, 200, 100, 200};
    color colBK={random(0,150), random(0,255), random(0,100), random(0,255)};
    //set background
    Clear(colBK);
    //draw cosine curve
    int px = 0;
    int py = 0;
    float y;
    float t = 0;
    while(px < GetMatrixWidth())
    {
        y = cos(t) * GetMatrixHeight();
        py = (int)y;
        t = t + (PI * 3 / GetMatrixHeight());
        px++;
        SetPixel(col, px, py);
    } //while[x < GetMatrixWidth()]
}
```

'For' Loop

Here is another full example for the MAS Script Effect which uses fields to store random colors and to fill the matrix with them.

```
persistent color g_MatrixColors[][];
void RenderEffect()
{
    //select random color
    color col = {random(0,255), random(0,255), random(0,255), random(0,255)};

    //select random pixel coordinates
    int px = random(0,GetMatrixWidth()-1);
    int py = random(0,GetMatrixHeight()-1);
```

```

//save the selected color
g_MatrixColors[px][py] = col;

//draw points of the array
for(px = 0; px < GetMatrixWidth(); px++)
{
    for(py = 0; py < GetMatrixHeight(); py++)
    {
        SetPixel(g_MatrixColors[px][py], px, py);
    } //for[each line]
} //for[each column]
}

void InitEffect()
{
    for(int x = 0; x < GetMatrixWidth(); x++)
        for(int y = 0; y < GetMatrixHeight(); y++)
        {
            g_MatrixColors[x][y].r = 0;
            g_MatrixColors[x][y].g = 0;
            g_MatrixColors[x][y].b = 0;
            g_MatrixColors[x][y].w = 0;
        }
    SetBpm(100);
}

```

2.1.10 Reading From External Files

Asynchronous File Reading

The function

```
int ReadAsync(string file, string txt)
```

reads content as text from a file into the string *txt*. The file is opened and closed automatically. There is no "open" function like in other programming languages. The parameter *file* may contain a filename of a local file, like "C:\config.txt". In addition, the HTTP protocol is supported. That means it is possible to retrieve data from a web server. For example: "http://www.madrix.com". The following examples would read some content from different files.

```

string txt;
ReadAsync("C:\config.txt", txt);
ReadAsync("http://www.testserver.de/testfile.txt");

```

Here is an example which reads some numbers from a file (to be found at C:\temp\src.txt) and renders a curve on the matrix.

```
float g_pos[] = {0.8, 0.5};
```

```

string file = "C:\temp\src.txt";
string txt;

void InitEffect()
{
    SetBpm(300);
}

void RenderEffect()
{
    ShiftVectorMatrix(0.0, 0.0, 1.0, 1.0, SHIFT_LEFT, 0.1);
    ReadAsync(file, txt);
    float f = (float)txt;

    DrawVectorLine(WHITE, g_pos[0], g_pos[1], g_pos[0] + 0.1, f);
    g_pos[1] = f;
}

```

Let's take for example a program which writes the temperature from an external sensor connected to USB to the file and MADRIX draws the curve onto a matrix. As described later on, it would also be possible to write a macro for the SCE Ticker effect to display the values as text.

The function can return several codes/status updates for different scenarios:

Value	Description
int FILE_OK	The function could read the file without problems.
int FILE_NOT_EXIST	The specified file does not exist. This is returned if a local file has been specified that is not there. If the file was a HTTP request, this error is returned when the file does not exist on the host.
int FILE_ERROR	This is returned if any error occurred while reading the content of a local file.
int INVALID_HOST	This value is returned if the file was a HTTP request and the specified host does not exist.
int NETWORK_ERROR	This value is returned on any network error, e.g. if no network adapter is available or the connection between the host and the client has been disconnected.

Example

For testing purposes there are two scripts which deliver random numbers at the end of this chapter. Or you could play with this test set-up for SCE Ticker / Scrolling Text:

```

@scriptname="ReadAsync Test Set-Up";
@author="";
@version="";
@description="";

```

```
string file = "C:\\temp\\src.txt"; //location of the source text file
string txt;
int interval = 600000; //interval = 10 minutes

void InitEffect()
{
    SetReadAsyncInterval(file, interval);
}

void PreRenderEffect()
{
    switch(ReadAsync(file, txt))
    {
        case FILE_OK : WriteText("FILE_OK"); SetText(txt); break; // txt is displayed
        case FILE_NOT_EXIST : WriteText("FILE_NOT_EXIST");break;
        case FILE_ERROR : WriteText("FILE_ERROR");break;
        case NETWORK_ERROR : WriteText("NETWORK_ERROR");break;
        case INVALID_HOST : WriteText("INVALID_HOST");break;
        default : break;
    }
}

void PostRenderEffect()
{
}
```

Detailed Information About 'ReadAsync'

As you can see, it is neither necessary to explicitly open the file nor to close it. During the first call of the function, the specified file is opened. File reading happens asynchronously, which means that the function immediately returns a value but does not wait for the physical reading. Internally, the file will be read and the content is stored in a buffer. The function itself just reads from this buffer. This also means that after the first call of the function, it is more likely that no text will be read. There is a big advantage of this behavior. It is not necessary for the script to wait for potentially long reading times, which may occur, especially if you read content from internet servers.

Setting The Reading Interval

The file will be continuously read in the background. *ReadAsync* always receives the result of the last reading process. It is possible to control the interval of the reading process. The default value is 1000ms which means that an opened file will be read one time each second. The function

```
int SetReadAsyncInterval(string file, int interval)
```

sets the reading interval for a certain file. The *int interval* is given in milliseconds. The minimum reading interval is 10 ms. Imagine your sensor writes data every 500 ms. Therefore, you can set the interval to 500ms in order to let MADRIX instantly show the values. Or you can set it higher, e.g. to 5000 ms (5 seconds), in order to save resources.

If the file in question has not been opened yet, e.g. by a call of *ReadAsync*, the file will be opened to begin internal reading. It makes sense to set the reading interval within the *InitEffect* function in order to have the content of the file read before the first call of *ReadAsync*, which is perhaps located in *RenderEffect*.

Tips For Using Files In MADRIX Script

Overview

Up to now, MADRIX Script is not designed to operate on strings. There aren't any proper functions available that may help you to parse strings or even manipulate them. Furthermore, such functionality requires a lot of computing time, which is not necessarily available within MADRIX and therefore within MADRIX Script. It may be better to have external tools (e.g. python scripts, PHP, or Visual basic scripts) which prepare files for MADRIX in order to have faster scripts.

Another interesting possibility is to have interactive scripts. Imagine a small application which retrieves input from an user and writes it to a file. A script may read the file and react to the input.

The following scripts are external scripts which may be used to test the script above or to play around with the reading functionality of MADRIX Script. Both scripts deliver random numbers using a local file or via HTTP request.

A Python Script To Create Random Numbers

The following script creates random values between 0 and 1 and writes them to the file "C:\temp\src.txt". In order to use a different file, set the *file* variable in the third line of the script to a different one. Please do not forget to change the script above to read the same file. Each second one value is written. In order to test HTTP functionality, this script may also run on a web server and you can request the written file from the web server.

```
import time
import random

file = "C:/temp/src.txt"
```

```
while True:
    f = random.random()
    s = "%.2f" % f
    try:
        wf = open(file, "w")
        wf.write(s)
        wf.close()
    except:
        print "Can't open file"

    print "Wert %.2f" %f

    time.sleep(1)
```

A PHP Script To Create Random Numbers

The following PHP script delivers a random number between 0 and 1 each time it is called.

```
<?php
    echo (rand() / getrandmax()) . "\n";
?>
```

2.1.11 Using Comments

During your study of this manual, surely you have encountered source code examples with text that is not part of the actual script. These so-called comments are a help for the programmer and other users of the script. Comments are used for a better readability and understandability of the source code.

There are two different kinds of comments in MADRIX Script:

- Single line comments are induced with "//" and they end at the end of the line.

```
//This is a comment about a single line
//This is the next line
```

- Multi-line comments are started with "/*" and they end with "*/".

```
/* a comment starts here

*/ the comment ends here
```


2.1.12 Including Extra Information

It is possible to provide some additional information about a script. This includes a script name, a version number, the author's name, and a description. The information is visible within a script, because it is written into the Script Editor's input field if it has been loaded as compiled script.

Here is an example on how the information can be included:

```
@name="Name of the script"  
@version="1.24";  
@author="John Smith";  
@description="Any text which describes the following script.";
```

As shown above, information is set using the following syntax:

```
@INFORMATION="any string";
```

Values after "=" have to be a string within double quotes. Therefore, it is also possible to set version to "1.2a" or any other string. Please note case sensitivity. It is not possible to set any of the values within a function and it is recommended to write the information at the beginning of a script. Overwriting one of the values results in a warning. The summary contains an [»overview about the information that can be included](#) in a script.

2.2 Advanced Techniques

2.2.1 Draw And Render Functions

2.2.1.1 Pixels Vs. Vectors

Introduction

- In a lot of cases, MADRIX Script offers both a pixel-based or a vector-based version of a function.
- When working with a matrix and pixels, the dimensions of matrix and effects, such as a vertical line, are absolute and adjusted to that particular matrix.
 - For example, you might want to draw a 20x2 horizontal line on a 50x50 matrix.
- However, this can be a disadvantage since you might want to write a macro/script that can be applied to a multitude of matrixes with different sizes or someone else might want to use your script. In this case using relative values can help a lot, since effects are scalable then.
 - For example, the horizontal line should always be of 50% width and 5% height.
 - Valid values for relative values range from 0.0 to 1.0.

Rules Of Calling Functions

Overview

- Functions of MADRIX Script often tell you what their purpose is and which kind of values they require (absolute or relative).
- The name of a draw or render function often starts with a description of what it does, like *Draw* or *Fill*. It is followed by *Pixel* or *Vector* to describe whether the function requires pixel coordinates or relative coordinates. The final part describes the application of the function, like *Rect* or *Line*. Here are two examples:
 - `FillPixelRect` - Draws and fills a rectangle using absolute values
 - `DrawVectorCircle` - Draws an unfilled circle using relative values

Using Absolute Coordinates

- Functions with *Pixel* in their name operate on absolute pixel values. Imagine a rectangle which is drawn from $x=5, y=5$ with a size of 10. The object will always be rendered starting from 5, 5 to 15, 15, on every matrix.
 - On the one hand, the rectangle appears to be very small on large matrices.
 - On the other hand, on small matrices it seems to be a big rectangle because it fills a larger area of the matrix.

Using Relative Coordinates

- Functions with *Vector* in their name operate on relative values. 0, 0 stands for the upper left corner of the effects matrix. 1, 1 describes its lower right corner, or its whole length and height.
 - A rectangle which is drawn from 0.25 with a size of 0.5 will look the same on every matrix. Its size is simply the half of the matrix size.
 - On a matrix with more pixels the rectangle is also drawn with more pixels compared to fewer pixels on a smaller matrix.
 - In contrast, the usage of absolute coordinates dictates the utilization of the same amount of pixels.

2.2.1.2 Using Filters

Introduction

You can use filters in order to render your output differently.

The functions looks as follows:

- `void Filter(int filter);`
- This function basically works whenever a matrix is used, which is the case with the MAS Script Effect, Macros for Effects, the Main Output Macro, and the Storage Place Macro. Insert the function into PostRenderEffect in order to use it.
- Filters are useful tools to manipulate every MADRIX effect, videos, and images.
- Several filters can be applied/used at the same time.

For MAS Script Effect, Macros for Effects, and the Storage Place Macro you can also use:

- `void SetFilter(int filter);`

Types Of Filters

Filters are divided into several groups, such as color correction filters or transformation filters, for example.

Constants for Filters / Storage Place and Layer Effects (FX)	
General Filters	
int <code>FILTER_NONE</code>	Deactivates the filter.
Blur/Sharpen Filters	
int <code>FILTER_BLUR</code>	This filter blurs the output.
int <code>FILTER_BLUR_BSPLINE</code>	This filter blurs the output applying a B-spline.
int <code>FILTER_BLUR_CATMULL_ROM</code>	This filter blurs the output applying a Catmull-Rom spline.
int <code>FILTER_BLUR_GAUSS</code>	This filter blurs the output applying the Gaussian function.

Constants for Filters / Storage Place and Layer Effects (FX)	
int FILTER_BLUR_MITCHELL	This filter blurs the output applying the Mitchell-Netravali function.
int FILTER_SHARPEN	This filter sharpens the output.
Color Correction Filters	
int FILTER_BRIGHTEN	The brighten filter to light up the whole matrix.
int FILTER_DARKEN	The darken filter to darken the whole matrix.
int FILTER_GRAYSCALE	The grayscale filter to render the matrix grayscale, i.e. in gray colors.
int FILTER_INVERT_COLOR	The invert color filter to invert every color channel.
Color Mask Filters	
int FILTER_RED	The red filter to filter out every color except the red color channel.
int FILTER_GREEN	The green filter to filter out every color except the green color channel.
int FILTER_BLUE	The blue filter to filter out every color except the blue color channel.
int FILTER_WHITE	The white filter to filter out every color except the white color channel.
int FILTER_RED_GREEN	The red/green filter to filter out every color except the red and the green color channel.
int FILTER_RED_BLUE	The red/blue filter to filter out every color except the red and the blue color channel.
int FILTER_GREEN_BLUE	The green/blue filter to filter out every color except the green and the blue color channel.
int FILTER_RED_WHITE	The red/white filter to filter out every color except the red and the white color channel.
int FILTER_GREEN_WHITE	The green/white filter to filter out every color except the green and the white color channel.
int FILTER_BLUE_WHITE	The blue/white filter to filter out every color except the blue and the white color channel.
int FILTER_RED_GREEN_BLUE	The red/green/blue filter to filter out every color except the red, the green, and the blue color channel.
int FILTER_RED_GREEN_WHITE	The red/green/white filter to filter out every color except the red, the green, and the white color channel.

Constants for Filters / Storage Place and Layer Effects (FX)	
int <code>FILTER_RED_BLUE_WHITE</code>	The red/blue/white filter to filter out every color except the red, the blue, and the white color channel.
int <code>FILTER_GREEN_BLUE_WHITE</code>	The green/blue/white filter to filter out every color except the green, the blue, and the white color channel.
Style Filters	
int <code>FILTER_EDGES</code>	The edges filter to make the edges of objects/motifs stand out.
int <code>FILTER_EDGES_POPUP</code>	The edges popup filter to make the edges of objects/motifs stand out.
int <code>FILTER_EMOSS</code>	The emboss filter to create an image with just highlights and shadows.
int <code>FILTER_EMOSS_POPUP</code>	The emboss popup filter to create an image with just highlights and shadows depending on the motif.
Transformation Filters	
int <code>FILTER_INVERT_H_MATRIX</code>	The filter flips the matrix horizontally.
int <code>FILTER_INVERT_V_MATRIX</code>	The filter flips the matrix vertically.
int <code>FILTER_INVERT_HV_MATRIX</code>	The filter flips the matrix horizontally and vertically. Therefore it instantly rotates the matrix by 180°.
int <code>FILTER_INVERT_D_MATRIX</code>	The filter flips the matrix regarding the depth.
int <code>FILTER_INVERT_HD_MATRIX</code>	The filter flips the matrix horizontally and regarding the depth.
int <code>FILTER_INVERT_VD_MATRIX</code>	The filter flips the matrix vertically and regarding the depth.
int <code>FILTER_INVERT_HVD_MATRIX</code>	The filter flips the matrix horizontally, vertically, and regarding the depth.

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
int <code>FILTER_GREYSCALE</code>	Use int <code>FILTER_GRAYSCALE</code> instead.

Example

Paste the following example into the Main Output Macro Editor to see how this filter inverts all colors of your main output.

```
@scriptname="Filter: Invert Colors";
@author="";
@version="2.8";
@description="";

void InitEffect()
{}

void PreRenderEffect()
{}

void PostRenderEffect()
{
    Filter(FILTER_INVERT_COLOR);
}
```

2.2.1.3 Using Mix Modes

Available Functions

The function *SetMixMode* offers the possibility to set the mix mode of a Layer. The function *GetMixMode* retrieves the mix mode currently in use. They are declared as follows:

- `void SetMixMode(int mode)`
- `int GetMixMode()`

For the parameter *mode* one of the values described in the table below must be used. If *mode* has an invalid value, nothing will happen and a message will be displayed inside the Script output window of the Script editor. You can find more information about mix modes and their usage in the MADRIX manual.

Available Parameters

Identifier/ Mix Mode	Description
int <code>MIXMODE_NORMAL</code>	The Normal mix mode.
int <code>MIXMODE_DARKEN</code>	The Darken mix mode.
int <code>MIXMODE_MULTIPLY</code>	The Multiply mix mode.
int <code>MIXMODE_COLORBURN</code>	The Color Burn mix mode.
int <code>MIXMODE_LINEARBURN</code>	The Linear Burn mix mode.
int <code>MIXMODE_LIGHTEN</code>	The Lighten (HTP) mix mode.
int <code>MIXMODE_SCREEN</code>	The Screen mix mode.
int <code>MIXMODE_COLORDODGE</code>	The Color Dodge mix mode.
int <code>MIXMODE_LINEARDODGE</code>	The Linear Dodge mix mode.
int <code>MIXMODE_OVERLAY</code>	The Overlay mix mode.
int <code>MIXMODE_SOFTLIGHT</code>	The Soft Light mix mode.
int <code>MIXMODE_HARDLIGHT</code>	The Hard Light mix mode.
int <code>MIXMODE_VIVIDLIGHT</code>	The Vivid Light mix mode.
int <code>MIXMODE_LINEARLIGHT</code>	The Linear Light mix mode.
int <code>MIXMODE_PINLIGHT</code>	The Pin Light mix mode.
int <code>MIXMODE_HARDMIX</code>	The Hard Mix mix mode.
int <code>MIXMODE_DIFFERENCE</code>	The Difference mix mode.
int <code>MIXMODE_EXCLUSION</code>	The Exclusion mix mode.
int <code>MIXMODE_AND</code>	The AND mix mode.
int <code>MIXMODE_OR</code>	The OR mix mode.
int <code>MIXMODE_XOR</code>	The XOR mix mode.
int <code>MIXMODE_NAND</code>	The NAND mix mode.
int <code>MIXMODE_NOR</code>	The NOR mix mode.
int <code>MIXMODE_MASK</code>	The Mask mix mode.

2.2.1.4 Mapping / Tiling / Rotation

Overview

- MADRIX provides advanced mapping functionality, including mapping, tiling, and rotation.
- The following functions are available for the MAS Script Effect as well as Macros for Effects for usage in MADRIX Script.
- The Storage Place Macro provides its own functions. Learn more: »[Storage Place Macro: Functions](#)

Functions

Function	Description	MAS Script	Macro s for Effect s	Storag e Place Macro	Main Output Macro
int MapDlgIsMapped()	Retrieves if the Layer is mapped.	+	+		
void MapDlgGetMapVector (float map[])	Retrieves the map settings for the Layer using relative values. The values are saved in a array (<i>map[]</i>). <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = width (Size X) ▪ map[3] = height (Size Y) 	+	+		
void MapDlgSetMapVector (float x, float y, float w, float h)	Maps the Layer to a certain area of the matrix using relative values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.	+	+		
void MapDlgGetMapVector3D (float map[])	Retrieves the map settings for the Layer in 3D using relative values. The values are saved in an array (<i>map[]</i>). <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = Z-coordinate (Position Z) ▪ map[3] = width (Size X) ▪ map[4] = height (Size Y) ▪ map[5] = depth (Size Z) 	+	+		

void MapDlgSetMapVector3D (float x, float y, float z, float w, float h, float d)	Maps the Layer to a certain area of the matrix in 3D using relative values. <i>x</i> , <i>y</i> , and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.	+	+		
void MapDlgGetMapPixel (int map[])	Retrieves the map settings for the Layer using pixel values. The values are saved in an array (<i>map[]</i>). <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = width (Size X) ▪ map[3] = height (Size Y) 	+	+		
void MapDlgSetMapPixel (int x, int y, int w, int h)	Maps the Layer to a certain area of the matrix using pixel values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.	+	+		
void MapDlgGetMapPixel3D (int map[])	Retrieves the map settings for the Layer in 3D using pixel values. The values are saved in an array (<i>map[]</i>). <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = Z-coordinate (Position Z) ▪ map[3] = width (Size X) ▪ map[4] = height (Size Y) ▪ map[5] = depth (Size Z) 	+	+		
void MapDlgSetMapPixel3D (int x, int y, int z, int w, int h, int d)	Maps the Layer to a certain area of the matrix in 3D using pixel values. <i>x</i> , <i>y</i> , and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.	+	+		
int MapDlgGetMapMode ()	Retrieves the currently used Map Mirror Mode of the Layer. See below for a list of constants.	+	+		
void MapDlgSetMapMode (int mode)	Sets the Map Mirror Mode for the Layer. See below for a list of constants.	+	+		
void MapDlgGetTileVector (float tile[])	Retrieves the Tiling settings for the Layer using relative values. The values are saved in an array (<i>tile[]</i>). <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = width (Size X) ▪ tile[3] = height (Size Y) 	+	+		
void MapDlgSetTileVector (float x, float y, float w, float h)	Tiles the Layer to a certain area of the mapping using relative values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.	+	+		

<p>void MapDlgGetTileVector3D (float tile[])</p>	<p>Retrieves the Tiling settings for the Layer in 3D using relative values. The values are saved in an array (<i>tile[]</i>).</p> <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = Z-coordinate (Position Z) ▪ tile[3] = width (Size X) ▪ tile[4] = height (Size Y) ▪ tile[5] = depth (Size Z) 	<p>+</p>	<p>+</p>		
<p>void MapDlgSetTileVector3D (float x, float y, float z, float w, float h, float d)</p>	<p>Tiles the Layer in a certain area of the mapping in 3D using relative values. Layer indexing (<i>number</i>) starts with 0. <i>x</i>, <i>y</i>, and <i>z</i> describe the coordinates. <i>w</i>, <i>h</i>, and <i>d</i> describe width, height, and depth.</p>	<p>+</p>	<p>+</p>		
<p>void MapDlgGetTilePixel(int tile [])</p>	<p>Retrieves the Tiling settings for the Layer using pixel values. The values are saved in an array (<i>tile[]</i>).</p> <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = width (Size X) ▪ tile[3] = height (Size Y) 	<p>+</p>	<p>+</p>		
<p>void MapDlgSetTilePixel(int x, int y, int w, int h)</p>	<p>Tiles the Layer in a certain area of the mapping using pixel values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.</p>	<p>+</p>	<p>+</p>		
<p>void MapDlgGetTilePixel3D(int tile[])</p>	<p>Retrieves the Tiling settings for the Layer in 3D using pixel values. The values are saved in an array (<i>tile[]</i>).</p> <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = Z-coordinate (Position Z) ▪ tile[3] = width (Size X) ▪ tile[4] = height (Size Y) ▪ tile[5] = depth (Size Z) 	<p>+</p>	<p>+</p>		
<p>void MapDlgSetTilePixel3D(int x, int y, int z, int w, int h, int d)</p>	<p>Tiles the Layer in a certain area of the mapping using pixel values. <i>x</i>, <i>y</i> and <i>z</i> describe the coordinates. <i>w</i>, <i>h</i>, and <i>d</i> describe width, height, and depth.</p>	<p>+</p>	<p>+</p>		

void MapDlgGetTileOffsetVector (float offset[])	Retrieves the Tiling Offset of the Layer using relative values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) 	+	+		
void MapDlgSetTileOffsetVector (float x, float y)	Sets the Tiling Offset of the Layer using relative values. <i>x</i> describes Offset X, while <i>y</i> represents Offset Y.	+	+		
void MapDlgGetTileOffsetVector3D (float offset[])	Retrieves the Tiling Offset of the Layer in 3D using relative values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) ▪ offset[2] = Z-coordinate (Offset Z) 	+	+		
void MapDlgSetTileOffsetVector3D (float x, float y, float z)	Sets the Tiling Offset of the Layer in 3D using relative values. <i>x</i> describes Offset X, <i>y</i> describes Offset Y, while <i>z</i> represents Offset Z.	+	+		
void MapDlgGetTileOffsetPixel (int offset[])	Retrieves the Tiling Offset of the Layer using pixel values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) 	+	+		
void MapDlgSetTileOffsetPixel (int x, int y)	Sets the Tiling Offset of the Layer using pixel values. <i>x</i> describes Offset X, while <i>y</i> represents Offset Y.	+	+		
void MapDlgGetTileOffsetPixel3D (int offset[])	Retrieves the Tiling Offset of the Layer in 3D using pixel values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) ▪ offset[2] = Z-coordinate (Offset Z) 	+	+		
void MapDlgSetTileOffsetPixel3D (int x, int y, int z)	Sets the Tiling Offset of the Layer in 3D using pixel values. <i>x</i> describes Offset X, <i>y</i> describes Offset Y, while <i>z</i> represents Offset Z.	+	+		
int MapDlgGetTileMode ()	Retrieves the currently used Tile Mode of the Layer. See below for a list of Tile Mode constants.	+	+		
void MapDlgSetTileMode (int mode)	Sets the Tile Mode of the Layer. See below for a list of Tile Mode constants.	+	+		

void MapDlgGetRotationVector (float rot[])	Retrieves the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using relative values. The values are saved in an array (<i>rot[]</i>). <ul style="list-style-type: none"> ▪ rot[0] = X-coordinate (X-Axis) ▪ rot[1] = Y-coordinate (Y-Axis) ▪ rot[2] = Z-coordinate (Z-Axis) 	+	+		
void MapDlgSetRotationVector (float x, float y, float z)	Sets the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using relative values.	+	+		
void MapDlgGetRotationDegree (int rot[])	Retrieves the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using degree values. The values are saved in an array (<i>rot[]</i>). <ul style="list-style-type: none"> ▪ rot[0] = X-coordinate (X-Axis) ▪ rot[1] = Y-coordinate (Y-Axis) ▪ rot[2] = Z-coordinate (Z-Axis) 	+	+		
void MapDlgSetRotationDegree (int x, int y, int z)	Sets the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using degree values.	+	+		
float MapDlgGetRotationXVector ()	Retrieves the Rotation for the X-axis of the Layer using relative values.	+	+		
void MapDlgSetRotationXVector (float value)	Sets the Rotation value for the X-axis of the specified Layer using degree values.	+	+		
int MapDlgGetRotationXDegree ()	Retrieves the Rotation for the X-axis of the Layer using degree values.	+	+		
void MapDlgSetRotationXDegree (int value)	Sets the Rotation value for the X-axis of the Layer using degree values.	+	+		
int MapDlgGetRotationXMode ()	Retrieves the Rotation mode for the X-axis of the Layer. See below for a list of Rotation Mode constants.	+	+		
void MapDlgSetRotationXMode (int mode)	Sets the Rotation mode for the X-axis of the Layer. See below for a list of Rotation Mode constants.	+	+		
float MapDlgGetRotationYVector ()	Retrieves the Rotation for the Y-axis of the Layer using relative values.	+	+		
void MapDlgSetRotationYVector (float value)	Sets the Rotation value for the Y-axis of the Layer using relative values.	+	+		
int MapDlgGetRotationYDegree ()	Retrieves the Rotation for the Y-axis of the Layer using degree values.	+	+		
void MapDlgSetRotationYDegree (int value)	Sets the Rotation value for the Y-axis of the Layer using degree values.	+	+		
int MapDlgGetRotationYMode ()	Retrieves the Rotation mode for the Y-axis of the Layer. See below for a list of Rotation Mode constants.	+	+		

void MapDlgSetRotationYMode (int mode)	Sets the Rotation mode for the Y-axis of the Layer. See below for a list of Rotation Mode constants.	+	+		
float MapDlgGetRotationZVector ()	Retrieves the Rotation value for the Z-axis of the Layer using relative values.	+	+		
void MapDlgSetRotationZVector (float value)	Sets the Rotation value for the Z-axis of the Layer using relative values.	+	+		
int MapDlgGetRotationZDegree ()	Retrieves the Rotation value for the Z-axis of the Layer using degree values.	+	+		
void MapDlgSetRotationZDegree (int value)	Sets the Rotation value for the Z-axis of the Layer using degree values.	+	+		
int MapDlgGetRotationZMode ()	Retrieves the Rotation mode for the Z-axis of the Layer. See below for a list of Rotation Mode constants.	+	+		
void MapDlgSetRotationZMode (int mode)	Sets the Rotation mode for the Z-axis of the Layer. See below for a list of Rotation Mode constants.	+	+		
void MapDlgGetRotationMode (int mode[])	Retrieves the Rotation mode for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer. See below for a list of Rotation Mode constants. The values are saved in an array (<i>mode[]</i>). <ul style="list-style-type: none"> ▪ mode[0] = X-coordinate (X-Axis) ▪ mode[1] = Y-coordinate (Y-Axis) ▪ mode[2] = Z-coordinate (Z-Axis) 	+	+		
void MapDlgSetRotationMode (int x, int y, int z)	Sets the Rotation Mode for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer. See below for a list of Rotation Mode constants.	+	+		
int MapDlgGetAntiAliasing ()	Retrieves the Anti-Aliasing mode of the Layer. See below for a list of Anti-Aliasing Mode constants.	+	+		
void MapDlgSetAntiAliasing (int aaLevel)	Sets the Anti-Aliasing mode of the Layer. See below for a list of Anti-Aliasing Mode constants.	+	+		

Map Mirror Mode Constants

Constant	Description
int MAP_MIRROR_NONE	Sets no Mirror Mode.
int MAP_MIRROR_H	Mirrors the content of the matrix horizontally.
int MAP_MIRROR_V	Mirrors the content of the matrix vertically.
int MAP_MIRROR_HV	Mirrors the content of the matrix horizontally and vertically.
int MAP_MIRROR_D	Mirrors the content of the matrix in the depth.
int MAP_MIRROR_HD	Mirrors the content of the matrix horizontally and in the depth.

Constant	Description
int <code>MAP_MIRROR_VD</code>	Mirrors the content of the matrix vertically and in the depth.
int <code>MAP_MIRROR_HVD</code>	Mirrors the content of the matrix horizontally, vertically, and in the depth.

Map Tile Mode Constants

Constant	Description
int <code>MAP_TILE_NONE</code>	Sets no Tile Mode.
int <code>MAP_TILE_REPEAT</code>	Repeats tiles on the mapped matrix.
int <code>MAP_TILE_MIRROR_H</code>	Mirrors tiles horizontally.
int <code>MAP_TILE_MIRROR_V</code>	Mirrors tiles vertically.
int <code>MAP_TILE_MIRROR_HV</code>	Mirrors tiles horizontally and vertically.
int <code>MAP_TILE_MIRROR_D</code>	Mirrors tiles in the depth.
int <code>MAP_TILE_MIRROR_HD</code>	Mirrors tiles horizontally and in the depth.
int <code>MAP_TILE_MIRROR_VD</code>	Mirrors tiles vertically and in the depth.
int <code>MAP_TILE_MIRROR_HVD</code>	Mirrors tiles horizontally, vertically, and in the depth.

Map Rotation Mode Constants

Constant	Description
int <code>MAP_ROTATION_FIXED</code>	The rotation value is fixed and not animated.
int <code>MAP_ROTATION_LOOP</code>	The rotation value is used for a looped animation.

Map Anti-Aliasing Mode Constants

Constant	Description
int <code>MAP_AA_NONE</code>	Sets no anti-aliasing.
int <code>MAP_AA_2X</code>	Sets simple anti-aliasing (requires some performance).

Constant	Description
int <code>MAP_AA_4X</code>	Sets complex anti-aliasing (requires a lot performance).

2.2.1.5 'ShiftMatrix'

The shifting function allows you to move the content of the matrix into a given direction. It is declared as follows:

```
void ShiftPixelMatrix(int x, int y, int w, int h, int dir, int step)
void ShiftVectorMatrix(float x, float y, float w, float h, int dir, float step)
```

Again there are two possibilities. One is used with absolute pixel coordinates and values, and one uses relative coordinates and values between 0 and 1.

- *x*, *y*, *w*, and *h* define the pixel area that should be shifted.
- *step* defines how many pixels the content should be shifted into a given direction, which specified by *dir*.
- For *dir* »[the SHIFT_direction values](#) are allowed. If the value of *dir* is invalid, the default direction `SHIFT_TOP` will be used.

The following script for the MAS Script Effect fills the matrix with yellow and draws a red cross onto it during initialization. During the rendering of the content, the whole matrix is shifted downwards. Hence, the cross is moving to the bottom of the matrix. You can simply copy and paste it.

```
void InitEffect()
{
    color colbg = {255,255};
    color col = {255};
    Clear(colbg);
    DrawVectorCross(col,0.0,0.0,1.0,1.0);
}

void RenderEffect()
{
    ShiftPixelMatrix(0,0,GetMatrixWidth(),GetMatrixHeight(),SHIFT_DOWN,1);
}
```

The script also demonstrates an important behavior of the function. As you can see, the matrix remains yellow, but the cross moves to the bottom. Furthermore, red lines will be drawn on the left and right side. This is due to the fact that the *Shift* function copies the complete content of the matrix and redraws this picture on the new position. While the content is moved into the given direction, the original matrix is left unchanged. This leaves the first pixel "line" unchanged in our example.

2.2.1.6 'DrawPixelArea'

Introduction

Two specific functions will be described in this chapter. First, MADRIX Script provides a function to be able to retrieve the content of a specific area of the matrix. Second, there is a function which is able to draw pixels onto the matrix using the obtained data array(s) as source.

Retrieving Content Of The Matrix

The function *GetPixelArea* retrieves data from the matrix and stores it into a 2-dimensional array of colors. Data is stored in the background at a certain position of the virtual matrix.

```
void GetPixelArea(matrix[][], int xSrc, int ySrc, int w, int h,  
int xDst, int yDst)
```

Explanation:

- *matrix[]* is a 2-dimensional array of colors in which the content of the virtual matrix is saved.
- *xSrc*, *ySrc* describe the position of the source area (upper left corner). The default values are 0.
- *w*, *h* describe the width and height of the source area. The default values are -1.
A value of -1 means that the whole width or height of the virtual matrix will be retrieved (the complete matrix).
- *xDst* and *yDst* describe the position of the destination area (upper left corner). The default values are 0.
The retrieved array will be stored in the background. It will be stored at a certain position of a matrix in the background. As such, you can define an individual target destination.
This behavior allows you, **for example**, to retrieve multiple source areas by calling *GetPixelArea* several times and to draw them only once by calling *DrawPixelArea* one time (see below).
If your array is larger than your target destination allows, it will be reduced to fit the size of the virtual matrix.

- In order to retrieve the whole matrix into the given array, it is possible to just call:

```
color matrix[][];  
GetPixelArea(matrix);
```

- Summary: You can store the complete virtual matrix or only parts of it in a array. The array can be stored at the default position or an individual position. The array is stored on a matrix in the background. The background matrix acts as source for *DrawPixelArea*. It can contain several arrays.

Drawing Content Onto The Matrix

The function *DrawPixelArea* copies data from a 2-dimensional array of colors from the background and renders it onto the actual matrix.

```
void DrawPixelArea(matrix[][], int xDst, int yDst, int w, int h,  
int xSrc, int ySrc)
```

Explanation:

- *matrix[]* is a 2-dimensional array of colors that holds the source for *DrawPixelArea*. Use *GetPixelArea* as described above to retrieve the data.
- *xDst*, *yDst* describe the destination area. The default values are 0.
This allows you to draw the array onto the default position of your virtual matrix or an individual position.
If the source array is larger than your target destination allows, it will be reduced to fit the size of the virtual matrix.
- *w*, *h* describe the width and height of the render area. The default values are -1.
A value of -1 means that the whole width or height of the given array will be copied to the virtual matrix (the complete array).
- *xSrc*, *ySrc* describe the source area. The default values are 0.
DrawPixelArea can use and render the complete background matrix that was retrieved with *GetPixelArea*. Or it can only access and render a certain part of it.
- In order to draw the whole matrix it is possible to call:

```
color matrix[][];  
DrawPixelArea(matrix);
```

- Summary: *DrawPixelArea* can access the background matrix that was created with *GetPixelArea*. With *DrawPixelArea* you can render the complete array or only parts of it onto your virtual matrix. The array can be drawn at the default or an individual position.

- (For the drawing operation, it is assumed that the array describes a rectangular area in which every single line has the same number of columns.)

Example

DrawPixelArea

The first example for the MAS Script Effect will simply draw a small, red square in the upper left corner of the matrix with a green center. The colors drawn are defined in the array variable *matrix[][]* in *InitEffect*.

```
@scriptname="";
@author="";
@version="";
@description="";

color matrix[][];

void InitEffect()
{
    matrix[0][0]=RED;
    matrix[0][1]=RED;
    matrix[0][2]=RED;
    matrix[0][3]=RED;
    matrix[1][0]=RED;
    matrix[1][1]=GREEN;
    matrix[1][2]=GREEN;
    matrix[1][3]=RED;
    matrix[2][0]=RED;
    matrix[2][1]=GREEN;
    matrix[2][2]=GREEN;
    matrix[2][3]=RED;
    matrix[3][0]=RED;
    matrix[3][1]=RED;
    matrix[3][2]=RED;
    matrix[3][3]=RED;
}

void RenderEffect()
{
    DrawPixelArea(matrix, 0, 0, -1, -1, 0, 0);
}
```

2.2.1.7 'PixelTranspose'

Introduction

PixelTranspose is a technic to transpose (move) pixels from their origin/source (*srcX* and *srcY* coordinate) to a new destination. Three (or four) steps are necessary to perform a pixel transposition.

1. Creating the pixel transpose table which holds the information for each pixel that should be moved.
2. Setting or adding the information (source and destination coordinates) for each of those pixels to the table.
3. Executing the pixel transposition.
4. Releasing the pixel transpose table.

1. Creating The Pixel Transpose Table

```
void CreatePixelTransposeTable(int size, int growsize)
```

The parameter *size* describes the amount of pixels in the table. The second parameter *growsize* describes the size that will be used to grow the table by using *AddPixelTransposeEntry* if the predefined size of *PixelTransposeTable* is reached. It is not necessarily required to use the second parameter because the *growsize* is set to 128 by default.

2. Setting Or Adding Information

```
void SetPixelTransposeEntry(int idx, int srcX, int srcY, int destX, int destY)
```

Using *SetPixelTransposeEntry* requires 5 parameters. The first parameter *idx* defines the index of the predefined table. This index count starts with zero and has to be lower than the *size* value of *CreatePixelTransposeTable(int size, int growsize)*. The second and third parameter, *srcX* and *srcY*, describe the source coordinate and the fourth and fifth parameter, *destX* and *destY*, set the destination coordinates.

```
void AddPixelTransposeEntry(int srcX, int srcY, int destX, int destY)
```

Using *AddPixelTransposeEntry* requires only 4 parameters, i.e. the source and destination coordinates. The function validates if an entry already exists. If this is not the case, the function adds the entry to the end of the pixel transpose table. If the predefined *size* in *CreatePixelTransposeTable(int size, int growsize)* is then exceeded, the table automatically grows by the size defined with *growsize*.

The execution of *SetPixelTransposeEntry* is performed much faster than that of *AddPixelTransposeEntry*.

3. Executing The Pixel Transposition

```
void ExecutePixelTranspose(int clear)
```

Using this function executes all pixel transpositions that are defined in the pixel transpose table. The *clear* parameter defines how the part of the matrix is handled which is not defined as destination. If the *clear* parameter is set to **CLEAR**, the part will be erased using black. Otherwise, if this parameter is set to **NOCLEAR**, the color values will be left like they were before.

4. Releasing The Pixel Transpose Table

```
void ReleasePixelTransposeTable()
```

Using this function releases the created transpose table. That means, that the reserved memory is made available again.

Examples

The following 3 examples will rotate the Main Output using the pixel transpose technique. Please note that this only works on quadratic matrices. Just use the SCE Color Gradient effect and insert the following source code into the Main Output Macro. The differences will be easily visible.

Clockwise Rotation

As an Main Output Macro, this macro rotates the output 90° clockwise.

```

@scriptname="Output Rotation";
@author="inoage";
@version="2.9";
@description="Rotates the main output";

int Init=0;

void InitEffect()
{
int w = GetMatrixWidth();
int h = GetMatrixHeight();
Init=0;

if(w==h) //this example runs only on quadratic matrices
{
int idx = 0;
CreatePixelTransposeTable(w*h); //make a table with w*h entities

for(int y=0;y<h;y++)
{
for(int x=0;x<w;x++)

{
SetPixelTransposeEntry(idx,x,y,h-y-1,x); //rotate clockwise
idx++;
}
}

Init=1; //init ready, can use ExecutePixelTranspose()
}

else
{
WriteText("This script runs only on quadratic matrices,");
WriteText("but your matrix is "+(string)w+"x"+(string)h);
}
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
if(Init==1)
ExecutePixelTranspose(CLEAR); //execute to transpose all pixels
//and to clear all non-transposed pixels
}

void MatrixSizeChanged()
{
ReleasePixelTransposeTable(); //release the old transpose table if existent
InitEffect();
}

```

Counter-Clockwise Rotation

As a Main Output Macro, this macro rotates the Main Output by 90° counter-clockwise.

```

@scriptname="Output Rotation";
@author="inoage";
@version="2.9";
@description="Rotates the main output";

int Init=0;

void InitEffect()
{
int w = GetMatrixWidth();
int h = GetMatrixHeight();
Init=0;

if(w==h) //this example runs only on quadratic matrices
{
int idx = 0;
CreatePixelTransposeTable(w*h); //make a table with w*h entities

for(int y=0;y<h;y++)
{
for(int x=0;x<w;x++)

{
SetPixelTransposeEntry(idx,x,y,y,w-x-1); //rotate counter-clockwise
idx++;
}
}

Init=1; //init ready, can use ExecutePixelTranspose()
}

else
{
WriteText("This script runs only on quadratic matrices,");
WriteText("but your matrix is "+(string)w+"x"+(string)h);
}
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
if(Init==1)
ExecutePixelTranspose(CLEAR); //execute to transpose all pixels
//and to clear all non-transposed pixels
}

```

```

void MatrixSizeChanged()
{
ReleasePixelTransposeTable(); //release the old transpose table if existent
InitEffect();
}

```

Mirror Diagonally

As an Main Output Macro, use a SCE Color Gradient from bottom left to top right for example to see the result.

```

@scriptname="Output Rotation";
@author="inoage";
@version="2.9";
@description="Rotates the main output";

int Init=0;

void InitEffect()
{
int w = GetMatrixWidth();
int h = GetMatrixHeight();
Init=0;

if(w==h) //this example runs only on quadratic matrices

{
int idx = 0;
CreatePixelTransposeTable(w*h); //make a table with w*h entities

for(int y=0;y<h;y++)
{
for(int x=0;x<w;x++)

{
SetPixelTransposeEntry(idx,x,y,y,x); //mirror diagonally
idx++;
}
}

Init=1; //init ready, can use ExecutePixelTranspose()
}

else
{
WriteText("This script runs only on quadratic matrices,");
WriteText("but your matrix is "+(string)w+"x"+(string)h);
}
}

void PreRenderEffect()
{
}

```

```
void PostRenderEffect()
{
  if(Init==1)
  ExecutePixelTranspose(CLEAR); //execute to transpose all pixels
                                //and to clear all non-transposed pixels
}

void MatrixSizeChanged()
{
  ReleasePixelTransposeTable(); //release the old transpose table if existent
  InitEffect();
}
```

2.2.1.8 'SetPixel'

Functionality

SetPixel functions offer the possibility to change the color of pixels. You can either specify a certain color or use grayscale. The following examples use only some of the functions that are available.

Examples

SetPixel

To test this script, please use the MAS Script Effect.

This sample paints red pixels onto the complete matrix with different brightness values.

```
@scriptname="SetPixel test, use with MAS Script Effect";
@author="";
@version="";
@description="";

color col;
int maxX,maxY,x,y;
void InitEffect()
{
  maxX=GetMatrixWidth();
  maxY=GetMatrixHeight();
}

void RenderEffect()
{
  col.r=random(0,255);
  x=random(0,maxX-1);
  y=random(0,maxY-1);
  SetPixel(col,x,y);
}
```



```

}

void MatrixSizeChanged()
{
    InitEffect();
}

```

SetPixel3D

To test this script, please use the MAS Script Effect.

This sample paints golden pixels onto the complete matrix. Please use a 3D matrix.

```

@scriptname="SetPixel3D test, use with MAS script effect";
@author="";
@version="";
@description="";

int maxX,maxY,maxZ,x,y,z;

void InitEffect()
{
    maxX=GetMatrixWidth();
    maxY=GetMatrixHeight();
    maxZ=GetMatrixDepth();
}

void RenderEffect()
{
    Clear();
    x=random(0,maxX-1);
    y=random(0,maxY-1);
    z=random(0,maxZ-1);
    SetPixel3D(GOLD,x,y,z);
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

SetPixel - Filling The Matrix

To test this script, please use the MAS Script Effect.

This sample fills every pixel of every row of the matrix with the color white from left to right until the complete matrix is covered. Every second iteration black is used instead of white.

```

@scriptname="SetPixelSample";
@author="inoage";
@version="MADRIX 2.13";
@description="a simple setpixel example to fill the matrix";

```

```

int x,y,c;
color col;

void InitEffect()
{
    x=0;
    y=0;
    c=0;
    col=WHITE;
}

void RenderEffect()
{
    SetPixel(col,x,y);
    x++;
    if(x>=GetMatrixWidth())
    {
        x=0;
        y++;
        if(y>=GetMatrixHeight())
        {
            y=0;
            c++;
            if(c%2==0)
                col=WHITE;
            else
                col=BLACK;
        }
    }
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

SetPixelGrayscale (MAS Script)

To test this script, please use the MAS Script effect.

```

@scriptname="sample of grayscale for a single pixel";
@author="";
@version="";
@description="";

int X,Y;
void InitEffect()
{
    X=GetMatrixHeight();
    Y=GetMatrixWidth();
    Clear(BLUE);
}

void RenderEffect()
{

```

```

    for(int i=0;i<X && i<Y;i++)
    {
        SetPixelGrayscale(i,i); // line from top left to bottom right
        SetPixelGrayscale(X-i-1,i); // line from top right to bottom left
    }
    // to render the complete matrix in grayscale, the grayscale() command
    // offers higher performance:
    // Grayscale();
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

SetPixelGrayscale (Macro)

To test this script, you can use the Main Output Macro.

But first, please select for example the SCE Color Scroll effect in Storage Left or Right and display the effect on the output.

```

@scriptname="sample of grayscale for single pixel";
@author="";
@version="";
@description="";

int X,Y;
void InitEffect()
{
    X=GetMatrixWidth();
    Y=GetMatrixHeight();
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
    if(X>Y)// width larger than height
    {
        for(int i=0;i<Y;i++)
        {
            SetPixelGrayscale(i,i); // line from top left to bottom right
            SetPixelGrayscale(i,Y-i-1); // line from top right to bottom left
        }
    }
    else // height larger than width
    {
        for(int i=0;i<X;i++)
        {
            SetPixelGrayscale(i,i); // line from top left to bottom right
            SetPixelGrayscale(X-i-1,i); // line from top right to bottom left
        }
    }
}

```

```

// to render the complete matrix in grayscale, the Grayscale() command
// offers higher performance
// Grayscale();
}

```

2.2.1.9 Draw Shapes

Overview

- MADRIX Script provides powerful functions to draw shapes onto the matrix.
- You can either use absolute pixel values or you can use relative vector values.
- These functions can be used for 2D as well as 3D.

Functions

- `void DrawPixelShape(color col, int shape, int x, int y, int z, int w, int h, int d, int lineWidth, int drawMode, int lookAtType)`

color col - Is of the data type structure and defines a color for the shape. »[Using Data Types](#)

int shape - Is of the file data integer and defines the type of shape. See [below](#) for a list of Shape Type constants.

int x - Is of the file data integer and defines the X-coordinate (left).

int y - Is of the file data integer and defines the Y-coordinate (top).

int z - Is of the file data integer and defines the Z-coordinate (front).

int w - Is of the file data integer and defines the width of the shape.

int h - Is of the file data integer and defines the height of the shape.

int d - Is of the file data integer and defines the depth of the shape.

int lineWidth - Is of the data type integer and defines the width of the shapes' border. This is not supported by all shapes. See [below](#) for a list of supported shapes and modes.

int drawMode - Is of the data type integer and defines the Draw Mode. See [below](#) for a list of Draw Mode constants.

int lookAtType - Is of the data type integer and defines the Look-At Type. See [below](#) for a list of Look-At Type Constants.

- `void DrawVectorShape(color col, int shape, float x, float y, float z, float w, float h, float d, int lineWidth, int drawMode, int lookAtType)`

color col - Is of the data type structure and defines a color for the shape. »[Using Data Types](#)

int shape - Is of the file data integer and defines the type of shape. See [below](#) for a list of Shape Type constants.

float x - Is of the file data float and defines the X-coordinate relative to the matrix size (left).

float y - Is of the file data float and defines the Y-coordinate relative to the matrix size (top).

float z - Is of the file data float and defines the Z-coordinate relative to the matrix size (front).

float w - Is of the file data float and defines the width of the shape relative to the matrix size.

float h - Is of the file data float and defines the height of the shape relative to the matrix size.

float d - Is of the file data float and defines the depth of the shape relative to the matrix size.

int lineWidth - Is of the data type integer and defines the width of the shapes' border. This is not supported by all shapes. See [below](#) for a list of supported shapes and modes.

int drawMode - Is of the data type integer and defines the Draw Mode. See [below](#) for a list of Draw Mode constants.

int lookAtType - Is of the data type integer and defines the Look-At Type. See [below](#) for a list of Look-At Type Constants.

- Valid values for relative float values range from 0.0 to 1.0.

Shape Type Constants

Constant	Description	Supported Draw Modes	lineWidth
int <code>DRAWSHAPE_RECTANGLE</code>	Renders a rectangle.	int <code>DRAWMODE_LINE</code> int <code>DRAWMODE_FACE</code>	Only supported with int <code>DRAWMODE_LINE</code>
int <code>DRAWSHAPE_SQUARE</code>	Renders a square.	int <code>DRAWMODE_LINE</code> int <code>DRAWMODE_FACE</code>	Only supported with int <code>DRAWMODE_LINE</code>
int <code>DRAWSHAPE_CIRCLE</code>	Renders a circle.	int <code>DRAWMODE_LINE</code> int <code>DRAWMODE_FACE</code>	Only supported with int <code>DRAWMODE_LINE</code>
int <code>DRAWSHAPE_ELLIPSE</code>	Renders an ellipse.	int <code>DRAWMODE_LINE</code> int <code>DRAWMODE_FACE</code>	Only supported with int <code>DRAWMODE_LINE</code>
int <code>DRAWSHAPE_CROSS</code>	Renders a cross.	int <code>DRAWMODE_LINE</code>	Not Supported
int <code>DRAWSHAPE_STAR</code>	Renders a star.	int <code>DRAWMODE_LINE</code>	Not Supported
int <code>DRAWSHAPE_DIAMOND</code>	Renders a diamond.	int <code>DRAWMODE_LINE</code> int <code>DRAWMODE_FACE</code>	Only supported with int <code>DRAWMODE_LINE</code>
int <code>DRAWSHAPE_SPHERE</code>	Renders a sphere.	int <code>DRAWMODE_LINE</code> int <code>DRAWMODE_FACE</code> int <code>DRAWMODE_VOLUME</code>	Only supported with int <code>DRAWMODE_FACE</code>
int <code>DRAWSHAPE_OCTAHEDRON</code>	Renders an octahedron.	int <code>DRAWMODE_LINE</code> int <code>DRAWMODE_FACE</code> int <code>DRAWMODE_VOLUME</code>	Only supported with int <code>DRAWMODE_FACE</code>
int <code>DRAWSHAPE_BOX</code>	Renders a box.	int <code>DRAWMODE_LINE</code> int <code>DRAWMODE_FACE</code> int <code>DRAWMODE_VOLUME</code>	Only supported with int <code>DRAWMODE_FACE</code>
int <code>DRAWSHAPE_CUBE</code>	Renders a cube.	int <code>DRAWMODE_LINE</code> int <code>DRAWMODE_FACE</code> int <code>DRAWMODE_VOLUME</code>	Only supported with int <code>DRAWMODE_FACE</code>

Draw Mode Constants

Constant	Description
int <code>DRAWMODE_LINE</code>	Renders the outline of the shape (2D and 3D: Outlined).
int <code>DRAWMODE_FACE</code>	Renders the outer surfaces (2D: Filled , 3D : Unfilled).
int <code>DRAWMODE_VOLUME</code>	Renders the complete inner and outer shape (3D: Filled).

Look-At Type Constants

Constant	Description
int <code>LOOKAT_FRONT</code>	Applies no rotation and allows you to look directly at the shape (Front).
int <code>LOOKAT_BACK</code>	Represents a rotation of 180° around the Y-axis (Back).
int <code>LOOKAT_LEFT</code>	Represents a rotation of -90° around the Y-axis (Left).
int <code>LOOKAT_RIGHT</code>	Represents a rotation of 90° around the Y-axis (Right).
int <code>LOOKAT_TOP</code>	Represents a rotation of -90° around the X-axis (Top).
int <code>LOOKAT_BOTTOM</code>	Represents a rotation of 90° around the X-axis (Bottom).

2.2.1.10 Render Shapes

Overview

- MADRIX Script provides powerful functions to render shapes onto the matrix.
- These functions can be used for 2D as well as 3D.

Functions

- `void RenderShape(struct color, int shapeType, float positionX, float positionY, float positionZ, float sizeX, float sizeY, float sizeZ, struct shape, int unitType)`

struct color - Is of the data type structure and defines a color for the shape. »[Using Data Types](#)

int shapeType - Is of the data type integer and defines the type of shape. See [below](#) for a list of Shape Type constants.

float positionX - Is of the data type float and defines the X-coordinate (left) in percent of the matrix size.

float positionY - Is of the data type float and defines the Y-coordinate (top) in percent of the matrix size.

float positionZ - Is of the data type float and defines the Z-coordinate (front) in percent of the matrix size.

float sizeX - Is of the data type float and defines the width of the shape in percent of the matrix size.

float sizeY - Is of the data type float and defines the width of the shape in percent of the matrix size.

float sizeZ - Is of the data type float and defines the width of the shape in percent of the matrix size.

struct shape - Is of the data type structure and defines various settings for the shape. This structure needs be initialized first. Initialize it with its default settings by using the function *GetDefaultShape()*. Define settings as required. See [below](#) for more information.

int unitType - Is of the data type integer and defines the usage of units. See [below](#) for a list of Unit Type constants.

Shape Type Constants

Constant	Description
int <code>SHAPE_TYPE_LINE</code>	Sets the Shape Type to Line .
int <code>SHAPE_TYPE_CURVE</code>	Sets the Shape Type to Curve .
int <code>SHAPE_TYPE_FILLED</code>	Sets the Shape Type to Filled .
int <code>SHAPE_TYPE_RECTANGLE_OUTLINED</code>	Sets the Shape Type to Rectangle Outlined .
int <code>SHAPE_TYPE_RECTANGLE_OUTLINED_IMPLODE</code>	Sets the Shape Type to Rectangle Outlined Implode .
int <code>SHAPE_TYPE_RECTANGLE_OUTLINED_EXPLODE</code>	Sets the Shape Type to Rectangle Outlined Explode .
int <code>SHAPE_TYPE_RECTANGLE_FILLED</code>	Sets the Shape Type to Rectangle Filled .
int <code>SHAPE_TYPE_RECTANGLE_FILLED_IMPLODE</code>	Sets the Shape Type to Rectangle Filled Implode .
int <code>SHAPE_TYPE_RECTANGLE_FILLED_EXPLODE</code>	Sets the Shape Type to Rectangle Filled Explode .
int <code>SHAPE_TYPE_SQUARE_OUTLINED</code>	Sets the Shape Type to Square Outlined .
int <code>SHAPE_TYPE_SQUARE_OUTLINED_IMPLODE</code>	Sets the Shape Type to Square Outlined Implode .

Constant	Description
int <code>SHAPE_TYPE_SQUARE_OUTLINED_EXPLODE</code>	Sets the Shape Type to Square Outlined Explode .
int <code>SHAPE_TYPE_SQUARE_FILLED</code>	Sets the Shape Type to Square Filled .
int <code>SHAPE_TYPE_SQUARE_FILLED_IMPLODE</code>	Sets the Shape Type to Square Filled Implode .
int <code>SHAPE_TYPE_SQUARE_FILLED_EXPLODE</code>	Sets the Shape Type to Square Filled Explode .
int <code>SHAPE_TYPE_ELLIPSE_OUTLINED</code>	Sets the Shape Type to Ellipse Outlined .
int <code>SHAPE_TYPE_ELLIPSE_OUTLINED_IMPLODE</code>	Sets the Shape Type to Ellipse Outlined Implode .
int <code>SHAPE_TYPE_ELLIPSE_OUTLINED_EXPLODE</code>	Sets the Shape Type to Ellipse Outlined Explode .
int <code>SHAPE_TYPE_ELLIPSE_FILLED</code>	Sets the Shape Type to Ellipse Filled .
int <code>SHAPE_TYPE_ELLIPSE_FILLED_IMPLODE</code>	Sets the Shape Type to Ellipse Filled Implode .
int <code>SHAPE_TYPE_ELLIPSE_FILLED_EXPLODE</code>	Sets the Shape Type to Ellipse Filled Explode .
int <code>SHAPE_TYPE_CIRCLE_OUTLINED</code>	Sets the Shape Type to Circle Outlined .
int <code>SHAPE_TYPE_CIRCLE_OUTLINED_IMPLODE</code>	Sets the Shape Type to Circle Outlined Implode .
int <code>SHAPE_TYPE_CIRCLE_OUTLINED_EXPLODE</code>	Sets the Shape Type to Circle Outlined Explode .
int <code>SHAPE_TYPE_CIRCLE_FILLED</code>	Sets the Shape Type to Circle Filled .
int <code>SHAPE_TYPE_CIRCLE_FILLED_IMPLODE</code>	Sets the Shape Type to Circle Filled Implode .
int <code>SHAPE_TYPE_CIRCLE_FILLED_EXPLODE</code>	Sets the Shape Type to Circle Filled Explode .
int <code>SHAPE_TYPE_DIAMOND_OUTLINED</code>	Sets the Shape Type to Diamond Outlined .
int <code>SHAPE_TYPE_DIAMOND_OUTLINED_IMPLODE</code>	Sets the Shape Type to Diamond Outlined Implode .
int <code>SHAPE_TYPE_DIAMOND_OUTLINED_EXPLODE</code>	Sets the Shape Type to Diamond Outlined Explode .
int <code>SHAPE_TYPE_DIAMOND_FILLED</code>	Sets the Shape Type to Diamond Filled .
int <code>SHAPE_TYPE_DIAMOND_FILLED_IMPLODE</code>	Sets the Shape Type to Diamond Filled Implode .
int <code>SHAPE_TYPE_DIAMOND_FILLED_EXPLODE</code>	Sets the Shape Type to Diamond Filled Explode .
int <code>SHAPE_TYPE_HEART_OUTLINED</code>	Sets the Shape Type to Heart Outlined .
int <code>SHAPE_TYPE_HEART_OUTLINED_IMPLODE</code>	Sets the Shape Type to Heart Outlined Implode .

Constant	Description
int <code>SHAPE_TYPE_HEART_OUTLINED_EXPLODE</code>	Sets the Shape Type to Heart Outlined Explode .
int <code>SHAPE_TYPE_HEART_FILLED</code>	Sets the Shape Type to Heart Filled .
int <code>SHAPE_TYPE_HEART_FILLED_IMPLODE</code>	Sets the Shape Type to Heart Filled Implode .
int <code>SHAPE_TYPE_HEART_FILLED_EXPLODE</code>	Sets the Shape Type to Heart Filled Explode .
int <code>SHAPE_TYPE_CROSS_OUTLINED</code>	Sets the Shape Type to Cross Outlined .
int <code>SHAPE_TYPE_CROSS_OUTLINED_IMPLODE</code>	Sets the Shape Type to Cross Outlined Implode .
int <code>SHAPE_TYPE_CROSS_OUTLINED_EXPLODE</code>	Sets the Shape Type to Cross Outlined Explode .
int <code>SHAPE_TYPE_CROSS_FILLED</code>	Sets the Shape Type to Cross Filled .
int <code>SHAPE_TYPE_CROSS_FILLED_IMPLODE</code>	Sets the Shape Type to Cross Filled Implode .
int <code>SHAPE_TYPE_CROSS_FILLED_EXPLODE</code>	Sets the Shape Type to Cross Filled Explode .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_OUTLINED</code>	Sets the Shape Type to Cross Straight Outlined .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_OUTLINED_IMPLODE</code>	Sets the Shape Type to Cross Straight Outlined Implode .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_OUTLINED_EXPLODE</code>	Sets the Shape Type to Cross Straight Outlined Explode .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_FILLED</code>	Sets the Shape Type to Cross Straight Filled .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_FILLED_IMPLODE</code>	Sets the Shape Type to Cross Straight Filled Implode .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_FILLED_EXPLODE</code>	Sets the Shape Type to Cross Straight Filled Explode .
int <code>SHAPE_TYPE_STAR_OUTLINED</code>	Sets the Shape Type to Star Outlined .
int <code>SHAPE_TYPE_STAR_OUTLINED_IMPLODE</code>	Sets the Shape Type to Star Outlined Implode .
int <code>SHAPE_TYPE_STAR_OUTLINED_EXPLODE</code>	Sets the Shape Type to Star Outlined Explode .
int <code>SHAPE_TYPE_STAR_FILLED</code>	Sets the Shape Type to Star Filled .
int <code>SHAPE_TYPE_STAR_FILLED_IMPLODE</code>	Sets the Shape Type to Star Filled Implode .
int <code>SHAPE_TYPE_STAR_FILLED_EXPLODE</code>	Sets the Shape Type to Star Filled Explode .
int <code>SHAPE_TYPE_TRIANGLE_OUTLINED</code>	Sets the Shape Type to Triangle Outlined .
int <code>SHAPE_TYPE_TRIANGLE_OUTLINED_IMPLODE</code>	Sets the Shape Type to Triangle Outlined Implode .

Constant	Description
int <code>SHAPE_TYPE_TRIANGLE_OUTLINED_EXPLODE</code>	Sets the Shape Type to Triangle Outlined Explode .
int <code>SHAPE_TYPE_TRIANGLE_FILLED</code>	Sets the Shape Type to Triangle Filled .
int <code>SHAPE_TYPE_TRIANGLE_FILLED_IMPLODE</code>	Sets the Shape Type to Triangle Filled Implode .
int <code>SHAPE_TYPE_TRIANGLE_FILLED_EXPLODE</code>	Sets the Shape Type to Triangle Filled Explode .
int <code>SHAPE_TYPE_BOX_OUTLINED</code>	Sets the Shape Type to 3D Box Outlined .
int <code>SHAPE_TYPE_BOX_OUTLINED_IMPLODE</code>	Sets the Shape Type to 3D Box Outlined Implode .
int <code>SHAPE_TYPE_BOX_OUTLINED_EXPLODE</code>	Sets the Shape Type to 3D Box Outlined Explode .
int <code>SHAPE_TYPE_BOX_UNFILLED</code>	Sets the Shape Type to 3D Box Unfilled .
int <code>SHAPE_TYPE_BOX_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Box Unfilled Implode .
int <code>SHAPE_TYPE_BOX_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Box Unfilled Explode .
int <code>SHAPE_TYPE_BOX_FILLED</code>	Sets the Shape Type to 3D Box Filled .
int <code>SHAPE_TYPE_BOX_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Box Filled Implode .
int <code>SHAPE_TYPE_BOX_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Box Filled Explode .
int <code>SHAPE_TYPE_CUBE_OUTLINED</code>	Sets the Shape Type to 3D Cube Outlined .
int <code>SHAPE_TYPE_CUBE_OUTLINED_IMPLODE</code>	Sets the Shape Type to 3D Cube Outlined Implode .
int <code>SHAPE_TYPE_CUBE_OUTLINED_EXPLODE</code>	Sets the Shape Type to 3D Cube Outlined Explode .
int <code>SHAPE_TYPE_CUBE_UNFILLED</code>	Sets the Shape Type to 3D Cube Unfilled .
int <code>SHAPE_TYPE_CUBE_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Cube Unfilled Implode .
int <code>SHAPE_TYPE_CUBE_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Cube Unfilled Explode .
int <code>SHAPE_TYPE_CUBE_FILLED</code>	Sets the Shape Type to 3D Cube Filled .
int <code>SHAPE_TYPE_CUBE_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Cube Filled Implode .
int <code>SHAPE_TYPE_CUBE_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Cube Filled Explode .
int <code>SHAPE_TYPE_SPHERE_UNFILLED</code>	Sets the Shape Type to 3D Sphere Unfilled .

Constant	Description
int <code>SHAPE_TYPE_SPHERE_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Sphere Unfilled Implode.
int <code>SHAPE_TYPE_SPHERE_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Sphere Unfilled Explode.
int <code>SHAPE_TYPE_SPHERE_FILLED</code>	Sets the Shape Type to 3D Sphere Filled.
int <code>SHAPE_TYPE_SPHERE_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Sphere Filled Implode.
int <code>SHAPE_TYPE_SPHERE_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Sphere Filled Explode.
int <code>SHAPE_TYPE_ELLIPSOID_UNFILLED</code>	Sets the Shape Type to 3D Ellipsoid Unfilled.
int <code>SHAPE_TYPE_ELLIPSOID_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Ellipsoid Unfilled Implode.
int <code>SHAPE_TYPE_ELLIPSOID_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Ellipsoid Unfilled Explode.
int <code>SHAPE_TYPE_ELLIPSOID_FILLED</code>	Sets the Shape Type to 3D Ellipsoid Filled.
int <code>SHAPE_TYPE_ELLIPSOID_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Ellipsoid Filled Implode.
int <code>SHAPE_TYPE_ELLIPSOID_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Ellipsoid Filled Explode.
int <code>SHAPE_TYPE_OCTAHEDRON_UNFILLED</code>	Sets the Shape Type to 3D Octahedron Unfilled.
int <code>SHAPE_TYPE_OCTAHEDRON_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Octahedron Unfilled Implode.
int <code>SHAPE_TYPE_OCTAHEDRON_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Octahedron Unfilled Explode.
int <code>SHAPE_TYPE_OCTAHEDRON_FILLED</code>	Sets the Shape Type to 3D Octahedron Filled.
int <code>SHAPE_TYPE_OCTAHEDRON_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Octahedron Filled Implode.
int <code>SHAPE_TYPE_OCTAHEDRON_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Octahedron Filled Explode.
int <code>SHAPE_TYPE_3D_HEART_UNFILLED</code>	Sets the Shape Type to 3D Heart Unfilled.
int <code>SHAPE_TYPE_3D_HEART_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Heart Unfilled Implode.
int <code>SHAPE_TYPE_3D_HEART_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Heart Unfilled Explode.
int <code>SHAPE_TYPE_3D_HEART_FILLED</code>	Sets the Shape Type to 3D Heart Filled.
int <code>SHAPE_TYPE_3D_HEART_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Heart Filled Implode.
int <code>SHAPE_TYPE_3D_HEART_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Heart Filled Explode.

Constant	Description
int <code>SHAPE_TYPE_3D_STAR_UNFILLED</code>	Sets the Shape Type to 3D Star Unfilled .
int <code>SHAPE_TYPE_3D_STAR_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Star Unfilled Implode .
int <code>SHAPE_TYPE_3D_STAR_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Star Unfilled Explode .
int <code>SHAPE_TYPE_3D_STAR_FILLED</code>	Sets the Shape Type to 3D Star Filled .
int <code>SHAPE_TYPE_3D_STAR_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Star Filled Implode .
int <code>SHAPE_TYPE_3D_STAR_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Star Filled Explode .
int <code>SHAPE_TYPE_3D_CROSS_UNFILLED</code>	Sets the Shape Type to 3D Cross Unfilled .
int <code>SHAPE_TYPE_3D_CROSS_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Cross Unfilled Implode .
int <code>SHAPE_TYPE_3D_CROSS_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Cross Unfilled Explode .
int <code>SHAPE_TYPE_3D_CROSS_FILLED</code>	Sets the Shape Type to 3D Cross Filled .
int <code>SHAPE_TYPE_3D_CROSS_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Cross Filled Implode .
int <code>SHAPE_TYPE_3D_CROSS_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Cross Filled Explode .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_UNFILLED</code>	Sets the Shape Type to 3D Cross Straight Unfilled .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Cross Straight Unfilled Implode .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Cross Straight Unfilled Explode .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_FILLED</code>	Sets the Shape Type to 3D Cross Straight Filled .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Cross Straight Filled Implode .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Cross Straight Filled Explode .
int <code>SHAPE_TYPE_PYRAMID_UNFILLED</code>	Sets the Shape Type to 3D Pyramid Unfilled .
int <code>SHAPE_TYPE_PYRAMID_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Pyramid Unfilled Implode .
int <code>SHAPE_TYPE_PYRAMID_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Pyramid Unfilled Explode .
int <code>SHAPE_TYPE_PYRAMID_FILLED</code>	Sets the Shape Type to 3D Pyramid Filled .
int <code>SHAPE_TYPE_PYRAMID_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Pyramid Filled Implode .

Constant	Description
int <code>SHAPE_TYPE_PYRAMID_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Pyramid Filled Explode .
int <code>SHAPE_TYPE_TEXT</code>	Sets the Shape Type to Text .
int <code>SHAPE_TYPE_WAVE_LINEAR</code>	Sets the Shape Type to Wave Linear .
int <code>SHAPE_TYPE_WAVE_RADAR</code>	Sets the Shape Type to Wave Radar .
int <code>SHAPE_TYPE_WAVE_HELIX</code>	Sets the Shape Type to Wave Helix .
int <code>SHAPE_TYPE_WAVE_CIRCLE</code>	Sets the Shape Type to Wave Circle .
int <code>SHAPE_TYPE_WAVE_SQUARE</code>	Sets the Shape Type to Wave Square .
int <code>SHAPE_TYPE_WAVE_DIAMOND</code>	Sets the Shape Type to Wave Diamond .
int <code>SHAPE_TYPE_WAVE_SPHERE</code>	Sets the Shape Type to Wave Sphere .
int <code>SHAPE_TYPE_WAVE_CUBE</code>	Sets the Shape Type to Wave Cube .
int <code>SHAPE_TYPE_WAVE_OCTAHEDRON</code>	Sets the Shape Type to Wave Octahedron .
int <code>SHAPE_TYPE_RANDOM</code>	Selects an available Shape Type for each shape randomly. Sets the Shape Type to Random .
int <code>SHAPE_TYPE_RANDOM_STATIC</code>	Sets the Shape Type to Random Static .
int <code>SHAPE_TYPE_RANDOM_IMPLODE</code>	Sets the Shape Type to Random Implode .
int <code>SHAPE_TYPE_RANDOM_EXPLODE</code>	Sets the Shape Type to Random Explode .
int <code>SHAPE_TYPE_RANDOM_OUTLINED</code>	Sets the Shape Type to Random Outlined .
int <code>SHAPE_TYPE_RANDOM_OUTLINED_STATIC</code>	Sets the Shape Type to Random Outlined Static .
int <code>SHAPE_TYPE_RANDOM_OUTLINED_IMPLODE</code>	Sets the Shape Type to Random Outlined Implode .
int <code>SHAPE_TYPE_RANDOM_OUTLINED_EXPLODE</code>	Sets the Shape Type to Random Outlined Explode .
int <code>SHAPE_TYPE_RANDOM_UNFILLED</code>	Sets the Shape Type to Random Unfilled .
int <code>SHAPE_TYPE_RANDOM_UNFILLED_STATIC</code>	Sets the Shape Type to Random Unfilled Static .
int <code>SHAPE_TYPE_RANDOM_UNFILLED_IMPLODE</code>	Sets the Shape Type to Random Unfilled Implode .
int <code>SHAPE_TYPE_RANDOM_UNFILLED_EXPLODE</code>	Sets the Shape Type to Random Unfilled Explode .
int <code>SHAPE_TYPE_RANDOM_FILLED</code>	Sets the Shape Type to Random Filled .
int <code>SHAPE_TYPE_RANDOM_FILLED_STATIC</code>	Sets the Shape Type to Random Filled Static .

Constant	Description
int <code>SHAPE_TYPE_RANDOM_FILLED_IMPLODE</code>	Sets the Shape Type to Random Filled Implode .
int <code>SHAPE_TYPE_RANDOM_FILLED_EXPLODE</code>	Sets the Shape Type to Random Filled Explode .
int <code>SHAPE_TYPE_2D_RANDOM</code>	Sets the Shape Type to 2D Random .
int <code>SHAPE_TYPE_2D_RANDOM_STATIC</code>	Sets the Shape Type to 2D Random Static .
int <code>SHAPE_TYPE_2D_RANDOM_IMPLODE</code>	Sets the Shape Type to 2D Random Implode .
int <code>SHAPE_TYPE_2D_RANDOM_EXPLODE</code>	Sets the Shape Type to 2D Random Explode .
int <code>SHAPE_TYPE_2D_RANDOM_OUTLINED</code>	Sets the Shape Type to 2D Random Outlined .
int <code>SHAPE_TYPE_2D_RANDOM_OUTLINED_STATIC</code>	Sets the Shape Type to 2D Random Outlined Static .
int <code>SHAPE_TYPE_2D_RANDOM_OUTLINED_IMPLODE</code>	Sets the Shape Type to 2D Random Outlined Implode .
int <code>SHAPE_TYPE_2D_RANDOM_OUTLINED_EXPLODE</code>	Sets the Shape Type to 2D Random Outlined Explode .
int <code>SHAPE_TYPE_2D_RANDOM_FILLED</code>	Sets the Shape Type to 2D Random Filled .
int <code>SHAPE_TYPE_2D_RANDOM_FILLED_STATIC</code>	Sets the Shape Type to 2D Random Filled Static .
int <code>SHAPE_TYPE_2D_RANDOM_FILLED_IMPLODE</code>	Sets the Shape Type to 2D Random Filled Implode .
int <code>SHAPE_TYPE_2D_RANDOM_FILLED_EXPLODE</code>	Sets the Shape Type to 2D Random Filled Explode .
int <code>SHAPE_TYPE_3D_RANDOM</code>	Sets the Shape Type to 3D Random .
int <code>SHAPE_TYPE_3D_RANDOM_STATIC</code>	Sets the Shape Type to 3D Random Static .
int <code>SHAPE_TYPE_3D_RANDOM_IMPLODE</code>	Sets the Shape Type to 3D Random Implode .
int <code>SHAPE_TYPE_3D_RANDOM_EXPLODE</code>	Sets the Shape Type to 3D Random Explode .
int <code>SHAPE_TYPE_3D_RANDOM_UNFILLED</code>	Sets the Shape Type to 3D Random Unfilled .
int <code>SHAPE_TYPE_3D_RANDOM_UNFILLED_STATIC</code>	Sets the Shape Type to 3D Random Unfilled Static .
int <code>SHAPE_TYPE_3D_RANDOM_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Random Unfilled Implode .
int <code>SHAPE_TYPE_3D_RANDOM_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Random Unfilled Explode .
int <code>SHAPE_TYPE_3D_RANDOM_FILLED</code>	Sets the Shape Type to 3D Random Filled .

Constant	Description
int <code>SHAPE_TYPE_3D_RANDOM_FILLED_STATIC</code>	Sets the Shape Type to 3D Random Filled Static .
int <code>SHAPE_TYPE_3D_RANDOM_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Random Filled Implode .
int <code>SHAPE_TYPE_3D_RANDOM_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Random Filled Explode .

Shape Structure

<p>shape</p>	<ul style="list-style-type: none"> ▪ int renderingMode ▪ int shapeAlignment ▪ int shapeRotation ▪ int blendingMode ▪ int originType ▪ float border ▪ float innerGlow ▪ float outerGlow ▪ int innerGlowInterpolation ▪ int outerGlowInterpolation ▪ float proportion ▪ float diagonalLength 	<p><i>shape</i> stores specific information for shapes.</p> <p>Valid values for <i>renderingMode</i> are: RENDERING_MODE_EXTENDED RENDERING_MODE_SIMPLE</p> <p>Valid values for <i>shapeAlignment</i> are: LOOKAT_FRONT LOOKAT_BACK LOOKAT_LEFT LOOKAT_RIGHT LOOKAT_TOP LOOKAT_BOTTOM LOOKAT_RANDOM</p> <p>Valid values for <i>shapeRotation</i> are: ROTATION_CCW_0 ROTATION_CCW_90 ROTATION_CCW_180 ROTATION_CCW_270 ROTATION_CW_0 ROTATION_CW_90 ROTATION_CW_180 ROTATION_CW_270</p> <p><i>blendingMode</i> is only available for RENDERING_MODE_EXTENDED. Valid values are: BLENDING_MODE_NONE BLENDING_MODE_ALPHA</p> <p>Valid values for <i>originType</i> are: ORIGIN_CENTER ORIGIN_FRONT ORIGIN_BACK ORIGIN_LEFT ORIGIN_RIGHT ORIGIN_TOP ORIGIN_BOTTOM ORIGIN_TOP_LEFT ORIGIN_TOP_RIGHT ORIGIN_BOTTOM_LEFT ORIGIN_BOTTOM_RIGHT ORIGIN_FRONT_LEFT ORIGIN_FRONT_RIGHT ORIGIN_BACK_LEFT ORIGIN_BACK_RIGHT ORIGIN_FRONT_TOP ORIGIN_FRONT_BOTTOM ORIGIN_BACK_TOP ORIGIN_BACK_BOTTOM ORIGIN_FRONT_TOP_LEFT ORIGIN_FRONT_TOP_RIGHT ORIGIN_FRONT_BOTTOM_LEFT ORIGIN_FRONT_BOTTOM_RIGHT ORIGIN_BACK_TOP_LEFT ORIGIN_BACK_TOP_RIGHT</p>
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		<p>ORIGIN_BACK_BOTTOM_LEFT ORIGIN_BACK_BOTTOM_RIGHT</p> <p><i>border</i> is only available for RENDERING_MODE_EXTENDED. Valid values range from 0.01 to 1.00.</p> <p><i>innerGlow</i> is only available for RENDERING_MODE_EXTENDED. Valid values range from 0.01 to 1.00.</p> <p><i>outerGlow</i> is only available for RENDERING_MODE_EXTENDED. Valid values range from 0.01 to 1.00.</p> <p>Valid values for <i>innerGlowInterpolation</i> are: INTERPOLATION_TYPE_LINEAR INTERPOLATION_TYPE_EASE_BOUNCE_IN INTERPOLATION_TYPE_EASE_BOUNCE_OUT INTERPOLATION_TYPE_EASE_BOUNCE_INOUT INTERPOLATION_TYPE_EASE_CIRC_IN INTERPOLATION_TYPE_EASE_CIRC_OUT INTERPOLATION_TYPE_EASE_CIRC_INOUT INTERPOLATION_TYPE_EASE_CUBIC_IN INTERPOLATION_TYPE_EASE_CUBIC_OUT INTERPOLATION_TYPE_EASE_CUBIC_INOUT INTERPOLATION_TYPE_EASE_SINE_IN INTERPOLATION_TYPE_EASE_SINE_OUT INTERPOLATION_TYPE_EASE_SINE_INOUT INTERPOLATION_TYPE_EASE_EXPO_IN INTERPOLATION_TYPE_EASE_EXPO_OUT INTERPOLATION_TYPE_EASE_EXPO_INOUT</p> <p>Valid values for <i>outerGlowInterpolation</i> are: See <i>innerGlowInterpolation</i></p> <p><i>proportion</i> is only available for RENDERING_MODE_EXTENDED and for SHAPE_TYPE_CROSS_STRAIGHT, SHAPE_TYPE_STAR, SHAPE_TYPE_3D_CROSS_STRAIGHT, and SHAPE_TYPE_3D_STAR. Valid values range from 0.01 to 1.00.</p> <p><i>diagonalLength</i> is only available for RENDERING_MODE_EXTENDED and for SHAPE_TYPE_CROSS, SHAPE_TYPE_STAR, SHAPE_TYPE_3D_CROSS, and SHAPE_TYPE_3D_STAR. Valid values range from 0.01 to 1.00.</p>
--	--	---

Unit Type Constants

Constant	Description
int UNIT_TYPE_NORM	Uses normalized values ranging from 0.0 to 1.0. It is the default parameter.
int UNIT_TYPE_VOXEL	Uses voxel units based on the Matrix Size.
int UNIT_TYPE_PERCENT	Uses percentage values from 0 to 100.

Example

```

@scriptname="RenderShape";
@author="";
@version="MADRIX 3.4";
@description="Example";

color col = WHITE;
shape shapeProps = GetDefaultShape();
float pos_x = 0.5;
float pos_y = 0.5;
float pos_z = 0.5;
float size_x = 0.7;
float size_y = 0.7;
float size_z = 1.0;
int shapeType = SHAPE_TYPE_CIRCLE_OUTLINED;
int unitType = UNIT_TYPE_NORM;

void InitEffect()
{
    shapeProps.renderingMode = RENDERING_MODE_EXTENDED;
    shapeProps.shapeAlignment = LOOKAT_FRONT ;
    shapeProps.shapeRotation = ROTATION_CW_90;
    shapeProps.blendingMode = BLENDING_MODE_ALPHA ;
    shapeProps.originType = ORIGIN_CENTER;
    shapeProps.border = 0.01;
    shapeProps.innerGlow = 0.5;
    shapeProps.outerGlow = 0.2;
    shapeProps.innerGlowInterpolation = INTERPOLATION_TYPE_LINEAR;
    shapeProps.outerGlowInterpolation = INTERPOLATION_TYPE_LINEAR;
    //shapeProps.proportion;
    //shapeProps.diagonalLength;
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
    RenderShape(col, shapeType, pos_x, pos_y, pos_z, size_x, size_y, size_z, shapeProps, unitType);
    RenderShape(col, shapeType, pos_x - 0.25, pos_y - 0.25, pos_z - 0.25, size_x, size_y, size_z, sh
}

```

```
void MatrixSizeChanged()  
{  
    InitEffect();  
}
```

2.2.2 Sound2Light And Music2Light

MADRIX can analyze audio input for Sound2Light (S2L) or Music2Light (M2L) effects. This data is also available in MADRIX Script and may be used to create even more advanced effects, controlled by music.

It is necessary to differentiate between music and sound data.

- Sound data refers to data based on the frequency of the given input signal. A common effect based on sound data is the equalizer (audio spectrum). The volume is also this kind of sound data.
- Music data refers to information known from actual music theory. Therefore, MADRIX identifies musical parameters, such as tonality, bass, intervals or the current tone (or chord) itself. Using the tone and the tonality you could see that C Major or d minor are currently played, for example. There are numerous examples.

As is the case with M2L or S2L effects, if a script uses any functionality that needs the audio analysis, the audio function it is automatically started in MADRIX.

2.2.2.1 Sound2Light (S2L)

Functionality

- As described above, sound data refers mainly to frequency-based data. First of all, the function `GetSoundLevel()` retrieves the volume of the audio channels (left and right channel). The float value returned ranges from 0.0 to 1.0, the lowest and highest level possible, respectively.
- Moreover, other available data is frequency values. They are stored in the arrays `SOUND_DATA_LEFT` and `SOUND_DATA_RIGHT`, which are both of the data type `int`. There are up to 511 values and each describes the volume of a »[well-defined frequency](#).
- The `length`-operator of the »[arrays](#) tells how much valid data they contain. A check may be necessary and then just take the values that are actually available/provided to have a proper effect. But it is secure to always assume 511 values.
- In contrast to other dynamic arrays, in MADRIX Script those arrays will not grow because their size is fixed. Trying to get an invalid element, always results in 0.

The First S2L Example

The following example for the MAS Script Effect analyses the left and the right audio channel. Lines will be drawn onto the matrix to indicate the average frequency.

```
const color LEFT_CHANNEL = {255, 0, 0, 128};
const color RIGHT_CHANNEL= {0, 255, 0, 128};

void InitEffect()
{
}

float avgFrequ(float array[])
{
    float result;

    //to avoid division by zero later on
    if(array.length > 0)
    {
        for(int i = 0; i < array.length; i++)
            result += array[i];

        result /= (float)array.length;
    }

    return(result);
}

void RenderEffect()
```

```

{
    int valL = (int)(GetSoundLevel(0)*255.0);
    int valR = (int)(GetSoundLevel(1)*255.0);
    color c = {valL, valR, (valL * valR) % 255, (valR + valL) / 2, 0};

    float iHL = (float)avgFrequ(SOUND_DATA_LEFT);
    float iHR = (float)avgFrequ(SOUND_DATA_RIGHT);

    Clear();

    DrawVectorLine(c, 0.0, iHL, 1.0, iHL);
    DrawVectorLine(c, iHL, 0.0, iHL, 1.0);

    DrawVectorLine(c, 0.0, 1.0-iHL, 1.0, 1.0-iHL);
    DrawVectorLine(c, 1.0-iHL, 0.0, 1.0-iHL, 1.0);

    DrawVectorLine(c, 0.0, iHR, 1.0, iHR);
    DrawVectorLine(c, iHR, 0.0, iHR, 1.0);

    DrawVectorLine(c, 0.0, 1.0-iHR, 1.0, 1.0-iHR);
    DrawVectorLine(c, 1.0-iHR, 0.0, 1.0-iHR, 1.0);
}

```

2.2.2.2 Music2Light (M2L)

Introduction

Music2Light effects can go a step further and analyze music regarding music theoretical aspects. Tonality, scale, or intervals are only some examples of the data that can be retrieved by the sound analysis. This chapter describes how to retrieve the data provided by MADRIX. However, it does not describe any music theory.

Using Tonality And Scale

Let us start with tonality and scale of a chord. The two can be retrieved via the functions `GetTonality()` and `GetToneScale()`, respectively. The exemplary sample source code for the MAS Script Effect below uses tonality and scale to select a color and the alpha value will be the background color. Please remember: an audio input signal is needed.

```

const color g_colorTable[] = {
    {255, 0, 0, 0},           //C
    {255, 128, 128, 128},   //C#
    {0, 255, 0, 0},         //D
    {128, 255, 128, 128},   //D#
    {0, 0, 255, 0},         //E
    {255, 255, 0, 0},       //F
    {255, 255, 128, 128},   //F#

```

```

        {255, 0, 255, 0},          //G
        {255, 128,255,128},      //G#
        {255, 128, 0, 0},        //A
        {255, 100, 100, 100},    //A#
        {255, 255, 255, 128}     //B
    };

void InitEffect()
{
}

void RenderEffect()
{
    int idx=GetTonality();
    if (idx>=0 && idx<=11) ClearColor(g_colorTable[idx]);
    else ClearColor(BLACK);
    int alpha = (255 / (1 + GetToneScale()));
    ClearAlpha(alpha);
}

```

Explanation:

- The first thing is to create a color table in which each entry equals a tonality. If the tonality is undetermined, the function `GetTonality()` results in -1.
- Therefore, we have to check if the value is a valid array index and eventually draw a black matrix. You could use the function `IsTonality()` to check if the tonality was set or not.

Using Notes

MADRIX is able to identify the notes played in a song. The lowest note that can be evaluated is the C with 8.25 Hz. The highest note is an G with 12.6 kHz. There are two functions available to get information about the identified notes. `GetNoteValue()` retrieves the volume of the given note and `IsNote()` returns **TRUE** if the given note has been detected, otherwise **FALSE**. There is the function `GetAllNoteValues()`, which fills an array with the volume of each note. Using this method for a lot of notes is much faster then calling `GetNoteValue()`. An overview over which index corresponds to which note is given by the »[Table Of Notes](#)

The next example for the MAS Script Effect uses played notes to fill the matrix with different colors. It uses only the values of three frequencies of C.

```

void InitEffect()
{
}

void RenderEffect()
{
    float val[];
    //C with 528Hz
    val[0] = (float)GetNoteValue(72) / 127.0;
}

```

```

//C with 1056KHz
val[1] = (float)GetNoteValue(84) / 127.0;
//C with 2112KHz
val[2] = (float)GetNoteValue(96) / 127.0;

color c;
c.r = (int)(255.0 * val[0]);
c.g = (int)(255.0 * val[1]);
c.b = (int)(255.0 * val[2]);

Clear(c);
}

```

Explanation:

- First, the levels of the notes are retrieved and normalized to the range of 0.0 to 1.0. Hereby, only three C notes are used.
- Then, a color is initialized and the matrix is filled.

Using Intervals

There are similar functions to get information about the intervals indexed from 0 (small second interval) to 10 (large seventh interval). The function `IsInterval()` returns **TRUE** if the specified interval could be analyzed, otherwise **FALSE**. Again, the function `GetAllIntervals()` fills an array rapidly, each element with either **TRUE** (interval was analyzed) or **FALSE** (interval was not analyzed). The following short example for the MAS Script Effect clarifies the usage of `GetAllIntervals()`:

```

const int middle=GetMatrixHeight()/2;
int buf[];
int xStep;

void InitEffect()
{
    GetAllIntervals(buf);
    xStep=max(GetMatrixWidth()/buf.length,1);
}

void RenderEffect()
{
    ClearAlpha(255);
    GetAllIntervals(buf);
    for (int i=0;i<buf.length;i++)
    {
        DrawPixelLine(WHITE,i*xStep,!buf[i]*middle,i*xStep,(1+!buf[i])*middle);
    }
}

```


Explanation:

- At first, in `InitEffect()` the buffer `buf` is filled once, just in order to get the buffer length. With the buffer length, a horizontal distance `xStep` is calculated to separate some lines equally later on. Using the function `max()`, the distance is at least 1.
- Calling `RenderEffect()` the buffer `buf` is filled with the current interval appearances. Then, a vertical line is drawn for every interval, either from the middle to the top of the matrix (if the interval was analyzed) or from middle to bottom (if not).

Using Other Tone Theoretical Parameters

There is lots of other data which may be used to create effects, e.g. the sound level or the note of the currently lowest note (bass tone). The handling is similar to the functions described above. Further details are given in the »[List Of Functions](#)

//PART C

*MADRIX Script
(Programming Language
Overview)*

3 MADRIX Script (Programming Language Overview)

3.1 Keyword Search

The following keywords are available in MADRIX Script:

- »[break \(in 'switch' statements\)](#)
- »[break \(in loops\)](#)
- »[case](#)
- »[const](#)
- »[continue](#)
- »[default](#)
- »[else](#)
- »[false, FALSE](#)
- »[for](#)
- »[if](#)
- »[persistent](#)
- »[return](#)
- »[switch](#)
- »[true, TRUE](#)
- »[while](#)

3.2 List Of Functions (Alphabetical Order)

Overview

In addition to the specific functions of the MAS Script Effect, Macros for effects, the Main Output Macro, and the Storage Place Macro ([all listed below](#)), the following table lists additional functions. The "+" symbol indicates, in which areas of MADRIX Script the functions can be used.

Function	Description	MAS Script	Macros for Effects	Storage Place Macro	Main Output Macro
float abs (float x)	Returns the absolute value of x.	+	+	+	+
void AddPixelTransposeEntry (int srcX, int srcY, int destX, int destY)	Adds one entry to the pixel transpose table and resizes the table if necessary. <i>srcX</i> and <i>srcY</i> are the coordinates in X and Y of the source. <i>destX</i> and <i>destY</i> are the destination coordinates. » Description	+	+	+	+

void AddPixelTransposeEntry3D (int srcX, int srcY, int srcZ, int destX, int destY, int destZ)	Adds one entry to the pixel transpose table and resizes the table if necessary. <i>srcX</i> , <i>srcY</i> , and <i>srcZ</i> are the coordinates in X, Y, and Z of the source. <i>destX</i> , <i>destY</i> , and <i>destZ</i> are the coordinates of the destination. » Description	+	+	+	+
float arccos (float a) float arccosDeg (float a)	Returns the arc cosine of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
float arccot (float a) float arccotDeg (float a)	Returns the arc cotangent of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
float arcsin (float a) float arcsinDeg (float a)	Returns the arc sine of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
float arctan (float a) float arctanDeg (float a)	Returns the arc tangent of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
float arctan2 (float x, float y)	Returns the angle of polar coordinates from two Cartesian coordinates <i>x</i> and <i>y</i> .	+	+	+	+
float ceil (float f)	Rounds up the given value to the next integer value. E.g. <code>ceil(2.00001) = 3.0</code>	+	+	+	+
void ChangeBrightness (color col)	Adds the values of the specified color to the current color of each pixel in the matrix. » Example	+	+	+	+
int CheckScriptEngineVersion (int major, int minor)	Checks the Script engine version in use and returns <i>1</i> if the version is equal or higher to the version specified with <i>major</i> and <i>minor</i> . Or else <i>0</i> is returned. The current Script Engine Version is 2.15. A useful function to check if the minimum requirements of your script are met. » Example	+	+	+	+
int CheckSoftwareVersion (int major, int minor, int subminor, int subsubminor)	Checks the MADRIX software version in use and returns <i>1</i> if the version is equal or higher to the version specified with <i>major</i> , <i>minor</i> , <i>subminor</i> , and <i>subsubminor</i> . Or else <i>0</i> is returned. The current MADRIX version is 3.5.1.0. You can check which version you are using by opening the Logfile in MADRIX (at the beginning of the file) or check the MADRIX.exe (perform a right-click > Properties > Version). A useful function to check if the minimum requirements of your script are met. » Example	+	+	+	+
void Clear () void Clear (color col)	Fills the whole matrix with the given color. The default color (no color parameter) is black.	+	+	+	+
void ClearAlpha (int alpha)	Sets the alpha value of each pixel in the matrix to <i>alpha</i> .	+	+	+	+
void ClearColor (color col)	Fills the whole matrix with the given color without changing the alpha value.	+	+	+	+
void ColorReplace (color oldCol, color newCol)	Replaces the given color <i>oldCol</i> with a new one (<i>newCol</i>).	+	+	+	+
float cotan (float a) float cotanDeg (float a)	Returns the cotangent of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
float cos (float a) float cosDeg (float a)	Returns the cosine of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
float cosh (float a) float coshDeg (float a)	Returns the hyperbolic cosine of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
void CreatePixelTransposeTable (int size, int growsize)	Creates the pixel transpose table with the given <i>size</i> and <i>grow size</i> . » Description	+	+	+	+
float deg2rad (float a)	Converts the angle <i>a</i> from degrees to radian measure.	+	+	+	+

void Dim (float value)	Reduces the brightness of the complete virtual matrix. Valid values for <i>value</i> range from 0.0 to 1.0.	+	+	+	+
void DimPixel (float value, int x, int y)	Reduces the brightness of an individual pixel. <i>x</i> and <i>y</i> are the coordinates of the pixel. Valid values for <i>value</i> range from 0.0 to 1.0.	+	+	+	+
void DimPixel3D (float value, int x, int y, int z)	Reduces the brightness of an individual voxel. <i>x</i> , <i>y</i> , and <i>z</i> are the coordinates of the voxel. Valid values for <i>value</i> range from 0.0 to 1.0.	+	+	+	+
void DimPixelArea (float value, int x, int y, int width, int height)	Reduces the brightness of a certain area of the virtual matrix. <i>x</i> and <i>y</i> are the coordinates of the area (upper left corner). <i>width</i> and <i>height</i> specify the width and height of the area. Valid values for <i>value</i> range from 0.0 to 1.0.	+	+	+	+
void DimPixelArea3D (float value, int x, int y, int z, int width, int height, int depth)	Reduces the brightness of a certain area of the virtual 3D matrix. <i>x</i> , <i>y</i> , and <i>z</i> are the coordinates of the area (front upper left corner). <i>width</i> , <i>height</i> , and <i>depth</i> specify the width, height, and depth of the area. Valid values for <i>value</i> range from 0.0 to 1.0.	+	+	+	+
void DrawPixelArea (color matrix[], int xDst, int yDst, int w, int h, int xSrc, int ySrc, color filter)	Copies data from a 2-dimensional array of colors and renders it on the matrix. » Description	+	+	+	+
void DrawPixelArea3D (color matrix[][][], int xDst, int yDst, int zDst, int w, int h, int d, int xSrc, int ySrc, int zSrc, color filter)	Copies data from a 3-dimensional array of colors and renders it on the matrix.	+	+	+	+
void DrawPixelLine (color col, int x1, int y1, int x2, int y2)	Draws a line from pixel (<i>x1</i> , <i>y1</i>) to pixel (<i>x2</i> , <i>y2</i>) with the specified color <i>col</i> .	+	+	+	+
void DrawPixelLine3D (color col, int x1, int y1, int z1, int x2, int y2, int z2)	Draws a line from voxel (<i>x1</i> , <i>y1</i> , <i>z1</i>) to voxel (<i>x2</i> , <i>y2</i> , <i>z2</i>) with the specified color <i>col</i> .	+	+	+	+
void DrawPixelShape (color col, int shape, int x, int y, int z, int w, int h, int d, int lineWidth, int drawMode, int lookAtType)	Draws a given <i>shape</i> onto the matrix with the given size (width <i>w</i> , height <i>h</i> , depth <i>d</i>) at the given position (<i>x</i> , <i>y</i> , <i>z</i>) with the specified color <i>col</i> . Learn more » Draw Shapes	+	+	+	+
void DrawPixelText (color c, font f, string t, int x, int y, int rotation)	Draws a text across the main output. » <i>color c</i> and » <i>font f</i> are structures. Valid values for rotation are ROTATION_CCW_0 , ROTATION_CCW_90 , ROTATION_CCW_180 , ROTATION_CCW_270 for counter-clockwise rotation and ROTATION_CW_0 , ROTATION_CW_90 , ROTATION_CW_180 , ROTATION_CW_270 for clockwise rotation. » Example 1 » Example 2 » Example 3 » Example 4	+	+	+	+
void DrawVectorLine (color col, float x1, float y1, float x2, float y2)	Draws a line from the relative position (<i>x1</i> , <i>y1</i>) to the relative position (<i>x2</i> , <i>y2</i>) with the specified color.	+	+	+	+
void DrawVectorLine3D (color col, float x1, float y1, float z1, float x2, float y2, float z2)	Draws a line from the relative position (<i>x1</i> , <i>y1</i> , <i>z1</i>) to the relative position (<i>x2</i> , <i>y2</i> , <i>z2</i>) with the specified color <i>col</i> .	+	+	+	+

void DrawVectorShape (color col, int shape, float x, float y, float z, float w, float h, float d, int lineWidth, int drawMode, int lookAtType)	Draws a given <i>shape</i> at the relative position (<i>x</i> , <i>y</i> , <i>z</i>) with the relative size (width <i>w</i> , height <i>h</i> , depth <i>d</i>) and the specified color <i>col</i> . Learn more » Draw Shapes	+	+	+	+
void DrawVectorText (color c, font f, string t, float x, float y, int rotation)	Draws a vector text across the main output. » <i>color c</i> and » <i>font f</i> are structures. Valid values for rotation are ROTATION_CCW_0 , ROTATION_CCW_90 , ROTATION_CCW_180 , ROTATION_CCW_270 for counter-clockwise rotation and ROTATION_CW_0 , ROTATION_CW_90 , ROTATION_CW_180 , ROTATION_CW_270 for clockwise rotation. » Example 1 » Example 2	+	+	+	+
int endswith (string text, string substring)	This function checks if the string <i>text</i> ends with the given <i>substring</i> . If <i>text</i> ends with the specified <i>substring</i> , TRUE is returned, otherwise FALSE . » Description	+	+	+	+
void ExecutePixelTranspose (int clear)	Executes the pixel transposition by using the pixel transpose table. Using the value CLEAR will erase/overwrite all pixels that are not defined as destination with the color black. Otherwise, NOCLEAR will keep all pixels that are not defined as original destination. » Description	+	+	+	+
float exp (float x)	Returns the result of e (2.7182...) to the power of <i>x</i> .	+	+	+	+
void Filter (int filter)	Renders a filter over the matrix. » Valid parameters (Filters) » Description	+	+	+	+
int findstring (int startIndex, string text, string substring)	Searches for the <i>substring</i> within <i>text</i> starting at <i>startIndex</i> . The function returns an index that describes the position at which the <i>substring</i> begins. » Description Example: <code>substring(0, "Hallo Welt", "Welt")</code> returns 6. If the <i>substring</i> is not found within <i>text</i> , -1 is returned.	+	+	+	+
float fmax (float x, float y)	Returns the maximum value of the floating point numbers <i>x</i> and <i>y</i> .	+	+	+	+
float fmin (float x, float y)	Returns the minimum value of <i>x</i> and <i>y</i> .	+	+	+	+
float fmod (float denominator, float divisor)	Calculates the remainder of the float division.	+	+	+	+
float frandom ()	Returns a random number within the the range of 0 to 1.	+	+	+	+
void GetAllIntervals (int buf[])	Fills the array <i>buf</i> with the occurrences of each interval (<code>buf[0] ... buf[10]</code>). <i>buf[index]</i> is TRUE , if the specified interval was analyzed. » Example	+	+		
void GetAllNoteValues (int buf[])	Fills the array <i>buf</i> with the sound level values for each note (<code>buf[0] ... buf[127]</code>). <i>buf[index]</i> can differ from 0 to 127.	+	+		
string GetApplicationPath ()	Locates the MADRIX.exe on your harddisk and returns the path as a <i>string</i> . » Example	+	+	+	+
int GetAsync ()	Returns if asynchronous rendering is used. » Description This function is only available for some effects.	+	+		
int GetBlind ()	Returns if Blind Mode is used. » Description	+	+		
int GetBassTone ()	Returns a value, ranging from 0 to 127, representing the lowest tone (0 = C, 1 = C#, 2 = D, ...). The return value is -1, if the lowest tone could not be determined.	+	+		

int GetBassType ()	Returns a value, ranging from 0 to 11, representing the bass type (0 = base bass, 1,2 = small/large second bass, 3,4 = small/large third bass, ... , 10, 11 = small/large seventh bass). The return value is -1 if the bass type could not be determined.	+	+		
int GetBassValue ()	Returns a value, ranging from 0 to 127, representing the sound level of the bass tone.	+	+		
int GetColorDepth ()	Returns the color depth of the fixture.	+	+	+	+
string GetComputerName ()	Retrieves the name of the computer in use as defined in the Windows operating system.	+	+	+	+
date GetDate ()	Returns a date structure with the current date. » Example	+	+	+	+
int GetDegreeMapRotation ()	Returns the current rotation value in degrees.	+	+		
void GetDmxIn (int DmxValues[], int startchannel, int channels, int universe)	Stores the DMX-IN status of several DMX channels in an array (<i>DmxValues[]</i>). To use the function, choose a DMX start channel and specify the number of channels that should be scanned. Valid values for <i>startchannel</i> range from 0 to 511. Valid values for <i>channels</i> range from 0 to 511. Please note that a maximum of 512 channels can be scanned. This means that the sum of <i>startchannel</i> + <i>channels</i> must be less or equal to 512. In addition, specify the universe that should be scanned. Valid values for <i>universe</i> range from 0 to 255. The default <i>universe</i> is 0, i.e. DMX Universe 1.	+	+	+	+
int GetDmxInChannel (int channel, int universe)	Returns the status of the DMX-IN functionality of a specified DMX channel (<i>channel</i>). Valid values for <i>channel</i> range from 0 to 511. In addition, specify the universe that should be scanned. Valid values for <i>universe</i> range from 0 to 255. The default value of <i>universe</i> is 0, i.e. DMX Universe 1.	+	+	+	+
int GetFilter ()	Returns which Filter (FX) is applied to the matrix.	+	+	+	
float GetFrameCount ()	Retrieves the number of frames the effect produces before it gets repeated. This is the same value which was set by <i>SetFrameCount</i> for MAS Script. The initial value is 1000.0.	+	+		
float GetFrameId ()	Returns the ID of the current frame. » Description	+	+		
float GetFrameSteps ()	Returns the number of frames which are between this and the last call. » Description	+	+		
int GetLink ()	Returns 1 (i.e. TRUE) if the option to link effect Layers is enabled, otherwise 0 (FALSE).	+	+		
int GetMatrixDepth ()	Returns the pixel count of the matrix regarding the depth.	+	+	+	+
int GetMatrixHeight ()	Returns the vertical pixel count of the matrix.	+	+	+	+
int GetMatrixWidth ()	Returns the horizontal pixel count of the matrix.	+	+	+	+

void GetMidiInControl (int midivalues[], int startcontrol, int controlcount, int midichannel, int device)	Stores the MIDI values for multiple controls in an array (<i>midivalues[]</i>). To use the function, choose a start control (<i>startcontrol</i>) and the number of controls (<i>controlcount</i>), as well as the MIDI channel (<i>midichannel</i>) and the <i>device</i> . The default value of <i>startnote</i> , <i>midichannel</i> , and <i>device</i> is 0, i.e. the first control, channel, and device. The default and maximum value of <i>controlcount</i> is 128. (Please note: In MADRIX, the index for channels and devices starts with 1, while the index for MIDI notes starts with 0). » Example	+	+	+	+
int GetMidiInControlValue (int midicontrol, int midichannel, int device)	Returns the MIDI control value of the specified MIDI <i>control change</i> (<i>midicontrol</i>) and <i>midichannel</i> for the specified <i>device</i> . The default value of <i>control</i> , <i>midichannel</i> , and <i>device</i> is 0, i.e. the first control, channel, and device. (Please note: In MADRIX, the index for channels and devices starts with 1, while the index for MIDI notes starts with 0). » Example	+	+	+	+
void GetMidiInNote (int midivalues[], int startnote, int notecount, int midichannel, int device)	Stores the MIDI values for multiple notes in an array (<i>midivalues[]</i>). To use the function, choose a start note (<i>startnote</i>) and the number of notes (<i>notecount</i>), as well as the MIDI channel (<i>midichannel</i>) and the <i>device</i> . The default value of <i>startnote</i> , <i>midichannel</i> , and <i>device</i> is 0, i.e. the first control, channel, and device. The default and maximum value of <i>notecount</i> is 128. (Please note: In MADRIX, the index for channels and devices starts with 1, while the index for MIDI notes starts with 0). » Example	+	+	+	+
int GetMidiInNoteValue (int midinote, int midichannel, int device)	Returns the MIDI note value of the specified MIDI note (<i>midinote</i>) and <i>midichannel</i> for the specified <i>device</i> . The default value of <i>note</i> , <i>midichannel</i> , and <i>device</i> is 0, i.e. the first note, channel, and device. (Please note: In MADRIX, the index for channels and devices starts with 1, while the index for MIDI notes starts with 0). » Example	+	+	+	+
int GetMixMode ()	Returns the currently set Mix Mode . » Valid parameters (Mix modes) » Description	+	+		
int GetNoteValue (int note)	Returns a value, ranging from 0 to 127, representing the sound level of the specified note: 0 = C = 8.25 Hz, ..., 127 = G = 12.67 kHz. » Example	+	+		
int GetOpacity ()	Returns the currently set Opacity value of the effect. The value ranges from 0 to 255.	+	+		
color GetPixel (int x, int y)	Returns the color of the pixel at position (x, y).	+	+	+	+
color GetPixel3D (int x, int y, int z)	Returns the color of the voxel at position (x, y, z).	+	+	+	+
void GetPixelArea (color matrix[][], int xSrc, int ySrc, int w, int h, int xDst, int yDst)	Retrieves data from the matrix and stores it into a 2-dimensional array of colors. » Description	+	+	+	+
void GetPixelArea3D (color matrix[][][], int xSrc, int ySrc, int zSrc, int w, int h, int d, int xDst, int yDst, int zDst)	Retrieves data from the matrix and stores it into a 3-dimensional array of colors.	+	+	+	+
string GetScriptEngineVersion ()	Returns the script engine version and returns the value as a <i>string</i> . » Example	+	+	+	+
string GetSoftwareVersion ()	Returns the MADRIX software version and returns the value as a <i>string</i> . » Example	+	+	+	+
int GetSolo ()	Returns if Solo Mode is used. » Description	+	+		

float GetSoundLevel (int channel)	Returns a value, ranging from 0.0 to 1.0, representing the sound level of the stereo channel: 0 = left channel, 1 = right channel. » Example	+	+		
int GetStep ()	Returns if stepped rendering is used. » Description This function is only available for some effects.	+	+		
int GetSubMaster ()	Returns the currently set Submaster value of the effect. The value ranges from 0 to 255.	+	+		
time GetTime ()	Returns a time structure with the current time.	+	+	+	+
time GetTimeCode ()	Returns a time structure with the currently used Time Code . » Example	+	+	+	+
time GetTimeSunrise (struct date, int latitude_degrees, int latitude_minutes, int longitude_degrees, int longitude_minutes, float time_zone_UTC_offset)	Returns the sunrise time of a geographic location at the specified <i>date</i> . Note: Please use cautiously! Due to the performance requirements of this function, it is not recommended to call it often. Please call this function seldomly in your script/macro. » Example	+	+	+	+
time GetTimeSunriseCity (struct date, int city)	Returns the sunrise time of a specified <i>city</i> at the specified <i>date</i> . Valid values for city are » city constants . Note: Please use cautiously! Due to the performance requirements of this function, it is not recommended to call it often. Please call this function seldomly in your script/macro. » Example	+	+	+	+
time GetTimeSunset (struct date, int latitude_degrees, int latitude_minutes, int longitude_degrees, int longitude_minutes, float time_zone_UTC_offset)	Returns the sunset time of a geographic location at the specified <i>date</i> . Note: Please use cautiously! Due to the performance requirements of this function, it is not recommended to call it often. Please call this function seldomly in your script/macro. » Example	+	+	+	+
time GetTimeSunsetCity (struct date, int city)	Returns the sunset time of a specified <i>city</i> at the specified <i>date</i> . Valid values for city are » city constants . Note: Please use cautiously! Due to the performance requirements of this function, it is not recommended to call it often. Please call this function seldomly in your script/macro. » Example	+	+	+	+
int GetTonality ()	Returns a value, ranging from 0 to 11, representing the tonality (0 = C, 1 = C#, 2 = D ...). The return value is -1, if the tonality could not be determined. » Example	+	+		
int GetToneScale ()	Returns a value, ranging from 0 to 2, representing the tone scale (0 = undetermined, 1 = major, 2 = minor). » Example	+	+		
string GetUserName ()	Retrieves the name of the current user as defined in the Windows operating system.	+	+	+	+
string GetUserProfileDirectory ()	Locates the directory of the current user profile on the harddisk and returns the path as a <i>string</i> . » Example	+	+	+	+
color GetVectorPixel (float x, float y)	Returns the <i>color</i> of the pixel drawn at vector coordinates <i>x</i> and <i>y</i> .	+	+	+	+
color GetVectorPixel3D (float x, float y, float z)	Returns the <i>color</i> of the voxel drawn at vector coordinates <i>x</i> , <i>y</i> , and <i>z</i> .	+	+	+	+
void Grayscale ()	Converts the whole matrix to grayscale values.	+	+	+	+
float hypot (float x, float y)	Calculates the length of the hypotenuse of an orthogonal triangle with <i>x</i> and <i>y</i> as the cathetus' lengths.	+	+	+	+
void InvertColor ()	Inverts the color of the entire matrix.	+	+	+	+

void InvertMatrix ()	Inverts the whole matrix. The top left pixel will be moved to the bottom right and the bottom left pixel to the top right.	+	+	+	+
int isalnum (string text)	Returns TRUE if the given string text contains only characters and figures and if its length is greater than 0. Otherwise, FALSE is returned. » Description	+	+	+	+
int isalpha (string text)	Returns TRUE if the given string contains only characters and if its length is greater than 0. Otherwise, FALSE is returned. » Description	+	+	+	+
int IsDmxInEnabled ()	Retrieves if DMX-IN is activated (1) or not (0).	+	+	+	+
int IsInterval (int index)	Returns TRUE if the specified interval (at the <i>index</i> position, ranging from 0 to 10) was analyzed.	+	+		
int IsMidiInEnabled ()	Retrieves if MIDI-IN is activated (1) or not (0).	+	+	+	+
int IsNote (int note)	Returns TRUE if the specified note was analyzed. (0 = C = 8.25 Hz, ..., 127 = G = 12.67 kHz)	+	+		
int isnum (string text)	Returns TRUE if the given text represents a number. This may be an integer value or a floating point number. Otherwise it returns FALSE . » Description	+	+	+	+
int IsTonality ()	Returns TRUE if the tonality could be determined.	+	+		
float ln (float x)	Returns the result of the natural logarithm of x.	+	+	+	+
float log10 (float x)	Returns the result of the common logarithm of x.	+	+	+	+
int MapDlgGetAntiAliasing ()	Retrieves the Anti-Aliasing mode of the Layer. See » here for a list of Anti-Aliasing Mode constants.	+	+		
int MapDlgGetMapMode ()	Retrieves the currently used Map Mirror Mode of the Layer. See » here for a list of constants.	+	+		
void MapDlgGetMapPixel (int map[])	Retrieves the map settings for the Layer using pixel values. The values are saved in an array (<i>map[]</i>). <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = width (Size X) ▪ map[3] = height (Size Y) 	+	+		

<p>void MapDlgGetMapPixel3D(int map[])</p>	<p>Retrieves the map settings for the Layer in 3D using pixel values. The values are saved in an array (<i>map[]</i>).</p> <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = Z-coordinate (Position Z) ▪ map[3] = width (Size X) ▪ map[4] = height (Size Y) ▪ map[5] = depth (Size Z) 	<p>+</p>	<p>+</p>		
<p>void MapDlgGetMapVector(float map[])</p>	<p>Retrieves the map settings for the Layer using relative values. The values are saved in an array (<i>map[]</i>).</p> <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = width (Size X) ▪ map[3] = height (Size Y) 	<p>+</p>	<p>+</p>		
<p>void MapDlgGetMapVector3D (float map[])</p>	<p>Retrieves the map settings for the Layer in 3D using relative values. The values are saved in an array (<i>map[]</i>).</p> <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = Z-coordinate (Position Z) ▪ map[3] = width (Size X) ▪ map[4] = height (Size Y) ▪ map[5] = depth (Size Z) 	<p>+</p>	<p>+</p>		
<p>void MapDlgGetRotationDegree (int rot[])</p>	<p>Retrieves the Rotation values for axes <i>x</i>, <i>y</i>, and <i>z</i> of the Layer using degree values. The values are saved in an array (<i>rot[]</i>).</p> <ul style="list-style-type: none"> ▪ rot[0] = X-coordinate (X-Axis) ▪ rot[1] = Y-coordinate (Y-Axis) ▪ rot[2] = Z-coordinate (Z-Axis) 	<p>+</p>	<p>+</p>		

void MapDlgGetRotationMode (int mode[])	Retrieves the Rotation mode for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer. See » here for a list of Rotation Mode constants. The values are saved in an array (<i>mode[]</i>). <ul style="list-style-type: none"> ▪ mode[0] = X-coordinate (X-Axis) ▪ mode[1] = Y-coordinate (Y-Axis) ▪ mode[2] = Z-coordinate (Z-Axis) 	+	+		
void MapDlgGetRotationVector (float rot[])	Retrieves the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using relative values. The values are saved in an array (<i>rot[]</i>). <ul style="list-style-type: none"> ▪ rot[0] = X-coordinate (X-Axis) ▪ rot[1] = Y-coordinate (Y-Axis) ▪ rot[2] = Z-coordinate (Z-Axis) 	+	+		
int MapDlgGetRotationXDegree ()	Retrieves the Rotation for the X-axis of the Layer using degree values.	+	+		
int MapDlgGetRotationXMode ()	Retrieves the Rotation mode for the X-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
float MapDlgGetRotationXVector ()	Retrieves the Rotation for the X-axis of the Layer using relative values.	+	+		
int MapDlgGetRotationYDegree ()	Retrieves the Rotation for the Y-axis of the Layer using degree values.	+	+		
int MapDlgGetRotationYMode ()	Retrieves the Rotation mode for the Y-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
float MapDlgGetRotationYVector ()	Retrieves the Rotation for the Y-axis of the Layer using relative values.	+	+		
int MapDlgGetRotationZDegree ()	Retrieves the Rotation value for the Z-axis of the Layer using degree values.	+	+		
int MapDlgGetRotationZMode ()	Retrieves the Rotation mode for the Z-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
float MapDlgGetRotationZVector ()	Retrieves the Rotation value for the Z-axis of the Layer using relative values.	+	+		
int MapDlgGetTileMode ()	Retrieves the currently used Tile Mode of the Layer. See » here for a list of Tile Mode constants.	+	+		
void MapDlgGetTileOffsetPixel (int offset[])	Retrieves the Tiling Offset of the Layer using pixel values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) 	+	+		

void MapDlgGetTileOffsetPixel3D (int offset[])	Retrieves the Tiling Offset of the Layer in 3D using pixel values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) ▪ offset[2] = Z-coordinate (Offset Z) 	+	+		
void MapDlgGetTileOffsetVector (float offset[])	Retrieves the Tiling Offset of the Layer using relative values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) 	+	+		
void MapDlgGetTileOffsetVector3D (float offset[])	Retrieves the Tiling Offset of the Layer in 3D using relative values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) ▪ offset[2] = Z-coordinate (Offset Z) 	+	+		
void MapDlgGetTilePixel (int tile [])	Retrieves the Tiling settings for the Layer using pixel values. The values are saved in an array (<i>tile[]</i>). <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = width (Size X) ▪ tile[3] = height (Size Y) 	+	+		
void MapDlgGetTilePixel3D (int tile[])	Retrieves the Tiling settings for the Layer in 3D using pixel values. The values are saved in an array (<i>tile[]</i>). <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = Z-coordinate (Position Z) ▪ tile[3] = width (Size X) ▪ tile[4] = height (Size Y) ▪ tile[5] = depth (Size Z) 	+	+		

void MapDlgGetTileVector (float tile[])	Retrieves the Tiling settings for the Layer using relative values. The values are saved in an array (<i>tile[]</i>). <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = width (Size X) ▪ tile[3] = height (Size Y) 	+	+		
void MapDlgGetTileVector3D (float tile[])	Retrieves the tile settings for the Layer in 3D using relative values. The values are saved in an array (<i>tile[]</i>). <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = Z-coordinate (Position Z) ▪ tile[3] = width (Size X) ▪ tile[4] = height (Size Y) ▪ tile[5] = depth (Size Z) 	+	+		
int MapDlgIsMapped ()	Retrieves if the Layer is mapped.	+	+		
void MapDlgSetAntiAliasing (int aaLevel)	Sets the Anti-Aliasing mode of the Layer. See » here for a list of Anti-Aliasing Mode constants.	+	+		
void MapDlgSetMapMode (int mode)	Sets the Map Mirror Mode for the Layer. See » here for a list of constants.	+	+		
void MapDlgSetMapPixel (int x, int y, int w, int h)	Maps the Layer to a certain area of the matrix using pixel values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.	+	+		
void MapDlgSetMapPixel3D (int x, int y, int z, int w, int h, int d)	Maps the Layer to a certain area of the matrix in 3D using pixel values. <i>x</i> , <i>y</i> , and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.	+	+		
void MapDlgSetMapVector (float x, float y, float w, float h)	Maps the Layer to a certain area of the matrix using relative values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.	+	+		
void MapDlgSetMapVector3D (float x, float y, float z, float w, float h, float d)	Maps the Layer to a certain area of the matrix in 3D using relative values. <i>x</i> , <i>y</i> , and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.	+	+		
void MapDlgSetRotationDegree (int x, int y, int z)	Sets the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using degree values.	+	+		
void MapDlgSetRotationMode (int x, int y, int z)	Sets the Rotation mode for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer. See » here for a list of Rotation Mode constants.	+	+		
void MapDlgSetRotationVector (float x, float y, float z)	Sets the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using relative values.	+	+		
void MapDlgSetRotationXDegree (int value)	Sets the Rotation value for the X-axis of the Layer using degree values.	+	+		

void MapDlgSetRotationXMode (int mode)	Sets the Rotation mode for the X-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
void MapDlgSetRotationXVector (float value)	Sets the Rotation value for the X-axis of the specified Layer using degree values.	+	+		
void MapDlgSetRotationYDegree (int value)	Sets the Rotation value for the Y-axis of the Layer using degree values.	+	+		
void MapDlgSetRotationYMode (int mode)	Sets the Rotation mode for the Y-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
void MapDlgSetRotationYVector (float value)	Sets the Rotation value for the Y-axis of the Layer using relative values.	+	+		
void MapDlgSetRotationZDegree (int value)	Sets the Rotation value for the Z-axis of the Layer using degree values.	+	+		
void MapDlgSetRotationZMode (int mode)	Sets the Rotation mode for the Z-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
void MapDlgSetRotationZVector (float value)	Sets the Rotation value for the Z-axis of the Layer using relative values.	+	+		
void MapDlgSetTileMode (int mode)	Sets the Tile Mode of the Layer. See » here for a list of Tile Mode constants.	+	+		
void MapDlgSetTileOffsetPixel (int x, int y)	Sets the Tiling Offset of the Layer using pixel values. <i>x</i> describes Offset X, while <i>y</i> represents Offset Y.	+	+		
void MapDlgSetTileOffsetPixel3D (int x, int y, int z)	Sets the Tiling Offset of the Layer in 3D using pixel values. <i>x</i> describes Offset X, <i>y</i> describes Offset Y, while <i>z</i> represents Offset Z.	+	+		
void MapDlgSetTileOffsetVector (float x, float y)	Sets the Tiling Offset of the Layer using relative values. <i>x</i> describes Offset X, while <i>y</i> represents Offset Y.	+	+		
void MapDlgSetTileOffsetVector3D (float x, float y, float z)	Sets the Tiling Offset of the Layer in 3D using relative values. <i>x</i> describes Offset X, <i>y</i> describes Offset Y, while <i>z</i> represents Offset Z.	+	+		
void MapDlgSetTilePixel (int x, int y, int w, int h)	Tiles the Layer in a certain area of the mapping using pixel values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.	+	+		
void MapDlgSetTilePixel3D (int x, int y, int z, int w, int h, int d)	Tiles the Layer in a certain area of the mapping using pixel values. <i>x</i> , <i>y</i> and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.	+	+		
void MapDlgSetTileVector (float x, float y, float w, float h)	Tiles the Layer to a certain area of the mapping using relative values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.	+	+		
void MapDlgSetTileVector3D (float x, float y, float z, float w, float h, float d)	Tiles the Layer in a certain area of the mapping in 3D using relative values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> , <i>y</i> , and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.	+	+		
int max (int x, int y)	Returns the maximum value of the integer numbers <i>x</i> and <i>y</i> .	+	+	+	+
int min (int x, int y)	Returns the minimum value of <i>x</i> and <i>y</i> .	+	+	+	+

void PixelFloodFill (color col, int x, int y)	Fills a single-colored area with the specified color <i>col</i> , starting at the given position <i>x</i> and <i>y</i> .	+	+	+	+
float pow (float x, float y)	Returns the result of the calculation of <i>x</i> to the power of <i>y</i> .	+	+	+	+
float rad2deg (float a)	Converts the angle <i>a</i> from radian measure to degrees.	+	+	+	+
int random (int min, int max)	Returns a random integer number in the value range of <i>min</i> to <i>max</i> .	+	+	+	+
int ReadAsync (string file, string txt)	Reads content as text from a <i>file</i> into the string <i>txt</i> . » Description And Examples	+	+	+	+
void replace (string src, string old, string new)	Replaces any appearances of <i>old</i> within <i>src</i> with <i>new</i> . » Description	+	+	+	+
int rfindstring (int startIndex, string text, string substring)	This function looks for the <i>substring</i> in the given <i>text</i> from its ending to the beginning. The search starts at the given <i>startIndex</i> , while the last character has the index 0. The function returns the index where the substring occurs for the first time after the specified <i>startIndex</i> . If the substring was not found, <i>-1</i> is returned. » Description	+	+	+	+
float round (float f)	Rounds the given value to its next integer value. The value is rounded correctly, either up or down.	+	+	+	+
void SetAsync (int value)	Sets the asynchronous rendering mode. » Description This function is only available for some effects.	+	+		
void SetBlind (int value)	Sets the Blind Mode . » Description	+	+		
void SetChromaKey (color c, int alpha)	Sets the specified alpha value for the specified color <i>c</i> . <i>color c</i> is a structure. Valid values for <i>alpha</i> range from 0 to 255. Note: To be mainly used in <i>PostRenderEffect()</i> .	+	+	+	+
void SetDmxFaderValue (int index, int value)	Sets the value for a fader of the DMX Fader Tool. Valid values for <i>index</i> range from 0 to 11 (Indexing starts with 0). Valid values for <i>value</i> range from 0 to 255. Note: Make sure to activate the fader in the DMX Fader Tool first!	+	+	+	+
void SetFilter (int filter)	Applies a Filter Effect (FX) to the matrix. Valid values for <i>filter</i> are » Filters » Description	+	+	+	
void SetFrameId (float id)	Sets a new Frame ID. If the given <i>id</i> is lower than 0, it is set to 0. » Description	+	+		
void SetLink (int enable)	Enables or disables the option to link effect Layers. Valid values are 0 (false) or 1 (true).	+	+		
void SetMixMode (int mode)	Sets the Mix Mode of the effect. <i>mode</i> may be one of the values defined in » Mix Modes . If <i>mode</i> is invalid, nothing happens and a message is displayed in the Script output of the Script Editor. » Description	+	+		
void SetOpacity (int value)	Sets the Opacity value of the effect. Valid values range from 0 to 255.	+	+		
void SetPixel (color col, int x, int y)	Sets the pixel at position (<i>x</i> , <i>y</i>) to the specified color. » Description And Examples	+	+	+	+
void SetPixel3D (color col, int x, int y, int z)	Sets the voxel at position (<i>x</i> , <i>y</i> , <i>z</i>) to the specified color.	+	+	+	+
void SetPixelGrayscale (int x, int y)	Renders the selected pixel at position (<i>x</i> , <i>y</i>) in grayscale. » Description	+	+	+	+

void SetPixelGrayscale3D (int x, int y, int z)	Renders the selected voxel at position (x, y, z) in grayscale.	+	+	+	+
void SetPixelTransposeEntry (int idx, int srcX, int srcY, int destX, int destY)	Adds one pixel transpose table entry defined by <i>idx</i> . <i>srcX</i> and <i>srcY</i> are the coordinates of the source in x and y. <i>destX</i> and <i>destY</i> are the destination coordinates. » Description	+	+	+	+
void SetPixelTransposeEntry3D (int idx, int srcX, int srcY, int srcZ, int destX, int destY, int destZ)	Adds one pixel transpose table entry defined by <i>idx</i> . <i>srcX</i> , <i>srcY</i> and <i>srcZ</i> are the coordinates of the source in x, y, and z. <i>destX</i> , <i>destY</i> , and <i>destZ</i> are the destination coordinates. » Description	+	+	+	+
int SetReadAsyncInterval (string file, int interval)	Sets the reading <i>interval</i> for a certain <i>file</i> . To be used in combination with ReadAsync . » Description And Examples	+	+	+	+
void SetSolo (int value)	Sets the Solo Mode . » Description	+	+		
void SetStep (int value)	Sets the stepped rendering mode. » Description This function is only available for some effects.	+	+		
void SetSubMaster (int value)	Sets the Submaster value of the effect. Valid values range from 0 to 255.	+	+		
void SetVectorPixel (color, float x, float y)	Draws one pixel at the given vector coordinates. In addition to the coordinates, a <i>color</i> must be specified.	+	+	+	+
void SetVectorPixel3D (color, float x, float y, float z)	Draws one voxel at the given vector coordinates. In addition to the coordinates, a <i>color</i> must be specified.	+	+	+	+
void ShiftPixelMatrix (int x, int y, int w, int h, int dir, int step)	Moves the area of the matrix (defined by <i>x</i> , <i>y</i> , <i>w</i> , and <i>h</i>) <i>step</i> pixel into the given direction. Exemplary values for <i>dir</i> are SHIFT_UP , SHIFT_DOWN , or SHIFT_UL . » List Of Global Constants Note: After shifting the pixels, the data is lost. It is not possible to undo a shifting operation. <i>x</i> , <i>y</i> , <i>w</i> , <i>h</i> describe the rectangle that should be shifted. <i>x</i> and <i>y</i> describe the upper left corner. <i>w</i> and <i>h</i> are the width and height of the rectangle. Learn more » ShiftMatrix	+	+	+	+
void ShiftVectorMatrix (float x, float y, float w, float h, int dir, float step)	Moves the area of the matrix (defined by <i>x</i> , <i>y</i> , <i>w</i> , and <i>h</i>) <i>step</i> pixel into the given direction. Exemplary values for <i>dir</i> are SHIFT_UP , SHIFT_DOWN , or SHIFT_UL . » List Of Global Constants Note: After shifting the pixels, the data is lost. It is not possible to undo a shifting operation. <i>x</i> , <i>y</i> , <i>w</i> , <i>h</i> describe the rectangle that should be shifted. <i>x</i> and <i>y</i> describe the upper left corner. <i>w</i> and <i>h</i> are the width and height of the rectangle. Learn more » ShiftMatrix	+	+	+	+
float sin (float a) float sinDeg (float a)	Returns the sine of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
float sinH (float a) float sinHDeg (float a)	Returns the hyperbolic sine of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
float sqrt (float x)	Returns the square root of <i>x</i> .	+	+	+	+
int startswith (string text, string substring)	This function checks if the <i>text</i> string starts with the given <i>substring</i> . If <i>text</i> starts with <i>substring</i> , TRUE is returned. Otherwise FALSE is returned. » Description	+	+	+	+
int strcmp (string str1, string str2)	Compares the two given strings each other. If they are equal, 0 is returned. A value of -1 is returned if <i>str1</i> is less than <i>str2</i> . A value of 1 is returned if <i>str1</i> is greater than <i>str2</i> . » Description	+	+	+	+

void strip (string text)	Removes leading and ending white spaces, such as space, tabulator, line feeds, etc., from the given string <i>text</i> . » Description	+	+	+	+
string substring (string text, int start, int count)	Extracts a certain number of characters (<i>count</i>) beginning with <i>start</i> from the given <i>text</i> . If <i>count</i> is <i>-1</i> , all characters of the string starting at <i>start</i> are returned. » Description E.g.: <code>substring("Hello", 0, 2)</code> returns "He".	+	+	+	+
float tan (float a) float tanDeg (float a)	Returns the tangent of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
float tanH (float a) float tanHDeg (float a)	Returns the hyperbolic tangent of the angle <i>a</i> in radian measure or degrees, respectively.	+	+	+	+
void ToggleAsync ()	Toggles the asynchronous rendering mode. » Description This function is only available for some effects.	+	+		
void ToggleBlind ()	Toggles Blind Mode . » Description	+	+		
void ToggleLink ()	Toggles Link Mode , the option to link effect Layers.	+	+		
void ToggleSolo ()	Toggles Solo Mode . » Description	+	+		
void ToggleStep ()	Toggles the stepped rendering mode. » Description This function is only available for some effects.	+	+		
void tokenize (string src, string delimiter, string reslist[])	Strips the string <i>src</i> into smaller pieces delimited by characters within <i>delimiter</i> . The result is returned in <i>reslist</i> . » Description	+	+	+	+
void tolower (string text)	Converts each character of the given string <i>text</i> into a lowercase character. » Description	+	+	+	+
void toupper (string text)	Converts each character of the given string <i>text</i> into a uppercase characters. » Description	+	+	+	+
void TRACE (variable)	Writes the value of the specified variable into the Script output window. Fulfills the same function as » WriteText	+	+	+	+
float trunc (float f)	Truncates/cuts off the decimals from a floating point value.	+	+	+	+
void VectorFloodFill (color col, float x, float y)	Fills an single-colored area with the given color <i>col</i> , starting at the given position <i>x</i> and <i>y</i> . In contrast to <code>PixelFloodFill()</code> , the coordinates are given as floating point values ranging from 0.0 to 1.0.	+	+	+	+
void WriteText (string s)	Writes the specified message into the Script Output window. » Example	+	+	+	+
void WriteTextClear ()	Clears the Script Output window from all messages.	+	+	+	+

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void Greyscale ()	Use void Grayscale () instead.

void SetPixelGreyscale (int x, int y)	Use void SetPixelGrayscale (int x, int y) instead.
void SetPixelGreyscale3D (int x, int y, int z)	Use void SetPixelGrayscale3D (int x, int y, int z) instead.
void DrawPixelRect (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void FillPixelRect (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void DrawVectorRect (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.
void FillVectorRect (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.
void DrawPixelCircle (color col, int x, int y, int rw, int rh)	Use void DrawPixelShape () instead.
void FillPixelCircle (color col, int x, int y, int rw, int rh)	Use void DrawPixelShape () instead.
void DrawVectorCircle (color col, float x, float y, float rw, float rh)	Use void DrawVectorShape () instead.
void FillVectorCircle (color col, float x, float y, float rw, float rh)	Use void DrawVectorShape () instead.
void DrawPixelDiamond (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void FillPixelDiamond (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void DrawVectorDiamond (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.
void FillVectorDiamond (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.
void DrawPixelEllipse (color col, int mx, int my, int w, int h)	Use void DrawPixelShape () instead.
void FillPixelEllipse (color col, int mx, int my, int w, int h)	Use void DrawPixelShape () instead.
void DrawVectorEllipse (color col, float mx, float my, float w, float h)	Use void DrawVectorShape () instead.
void FillVectorEllipse (color col, float mx, float my, float w, float h)	Use void DrawVectorShape () instead.
void DrawPixelStar (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void DrawVectorStar (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.
void DrawPixelCross (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void DrawVectorCross (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions are not supported anymore. Please follow the hints to migrate your macros.

Function	Description
void EnableFrameFade (int value)	Use SetStep (int value) instead. Please note that the interpretation of <i>value</i> is inverted now (deactivated stepped rendering corresponds approximately to an activated frame fade and vice versa).
int IsFrameFadeEnabled ()	Use GetStep () instead. Please note that the interpretation of the return value is inverted now (deactivated stepped rendering corresponds approximately to an activated frame fade and vice versa).
void SetValid ()	Please just delete this function from your macros as it is not supported anymore.
void SetInvalid ()	Please just delete this function from your macros as it is not supported anymore.
int IsMapped ()	Use MapDlgIsMapped () instead.
int GetMapPixel (int map[])	Use MapDlgGetMapPixel () instead.
int GetMapVector (float map[])	Use MapDlgGetMapVector () instead.
void MapEffectPixel (int x, int y, int w, int h)	Use MapDlgSetMapPixel () instead.
void MapEffectVector (float x, float y, float w, float h)	Use MapDlgSetMapVector () instead.
int GetMapTileEffectPixel (int map[])	Use MapDlgGetTilePixel () instead.
int GetMapTileEffectVector (float map[])	Use MapDlgSetTileVector () instead.
void MapTileEffectPixel (int x, int y, int w, int h)	Use MapDlgSetTilePixel () instead.
void MapTileEffectVector (float x, float y, float w, float h)	Use MapDlgSetTileVector () instead.
int GetMapModeMirror ()	Use MapDlgGetMapMode () instead.
int GetMapModeTile ()	Use MapDlgGetTileMode () instead.
void SetMapModeMirror (mirrorMode)	Use MapDlgSetMapMode () instead.
void SetMapModeTile (tileMode)	Use MapDlgSetTileMode () instead.
void SetVectorMapRotation (float value, int anim)	Use MapDlgSetRotationVector () instead.
float GetVectorMapRotation ()	Use MapDlgGetRotationVector () instead.
void SetDegreeMapRotation (int degree, int anim)	Use MapDlgSetRotationDegree () instead.
int GetDegreeMapRotation ()	Use MapDlgGetRotationDegree () instead.
int IsMapRotation ()	Use MapDlgGetRotationMode () instead.

Specific Functions

Macro Functions Only Available For The MAS Script Effect

You can find a detailed description in the chapter »[MAS Script Effect: Functions](#)

Here is an overview:

- **SetFrameCount**

Functions Only Available For Macros For Effects

The standard functions of the MAS Script effect are also available for effect macros. Effects in MADRIX are grouped into three categories: SCE - Static Color effects, S2L - Sound2Light effects, and M2L - Music2Light effects.

For better readability, we have only listed the various effects. You can find more information in the chapter »[Macros for Effects: Functions](#) or in the sub-chapters:

SCE - Static Color Effects S2L - Sound2Light Effects M2L - Music2Light Effects

- »[SCE Bounce](#)
- »[SCE Capture](#)
- »[SCE Clouds](#)
- »[SCE Color](#)
- »[SCE Color Change](#)
- »[SCE Color Scroll](#)
- »[SCE Counter](#)
- »[SCE Drops](#)
- »[SCE Explosions](#)
- »[SCE Fill Drops](#)
- »[SCE Fill Random](#)
- »[SCE Fill Snake](#)
- »[SCE Fill Solid](#)
- »[SCE Fire](#)
- »[SCE Flames](#)
- »[SCE Fluid](#)
- »[SCE Gradient](#)
- »[SCE Graph](#)
- »[SCE Image](#)
- »[SCE Level Color Simulator](#)
- »[SCE Metaballs](#)
- »[SCE Noise](#)
- »[SCE Plasma](#)
- »[SCE Pulse / Stroboscope](#)
- »[SCE Screen Capture](#)
- »[SCE Shapes](#)
- »[SCE Simple Shape](#)
- »[SCE Starfield](#)
- »[SCE Swarm](#)
- »[SCE Ticker / Scrolling Text](#)
- »[SCE Tubes](#)
- »[SCE Video](#)
- »[SCE Wave / Radial](#)
- »[S2L Drops](#)
- »[S2L EQ / Spectrum](#)
- »[S2L Frequency Flash](#)
- »[S2L Level Color](#)
- »[S2L Level Color Scroll](#)
- »[S2L Level Meter](#)
- »[S2L Level Shape](#)
- »[S2L Shapes](#)
- »[S2L Tubes](#)
- »[S2L Waveform](#)
- »[S2L Wavegraph](#)
- »[M2L Color Change](#)
- »[M2L Color Scroll](#)
- »[M2L Drops](#)
- »[M2L Note Flash](#)
- »[M2L Shapes](#)
- »[M2L Single Tone Spectrum](#)
- »[M2L Tubes](#)

Functions Only Available For The Main Output Macro

You can find a detailed description in the chapter »[Main Output Macro: Functions](#)

Here is an overview:

- **GetFadeType**
- **SetFadeType**
- **GetFadeColor**
- **SetFadeColor**
- **GetFadeTime**
- **SetFadeTime**
- **GetFadeValue**
- **SetFadeValue**
- **GetFreeze**
- **SetFreeze**
- **GetMasterFader**
- **SetMasterFader**
- **GetAudioFader**
- **SetAudioFader**
- **GetStorageSpeedMaster**
- **SetStorageSpeedMaster**
- **GetStoragePause**
- **SetStoragePause**
- **GetStoragePlace**
- **SetStoragePlace**
- **GetStorageSubMaster**
- **SetStorageSubMaster**
- **GetStorageFullState**
- **SetFilterColor**
- **GetFilterColor**
- **SetBlackout**
- **GetBlackout**

- **SetStorageFilter**
- **GetStorageFilter**
- **ImportStoragePlace**
- **ImportStorage**
- **ImportPatch**
- **Filter**
- **GetAutoGainControl**
- **SetAutoGainControl**
- **GetStrobe**
- **SetStrobe**
- **GetStrobeColor**
- **SetStrobeColor**
- **GetStrobeValue**
- **SetStrobeValue**
- **GetStorage**
- **SetStorage**
- **CuelistStop**
- **CuelistPlay**
- **CuelistGo**
- **CuelistBack**
- **CuelistGoto**
- **CuelistCurrentCue**
- **CuelistCurrentCue**
- **CuelistCount**
- **CuelistCueAllOccupied**
- **CuelistNew**
- **CuelistProgress**
- **CueAdd**
- **CueDelete**
- **CueDeleteAll**
- **CueDeleteCurrent**

- **CueSetDescription**
- **CueGetDescription**
- **CueSetDate**
- **CueGetDateYear**
- **CueGetDateMonth**
- **CueGetDateDay**
- **CueSetDateWeekday**
- **CueGetDateWeekday**
- **CueSetDateString**
- **CueGetDateString**
- **CueSetTimeCode**
- **CueGetTimeCodeHour**
- **CueGetTimeCodeMinute**
- **CueGetTimeCodeSecond**
- **CueGetTimeCodeFrame**
- **CueSetTimeCodeString**
- **CueGetTimeCodeString**
- **CueSetDuration**
- **CueGetDurationHour**
- **CueGetDurationMinute**
- **CueGetDurationSecond**
- **CueGetDurationFrame**
- **CueSetDurationString**
- **CueGetDurationString**
- **CueSetFollow**
- **CueGetFollowCue**
- **CueSetStorage**
- **CueGetStorage**
- **CueSetPlace**
- **CueGetPlace**
- **CueSetFadeType**

- **CueGetFadeType**
- **CueGetFadeTypeString**
- **CueSetFadeTime**
- **CueGetFadeTime**
- **CueGetFadeTimeString**
- **CueSetFadeColor**
- **CueGetFadeColor**
- **CueSetGroupPreset**
- **CueGetGroupPreset**
- **GetGroupCount**
- **GetGroupIdByIndex**
- **GetGroupDefaultValue**
- **GetGroupDefaultValueByIndex**
- **GetGroupDisplayColor**
- **GetGroupDisplayColorByIndex**
- **GetGroupDisplayName**
- **GetGroupDisplayNameByIndex**
- **SetGroupValue**
- **SetGroupValueByIndex**
- **GetGroupValue**
- **GetGroupValueByIndex**
- **SetGroupFlashMode**
- **SetGroupFlashModeByIndex**
- **GetGroupFlashMode**
- **GetGroupFlashModeByIndex**
- **ToggleGroupFlashMode**
- **ToggleGroupFlashModeByIndex**
- **SetGroupFadeTime**
- **GetGroupFadeTime**
- **SetGroupPreset**
- **CallGroupPreset**

Functions Only Available For The Storage Place Macro

You can find a detailed description in the chapter »[Storage Place Macro: Functions](#)

Here is an overview:

- **GetDescription**
- **GetFilter**
- **GetLayerCount**
- **GetPause**
- **GetSpeedMaster**
- **GetSubMaster**
- **LayerGetAsync**
- **LayerGetBlind**
- **LayerGetFilter**
- **LayerGetFrameCount**
- **LayerGetFrameId**
- **LayerGetFrameSteps**
- **LayerGetLink**
- **LayerGetMixMode**
- **LayerGetOpacity**
- **LayerGetSolo**
- **LayerGetStep**
- **LayerGetSubMaster**
- **LayerMapDlgGetMapMode**
- **LayerMapDlgGetMapPixel**
- **LayerMapDlgGetMapPixel3D**
- **LayerMapDlgGetMapVector**
- **LayerMapDlgGetMapVector3D**
- **LayerMapDlgGetRotationDegree**
- **LayerMapDlgGetRotationMode**

- **LayerMapDlgGetRotationVector**
- **LayerMapDlgGetRotationXDegree**
- **LayerMapDlgGetRotationXMode**
- **LayerMapDlgGetRotationXVector**
- **LayerMapDlgGetRotationYDegree**
- **LayerMapDlgGetRotationYMode**
- **LayerMapDlgGetRotationYMode**
- **LayerMapDlgGetRotationYVector**
- **LayerMapDlgGetRotationZDegree**
- **LayerMapDlgGetRotationZMode**
- **LayerMapDlgGetRotationZVector**
- **LayerMapDlgGetTileMode**
- **LayerMapDlgGetTileOffsetPixel**
- **LayerMapDlgGetTileOffsetPixel3D**
- **LayerMapDlgGetTileOffsetVector**
- **LayerMapDlgGetTileOffsetVector3D**
- **LayerMapDlgGetTilePixel**
- **LayerMapDlgGetTilePixel3D**
- **LayerMapDlgGetTileVector**
- **LayerMapDlgGetTileVector3D**
- **LayerMapDlgIsMapped**
- **LayerMapDlgSetMapMode**
- **LayerMapDlgSetMapPixel**
- **LayerMapDlgSetMapPixel3D**
- **LayerMapDlgSetMapVector**
- **LayerMapDlgSetMapVector3D**
- **LayerMapDlgSetRotationDegree**
- **LayerMapDlgSetRotationMode**
- **LayerMapDlgSetRotationVector**
- **LayerMapDlgSetRotationXDegree**
- **LayerMapDlgSetRotationXMode**

- **LayerMapDlgSetRotationXVector**
- **LayerMapDlgSetRotationYDegree**
- **LayerMapDlgSetRotationYMode**
- **LayerMapDlgSetRotationYMode**
- **LayerMapDlgSetRotationYVector**
- **LayerMapDlgSetRotationZDegree**
- **LayerMapDlgSetRotationZMode**
- **LayerMapDlgSetRotationZVector**
- **LayerMapDlgSetTileMode**
- **LayerMapDlgSetTileOffsetPixel**
- **LayerMapDlgSetTileOffsetPixel3D**
- **LayerMapDlgSetTileOffsetVector**
- **LayerMapDlgSetTileOffsetVector3D**
- **LayerMapDlgSetTilePixel**
- **LayerMapDlgSetTilePixel3D**
- **LayerMapDlgSetTileVector**
- **LayerMapDlgSetTileVector3D**
- **LayerSetAsync**
- **LayerSetBlind**
- **LayerSetFilter**
- **LayerSetFrameId**
- **LayerSetLink**
- **LayerSetMixMode**
- **LayerSetOpacity**
- **LayerSetSolo**
- **LayerSetStep**
- **LayerSetSubMaster**
- **LayerToggleAsync**
- **LayerToggleBlind**
- **LayerToggleLink**
- **LayerToggleSolo**

- **LayerToggleStep**
- **SetDescription**
- **SetFilter**
- **SetPause**
- **SetSpeedMaster**
- **SetSubMaster**
- **TogglePause**

3.3 List Of Functions (Grouped)

Overview

This chapter lists a selection of functions of the List Of Functions (Alphabetical Order) in groups of similar kind. Further information is provided in the chapter »[List Of Functions \(Alphabetical Order\)](#).

Function Header	Description	MAS Script	Macros For Effects	Storage Place Macro	Main Output Macro
Draw Functions					
void Clear () void Clear (color col)	Fills the whole matrix with the given color. The default color (no color parameter) is black.	+	+	+	+
void ClearAlpha (int alpha)	Sets the alpha channel of each pixel in the matrix to the specified <i>alpha</i> value.	+	+	+	+
void ClearColor (color col)	Fills the entire matrix with the given color without changing the alpha value.	+	+	+	+
void ChangeBrightness (color col)	Adds the values of the specified color to the current color of every pixel in the matrix.	+	+	+	+
void ColorReplace (color oldCol, color newCol)	Replaces the given color <i>oldCol</i> by another one.	+	+	+	+
void SetPixel (color col, int x, int y)	Sets the pixel at position (x, y) to the specified color. » Description And Examples	+	+	+	+
void SetPixel3D (color col, int x, int y, int z)	Sets the voxel at position (x, y, z) to the specified color.	+	+	+	+
void SetPixelGrayscale (int x, int y)	Renders the selected pixel at position (x, y) in grayscale. » Description And Examples	+	+	+	+
void SetPixelGrayscale3D (int x, int y, int z)	Renders the selected voxel at position (x, y, z) in grayscale.	+	+	+	+
color GetPixel (int x, int y)	Returns the color of the pixel at position (x, y).	+	+	+	+

color GetPixel3D (int x, int y, int z)	Returns the color of the voxel at position (x, y, z).	+	+	+	+
void GetPixelArea (color matrix[[], int xSrc, int ySrc, int w, int h, int xDst, int yDst)	Retrieves data from the matrix and stores it into a 2-dimensional array of colors. » Description	+	+	+	+
void GetPixelArea3D (color matrix[[][]], int xSrc, int ySrc, int zSrc, int w, int h, int d, int xDst, int yDst, int zDst)	Retrieves data from the matrix and stores it into a 3-dimensional array of colors.	+	+	+	+
void DrawPixelArea (color matrix[[], int xDst, int yDst, int w, int h, int xSrc, int ySrc, color filter)	Copies data from a 2-dimensional array of colors and renders it on the matrix. » Description	+	+	+	+
void DrawPixelArea3D (color matrix[[][]], int xDst, int yDst, int zDst, int w, int h, int d, int xSrc, int ySrc, int zSrc, color filter)	Copies data from a 3-dimensional array of colors and renders it on the matrix.	+	+	+	+
void DrawPixelLine (color col, int x1, int y1, int x2, int y2)	Draws a line from pixel (x1, y1) to pixel (x2, y2) with the specified color.	+	+	+	+
void DrawPixelLine3D (color col, int x1, int y1, int z1, int x2, int y2, int z2)	Draws a line from voxel (x1, y1, z1) to voxel (x2, y2, z2) with the specified color col				
void DrawVectorLine (color col, float x1, float y1, float x2, float y2)	Draws a line from the relative position (x1, y1) to relative position (x2, y2) with the specified color.	+	+	+	+
void DrawVectorLine3D (color col, float x1, float y1, float z1, float x2, float y2, float z2)	Draws a line from the relative position (x1, y1, z1) to the relative position (x2, y2, z2) with the specified color col				
void DrawPixelText (color c, font f, string t, int x, int y, int rotation)	Draws a text across the main output. color c and font f are structures. Valid values for rotation are ROTATION_CCW_0 , ROTATION_CCW_90 , ROTATION_CCW_180 , ROTATION_CCW_270 for counter-clockwise rotation and ROTATION_CW_0 , ROTATION_CW_90 , ROTATION_CW_180 , ROTATION_CW_270 for clockwise rotation. » Example 1 » Example 2 » Example 3 » Example 4	±	±	±	±
void DrawVectorText (color c, font f, string t, float x, float y, int rotation)	Draws a vector text across the main output. color c and font f are structures. Valid values for rotation are ROTATION_CCW_0 , ROTATION_CCW_90 , ROTATION_CCW_180 , ROTATION_CCW_270 for counter-clockwise rotation and ROTATION_CW_0 , ROTATION_CW_90 , ROTATION_CW_180 , ROTATION_CW_270 for clockwise rotation. » Example 1 » Example 2	+	+	+	+
void DrawPixelShape (color col, int shape, int x, int y, int z, int w, int h, int d, int lineWidth, int drawMode, int lookAtType)	Draws a given shape onto the matrix with the given size (width w, height h, depth d) at the given position (x, y, z) with the specified color col Learn more » Draw Shapes	+	+	+	+

void DrawVectorShape (color col, int shape, float x, float y, float z, float w, float h, float d, int lineWidth, int drawMode, int lookAtType)	Draws a given <i>shape</i> at the relative position (<i>x</i> , <i>y</i> , <i>z</i>) with the relative size (width <i>w</i> , height <i>h</i> , depth <i>d</i>) and the specified color <i>col</i> . Learn more » Draw Shapes	+	+	+	+
void ShiftPixelMatrix (int x, int y, int w, int h, int dir, int step)	Moves the area of the matrix (defined by <i>x</i> , <i>y</i> , <i>w</i> , and <i>h</i>) <i>step</i> pixel into the given direction. Exemplary values for <i>dir</i> are SHIFT_UP , SHIFT_DOWN , or SHIFT_UL . » List of Global Constants Note: After shifting the pixels, the data is lost. It is not possible to undo a shifting operation. <i>x</i> , <i>y</i> , <i>w</i> , <i>h</i> describe the rectangle that should be shifted. <i>x</i> and <i>y</i> describe the upper left corner. <i>w</i> and <i>h</i> are the width and height of the rectangle. Learn more » ShiftMatrix	+	+	+	+
void ShiftVectorMatrix (float x, float y, float w, float h, int dir, float step)	Moves the area of the matrix (defined by <i>x</i> , <i>y</i> , <i>w</i> , and <i>h</i>) <i>step</i> pixel into the given direction. Exemplary values for <i>dir</i> are SHIFT_UP , SHIFT_DOWN , or SHIFT_UL . » List of Global Constants Note: After shifting the pixels, the data is lost. It is not possible to undo a shifting operation. <i>x</i> , <i>y</i> , <i>w</i> , <i>h</i> describe the rectangle that should be shifted. <i>x</i> and <i>y</i> describe the upper left corner. <i>w</i> and <i>h</i> are the width and height of the rectangle. Learn more » ShiftMatrix	+	+	+	+
void VectorFloodFill (color col, float x, float y)	Fills a single-colored area with the given color <i>col</i> , starting at the given position <i>x</i> and <i>y</i> . In contrast to <code>PixelFloodFill()</code> , the coordinates are given as floating point values ranging from 0.0 to 1.0.	+	+	+	+
void PixelFloodFill (color col, int x, int y)	Fills a single-colored area with the specified color <i>col</i> , starting at the given position <i>x</i> and <i>y</i> .	+	+	+	+
void InvertColor ()	Inverts the color of the entire matrix.	+	+	+	+
void InvertMatrix ()	Inverts the whole matrix. The top left pixel will be moved to the bottom right and the bottom left pixel to the top right.	+	+	+	+
void Grayscale ()	Converts the whole matrix to grayscaled values.	+	+	+	+
void SetVectorPixel (color, float x, float y)	Draws one pixel at the given vector coordinates. In addition to the coordinates, a <i>color</i> must be specified.	+	+	+	+
void SetVectorPixel (color, float x, float y, float z)	Draws one voxel at the given vector coordinates. In addition to the coordinates, a <i>color</i> must be specified.	+	+	+	+
void SetVectorPixel3D (color, float x, float y, float z)	Draws one voxel at the given vector coordinates. In addition to the coordinates, a <i>color</i> must be specified.	+	+	+	+
color GetVectorPixel (float x, float y)	Returns the <i>color</i> of the pixel drawn at vector coordinates <i>x</i> and <i>y</i> .	+	+	+	+
color GetVectorPixel3D (float x, float y, float z)	Returns the <i>color</i> of the voxel drawn at vector coordinates <i>x</i> , <i>y</i> , and <i>z</i> .				
void Filter (int filter)	Renders a filter over the matrix. » Valid parameters (Filters) » Description	+	+	+	+
void SetFilter (int filter)	Applies a Filter (FX) to the matrix. Valid values for <i>filter</i> are » Filters » Description	+	+	+	
int GetFilter ()	Returns which Filter (FX) is applied to the matrix.	+	+	+	

void SetChromaKey (color c, int alpha)	Sets the specified alpha value for the specified color c. <i>color c</i> is a structure. Valid values for <i>alpha</i> range from 0 to 255. Note: To be mainly used in <i>PostRenderEffect()</i> .	+	+	+	+
S2L Functions					
float GetSoundLevel (int channel)	Returns a value, ranging from 0.0 to 1.0, representing the sound level of the stereo channel: 0 = left channel, 1 = right channel.	+	+		
M2L Functions					
int GetNoteValue (int note)	Returns a value, ranging from 0 to 127, representing the sound level of the specified note: 0 = C = 8.25 Hz, ..., 127 = G = 12.67 kHz.	+	+		
int GetBassValue ()	Returns a value from 0 to 127 representing the sound level of the bass tone.	+	+		
void GetAllNoteValues (int buf[])	Fills the array <i>buf</i> with the sound level values for each note (buf[0] ... buf[127]). <i>buf[index]</i> can differ from 0 to 127.	+	+		
void GetAllIntervals (int buf[])	Fills the array <i>buf</i> with the occurrences of each interval (buf[0] ... buf[10]). <i>buf[index]</i> is TRUE , if the specified interval was analyzed.	+	+		
int IsInterval (int index)	Returns TRUE if the specified interval (at the <i>index</i> position, ranging from 0 to 10) was analyzed.	+	+		
int IsNote (int note)	Returns TRUE if the specified note was analyzed. (0 = C = 8.25 Hz, ..., 127 = G = 12.67 kHz)	+	+		
int GetTonality ()	Returns a value, ranging from 0 to 11, representing the tonality (0 = C, 1 = C#, 2 = D ...). The return value is -1 if the tonality could not be determined.	+	+		
int GetBassTone ()	Returns a value, ranging from 0 to 127, representing the lowest tone (0 = C, 1 = C#, 2 = D, ...). The return value is -1 if the lowest tone could not be determined.	+	+		
int GetBassType ()	Returns a value, ranging from 0 to 11, representing the bass type (0 = base bass, 1,2 = small/large second bass, 3,4 = small/large third bass, ... , 10, 11 = small/large seventh bass). The return value is -1 if the bass type could not be determined.	+	+		
int GetToneScale ()	Returns a value, ranging from 0 to 2, representing the tone scale (0 = undetermined, 1 = major, 2 = minor).	+	+		
int IsTonality ()	Returns TRUE if the tonality could be determined.	+	+		
Mathematical Functions					
int random (int min, int max)	Returns a random integer number in the value range of <i>min</i> to <i>max</i> .	+	+	+	+
float frandom ()	Returns a random float number in the value range of 0.0 to 1.0.	+	+	+	+
int min (int x, int y) float fmin (float x, float y)	Returns the minimum value of <i>x</i> and <i>y</i> .	+	+	+	+
int max (int x, int y) float fmax (float x, float y)	Returns the maximum value of <i>x</i> and <i>y</i> .	+	+	+	+
float abs (float x)	Returns the absolute value of <i>x</i> .	+	+	+	+
float sqrt (float x)	Returns the square root of <i>x</i> .	+	+	+	+

float pow (float x, float y)	Returns the result of the calculation of x to the power of y .	+	+	+	+
float exp (float x)	Returns the result of e (2.7182...) to the power of x .	+	+	+	+
float ln (float x)	Returns the result of the natural logarithm of x .	+	+	+	+
float log10 (float x)	Returns the result of the common logarithm of x .	+	+	+	+
float hypot (float x, float y)	Calculates the length of the hypotenuse of an orthogonal triangle with x and y as the cathetus' lengths.	+	+	+	+
float rad2deg (float a)	Converts the angle a from radian measure to degrees.	+	+	+	+
float deg2rad (float a)	Converts the angle a from degrees to radian measure.	+	+	+	+
float sin (float a) float sinDeg (float a)	Returns the sine of the angle a in radian measure or degrees, respectively.	+	+	+	+
float arcsin (float a) float arcsinDeg (float a)	Returns the arc sine of the angle a in radian measure or degrees, respectively.	+	+	+	+
float sinH (float a) float sinHDeg (float a)	Returns the hyperbolic sine of the angle a in radian measure or degrees, respectively.	+	+	+	+
float cos (float a) float cosDeg (float a)	Returns the cosine of the angle a in radian measure or degrees, respectively.	+	+	+	+
float arccos (float a) float arccosDeg (float a)	Returns the arc cosine of the angle a in radian measure or degrees, respectively.	+	+	+	+
float cosh (float a) float coshDeg (float a)	Returns the hyperbolic cosine of the angle a in radian measure or degrees, respectively.	+	+	+	+
float tan (float a) float tanDeg (float a)	Returns the tangent of the angle a in radian measure or degrees, respectively.	+	+	+	+
float arctan (float a) float arctanDeg (float a)	Returns the arc tangent of the angle a in radian measure or degrees, respectively.	+	+	+	+
float tanH (float a) float tanHDeg (float a)	Returns the hyperbolic tangent of the angle a in radian measure or degrees, respectively.	+	+	+	+
float arccot (float a) float arccotDeg (float a)	Returns the arc cotangent of the angle a in radian measure or degrees, respectively.	+	+	+	+
float cotan (float a) float cotanDeg (float a)	Returns the cotangent of the angle a in radian measure or degrees, respectively.	+	+	+	+
float arctan2 (float x, float y)	Returns the angle of polar coordinates from two Cartesian coordinates x and y .	+	+	+	+
float round (float f)	Rounds the given value to its next integer value. The value is rounded correctly, either up or down.	+	+	+	+
float trunc (float f)	Truncates/cuts off the decimals from a floating point value.	+	+	+	+
float ceil (float f)	Rounds up the given value to the next integer value. E.g. $\text{ceil}(2.00001) = 3.0$	+	+	+	+
float fmod (float denominator, float divisor)	Calculates the remainder of the float division.	+	+	+	+
Mapping Functions					
int MapDlgIsMapped ()	Retrieves if the Layer is mapped.	+	+		

<p>void MapDlgGetMapVector(float map[])</p>	<p>Retrieves the map settings for the Layer using relative values. The values are saved in an array (<i>map[]</i>).</p> <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = width (Size X) ▪ map[3] = height (Size Y) 	+	+		
<p>void MapDlgSetMapVector(float x, float y, float w, float h)</p>	<p>Maps the Layer to a certain area of the matrix using relative values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.</p>	+	+		
<p>void MapDlgGetMapVector3D (float map[])</p>	<p>Retrieves the map settings for the Layer in 3D using relative values. The values are saved in an array (<i>map[]</i>).</p> <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = Z-coordinate (Position Z) ▪ map[3] = width (Size X) ▪ map[4] = height (Size Y) ▪ map[5] = depth (Size Z) 	+	+		
<p>void MapDlgSetMapVector3D (float x, float y, float z, float w, float h, float d)</p>	<p>Maps the Layer to a certain area of the matrix in 3D using relative values. <i>x</i>, <i>y</i>, and <i>z</i> describe the coordinates. <i>w</i>, <i>h</i>, and <i>d</i> describe width, height, and depth.</p>	+	+		
<p>void MapDlgGetMapPixel(int map[])</p>	<p>Retrieves the map settings for the Layer using pixel values. The values are saved in an array (<i>map[]</i>).</p> <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = width (Size X) ▪ map[3] = height (Size Y) 	+	+		
<p>void MapDlgSetMapPixel(int x, int y, int w, int h)</p>	<p>Maps the Layer to a certain area of the matrix using pixel values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.</p>	+	+		

void MapDlgGetMapPixel3D (int map[])	Retrieves the map settings for the Layer in 3D using pixel values. The values are saved in an array (<i>map[]</i>). <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = Z-coordinate (Position Z) ▪ map[3] = width (Size X) ▪ map[4] = height (Size Y) ▪ map[5] = depth (Size Z) 	+	+		
void MapDlgSetMapPixel3D (int x, int y, int z, int w, int h, int d)	Maps the Layer to a certain area of the matrix in 3D using pixel values. <i>x</i> , <i>y</i> , and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.	+	+		
int MapDlgGetMapMode ()	Retrieves the currently used Map Mirror Mode of the Layer. See » here for a list of constants.	+	+		
void MapDlgSetMapMode (int mode)	Sets the Map Mirror Mode for the Layer. See » here for a list of constants.	+	+		
void MapDlgGetTileVector (float tile[])	Retrieves the Tiling settings for the Layer using relative values. The values are saved in an array (<i>tile[]</i>). <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = width (Size X) ▪ tile[3] = height (Size Y) 	+	+		
void MapDlgSetTileVector (float x, float y, float w, float h)	Tiles the Layer to a certain area of the mapping using relative values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.	+	+		
void MapDlgGetTileVector3D (float tile[])	Retrieves the Tiling settings for the Layer in 3D using relative values. The values are saved in an array (<i>tile[]</i>). <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = Z-coordinate (Position Z) ▪ tile[3] = width (Size X) ▪ tile[4] = height (Size Y) ▪ tile[5] = depth (Size Z) 	+	+		
void MapDlgSetTileVector3D (float x, float y, float z, float w, float h, float d)	Tiles the Layer in a certain area in 3D using relative values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> , <i>y</i> , and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.	+	+		

void MapDlgGetTilePixel (int tile [])	Retrieves the Tiling settings for the Layer using pixel values. The values are saved in an array (<i>tile[]</i>). <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = width (Size X) ▪ tile[3] = height (Size Y) 	+	+		
void MapDlgSetTilePixel (int x, int y, int w, int h)	Tiles the Layer in a certain area using pixel values. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.	+	+		
void MapDlgGetTilePixel3D (int tile[])	Retrieves the Tiling settings for the Layer in 3D using pixel values. The values are saved in an array (<i>tile[]</i>). <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = Z-coordinate (Position Z) ▪ tile[3] = width (Size X) ▪ tile[4] = height (Size Y) ▪ tile[5] = depth (Size Z) 	+	+		
void MapDlgSetTilePixel3D (int x, int y, int z, int w, int h, int d)	Tiles the Layer in a certain area using pixel values. <i>x</i> , <i>y</i> and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.	+	+		
void MapDlgGetTileOffsetVector (float offset[])	Retrieves the Tiling Offset of the Layer using relative values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) 	+	+		
void MapDlgSetTileOffsetVector (float x, float y)	Sets the Tiling Offset of the Layer using relative values. <i>x</i> describes Offset X, while <i>y</i> represents Offset Y.	+	+		
void MapDlgGetTileOffsetVector3D (float offset[])	Retrieves the Tiling Offset of the Layer in 3D using relative values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) ▪ offset[2] = Z-coordinate (Offset Z) 	+	+		
void MapDlgSetTileOffsetVector3D (float x, float y, float z)	Sets the Tiling Offset of the Layer in 3D using relative values. <i>x</i> describes Offset X, <i>y</i> describes Offset Y, while <i>z</i> represents Offset Z.	+	+		

void MapDlgGetTileOffsetPixel (int offset[])	Retrieves the Tiling Offset of the Layer using pixel values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) 	+	+		
void MapDlgSetTileOffsetPixel (int x, int y)	Sets the Tiling Offset of the Layer using pixel values. <i>x</i> describes Offset X, while <i>y</i> represents Offset Y.	+	+		
void MapDlgGetTileOffsetPixel3D (int offset[])	Retrieves the Tiling Offset of the Layer in 3D using pixel values. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) ▪ offset[2] = Z-coordinate (Offset Z) 	+	+		
void MapDlgSetTileOffsetPixel3D (int x, int y, int z)	Sets the Tiling Offset of the Layer in 3D using pixel values. <i>x</i> describes Offset X, <i>y</i> describes Offset Y, while <i>z</i> represents Offset Z.	+	+		
int MapDlgGetTileMode ()	Retrieves the currently used Tile Mode of the Layer. See »here for a list of Tile Mode constants.	+	+		
void MapDlgSetTileMode (int mode)	Sets the Tile Mode of the Layer. See »here for a list of Tile Mode constants.	+	+		
void MapDlgGetRotationVector (float rot[])	Retrieves the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using relative values. The values are saved in an array (<i>rot[]</i>). <ul style="list-style-type: none"> ▪ rot[0] = X-coordinate (X-Axis) ▪ rot[1] = Y-coordinate (Y-Axis) ▪ rot[2] = Z-coordinate (Z-Axis) 	+	+		
void MapDlgSetRotationVector (float x, float y, float z)	Sets the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using relative values.	+	+		
void MapDlgGetRotationDegree (int rot[])	Retrieves the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using degree values. The values are saved in an array (<i>rot[]</i>). <ul style="list-style-type: none"> ▪ rot[0] = X-coordinate (X-Axis) ▪ rot[1] = Y-coordinate (Y-Axis) ▪ rot[2] = Z-coordinate (Z-Axis) 	+	+		
void MapDlgSetRotationDegree (int x, int y, int z)	Sets the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer using degree values.	+	+		
float MapDlgGetRotationXVector ()	Retrieves the Rotation for the X-axis of the Layer using relative values.	+	+		
void MapDlgSetRotationXVector (float value)	Sets the Rotation value for the X-axis of the specified Layer using degree values.	+	+		

int MapDlgGetRotationXDegree ()	Retrieves the Rotation for the X-axis of the Layer using degree values.	+	+		
void MapDlgSetRotationXDegree (int value)	Sets the Rotation value for the X-axis of the Layer using degree values.	+	+		
int MapDlgGetRotationXMode ()	Retrieves the Rotation mode for the X-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
void MapDlgSetRotationXMode (int mode)	Sets the Rotation mode for the X-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
float MapDlgGetRotationYVector ()	Retrieves the Rotation for the Y-axis of the Layer using relative values.	+	+		
void MapDlgSetRotationYVector (float value)	Sets the Rotation value for the Y-axis of the Layer using relative values.	+	+		
int MapDlgGetRotationYDegree ()	Retrieves the Rotation for the Y-axis of the Layer using degree values.	+	+		
void MapDlgSetRotationYDegree (int value)	Sets the Rotation value for the Y-axis of the Layer using degree values.	+	+		
int MapDlgGetRotationYMode ()	Retrieves the Rotation mode for the Y-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
void MapDlgSetRotationYMode (int mode)	Sets the Rotation mode for the Y-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
float MapDlgGetRotationZVector ()	Retrieves the Rotation value for the Z-axis of the Layer using relative values.	+	+		
void MapDlgSetRotationZVector (float value)	Sets the Rotation value for the Z-axis of the Layer using relative values.	+	+		
int MapDlgGetRotationZDegree ()	Retrieves the Rotation value for the Z-axis of the Layer using degree values.	+	+		
void MapDlgSetRotationZDegree (int value)	Sets the Rotation value for the Z-axis of the Layer using degree values.	+	+		
int MapDlgGetRotationZMode ()	Retrieves the Rotation mode for the Z-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
void MapDlgSetRotationZMode (int mode)	Sets the Rotation mode for the Z-axis of the Layer. See » here for a list of Rotation Mode constants.	+	+		
void MapDlgGetRotationMode (int mode[])	Retrieves the Rotation mode for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer. See » here for a list of Rotation Mode constants. The values are saved in an array (<i>mode[]</i>). <ul style="list-style-type: none"> ▪ mode[0] = X-coordinate (X-Axis) ▪ mode[1] = Y-coordinate (Y-Axis) ▪ mode[2] = Z-coordinate (Z-Axis) 	+	+		
void MapDlgSetRotationMode (int x, int y, int z)	Sets the Rotation mode for axes <i>x</i> , <i>y</i> , and <i>z</i> of the Layer. See » here for a list of Rotation Mode constants.	+	+		

int MapDlgGetAntiAliasing ()	Retrieves the Anti-Aliasing mode of the Layer. See » here for a list of Anti-Aliasing Mode constants.	+	+		
void MapDlgSetAntiAliasing (int aaLevel)	Sets the Anti-Aliasing mode of the Layer. See » here for a list of Anti-Aliasing Mode constants.	+	+		
String Functions					
int findstring (int startIndex, string text, string substring)	This functions looks for the <i>substring</i> in the given text. The search starts at the given <i>startIndex</i> . The first character has an index of 0. The function starts its search at a specified position of the entire <i>text</i> using <i>startIndex</i> and returns an index that describes the position at which the <i>substring</i> begins. If the <i>substring</i> is not found, <i>-1</i> is returned.	+	+	+	+
string substring (string text, int start, int count)	The function extracts <i>count</i> characters from the given <i>text</i> starting with <i>start</i> . If <i>count</i> is <i>-1</i> , all characters of the string starting at <i>start</i> are returned. » Description E.g.: <code>substring("Hello", 0, 2)</code> returns "He".	+	+	+	+
int rfindstring (int startIndex, string text, string substring)	This functions looks for the <i>substring</i> in the given text from its end to the beginning. The function starts its search at a specified position of the entire <i>text</i> using <i>startIndex</i> and returns an index that describes the position at which the <i>substring</i> begins. If the substring was not found, <i>-1</i> is returned.	+	+	+	+
int startswith (string text, string substring)	This function checks if the string <i>text</i> starts with the given <i>substring</i> . If <i>text</i> starts with <i>substring</i> , TRUE is returned, otherwise FALSE .	+	+	+	+
int endswith (string text, string substring)	This function checks if the string <i>text</i> ends with the given <i>substring</i> . If <i>text</i> ends with <i>substring</i> , TRUE is returned, otherwise FALSE .	+	+	+	+
int isalnum (string text)	Returns TRUE if the given string contains only characters and figures and if its length is greater then 0. Otherwise, FALSE is returned.	+	+	+	+
int isalpha (string text)	Returns TRUE if the given string contains only characters and if its length is greater than 0, otherwise FALSE is returned.	+	+	+	+
int isnum (string text)	Returns TRUE if the given <i>text</i> represents a number. This may be an integer number or a floating point number (e.g. 1.3). Otherwise, it returns FALSE .	+	+	+	+
void tolower (string text)	Converts each character of the given <i>string</i> into a lower-case character.	+	+	+	+
void toupper (string text)	Converts each character of the given <i>string</i> into an upper-case character.	+	+	+	+
void strip (string text)	Removes leading and ending white spaces, like space, tabulator, line feeds, etc. from the given <i>string</i> .	+	+	+	+
int strcmp (string str1, string str2)	Compares two given strings with each other. If they are equal, <i>0</i> is returned. <i>-1</i> is returned if <i>str1</i> is less than <i>str2</i> . A value of <i>1</i> is returned if <i>str1</i> is bigger than <i>str2</i> .	+	+	+	+
void replace (string src, string old, string new)	Replaces any appearances of <i>old</i> within <i>src</i> with <i>new</i> .	+	+	+	+

void tokenize (string src, string delimiter, string reslist[])	Strips the <i>src</i> string into smaller pieces delimited by characters within <i>delimiter</i> . The result is returned in <i>reslist</i> . » Description	+	+	+	+
Effect-Controlling Functions					
void SetAsync (int value)	Sets the asynchronous rendering mode. » Description This function is only available for some effects.	+	+		
int GetAsync ()	Returns if asynchronous rendering is used. » Description This function is only available for some effects.	+	+		
void ToggleAsync ()	Toggles the asynchronous rendering mode. » Description This function is only available for some effects.	+	+		
void SetBlind (int value)	Sets Blind Mode . » Description	+	+		
int GetBlind ()	Returns if Blind Mode is used. » Description	+	+		
void ToggleBlind ()	Toggles Blind Mode . » Description	+	+		
void SetFrameId (float id)	Sets a new Frame ID. If the given <i>id</i> is lower than 0, it is set to 0.	+	+		
float GetFrameId ()	Returns the ID of the current frame. » Description	+	+		
float GetFrameSteps ()	Returns the number of frames between this and the last call. » Description	+	+		
float GetFrameCount ()	Retrieves the number of frames the effect produces before it gets repeated. This is the same value which was set by <i>SetFrameCount</i> for MAS Script. The initial value is 1000.0.	+	+		
void SetSolo (int value)	Sets Solo Mode . » Description	+	+		
int GetSolo ()	Returns if Solo Mode is used. » Description	+	+		
void ToggleSolo ()	Toggles Solo Mode . » Description	+	+		
void SetStep (int value)	Sets the stepped rendering mode. » Description This function is only available for some effects.	+	+		
int GetStep ()	Returns if stepped rendering is used. » Description This function is only available for some effects.	+	+		
void ToggleStep ()	Toggles the stepped rendering mode. » Description This function is only available for some effects.	+	+		
Other Functions					
void TRACE (variable)	Writes the value of the specified variable into the Script output window. Fulfills the same function as WriteText	+	+	+	+
void WriteText (string s)	Writes the specified message into the Script Output window.	+	+	+	+
void WriteTextClear ()	Clears the Script Output window from all messages.	+	+	+	+
int GetMatrixDepth ()	Returns the pixel count of the matrix regarding the depth.				
int GetMatrixWidth ()	Returns the horizontal pixel count of the matrix.	+	+	+	+
int GetMatrixHeight ()	Returns the vertical pixel count of the matrix.	+	+	+	+
int GetColorDepth ()	Returns the color depth of the fixture.	+	+	+	+
date GetDate ()	Returns a date structure with the current date.	+	+	+	+
time GetTime ()	Returns a time structure with the current time.	+	+	+	+

int GetMixMode()	Returns the currently set Mix Mode . » Valid parameters (Mix Modes) » Description	+	+		
void SetMixMode (int mode)	Sets the Mix Mode of the effect. <i>mode</i> may be one of the values defined in » Mix Modes . If <i>mode</i> is invalid, nothing happens and a message is displayed in the Script output of the Script Editor. » Description	+	+		
int GetSubMaster()	Returns the currently set Submaster value of the effect. The value ranges from 0 to 255.	+	+		
void SetSubMaster (int value)	Sets the Submaster value of the effect. Valid values range from 0 to 255.	+	+		
int GetOpacity()	Returns the currently set Opacity value of the effect. The value ranges from 0 to 255.	+	+		
void SetOpacity (int value)	Sets the Opacity value of the effect. Valid values range from 0 to 255.	+	+		
void SetLink (int enable)	Enables or disables the option to link effect Layers. Valid values are 0 (false) or 1 (true).	+	+		
int GetLink()	Returns 1 (i.e. TRUE) if the option to link effect Layers is enabled, otherwise 0 (FALSE).	+	+		
void ToggleLink()	Toggles Link Mode , the option to link effect Layers.	+	+		
int ReadAsync (string file, string txt)	Reads content as text from a <i>file</i> into the string <i>txt</i> . » Description And Examples	+	+	+	+
int SetReadAsyncInterval (string file, int interval)	Sets the reading <i>interval</i> for a certain <i>file</i> . To be used in combination with ReadAsync . » Description And Examples	+	+	+	+
string GetApplicationPath()	Locates the MADRIX.exe on your harddisk and returns the path as a <i>string</i> . » Example	+	+	+	+
string GetUserProfileDirectory()	Locates the directory of the current user profile on the harddisk and returns the path as a <i>string</i> . » Example	+	+	+	+
void GetComputerName()	Retrieves the name of the computer in use as defined in Windows.	+	+	+	+
void GetUserName()	Retrieves the name of the current user as defined in Windows.	+	+	+	+
time GetTimeCode()	Returns a time structure with the currently used Time Code . » Example	+	+	+	+
Version Number Functions					
string GetScriptEngineVersion()	Returns the script engine version and returns the value as a <i>string</i> . » Example	+	+	+	+
string GetSoftwareVersion()	Returns the MADRIX software version and returns the value as a <i>string</i> . » Example	+	+	+	+
int CheckScriptEngineVersion (int major, int minor)	Checks the Script engine version in use and returns 1 if the version is equal or higher to the version specified with <i>major</i> and <i>minor</i> . Or else 0 is returned. The current Script Engine Version is 2.15. A useful function to check if the minimum requirements of your script are met. » Example	+	+	+	+

int CheckSoftwareVersion (int major, int minor, int subminor, int subsubminor)	Checks the MADRIX software version in use and returns <i>1</i> if the version is equal or higher to the version specified with <i>major</i> , <i>minor</i> , <i>subminor</i> , and <i>subsubminor</i> . Or else <i>0</i> is returned. The current MADRIX version is 3.5.1.0. You can check which version you are using by opening the Logfile in MADRIX (at the beginning of the file) or check the MADRIX.exe (perform a right-click > Properties >Version). A useful function to check if the minimum requirements of your script are met. » Example	+	+	+	+
DMX-IN Functions					
void GetDmxIn (int DmxValues[], int startchannel, int channels, int universe)	Stores the DMX-IN status of several DMX channels in an array (<i>DmxValues[]</i>). To use the function, choose a DMX start channel and specify the number of channels that should be scanned. Valid values for <i>startchannel</i> range from <i>0</i> to <i>511</i> . Valid values for <i>channels</i> range from <i>0</i> to <i>511</i> . Please note that a maximum of 512 channels can be scanned. This means that the sum of <i>startchannel</i> + <i>channels</i> must be less or equal to 512. In addition, specify the universe that should be scanned. Valid values for <i>universe</i> range from <i>0</i> to <i>255</i> . The default <i>universe</i> is <i>0</i> , i. e. DMX Universe 1.	+	+	+	+
int GetDmxInChannel (int channel, int universe)	Returns the status of the DMX-IN functionality of a specified DMX channel (<i>channel</i>). Valid values for <i>channel</i> range from <i>0</i> to <i>511</i> . In addition, specify the universe that should be scanned. Valid values for <i>universe</i> range from <i>0</i> to <i>255</i> . The default value of <i>universe</i> is <i>0</i> , i.e. DMX Universe 1.	+	+	+	+
int IsDmxInEnabled ()	Retrieves if DMX-IN is activated (<i>1</i>) or not (<i>0</i>).	+	+	+	+
PixelTranspose Functions					
void CreatePixelTransposeTable (int size, int growsize)	Creates the pixel transpose table with the given <i>size</i> and <i>grow size</i> .	+	+	+	+
void SetPixelTransposeEntry (int idx, int srcX, int srcY, int destX, int destY)	Adds one pixel transpose table entry defined by <i>idx</i> . <i>srcX</i> and <i>srcY</i> are the x and y coordinates of the source. <i>destX</i> and <i>destY</i> are the destination coordinates.	+	+	+	+
void SetPixelTransposeEntry3D (int idx, int srcX, int srcY, int srcZ, int destX, int destY, int destZ)	Adds one pixel transpose table entry defined by <i>idx</i> . <i>srcX</i> , <i>srcY</i> and <i>srcZ</i> are the coordinates of the source in x, y, and z. <i>destX</i> , <i>destY</i> , and <i>destZ</i> are the destination coordinates. » Description	+	+	+	+
void AddPixelTransposeEntry (int srcX, int srcY, int destX, int destY)	Adds one entry to the pixel transpose table and resizes the table if necessary. <i>srcX</i> and <i>srcY</i> are the coordinates in X and Y of the source. <i>destX</i> and <i>destY</i> are the destination coordinates.	+	+	+	+
void AddPixelTransposeEntry3D (int srcX, int srcY, int srcZ, int destX, int destY, int destZ)	Adds one entry to the pixel transpose table and resizes the table if necessary. <i>srcX</i> , <i>srcY</i> , and <i>srcZ</i> are the coordinates in X, Y, and Z of the source. <i>destX</i> , <i>destY</i> , and <i>destZ</i> are the coordinates of the destination. » Description	+	+	+	+
void ExecutePixelTranspose (int clear)	Executes the pixel transposition by using the pixel transpose table. Using the value CLEAR will erase/overwrite all pixels that are not defined as destination with the color black. Otherwise, NOCLEAR will keep all pixels that are not defined as original destination.	+	+	+	+
MIDI-IN Functions					
int IsMidiInEnabled ()	Retrieves if MIDI-IN is activated (<i>1</i>) or not (<i>0</i>).	+	+	+	+

int GetMidiInNoteValue (int midinote, int midichannel, int device)	Returns the MIDI note value of the specified MIDI note (<i>midinote</i>) and <i>midichannel</i> for the specified <i>device</i> . The default value of <i>note</i> , <i>midichannel</i> , and <i>device</i> is 0, i.e. the first note, channel, and device. (Please note: In MADRIX, the index for channels and devices starts with 1, while the index for MIDI notes starts with 0). » Example	+	+	+	+
int GetMidiInControlValue (int midicontrol, int midichannel, int device)	Returns the MIDI control value of the specified MIDI <i>control change</i> (<i>midicontrol</i>) and <i>midichannel</i> for the specified <i>device</i> . The default value of <i>control</i> , <i>midichannel</i> , and <i>device</i> is 0, i.e. the first control, channel, and device. (Please note: In MADRIX, the index for channels and devices starts with 1, while the index for MIDI notes starts with 0). » Example	+	+	+	+
void GetMidiInNote (int midivalues[], int startnote, int notecount, int midichannel, int device)	Stores the MIDI values for multiple notes in an array (<i>midivalues[]</i>). To use the function, choose a start note (<i>startnote</i>) and the number of notes (<i>notecount</i>), as well as the MIDI channel (<i>midichannel</i>) and the <i>device</i> . The default value of <i>startnote</i> , <i>midichannel</i> , and <i>device</i> is 0, i.e. the first control, channel, and device. The default and maximum value of <i>notecount</i> is 128. (Please note: In MADRIX, the index for channels and devices starts with 1, while the index for MIDI notes starts with 0). » Example	+	+	+	+
void GetMidiInControl (int midivalues[], int startcontrol, int controlcount, int midichannel, int device)	Stores the MIDI values for multiple controls in an array (<i>midivalues[]</i>). To use the function, choose a start control (<i>startcontrol</i>) and the number of controls (<i>controlcount</i>), as well as the MIDI channel (<i>midichannel</i>) and the <i>device</i> . The default value of <i>startnote</i> , <i>midichannel</i> , and <i>device</i> is 0, i.e. the first control, channel, and device. The default and maximum value of <i>controlcount</i> is 128. (Please note: In MADRIX, the index for channels and devices starts with 1, while the index for MIDI notes starts with 0). » Example	+	+	+	+
Dimming Functions					
void Dim (float value)	Reduces the brightness of the complete virtual matrix. Valid values for <i>value</i> range from 0.0 to 1.0.	+	+	+	+
void DimPixel (float value, int x, int y)	Reduces the brightness of an individual pixel. <i>x</i> and <i>y</i> are the coordinates of the pixel. Valid values for <i>value</i> range from 0.0 to 1.0.	+	+	+	+
void DimPixel3D (float value, int x, int y, int z)	Reduces the brightness of an individual voxel. <i>x</i> , <i>y</i> , and <i>z</i> are the coordinates of the voxel. Valid values for <i>value</i> range from 0.0 to 1.0.	+	+	+	+
void DimPixelArea (float value, int x, int y, int width, int height)	Reduces the brightness of a certain area of the virtual matrix. <i>x</i> and <i>y</i> are the coordinates of the area (upper left corner). <i>width</i> and <i>height</i> specify the width and height of the area. Valid values for <i>value</i> range from 0.0 to 1.0.	+	+	+	+
void DimPixelArea3D (float value, int x, int y, int z, int width, int height, int depth)	Reduces the brightness of a certain area of the virtual 3D matrix. <i>x</i> , <i>y</i> , and <i>z</i> are the coordinates of the area (front upper left corner). <i>width</i> , <i>height</i> , and <i>depth</i> specify the width, height, and depth of the area. Valid values for <i>value</i> range from 0.0 to 1.0.	+	+	+	+
Sunset And Sunrise Functions					

time GetTimeSunrise (struct date, int latitude_degrees, int latitude_minutes, int longitude_degrees, int longitude_minutes, float time_zone_UTC_offset)	Returns the sunrise time of a geographic location at the specified <i>date</i> . Note: Please use cautiously! Due to the performance requirements of this function, it is not recommended to call it often. Please call this function seldomly in your script/macro. » Example	+	+	+	+
time GetTimeSunriseCity (struct date, int city)	Returns the sunrise time of a specified <i>city</i> at the specified <i>date</i> . Valid values for <i>city</i> are » city constants . Note: Please use cautiously! Due to the performance requirements of this function, it is not recommended to call it often. Please call this function seldomly in your script/macro. » Example	+	+	+	+
time GetTimeSunset (struct date, int latitude_degrees, int latitude_minutes, int longitude_degrees, int longitude_minutes, float time_zone_UTC_offset)	Returns the sunset time of a geographic location at the specified <i>date</i> . Note: Please use cautiously! Due to the performance requirements of this function, it is not recommended to call it often. Please call this function seldomly in your script/macro. » Example	+	+	+	+
time GetTimeSunsetCity (struct date, int city)	Returns the sunset time of a specified <i>city</i> at the specified <i>date</i> . Valid values for <i>city</i> are » city constants . Note: Please use cautiously! Due to the performance requirements of this function, it is not recommended to call it often. Please call this function seldomly in your script/macro. » Example	+	+	+	+
DMX Fader Tool					
void SetDmxFaderValue (int index, int value)	Sets the value for a fader of the DMX Fader Tool. Valid values for <i>index</i> range from 0 to 11 (Indexing starts with 0). Valid values for <i>value</i> range from 0 to 255. Note: Make sure to activate the fader in the DMX Fader Tool first!	+	+	+	+

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void Greyscale ()	Use void Grayscale () instead.
void SetPixelGreyscale (int x, int y)	Use void SetPixelGrayscale (int x, int y) instead.
void SetPixelGreyscale3D (int x, int y, int z)	Use void SetPixelGrayscale3D (int x, int y, int z) instead.
void DrawPixelRect (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void FillPixelRect (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void DrawVectorRect (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.
void FillVectorRect (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.

void DrawPixelCircle (color col, int x, int y, int rw, int rh)	Use void DrawPixelShape () instead.
void FillPixelCircle (color col, int x, int y, int rw, int rh)	Use void DrawPixelShape () instead.
void DrawVectorCircle (color col, float x, float y, float rw, float rh)	Use void DrawVectorShape () instead.
void FillVectorCircle (color col, float x, float y, float rw, float rh)	Use void DrawVectorShape () instead.
void DrawPixelDiamond (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void FillPixelDiamond (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void DrawVectorDiamond (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.
void FillVectorDiamond (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.
void DrawPixelEllipse (color col, int mx, int my, int w, int h)	Use void DrawPixelShape () instead.
void FillPixelEllipse (color col, int mx, int my, int w, int h)	Use void DrawPixelShape () instead.
void DrawVectorEllipse (color col, float mx, float my, float w, float h)	Use void DrawVectorShape () instead.
void FillVectorEllipse (color col, float mx, float my, float w, float h)	Use void DrawVectorShape () instead.
void DrawPixelStar (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void DrawVectorStar (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.
void DrawPixelCross (color col, int x, int y, int w, int h)	Use void DrawPixelShape () instead.
void DrawVectorCross (color col, float x, float y, float w, float h)	Use void DrawVectorShape () instead.

MADRIX 2.X To MADRIX 3.X Migration Hints















The following functions are not supported anymore. Please follow the hints to migrate your macros.



Function	Description
void EnableFrameFade (int value)	Use SetStep (int value) instead. Please note that the interpretation of <i>value</i> is inverted now (deactivated stepped rendering corresponds approximately to an activated frame fade and vice versa).

int IsFrameFadeEnabled()	Use GetStep() instead. Please note that the interpretation of the return value is inverted now (deactivated stepped rendering corresponds approximately to an activated frame fade and vice versa).
void SetValid()	Please just delete this function from your macros as it is not supported anymore.
void SetInvalid()	Please just delete this function from your macros as it is not supported anymore.
int IsMapped()	Use MapDlgIsMapped() instead.
int GetMapPixel (int map[])	Use MapDlgGetMapPixel() instead.
int GetMapVector (float map[])	Use MapDlgGetMapVector() instead.
void MapEffectPixel (int x, int y, int w, int h)	Use MapDlgSetMapPixel() instead.
void MapEffectVector (float x, float y, float w, float h)	Use MapDlgSetMapVector() instead.
int GetMapTileEffectPixel (int map[])	Use MapDlgGetTilePixel() instead.
int GetMapTileEffectVector (float map[])	Use MapDlgSetTileVector() instead.
void MapTileEffectPixel (int x, int y, int w, int h)	Use MapDlgSetTilePixel() instead.
void MapTileEffectVector (float x, float y, float w, float h)	Use MapDlgSetTileVector() instead.
int GetMapModeMirror()	Use MapDlgGetMapMode() instead.
int GetMapModeTile()	Use MapDlgGetTileMode() instead.
void SetMapModeMirror (mirrorMode)	Use MapDlgSetMapMode() instead.
void SetMapModeTile (tileMode)	Use MapDlgSetTileMode() instead.
void SetVectorMapRotation (float value, int anim)	Use MapDlgSetRotationVector() instead.
float GetVectorMapRotation ()	Use MapDlgGetRotationVector() instead.
void SetDegreeMapRotation (int degree, int anim)	Use MapDlgSetRotationDegree() instead
int GetDegreeMapRotation ()	Use MapDlgGetRotationDegree() instead.
int IsMapRotation ()	Use MapDlgGetRotationMode() instead.

3.4 List Of Global Variables And Constants

Variable/Constant	Description
Math	
float PI	Represents the number PI with a value of 3.141592.
S2L - Sound2Light	

Variable/Constant	Description
float SOUND_DATA_LEFT []	Contains the sound values of the left audio channel. 511 bands/values in a range from 0.0 to 1.0.
float SOUND_DATA_RIGHT []	Contains the sound values of the right audio channel. 511 bands/values in a range from 0.0 to 1.0.
Drawing	
color WHITE	 White color without alpha. {255,255,255,0,0}
color BLACK	 Black color without alpha. {0,0,0,0,0}
color RED	 Red color without alpha. {255,0,0,0,0}
color MAROON	 Maroon color without alpha. {128,0,0,0,0}
color GREEN	 Green color without alpha. {0,255,0,0,0}
color MADRIX_GREEN	 MADRIX green without alpha. {177,219,24,0,0}
color BLUE	 Blue color without alpha. {0,0,255,0,0}
color NAVY	 Navy color without alpha. {0,0,128,0,0}
color AQUA	 Aqua color without alpha. {0,255,255,0,0}
color CYAN	 Cyan color without alpha. {0,255,255,0,0}
color TURQUOISE	 Turquoise color without alpha. {0,255,255,0,0}
color TEAL	 Teal color without alpha. {0,128,128,0,0}
color FUCHSIA	 Fuchsia color without alpha. {255,0,255,0,0}
color PINK	 Pink color without alpha. {255,0,255,0,0}

Variable/Constant	Description
color MAGENTA	 Magenta color without alpha. {255,0,255,0,0}
color PURPLE	 Purple color without alpha. {128,0,128,0,0}
color YELLOW	 Yellow color without alpha. {255,255,0,0,0}
color OLIVE	 Olive color without alpha. {128,128,0,0,0}
color LIGHT_GRAY	 Light gray color without alpha. {192,192,192,0,0}
color SILVER	 Silver color without alpha. {192,192,192,0,0}
color GRAY	 Gray color without alpha. {128,128,128,0,0}
color DARK_GRAY	 Dark gray color without alpha. {64,64,64,0,0}
color ORANGE	 Orange color without alpha. {255,128,0,0,0}
color BROWN	 Brown color without alpha. {139,69,19,0,0}
color SKY	 Sky color without alpha. {0,191,255,0,0}
color GOLD	 Gold color without alpha. {238,201,0,0,0}
color WHITE_ALPHA	 White color with alpha. {255,255,255,255,255}
color BLACK_ALPHA	 Black color with alpha. {0,0,0,0,255}
color COLOR	<p>COLOR may be used as last parameter for drawing functions. The functions then draws the color channels red, green, blue, and white.</p>
color ALPHA	<p>ALPHA may be used as last parameter for drawing functions. The functions then draws only the alpha channel.</p>

Variable/Constant	Description
color <code>COLOR_AND_ALPHA</code>	<code>COLOR_AND_ALPHA</code> may be used as last parameter for drawing functions. The function then draws both the color and the alpha channel.
Mix Modes	
int <code>MIXMODE_NORMAL</code>	The Normal mix mode.
int <code>MIXMODE_DARKEN</code>	The Darken mix mode.
int <code>MIXMODE_MULTIPLY</code>	The Multiply mix mode.
int <code>MIXMODE_COLORBURN</code>	The Color Burn mix mode.
int <code>MIXMODE_LINEARBURN</code>	The Linear Burn mix mode.
int <code>MIXMODE_LIGHTEN</code>	The Lighten (HTP) mix mode.
int <code>MIXMODE_SCREEN</code>	The Screen mix mode.
int <code>MIXMODE_COLORDODGE</code>	The Color Dodge mix mode.
int <code>MIXMODE_LINEARDODGE</code>	The Linear Dodge mix mode.
int <code>MIXMODE_OVERLAY</code>	The Overlay mix mode.
int <code>MIXMODE_SOFTLIGHT</code>	The Soft Light mix mode.
int <code>MIXMODE_HARDLIGHT</code>	The Hard Light mix mode.
int <code>MIXMODE_VIVIDLIGHT</code>	The Vivid Light mix mode.
int <code>MIXMODE_LINEARLIGHT</code>	The Linear Light mix mode.
int <code>MIXMODE_PINLIGHT</code>	The Pin Light mix mode.
int <code>MIXMODE_HARDMIX</code>	The Hard Mix mix mode.
int <code>MIXMODE_DIFFERENCE</code>	The Difference mix mode.
int <code>MIXMODE_EXCLUSION</code>	The Exclusion mix mode.
int <code>MIXMODE_AND</code>	The AND mix mode.
int <code>MIXMODE_OR</code>	The OR mix mode.
int <code>MIXMODE_XOR</code>	The XOR mix mode.
int <code>MIXMODE_NAND</code>	The NAND mix mode.
int <code>MIXMODE_NOR</code>	The NOR mix mode.
int <code>MIXMODE_MASK</code>	The Mask mix mode.
Filters / Storage Place and Layer Effects (FX)	
General Filters	
int <code>FILTER_NONE</code>	Deactivates the filter.
Blur / Sharpen Filters	
int <code>FILTER_BLUR</code>	This filter blurs the output.

Variable/Constant	Description
int <code>FILTER_BLUR_BSPLINE</code>	This filter blurs the output applying a B-spline.
int <code>FILTER_BLUR_CATMULL_ROM</code>	This filter blurs the output applying a Catmull-Rom spline.
int <code>FILTER_BLUR_GAUSS</code>	This filter blurs the output applying the Gaussian function.
int <code>FILTER_BLUR_MITCHELL</code>	This filter blurs the output applying the Mitchell-Netravali function.
int <code>FILTER_SHARPEN</code>	This filter sharpens the output.
Color Correction Filters	
int <code>FILTER_BRIGHTEN</code>	The brighten filter to light up the whole matrix.
int <code>FILTER_DARKEN</code>	The darken filter to darken the whole matrix.
int <code>FILTER_GRAYSCALE</code>	The grayscale filter to render the matrix grayscale, i.e. in gray colors.
int <code>FILTER_INVERT_COLOR</code>	The invert color filter to invert every color channel.
Color Mask Filters	
int <code>FILTER_RED</code>	The red filter to filter out every color except the red color channel.
int <code>FILTER_GREEN</code>	The green filter to filter out every color except the green color channel.
int <code>FILTER_BLUE</code>	The blue filter to filter out every color except the blue color channel.
int <code>FILTER_WHITE</code>	The white filter to filter out every color except the white color channel.
int <code>FILTER_RED_GREEN</code>	The red/green filter to filter out every color except the red and the green color channel.
int <code>FILTER_RED_BLUE</code>	The red/blue filter to filter out every color except the red and the blue color channel.
int <code>FILTER_GREEN_BLUE</code>	The green/blue filter to filter out every color except the green and the blue color channel.
int <code>FILTER_RED_WHITE</code>	The red/white filter to filter out every color except the red and the white color channel.
int <code>FILTER_GREEN_WHITE</code>	The green/white filter to filter out every color except the green and the white color channel.
int <code>FILTER_BLUE_WHITE</code>	The blue/white filter to filter out every color except the blue and the white color channel.

Variable/Constant	Description
int <code>FILTER_RED_GREEN_BLUE</code>	The red/green/blue filter to filter out every color except the red, the green, and the blue color channel.
int <code>FILTER_RED_GREEN_WHITE</code>	The red/green/white filter to filter out every color except the red, the green, and the white color channel.
int <code>FILTER_RED_BLUE_WHITE</code>	The red/blue/white filter to filter out every color except the red, the blue, and the white color channel.
int <code>FILTER_GREEN_BLUE_WHITE</code>	The green/blue/white filter to filter out every color except the green, the blue, and the white color channel.
Kaleidoscope Filters	
int <code>FILTER_KALEIDOSCOPE_6X</code>	The 6x mix mode.
int <code>FILTER_KALEIDOSCOPE_8X</code>	The 8x mix mode.
int <code>FILTER_KALEIDOSCOPE_12X</code>	The 12x mix mode.
Style Filters	
int <code>FILTER_EDGES</code>	The edges filter to make the edges of objects/motifs stand out.
int <code>FILTER_EDGES_POPUP</code>	The edges popup filter to make the edges of objects/motifs stand out.
int <code>FILTER_EMOSS</code>	The emboss filter to create an image with just highlights and shadows.
int <code>FILTER_EMOSS_POPUP</code>	The emboss popup filter to create an image with just highlights and shadows depending on the motif.
Transformation Filters	
int <code>FILTER_INVERT_H_MATRIX</code>	The filter flips the matrix horizontally.
int <code>FILTER_INVERT_V_MATRIX</code>	The filter flips the matrix vertically.
int <code>FILTER_INVERT_HV_MATRIX</code>	The filter flips the matrix horizontally and vertically. Therefore it instantly rotates the matrix by 180°.
int <code>FILTER_INVERT_D_MATRIX</code>	The filter flips the matrix regarding the depth.
int <code>FILTER_INVERT_HD_MATRIX</code>	The filter flips the matrix horizontally and regarding the depth.
int <code>FILTER_INVERT_VD_MATRIX</code>	The filter flips the matrix vertically and regarding the depth.
int <code>FILTER_INVERT_HVD_MATRIX</code>	The filter flips the matrix horizontally, vertically, and regarding the depth.
Shifting the Matrix	
int <code>SHIFT_UP</code>	Shifts the content of the defined area upwards.

Variable/Constant	Description
int <code>SHIFT_DOWN</code>	Shifts the content of the defined area downwards.
int <code>SHIFT_LEFT</code>	Shifts the content of the defined area to the left.
int <code>SHIFT_RIGHT</code>	Shifts the content of the defined area to the right.
int <code>SHIFT_UL</code>	Shifts the content of the defined area to the upper left.
int <code>SHIFT_UR</code>	Shifts the content of the defined area to the upper right.
int <code>SHIFT_DL</code>	Shifts the content of the defined area to the bottom left.
int <code>SHIFT_DR</code>	Shifts the content of the defined area to the bottom right.
int <code>SHIFT_H_IN_OUT</code>	Shifts the content of the defined area from the middle of the the area outwards in a horizontal direction.
int <code>SHIFT_H_OUT_IN</code>	Shifts the content of the defined area from the outside of the the area to the middle in a horizontal direction.
int <code>SHIFT_V_IN_OUT</code>	Shifts the content of the defined area from the middle of the the area outwards in a vertical direction.
int <code>SHIFT_V_OUT_IN</code>	Shifts the content of the defined area from the outside of the the area to the middle in a vertical direction.
int <code>SHIFT_C_IN_OUT</code>	Shifts the content of the defined area from the middle of the the area outwards in a vertical and a horizontal direction.
int <code>SHIFT_C_OUT_IN</code>	Shifts the content of the defined area from the outside of the the area to the middle in vertical and horizontal direction.
Map Modes	
int <code>MAP_MIRROR_NONE</code>	Disables the mirror map mode.
int <code>MAP_MIRROR_H</code>	Mirrors the content of the matrix horizontally.
int <code>MAP_MIRROR_V</code>	Mirrors the content of the matrix vertically.
int <code>MAP_MIRROR_HV</code>	Mirrors the content of the matrix both vertically and horizontally.
int <code>MAP_MIRROR_D</code>	Mirrors the content regarding the depth.
int <code>MAP_MIRROR_HD</code>	Mirrors the content of the matrix horizontally and regarding the depth.

Variable/Constant	Description
int <code>MAP_MIRROR_VD</code>	Mirrors the content of the matrix vertically and regarding the depth.
int <code>MAP_MIRROR_HVD</code>	Mirrors the content of the matrix horizontally, vertically, and regarding the depth.
int <code>MAP_TILE_NONE</code>	Disables mapping tile modes.
int <code>MAP_TILE_REPEAT</code>	Repeats tiles on the mapped matrix.
int <code>MAP_TILE_MIRROR_H</code>	Mirrors tiles horizontally.
int <code>MAP_TILE_MIRROR_V</code>	Mirrors tiles vertically.
int <code>MAP_TILE_MIRROR_HV</code>	Mirrors tiles both vertically and horizontally.
int <code>MAP_TILE_MIRROR_D</code>	Mirrors tiles regarding the depth.
int <code>MAP_TILE_MIRROR_HD</code>	Mirrors tiles horizontally and regarding the depth.
int <code>MAP_TILE_MIRROR_VD</code>	Mirrors tiles vertically and regarding the depth.
int <code>MAP_TILE_MIRROR_HVD</code>	Mirrors tiles horizontally, vertically, and regarding the depth.
int <code>MAP_ROTATION_FIXED</code>	Sets a fixed rotation.
int <code>MAP_ROTATION_LOOP</code>	Sets a lopped rotation animation.
int <code>MAP_AA_NONE</code>	Sets no anti-aliasing mode.
int <code>MAP_AA_2X</code>	Sets simple anti-aliasing (requires some performance).
int <code>MAP_AA_4X</code>	Sets complex anti-aliasing (requires a lot performance).
Directions	
For a complete list of direction constants, see »Using Directions	
Distributions	
int <code>DIST_UNIFORM</code>	Sets the distribution to Uniform .
int <code>DIST_LINEAR</code>	Sets the distribution to Linear .
int <code>DIST_QUADRATIC</code>	Sets the distribution to Quadratic .
int <code>DIST_SQRT</code>	Sets the distribution to Square root .
int <code>DIST_CUBIC</code>	Sets the distribution to Cubic .
int <code>DIST_RND</code>	Sets the distribution to Random .
Wave Types / Function Types	
int <code>WAVE_TYPE_SINE</code>	Sets the wave type to Sine .
int <code>WAVE_TYPE_SINE_ABSOLUTE</code>	Sets the wave type to Absolute Sine .

Variable/Constant	Description
int <code>WAVE_TYPE_SAWTOOTH_DOWNWARDS</code>	Sets the wave type to Sawtooth Downwards .
int <code>WAVE_TYPE_SAWTOOTH_UPWARDS</code>	Sets the wave type to Sawtooth Upwards .
int <code>WAVE_TYPE_TRIANGLE</code>	Sets the wave type to Triangle .
int <code>WAVE_TYPE_COSINE</code>	Sets the wave type to Cosine .
int <code>WAVE_TYPE_SQUARE</code>	Sets the wave type to Square .
Others	
string <code>WHITE_SPACES</code>	A string which contains white spaces, like tab, new line, or space. This can be used as delimiter string for » Tokenizing
int <code>TRUE</code>	Represents value 1.
int <code>FALSE</code>	Represents value 0.

Cities	
A - L	M - Z
<p><code>CITY_AACHEN</code> <code>CITY_AALBORG</code> <code>CITY_AARHUS</code> <code>CITY_ABERDEEN</code> <code>CITY_ABIDJAN</code> <code>CITY_ABILENE</code> <code>CITY_ABU_DHABI</code> <code>CITY_ACAPULCO</code> <code>CITY_ACCRA</code> <code>CITY_ADANA</code> <code>CITY_ADDIS_ABABA</code> <code>CITY_ADELAIDE</code> <code>CITY_ADEN</code> <code>CITY_AGADEZ</code> <code>CITY_AGADIR</code> <code>CITY_AHMEDABAD</code> <code>CITY_AKRON</code> <code>CITY_AKUREYRI</code> <code>CITY_AKYAB</code> <code>CITY_ALBANY</code> <code>CITY_ALBANY_NEW_YORK_USA</code> <code>CITY_ALBUQUERQUE</code> <code>CITY_ALEPPO</code> <code>CITY_ALEXANDRIA</code> <code>CITY_ALEXANDRIA_LOUISIANA_USA</code> <code>CITY_ALEXANDRIA_VIRGINIA_USA</code> <code>CITY_ALGIERS</code> <code>CITY_ALLENTOWN</code> <code>CITY_ALTOONA</code> <code>CITY_AL_MAHALLA_AL_KUBRA</code> <code>CITY_AL_MOBARRAZ</code></p>	<p><code>CITY_MAASTRICHT</code> <code>CITY_MACAO</code> <code>CITY_MACHALA</code> <code>CITY_MACHAZE</code> <code>CITY_MACON</code> <code>CITY_MADISON</code> <code>CITY_MADRAS</code> <code>CITY_MADRID</code> <code>CITY_MAGDEBURG</code> <code>CITY_MAINZ</code> <code>CITY_MAJUNGA</code> <code>CITY_MALABO</code> <code>CITY_MALAGA</code> <code>CITY_MALANG</code> <code>CITY_MALDEN_BRIDGE</code> <code>CITY_MALE</code> <code>CITY_MALMOE</code> <code>CITY_MANAGUA</code> <code>CITY_MANAMA</code> <code>CITY_MANAUS</code> <code>CITY_MANCHESTER</code> <code>CITY_MANCHESTER_NEW_HAMPSHIRE_USA</code> <code>CITY_MANDALAY</code> <code>CITY_MANILA</code> <code>CITY_MANIZALES</code> <code>CITY_MANNHEIM</code> <code>CITY_MANTA</code> <code>CITY_MAPUTO</code> <code>CITY_MARACAIBO</code> <code>CITY_MARACAY</code></p>

Cities	
CITY_AMADORA	CITY_MARADI
CITY_AMARILLO	CITY_MAROUA
CITY_AMBATO	CITY_MARRAKESH
CITY_AMMAN	CITY_MARSEILLE
CITY_AMSTERDAM	CITY_MAR_DEL_PLATA
CITY_AMSTETTEN	CITY_MASERU
CITY_ANAHEIM	CITY_MASHHAD
CITY_ANCHORAGE	CITY_MAZAR_I_SHARIF
CITY_ANDORRA_LA_VELLA	CITY_MBABANE
CITY_ANGELES	CITY_MBALE
CITY_ANKARA	CITY_MBUJI_MAYI
CITY_ANNABA	CITY_MECCA
CITY_ANNAPOLIS	CITY_MECHELEN
CITY_ANN_ARBOR	CITY_MEDAN
CITY_ANTANANARIVO	CITY_MEDELLIN
CITY_ANTOFAGASTA	CITY_MEDINA
CITY_ANTSIRABE	CITY_MEKNES
CITY_ANTSIRANANA	CITY_MELBOURNE
CITY_ANTWERP	CITY_MELBOURNE_FLORIDA_USA
CITY_APELDOORN	CITY_MEMPHIS
CITY_APIA	CITY_MENDOZA
CITY_AREQUIPA	CITY_MERIDA
CITY_ARIANA	CITY_MERIDIAN
CITY_ARICA	CITY_MEXICALI
CITY_ARLINGTON	CITY_MEXICO_CITY
CITY_ARUSHA	CITY_MIAMI
CITY_ASHEVILLE	CITY_MIDDLETOWN
CITY_ASMARA	CITY_MIDLAND
CITY_ASSIUT	CITY_MILAN
CITY_ASUNCION	CITY_MILWAUKEE
CITY_AS_SMARA	CITY_MINDELO
CITY_ATBARA	CITY_MINNEAPOLIS
CITY_ATHENS	CITY_MINSK
CITY_ATLANTA	CITY_MISKOLC
CITY_ATLANTIC_CITY	CITY_MOBILE
CITY_AUCKLAND	CITY_MOENCHENGLADBACH
CITY_AUGSBURG	CITY_MOERS
CITY_AUGUSTA	CITY_MOGADISHU
CITY_AUSTIN	CITY_MOMBASA
CITY_BACOLOD	CITY_MONACO
CITY_BADEN	CITY_MONROE
CITY_BAGHDAD	CITY_MONROVIA
CITY_BAHIA_BLANCA	CITY_MONS
CITY_BAKERSFIELD	CITY_MONTEGO_BAY
CITY_BAKHTARAN	CITY_MONTERREY
CITY_BAKU	CITY_MONTEVIDEO
CITY_BALTIMORE	CITY_MONTE_CARLO
CITY_BAMAKO	CITY_MONTGOMERY
CITY_BANDAR_SERI_BEGAWAN	CITY_MONTPELLIER
CITY_BANDUNG	CITY_MONTREAL
CITY_BANGALORE	CITY_MOPTI
CITY_BANGKOK	CITY_MORATUWA
CITY_BANGOR	CITY_MORONI

Cities	
CITY_BANGUI	CITY_MOSCOW
CITY_BANJUL	CITY_MOSUL
CITY_BARCELONA	CITY_MOULMEIN
CITY_BARCELONA_VENEZUELA	CITY_MOUNT_VERNON
CITY_BARI	CITY_MUELHEIM
CITY_BARQUISIMETO	CITY_MUKALLA
CITY_BARRANQUILLA	CITY_MULTAN
CITY_BARREIRO	CITY_MUNCIE
CITY_BASEL	CITY_MUNICH
CITY_BASRA	CITY_MUNSTER
CITY_BASSEIN	CITY_MUSCAT
CITY_BASSE_TERRE	CITY_MWANZA
CITY_BATA	CITY_NACALA
CITY_BATON_ROUGE	CITY_NAGASAKI
CITY_BEAUMONT	CITY_NAGOYA
CITY_BEERSHEBA	CITY_NAGPUR
CITY_BEIJING	CITY_NAIROBI
CITY_BEIRA	CITY_NAJAF
CITY_BEIRUT	CITY_NAKHON_RATHISAMA
CITY_BELEM	CITY_NAKHON_SI_THAMMARAT
CITY_BELFAST	CITY_NAKURU
CITY_BELGRADE	CITY_NAMUR
CITY_BELIZE_CITY	CITY_NANJING
CITY_BELMOPAN	CITY_NANTES
CITY_BELO_HORIZONTE	CITY_NAPLES
CITY_BENGHAZI	CITY_NASHUA
CITY_BERBERA	CITY_NASHVILLE
CITY_BERGEN	CITY_NASSAU
CITY_BERGISCH_GLABDACH	CITY_NATCHEZ
CITY_BERLIN	CITY_NATITINGOU
CITY_BERN	CITY_NDJAMENA
CITY_BETHLEHEM	CITY_NDOLA
CITY_BIEL	CITY_NEE_SOON
CITY_BIELEFELD	CITY_NEUCHATEL
CITY_BILBAO	CITY_NEUSS
CITY_BILE	CITY_NEWARK
CITY_BILLINGS	CITY_NEWCASTLE
CITY_BILOXI	CITY_NEWPORT
CITY_BINGHAMTON	CITY_NEWPORT_NEWS
CITY_BIRMINGHAM	CITY_NEW_BEDFORD
CITY_BIRMINGHAM_UNITED_KINGDOM	CITY_NEW_DELHI
CITY_BISMARCK	CITY_NEW_HAVEN
CITY_BISSAU	CITY_NEW_ORLEANS
CITY_BIZERTA	CITY_NEW_YORK
CITY_BLANTYRE	CITY_NHA_TRANG
CITY_BLIDA	CITY_NIAGARA_FALLS
CITY_BNEI_BRAK	CITY_NIAMEY
CITY_BO	CITY_NICE
CITY_BOBO_DIOULASSO	CITY_NICOSIA
CITY_BOCHUM	CITY_NIJMEGEN
CITY_BOGATA	CITY_NISH
CITY_BOISE	CITY_NIZHNY_NOVGOROD
CITY_BOLOGNA	CITY_NORFOLK

Cities	
CITY_BOLZANO	CITY_NORRKOEPING
CITY_BOMBAY	CITY_NORWICH
CITY_BONN	CITY_NOUADHIBOU
CITY_BORAS	CITY_NOUAKCHOTT
CITY_BORDEAUX	CITY_NOVA_IGUACU
CITY_BOSTON	CITY_NOVI_SAD
CITY_BOTTROP	CITY_NOVOSIBIRSK
CITY_BOULDER	CITY_NUKUALOFA
CITY_BOULOGNE	CITY_NUREMBERG
CITY_BRADFORD	CITY_NZEREKORE
CITY_BRAGA	CITY_OAKLAND
CITY_BRAILA	CITY_OBERHAUSEN
CITY_BRASILIA	CITY_ODENSE
CITY_BRATISLAVA	CITY_ODESSA
CITY_BRAUNAU	CITY_ODESSA_TEXAS_USA
CITY_BRAUNSCHWEIG	CITY_OFFENBACH
CITY_BRAZZAVILLE	CITY_OGBOMOSHO
CITY_BREGENZ	CITY_OGDEN
CITY_BREMEN	CITY_OKLAHOMA_CITY
CITY_BREMERHAVEN	CITY_OLDENBURG
CITY_BRESLAU	CITY_OLOMOUC
CITY_BRIDGEPORT	CITY_OMAHA
CITY_BRIDGETOWN	CITY_OMDURMAN
CITY_BRISBANE	CITY_OMSK
CITY_BRISTOL	CITY_ORAN
CITY_BRNO	CITY_ORANGE_WALK
CITY_BROMBERG	CITY_ORANJESTAD
CITY_BROWNSVILLE	CITY_OREBRO
CITY_BRUCK_AN_DER_MUR	CITY_ORLANDO
CITY_BRUEGGE	CITY_ORURO
CITY_BRUSSELS	CITY_OSAKA
CITY_BUAK	CITY_OSHKOSH
CITY_BUCARAMANGA	CITY_OSIJEK
CITY_BUCHAREST	CITY_OSLO
CITY_BUDAPEST	CITY_OSNABRUECK
CITY_BUENOS_AIRES	CITY_OSTEND
CITY_BUFFALO	CITY_OSTRAVA
CITY_BUJUMBURA	CITY_OTTAWA
CITY_BUKAVU	CITY_OUAGADOUGOU
CITY_BULAWAYO	CITY_OUJDA
CITY_BURAIDAH	CITY_OULU
CITY_BURGAS	CITY_OWENSBORO
CITY_BURLINGTON	CITY_OXFORD
CITY_BURSA	CITY_PADANG
CITY_BUTARE	CITY_PADERBORN
CITY_BUTTE	CITY_PAKSE
CITY_CAGAYAN_DE_ORO	CITY_PALEMBANG
CITY_CAIRO	CITY_PALERMO
CITY_CALCUTTA	CITY_PALMA_DE_MALLORCA
CITY_CALGARY	CITY_PALM_SPRINGS
CITY_CALI	CITY_PANAMA_CITY
CITY_CALLAO	CITY_PANCHIAO
CITY_CALOOCAN	CITY_PAPEETE

Cities	
CITY_CAMAGUEY	CITY_PARAMARIBO
CITY_CAMDEN	CITY_PARIS
CITY_CAM_RANH	CITY_PASADENA
CITY_CANBERRA	CITY_PASAY
CITY_CANTON	CITY_PATERSON
CITY_CAPE_TOWN	CITY_PATRAS
CITY_CAP_HAITIEN	CITY_PAU
CITY_CARACAS	CITY_PAYSANDU
CITY_CARDIFF	CITY_PECs
CITY_CARTAGENA	CITY_PEDRO_JUAN_CABALLERO
CITY_CASABLANCA	CITY_PENSACOLA
CITY_CASPER	CITY_PEORIA
CITY_CASTRIES	CITY_PEREIRA
CITY_CATANIA	CITY_PERM
CITY_CEBU	CITY_PETACH_TIKVA
CITY_CEDAR_RAPIDS	CITY_PETANGE
CITY_CHAMPAIGN	CITY_PETERSBURG
CITY_CHANIA	CITY_PFORZHEIM
CITY_CHARLEROI	CITY_PHILADELPHIA
CITY_CHARLESTON	CITY_PHNOM_PENH
CITY_CHARLESTON_WEST_VIRGINIA_USA	CITY_PHOENIX
CITY_CHARLOTTE	CITY_PINANG
CITY_CHARLOTTESVILLE	CITY_PINE_BLUFF
CITY_CHATTANOOGA	CITY_PIRAEUS
CITY_CHEMNITZ	CITY_PITTSBURGH
CITY_CHENGDU	CITY_PITTSFIELD
CITY_CHEYENNE	CITY_PIURA
CITY_CHIANG_MAI	CITY_PLOVDIV
CITY_CHIAYI	CITY_PLYMOUTH
CITY_CHICAGO	CITY_PLZEN
CITY_CHICLAYO	CITY_POCATELLO
CITY_CHIHUAHUA	CITY_POINTE_NOIRE
CITY_CHILLAN	CITY_POONA
CITY_CHIMBOTE	CITY_PORI
CITY_CHINGOLA	CITY_PORTLAND
CITY_CHITTAGONG	CITY_PORTLAND_OREGON_USA
CITY_CHITUNGWIZA	CITY_PORTO
CITY_CHOLUTECA	CITY_PORTOVIEJO
CITY_CHONGJIN	CITY_PORTO_ALEGRE
CITY_CHONGQING	CITY_PORTO_NOVO
CITY_CHON_BURI	CITY_PORTSOUTH
CITY_CHOYBALSAN	CITY_PORT_ARTHUR
CITY_CHRISTCHURCH	CITY_PORT_AU_PRINCE
CITY_CHUNGLI	CITY_PORT_ELIZABETH
CITY_CHUR	CITY_PORT_GENTIL
CITY_CINCINNATI	CITY_PORT_LOUIS
CITY_CIRCLEVILLE	CITY_PORT_MORESBY
CITY_CIUDAD_GUAYANA	CITY_PORT_OF_SPAIN
CITY_CIUDAD_JUAREZ	CITY_PORT_SAID
CITY_CLARKSVILLE	CITY_PORT_SUDAN
CITY_CLEVELAND	CITY_PORT_VILA
CITY_CLUJ_NAPOCA	CITY_POSES
CITY_COCHABAMBA	CITY_POTOSI

Cities	
CITY_COIMBRA	CITY_POTSDAM
CITY_COLOGNE	CITY_POUGHKEEPSIE
CITY_COLOMBO	CITY_PRAGUE
CITY_COLON	CITY_PRAIA
CITY_COLORADO_SPRINGS	CITY_PRETORIA
CITY_COLUMBIA	CITY_PROVIDENCE
CITY_COLUMBIA_SOUTH_CAROLINA_USA	CITY_PROVO
CITY_COLUMBUS	CITY_PUEBLA
CITY_COLUMBUS_OHIO_USA	CITY_PUEBLA_DE_ZARAGOZA
CITY_CONAKRY	CITY_PUEBLO
CITY_CONCEPCION	CITY_PUERTO_BARRIOS
CITY_CONCEPCION_PARAGUAY	CITY_PUERTO_PLATA
CITY_CONCORD	CITY_PUERTO_STROESSNER
CITY_CONSTANTINE	CITY_PUNTARENAS
CITY_CONSTANZA	CITY_PUSAN
CITY_COPENHAGEN	CITY_PYONGYANG
CITY_CORDOBA	CITY_PYUTHAN
CITY_CORK	CITY_QUEBEC
CITY_COROZAL	CITY_QUEZALTENANGO
CITY_CORPUS_CHRISTI	CITY_QUEZON_CITY
CITY_COTONOU	CITY_QUITO
CITY_COTTBUS	CITY_QUI_NHON
CITY_CRAIOVA	CITY_RABAT
CITY_CUCUTA	CITY_RABAU
CITY_CUENCA	CITY_RALEIGH
CITY_CURITIBA	CITY_RAMAT_GAN
CITY_CUZCO	CITY_RANCAGUA
CITY_DAKAR	CITY_RANDERS
CITY_DAKHLA	CITY_RANGOON
CITY_DALLAS	CITY_RAPID_CITY
CITY_DALOA	CITY_RAQQA
CITY_DAMASCUS	CITY_RAWALPINDI
CITY_DANBURY	CITY_RECIFE
CITY_DANGRIGA	CITY_RECKLINGHAUSEN
CITY_DANZIG	CITY_REGENSBURG
CITY_DARKHAN	CITY_REGINA
CITY_DARMSTADT	CITY_REMICH
CITY_DAR_ES_SALAAM	CITY_REMSCHIED
CITY_DAVAO	CITY_RENO
CITY_DAVID	CITY_REYKJAVIK
CITY_DAYTON	CITY_RICHMOND
CITY_DAYTONA_BEACH	CITY_RIGA
CITY_DA_NANG	CITY_RIO_DE_JANEIRO
CITY_DEBRECEN	CITY_RIVERA
CITY_DEHIWALA	CITY_RIVERSIDE
CITY_DEIR_EZ_ZOR	CITY_RIYADH
CITY_DENVER	CITY_ROANOKE
CITY_DESSAU	CITY_ROCHESTER
CITY_DES_MOINES	CITY_ROCHESTER_NEW_YORK_USA
CITY_DETROIT	CITY_ROCKFORD
CITY_DHAKA	CITY_ROCK_ISLAND
CITY_DIFFERDANGE	CITY_ROME
CITY_DJERBA	CITY_ROODEPOORT

Cities	
CITY_DJIBOUTI	CITY_ROSARIO
CITY_DODOMA	CITY_ROSEAU
CITY_DOHA	CITY_ROSKILDE
CITY_DONETSK	CITY_ROSTOCK
CITY_DORNBIRN	CITY_ROSTOV
CITY_DORTMUND	CITY_ROTTERDAM
CITY_DOUALA	CITY_RUSE
CITY_DRAMMEN	CITY_SAABRUECKEN
CITY_DRESDEN	CITY_SACRAMENTO
CITY_DUBAI	CITY_SAFI
CITY_DUBLIN	CITY_SAGINAW
CITY_DUDELANGE	CITY_SALEM
CITY_DUESSELDORF	CITY_SALEM_OREGON_USA
CITY_DUISBURG	CITY_SALINAS
CITY_DULUTH	CITY_SALIYAN
CITY_DUNEDIN	CITY_SALTA
CITY_DURBAN	CITY_SALTO
CITY_DURHAM	CITY_SALT_LAKE_CITY
CITY_DURRES	CITY_SALVADOR
CITY_EDINBURGH	CITY_SALZBURG
CITY_EDMONTON	CITY_SALZGITTER
CITY_EERDENET	CITY_SANA
CITY_EINDHOVEN	CITY_SANKT_POELTEN
CITY_EISENSTADT	CITY_SANTA_ANA
CITY_ELIZABETH	CITY_SANTA_BARBARA
CITY_ELMIRA	CITY_SANTA_CLARA
CITY_ELOBIED	CITY_SANTA_CRUZ
CITY_ELSINORE	CITY_SANTA_FE
CITY_EL_ALAIUN	CITY_SANTA_FE_NEW_MEXICO_USA
CITY_EL_MANSOURA	CITY_SANTA_ROSA
CITY_EL_PASO	CITY_SANTIAGO
CITY_ENCARNACION	CITY_SANTIAGO_DE_CHILE
CITY_ENSCHEDE	CITY_SANTIAGO_DE_CUBA
CITY_ENTEBBE	CITY_SANTIAGO_PANAMA
CITY_ERFURT	CITY_SANTO_DOMINGO
CITY_ERIE	CITY_SAN_ANTONIO
CITY_ESBJERG	CITY_SAN_BERNARDINO
CITY_ESCH	CITY_SAN_CRISTOBAL
CITY_ESCUINTLA	CITY_SAN_DIEGO
CITY_ESMERALDAS	CITY_SAN_FRANCISCO
CITY_ESPOO	CITY_SAN_JOSE
CITY_ESSEN	CITY_SAN_JOSE_COSTA_RICA
CITY_EUGENE	CITY_SAN_JUAN
CITY_EVANSVILLE	CITY_SAN_JUAN_DOMINICAN_REPUBLI C
CITY_FAIRBANKS	CITY_SAN_JUAN_PUERTO_RICO
CITY_FAISALABAD	CITY_SAN_LORENZO
CITY_FARGO	CITY_SAN_LUIS_POTOSI
CITY_FAYETTEVILLE	CITY_SAN_MARINO
CITY_FELDKIRCH	CITY_SAN_MIGUEL
CITY_FERNANDO_DE_LA_MORA	CITY_SAN_MIGUEL_DE_TUCUMAN
CITY_FEZ	CITY_SAN_PEDRO_SULA
CITY_FIANAR	CITY_SAN_SALVADOR
CITY_FLINT	

Cities	
CITY_FLORENCE	CITY_SAO_PAULO
CITY_FORTALEZA	CITY_SAO_TOME
CITY_FORT_DE_FRANCE	CITY_SAPPORO
CITY_FORT_LAUDERDALE	CITY_SARAJEVO
CITY_FORT_LAUDERDALE_FLORIDA_USA	CITY_SARH
CITY_FORT_SMITH	CITY_SAVANNAH
CITY_FORT_SMITH_ARKANSAS_USA	CITY_SAVANNAKHET
CITY_FORT_WAYNE	CITY_SCHAFFHAUSEN
CITY_FORT_WAYNE_INDIANA_USA	CITY_SCHENECTADY
CITY_FORT_WORTH	CITY_SCHWERIN
CITY_FORT_WORTH_TEXAS_USA	CITY_SCRANTON
CITY_FRANCISTOWN	CITY_SEATTLE
CITY_FRANKFURT	CITY_SEGOU
CITY_FREEPORT	CITY_SEMARANG
CITY_FREETOWN	CITY_SEOUL
CITY_FREIBURG	CITY_SERANGOON
CITY_FREISING	CITY_SERKA
CITY_FRESNO	CITY_SERRES
CITY_FRIBOURG	CITY_SETIF
CITY_FUKUOKA	CITY_SETUBAL
CITY_FUNAFUTI	CITY_SEVILLE
CITY_FUNCHAL	CITY_SFAX
CITY_GABORONE	CITY_SHANGHAI
CITY_GAIN	CITY_SHARJAH
CITY_GAINESVILLE	CITY_SHEFFIELD
CITY_GALATZ	CITY_SHENYANG
CITY_GALVESTON	CITY_SHIRAZ
CITY_GALWAY	CITY_SHKODER
CITY_GAO	CITY_SHREVEPORT
CITY_GARLAND	CITY_SHUBRA_AL_KHAIMA
CITY_GARY	CITY_SIDI_BEL_ABBES
CITY_GASIANTEP	CITY_SIEGEN
CITY_GEELONG	CITY_SIGUIRI
CITY_GELSENKIRCHEN	CITY_SIKASSO
CITY_GENEVE	CITY_SINGAPORE
CITY_GENOA	CITY_SIOUX_CITY
CITY_GEORGETOWN	CITY_SIOUX_FALLS
CITY_GERA	CITY_SKOPJE
CITY_GERMISTON	CITY_SLIEMA
CITY_GHENT	CITY_SOFIA
CITY_GIBRALTAR	CITY_SOLINGEN
CITY_GIZA	CITY_SONGKHLA
CITY_GLASGOW	CITY_SOSNOWIEC
CITY_GOETEBORG	CITY_SOUTHAMPTON
CITY_GOETTINGEN	CITY_SOUTH_BEND
CITY_GOLD_COAST	CITY_SPARTANBURG
CITY_GOTHAM_CITY	CITY_SPLIT
CITY_GRANADA	CITY_SPOKANE
CITY_GRAND_FORKS	CITY_SPRINGFIELD
CITY_GRAND_RAPIDS	CITY_SPRINGFIELD_MASSACHUSETTS_USA
CITY_GRAZ	CITY_SPRINGFIELD_MISSOURI_USA
CITY_GREAT_FALLS	CITY_STAMFORD
CITY_GREENSBORO	

CITY_FLORENCE
 CITY_FORTALEZA
 CITY_FORT_DE_FRANCE
 CITY_FORT_LAUDERDALE
 CITY_FORT_LAUDERDALE_FLORIDA_USA
 CITY_FORT_SMITH
 CITY_FORT_SMITH_ARKANSAS_USA
 CITY_FORT_WAYNE
 CITY_FORT_WAYNE_INDIANA_USA
 CITY_FORT_WORTH
 CITY_FORT_WORTH_TEXAS_USA
 CITY_FRANCISTOWN
 CITY_FRANKFURT
 CITY_FREEPORT
 CITY_FREETOWN
 CITY_FREIBURG
 CITY_FREISING
 CITY_FRESNO
 CITY_FRIBOURG
 CITY_FUKUOKA
 CITY_FUNAFUTI
 CITY_FUNCHAL
 CITY_GABORONE
 CITY_GAIN
 CITY_GAINESVILLE
 CITY_GALATZ
 CITY_GALVESTON
 CITY_GALWAY
 CITY_GAO
 CITY_GARLAND
 CITY_GARY
 CITY_GASIANTEP
 CITY_GEELONG
 CITY_GELSENKIRCHEN
 CITY_GENEVE
 CITY_GENOA
 CITY_GEORGETOWN
 CITY_GERA
 CITY_GERMISTON
 CITY_GHENT
 CITY_GIBRALTAR
 CITY_GIZA
 CITY_GLASGOW
 CITY_GOETEBORG
 CITY_GOETTINGEN
 CITY_GOLD_COAST
 CITY_GOTHAM_CITY
 CITY_GRANADA
 CITY_GRAND_FORKS
 CITY_GRAND_RAPIDS
 CITY_GRAZ
 CITY_GREAT_FALLS
 CITY_GREENSBORO

CITY_SAO_PAULO
 CITY_SAO_TOME
 CITY_SAPPORO
 CITY_SARAJEVO
 CITY_SARH
 CITY_SAVANNAH
 CITY_SAVANNAKHET
 CITY_SCHAFFHAUSEN
 CITY_SCHENECTADY
 CITY_SCHWERIN
 CITY_SCRANTON
 CITY_SEATTLE
 CITY_SEGOU
 CITY_SEMARANG
 CITY_SEOUL
 CITY_SERANGOON
 CITY_SERKA
 CITY_SERRES
 CITY_SETIF
 CITY_SETUBAL
 CITY_SEVILLE
 CITY_SFAX
 CITY_SHANGHAI
 CITY_SHARJAH
 CITY_SHEFFIELD
 CITY_SHENYANG
 CITY_SHIRAZ
 CITY_SHKODER
 CITY_SHREVEPORT
 CITY_SHUBRA_AL_KHAIMA
 CITY_SIDI_BEL_ABBES
 CITY_SIEGEN
 CITY_SIGUIRI
 CITY_SIKASSO
 CITY_SINGAPORE
 CITY_SIOUX_CITY
 CITY_SIOUX_FALLS
 CITY_SKOPJE
 CITY_SLIEMA
 CITY_SOFIA
 CITY_SOLINGEN
 CITY_SONGKHLA
 CITY_SOSNOWIEC
 CITY_SOUTHAMPTON
 CITY_SOUTH_BEND
 CITY_SPARTANBURG
 CITY_SPLIT
 CITY_SPOKANE
 CITY_SPRINGFIELD
 CITY_SPRINGFIELD_MASSACHUSETTS_USA
 CITY_SPRINGFIELD_MISSOURI_USA
 CITY_STAMFORD

Cities	
CITY_GREENVILLE	CITY_STARA_ZAGORA
CITY_GREEN_BAY	CITY_STAVANGER
CITY_GRONINGEN	CITY_STETTIN
CITY_GUADALAJARA	CITY_STEYR
CITY_GUANGZHOU	CITY_STOCKHOLM
CITY_GUANTANAMO	CITY_STOCKTON
CITY_GUATEMALA_CITY	CITY_STRASBOURG
CITY_GUAYAQUIL	CITY_STUTTGART
CITY_GUJRANWALA	CITY_ST_AUGUSTINE
CITY_GULF_PORT	CITY_ST_CATHARINES
CITY_GWERU	CITY_ST_ETIENNE
CITY_GYOER	CITY_ST_GALLEN
CITY_HAARLEM	CITY_ST_GEORGES
CITY_HAGEN	CITY_ST_GEORGES_GRENADA
CITY_HAIFA	CITY_ST_JOHNS
CITY_HAIPHONG	CITY_ST_JOHNS_ANTIGUA
CITY_HALLE	CITY_ST_JOSEPH
CITY_HALLEIN	CITY_ST_LAURENT
CITY_HAMA	CITY_ST_LOUIS
CITY_HAMBURG	CITY_ST_LOUIS_SENEGAL
CITY_HAMILTON	CITY_ST_PAUL
CITY_HAMILTON_CANADA	CITY_ST_PETERSBURG
CITY_HAMILTON_NEW_ZEALAND	CITY_ST_PETERSBURG_FLORIDA_USA
CITY_HAMM	CITY_SUCRE
CITY_HAMPTON	CITY_SUDBURY
CITY_HANOI	CITY_SUEZ
CITY_HANOVER	CITY_SUNNYVALE
CITY_HARARE	CITY_SURABAYA
CITY_HARBIN	CITY_SURAKARTA
CITY_HARGEISA	CITY_SUVA
CITY_HARRISBURG	CITY_SVERDLOVSK
CITY_HARTFORD	CITY_SYDNEY
CITY_HAVANA	CITY_SYRACUSE
CITY_HEIDELBERG	CITY_SZEGED
CITY_HEILBRONN	CITY_TABOUK
CITY_HELENA	CITY_TABRIZ
CITY_HELSEINGBORG	CITY_TACOMA
CITY_HELSEINKI	CITY_TAEGU
CITY_HERAT	CITY_TAEJEON
CITY_HERNE	CITY_TAHOUA
CITY_HIGH_POINT	CITY_TAICHUNG
CITY_HILO	CITY_TAIF
CITY_HIROSHIMA	CITY_TAINAN
CITY_HOBART	CITY_TAIPEI
CITY_HODEIDA	CITY_TAIS
CITY_HOFUF	CITY_TALCA
CITY_HOLGUIN	CITY_TALCAHUANO
CITY_HOLON	CITY_TALLAHASSEE
CITY_HOMS	CITY_TAMALE
CITY_HONG_KONG	CITY_TAMPA
CITY_HONIARA	CITY_TAMPERE
CITY_HONOLULU	CITY_TAMPICO
CITY_HORSENS	CITY_TANGA

Cities	
CITY_HOSPITALET	CITY_TANGIER
CITY_HOUSTON	CITY_TANTA
CITY_HO_CHI_MINH_CITY	CITY_TARAWA
CITY_HSINCHU	CITY_TASHKENT
CITY_HUAMBO	CITY_TAUNGGYI
CITY_HUNGNAM	CITY_TBILISI
CITY_HUNTINGTON	CITY_TEGUCIGALPA
CITY_HUNTSVILLE	CITY_TEHRAN
CITY_HYDERABAD	CITY_TEL_AVIV
CITY_HYDERABAD_PAKISTAN	CITY_TEMPE
CITY_IASI	CITY_TEMUCO
CITY_IBADAN	CITY_TERNITZ
CITY_IBAGUE	CITY_TERRE_HAUTE
CITY_IDAHO_FALLS	CITY_TETOUAN
CITY_ILOILO	CITY_THESSALONIKI
CITY_INCHON	CITY_THE_HAGUE
CITY_INDEPENDENCE	CITY_THIES
CITY_INDIANAPOLIS	CITY_THIMPHU
CITY_INNSBRUCK	CITY_THUN
CITY_IPOH	CITY_TIANJIN
CITY_IQUITOS	CITY_TIJUANA
CITY_IRAKLION	CITY_TILBURG
CITY_IRBID	CITY_TIMBUKTU
CITY_IRKUTSK	CITY_TIMISOARA
CITY_ISFAHAN	CITY_TIRANA
CITY_ISLAMABAD	CITY_TLEMCEN
CITY_ISTANBUL	CITY_TOAMASINA
CITY_IZMIR	CITY_TOKYO
CITY_JACKSON	CITY_TOLEDO
CITY_JACKSONVILLE	CITY_TOLIARY
CITY_JAFFNA	CITY_TOPEKA
CITY_JAIPUR	CITY_TORONTO
CITY_JAKARTA	CITY_TORREON
CITY_JALALABAD	CITY_TOULOUSE
CITY_JEDDAH	CITY_TOURS
CITY_JEFFERSON_CITY	CITY_TRAUN
CITY_JENA	CITY_TRENTON
CITY_JERSEY_CITY	CITY_TRIPOLI
CITY_JERUSALEM	CITY_TRIPOLI_LIBYA
CITY_JINJA	CITY_TRONDHEIM
CITY_JOENKOEPING	CITY_TROY
CITY_JOHANNESBURG	CITY_TRUJILLO
CITY_JOHNSTOWN	CITY_TSCHOUDJO
CITY_JOHORE_BHARU	CITY_TSUMEB
CITY_JUMLA	CITY_TUCSON
CITY_JURONG	CITY_TULSA
CITY_KABUL	CITY_TUNIS
CITY_KAESONG	CITY_TURIN
CITY_KAISERSLAUTERN	CITY_TURKU
CITY_KALAMAZOO	CITY_TUSCALOOSA
CITY_KAMPALA	CITY_UJUNG_PADANG
CITY_KANANGA	CITY_ULAN_BATOR
CITY_KANDAHAR	CITY_ULM

Cities	
CITY_KANDY	CITY_UMHLAZI
CITY_KANKAN	CITY_UPPSALA
CITY_KANO	CITY_UTICA
CITY_KANPUR	CITY_UTRECHT
CITY_KANSAS_CITY	CITY_VADUZ
CITY_KANSAS_CITY_MISSOURI_USA	CITY_VAESTERAS
CITY_KAOLACK	CITY_VALENCIA
CITY_KAPFENBERG	CITY_VALENCIA_VENEZUELA
CITY_KARACHI	CITY_VALLADOLID
CITY_KARLSRUHE	CITY_VALLETTA
CITY_KARONGA	CITY_VALPARAISO
CITY_KASSEL	CITY_VANCOUVER
CITY_KATMANDU	CITY_VANTAA
CITY_KATOWICE	CITY_VARNA
CITY_KAVALA	CITY_VEJLE
CITY_KAWASAKI	CITY_VENICE
CITY_KAYES	CITY_VERA_CRUZ
CITY_KAZAN	CITY_VICTORIA
CITY_KEELUNG	CITY_VICTORIA_CANADA
CITY_KEETMANSHOOP	CITY_VICTORIA_SEYCHELLES
CITY_KENITRA	CITY_VIENNA
CITY_KEY_WEST	CITY_VIENTIANE
CITY_KHAMIS_MUSHAIT	CITY_VILA_NOVA_DE_GAIA
CITY_KHAOSIUNG	CITY_VILLACH
CITY_KHARKOV	CITY_VINA_DEL_MAR
CITY_KHARTOUM	CITY_VINELAND
CITY_KIEL	CITY_VLADIVOSTOK
CITY_KIEV	CITY_VOLGOGRAD
CITY_KIGALI	CITY_VOLOS
CITY_KINGSTON	CITY_WACO
CITY_KINGSTOWN	CITY_WADI_MEDANI
CITY_KINSHASA	CITY_WARSAW
CITY_KIRKUK	CITY_WARWICK
CITY_KISANGANI	CITY_WASHINGTON
CITY_KISMAYU	CITY_WATERBURY
CITY_KISUMU	CITY_WATERFORD
CITY_KITAKIUSHU	CITY_WATERLOO
CITY_KITCHENER	CITY_WELLINGTON
CITY_KITWE	CITY_WELS
CITY_KLAGENFURT	CITY_WEST_PALM_BEACH
CITY_KLOSTERNEUBURG	CITY_WHEELING
CITY_KNOXVILLE	CITY_WICHITA
CITY_KOBE	CITY_WICHITA_FALLS
CITY_KOBLENZ	CITY_WIENER_NEUSTADT
CITY_KOENIZ	CITY_WIESBADEN
CITY_KOLDING	CITY_WILKES_BARRE
CITY_KORTRIJK	CITY_WILLEMSTAD
CITY_KOSICE	CITY_WILLIAMSBURG
CITY_KOTA_BHARU	CITY_WILLISTON
CITY_KOWLOON	CITY_WILMINGTON
CITY_KRAKOW	CITY_WILMINGTON_NORTH_CAROLINA_USA
CITY_KREFELD	CITY_WINDHOEK
CITY_KREMS	

Cities

CITY_KRISTIANSAND	CITY_WINDSOR
CITY_KRONSTADT	CITY_WINNIPEG
CITY_KUALA_LUMPUR	CITY_WINSTON_SALEM
CITY_KUALA_TRENGGANU	CITY_WINTERTHUR
CITY_KUIBYSHEV	CITY_WITTEN
CITY_KUMASI	CITY_WOLFSBURG
CITY_KUOPIO	CITY_WOLF_MOUNTAIN
CITY_KUWAIT_CITY	CITY_WOLLONGONG
CITY_KWANGJU	CITY_WORCESTER
CITY_KYOTO	CITY_WUERZBURG
CITY_LABE	CITY_WUHAN
CITY_LAE	CITY_WUPPERTAL
CITY_LAGOS	CITY_XIAN
CITY_LAHORE	CITY_YAKIMA
CITY_LAHTI	CITY_YAOUNDE
CITY_LANCASTER	CITY_YAREN
CITY_LANSING	CITY_YEREVAN
CITY_LAREDO	CITY_YOKOHAMA
CITY_LARISSA	CITY_YORK
CITY_LAS_CRUCES	CITY_YORK_PENNSYLVANIA_USA
CITY_LAS_PALMAS	CITY_YOUNGSTOWN
CITY_LAS_PIEDRAS	CITY_YUNGHU
CITY_LAS_VEGAS	CITY_ZAGAZIG
CITY_LATAKIA	CITY_ZAGREB
CITY_LAUSANNE	CITY_ZAMBOANGA
CITY_LAWRENCE	CITY_ZANZIBAR
CITY_LAWRENCE_MASSACHUSETTS_USA	CITY_ZARAGOZA
CITY_LA_CEIBA	CITY_ZIGUINCHOR
CITY_LA_CHAUX_DE_FONDS	CITY_ZINDER
CITY_LA_CHORRERA	CITY_ZOMBA
CITY_LA_CROSSE	CITY_ZURICH
CITY_LA_PAZ	CITY_ZWICKAU
CITY_LA_PLATA	
CITY_LA_ROMANA	
CITY_LEEDS	
CITY_LEIPZIG	
CITY_LEOBEN	
CITY_LEON	
CITY_LEVERKUSEN	
CITY_LEWISTON	
CITY_LEXINGTON	
CITY_LE_HAVRE	
CITY_LIBEREC	
CITY_LIBREVILLE	
CITY_LIEGE	
CITY_LILONGWE	
CITY_LIMA	
CITY_LIMASSOL	
CITY_LIMERICK	
CITY_LIMON	
CITY_LINCOLN	
CITY_LINDEN	
CITY_LINKOEPING	

Cities	
<p>CITY_LINZ CITY_LISBON CITY_LITTLE_ROCK CITY_LIVERPOOL CITY_LJUBLJANA CITY_LODZ CITY_LOME CITY_LONDON CITY_LONG_BEACH CITY_LOS_ANGELES CITY_LOUISVILLE CITY_LOWELL CITY_LUANDA CITY_LUANG_PRABANG CITY_LUBANGO CITY_LUBBOCK CITY_LUBLIN CITY_LUBUMBASHI CITY_LUCERNE CITY_LUDWIGSHAFEN CITY_LUEBECK CITY_LUSAKA CITY_LUXEMBOURG CITY_LYNCHBURG CITY_LYON</p>	

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
int FILTER_GREYSCALE	Use int FILTER_GRAYSCALE instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following constants are not supported anymore. Please follow the hints to migrate your macros.

Constant	Description
int FILTER_SHARPE	Use FILTER_SHARPEN instead.

int FILTER_INVERT_MATRIX	Use FILTER_INVERT_HV_MATRIX instead.
int SOUND_DATA_LEFT[]	Use float SOUND_DATA_LEFT[] . The range of values is now 0.0 to 1.0 instead of 0 to MAX_FREQUENCY_VOLUME .
int SOUND_DATA_RIGHT[]	Use float SOUND_DATA_RIGHT[] . The range of values is now 0.0 to 1.0 instead of 0 to MAX_FREQUENCY_VOLUME .
int MAX_FREQUENCY_VOLUME	Is not needed anymore. Described the maximum value of an entry in either SOUND_DATA_LEFT or SOUND_DATA_RIGHT .

List Of Extra Script Information

Name of Value	Description
@author	The name of the author who wrote the script. » Description
@description	Any text that describes the script. » Description
@name	A name for the script. » Description
@version	The current version of this script, if there is any. » Description

3.5 List Of Operations

Arithmetical And Logical Operations

Operator	Operand/ Data Type	Results In Data Type	Description
++, --	int	int	Adds/subtracts 1 to/from the value of the operand. Superior expressions are evaluated before the value of the operand is changed.
+	int, float, bool, string	Depends on operand data types. It will be converted into the more precise data type.	Calculates the sum of the two operands or concatenates two character strings.
-, *, /	int, float, bool	Depends on operand data types. It will be converted into the more precise data type.	Calculates the difference/product/quotient of the two operands.
%	int	int	Calculates the remainder of an integer division.
<, <=, >, >=, ==, !=	int, float, bool, string	bool	Compares two operands.

!	bool	bool	This is the logical NOT. It negates the following operand.
	bool	bool	This is the logical OR. The result is true, if at least one operand is true. Both operands are evaluated in every single case.
&&	bool	bool	This is the logical AND. The result is true, if both operands are true. Both operands are evaluated in every single case.

Assignment Operations

Operator	Description
=	A simple assignment. The left operand gets the value of the right one.
+=	For example: <code>i += 4</code> corresponds to <code>i = i + 4</code> .
-=	For example: <code>i -= 4</code> corresponds to <code>i = i - 4</code> .
*=	For example: <code>i *= 4</code> corresponds to <code>i = i * 4</code> .
/=	For example: <code>i /= 4</code> corresponds to <code>i = i / 4</code> .
%=	For example: <code>i %= 4</code> corresponds to <code>i = i % 4</code> .

3.6 List Of Structures

Complex data types, so-called structures, consist of different elements. The elements of a structure are accessed by their names in the following way: *nameOfVariable.nameOfElement*. For example, *col.r*, if *col* is a variable of data type *color*. The following table is an overview of the structures MADRIX Script provides.

Structure	Elements	Description
color	<ul style="list-style-type: none"> ▪ int r ▪ int g ▪ int b ▪ int w ▪ int a 	<p><i>color</i> stores a color value.</p> <p>There are 5 channels (red, green, blue, white, alpha) with values between 0 and 255.</p> <p>Example: <code>color c = {255, 255, 0, 0};</code> Member examples: <code>c.r</code>, <code>c.g</code>, <code>c.b</code>, <code>c.w</code>, <code>c.a</code></p> <p>Learn more »List Of Global Variables And Constants</p> <p>»Script Example</p>

<p>date</p>	<ul style="list-style-type: none"> ▪ int day ▪ int weekday ▪ int month ▪ int year 	<p><i>date</i> stores a date.</p> <p>Values for <i>day</i> include 1 to 31 for a single day of the month. Values for <i>weekday</i> include: 0 = Sunday, 1 = Monday, ..., 6 = Saturday. Values for <i>month</i> include 1 to 12 for every single month of the year. Vales for <i>year</i> include year dates.</p> <p>Example: date d = {24, 11, 1980}; Member examples: d.day, d.weekday, d.month, d.year</p> <p>»Script Example</p>
<p>time</p>	<ul style="list-style-type: none"> ▪ int hour ▪ int min ▪ int sec 	<p><i>time</i> stores a certain time.</p> <p>Valid values are: hours: 0 .. 23, minutes: 0 .. 59, seconds: 0 .. 59.</p> <p>Example: time t = {12, 05, 00}; Member examples: t.hour, t.min, t.sec</p> <p>»Script Example</p>
<p>font</p>	<ul style="list-style-type: none"> ▪ int height ▪ int width ▪ int escapement ▪ int orientation ▪ int weight ▪ int italic ▪ int underline ▪ int strikeOut ▪ int charset ▪ int outprecision ▪ int clipprecision ▪ int quality ▪ int pitch ▪ int family ▪ string fontname 	<p><i>font</i> stores a specific font face.</p> <p><i>height</i> specifies the size of the font and requires an <i>integer</i> value. <i>width</i> specifies the wideness of the font and requires an <i>integer</i> value. <i>escapement</i> specifies the desired rotation angle in tenths of a degree and requires an <i>integer</i> value. <i>orientation</i> should be set to the same value as <i>escapement</i> and requires an <i>integer</i> value.</p> <p><i>weight</i> specifies the weight of the font. Valid values are: FONT_WEIGHT_DONTCARE FONT_WEIGHT_THIN FONT_WEIGHT_EXTRALIGHT FONT_WEIGHT_LIGHT FONT_WEIGHT_NORMAL FONT_WEIGHT_MEDIUM FONT_WEIGHT_SEMIBOLD FONT_WEIGHT_BOLD FONT_WEIGHT_EXTRABOLD FONT_WEIGHT_HEAVY</p> <p><i>italic</i> specifies the sloping of the font and requires an <i>integer</i> value: 0 (off) or 1 (on).</p> <p><i>underline</i> draws a line under the font and requires an <i>integer</i> value: 0 (off) or 1 (on).</p> <p><i>strikeOut</i> draws a line through the middle of the font and requires an <i>integer</i> value: 0 (off) or 1 (on).</p> <p><i>charset</i> specifies the character set of the font. Valid values are: CHARSET_ANSI</p>

		<p>CHARSET_DEFAULT CHARSET_SYMBOL CHARSET_SHIFTJIS CHARSET_HANGEUL CHARSET_HANGUL CHARSET_GB2312 CHARSET_CHINESEBIG5 CHARSET_OEM CHARSET_JOHAB CHARSET_HEBREW CHARSET_ARABIC CHARSET_GREEK CHARSET_TURKISH CHARSET_VIETNAMESE CHARSET_THAI CHARSET_EASTEUROPE CHARSET_RUSSIAN CHARSET_MAC CHARSET_BALTIC</p> <p><i>outprecision</i> specifies how closely the output must match the requested height, weight, and other attributes of a font. Valid values are: PRECIS_OUT_DEFAULT PRECIS_OUT_STRING PRECIS_OUT_CHARACTER PRECIS_OUT_STROKE PRECIS_OUT_TT PRECIS_OUT_DEVICE PRECIS_OUT_RASTER PRECIS_OUT_TT_ONLY PRECIS_OUT_OUTLINE PRECIS_OUT_SCREEN_OUTLINE PRECIS_OUT_PS_ONLY</p> <p><i>clipprecision</i> specifies how to clip characters that are partially outside the clipping region. Valid values are: PRECIS_CLIP_DEFAULT PRECIS_CLIP_CHARACTER PRECIS_CLIP_STROKE PRECIS_CLIP_MASK PRECIS_CLIP_LH_ANGLES PRECIS_CLIP_TT_ALWAYS PRECIS_CLIP_DFA_DISABLE PRECIS_CLIP_EMBEDDED</p> <p><i>quality</i> specifies the quality of the font. Valid values are: QUALITY_DEFAULT QUALITY_DRAFT QUALITY_PROOF QUALITY_NONANTIALIASED QUALITY_ANTIALIASED QUALITY_CLEARTYPE QUALITY_CLEARTYPE_NATURAL</p>
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		<p><i>pitch</i> specifies the pitch of the font. Valid values for are: PITCH_DEFAULT PITCH_FIXED PITCH_VARIABLE PITCH_MONO_FONT</p> <p><i>family</i> specifies the font family that describes the font in a general way. Valid values are: FONT_FAMILY_DONTCARE FONT_FAMILY_ROMAN FONT_FAMILY_SWISS FONT_FAMILY_MODERN FONT_FAMILY_SCRIPT FONT_FAMILY_DECORATIVE</p> <p><i>fontname</i> requires a <i>string</i>. For example "Arial".</p> <p>»Script Example</p>
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<p>shape</p>	<ul style="list-style-type: none"> ▪ int renderingMode ▪ int shapeAlignment ▪ int shapeRotation ▪ int blendingMode ▪ int originType ▪ float border ▪ float innerGlow ▪ float outerGlow ▪ int innerGlowInterpolation ▪ int outerGlowInterpolation ▪ float proportion ▪ float diagonalLength 	<p><i>shape</i> stores specific information for shapes.</p> <p>Valid values for <i>renderingMode</i> are: RENDERING_MODE_EXTENDED RENDERING_MODE_SIMPLE</p> <p>Valid values for <i>shapeAlignment</i> are: LOOKAT_FRONT LOOKAT_BACK LOOKAT_LEFT LOOKAT_RIGHT LOOKAT_TOP LOOKAT_BOTTOM LOOKAT_RANDOM</p> <p>Valid values for <i>shapeRotation</i> are: ROTATION_CCW_0 ROTATION_CCW_90 ROTATION_CCW_180 ROTATION_CCW_270 ROTATION_CW_0 ROTATION_CW_90 ROTATION_CW_180 ROTATION_CW_270</p> <p><i>blendingMode</i> is only available for RENDERING_MODE_EXTENDED. Valid values are: BLENDING_MODE_NONE BLENDING_MODE_ALPHA</p> <p>Valid values for <i>originType</i> are: ORIGIN_CENTER ORIGIN_FRONT ORIGIN_BACK ORIGIN_LEFT ORIGIN_RIGHT ORIGIN_TOP ORIGIN_BOTTOM ORIGIN_TOP_LEFT ORIGIN_TOP_RIGHT ORIGIN_BOTTOM_LEFT ORIGIN_BOTTOM_RIGHT ORIGIN_FRONT_LEFT ORIGIN_FRONT_RIGHT ORIGIN_BACK_LEFT ORIGIN_BACK_RIGHT ORIGIN_FRONT_TOP ORIGIN_FRONT_BOTTOM ORIGIN_BACK_TOP ORIGIN_BACK_BOTTOM ORIGIN_FRONT_TOP_LEFT ORIGIN_FRONT_TOP_RIGHT ORIGIN_FRONT_BOTTOM_LEFT ORIGIN_FRONT_BOTTOM_RIGHT ORIGIN_BACK_TOP_LEFT ORIGIN_BACK_TOP_RIGHT</p>
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		<p>ORIGIN_BACK_BOTTOM_LEFT ORIGIN_BACK_BOTTOM_RIGHT</p> <p><i>border</i> is only available for RENDERING_MODE_EXTENDED. Valid values range from 0.01 to 1.00.</p> <p><i>innerGlow</i> is only available for RENDERING_MODE_EXTENDED. Valid values range from 0.01 to 1.00.</p> <p><i>outerGlow</i> is only available for RENDERING_MODE_EXTENDED. Valid values range from 0.01 to 1.00.</p> <p>Valid values for <i>innerGlowInterpolation</i> are: INTERPOLATION_TYPE_LINEAR INTERPOLATION_TYPE_EASE_BOUNCE_IN INTERPOLATION_TYPE_EASE_BOUNCE_OUT INTERPOLATION_TYPE_EASE_BOUNCE_INOUT INTERPOLATION_TYPE_EASE_CIRC_IN INTERPOLATION_TYPE_EASE_CIRC_OUT INTERPOLATION_TYPE_EASE_CIRC_INOUT INTERPOLATION_TYPE_EASE_CUBIC_IN INTERPOLATION_TYPE_EASE_CUBIC_OUT INTERPOLATION_TYPE_EASE_CUBIC_INOUT INTERPOLATION_TYPE_EASE_SINE_IN INTERPOLATION_TYPE_EASE_SINE_OUT INTERPOLATION_TYPE_EASE_SINE_INOUT INTERPOLATION_TYPE_EASE_EXPO_IN INTERPOLATION_TYPE_EASE_EXPO_OUT INTERPOLATION_TYPE_EASE_EXPO_INOUT</p> <p>Valid values for <i>outerGlowInterpolation</i> are: See <i>innerGlowInterpolation</i></p> <p><i>proportion</i> is only available for RENDERING_MODE_EXTENDED and for SHAPE_TYPE_CROSS_STRAIGHT, SHAPE_TYPE_STAR, SHAPE_TYPE_3D_CROSS_STRAIGHT, and SHAPE_TYPE_3D_STAR. Valid values range from 0.01 to 1.00.</p> <p><i>diagonalLength</i> is only available for RENDERING_MODE_EXTENDED and for SHAPE_TYPE_CROSS, SHAPE_TYPE_STAR, SHAPE_TYPE_3D_CROSS, and SHAPE_TYPE_3D_STAR. Valid values range from 0.01 to 1.00.</p> <p>»Script Example</p>
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3.7 Table Of Frequencies

The two global fields `SOUND_DATA_LEFT` and `SOUND_DATA_RIGHT` hold the volume of the frequencies. The following table indicates which value defines which frequency.

Index	Spectrum In Hz	Index	Spectrum In Hz	Index	Spectrum In Hz
0	5.38	171	1,841.09	341	5,733.22
1	10.77	172	1,857.24	342	5,765.52
2	16.15	173	1,873.39	343	5,792.43
3	21.53	174	1,894.92	344	5,819.35
4	26.92	175	1,911.07	345	5,851.65
5	32.30	176	1,927.22	346	5,878.56
6	37.68	177	1,943.37	347	5,905.48
7	43.07	178	1,959.52	348	5,937.78
8	48.45	179	1,975.67	349	5,964.70
9	53.83	180	1,991.82	350	5,991.61
10	59.22	181	2,013.35	351	6,023.91
11	64.60	182	2,029.50	352	6,056.21
12	69.98	183	2,045.65	353	6,088.51
13	75.37	184	2,067.19	354	6,115.43
14	80.75	185	2,083.34	355	6,142.35
15	86.13	186	2,099.49	356	6,174.65
16	91.52	187	2,121.02	357	6,206.95
17	96.90	188	2,137.17	358	6,239.25
18	102.28	189	2,153.32	359	6,266.16
19	107.67	190	2,174.85	360	6,293.08
20	113.05	191	2,191.00	361	6,325.38
21	123.82	192	2,207.15	362	6,357.68
22	129.20	193	2,228.69	363	6,389.98
23	134.58	194	2,244.84	364	6,416.89
24	139.97	195	2,260.99	365	6,443.81
25	145.35	196	2,282.52	366	6,476.11
26	150.73	197	2,304.05	367	6,508.41
27	156.12	198	2,320.20	368	6,540.71
28	166.88	199	2,336.35	369	6,573.01
29	172.27	200	2,357.89	370	6,605.31
30	177.65	201	2,379.42	371	6,637.61
31	188.42	202	2,400.95	372	6,664.53

Index	Spectrum In Hz	Index	Spectrum In Hz	Index	Spectrum In Hz
32	193.80	203	2,417.10	373	6,691.44
33	199.18	204	2,433.25	374	6,723.74
34	209.95	205	2,454.79	375	6,756.04
35	215.33	206	2,476.32	376	6,788.34
36	220.72	207	2,492.47	377	6,820.64
37	226.10	208	2,508.62	378	6,852.94
38	231.48	209	2,530.15	379	6,885.24
39	242.25	210	2,551.68	380	6,917.54
40	247.63	211	2,573.22	381	6,949.84
41	253.02	212	2,594.75	382	6,982.14
42	263.78	213	2,610.90	383	7,014.44
43	274.55	214	2,627.05	384	7,046.74
44	279.93	215	2,648.58	385	7,079.04
45	285.31	216	2,670.12	386	7,111.34
46	296.08	217	2,691.65	387	7,143.64
47	306.85	218	2,713.18	388	7,175.94
48	312.23	219	2,734.72	389	7,208.24
49	317.61	220	2,750.87	390	7,240.54
50	328.38	221	2,767.02	391	7,272.84
51	339.15	222	2,788.55	392	7,305.14
52	344.53	223	2,810.08	393	7,337.44
53	349.91	224	2,831.62	394	7,369.74
54	360.68	225	2,853.15	395	7,402.04
55	371.45	226	2,874.68	396	7,434.34
56	382.21	227	2,896.22	397	7,466.64
57	387.60	228	2,917.75	398	7,498.94
58	392.98	229	2,939.28	399	7,531.24
59	403.75	230	2,960.82	400	7,563.54
60	414.51	231	2,982.35	401	7,595.84
61	425.28	232	3,003.88	402	7,628.14
62	436.05	233	3,025.42	403	7,660.44
63	441.43	234	3,046.95	404	7,698.12
64	446.81	235	3,063.10	405	7,735.80
65	457.58	236	3,079.25	406	7,768.10
66	468.35	237	3,100.78	407	7,800.40
67	479.11	238	3,122.31	408	7,832.70
68	489.88	239	3,149.23	409	7,865.00

Index	Spectrum In Hz	Index	Spectrum In Hz	Index	Spectrum In Hz
69	495.26	240	3,176.15	410	7,897.30
70	500.65	241	3,197.68	411	7,934.99
71	511.41	242	3,219.21	412	7,972.67
72	522.18	243	3,240.75	413	8,004.97
73	532.95	244	3,262.28	414	8,037.27
74	543.71	245	3,283.81	415	8,069.57
75	554.48	246	3,305.35	416	8,101.87
76	565.25	247	3,326.88	417	8,139.55
77	576.01	248	3,348.41	418	8,177.23
78	586.78	249	3,369.95	419	8,209.53
79	597.55	250	3,391.48	420	8,241.83
80	608.31	251	3,413.01	421	8,274.13
81	619.08	252	3,434.55	422	8,311.82
82	629.85	253	3,456.08	423	8,349.50
83	640.61	254	3,483.00	424	8,381.80
84	651.38	255	3,509.91	425	8,414.10
85	662.15	256	3,531.45	426	8,451.78
86	672.91	257	3,552.98	427	8,489.46
87	683.68	258	3,574.51	428	8,521.77
88	694.45	259	3,596.04	429	8,554.06
89	705.21	260	3,617.58	430	8,591.75
90	715.98	261	3,644.49	431	8,629.43
91	726.75	262	3,671.41	432	8,661.73
92	737.51	263	3,692.94	433	8,699.41
93	748.28	264	3,714.48	434	8,737.10
94	759.05	265	3,736.01	435	8,769.40
95	769.81	266	3,757.54	436	8,807.08
96	780.58	267	3,784.46	437	8,844.76
97	791.35	268	3,811.38	438	8,877.06
98	802.11	269	3,832.91	439	8,914.75
99	812.88	270	3,854.44	440	8,952.43
100	823.65	271	3,881.36	441	8,984.73
101	834.41	272	3,908.28	442	9,022.41
102	850.56	273	3,929.81	443	9,060.10
103	866.71	274	3,951.34	444	9,092.39
104	877.48	275	3,972.88	445	9,130.08
105	888.24	276	3,999.79	446	9,167.76

Index	Spectrum In Hz	Index	Spectrum In Hz	Index	Spectrum In Hz
106	899.01	277	4,026.71	447	9,200.06
107	909.78	278	4,048.24	448	9,237.74
108	920.54	279	4,069.78	449	9,275.43
109	931.31	280	4,096.69	450	9,313.11
110	942.08	281	4,123.61	451	9,350.79
111	958.23	282	4,145.14	452	9,388.48
112	974.38	283	4,172.06	453	9,426.16
113	985.14	284	4,198.97	454	9,463.84
114	995.91	285	4,220.51	455	9,501.53
115	1,006.68	286	4,247.42	456	9,533.83
116	1,022.83	287	4,274.34	457	9,571.51
117	1,038.98	288	4,295.87	458	9,609.19
118	1,049.74	289	4,322.79	459	9,646.88
119	1,060.51	290	4,349.71	460	9,684.56
120	1,076.66	291	4,371.24	461	9,722.24
121	1,092.81	292	4,398.16	462	9,759.92
122	1,103.58	293	4,425.07	463	9,797.61
123	1,114.34	294	4,446.61	464	9,835.29
124	1,125.11	295	4,473.52	465	9,872.97
125	1,141.26	296	4,500.44	466	9,910.66
126	1,157.41	297	4,527.36	467	9,948.34
127	1,168.18	298	4,554.27	468	9,986.02
128	1,184.33	299	4,581.19	469	10,023.71
129	1,200.48	300	4,608.11	470	10,061.39
130	1,211.24	301	4,629.64	471	10,099.07
131	1,222.01	302	4,656.56	472	10,142.14
132	1,238.16	303	4,683.47	473	10,179.82
133	1,254.31	304	4,710.39	474	10,217.50
134	1,265.08	305	4,737.30	475	10,255.19
135	1,281.23	306	4,758.84	476	10,292.87
136	1,297.38	307	4,785.75	477	10,330.55
137	1,308.14	308	4,812.67	478	10,368.24
138	1,324.29	309	4,839.59	479	10,411.30
139	1,340.44	310	4,866.50	480	10,448.99
140	1,351.21	311	4,893.42	481	10,486.67
141	1,367.36	312	4,920.34	482	10,529.74
142	1,383.51	313	4,947.25	483	10,567.42

Index	Spectrum In Hz	Index	Spectrum In Hz	Index	Spectrum In Hz
143	1,399.66	314	4,979.55	484	10,605.10
144	1,415.81	315	5,006.47	485	10,642.79
145	1,426.57	316	5,033.39	486	10,680.47
146	1,442.72	317	5,060.30	487	10,723.54
147	1,458.87	318	5,087.22	488	10,761.22
148	1,469.64	319	5,114.14	489	10,798.90
149	1,485.79	320	5,141.05	490	10,841.97
150	1,501.94	321	5,167.97	491	10,879.65
151	1,518.09	322	5,194.89	492	10,917.33
152	1,534.24	323	5,221.80	493	10,960.40
153	1,550.39	324	5,248.72	494	11,003.47
154	1,566.54	325	5,281.02	495	11,041.15
155	1,582.69	326	5,307.93	496	11,078.83
156	1,598.84	327	5,334.85	497	11,121.90
157	1,614.99	328	5,361.77	498	11,159.58
158	1,631.14	329	5,388.68	499	11,197.27
159	1,641.91	330	5,420.98	500	11,240.33
160	1,658.06	331	5,447.90	501	11,283.40
161	1,674.21	332	5,474.82	502	11,321.08
162	1,690.36	333	5,501.73	503	11,358.76
163	1,706.51	334	5,528.65	504	11,401.83
164	1,722.66	335	5,560.95	505	11,444.90
165	1,738.81	336	5,587.87	506	11,487.96
166	1,754.96	337	5,614.78	507	11,525.65
167	1,771.11	338	5,647.08	508	11,563.33
168	1,787.26	339	5,674.00	509	11,606.40
169	1,808.79	340	5,700.92	510	11,649.46
170	1,824.94				

3.8 Table Of Notes

The following table provides an overview about the notes MADRIX is able to recognize during the music analysis and the corresponding indices, which must be used for functions like *GetNoteValue* to retrieve the value.

Note	C	C#	D	D#	E	F	F#	G	G#	A	A#	B
------	---	----	---	----	---	---	----	---	----	---	----	---

Index	0	1	2	3	4	5	6	7	8	9	10	11
Freq. (Hz)	8.25	8.56	9.28	9.90	10.30	11.00	11.60	12.38	13.2	13.75	14.85	15.47
Index	12	13	14	15	16	17	18	19	20	21	22	23
Freq. (Hz)	16.50	17.19	18.60	19.80	20.63	22.00	23.20	24.75	26.40	27.50	29.70	30.94
Index	24	25	26	27	28	29	30	31	32	33	34	35
Freq. (Hz)	33.00	34.38	37.128	39.60	41.25	44.00	46.40	49.50	52.80	55.00	59.40	61.88
Index	36	37	38	39	40	41	42	43	44	45	46	47
Freq. (Hz)	66.00	68.75	74.25	79.20	82.50	88.00	92.80	99.00	105.60	110.00	118.80	123.75
Index	48	49	50	51	52	53	54	55	56	57	58	59
Freq. (Hz)	132.00	137.00	148.50	158.40	165.00	176.00	185.60	198.00	211.20	220.00	237.60	247.50
Index	60	61	62	63	64	65	66	67	68	69	70	71
Freq. (Hz)	264.00	275.00	297.00	316.80	330.00	352.00	371.25	396.00	422.40	440.00	475.20	495.00
Index	72	73	74	75	76	77	78	79	80	81	82	83
Freq. (Hz)	528.00	550.00	594.00	633.60	660.00	704.00	742.50	792.00	844.80	880.00	950.40	990.00
Index	84	85	86	87	88	89	90	91	92	93	94	95
Freq. (Hz)	1,056	1,100	1,188	1,267.2	1,320	1,408	1,485	1,584	1,689.6	1,760	1,900.8	1,980
Index	96	97	98	99	100	101	102	103	104	105	106	107
Freq. (Hz)	2,112	2,200	2,376	2,534.4	2,640	2,816	2,970	3,168	3,379.2	3,520	3,801.6	3,960
Index	108	109	110	111	112	113	114	115	116	117	118	119
Freq. (Hz)	4,224	4,400	4,752	5,068.8	5,280	5,632	5,940	6,336	6,758.4	7,040	7,603.2	7,920
Index	120	121	122	123	124	125	126	127				
Freq. (Hz)	8,558	8,800	9,504	10,137	10,560	11,264	11,880	12,672				

3.9 Examples

Script Examples for Specific Functions

GetApplicationPath

Copy and paste this Macro into the Main Output Macro Editor, for example, and monitor the **Script Output** to see the result.

```
@scriptname="Example GetApplicationPath";
@author="";
@version="MADRIX 2.8a";
@description="Display the application path,
running from script engine version 1.25 and MADRIX 2.8a";

void InitEffect()
{

}

void PreRenderEffect()
{

}

void PostRenderEffect()
{
    WriteText(GetApplicationPath());
}
```

»[Description](#)

GetUserProfileDirectory

Copy and paste this Macro into the Main Output Macro Editor, for example, and monitor the **Script Output** to see the result.

```
@scriptname="Example GetUserProfileDirectory";
@author="";
@version="MADRIX 2.8a";
@description="Display the user profile directory,
running from script engine version 1.25 and MADRIX 2.8a";

void InitEffect()
{

}
```

```
void PreRenderEffect()  
{  
  
}  
  
void PostRenderEffect()  
{  
    WriteText(GetUserProfileDirectory());  
}
```

»[Description](#)

CheckScriptEngineVersion

Copy and paste this Macro into the Main Output Macro Editor, for example, and monitor the **Script Output** to see the result.

```
@scriptname="Example CheckScriptEngineVersion";  
@author="";  
@version="MADRIX 2.8a";  
@description="Check script engine version number,  
running from script engine version 1.25 and MADRIX 2.8a";  
  
void InitEffect()  
{  
}  
void PreRenderEffect()  
{  
}  
void PostRenderEffect()  
{  
    if(CheckScriptEngineVersion(1,25)>0)  
        WriteText("Script engine version ok");  
    else  
        WriteText("Script engine version too old");  
}
```

»[Description](#)

CheckSoftwareVersion

Copy and paste this Macro into the Main Output Macro Editor, for example, and monitor the **Script Output** to see the result.

```
@scriptname="Example CheckSoftwareVersion";  
@author="";  
@version="MADRIX 2.8a";
```

```
@description="Check software version number,
running from script engine version 1.25 and MADRIX 2.8a";

void InitEffect()
{}
void PreRenderEffect()
{}
void PostRenderEffect()
{
    if(CheckSoftwareVersion(2,8,1,0)>0)
        WriteText("MADRIX version ok");
    else
        WriteText("MADRIX version too old");
}
```

»[Description](#)

GetScriptEngineVersion

Copy and paste this Macro into the Main Output Macro Editor, for example, and monitor the **Script Output** to see the result.

```
@scriptname="Example GetScriptEngineVersion";
@author=" ";
@version="MADRIX 2.8a";
@description="Get MADRIX version,
running from script engine version 1.25 and MADRIX 2.8a";

void InitEffect()
{}
void PreRenderEffect()
{}
void PostRenderEffect()
{
    WriteText("ScriptEngine " +GetScriptEngineVersion());
}
```

»[Description](#)

GetSoftwareVersion

Copy and paste this Macro into the Main Output Macro Editor, for example, and monitor the **Script Output** to see the result.

```
@scriptname="Example GetSoftwareVersion";
@author=" ";
```

```
@version="MADRIX 2.8a";
@description="Get MADRIX version,
running from script engine version 1.25 and MADRIX 2.8a";

void InitEffect()
{
}
void PreRenderEffect()
{
}
void PostRenderEffect()
{
    WriteText("MADRIX " +GetSoftwareVersion());
}
```

»[Description](#)

SetText (SCE Ticker) and GetTime

Copy and paste this Macro into the Macro Editor of the effect SCE Ticker and monitor the Previews to see the result.

```
@scriptname="local ticker time";
@author="inoage";
@version="MADRIX 2.10";
@description="Set time in SCE_Ticker text with GetTime and pm and am";

void InitEffect()
{
}

void PreRenderEffect()
{
    time t=GetTime();
    string m,s;
    if(t.min<10)
        m="0"+(string)t.min;
    else
        m=(string)t.min;
    if(t.sec<10)
        s="0"+(string)t.sec;
    else
        s=(string)t.sec;
    if(t.hour>12)
        SetText((string)(t.hour-12)+":"+m+":"+s+" pm");
    else
        SetText((string) t.hour +":"+m+":"+s+" am");
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

»[Description](#)

DrawPixelText - Font Size

Copy and paste this Macro into the Main Output Macro Editor, for example. It draws the text "Hello", which constantly increases over and over again.

```
@scriptname="";
@author="";
@version="";
@description="";

font f={10,
        0,
        0,
        0,
        FONT_WEIGHT_BOLD,
        0,
        0,
        0,
        CHARSET_DEFAULT,
        PRECIS_OUT_DEFAULT,
        PRECIS_CLIP_DEFAULT,
        QUALITY_DEFAULT,
        PITCH_DEFAULT,
        FONT_FAMILY_SWISS,
        "Arial"};

int i=0;

void InitEffect()
{
    i=0;
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
    i++;
    f.height=i%40;
    DrawPixelText(WHITE,f,"Hello",0,0,ROTATION_CCW_0);
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

»[Description](#)

DrawPixelText - Font Color

Copy and paste this Macro into the Main Output Macro Editor, for example. It draws the text "Hello" and changes its color.

```
@scriptname="";
@author="";
@version="";
@description="";

font f={20,
        0,
        0,
        0,
        FONT_WEIGHT_BOLD,
        0,
        0,
        0,
        CHARSET_DEFAULT,
        PRECIS_OUT_DEFAULT,
        PRECIS_CLIP_DEFAULT,
        QUALITY_DEFAULT,
        PITCH_DEFAULT,
        FONT_FAMILY_SWISS,
        "Arial"};

int i=0;
color col;
void InitEffect()
{
    i=0;
    col=WHITE;
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
    i++;
    col.r=i%255;
    col.g=(i%512)/2;
    col.b=(i%767)/3;
    DrawPixelText(col,f,"Hello",0,0,ROTATION_CCW_0);
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

»[Description](#)

DrawPixelText - Moving Text

Copy and paste this Macro into the Main Output Macro Editor, for example It draws the text "Hello", which moves from the upper left to the lower right.

```
@scriptname="";
@author="";
@version="";
@description="";

font f={20,
        0,
        0,
        0,
        FONT_WEIGHT_BOLD,
        0,
        0,
        0,
        CHARSET_DEFAULT,
        PRECIS_OUT_DEFAULT,
        PRECIS_CLIP_DEFAULT,
        QUALITY_DEFAULT,
        PITCH_DEFAULT,
        FONT_FAMILY_SWISS,
        "Arial"};

int i=0;

void InitEffect()
{
    i=0;
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
    i++;
    i=i%50;
    DrawPixelText(RED,f,"Hello",i,i,ROTATION_CCW_0);
}

void MatrixSizeChanged()
{
    InitEffect();
}
```


»[Description](#)

DrawPixelText - Rotating Text

Copy and paste this Macro into the Main Output Macro Editor, for example. Draws the text "Hello", which rotates by 90°, 180°, and 270°.

```
@scriptname="";
@author="";
@version="";
@description="";

font f={20,
        0,
        0,
        0,
        FONT_WEIGHT_BOLD,
        0,
        0,
        0,
        CHARSET_DEFAULT,
        PRECIS_OUT_DEFAULT,
        PRECIS_CLIP_DEFAULT,
        QUALITY_DEFAULT,
        PITCH_DEFAULT,
        FONT_FAMILY_SWISS,
        "Arial"};

int i=0;

void InitEffect()
{
    i=0;
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
    i++;
    i=i%400;
    switch(i/100)
    {
        case 0:DrawPixelText(RED,f,"Hello",25,25,ROTATION_CCW_0);break;
        case 1:DrawPixelText(RED,f,"Hello",25,25,ROTATION_CCW_90);break;
        case 2:DrawPixelText(RED,f,"Hello",25,25,ROTATION_CCW_180);break;
        case 3:DrawPixelText(RED,f,"Hello",25,25,ROTATION_CCW_270);break;
    }
}

void MatrixSizeChanged()
```

```
{
    InitEffect();
}
```

»[Description](#)

GetTimeCode

Retrieves the currently used Time Code. This Macro/Script works in all four Script locations.

```
@scriptname="GetTimeCode";
@author="inoage";
@version="2.14a";
@description="Returns the currently used Time Code";

void InitEffect()
{
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
    time TimeCode=GetTimeCode();
    WriteText("Timecode: "+(string)TimeCode.hour+": "+(string)TimeCode.min+": "
+(string)TimeCode.sec);
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

»[Description](#)

GetDmxIn

Uses incoming DMX-IN data to show colors on the LED matrix. This Macro/Script works in all four Script locations.

```
@scriptname="DmxInToColor";
@author="inoage";
@version="1.0";
```

```

@description="Read DMX-IN data and makes to matrix color";

const int CHANNEL_START=0; // start by channel 1
const int CHANNEL_COUNT=3; // use this number of channels
const int UNIVERSE=0; // use this universe for DMX-IN data
int DmxValues[]; // array of DMX Universe
color col;

void InitEffect()
{
    col=BLACK;
    if(IsDmxInEnabled()==0)// if DMX-In is enabled
        WriteText("DMX-IN is disabled!");
}

void RenderEffect()
{
    if(IsDmxInEnabled()==1)// if DMX-In enabled?
    {
        // Get the DMX values from selected Universe
        GetDmxIn(DmxValues,CHANNEL_START,CHANNEL_COUNT,UNIVERSE);
        // set dmx value to color
        col.r= DmxValues[0]; // channel 1 to red
        col.g= DmxValues[1]; // channel 2 to green
        col.b= DmxValues[2]; // channel 3 to blue
    }
    else
        col=BLACK;// no DMX then no color
    Clear(col);// set complete matrix with color

    //Information for help
    /* WriteText("Set color with Value Red="+(string)col.r+", Green="+(string)col.g+",
    Blue="+(string)col.b);*/
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

»[Description](#)

GetMidiInNoteValue And GetMidiInControlValue

Uses incoming MIDI-IN data to control the Master. This Script works in the Main Output Macro.

```

@scriptname="MIDItoMaster";
@author="inoage";
@version="";
@description="Uses incoming MIDI to control the Master Fader";

const int NOTE=0; // MIDI Note for control
const int CHANNEL=0; // MIDI Channel for control
const int DEVICE_ID=0; // MIDI Device for control

```

```

void InitEffect()
{
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
    if(IsMidiInEnabled()==1)
    {
        // MIDI NOTES 0x9, 0x8
        const float Value = (float)GetMidiInNoteValue(NOTE,CHANNEL,DEVICE_ID)/127.0;
        // MIDI CONTROLLER 0xb
        //const float Value = (float)GetMidiInControlValue(NOTE,CHANNEL,DEVICE_ID)/127.0;
        SetMasterFader(Value*255);
    }
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

»[Description](#)

GetMidiInNote And GetMidiInControl

Uses incoming MIDI-IN data to control the Master and the Audio Input Level. This Script works in the Main Output Macro.

```

@scriptname="MIDItoMasterandAudio";
@author="inoage";
@version="";
@description="Uses incoming MIDI of 2 channels to control the Master Fader and Audio Level";

const int NOTE=0; // MIDI Note for control
const int NOTE_COUNT=2; // MIDI Note Count for control
const int CHANNEL=0; // MIDI Channel for control
const int DEVICE_ID=0; // MIDI Device for control

int MidiData[];

void InitEffect()
{
}

void PreRenderEffect()

```

```
{
}

void PostRenderEffect()
{
    if(IsMidiInEnabled()==1)
    {
        // MIDI NOTES 0x9, 0x8
        GetMidiInNote(MidiData, NOTE, NOTE_COUNT, CHANNEL, DEVICE_ID);
        // MIDI NOTES 0xb
        //GetMidiInControl(MidiData, NOTE, NOTE_COUNT, CHANNEL, DEVICE_ID);
        SetMasterFader(MidiData[0]*255/127);
        SetAudioFader(MidiData[1]*255/127);
    }
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

»[Description](#)

DrawVectorText - Font Size

Copy and paste this Macro into the Main Output Macro Editor, for example. It draws the text "Hello", which constantly increases over and over again.

```
@scriptname=" ";
@author=" ";
@version=" ";
@description=" ";

font f={10,
        0,
        0,
        0,
        FONT_WEIGHT_BOLD,
        0,
        0,
        0,
        CHARSET_DEFAULT,
        PRECIS_OUT_DEFAULT,
        PRECIS_CLIP_DEFAULT,
        QUALITY_DEFAULT,
        PITCH_DEFAULT,
        FONT_FAMILY_SWISS,
        "Arial"};

int i=0;

void InitEffect()
```

```
{
    i=0;
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
    i++;
    f.height=i%40;
    DrawVectorText(WHITE,f,"Hello",0.0,0.0,ROTATION_CCW_0);
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

»[Description](#)

DrawVectorText - Font Color

Copy and paste this Macro into the Main Output Macro Editor, for example. It draws the text "Hello" and changes its color.

```
@scriptname="";
@author="";
@version="";
@description="";

font f={20,
    0,
    0,
    0,
    FONT_WEIGHT_BOLD,
    0,
    0,
    0,
    CHARSET_DEFAULT,
    PRECIS_OUT_DEFAULT,
    PRECIS_CLIP_DEFAULT,
    QUALITY_DEFAULT,
    PITCH_DEFAULT,
    FONT_FAMILY_SWISS,
    "Arial"};

int i=0;
color col;
void InitEffect()
{
    i=0;
```

```

        col=WHITE;
    }

void PreRenderEffect()
{
}

void PostRenderEffect()
{
    i++;
    col.r=i%255;
    col.g=(i%512)/2;
    col.b=(i%767)/3;
    DrawVectorText(col,f,"Hello",0.0,0.0,ROTATION_CCW_0);
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

»[Description](#)

GetTimeSunrise / GetTimeSunset

Copy and paste this Macro into the Main Output Macro Editor, for example. It provides the sunrise and sunset times of Dresden of today in the **Script Output**.

```

@scriptname="";
@author="";
@version="3.3";
@description="get sunrise/sunset of Dresden of today";

void InitEffect()
{
    date d = GetDate();
    time t = GetTimeSunrise(d,51,3,13,44, 1.0); // DRESDEN
    WriteText(t.hour+":"+t.min+":"+t.sec);
    t = GetTimeSunriseCity(d, CITY_DRESDEN);
    WriteText(t.hour+":"+t.min+":"+t.sec);
    t = GetTimeSunset(d,51,3,13,44, 1.0); // DRESDEN
    WriteText(t.hour+":"+t.min+":"+t.sec);
    t = GetTimeSunsetCity(d, CITY_DRESDEN);
    WriteText(t.hour+":"+t.min+":"+t.sec);
}

void PreRenderEffect()
{}

void PostRenderEffect()
{}

void MatrixSizeChanged()

```

```
{
    InitEffect();
}
```

»[Description](#)

GetTimeSunriseCity / GetTimeSunsetCity

Copy and paste this Macro into the Main Output Macro Editor, for example. It provides the sunrise and sunset times of Berlin of today in the **Script Output**.

```
@scriptname="";
@author="";
@version="3.3";
@description="get sunrise/sunset of Berlin of today";

void InitEffect()
{
    date d =GetDate();// today
    time tr =GetTimeSunriseCity(d,CITY_BERLIN);
    WriteText("Sunrise: "+(string)tr.hour+":"+(string)tr.min);
    time ts =GetTimeSunsetCity( d,CITY_BERLIN);
    WriteText("Sunset : "+(string)ts.hour+":"+(string)ts.min);
}

void PreRenderEffect()
{}

void PostRenderEffect()
{}

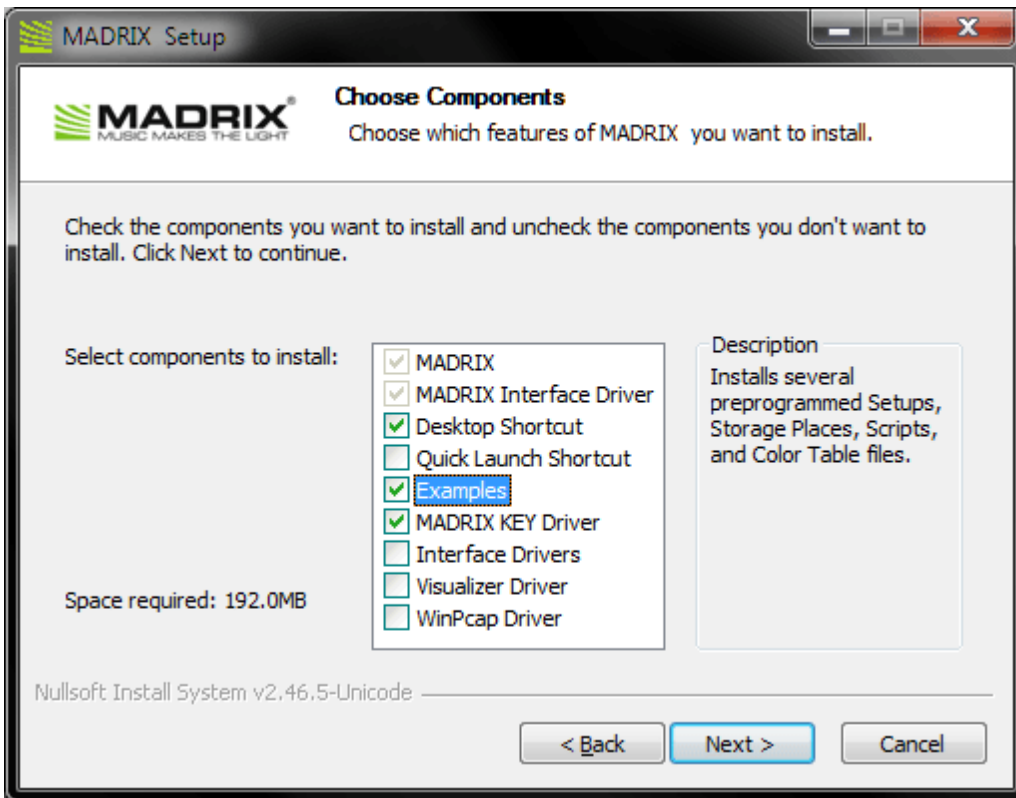
void MatrixSizeChanged()
{
    InitEffect();
}
```


»[Description](#)

Installed Examples

Throughout this MADRIX Script Help and Manual a lot of practical script examples are already given.

If you would like to see some more examples, several exemplary scripts are already installed on your PC if you have enabled this option during the installation process.



You can find the examples on your harddisk. Please navigate to C:\Users\USERNAME\Documents\MADRIX3 Samples\scripts

(Please choose your Windows username for USERNAME).

It contains various examples.

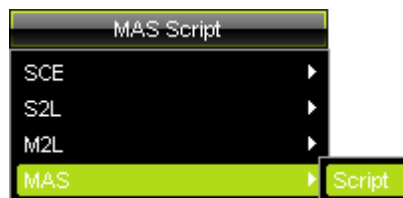
//PART D
MAS Script Effect

4 MAS Script Effect

4.1 Overview

Introduction

- The MAS Script Effect provides the potential to create your own effects. That could be a completely new effect that MADRIX does not offer in its stock library of effects.
- Basically, the MAS Script effect is an effect like any other effect in MADRIX, except that it interprets a script written in MADRIX Script to calculate the effect.
- In this way, the MAS Script effect has full control over the effect matrix. It is called continuously to render the effect onto the matrix.
- Scripts are stored as part of the effect. This means they are part of a stored Storage Place file or Setup file.
- It is possible to save scripts as separate files. The file extension of a MAS script is **.mas*. The extension of a compiled script is **.macs*.
- The MAS Script Effect is an effect of MADRIX. For that reason, its result can be controlled and manipulated by a [»Macro For Effects](#) like all the other effects as well.
- The MAS Script Effect can be selected from the effect list like all the other effects.



Functions Called By MADRIX

Overview

There are several functions called by MADRIX in order to let the script react to different events.

- `void InitEffect()`
- `void RenderEffect()`
- `void MatrixSizeChanged()`

If a function is not needed by a script, it is not necessary to implement it. Regarding *InitEffect* and *RenderEffect* a message is printed out if one of them is missing. This is not an error, but only an information for the developer of the script.

InitEffect

(Automatically included in a new script)

InitEffect is called by MADRIX whenever the script needs to be initialized. This is the case after compiling and starting a new script or when the user pressed the **Start** button of the »[Script Editor](#). A script can assume that any global variable is initialized with 0 and that any global array is empty as long as it has not been initialized with any value.

This function is the right place to initialize global variables, reset any arrays, set the speed of an effect, or whatever is necessary to (re)start the script.

RenderEffect

(Automatically included in a new script)

This function is called whenever the effect needs to be rendered. This is the right place to calculate the effect and draw it onto the matrix.

MatrixSizeChanged

(Automatically included in a new script)

MatrixSizeChanged is called after the size of the matrix has been changed. This may be due to a change to the matrix settings or because a new map setting was set, e.g. caused by the call of a map function.

Standard Outline

A newly created macro for an effect will look like this:

```
@scriptname="";
@author="";
@version="";
@description="";

void InitEffect()
{

}

void RenderEffect()
{

}

void MatrixSizeChanged()
{
    InitEffect();
}
```

4.2 Functions

Specific Resources

- » [Functions called by MADRIX](#)
- [MAS Script Effect: Available Functions](#)
- » [Using Frames](#)

General Resources

- » [Keyword Search](#)
- » [List Of Functions \(Alphabetical Order\)](#)
- » [List Of Functions \(Grouped\)](#)
- » [List Of Global Variables and Constants](#)
- » [List Of Operations](#)
- » [List Of Structures](#)
- » [Table Of Frequencies](#)
- » [Table Of Notes](#)

Available Functions

- For non-specific functions, see » [List of Functions \(Alphabetical Order\)](#)
- In addition to that, there are several other functions available for the MAS Script Effect which are not available for macros.

MAS Script-Specific Functions

Function	Description
void SetFrameCount (float fc)	Set the number of frames the effect produces before it gets repeated. See » here for further details.

Learn more »[Using Frames](#)

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions are not supported anymore. Please follow the hints to migrate your macros.

Function	Description
void SetFixedFrameRate (int bpm, int enable)	Use SetAsync (int value) instead. » Description Please note that the interpretation of <i>value</i> is inverted now (deactivated asynchronous rendering activates the usage of a fixed frame rate and vice versa). Furthermore, the usage of a fixed frame rate will always synchronize the effect to the frame rate of the Main Mixer of MADRIX which is 50 Hz by default. The render frequency (<i>bpm</i>) cannot be controlled by macro anymore.
void SetUseFloatFrames (int enable)	Use SetStep (int value) instead. » Description Please note that the interpretation of <i>value</i> is inverted now. (If stepped rendering is deactivated, floating-point frames are used. If stepped rendering is activated, integer frames are used.)

4.3 Using Frames

Introduction

- The MADRIX user interface provides several possibilities to change the speed of effects, such as Speed Master Left/Right, Speed Pitch, and BPM.
- In MADRIX Script, additional functions are provided that allow for much more control.

Functions

Function	Description	MAS Script	Macro s for Effect s	Storag e Place Macro	Main Output Macro
void SetAsync (int value)	Sets the asynchronous rendering mode. This function is only available for some effects.	+	+		
int GetAsync ()	Returns if asynchronous rendering is used. This function is only available for some effects.	+	+		
void ToggleAsync ()	Toggles the asynchronous rendering mode. This function is only available for some effects.	+	+		
void SetFrameId (float id)	Sets a new Frame ID. If the given <i>id</i> is lower than 0, it is set to 0.	+	+		
float GetFrameId ()	Returns the ID of the current frame.	+	+		
float GetFrameSteps ()	Returns the number of frames between this and the last call.	+	+		
float GetFrameCount ()	Retrieves the number of frames the effect produces before it gets repeated. This is the same value which was set by <i>SetFrameCount</i> for MAS Script. The initial value is 1000.0.	+	+		
void SetFrameCount (float fc)	Set the number of frames the effect produces before it gets repeated.	+			
void SetStep (int value)	Sets the stepped rendering mode. This function is only available for some effects.	+	+		
int GetStep ()	Returns if stepped rendering is used. This function is only available for some effects.	+	+		
void ToggleStep ()	Toggles the stepped rendering mode. This function is only available for some effects.	+	+		

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions are not supported anymore. Please follow the hints to migrate your macros.

Function	Description
----------	-------------

void SetFixedFrameRate (int bpm, int enable)	Use SetAsync (int value) instead. Please note that the interpretation of <i>value</i> is inverted now (deactivated asynchronous rendering activates the usage of a fixed frame rate and vice versa). Furthermore, the usage of a fixed frame rate will always synchronize the effect to the frame rate of the Main Mixer of MADRIX which is 50 Hz by default. The render frequency (<i>bpm</i>) cannot be controlled by macro anymore.
void SetUseFloatFrames (int enable)	Use SetStep (int value) instead. Please note that the interpretation of <i>value</i> is inverted now. (If stepped rendering is deactivated, floating-point frames are used. If stepped rendering is activated, integer frames are used.)

Applying Asynchronous Rendering

Overview

Normally, MADRIX Effects are synchronized to the Main Mixing Frame Rate, which is set to 50 Hz by default. But for the »[MAS Script](#) Effect there is the option to control the render frequency independently.

- void **SetAsync**(int value)
- int **GetAsync**()
- void **ToggleAsync**()

Valid values for *value* are 0 (*Off*) or 1 (*On*). If asynchronous rendering is activated, the render frequency directly corresponds to the BPM value set by the slider or the macro. For example, a BPM value of 1200 causes a render frequency of 20 Hz. In other words, the effect renders 20 frames per second. Thus, you can decrease the render frequency in order to save performance by slowing down the effect. However, there is an upper limit for the render frequency, which is 50 Hz by default according to the Main Mixing.

There is another scenario to use asynchronous rendering in the MAS Script Effect: Imagine, you want to draw a line step by step, one pixel per frame. Straight forwardly, you can set one pixel after another with each call of »[RenderEffect](#). In order to control the speed of drawing with the BPM slider, it would be smart to activate asynchronous rendering. That way, `RenderEffect` is called more or less often, depending on the BPM value. Yet another example would be to write a speed-sensitive counter which draws sequential numbers according to the BPM value.

Summary

- During execution of an MAS Script Effect script, you can use the BPM slider.

- If **Async** is deactivated (**Sync** is activated), the script runs with the Main Mixing frequency. The render frequency is fixed. The BPM slider controls the Frame ID / Frame Step.
(Go to **Preferences > Options... > Performance** to change the Main Mixing FPS if really necessary.)
- If **Async** is activated, the MAS Script Effect calculates its render frequency according to the BPM slider (60 BPM = 1 FPS; 1200 BPM = 20 FPS; 3000 BPM = 50 FPS; etc.). The render frequency is variable. The maximum render frequency is still set up by the Main Mixing frequency.
(Go to **Preferences > Options... > Performance** to change the Main Mixing FPS if really necessary.)
- When Async is activated, use the following formulas to calculate the speed or render frequency:

BPM = FPS * 60
FPS = BPM / 60

Applying Stepped Rendering

Normally, the effects use floating-point frames which is represented by the rational return values of the functions `GetFrameId` and `GetFrameSteps`. That way, the effects are able to render very precisely and smooth. However, sometimes it is desired to let the effects "step" pixel by pixel. This option is only available for some effects, for example »[SCE Color Scroll](#) and »[MAS Script](#)

- `void SetStep(int value)`
- `int GetStep()`
- `void ToggleStep()`

Valid values for *value* are *0 (Off)* or *1 (On)*. If stepped rendering is activated, effects like SCE Color Scroll look hard-stepping. In the MAS Script effect, stepped rendering causes `GetFrameId()` and `GetFrameSteps()` to return only integer values.

- If stepped rendering is deactivated, Frame IDs will be returned as float values.
 - For example, SCE Color Scroll will be rendered smoothly.
- If stepped rendering is activated, Frame IDs will be returned as integer values.
 - For example, SCE Color Scroll will not look as smooth.

GetFrameSteps

- `GetFrameSteps()` - Defines the number of steps between Frames / Frame IDs.

Frame Steps * Main Mixer FPS * 60 = BPM

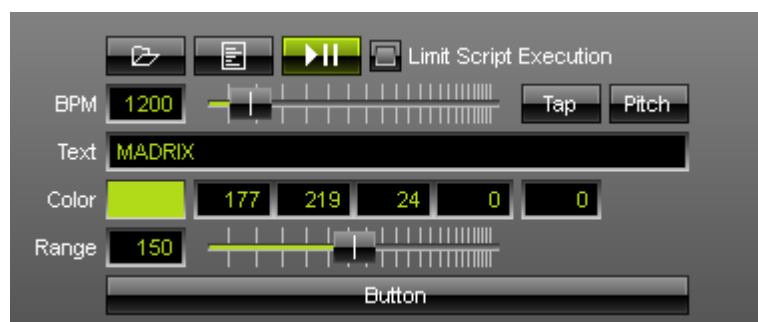
Using Frame Count And FrameID

Note: The script of the MAS Script effect itself is able to control the Frame ID and the Frame Count. Setting the Frame ID within both locations, a script and an additional macro, may result in undesired behavior.

4.4 Using GUI Elements (User Interaction)

Introduction

This chapter is about interaction with the graphical user interface of MADRIX in addition to just writing a source code. In this way, working with elements of the GUI (graphical user interface) expands the options of the MAS Script Effect further. You will have the possibility to set values a script should use, such as a color or the text to write. MADRIX Script provides several GUI elements, which can be placed on the effects dialog. The picture below exemplarily shows the available graphical elements.



Exemplary GUI Elements of the MAS Script Effect

As you can see, it is possible to create additional elements. For example, there is a text field to enter text, a color control to select a color, a slider, and a button. Each different element will be placed in a new line.

Creating GUI Elements

Creating a GUI element within MADRIX Script is as simple as declaring a variable. The corresponding element is created automatically. You just have to declare a type of element and a variable/name for it. Here is how it generally looks like:

```
ctrledit myText;  
ctrlcolor myColor;  
ctrlslider mySlider;  
ctrlbutton myButton;
```

MADRIX Script will create the elements on the effect dialog and they can be utilized right away. Since GUI elements should last as long as the script is loaded, those variables need to be global.

Please note: You cannot create local variables of those types. GUI elements have to be global! Furthermore, it is not possible to declare such variables as *persistent*. But their values will always be stored and reloaded automatically. It is also not allowed to copy or assign variables of those types.

Within MADRIX Script those data types are simple structures. Hence, you can initialize them like any other structures. The particular structures are described below. Here is an example with global variables which creates the GUI shown above:

```
ctrledit myText = {"Text", EDIT_ALIGN_LEFT, "MADRIX"};
ctrlcolor myCol = {"Color", MADRIX_GREEN};
ctrlslider mySlider = {"Range", 100, 150, 200};
ctrlbutton myButton = {"Button", "OnButton"};
```

Explanation:


- This source code creates each GUI elements and initializes them with specific values.
- The first value always represents the description that is used to label the corresponding element.
- Then, several values may follow which are different for each structure.
- For example, the slider is initialized with a range of 100 to 200 and starts with value of 150.


Using GUI Elements


Overview


After creating an element, it can be used like controls of the same kind in MADRIX. A slider can be moved by using the mouse or by writing a value into the edit field next to it, etc. The script can access these values via the different elements of the corresponding structure. The table below shows those structures in detail:

List Of Available Elements


Structure	Entries			GUI Element / Description
<p>ctrlbutton</p> 	string	label	The label for the button.	<p><i>ctrlbutton</i> provides a button. A function must be assigned that is called whenever the button was pressed. This is done by assigning the name of the function to the <i>proc</i> element of a <i>ctrlbutton</i> variable. The set function must be of the type void function().</p> <p>The <i>tooltip</i> member holds the tooltip for the button, which is shown when the user holds the mouse over the button for some seconds.</p> <p>Descriptive Example Example 1 Example 2 Example 3 Example 4</p>
	string	proc	The name of the function which is called after the button has been pressed.	
	string	tooltip	The tooltip for the button.	


Structure	Entries			GUI Element / Description
<p>ctrlbutton2</p> 	string	label1	The label for the first button.	<p><i>ctrlbutton2</i> provides two buttons in one line. For each button a function must be assigned, which is called whenever the corresponding button has been pressed. This is done by assigning the name of the function to the <i>proc[n]</i> element of a <i>ctrlbutton</i> variable. The function set must be of the type void function().</p> <p>The <i>tooltip</i> members hold the tooltip for the buttons, which is shown when the user holds the mouse over a button for some seconds.</p> <p>Description Example 1 Example 2 Example 3 Example 4</p>
	string	proc1	Function handler for the first button.	
	string	label2	Label for the second button.	
	string	proc2	Function handler for the second button.	
	string	tooltip1	Tooltip for the first button.	
	string	tooltip2	Tooltip for the second button.	



Structure	Entries			GUI Element / Description
<p>ctrlbutton3</p> 	string	label1	The label for the first button.	<p><i>ctrlbutton3</i> provides three buttons in one line. For each button a function must be assigned, which is called whenever the corresponding button has been pressed. This is done by assigning the name of the function to the <i>proc[n]</i> element of a <i>ctrlbutton</i> variable. The function set must be of the type void function().</p> <p>The <i>tooltip</i> members hold the tooltip for each button, which are shown when the user holds the mouse over a button for some seconds.</p> <p>Description Example 1 Example 2 Example 3 Example 4</p>
	string	proc1	Function handler for the first button.	
	string	label2	Label for the second button.	
	string	proc2	Function handler for the second button.	
	string	label3	Label for the third button.	
	string	proc3	Function handler for the third button.	
	string	tooltip1	Tooltip for the first button.	
	string	tooltip2	Tooltip for the second button.	
	string	tooltip3	Tooltip for the third button.	



Structure	Entries			GUI Element / Description
<p>ctrlbutton4</p> 	string	label1	The label for the first button.	<p><i>ctrlbutton4</i> provides four buttons in one line. For each button a function must be assigned, which is called whenever the corresponding button has been pressed. This is done by assigning the name of the function to the <i>proc[n]</i> element of a <i>ctrlbutton</i> variable. The function set must be of type void function().</p> <p>The <i>tooltip</i> members hold the tooltip for each button, which are shown when the user holds the mouse over a button for some seconds.</p> <p>Description Example 1 Example 2 Example 3 Example 4</p>
	string	proc1	Function handler for the first button.	
	string	label2	Label for the second button.	
	string	proc2	Function handler for the second button.	
	string	label3	Label for the third button.	
	string	proc3	Function handler for the third button.	
	string	label4	Label for the fourth button.	
	string	proc4	Function handler for the fourth button.	
	string	tooltip1	Tooltip for the first button.	
	string	tooltip2	Tooltip for the second button.	
	string	tooltip3	Tooltip for the third button.	
	string	tooltip4	Tooltip for the fourth button.	


Structure	Entries			GUI Element / Description
<p>ctrlbutton5</p> <pre>ctrlbutton1 ctrlbutton2 ctrlbutton3 ctrlbutton4 ctrlbutton5</pre>	string	label1	The label for the first button.	<p><i>ctrlbutton5</i> provides five buttons in one line. For each button a function must be assigned, which is called whenever the corresponding button has been pressed. This is done by assigning the name of the function to the <i>proc[n]</i> element of a <i>ctrlbutton</i> variable. The function set must be of type void function().</p> <p>The <i>tooltip</i> members hold the tooltip for each button, which are shown when the user holds the mouse over a button for some seconds.</p> <p>Description Example 1 Example 2 Example 3 Example 4</p>
	string	proc1	Function handler for the first button.	
	string	label2	Label for the second button.	
	string	proc2	Function handler for the second button.	
	string	label3	Label for the third button.	
	string	proc3	Function handler for the third button.	
	string	label4	Label for the fourth button.	
	string	proc4	Function handler for the fourth button.	
	string	label5	Label for the fifth button.	
	string	proc5	Function handler for the fifth button.	
	string	tooltip1	Tooltip for the first button.	
	string	tooltip2	Tooltip for the second button.	
	string	tooltip3	Tooltip for the third button.	


Structure	Entries			GUI Element / Description
	string	tooltip4	Tooltip for the fourth button.	
	string	tooltip5	Tooltip for the fifth button.	
<p>ctrlbutton6</p> 	string	label1	The label for the first button.	<p><i>ctrlbutton6</i> provides six buttons in one line. For each button a function must be assigned, which is called whenever the corresponding button has been pressed. This is done by assigning the name of the function to the <i>proc[n]</i> element of a <i>ctrlbutton</i> variable. The function set must be of type void function().</p> <p>The <i>tooltip</i> members hold the tooltip for each button, which are shown when the user holds the mouse over a button for some seconds.</p> <p>Description Example 1 Example 2 Example 3 Example 4</p>
string	proc1	Function handler for the first button.		
string	label2	Label for the second button.		
string	proc2	Function handler for the second button.		
string	label3	Label for the third button.		
string	proc3	Function handler for the third button.		
string	label4	Label for the fourth button.		
string	proc4	Function handler for the fourth button.		
string	label5	Label for the fifth button.		
string	proc5	Function handler for the fifth button.		
string	label6	Label for the sixth button.		


Structure	Entries			GUI Element / Description
	string	proc6	Function handler for the sixth button.	
	string	tooltip1	Tooltip for the first button.	
	string	tooltip2	Tooltip for the second button.	
	string	tooltip3	Tooltip for the third button.	
	string	tooltip4	Tooltip for the fourth button.	
	string	tooltip5	Tooltip for the fifth button.	
	string	tooltip6	Tooltip for the sixth button.	
<p>ctrlcolor</p> 	string	label	The label for the element .	<p><i>ctrlcolor</i> provides a color input control with the Color Picker and five edit fields to enter the red, green, blue, white, and alpha values.</p> <p>The alpha value will not be provided/set by the Color Picker.</p> <p>Example</p>
	color	value	The value set by the element .	

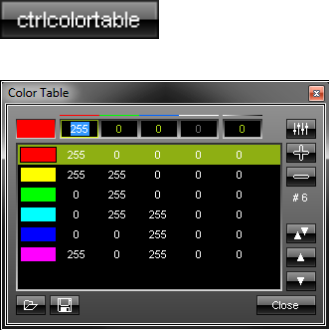
Structure	Entries			GUI Element / Description
<p>ctrlredit</p> 	string	label	The label for the element .	<p><i>ctrlredit</i> provides an edit control which allows to enter a text or values.</p> <p>The variable <i>align</i> can be set to one of the following values: EDIT_ALIGN_LEFT, EDIT_ALIGN_CENTER, or EDIT_ALIGN_RIGHT.</p> <p>Example 1 Example 2 Example 3</p>
<p>ctrlredit2</p> 	string	label	The label for the element .	<p><i>ctrlredit2</i> provides two edit controls in one line to enter text or values.</p> <p>The variable <i>align</i> can be set to one of the following values: EDIT_ALIGN_LEFT, EDIT_ALIGN_CENTER, or EDIT_ALIGN_RIGHT.</p> <p>Example 1 Example 2 Example 3</p>

Structure	Entries			GUI Element / Description
<p>ctrlredit3</p> 	string	label	The label for the element .	<p><i>ctrlredit3</i> provides three edit controls in one line to enter text or values.</p> <p>The variable <i>align</i> can be set to one of the following values: EDIT_ALIGN_LEFT, EDIT_ALIGN_CENTER, or EDIT_ALIGN_RIGHT.</p> <p>Example 1 Example 2 Example 3</p>
int	align	Alignme nt of the edit fields		
string	value1	The first value.		
string	value2	The second value.		
string	value3	The third value.		
string	tooltip1	Tooltip for the first edit control.		
string	tooltip2	Tooltip for the second edit control.		
string	tooltip3	Tooltip for the third edit control.		
<p>ctrlredit4</p> 	string	label	The label for the element .	<p><i>ctrlredit4</i> provides four edit controls in one line to enter text or values.</p> <p>The variable <i>align</i> can be set to one of the following values: EDIT_ALIGN_LEFT, EDIT_ALIGN_CENTER, or EDIT_ALIGN_RIGHT.</p> <p>Example 1 Example 2 Example 3</p>
int	align	Alignme nt of the edit fields.		
string	value1	The first value.		
string	value2	The second value.		
string	value3	The third value.		
string	value4	The fourth value.		

Structure	Entries			GUI Element / Description
	string	tooltip1	Tooltip for the first edit control.	
	string	tooltip2	Tooltip for the second edit control.	
	string	tooltip3	Tooltip for the third edit control.	
	string	tooltip4	Tooltip for the fourth edit control.	
<p>ctrlredit5</p> 	string	label	The label for the element .	<p><i>ctrlredit5</i> provides five edit controls in one line to enter text or values.</p> <p>The variable <i>align</i> can be set to one of the following values: EDIT_ALIGN_LEFT, EDIT_ALIGN_CENTER, or EDIT_ALIGN_RIGHT.</p> <p>Example 1 Example 2 Example 3</p>
int	align	Alignme nt of the edit fields.		
string	value1	The first value.		
string	value2	The second value.		
string	value3	The third value.		
string	value4	The fourth value.		
string	value5	The fifth value.		
string	tooltip1	Tooltip for the first edit control.		
string	tooltip2	Tooltip for the second edit control.		

Structure	Entries			GUI Element / Description
	string	tooltip3	Tooltip for the third edit control.	
	string	tooltip4	Tooltip for the fourth edit control.	
	string	tooltip5	Tooltip for the fifth edit control.	
<p>ctrlredit6</p> 	string	label	The label for the element	<p><i>ctrlredit6</i> provides six edit controls in one line to enter text or values.</p> <p>The variable <i>align</i> can be set to one of the following values: EDIT_ALIGN_LEFT, EDIT_ALIGN_CENTER, or EDIT_ALIGN_RIGHT.</p> <p>Example 1 Example 2 Example 3</p>
int	align	Alignme nt of the edit fields.		
string	value1	The first value.		
string	value2	The second value.		
string	value3	The third value.		
string	value4	The fourth value.		
string	value5	The fifth value.		
string	value6	The sixth value.		
string	tooltip1	Tooltip for the first edit control.		
string	tooltip2	Tooltip for the second edit control.		
string	tooltip3	Tooltip for the third edit control.		

Structure	Entries			GUI Element / Description
	string	tooltip4	Tooltip for the fourth edit control.	
	string	tooltip5	Tooltip for the fifth edit control.	
	string	tooltip6	Tooltip for the sixth edit control.	
<p>ctrslider</p> 	string	label	The label for the element	<p><i>ctrslider</i> provides a slider with a predefined range. Like shown in MADRIX, a slider is represented by an edit control to enter a value as well as a slider control.</p> <p>You can set a range for the slider. The minimum value (<i>rangeMin</i>) has to be greater or equal to 0, while the maximum value (<i>rangeMax</i>) must be greater than the minimum value.</p> <p>If <i>value</i> itself is set to a value outside the range, it is automatically set to the minimum or maximum value.</p> <p>The <i>tooltip</i> is shown when the user leaves the mouse over the slider for some seconds.</p> <p>Example</p>
int	rangeMin	The minimum value the slider provides . This value must be greater than or equal to 0.		
int	value	The start value set by the slider.		
int	rangeMax	The maximum value the slider provides . This value must be greater than the minimum value.		
string	tooltip	Holds the tooltip for the slider.		

Structure	Entries		GUI Element / Description
<p>ctrlcolortable</p> 	string	label	Label of the button.
	color[]	value	A field of values which holds the entries of the color table.
	string	tooltip	The tooltip for the button to open the color table.
			<p><i>ctrlcolortable</i> provides a color table dialog to set a number of colors. On the GUI of the effect, a button is provided to open the color table dialog. The label description is used to mark the button.</p> <p>The <i>tooltip</i> is shown when the user holds the mouse over the button that opens the color table for some seconds.</p> <p>Example</p>

Retrieving Values From GUI Elements

In order to receive values from a GUI element, it is simply necessary to read the appropriate value from the corresponding variable. The following example for the MAS Script Effect demonstrates that:

```

@author="";
@version="";
@description="";

ctrlcolor col = {"Color",AQUA}; //create color control
ctrlslider chgB = {"Fade", 0, 5,150, "The value used to dim the lines"};
//create slider

void InitEffect()
{
}

void RenderEffect()
{
    //create a color structure for ChangeBrightness with the value set
    //set by the slider
    color chg = {-chgB.value, -chgB.value, -chgB.value, -chgB.value, -chgB.value};
    ChangeBrightness(chg);

    float f = frandom();
    //draw a line with the color set by the color control
    DrawVectorLine(col.value, f, 0.0, f, 1.0);
}
    
```

```
}
```

Description

Explanation:

- This exemplary effect randomly draws lines onto the matrix and a fade out is added.
- First, one color and one slider control are created in addition to the standard speed control. The color control is used to set the color of the lines. The slider is used to determine the fading time.
- In the function `RenderEffect()`, first, the variable `chg` of the type `color` is created. It is initialized using the negative value of the slider control. Then, `ChangeBrightness()` is called in order to fade out the current content of the matrix.
- Finally, a line is drawn using the color value of the color control.

Setting Values Of GUI Elements

Just as it is possible to read the value, description, or range of a GUI element, it is also possible to set those values. In this way, it is possible to change the range of a slider, the text of an edit, or even their descriptions. You just have to set the corresponding value of the appropriate variable. Here is an example for the MAS Script Effect:

```
@author="";
@version="";
@description="";

ctrlcolor col = {"Color", FUCHSIA};
ctrlslider t = {"Fade", 0, 5, 10};

void InitEffect()
{
}

void RenderEffect()
{
    col.value.a += t.value; //count up alpha value
    if(col.value.a > 255) //if necessary reset it
        col.value.a = 0;

    Clear(col.value); //clear matrix
}
```

Explanation:

- In this example the matrix is cleared with a predefined color and the alpha constantly changes in order to render the effect more and more transparent.
- A color control is created to change the color in use and a slider allows users to define how fast the color becomes transparent.
- When the color is fully transparent, it is reset to no transparency at all.
- In order to accomplish this effect, the script continually increases the alpha value set by the color control.
- You will see how the alpha value counts up by each frame and is reset to 0, after it has reached the maximum value of 255.

Using Buttons

Buttons are created like any other GUI element by declaring a global variable of one of the *ctrlbutton* elements. In order to use a button, it is necessary to assign a function which is called when the button has been pressed. Those functions must be of the following type:

```
void <function name>()
```

In order to assign such a handler function, the name of the according function must be assigned to the *proc*-element of the according variable. In theory it could look like this:

```
ctrlbutton btn;

void InitEffect()
{
    btn.proc = "OnBtn";
    btn.tooltip="A button";
}

void OnBtn()
{
    do something after button was pressed
}
```

If the assigned function does not exist or does not have the correct return type or parameter list, a warning is displayed in the Script Output of the Script Editor.

Description

Examples

Button Example 1 (*ctrlbutton*)

The following example for the MAS Script Effect creates four buttons. Pressing a button will activate the color indicated by the button (Red, Green, Blue, or White).

```
@scriptname="ColorTestWithButton";
@author="inoage info@madrix.com";
@version="v1.0-2010/03/31";
@description="Create buttons that set the color of the matrix";

ctrlbutton ButtonRed = {"Red", "OnRed"};
ctrlbutton ButtonGreen= {"Green", "OnGreen"};
ctrlbutton ButtonBlue = {"Blue", "OnBlue"};
ctrlbutton ButtonWhite= {"White", "OnWhite"};

void InitEffect()
{
    ButtonRed.tooltip= "Press here to set color red";
    ButtonGreen.tooltip="Press here to set color green";
    ButtonBlue.tooltip= "Press here to set color blue";
    ButtonWhite.tooltip="Press here to set color white";
    Clear();
}

void RenderEffect()
{
    // do noting
}

void MatrixSizeChanged()
{
    InitEffect();
}

void OnRed()
{
    Clear(RED);
}

void OnGreen()
{
    Clear(GREEN);
}
```



```
void OnBlue()
{
    Clear(BLUE);
}

void OnWhite()
{
    Clear(WHITE);
}
```

Description

Button Example 2 (*ctrlbutton*)

The following example for the MAS Script Effect provides two buttons. By pressing the first button, blinking is started and stopped. Pressing the second button selects another color. This example changes the label and the handler function of the first button.

```
@scriptname="";
@author="";
@version="";
@description="";

ctrlbutton g_btnMode = {"Mode: Blinking", "OnBlinkOff",
"Enable or disable blinking mode"};
ctrlbutton g_btnColor= {"Change Color", "OnColor", "Select a new color"};

const int MODE_BLINK = 0;
const int MODE_STOP = 1;

int g_mode;
int g_counter;
color g_color = RED;

void InitEffect()
{
}

void RenderEffect()
{
    if(g_mode == MODE_BLINK)
    {
        if(g_counter++ == 10)
        {
            Clear(g_color);
            g_counter = 0;
        }
        else if(g_counter++ == 5)
        {
            Clear();
        }
    }
}
```

```

    }
    else
    {
        Clear(g_color);
    }
}

void OnColor()
{
    g_color.r = random(0, 255);
    g_color.g = random(0, 255);
    g_color.b = random(0, 255);
    g_color.w = random(0, 255);
}

void OnBlinkOff()
{
    g_mode = MODE_STOP;
    g_btnMode.label = "Blinking Off";
    g_btnMode.proc = "OnBlinkOn";
    g_btnMode.tooltip = "Enable blinking mode";
    WriteText("Blink disabled");
}

void OnBlinkOn()
{
    g_mode = MODE_BLINK;
    g_btnMode.label = "Blinking On";
    g_btnMode.proc = "OnBlinkOff";
    g_btnMode.tooltip = "Disable blinking mode";
    WriteText("Blinking enabled");
}

```

[Description](#)

Button Example 3 (*ctrlbutton*)

The following example for the MAS Script Effect draws a continuing circles and provides 4 rows, each containing 1, 2, 3, or 4 buttons. The buttons are labeled with a color. Press the according button and the displayed circles will change their color.

```

@scriptname="buttons";
@author="inoage";
@version="1.0";
@description="view to use button 1-4";

int height=0;
int width=0;
int i;
color col=WHITE;
ctrlbutton Button1={"Red","OnRed","set red color"};
ctrlbutton2 Button2={"Red","OnRed","Green","OnGreen","set red color","set green color"};
ctrlbutton3 Button3={"Red","OnRed","Green","OnGreen","Blue","OnBlue","set red color",

```

```
"set green color","set blue color"};
ctrlbutton4 Button4 ={"Red","OnRed","Green","OnGreen","Blue","OnBlue","White","OnWhite",
"set red color", "set green color","set blue color","set white color"};

void InitEffect()
{
    height = GetMatrixHeight();
    width = GetMatrixWidth();
    Clear();
    i=0;
    SetBpm(100);
}

void RenderEffect()
{
    i++;
    if(i>width || i>height)
    {
        i=0;
        Clear();
    }

    DrawPixelCircle(col, width/2-i, height/2-i, i*2,i*2);
}

void MatrixSizeChanged()
{
    InitEffect();
}

void OnRed()
{
    col=RED;
}

void OnGreen()
{
    col=GREEN;
}

void OnBlue()
{
    col=BLUE;
}

void OnWhite()
{
    col=WHITE;
}
```

[Description](#)

Button Example 4 (*ctrlbutton2*)

The following example for the MAS Script Effect.

```
@scriptname="";
@author="";
@version="";
@description="";

ctrlbutton2 btn;

void InitEffect()
{
    btn.label1="A";
    btn.proc1="OnBtnA";
    btn.tooltip1="A button";

    btn.label2="B";
    btn.proc2="OnBtnB";
    btn.tooltip2="B button";
}

void RenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}
void OnBtnA()
{
    // action btn A clicked
}
void OnBtnB()
{
    // action btn B clicked
}
```

[Description](#)

Color Table (*ctrlcolortable*)

The following example for the MAS Script Effect clears the matrix with several predefined colors. The effect provides a color table to set up these colors. This example shows how to initialize and to use a color table within a script.

```
@author="";
@version="";
@description="";

ctrlcolortable col = {"Color Table", {RED, GREEN, {255, 255, 128}, FUCHSIA},
"Colors used to fill the matrix"};

void InitEffect()
{
    SetBpm(60);
}

void RenderEffect()
{
    if(col.value.length > 0)
    {
        Clear(col.value[random(0, col.value.length - 1)]);
    }
}
```

Description

Edit Field (*ctrledit*)

The following example for the MAS Script Effect clears the matrix with the color white. It also creates 1 edit fields to enter the color values for the red color channel. You can enter different values than 255, which is the default value of the edit field in this script. The green and blue color channel are automatically set to 255.

```
@scriptname="ctrledit1 sample";
@author="inoage";
@version="MADRIX 2.10";
@description="color edit via script gui";

color col=WHITE;
// create 1x edit
ctrledit editColor={"Color",EDIT_ALIGN_RIGHT,"255","color red"};

void InitEffect()
{
}

void RenderEffect()
{
    col.r=(int)editColor.value;// value1 to color red via cast (int)
    Clear(col);// Set color to complete matrix
}
```

```
}  
  
void MatrixSizeChanged()  
{  
    InitEffect();  
}
```

Description

Edit Fields (*ctrledit2*)

The following example for the MAS Script Effect creates an edit field `ctrledit2` and assigns strings in `InitEffect()`.

```
@scriptname="ctrledit2 example";  
@author="inoage";  
@version="MADRIX 3.1";  
@description="";  
  
ctrledit2 edit;  
  
void InitEffect()  
{  
    edit.label="EDIT";  
    edit.align=EDIT_ALIGN_RIGHT;  
  
    edit.value1="1";  
    edit.tooltip1="First Edit Field";  
  
    edit.value2="2";  
    edit.tooltip2="Second Edit Field";  
  
}  
  
void RenderEffect()  
{  
  
}  
  
void MatrixSizeChanged()  
{  
    InitEffect();  
}
```

[Description](#)

Edit Fields (*ctrledit4*)

The following example for the MAS Script Effect clears the matrix with the color white. It also creates 4 edit fields to enter color values for the red, green, blue, and white color channel. You can enter different values than 255, which is the default value of the edit fields in this script.

```
@scriptname="ctrledit4 sample";
@author="inoage";
@version="MADRIX 2.10";
@description="color edit via script gui";

color col=WHITE;
// create 4x edit
ctrledit4 editColor={"Color",EDIT_ALIGN_RIGHT,"255","255","255","255",
"color red","color green","color blue","color white"};

void InitEffect()
{
}

void RenderEffect()
{
    col.r=(int)editColor.value1;// value1 to color red   via cast (int)
    col.g=(int)editColor.value2;// value2 to color green via cast (int)
    col.b=(int)editColor.value3;// value3 to color blue  via cast (int)
    col.w=(int)editColor.value4;// value4 to color white via cast (int)
    Clear(col);// Set color to complete matrix
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

[Description](#)

//PART E

Macros For Effects

5 Macros For Effects

5.1 General Resources

5.1.1 Overview

Introduction

- Macros for MADRIX Effects can be used to modify, manipulate, and affect the visual outcome of an effect or add automatization to it.
- Effect Macros are bound to a particular effect due to the different effects and its different functions and parameters.
- Effect Macros are available for every single MADRIX Effect, incl. SCE, S2L, M2L, as well as MAS.
- Effect Macros are stored as a part of the effect. This means they are part of a stored Storage Place file or Setup file.
- It is possible to save macros as separate files. The file extension of a macro is *.*mms*. The extension of a crypted macro is *.*mcm*.



Editor - Controls the corresponding Macro Editor.



Macro - Allows you to configure and manage a Macro. At the same time this means that no Macro is running or included.



Deactivated [Macro Included] - A macro is included/inserted in the Macro Editor, but the macro is currently not running.

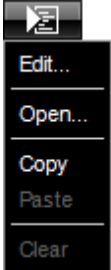
Left Mouse Click - Click once to activate the Macro.



Activated - A macro has been compiled and is currently running.

Left Mouse Click - Click once to deactivate the Macro.

Right Mouse Click - Opens the context menu.



Edit... - Opens the Macro Editor to write, edit, include, and compile Macros.

Open... - Allows you to load a Macro from an external file [of the file type *.mms and *.mcm]. Once loaded, the Macro will automatically be activated.

Copy - Allows you to copy the Macro to the clipboard of the computer.

Paste - Allows you to paste the Macro from the clipboard into the currently selected Macro Editor. If the copied Macro is running, the new Macro will be automatically activated as well. If the copied Macro is deactivated, the new Macro will be automatically deactivated as well.

Clear - Deletes all content of the Macro Editor and thereby deactivates and erases any Macro.

Functions Called By MADRIX

Overview

The following functions are called by MADRIX for each effect and can be implemented by a macro in order to react to different events:

- `void InitEffect()`
- `void PreRenderEffect`
- `void PostRenderEffect()`
- `void MatrixSizeChanged()`

InitEffect

(Automatically included in a new macro)

InitEffect is called by MADRIX whenever the script needs to be initialized. This is the case after compiling and starting a new macro or when the user pressed the **Start** button of the »[Script Editor](#). A macro can assume that any global variable is initialized with 0 and that any global array is empty as long as it has not been initialized with any value.

PreRenderEffect

(Automatically included in a new macro)

PreRenderEffect is called before the effect is going to be rendered. Changes done here affect the current frame, but may be overwritten by the effect itself.

PostRenderEffect

(Automatically included in a new macro)

This function is called after the effect has been rendered. Here, the result of the effect can be manipulated. You could use a gray filter on it, for example.

Note: The matrix, which the macro manipulates, is the same matrix that the effect uses to calculate its own effect. The effect may rely on the output being the input for the next frame with undefined behavior.

Also note: Mapping operations done in *PostRenderEffect* will effect the next frame, but not the current one. To control the current frame, please use *PreRenderEffect*.

MatrixSizeChanged

(Automatically included in a new macro)

MatixSizeChanged is called after the size of the matrix has been changed. This may be due to a change to the matrix settings.

Standard Outline

When you open the Effect Macro Editor, the empty standard macro will look like this:

```
@scriptname="";
@author="";
@version="";
@description="";

void InitEffect()
{

}

void PreRenderEffect()
{

}

void PostRenderEffect()
{

}

void MatrixSizeChanged()
{
    InitEffect();
}
```

5.1.2 Functions

Specific Resources

- » [Functions called by MADRIX](#)
- [Macros for Effects: Available Functions](#)
- » [Effect Parameter Chaser](#)

- [Using the Frame ID](#)
- [Applying Asynchronous Rendering](#)
- [Applying Stepped Rendering](#)
- [Applying Filter Effects \(FX\)](#)
- [Setting And Getting Blind Mode Or Solo Mode](#)

- » [Static Color Effects Overview \(SCE\)](#)
- » [Sound2Light Effects Overview \(S2L\)](#)
- » [Music2Light Effects Overview \(M2L\)](#)

General Resources

- » [Keyword Search](#)
- » [List Of Functions \(Alphabetical Order\)](#)
- » [List Of Functions \(Grouped\)](#)
- » [List Of Global Variables and Constants](#)
- » [List Of Operations](#)
- » [List Of Structures](#)
- » [Table Of Frequencies](#)
- » [Table Of Notes](#)

Available Functions

Standard Functions

- For non-specific functions, see » [List of Functions \(Alphabetical Order\)](#)

Effect-Specific Functions Depending On The Effect

- Each MADRIX Effect is different. In addition to the non-specific functions, each effect has therefore its own settings and specific functions.

- Such functions are not working in other effects. A macro which uses such commands cannot be compiled in another effect.
- A separate topic is provided for each MADRIX Effect.

Using The Frame ID

There are a lot of effects which use an internal Frame ID to have more control. For example, the SCE Color Scroll Effect uses the Frame ID to control the speed of scrolling. This does not make sense for all effects. However, for each effect it is possible to set and get the current Frame ID and Frame Count. The Frame Count identifies the maximal Frame ID used by the effect. This may be utilized to speed up the effect. For example, the following source code increases the speed of an effect that is controlled by the Frame ID.

```
void PreRenderEffect()  
{  
    SetFrameId(fmod(GetFrameId() + 2, GetFrameCount()));  
}
```

However, it is not possible to set the Frame Count by a macro; except for a macro of the MAS Script Effect.

Learn more »[Using Frames](#)

Applying Asynchronous Rendering

- Normally, the effects are synchronized to the Main Mixing frame rate, which is set to 50 Hz by default.
- But for the »[MAS Script](#) effect, there is the option to control the render frequency independently.
- Learn more »[Using Frames](#)

Applying Stepped Rendering

Normally, the effects use floating-point frames which is represented by the rational return values of the functions GetFrameId and GetFrameSteps. That way, the effects are able to render very precisely and smooth. However, sometimes it is desired to let the effects "step" pixel by pixel. This option is only available for some effects, for example »[SCE Color Scroll](#) and »[MAS Script](#)

- `void SetStep(int value)`

- `int GetStep()`
- `void ToggleStep()`

Valid values for *value* are *0 (Off)* or *1 (On)*. If stepped rendering is activated, effects like SCE Color Scroll look hard-stepping. In the MAS Script effect, stepped rendering causes `GetFrameId` and `GetFrameSteps` to return only integer values.

Learn more »[Using Frames](#)

Applying Filter Effects (FX)

You may quickly change the visual outcome of Effects using Filters (also called Filter Effects, FX).

- `void SetFilter(int filter)`
- `int GetFilter()`

Valid values for *filter* are the global variables »[Filters](#). You can also find further explanations about the various filter types in this chapter.

Setting And Getting Blind Mode Or Solo Mode

Blind Mode and Solo Mode are two options available for each Layer. Blind Mode will deactivate the current Layer, while Solo Mode will only show this Layer while disabling all other Layers.

- `void SetBlind(int value)`
- `int GetBlind()`
- `void ToggleBlind()`
- `void SetSolo(int value)`
- `int GetSolo()`
- `void ToggleSolo()`

Valid values for *value* are *0 (Off)* or *1 (On)*.

5.1.3 Effect Parameter Chaser

Functions Provided For Using The Effect Parameter Chaser

Function	Description
int ChaserGetPlaybackState ()	Returns the current playback state of the Effect Parameter Chaser. See below for a list of Playback State constants.
void ChaserPlay ()	Starts Chaser playback.
void ChaserStop ()	Stops Chaser playback.
void ChaserPause ()	Pauses Chaser playback.
int ChaserGetCurrentStep ()	Returns the index of the Step that is currently active. Indexing starts with 0.
void ChaserCallCurrentStep (int index)	Activates the Step specified with <i>index</i> . Indexing starts with 0.
void ChaserCallPreviousStep (int offset)	Returns to the Previous Step . <i>Offset</i> allows to define how many Steps are skipped. By default, <i>Offset</i> is set to 1 and does not need to be passed.
void ChaserCallNextStep (int offset)	Skips to the Next Step . <i>Offset</i> allows to define how many Steps are skipped. By default, <i>Offset</i> is set to 1 and does not need to be passed.
void ChaserGetStepCount (int count)	Returns the current number of Steps.
void ChaserSetLoopCount (int count)	Sets the Loop Count . Valid values range from 0 to s. A value of 0 means Endless .
int ChaserGetLoopCount ()	Returns the currently set Loop Count . A value of 0 means Endless .
float ChaserGetStepProgress ()	Returns the progression of the current Step in percent. Valid values range from 0.0 to 100.0.
float ChaserGetLoopProgress ()	Returns the progression of the Loop in percent. Valid values range from 0.0 to 100.0.
float ChaserGetStepTime (int index)	Returns the total Step Time of the Step specified with <i>index</i> in seconds. Indexing starts with 0.
float ChaserGetLoopTime ()	Returns the total Loop Time of the Chaser in seconds. Indexing starts with 0.
void ChaserSetStepDescription (int index, string description)	Sets the Description of the Step specified with <i>index</i> . Indexing starts with 0.
string ChaserGetStepDescription (int index)	Returns the Description of the Step specified with <i>index</i> . Indexing starts with 0.
void ChaserSetStepFadeType (int index, int type)	Sets the Fade Type of the Step specified with <i>index</i> . Indexing starts with 0. See below for a list of Interpolation Type constants for <i>type</i> .
int ChaserGetStepFadeType (int index)	Returns the Fade Type of the Step specified with <i>index</i> . Indexing starts with 0.
void ChaserSetStepFadeTime (int index, float time)	Sets the Fade Time of the Step specified with <i>index</i> , in seconds. Indexing starts with 0.
float ChaserGetStepFadeTime (int index)	Returns the Fade Time of the Step specified with <i>index</i> , in seconds. Indexing starts with 0.
void ChaserSetStepWaitTime (int index, float time)	Sets the Wait Time of the Step specified with <i>index</i> , in seconds. Indexing starts with 0.

float ChaserGetStepWaitTime (int index)	Returns the Wait Time of the Step specified with <i>index</i> , in seconds. Indexing starts with 0.
void ChaserInvert ()	Inverts the Step list.
void ChaserSwapSteps (int index1, int index2)	Swaps the positions of the Steps specified with <i>index1</i> and <i>index2</i> . Indexing starts with 0.
void ChaserMoveStepUp (int index)	Moves the Step specified with <i>index</i> one item up. Indexing starts with 0.
void ChaserMoveStepDown (int index)	Moves the Step specified with <i>index</i> one item down. Indexing starts with 0.

Playback State Constants

Constant	Description
int PLAYBACK_PLAYING	Shows that the Effect Parameter Chaser is currently playing (index 0).
int PLAYBACK_STOPPED	Shows that the Effect Parameter Chaser is currently stopped (index 1).
int PLAYBACK_PAUSED	Shows that the Effect Parameter Chaser is currently paused (index 2).
int PLAYBACK_FADING	Shows that the Effect Parameter Chaser is currently transitioning from one Step to the next Step after having been triggered manually (index 3).

Interpolation Type Constants

Constant	Description
int INTERPOLATION_TYPE_LINEAR	Sets the Interpolation Type to Linear .
int INTERPOLATION_TYPE_EASE_BOUNCE_IN	Sets the Interpolation Type to Ease In Bounce .
int INTERPOLATION_TYPE_EASE_BOUNCE_OUT	Sets the Interpolation Type to Ease Out Bounce .
int INTERPOLATION_TYPE_EASE_BOUNCE_INOUT	Sets the Interpolation Type to Ease In Out Bounce .
int INTERPOLATION_TYPE_EASE_CIRC_IN	Sets the Interpolation Type to Ease In Circular .
int INTERPOLATION_TYPE_EASE_CIRC_OUT	Sets the Interpolation Type to Ease Out Circular .
int INTERPOLATION_TYPE_EASE_CIRC_INOUT	Sets the Interpolation Type to Ease In Out Circular .

int <code>INTERPOLATION_TYPE_EASE_CUBIC_IN</code>	Sets the Interpolation Type to Ease In Cubic .
int <code>INTERPOLATION_TYPE_EASE_CUBIC_OUT</code>	Sets the Interpolation Type to Ease Out Cubic .
int <code>INTERPOLATION_TYPE_EASE_CUBIC_INOUT</code>	Sets the Interpolation Type to Ease In Out Cubic .
int <code>INTERPOLATION_TYPE_EASE_SINE_IN</code>	Sets the Interpolation Type to Ease In Sinusoidal .
int <code>INTERPOLATION_TYPE_EASE_SINE_OUT</code>	Sets the Interpolation Type to Ease Out Sinusoidal .
int <code>INTERPOLATION_TYPE_EASE_SINE_INOUT</code>	Sets the Interpolation Type to Ease In Out Sinusoidal .
int <code>INTERPOLATION_TYPE_EASE_EXPO_IN</code>	Sets the Interpolation Type to Ease In Exponential .
int <code>INTERPOLATION_TYPE_EASE_EXPO_OUT</code>	Sets the Interpolation Type to Ease Out Exponential .
int <code>INTERPOLATION_TYPE_EASE_EXPO_INOUT</code>	Sets the Interpolation Type to Ease In Out Exponential .

5.1.4 Using BPM Control

Functions Provided For Setting The Speed

The following table provides an overview of all functions to modify the speed:

Function	Description
void <code>SetBpm(float value)</code>	Sets the BPM value, which is the speed of the effect. Valid values for <i>value</i> range from 0 to 9999. Setting BPM to 0 means that the effect will be stopped immediately.
float <code>GetBpm()</code>	Returns the current BPM .
void <code>SetSpeedPitch(float value)</code>	Sets the Pitch value, which defines an additional multiplicative factor for the speed of the effect. Valid values for <i>value</i> range from -10 to 10. Setting the BPM pitch lower than 0 lets most effects run backwards.
float <code>GetSpeedPitch()</code>	Returns the current Pitch .

Remarks

Each effect which uses the BPM Control will interpret the speed in its own way.

- For example, 60 BPM in the »[SCE Color Change](#) effect will change the color 60 times per minute (once per second).
- 60 BPM in the »[SCE Pulse / Stroboscope](#) effect will flash the matrix 60 times per minute, too.
- For the »[SCE Shapes](#) and the »[SCE Tubes](#) effect, a BPM value of 60 means that 60 shapes/tubes will be created every minute by default.

However, other effects apply the range of BPM values differently. Just try the BPM slider to get a feeling for how the effects interpret the speed.

- For example, 3000 BPM in the »[M2L Drops](#) effect cause each drop to move over the whole matrix in one second.
- 3000 BPM in the »[SCE Graph](#) effect mean that the function will oscillate once per second.

Please note that both the BPM and the BPM pitch are floating-point values. Thus, you can create very slow effects, if you use values between 0 and 1.

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void SetBpmPitch (float value)	Use SetSpeedPitch () instead.
float GetBpmPitch ()	Use GetSpeedPitch () instead.

Example

This sample macro causes the BPM slider to stick to multiples of 60 BPM. It works with the »[SCE Color Change](#) effect, for example.

```
@scriptname=" ";
@author=" ";
@version=" ";
@description=" ";

const float step = 60.0; // use multiples of 60 BPM
float internalBpm = 0.0;
float previousBpm = 0.0;

void InitEffect()
{
```

```

    internalBpm = GetBpm();
    previousBpm = internalBpm;
}

void PreRenderEffect()
{
    internalBpm += (GetBpm() - previousBpm);
    //      WriteText("internalBpm: " + (string)internalBpm);

    int times = (int)round(internalBpm / step);
    SetBpm((float)times * step);

    previousBpm = GetBpm();
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

5.1.5 Using Color Controls

Functions Provided For Using Colors



Some effects, such as »[SCE Color](#) or »[SCE Wave / Radial](#), only support one particular color at a time. Then, make use of the following functions:

Function	Description
void SetColor (color col)	Sets the Color for the effect.
color GetColor ()	Returns the currently set Color .

- For a detailed description of the non-primitive data type color, see »[Using Data Types](#)
- Learn more »[List Of Global Variables And Constants](#)

Example

This macro example sets a random generated color each time the effect is started.

```
@scriptname="";
@author="";
@version="";
@description="";

void InitEffect()
{
    color c;
    c.r = random(0,255);
    c.g = random(0,255);
    c.b = random(0,255);
    c.w = 0;
    c.a = 0;

    SetColor(c);
}

void PreRenderEffect()
{
}

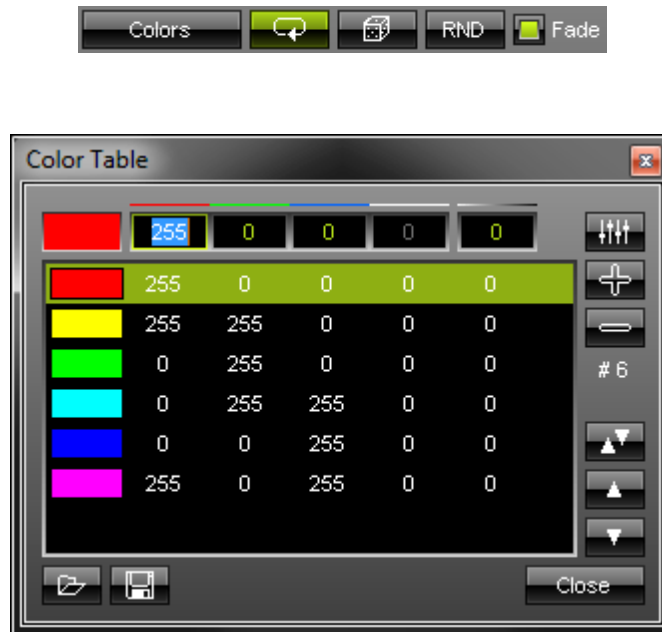
void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

5.1.6 Using Color Table

Functions Provided For Using The Color Table

Some effects provide more than one color. In this case the so-called Color Table (described here), »[Using Color Gradient](#), »[Using Color Gradient Dialog](#) or »[Using M2L Color Table](#) is offered by the effect to take control of the colors.



The following table provides an overview of all functions the effect can use to modify the colors in a Color Table:

Function	Description
void ColorTableSetColor (int index, color c)	Sets the color with the specified <i>index</i> to the given color value. If the index is out of range, nothing happens.
color ColorTableGetColor (int index)	Returns the color with the specified <i>index</i> in the Color Table. If the index is out of range, <i>black</i> is returned.
int ColorTableGetColorCount ()	Returns the current number of colors in the Color Table.
void ColorTableInvert (void)	Inverts the complete Color Table regarding the positions of the colors in the table.
void ColorTableSwapColors (int index1, int index2)	Swaps colors with their specified <i>indices</i> in the Color Table.
void ColorTableAddColor (int index, color c)	Adds another color to the Color Table at the specified <i>index</i> position. If the index is lower or equal to 0, the new color is added to the first position. If the index is greater than the current number of colors, the new color is added at the end.

void ColorTableRemoveColor (int index)	Removes the color at the specified <i>index</i> . If the given index is out of range, nothing happens.
void ColorTableSetColorFade (int)	Use TRUE to activate the color Fade mode. Use FALSE to deactivate it.
int ColorTableGetColorFade (void)	Returns TRUE , if the color Fade mode is activated, otherwise FALSE .
void ColorTableToggleColorFade (void)	Toggles the color Fade mode.
void ColorTableSetColorMode (int mode)	Sets the Color Mode . Please use a constant as described below for <i>mode</i> .
int ColorTableGetColorMode (void)	Returns the current Color Mode .

- For a detailed description of the non-primitive data type color, see »[Using Data Types](#)

Remarks

Not every function might be available for each MADRIX Effect. Also, some MADRIX effects require at least 2 entries in the Color Table. You will not able to overwrite this requirement with a Macro. In some MADRIX effects you cannot add or delete the number of colors, only the colors itself.

Color Mode Constants

Constant	Description
int COLOR_MODE_LOOP	The colors of the list will be used one after each other in a loop.
int COLOR_MODE_SHUFFLE	The colors of the list will be used without a specific order.
int COLOR_MODE_RANDOM	The effect creates random colors.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions are not supported anymore. Please follow the hints to migrate your macros.

Function	Description
----------	-------------

void SetColor (int idx, color c)	Use ColorTableSetColor (int idx, color c) instead.
color GetColor (int idx)	Use ColorTableGetColor (int idx) instead.
int GetColorCount ()	Use ColorTableGetColorCount () instead.
void AddColor (int idx, color c)	Use ColorTableAddColor (int idx, color c) instead
void RemoveColor (int idx)	Use ColorTableRemoveColor (int idx) instead.
void SetColorMode (int value)	Use ColorTableSetColorMode (int value) instead.
int GetColorMode ()	Use ColorTableGetColorMode () instead.

Example

This example ensures the amount of 6 colors in the Color Table and sets this 6 colors to defined values. The color Fade mode and the COLOR_MODE_LOOP are set. This example works with the »[SCE Color Change](#) or »[SCE Color Scroll](#) effect, for example.

```

@scriptname="";
@author="";
@version="";
@description="";

//Colors
color c1 = {255,0,0}; //red
color c2 = {0,255,0}; //green
color c3 = {0,0,255}; //blue

void InitEffect()
{
    //remove all colors from list until the amount of colors is 6
    while(ColorTableGetColorCount() > 6)
        ColorTableRemoveColor(0);

    //add colors to list until the amount of colors is 6
    while(ColorTableGetColorCount() < 6)
        ColorTableAddColor(0,WHITE);

    //set colors
    ColorTableSetColor(0,c1);
    ColorTableSetColor(1,c2);
    ColorTableSetColor(2,c3);
    ColorTableSetColor(3,YELLOW);
    ColorTableSetColor(4,ORANGE);
    ColorTableSetColor(5,PINK);

    //activate color fade mode
    ColorTableSetColorFade(true);

    //set color mode to COLOR_MODE_LOOP
    ColorTableSetColorMode(COLOR_MODE_LOOP);
}

```



```

void PreRenderEffect()
{
}

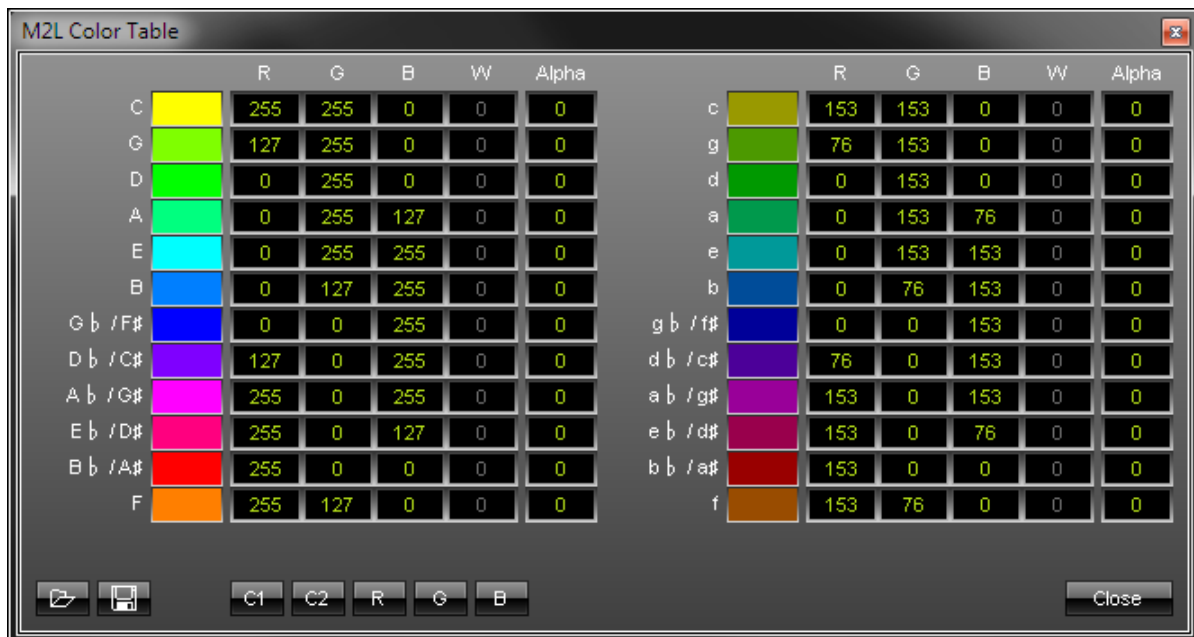
void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}
    
```

5.1.7 Using M2L Color Table

Functions Provided For Using The M2L Color Table

Some effects provide more than one color. In this case the so-called »Using Color Table, »Using Color Gradient, »Using Color Gradient Dialog or M2L Color Table (described here) is offered by the effect to take control of the colors.



The following table provides an overview of all functions the effect can use to modify the colors in a M2L Color Table:

Function	Description
----------	-------------

void M2LColorTableSetColor (int idx, color c)	Sets the color with the specified <i>index</i> to the given color value. If the index is out of range, nothing happens.
color M2LColorTableGetColor (int idx)	Returns the color with the specified <i>index</i> . If the index is out of range, <i>black</i> is returned.
void M2LColorTableSetPreset (int preset)	Sets the M2L Color Table preset. Please use a constant as described below for <i>preset</i> .
void M2LColorTableSetColorFade (int enable)	Sets the Fade option. Use TRUE to activate the fade. Use FALSE to deactivate it.
int M2LColorTableGetColorFade ()	Returns TRUE , if Fade is activated, otherwise FALSE .
void M2LColorTableToggleColorFade ()	Toggles the Fade option.

- For a detailed description of the non-primitive data type color, see »[Using Data Types](#)

Remarks

Not every function might be available for each MADRIX Effect. Therefore, the functions `M2LColorTableSetColorFade`, `M2LColorTableGetColorFade` and `M2LColorTableToggleColorFade` are only available, if the effect offers Fade Mode.

M2L Color Table Preset Constants

Constant	Description
int <code>M2L_COLORTABLE_PRESET_C1</code>	Sets preset C1 .
int <code>M2L_COLORTABLE_PRESET_C2</code>	Sets preset C2 .
int <code>M2L_COLORTABLE_PRESET_R</code>	Sets preset R .
int <code>M2L_COLORTABLE_PRESET_G</code>	Sets preset G .
int <code>M2L_COLORTABLE_PRESET_B</code>	Sets preset B .

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void <code>SetFade(int enable)</code>	Use <code>M2LColorTableSetColorFade(int enable)</code> instead.
int <code>GetFade()</code>	Use <code>M2LColorTableGetColorFade()</code> instead.

Example

This example sets the M2L Color Table preset C1 and sets the last 12 colors to color black.

```
@scriptname=" ";
@author=" ";
@version=" ";
@description=" ";
```

```

void InitEffect()
{
  //Set Preset C1
  M2LColorTableSetPreset(M2L_COLORTABLE_PRESET_C1);

  //Sets the last 12 colors to black
  for(int i=12;i<24;i++)
    M2LColorTableSetColor(i,BLACK);
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
  InitEffect();
}
    
```

5.1.8 Using Color Gradient

Functions Provided For Using The Color Gradient

Some effects provide more than one color. In this case the so-called »[Using Color Table](#), Color Gradient (described here), »[Using Color Gradient Dialog](#) or »[Using M2L Color Table](#) is offered by the effect to take control of the colors.



The following table provides an overview of all functions the effect can use to modify the colors in a Color Gradient:

Function	Description
----------	-------------

void GradientSetColor (int idx, color c)	Sets the color with the specified index to the given color value. If the index is out of range, nothing happens.
color GradientGetColor (int idx)	Returns the color with the specified index. If the index is out of range, <i>black</i> is returned.
int GradientGetColorCount ()	Returns the current number of colors in the Color Gradient.
void GradientAddColor (color c, float position, int fade)	Adds another color to the Color Gradient at the specified position. The position value have to be between <i>0.0</i> and <i>1.0</i> . The inserted color will be faded the color before if the fade value is TRUE .
void GradientRemoveColor (int idx)	Removes the color at the specified index. If the given index is out of range, nothing happens.
void GradientSetColorPosition (int idx, float pos)	Sets the color with the specified index to the given position value. The position value have to be between <i>0.0</i> and <i>1.0</i> . If the index is out of range, nothing happens.
float GradientGetColorPosition (int idx)	Returns the position of the color with the specified index. If the index is out of range, <i>0.0</i> is returned.
void GradientSetColorFade (int idx, int fade)	Use TRUE to activate the color fade mode for the color with the specified index. Use FALSE to deactivate it.
int GradientGetColorFade (int idx)	Returns TRUE , if the color fade mode is activated for the color with the specified index, otherwise FALSE .
void GradientFadeAllColors (void)	Activates the color fade mode for all colors in the Color Gradient.
void GradientFadeNoneColors (void)	Deactivates the color fade mode for all colors in the Color Gradient.
void GradientSetUniformDistances (void)	Sets the position values of each color in the Color Gradient to get uniform distances between each color.
void GradientInvertColorPositions (void)	Inverts the position values off all colors.
void GradientInvertColors (void)	Inverts all color values.

- For a detailed description of the non-primitive data type color, see »[Using Data Types](#)

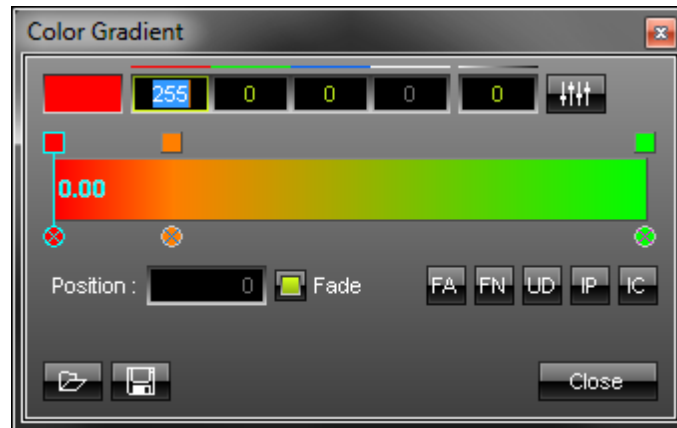
Remarks

The Color Gradient requires at least 2 colors. You will not able to overwrite this requirement with a Macro. Some MADRIX effects require the same color at the first and the last position.

5.1.9 Using Color Gradient Dialog

Functions Provided For Setting Effect Directions

Some effects provide more than one color. In this case the so-called »[Color_Table](#), »[Using_Color_Gradient](#), Color Gradient window (described here) or »[M2L Color Table](#) is offered by the effect to take control of the colors.



The following table provides an overview of all functions the effect can use to modify the colors in a Color Gradient window:

Function	Description
void GradientDlgSetColor (int idx, color c)	Sets the color with the specified index to the given color value. If the index is out of range, nothing happens.
color GradientDlgGetColor (int idx)	Returns the color with the specified index. If the index is out of range, <i>black</i> is returned.
int GradientDlgGetColorCount ()	Returns the current number of colors in the Color Gradient window.
void GradientDlgAddColor (color c, float position, int fade)	Adds another color to the Color Gradient window at the specified position. The position value have to be between 0.0 and 1.0. The inserted color will be faded the color before if the fade value is TRUE .
void GradientDlgRemoveColor (int idx)	Removes the color at the specified index. If the given index is out of range, nothing happens.
void GradientDlgSetColorPosition (int idx, float pos)	Sets the color with the specified index to the given position value. The position value have to be between 0.0 and 1.0. If the index is out of range, nothing happens.
float GradientDlgGetColorPosition (int idx)	Returns the position of the color with the specified index. If the index is out of range, 0.0 is returned.
void GradientDlgSetColorFade (int idx, int fade)	Use TRUE to activate the color fade mode for the color with the specified index. Use FALSE to deactivate it.

int GradientDlgGetColorFade (int idx)	Returns TRUE , if the color fade mode is activated for the color with the specified index, otherwise FALSE .
void GradientDlgFadeAllColors (void)	Activates the color fade mode for all colors in the Color Gradient window.
void GradientDlgFadeNoneColors (void)	Deactivates the color fade mode for all colors in the Color Gradient window.
void GradientDlgSetUniformDistances (void)	Sets the position values of each color in the Color Gradient window to get uniform distances between each color.
void GradientDlgInvertColorPositions (void)	Inverts the position values off all colors.
void GradientDlgInvertColors (void)	Inverts all color values.

- For a detailed description of the non-primitive data type color, see »[Using Data Types](#)

Remarks

The Gradient Dialog require at least 2 colors. You will not able to overwrite this requirement with a Macro. Some MADRIX effects require the same color at the first and last position.

5.1.10 Using Image Table

Functions Provided For Using The Image List

The following table provides an overview of all functions the effect can use to modify the images in an Image Table:

Function	Description
int ImageListGetCount ()	Returns the current number of images in the Image Table.
void ImageListMoveImageUp (int index)	Moves an image with its specified <i>index</i> up a place in the Image Table.
void ImageListMoveImageDown (int index)	Moves an image with its specified <i>index</i> down a place in the Image Table.
void ImageListInvert ()	Inverts the complete Image Table regarding the positions of the images in the table.
void ImageListSwapImage (int index1, int index2)	Swaps images with their specified <i>indices</i> in the Image Table.

void ImageListSetImageRotation (int index, int rotation)	Sets the image Rotation mode for an image with the specified <i>index</i> in the Image Table. See below for details.
int ImageListGetImageRotation (int index)	Returns the image Rotation mode for an image with the specified <i>index</i> in the Image Table. See below for details.
void ImageListSetImageDuration (int index, float duration)	Sets the Duration for an image with the specified <i>index</i> in the Image Table. Note that the Fade Time is a part of the Duration .
float ImageListGetImageDuration (int index)	Returns the Duration for an image with the specified <i>index</i> in the Image Table.
void ImageListSetImageFadeTime (int index, float fadetime)	Sets the Fade Time for an image with the specified <i>index</i> in the Image Table. Note that the Fade Time is a part of the Duration .
float ImageListGetImageFadeTime (int index)	Returns the Fade Time for an image with the specified <i>index</i> in the Image Table.

Rotation Mode Constants

Constant	Description
int ROTATION_CCW_0	Does not activate Rotation. Is the same as ROTATION_CW_0 .
int ROTATION_CCW_90	Rotates by 90 degrees in counter-clockwise direction. Is the same as ROTATION_CW_270 .
int ROTATION_CCW_180	Rotates by 180 degrees in counter-clockwise direction. Is the same as ROTATION_CW_180 .
int ROTATION_CCW_270	Rotates by 270 degrees in counter-clockwise direction. Is the same as ROTATION_CW_90 .
int ROTATION_CW_0	Does not activate Rotation. Is the same as ROTATION_CCW_0 .
int ROTATION_CW_90	Rotates by 90 degrees in clockwise direction. Is the same as ROTATION_CCW_270 .
int ROTATION_CW_180	Rotates by 180 degrees in clockwise direction. Is the same as ROTATION_CCW_180 .
int ROTATION_CW_270	Rotates by 270 degrees in clockwise direction. Is the same as ROTATION_CCW_90 .

5.1.11 Using Directions

Functions Provided For Setting Effect Directions

The following table provides an overview of all functions to modify effect directions:

Function	Description
void SetDirection (int value)	Sets the Direction . Please use a constant as described below for <i>value</i> .
int GetDirection ()	Returns the current Direction .
void SetDirectionCrossMode (int value)	Use TRUE to activate the direction Cross Mode . Use FALSE to deactivate it.
int GetDirectionCrossMode ()	Returns TRUE , if the direction Cross Mode is activated, otherwise FALSE .
void ToggleDirectionCrossMode ()	Toggles the direction Cross Mode .

Remarks

Not all effects which use directions offer Cross Mode. Therefore, the functions SetDirectionCrossMode, GetDirectionCrossMode and ToggleDirectionCrossMode are only available, if the effect offers Cross Mode. Also the effects mostly offer just a selection of all the directions which are listed below. The function SetDirection will only set directions which are offered by the effect.

Direction Constants

Constant	Description
int DIRECTION_NONE	Sets no direction. Usually this is the same as stopping the movement of an effect, if this is possible with the effect.
int DIRECTION_FRONT	Sets the direction to Front .
int DIRECTION_BACK	Sets the direction to Back .
int DIRECTION_LEFT	Sets the direction to Left .
int DIRECTION_RIGHT	Sets the direction to Right .
int DIRECTION_TOP	Sets the direction to Top .
int DIRECTION_BOTTOM	Sets the direction to Bottom .

Constant	Description
int <code>DIRECTION_TOP_LEFT</code>	Sets the direction to Top Left .
int <code>DIRECTION_TOP_RIGHT</code>	Sets the direction to Top Right .
int <code>DIRECTION_BOTTOM_LEFT</code>	Sets the direction to Bottom Left .
int <code>DIRECTION_BOTTOM_RIGHT</code>	Sets the direction to Bottom Right .
int <code>DIRECTION_FRONT_LEFT</code>	Sets the direction to Front Left .
int <code>DIRECTION_FRONT_RIGHT</code>	Sets the direction to Front Right .
int <code>DIRECTION_BACK_LEFT</code>	Sets the direction to Back Left .
int <code>DIRECTION_BACK_RIGHT</code>	Sets the direction to Back Right .
int <code>DIRECTION_FRONT_TOP</code>	Sets the direction to Front Top .
int <code>DIRECTION_FRONT_BOTTOM</code>	Sets the direction to Front Bottom .
int <code>DIRECTION_BACK_TOP</code>	Sets the direction to Back Top .
int <code>DIRECTION_BACK_BOTTOM</code>	Sets the direction to Back Bottom .
int <code>DIRECTION_FRONT_TOP_LEFT</code>	Sets the direction to Front Top Left .
int <code>DIRECTION_FRONT_TOP_RIGHT</code>	Sets the direction to Front Top Right .
int <code>DIRECTION_FRONT_BOTTOM_LEFT</code>	Sets the direction to Front Bottom Left .
int <code>DIRECTION_FRONT_BOTTOM_RIGHT</code>	Sets the direction to Front Bottom Right .
int <code>DIRECTION_BACK_TOP_LEFT</code>	Sets the direction to Back Top Left .
int <code>DIRECTION_BACK_TOP_RIGHT</code>	Sets the direction to Back Top Right .
int <code>DIRECTION_BACK_BOTTOM_LEFT</code>	Sets the direction to Back Bottom Left .
int <code>DIRECTION_BACK_BOTTOM_RIGHT</code>	Sets the direction to Back Bottom Right .
int <code>DIRECTION_X_AXIS_IMPLODE</code>	Sets the direction to X-Axis Implode .
int <code>DIRECTION_X_AXIS_EXPLODE</code>	Sets the direction to X-Axis Explode .
int <code>DIRECTION_Y_AXIS_IMPLODE</code>	Sets the direction to Y-Axis Implode .
int <code>DIRECTION_Y_AXIS_EXPLODE</code>	Sets the direction to Y-Axis Explode .
int <code>DIRECTION_Z_AXIS_IMPLODE</code>	Sets the direction to Z-Axis Implode .
int <code>DIRECTION_Z_AXIS_EXPLODE</code>	Sets the direction to Z-Axis Explode .
int <code>DIRECTION_RECTANGLE_IMPLODE</code>	Sets the direction to Rectangle Implode .
int <code>DIRECTION_RECTANGLE_EXPLODE</code>	Sets the direction to Rectangle Explode .
int <code>DIRECTION_SQUARE_IMPLODE</code>	Sets the direction to Square Implode .
int <code>DIRECTION_SQUARE_EXPLODE</code>	Sets the direction to Square Explode .
int <code>DIRECTION_ELLIPSE_IMPLODE</code>	Sets the direction to Ellipse Implode .
int <code>DIRECTION_ELLIPSE_EXPLODE</code>	Sets the direction to Ellipse Explode .
int <code>DIRECTION_CIRCLE_IMPLODE</code>	Sets the direction to Circle Implode .

Constant	Description
int <code>DIRECTION_CIRCLE_EXPLODE</code>	Sets the direction to Circle Explode .
int <code>DIRECTION_DIAMOND_IMPLODE</code>	Sets the direction to Diamond Implode .
int <code>DIRECTION_DIAMOND_EXPLODE</code>	Sets the direction to Diamond Explode .
int <code>DIRECTION_BOX_IMPLODE</code>	Sets the direction to Box Implode .
int <code>DIRECTION_BOX_EXPLODE</code>	Sets the direction to Box Explode .
int <code>DIRECTION_CUBE_IMPLODE</code>	Sets the direction to Cube Implode .
int <code>DIRECTION_CUBE_EXPLODE</code>	Sets the direction to Cube Explode .
int <code>DIRECTION_ELLIPSOID_IMPLODE</code>	Sets the direction to Ellipsoid Implode .
int <code>DIRECTION_ELLIPSOID_EXPLODE</code>	Sets the direction to Ellipsoid Explode .
int <code>DIRECTION_SPHERE_IMPLODE</code>	Sets the direction to Sphere Implode .
int <code>DIRECTION_SPHERE_EXPLODE</code>	Sets the direction to Sphere Explode .
int <code>DIRECTION_OCTAHEDRON_IMPLODE</code>	Sets the direction to Octahedron Implode .
int <code>DIRECTION_OCTAHEDRON_EXPLODE</code>	Sets the direction to Octahedron Explode .
int <code>DIRECTION_RADIAL</code>	Sets the direction to Radial .

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void <code>SetCrossed</code> (int enable)	Use <code>SetDirectionCrossMode</code> (int value) instead.
int <code>GetCrossed</code> ()	Use <code>GetDirectionCrossMode</code> () instead.
<code>DIR_NONE</code>	Use <code>DIRECTION_NONE</code> instead.
<code>DIR_LEFT</code>	Use <code>DIRECTION_LEFT</code> instead.
<code>DIR_RIGHT</code>	Use <code>DIRECTION_RIGHT</code> instead.
<code>DIR_UP</code>	Use <code>DIRECTION_TOP</code> instead.
<code>DIR_DOWN</code>	Use <code>DIRECTION_BOTTOM</code> instead.
<code>DIR_UL</code>	Use <code>DIRECTION_TOP_LEFT</code> instead.
<code>DIR_UR</code>	Use <code>DIRECTION_TOP_RIGHT</code> instead.
<code>DIR_DL</code>	Use <code>DIRECTION_BOTTOM_LEFT</code> instead.
<code>DIR_DR</code>	Use <code>DIRECTION_BOTTOM_RIGHT</code> instead.
Special Directions	

DIR_HORIZONTAL	Refer to the documentation of the » S2L Tubes or » M2L Tubes effect as SetDirection (int direction) and GetDirection () do not support this special direction anymore.
DIR_VERTICAL	Refer to the documentation of the » S2L Tubes or » M2L Tubes effect as SetDirection (int direction) and GetDirection () do not support this special direction anymore.
DIR_HV	Refer to the documentation of the » S2L Tubes or » M2L Tubes effect as SetDirection (int direction) and GetDirection () do not support this special direction anymore.
DIR_OUTWARDS	Use DIRECTION_RECTANGLE_EXPLODE instead in case of the » SCE Gradient effect. Otherwise, refer to the documentation of the specific effect as SetDirection (int direction) and GetDirection () do not support this special direction anymore.
DIR_INWARDS	Use DIRECTION_RECTANGLE_IMPLODE instead in case of the » SCE Gradient effect. Otherwise, refer to the documentation of the specific effect as SetDirection (int direction) and GetDirection () do not support this special direction anymore.
DIR_CIRCLE_OUTWARDS	Use DIRECTION_ELLIPSE_EXPLODE instead.
DIR_CIRCLE_INWARDS	Use DIRECTION_ELLIPSE_IMPLODE instead.
DIR_OUTWARDS_H	Use DIRECTION_X_AXIS_EXPLODE instead.
DIR_INWARDS_H	Use DIRECTION_X_AXIS_IMPLODE instead.
DIR_OUTWARDS_V	Use DIRECTION_Y_AXIS_EXPLODE instead.
DIR_INWARDS_V	Use DIRECTION_Y_AXIS_IMPLODE instead.
DIR_OUTWARDS_RECT	Use DIRECTION_RECTANGLE_EXPLODE instead.
DIR_INWARDS_RECT	Use DIRECTION_RECTANGLE_IMPLODE instead.
DIR_OUTWARDS_SQUARE	Use DIRECTION_SQUARE_EXPLODE instead.
DIR_INWARDS_SQUARE	Use DIRECTION_SQUARE_IMPLODE instead.
DIR_OUTWARDS_CIRCLE	Use DIRECTION_CIRCLE_EXPLODE instead.
DIR_INWARDS_CIRCLE	Use DIRECTION_CIRCLE_IMPLODE instead.
DIR_OUTWARDS_ELLIPSE	Use DIRECTION_ELLIPSE_EXPLODE instead.
DIR_INWARDS_ELLIPSE	Use DIRECTION_ELLIPSE_IMPLODE instead.
DIR_RADIAL	Use DIRECTION_RADIAL instead.

Example

This macro example switches the direction each second between left and right. It works with the »[SCE Color Scroll](#) effect, for example.

```
@scriptname=" ";
@author=" ";
```

```

@version="";
@description="";

int g_startTime;
int g_run;

void InitEffect()
{
    time t = GetTime();
    g_startTime = t.hour * 3600 + t.min * 60 + t.sec;

    g_run = 0;
    SetDirectionCrossMode(FALSE);    //Deactivate Cross Mode
}

void PreRenderEffect()
{
    time t = GetTime();
    int t2 = t.hour * 3600 + t.min * 60 + t.sec;

    if(t2 - g_startTime >= 1)
    {
        g_startTime = t2;
        switch(g_run % 2)
        {
            case 0:    SetDirection(DIRECTION_LEFT);    break;
            case 1:    SetDirection(DIRECTION_RIGHT);   break;
            default:   break;
        }
        g_run++;
    }
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

5.1.12 Using Look-At Types

Functions Provided For Setting Effect Look-At Types

The following table provides an overview of all functions to modify effect look-at types:

Function	Description
void SetLookAtType (int value)	Sets the look-at type <i>value</i> , which is the orientation of the effect related to the matrix. See below for a list of constants.

int GetLookAtType()	Returns the current look-at type. See below for a list of constants.
----------------------------	--

Remarks

The effects sometimes offer just a selection of all the look-at types which are listed below. The function `SetLookAtType` will only set look-at types which are offered by the effect.

Look-At Type Constants

Constant	Description
int <code>LOOKAT_FRONT</code>	Sets the look-at type to Front .
int <code>LOOKAT_BACK</code>	Sets the look-at type to Back .
int <code>LOOKAT_LEFT</code>	Sets the look-at type to Left .
int <code>LOOKAT_RIGHT</code>	Sets the look-at type to Right .
int <code>LOOKAT_TOP</code>	Sets the look-at type to Top .
int <code>LOOKAT_BOTTOM</code>	Sets the look-at type to Bottom .

Example

This macro example randomly changes the look-at type each second. It works with the »[SCE Image](#) or »[SCE Ticker / Scrolling Text](#) effect, for example. (In the SCE Image effect, please load at least one image.)

```
@scriptname="";
@author="";
@version="";
@description="";

int g_startTime;

void InitEffect()
{
    time t = GetTime();
    g_startTime = t.hour * 3600 + t.min * 60 + t.sec;
}

void PreRenderEffect()
```

```

{
time t = GetTime();
int t2 = t.hour * 3600 + t.min * 60 + t.sec;

if(t2 - g_startTime >= 1)
{
    g_startTime = t2;
    switch(random(0,5))
    {
        case 0:      SetLookAtType(LOOKAT_FRONT);      break;
        case 1:      SetLookAtType(LOOKAT_BACK);      break;
        case 2:      SetLookAtType(LOOKAT_LEFT);      break;
        case 3:      SetLookAtType(LOOKAT_RIGHT);     break;
        case 4:      SetLookAtType(LOOKAT_TOP);       break;
        case 5:      SetLookAtType(LOOKAT_BOTTOM);   break;
        default:     break;
    }
}
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

5.1.13 Using Shapes

Functions Provided For Setting Shapes

The following table provides an overview of all functions to modify shapes:

Function	Description
void SetRenderingMode (int mode)	Sets the Rendering Mode . Please use a constant as described below for <i>mode</i> .
int GetRenderingMode ()	Returns the currently set Rendering Mode .
void SetShapeType (int value)	Sets the Shape Type . Please use a constant as described below for <i>value</i> .
int GetShapeType ()	Returns the currently set Shape Type .
void SetShapeAlignment (int value)	Sets the Shape Alignment , which is the orientation of the shapes related to the matrix. Please use a constant as described below for <i>value</i> .
int GetShapeAlignment ()	Returns the currently set Shape Alignment .
void SetShapeRotation (int value)	Sets the Rotation Type . Please use a constant as described below for <i>value</i> .

int GetShapeRotation()	Returns the currently set Rotation Type .
void SetShapeOrigin (int type)	Sets the Origin Type . Please use a constant as described below for type.
int GetShapeOrigin()	Returns the currently set Origin Type .

Remarks

Not all effects which use shapes offer Rendering Mode. Therefore, the functions `SetRenderingMode` and `GetRenderingMode` are only available, if the effect offers Rendering Mode.

Not all effects which use shapes offer Shape Alignment. Therefore, the functions `SetShapeAlignment` and `GetShapeAlignment` are only available, if the effect offers Shape Alignment.

Not all effects which use shapes offer Shape Rotation. Therefore, the functions `SetShapeRotation` and `GetShapeRotation` are only available, if the effect offers Shape Rotation.

Not all effects which use shapes offer Origin. Therefore, the functions `SetOrigin` and `GetOrigin` are only available, if the effect offers Origin.

Also, the effects mostly offer just a selection of all the constants, which are listed below. The function `SetRenderingMode` will only set Rendering Modes which are offered by the effect. The function `SetShapeType` will only set Shape Types which are offered by the effect. The function `SetShapeAlignment` will only set Shape Alignments which are offered by the effect.

Rendering Mode Constants

Constant	Description
int RENDERING_MODE_SIMPLE	Sets the Rendering Mode to Simple .
int RENDERING_MODE_EXTENDED	Sets the Rendering Mode to Extended .
int RENDERING_MODE_BLOBBY	Sets the Rendering Mode to Blobby .

Shape Type Constants

Constant	Description
int <code>SHAPE_TYPE_LINE</code>	Sets the Shape Type to Line .
int <code>SHAPE_TYPE_CURVE</code>	Sets the Shape Type to Curve .
int <code>SHAPE_TYPE_FILLED</code>	Sets the Shape Type to Filled .
int <code>SHAPE_TYPE_RECTANGLE_OUTLINED</code>	Sets the Shape Type to Rectangle Outlined .
int <code>SHAPE_TYPE_RECTANGLE_OUTLINED_IMPLODE</code>	Sets the Shape Type to Rectangle Outlined Implode .
int <code>SHAPE_TYPE_RECTANGLE_OUTLINED_EXPLODE</code>	Sets the Shape Type to Rectangle Outlined Explode .
int <code>SHAPE_TYPE_RECTANGLE_FILLED</code>	Sets the Shape Type to Rectangle Filled .
int <code>SHAPE_TYPE_RECTANGLE_FILLED_IMPLODE</code>	Sets the Shape Type to Rectangle Filled Implode .
int <code>SHAPE_TYPE_RECTANGLE_FILLED_EXPLODE</code>	Sets the Shape Type to Rectangle Filled Explode .
int <code>SHAPE_TYPE_SQUARE_OUTLINED</code>	Sets the Shape Type to Square Outlined .
int <code>SHAPE_TYPE_SQUARE_OUTLINED_IMPLODE</code>	Sets the Shape Type to Square Outlined Implode .
int <code>SHAPE_TYPE_SQUARE_OUTLINED_EXPLODE</code>	Sets the Shape Type to Square Outlined Explode .
int <code>SHAPE_TYPE_SQUARE_FILLED</code>	Sets the Shape Type to Square Filled .
int <code>SHAPE_TYPE_SQUARE_FILLED_IMPLODE</code>	Sets the Shape Type to Square Filled Implode .
int <code>SHAPE_TYPE_SQUARE_FILLED_EXPLODE</code>	Sets the Shape Type to Square Filled Explode .
int <code>SHAPE_TYPE_ELLIPSE_OUTLINED</code>	Sets the Shape Type to Ellipse Outlined .
int <code>SHAPE_TYPE_ELLIPSE_OUTLINED_IMPLODE</code>	Sets the Shape Type to Ellipse Outlined Implode .
int <code>SHAPE_TYPE_ELLIPSE_OUTLINED_EXPLODE</code>	Sets the Shape Type to Ellipse Outlined Explode .
int <code>SHAPE_TYPE_ELLIPSE_FILLED</code>	Sets the Shape Type to Ellipse Filled .
int <code>SHAPE_TYPE_ELLIPSE_FILLED_IMPLODE</code>	Sets the Shape Type to Ellipse Filled Implode .
int <code>SHAPE_TYPE_ELLIPSE_FILLED_EXPLODE</code>	Sets the Shape Type to Ellipse Filled Explode .
int <code>SHAPE_TYPE_CIRCLE_OUTLINED</code>	Sets the Shape Type to Circle Outlined .
int <code>SHAPE_TYPE_CIRCLE_OUTLINED_IMPLODE</code>	Sets the Shape Type to Circle Outlined Implode .
int <code>SHAPE_TYPE_CIRCLE_OUTLINED_EXPLODE</code>	Sets the Shape Type to Circle Outlined Explode .
int <code>SHAPE_TYPE_CIRCLE_FILLED</code>	Sets the Shape Type to Circle Filled .

Constant	Description
int <code>SHAPE_TYPE_CIRCLE_FILLED_IMPLODE</code>	Sets the Shape Type to Circle Filled Implode .
int <code>SHAPE_TYPE_CIRCLE_FILLED_EXPLODE</code>	Sets the Shape Type to Circle Filled Explode .
int <code>SHAPE_TYPE_DIAMOND_OUTLINED</code>	Sets the Shape Type to Diamond Outlined .
int <code>SHAPE_TYPE_DIAMOND_OUTLINED_IMPLODE</code>	Sets the Shape Type to Diamond Outlined Implode .
int <code>SHAPE_TYPE_DIAMOND_OUTLINED_EXPLODE</code>	Sets the Shape Type to Diamond Outlined Explode .
int <code>SHAPE_TYPE_DIAMOND_FILLED</code>	Sets the Shape Type to Diamond Filled .
int <code>SHAPE_TYPE_DIAMOND_FILLED_IMPLODE</code>	Sets the Shape Type to Diamond Filled Implode .
int <code>SHAPE_TYPE_DIAMOND_FILLED_EXPLODE</code>	Sets the Shape Type to Diamond Filled Explode .
int <code>SHAPE_TYPE_HEART_OUTLINED</code>	Sets the Shape Type to Heart Outlined .
int <code>SHAPE_TYPE_HEART_OUTLINED_IMPLODE</code>	Sets the Shape Type to Heart Outlined Implode .
int <code>SHAPE_TYPE_HEART_OUTLINED_EXPLODE</code>	Sets the Shape Type to Heart Outlined Explode .
int <code>SHAPE_TYPE_HEART_FILLED</code>	Sets the Shape Type to Heart Filled .
int <code>SHAPE_TYPE_HEART_FILLED_IMPLODE</code>	Sets the Shape Type to Heart Filled Implode .
int <code>SHAPE_TYPE_HEART_FILLED_EXPLODE</code>	Sets the Shape Type to Heart Filled Explode .
int <code>SHAPE_TYPE_CROSS_OUTLINED</code>	Sets the Shape Type to Cross Outlined .
int <code>SHAPE_TYPE_CROSS_OUTLINED_IMPLODE</code>	Sets the Shape Type to Cross Outlined Implode .
int <code>SHAPE_TYPE_CROSS_OUTLINED_EXPLODE</code>	Sets the Shape Type to Cross Outlined Explode .
int <code>SHAPE_TYPE_CROSS_FILLED</code>	Sets the Shape Type to Cross Filled .
int <code>SHAPE_TYPE_CROSS_FILLED_IMPLODE</code>	Sets the Shape Type to Cross Filled Implode .
int <code>SHAPE_TYPE_CROSS_FILLED_EXPLODE</code>	Sets the Shape Type to Cross Filled Explode .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_OUTLINED</code>	Sets the Shape Type to Cross Straight Outlined .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_OUTLINED_IMPLODE</code>	Sets the Shape Type to Cross Straight Outlined Implode .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_OUTLINED_EXPLODE</code>	Sets the Shape Type to Cross Straight Outlined Explode .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_FILLED</code>	Sets the Shape Type to Cross Straight Filled .

Constant	Description
int <code>SHAPE_TYPE_CROSS_STRAIGHT_FILLED_IMPLODE</code>	Sets the Shape Type to Cross Straight Filled Implode .
int <code>SHAPE_TYPE_CROSS_STRAIGHT_FILLED_EXPLODE</code>	Sets the Shape Type to Cross Straight Filled Explode .
int <code>SHAPE_TYPE_STAR_OUTLINED</code>	Sets the Shape Type to Star Outlined .
int <code>SHAPE_TYPE_STAR_OUTLINED_IMPLODE</code>	Sets the Shape Type to Star Outlined Implode .
int <code>SHAPE_TYPE_STAR_OUTLINED_EXPLODE</code>	Sets the Shape Type to Star Outlined Explode .
int <code>SHAPE_TYPE_STAR_FILLED</code>	Sets the Shape Type to Star Filled .
int <code>SHAPE_TYPE_STAR_FILLED_IMPLODE</code>	Sets the Shape Type to Star Filled Implode .
int <code>SHAPE_TYPE_STAR_FILLED_EXPLODE</code>	Sets the Shape Type to Star Filled Explode .
int <code>SHAPE_TYPE_TRIANGLE_OUTLINED</code>	Sets the Shape Type to Triangle Outlined .
int <code>SHAPE_TYPE_TRIANGLE_OUTLINED_IMPLODE</code>	Sets the Shape Type to Triangle Outlined Implode .
int <code>SHAPE_TYPE_TRIANGLE_OUTLINED_EXPLODE</code>	Sets the Shape Type to Triangle Outlined Explode .
int <code>SHAPE_TYPE_TRIANGLE_FILLED</code>	Sets the Shape Type to Triangle Filled .
int <code>SHAPE_TYPE_TRIANGLE_FILLED_IMPLODE</code>	Sets the Shape Type to Triangle Filled Implode .
int <code>SHAPE_TYPE_TRIANGLE_FILLED_EXPLODE</code>	Sets the Shape Type to Triangle Filled Explode .
int <code>SHAPE_TYPE_BOX_OUTLINED</code>	Sets the Shape Type to 3D Box Outlined .
int <code>SHAPE_TYPE_BOX_OUTLINED_IMPLODE</code>	Sets the Shape Type to 3D Box Outlined Implode .
int <code>SHAPE_TYPE_BOX_OUTLINED_EXPLODE</code>	Sets the Shape Type to 3D Box Outlined Explode .
int <code>SHAPE_TYPE_BOX_UNFILLED</code>	Sets the Shape Type to 3D Box Unfilled .
int <code>SHAPE_TYPE_BOX_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Box Unfilled Implode .
int <code>SHAPE_TYPE_BOX_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Box Unfilled Explode .
int <code>SHAPE_TYPE_BOX_FILLED</code>	Sets the Shape Type to 3D Box Filled .
int <code>SHAPE_TYPE_BOX_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Box Filled Implode .
int <code>SHAPE_TYPE_BOX_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Box Filled Explode .
int <code>SHAPE_TYPE_CUBE_OUTLINED</code>	Sets the Shape Type to 3D Cube Outlined .

Constant	Description
int <code>SHAPE_TYPE_CUBE_OUTLINED_IMPLODE</code>	Sets the Shape Type to 3D Cube Outlined Implode.
int <code>SHAPE_TYPE_CUBE_OUTLINED_EXPLODE</code>	Sets the Shape Type to 3D Cube Outlined Explode.
int <code>SHAPE_TYPE_CUBE_UNFILLED</code>	Sets the Shape Type to 3D Cube Unfilled .
int <code>SHAPE_TYPE_CUBE_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Cube Unfilled Implode.
int <code>SHAPE_TYPE_CUBE_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Cube Unfilled Explode.
int <code>SHAPE_TYPE_CUBE_FILLED</code>	Sets the Shape Type to 3D Cube Filled.
int <code>SHAPE_TYPE_CUBE_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Cube Filled Implode.
int <code>SHAPE_TYPE_CUBE_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Cube Filled Explode.
int <code>SHAPE_TYPE_SPHERE_UNFILLED</code>	Sets the Shape Type to 3D Sphere Unfilled.
int <code>SHAPE_TYPE_SPHERE_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Sphere Unfilled Implode.
int <code>SHAPE_TYPE_SPHERE_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Sphere Unfilled Explode.
int <code>SHAPE_TYPE_SPHERE_FILLED</code>	Sets the Shape Type to 3D Sphere Filled.
int <code>SHAPE_TYPE_SPHERE_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Sphere Filled Implode.
int <code>SHAPE_TYPE_SPHERE_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Sphere Filled Explode.
int <code>SHAPE_TYPE_ELLIPSOID_UNFILLED</code>	Sets the Shape Type to 3D Ellipsoid Unfilled.
int <code>SHAPE_TYPE_ELLIPSOID_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Ellipsoid Unfilled Implode.
int <code>SHAPE_TYPE_ELLIPSOID_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Ellipsoid Unfilled Explode.
int <code>SHAPE_TYPE_ELLIPSOID_FILLED</code>	Sets the Shape Type to 3D Ellipsoid Filled.
int <code>SHAPE_TYPE_ELLIPSOID_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Ellipsoid Filled Implode.
int <code>SHAPE_TYPE_ELLIPSOID_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Ellipsoid Filled Explode.
int <code>SHAPE_TYPE_OCTAHEDRON_UNFILLED</code>	Sets the Shape Type to 3D Octahedron Unfilled.
int <code>SHAPE_TYPE_OCTAHEDRON_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Octahedron Unfilled Implode.
int <code>SHAPE_TYPE_OCTAHEDRON_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Octahedron Unfilled Explode.

Constant	Description
int <code>SHAPE_TYPE_OCTAHEDRON_FILLED</code>	Sets the Shape Type to 3D Octahedron Filled .
int <code>SHAPE_TYPE_OCTAHEDRON_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Octahedron Filled Implode .
int <code>SHAPE_TYPE_OCTAHEDRON_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Octahedron Filled Explode .
int <code>SHAPE_TYPE_3D_HEART_UNFILLED</code>	Sets the Shape Type to 3D Heart Unfilled .
int <code>SHAPE_TYPE_3D_HEART_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Heart Unfilled Implode .
int <code>SHAPE_TYPE_3D_HEART_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Heart Unfilled Explode .
int <code>SHAPE_TYPE_3D_HEART_FILLED</code>	Sets the Shape Type to 3D Heart Filled .
int <code>SHAPE_TYPE_3D_HEART_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Heart Filled Implode .
int <code>SHAPE_TYPE_3D_HEART_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Heart Filled Explode .
int <code>SHAPE_TYPE_3D_STAR_UNFILLED</code>	Sets the Shape Type to 3D Star Unfilled .
int <code>SHAPE_TYPE_3D_STAR_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Star Unfilled Implode .
int <code>SHAPE_TYPE_3D_STAR_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Star Unfilled Explode .
int <code>SHAPE_TYPE_3D_STAR_FILLED</code>	Sets the Shape Type to 3D Star Filled .
int <code>SHAPE_TYPE_3D_STAR_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Star Filled Implode .
int <code>SHAPE_TYPE_3D_STAR_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Star Filled Explode .
int <code>SHAPE_TYPE_3D_CROSS_UNFILLED</code>	Sets the Shape Type to 3D Cross Unfilled .
int <code>SHAPE_TYPE_3D_CROSS_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Cross Unfilled Implode .
int <code>SHAPE_TYPE_3D_CROSS_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Cross Unfilled Explode .
int <code>SHAPE_TYPE_3D_CROSS_FILLED</code>	Sets the Shape Type to 3D Cross Filled .
int <code>SHAPE_TYPE_3D_CROSS_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Cross Filled Implode .
int <code>SHAPE_TYPE_3D_CROSS_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Cross Filled Explode .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_UNFILLED</code>	Sets the Shape Type to 3D Cross Straight Unfilled .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Cross Straight Unfilled Implode .

Constant	Description
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Cross Straight Unfilled Explode .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_FILLED</code>	Sets the Shape Type to 3D Cross Straight Filled .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Cross Straight Filled Implode .
int <code>SHAPE_TYPE_3D_CROSS_STRAIGHT_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Cross Straight Filled Explode .
int <code>SHAPE_TYPE_PYRAMID_UNFILLED</code>	Sets the Shape Type to 3D Pyramid Unfilled .
int <code>SHAPE_TYPE_PYRAMID_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Pyramid Unfilled Implode .
int <code>SHAPE_TYPE_PYRAMID_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Pyramid Unfilled Explode .
int <code>SHAPE_TYPE_PYRAMID_FILLED</code>	Sets the Shape Type to 3D Pyramid Filled .
int <code>SHAPE_TYPE_PYRAMID_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Pyramid Filled Implode .
int <code>SHAPE_TYPE_PYRAMID_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Pyramid Filled Explode .
int <code>SHAPE_TYPE_TEXT</code>	Sets the Shape Type to Text .
int <code>SHAPE_TYPE_WAVE_LINEAR</code>	Sets the Shape Type to Wave Linear .
int <code>SHAPE_TYPE_WAVE_RADAR</code>	Sets the Shape Type to Wave Radar .
int <code>SHAPE_TYPE_WAVE_HELIX</code>	Sets the Shape Type to Wave Helix .
int <code>SHAPE_TYPE_WAVE_CIRCLE</code>	Sets the Shape Type to Wave Circle .
int <code>SHAPE_TYPE_WAVE_SQUARE</code>	Sets the Shape Type to Wave Square .
int <code>SHAPE_TYPE_WAVE_DIAMOND</code>	Sets the Shape Type to Wave Diamond .
int <code>SHAPE_TYPE_WAVE_SPHERE</code>	Sets the Shape Type to Wave Sphere .
int <code>SHAPE_TYPE_WAVE_CUBE</code>	Sets the Shape Type to Wave Cube .
int <code>SHAPE_TYPE_WAVE_OCTAHEDRON</code>	Sets the Shape Type to Wave Octahedron .
int <code>SHAPE_TYPE_RANDOM</code>	Selects an available Shape Type for each shape randomly. Sets the Shape Type to Random .
int <code>SHAPE_TYPE_RANDOM_STATIC</code>	Sets the Shape Type to Random Static .
int <code>SHAPE_TYPE_RANDOM_IMPLODE</code>	Sets the Shape Type to Random Implode .
int <code>SHAPE_TYPE_RANDOM_EXPLODE</code>	Sets the Shape Type to Random Explode .
int <code>SHAPE_TYPE_RANDOM_OUTLINED</code>	Sets the Shape Type to Random Outlined .

Constant	Description
int <code>SHAPE_TYPE_RANDOM_OUTLINED_STATIC</code>	Sets the Shape Type to Random Outlined Static .
int <code>SHAPE_TYPE_RANDOM_OUTLINED_IMPLODE</code>	Sets the Shape Type to Random Outlined Implode .
int <code>SHAPE_TYPE_RANDOM_OUTLINED_EXPLODE</code>	Sets the Shape Type to Random Outlined Explode .
int <code>SHAPE_TYPE_RANDOM_UNFILLED</code>	Sets the Shape Type to Random Unfilled .
int <code>SHAPE_TYPE_RANDOM_UNFILLED_STATIC</code>	Sets the Shape Type to Random Unfilled Static .
int <code>SHAPE_TYPE_RANDOM_UNFILLED_IMPLODE</code>	Sets the Shape Type to Random Unfilled Implode .
int <code>SHAPE_TYPE_RANDOM_UNFILLED_EXPLODE</code>	Sets the Shape Type to Random Unfilled Explode .
int <code>SHAPE_TYPE_RANDOM_FILLED</code>	Sets the Shape Type to Random Filled .
int <code>SHAPE_TYPE_RANDOM_FILLED_STATIC</code>	Sets the Shape Type to Random Filled Static .
int <code>SHAPE_TYPE_RANDOM_FILLED_IMPLODE</code>	Sets the Shape Type to Random Filled Implode .
int <code>SHAPE_TYPE_RANDOM_FILLED_EXPLODE</code>	Sets the Shape Type to Random Filled Explode .
int <code>SHAPE_TYPE_2D_RANDOM</code>	Sets the Shape Type to 2D Random .
int <code>SHAPE_TYPE_2D_RANDOM_STATIC</code>	Sets the Shape Type to 2D Random Static .
int <code>SHAPE_TYPE_2D_RANDOM_IMPLODE</code>	Sets the Shape Type to 2D Random Implode .
int <code>SHAPE_TYPE_2D_RANDOM_EXPLODE</code>	Sets the Shape Type to 2D Random Explode .
int <code>SHAPE_TYPE_2D_RANDOM_OUTLINED</code>	Sets the Shape Type to 2D Random Outlined .
int <code>SHAPE_TYPE_2D_RANDOM_OUTLINED_STATIC</code>	Sets the Shape Type to 2D Random Outlined Static .
int <code>SHAPE_TYPE_2D_RANDOM_OUTLINED_IMPLODE</code>	Sets the Shape Type to 2D Random Outlined Implode .
int <code>SHAPE_TYPE_2D_RANDOM_OUTLINED_EXPLODE</code>	Sets the Shape Type to 2D Random Outlined Explode .
int <code>SHAPE_TYPE_2D_RANDOM_FILLED</code>	Sets the Shape Type to 2D Random Filled .
int <code>SHAPE_TYPE_2D_RANDOM_FILLED_STATIC</code>	Sets the Shape Type to 2D Random Filled Static .
int <code>SHAPE_TYPE_2D_RANDOM_FILLED_IMPLODE</code>	Sets the Shape Type to 2D Random Filled Implode .
int <code>SHAPE_TYPE_2D_RANDOM_FILLED_EXPLODE</code>	Sets the Shape Type to 2D Random Filled Explode .

Constant	Description
int <code>SHAPE_TYPE_3D_RANDOM</code>	Sets the Shape Type to 3D Random .
int <code>SHAPE_TYPE_3D_RANDOM_STATIC</code>	Sets the Shape Type to 3D Random Static .
int <code>SHAPE_TYPE_3D_RANDOM_IMPLODE</code>	Sets the Shape Type to 3D Random Implode .
int <code>SHAPE_TYPE_3D_RANDOM_EXPLODE</code>	Sets the Shape Type to 3D Random Explode .
int <code>SHAPE_TYPE_3D_RANDOM_UNFILLED</code>	Sets the Shape Type to 3D Random Unfilled .
int <code>SHAPE_TYPE_3D_RANDOM_UNFILLED_STATIC</code>	Sets the Shape Type to 3D Random Unfilled Static .
int <code>SHAPE_TYPE_3D_RANDOM_UNFILLED_IMPLODE</code>	Sets the Shape Type to 3D Random Unfilled Implode .
int <code>SHAPE_TYPE_3D_RANDOM_UNFILLED_EXPLODE</code>	Sets the Shape Type to 3D Random Unfilled Explode .
int <code>SHAPE_TYPE_3D_RANDOM_FILLED</code>	Sets the Shape Type to 3D Random Filled .
int <code>SHAPE_TYPE_3D_RANDOM_FILLED_STATIC</code>	Sets the Shape Type to 3D Random Filled Static .
int <code>SHAPE_TYPE_3D_RANDOM_FILLED_IMPLODE</code>	Sets the Shape Type to 3D Random Filled Implode .
int <code>SHAPE_TYPE_3D_RANDOM_FILLED_EXPLODE</code>	Sets the Shape Type to 3D Random Filled Explode .

Shape Alignment Constants

Constant	Description
int <code>LOOKAT_FRONT</code>	Sets the Shape Alignment to Front .
int <code>LOOKAT_BACK</code>	Sets the Shape Alignment to Back .
int <code>LOOKAT_LEFT</code>	Sets the Shape Alignment to Left .
int <code>LOOKAT_RIGHT</code>	Sets the Shape Alignment to Right .
int <code>LOOKAT_TOP</code>	Sets the Shape Alignment to Top .
int <code>LOOKAT_BOTTOM</code>	Sets the Shape Alignment to Bottom .
int <code>LOOKAT_RANDOM</code>	Selects an available Shape Alignment for each shape randomly. Sets the Shape Alignment to Random .

Rotation Mode Constants

Constant	Description
int <code>ROTATION_CCW_0</code>	Does not activate Rotation. Is the same as <code>ROTATION_CW_0</code> .
int <code>ROTATION_CCW_90</code>	Rotates by 90 degrees in counter-clockwise direction. Is the same as <code>ROTATION_CW_270</code> .
int <code>ROTATION_CCW_180</code>	Rotates by 180 degrees in counter-clockwise direction. Is the same as <code>ROTATION_CW_180</code> .
int <code>ROTATION_CCW_270</code>	Rotates by 270 degrees in counter-clockwise direction. Is the same as <code>ROTATION_CW_90</code> .
int <code>ROTATION_CW_0</code>	Does not activate Rotation. Is the same as <code>ROTATION_CCW_0</code> .
int <code>ROTATION_CW_90</code>	Rotates by 90 degrees in clockwise direction. Is the same as <code>ROTATION_CCW_270</code> .
int <code>ROTATION_CW_180</code>	Rotates by 180 degrees in clockwise direction. Is the same as <code>ROTATION_CCW_180</code> .
int <code>ROTATION_CW_270</code>	Rotates by 270 degrees in clockwise direction. Is the same as <code>ROTATION_CCW_90</code> .

Origin Type Constants

Constant	Description
int <code>ORIGIN_CENTER</code>	Sets the Origin Type to Center .
int <code>ORIGIN_FRONT</code>	Sets the Origin Type to Front .
int <code>ORIGIN_BACK</code>	Sets the Origin Type to Back .
int <code>ORIGIN_LEFT</code>	Sets the Origin Type to Left .
int <code>ORIGIN_RIGHT</code>	Sets the Origin Type to Right .
int <code>ORIGIN_TOP</code>	Sets the Origin Type to Top .
int <code>ORIGIN_BOTTOM</code>	Sets the Origin Type to Bottom .
int <code>ORIGIN_TOP_LEFT</code>	Sets the Origin Type to Top Left .
int <code>ORIGIN_TOP_RIGHT</code>	Sets the Origin Type to Top Right .
int <code>ORIGIN_BOTTOM_LEFT</code>	Sets the Origin Type to Bottom Left .
int <code>ORIGIN_BOTTOM_RIGHT</code>	Sets the Origin Type to Bottom Right .
int <code>ORIGIN_FRONT_LEFT</code>	Sets the Origin Type to Front Left .
int <code>ORIGIN_FRONT_RIGHT</code>	Sets the Origin Type to Front Right .
int <code>ORIGIN_BACK_LEFT</code>	Sets the Origin Type to Back Left .
int <code>ORIGIN_BACK_RIGHT</code>	Sets the Origin Type to Back Right .
int <code>ORIGIN_FRONT_TOP</code>	Sets the Origin Type to Front Top .
int <code>ORIGIN_FRONT_BOTTOM</code>	Sets the Origin Type to Front Bottom .
int <code>ORIGIN_BACK_TOP</code>	Sets the Origin Type to Back Top .
int <code>ORIGIN_BACK_BOTTOM</code>	Sets the Origin Type to Back Bottom .
int <code>ORIGIN_FRONT_TOP_LEFT</code>	Sets the Origin Type to Front Top Left .
int <code>ORIGIN_FRONT_TOP_RIGHT</code>	Sets the Origin Type to Front Top Right .
int <code>ORIGIN_FRONT_BOTTOM_LEFT</code>	Sets the Origin Type to Front Bottom Left .
int <code>ORIGIN_FRONT_BOTTOM_RIGHT</code>	Sets the Origin Type to Front Bottom Right .
int <code>ORIGIN_BACK_TOP_LEFT</code>	Sets the Origin Type to Back Top Left .
int <code>ORIGIN_BACK_TOP_RIGHT</code>	Sets the Origin Type to Back Top Right .
int <code>ORIGIN_BACK_BOTTOM_LEFT</code>	Sets the Origin Type to Back Bottom Left .
int <code>ORIGIN_BACK_BOTTOM_RIGHT</code>	Sets the Origin Type to Back Bottom Right .

Deprecated Functions

Deprecated functions/constants are outdated functions and should not be used anymore.

Function/Constant	Description
int <code>SHAPE_TYPE_CROSS</code>	Use <code>SHAPE_TYPE_CROSS_FILLED</code> instead.
int <code>SHAPE_TYPE_CROSS_IMPLODE</code>	Use <code>SHAPE_TYPE_CROSS_FILLED_IMPLODE</code> instead.
int <code>SHAPE_TYPE_CROSS_EXPLODE</code>	Use <code>SHAPE_TYPE_CROSS_FILLED_EXPLODE</code> instead.
int <code>SHAPE_TYPE_STAR</code>	Use <code>SHAPE_TYPE_STAR_FILLED</code> instead.
int <code>SHAPE_TYPE_STAR_IMPLODE</code>	Use <code>SHAPE_TYPE_STAR_FILLED_IMPLODE</code> instead.
int <code>SHAPE_TYPE_STAR_EXPLODE</code>	Use <code>SHAPE_TYPE_STAR_FILLED_EXPLODE</code> instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void <code>SetShape</code> (int shape)	Use <code>SetShapeType</code> (int value) instead.
int <code>GetShape</code> ()	Use <code>GetShapeType</code> () instead.
void <code>SetDrawShape</code> (int shape)	Use <code>SetShapeType</code> (int value) instead.
int <code>GetDrawShape</code> ()	Use <code>GetShapeType</code> () instead.
<code>DRAW_LINE</code>	Use <code>SHAPE_TYPE_LINE</code> instead.
<code>DRAW_CURVE</code>	Use <code>SHAPE_TYPE_CURVE</code> instead.
<code>DRAW_RECT</code>	Use <code>SHAPE_TYPE_RECTANGLE_OUTLINED</code> or <code>SHAPE_TYPE_SQUARE_OUTLINED</code> instead, depending on the provided shape types of the effect and the desired result.
<code>DRAW_RECT_IMPLODE</code>	Use <code>SHAPE_TYPE_RECTANGLE_OUTLINED_IMPLODE</code> or <code>SHAPE_TYPE_SQUARE_OUTLINED_IMPLODE</code> instead, depending on the provided shape types of the effect and the desired result.
<code>DRAW_RECT_EXPLODE</code>	Use <code>SHAPE_TYPE_RECTANGLE_OUTLINED_EXPLODE</code> or <code>SHAPE_TYPE_SQUARE_OUTLINED_EXPLODE</code> instead, depending on the provided shape types of the effect and the desired result.
<code>FILL_RECT</code>	Use <code>SHAPE_TYPE_RECTANGLE_FILLED</code> or <code>SHAPE_TYPE_SQUARE_FILLED</code> instead, depending on the provided shape types of the effect and the desired result.
<code>FILL_RECT_IMPLODE</code>	Use <code>SHAPE_TYPE_RECTANGLE_FILLED_IMPLODE</code> or <code>SHAPE_TYPE_SQUARE_FILLED_IMPLODE</code> instead, depending on the provided shape types of the effect and the desired result.
<code>FILL_RECT_EXPLODE</code>	Use <code>SHAPE_TYPE_RECTANGLE_FILLED_EXPLODE</code> or <code>SHAPE_TYPE_SQUARE_FILLED_EXPLODE</code> instead, depending on the provided shape types of the effect and the desired result.

DRAW_CIRCLE	Use SHAPE_TYPE_ELLIPSE_OUTLINED or SHAPE_TYPE_CIRCLE_OUTLINED instead, depending on the provided shape types of the effect and the desired result.
DRAW_CIRCLE_IMPLODE	Use SHAPE_TYPE_ELLIPSE_OUTLINED_IMPLODE or SHAPE_TYPE_CIRCLE_OUTLINED_IMPLODE instead, depending on the provided shape types of the effect and the desired result.
DRAW_CIRCLE_EXPLODE	Use SHAPE_TYPE_ELLIPSE_OUTLINED_EXPLODE or SHAPE_TYPE_CIRCLE_OUTLINED_EXPLODE instead, depending on the provided shape types of the effect and the desired result.
FILL_CIRCLE	Use SHAPE_TYPE_ELLIPSE_FILLED or SHAPE_TYPE_CIRCLE_FILLED instead, depending on the provided shape types of the effect and the desired result.
FILL_CIRCLE_IMPLODE	Use SHAPE_TYPE_ELLIPSE_FILLED_IMPLODE or SHAPE_TYPE_CIRCLE_FILLED_IMPLODE instead, depending on the provided shape types of the effect and the desired result.
FILL_CIRCLE_EXPLODE	Use SHAPE_TYPE_ELLIPSE_FILLED_EXPLODE or SHAPE_TYPE_CIRCLE_FILLED_EXPLODE instead, depending on the provided shape types of the effect and the desired result.
DRAW_DIAMOND	Use SHAPE_TYPE_DIAMOND_OUTLINED instead.
DRAW_DIAMOND_IMPLODE	Use SHAPE_TYPE_DIAMOND_OUTLINED_IMPLODE instead.
DRAW_DIAMOND_EXPLODE	Use SHAPE_TYPE_DIAMOND_OUTLINED_EXPLODE instead.
FILL_DIAMOND	Use SHAPE_TYPE_DIAMOND_FILLED instead.
FILL_DIAMOND_IMPLODE	Use SHAPE_TYPE_DIAMOND_FILLED_IMPLODE instead.
FILL_DIAMOND_EXPLODE	Use SHAPE_TYPE_DIAMOND_FILLED_EXPLODE instead.
DRAW_CROSS	Use SHAPE_TYPE_CROSS instead.
DRAW_CROSS_IMPLODE	Use SHAPE_TYPE_CROSS_IMPLODE instead.
DRAW_CROSS_EXPLODE	Use SHAPE_TYPE_CROSS_EXPLODE instead.
DRAW_STAR	Use SHAPE_TYPE_STAR instead.
DRAW_STAR_IMPLODE	Use SHAPE_TYPE_STAR_IMPLODE instead.
DRAW_STAR_EXPLODE	Use SHAPE_TYPE_STAR_EXPLODE instead.
DRAW_RANDOM	Use SHAPE_TYPE_RANDOM instead.
DRAW_TEXT	Use SHAPE_TYPE_TEXT instead.

Example

This example changes the shape type each second in a predefined order. It works with the »[SCE Shapes](#) effect, for example.

```
@scriptname=" " ;
```

```
@author="";
@version="";
@description="";

int g_startTime;
int g_run;

void InitEffect()
{
    time t = GetTime();
    g_startTime = t.hour * 3600 + t.min * 60 + t.sec;

    g_run = 0;
}

void PreRenderEffect()
{
    time t = GetTime();
    int t2 = t.hour * 3600 + t.min * 60 + t.sec;

    if(t2 - g_startTime >= 1)
    {
        g_startTime = t2;
        switch(g_run % 6)
        {
            case 0:      SetShapeType(SHAPE_TYPE_CIRCLE_OUTLINED_EXPLODE);      break;
            case 1:      SetShapeType(SHAPE_TYPE_CIRCLE_OUTLINED);              break;
            case 2:      SetShapeType(SHAPE_TYPE_CIRCLE_OUTLINED_IMPLODE);     break;
            case 3:      SetShapeType(SHAPE_TYPE_SQUARE_OUTLINED_EXPLODE);     break;
            case 4:      SetShapeType(SHAPE_TYPE_SQUARE_OUTLINED);              break;
            case 5:      SetShapeType(SHAPE_TYPE_SQUARE_OUTLINED_IMPLODE);     break;
            default:     break;
        }
        g_run++;
    }
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

5.1.14 Using Text

Functions Provided For Setting Text

The following table provides an overview of all functions to modify text:

Function	Description
void EditableTextSetText (string value)	Sets the text to display.
string EditableTextGetText ()	Returns the currently displayed text.
void EditableTextSetTextRotationMode (int value)	Sets the text Rotation mode. See below for a list of constants.
int EditableTextGetTextRotationMode ()	Returns the current text Rotation mode. See below for a list of constants.
void EditableTextSetTextSplittingMode (int value)	Sets the text Splitting mode. See below for a list of constants.
int EditableTextGetTextSplittingMode ()	Returns the current text Splitting mode. See below for a list of constants.
void EditableTextSetRepeatText (int value)	Use <i>value</i> TRUE to activate Repeat Text , which means that the text is repeated to fill empty space. Use <i>value</i> FALSE to deactivate it.
int EditableTextGetRepeatText ()	Returns TRUE if Repeat Text is activated, otherwise FALSE .
void EditableTextToggleRepeatText ()	Activates or deactivates Repeat Text , depending on the current state.
void EditableTextSetReverseWords (int value)	Use <i>value</i> TRUE to invert the words' order, for example "Music makes the light" becomes "light the makes Music". Use <i>value</i> FALSE to use the default setting.
int EditableTextGetReverseWords ()	Returns TRUE if the words' order is inverted, otherwise FALSE .
void EditableTextToggleReverseWords ()	Inverts the words' order or uses the default setting, depending on the current state.
void EditableTextSetReverseCharacters (int value)	Use <i>value</i> TRUE to invert the characters' order, for example "Music makes the light" becomes "thgil eht sekam cisuM". Use <i>value</i> FALSE to use the default setting.
int EditableTextGetReverseCharacters ()	Returns TRUE if the characters' order is inverted, otherwise FALSE .
void EditableTextToggleReverseCharacters ()	Inverts the characters' order or uses the default setting, depending on the current state.
void EditableTextSetFontFaceName (string value)	Sets the font face name. Valid values for <i>value</i> should not exceed a length of 31 characters.
string EditableTextGetFontFaceName ()	Returns the current font face name.
void EditableTextSetFontHeight (int value)	Sets the font height. Valid values for <i>value</i> can be positive or negative. However, positive and negative values are interpreted differently. Value 0 uses a default font height.
int EditableTextGetFontHeight ()	Returns the current font height.
void EditableTextSetFontWidth (int value)	Sets the font width. Valid values for <i>value</i> should be positive.

int EditableTextGetFontWidth ()	Returns the current font width.
void EditableTextSetFontWeight (int value)	Sets the font weight. Valid values for <i>value</i> range from 0 to 1000.
int EditableTextGetFontWeight ()	Returns the current font weight.
void EditableTextSetFontItalic (int value)	Use <i>value</i> TRUE to display italic text. Use <i>value</i> FALSE to use the default setting.
int EditableTextGetFontItalic ()	Returns TRUE if the displayed text is italic, otherwise FALSE .
void EditableTextToggleFontItalic ()	Displays italic text or uses the default setting, depending on the current state.
void EditableTextSetFontUnderline (int value)	Use <i>value</i> TRUE to display underlined text. Use <i>value</i> FALSE to use the default setting.
int EditableTextGetFontUnderline ()	Returns TRUE if the displayed text is underlined, otherwise FALSE .
void EditableTextToggleFontUnderline ()	Displays underlined text or uses the default setting, depending on the current state.
void EditableTextSetFontStrikeOut (int value)	Use <i>value</i> TRUE to display struck out text. Use <i>value</i> FALSE to use the default setting.
int EditableTextGetFontStrikeOut ()	Returns TRUE if the displayed text is struck out, otherwise FALSE .
void EditableTextToggleFontStrikeOut ()	Displays struck out text or uses the default setting, depending on the current state.

Remarks

Not all effects which use text offer the text splitting mode as well as the possibilities to render repeated text and to reverse the words/characters. Therefore, the appropriate functions are only available if the effect offers the features.

Rotation Mode Constants

Constant	Description
int ROTATION_CCW_0	Does not activate Rotation. Is the same as ROTATION_CW_0 .
int ROTATION_CCW_90	Rotates by 90 degrees in counter-clockwise direction. Is the same as ROTATION_CW_270 .
int ROTATION_CCW_180	Rotates by 180 degrees in counter-clockwise direction. Is the same as ROTATION_CW_180 .
int ROTATION_CCW_270	Rotates by 270 degrees in counter-clockwise direction. Is the same as ROTATION_CW_90 .
int ROTATION_CW_0	Does not activate Rotation. Is the same as ROTATION_CCW_0 .

Constant	Description
int <code>ROTATION_CW_90</code>	Rotates by 90 degrees in clockwise direction. Is the same as <code>ROTATION_CCW_270</code> .
int <code>ROTATION_CW_180</code>	Rotates by 180 degrees in clockwise direction. Is the same as <code>ROTATION_CCW_180</code> .
int <code>ROTATION_CW_270</code>	Rotates by 270 degrees in clockwise direction. Is the same as <code>ROTATION_CCW_90</code> .

Text Splitting Mode Constants

Constant	Description
int <code>TEXT_SPLITTING_NONE</code>	Treats the whole text as a single object.
int <code>TEXT_SPLITTING_WORDS</code>	Treats every word of the text as a separate object.
int <code>TEXT_SPLITTING_CHARACTERS</code>	Treats every character of the text as a separate object.

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void <code>EditableTextSetContinuousText</code> (int value)	Use <code>EditableTextSetRepeatText</code> instead.
int <code>EditableTextGetContinuousText</code> ()	Use <code>EditableTextGetRepeatText</code> instead.
void <code>EditableTextToggleContinuousText</code> ()	Use <code>EditableTextToggleRepeatText</code> instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void <code>SetText</code> (string text)	Use <code>EditableTextSetText</code> (string value) instead.

string GetText ()	Use EditableTextGetText () instead.
void SetContinuous (int enable)	Use EditableTextSetRepeatText (int value) instead.
int GetContinuous ()	Use EditableTextGetRepeatText () instead.
void SetRotation (int angle)	Use EditableTextSetTextRotationMode (int value) with one of the above mentioned text splitting mode constants instead. Note that the former numerical values (<i>angle</i>) described the angle in clockwise direction.
int GetRotation ()	Use EditableTextGetTextRotationMode () which returns one of the above mentioned text splitting mode constants instead. Note that the former numerical return values described the angle in clockwise direction.
void SetMode (int mode)	Use EditableTextSetTextSplittingMode (int value) with one of the above mentioned text splitting mode constants instead.
int GetMode ()	Use EditableTextGetTextSplittingMode () which returns one of the above mentioned text splitting mode constants instead.
void SetFontFaceName (string name)	Use EditableTextSetFontFaceName (string value) instead.
string GetFontFaceName ()	Use EditableTextGetFontFaceName () instead.
void SetFontHeight (int value)	Use EditableTextSetFontHeight (int value) instead.
int GetFontHeight ()	Use EditableTextGetFontHeight () instead.
void SetFontWidth (int value)	Use EditableTextSetFontWidth (int value) instead.
int GetFontWidth ()	Use EditableTextGetFontWidth () instead.
void SetFontWeight (int value)	Use EditableTextSetFontWeight (int value) instead.
int GetFontWeight ()	Use EditableTextGetFontWeight () instead.
void SetFontItalic (int value)	Use EditableTextSetFontItalic (int value) instead.
int GetFontItalic ()	Use EditableTextGetFontItalic () instead.
void SetFontUnderline (int value)	Use EditableTextSetFontUnderline (int value) instead.
int GetFontUnderline ()	Use EditableTextGetFontUnderline () instead.
void SetFontStrikeOut (int value)	Use EditableTextSetFontStrikeOut (int value) instead.
int GetFontStrikeOut ()	Use EditableTextGetFontStrikeOut () instead.
MODE_SENTENCE	Use TEXT_SPLITTING_NONE instead.
MODE_WORD	Use TEXT_SPLITTING_WORDS instead.
MODE_CHAR	Use TEXT_SPLITTING_CHARACTERS instead.

Example

This macro example for SCE Graph parses the displayed text for comma-separated format tags: "italic", "bold" and font face names are recognized. Numbers are interpreted as font height. It works with the »[SCE Graph](#) effect, for example. Just set the shape type to text and edit it. For example, set the text to "italic, Comic Sans MS, 16" and the text is displayed automatically with this format. Of course, the same text is displayed on the matrix. That is why this is only a test scenario.

```

@scriptname="";
@author="";
@version="";
@description="";

void InitEffect()
{
    SetShapeType(SHAPE_TYPE_TEXT);
}

void PreRenderEffect()
{
    // default values
    int fontHeight = 12;
    int fontWeight = 400;
    int isItalic = false;
    string faceName = "Arial";
    string text = EditableTextGetText(), token;
    string tokens[];

    // parse values
    tokenize(text, ",", tokens);

    for (int i = 0; i < tokens.length; i++)
    {
        token = tokens[i];
        tolower(token);           // compare keywords case-insensitive
        strip(token);           // remove whitespace around keywords

        if (token.length == 0)
            continue;
        else if (isnum(token) == true)
            fontHeight = (int)token;
        else if (token == "bold")
            fontWeight = 800;
        else if (token == "italic")
            isItalic = true;
        else
            faceName = token;
    }

    // set values
    EditableTextSetFontHeight(fontHeight);
    EditableTextSetFontWeight(fontWeight);
    EditableTextSetFontItalic(isItalic);
    EditableTextSetFontFaceName(faceName);
}

void PostRenderEffect()
{

```

```

}

void MatrixSizeChanged()
{
    InitEffect();
}

```

5.1.15 Using Position Control

Functions Provided For Setting The Position

The following table provides an overview of all functions the effect can use to modify the position:

Function	Description
void SetPositionX (float value)	Sets the Position X value in percent of the matrix position.
float GetPositionX ()	Returns the current Position X .
void SetPositionY (float value)	Sets the Position Y value in percent of the matrix position.
float GetPositionY ()	Returns the current Position Y .
void SetPositionZ (float value)	Sets the Position Z value in percent of the matrix position.
float GetPositionZ ()	Returns the current Position Z .
void SetPosition (float x, float y, float z)	Sets the position values X, Y, Z in percent.
void SetPixelPositionX (int value)	Sets the Position X value in pixels.
int GetPixelPositionX ()	Returns the current Position X .
void SetPixelPositionY (int value)	Sets the Position Y value in pixels.
int GetPixelPositionY ()	Returns the current Position Y .
void SetPixelPositionZ (int value)	Sets the Position Z value in pixels.
int GetPixelPositionZ (void)	Returns the current Position Z .
void SetPixelPosition (int x, int y, int z)	Sets the position values X, Y, Z in percent.

5.1.16 Using Size Control

Functions Provided For Setting The Size

The following table provides an overview of all functions the effect can use to modify the size:

Function	Description
void SetSizeX (float value)	Sets the Size X (Width) value in percent of the matrix size.

float GetSizeX ()	Returns the current Size X (Width).
void SetSizeY (float value)	Sets the Size Y (Height) value in percent of the matrix size.
float GetSizeY ()	Returns the current Size Y (Height).
void SetSizeZ (float value)	Sets the Size Z (Depth) value in percent of the matrix size.
float GetSizeZ ()	Returns the current Size Z (Depth).
void SetSize (float x, float y, float z)	Sets the size values x, y, z (Width, Height, Depth) in percent.
void SetPixelSizeX (int value)	Sets the Size X (Width) value in pixels.
int GetPixelSizeX ()	Returns the current Size X (Width).
void SetPixelSizeY (int value)	Sets the Size Y (Height) value in pixels.
int GetPixelSizeY ()	Returns the current Size Y (Height).
void SetPixelSizeZ (int value)	Sets the Size Z (Depth) value in pixels.
int GetPixelSizeZ ()	Returns the current Size Z (Depth).
void SetPixelSize (int x, int y, int z)	Sets the size values x, y, z (Width, Height, Depth), in percent.

Remarks

Not all effects that are using the Size Control support the functions *SetSize* and *SetPixelSize* with several parameters.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetWidth (int size)	Use SetSizeX (float value) or void SetSizeY (float value) instead.
int GetWidth ()	Use GetSizeX () or void GetSizeY () instead.

5.1.17 Using String Table

Functions Provided For Using The String Table

The following table provides an overview of all functions the effect can use to modify the elements in an String Table:

Function	Description
int StringTableGetCount ()	Returns the current number of elements in the String Table.
void StringTableMoveStringUp (int index)	Moves an element with its specified <i>index</i> up a place in the String Table.
void StringTableMoveStringDown (int index)	Moves an element with its specified <i>index</i> down a place in the String Table.
void StringTableInvert ()	Inverts the complete String Table regarding the positions of the elements in the table.
void StringTableSwapStrings (int index1, int index2)	Swaps elements with their specified <i>indices</i> in the String Table.
void StringTableSetString (int index, string)	Sets a new <i>string</i> text for the element with the specified <i>index</i> .
string StringTableGetString (int index)	Returns the text as a <i>string</i> for the element with the specified <i>index</i> .
void StringTableAddString (int index, string)	Adds a new element with its text as <i>string</i> to the specified <i>index</i> .
void StringTableRemoveString (int index)	Removes the element with the specified <i>index</i> from the String Table.
void StringTableSetLoop (int)	Sets the Loop Mode . Use TRUE to activate it. Use FALSE to deactivate it.
int StringTableGetLoop ()	Returns TRUE , if Loop Mode is activated, otherwise FALSE .
void StringTableToggleLoop ()	Toggles the Loop Mode .
int StringTableGetShuffle ()	Sets the Shuffle Mode . Use TRUE to activate it. Use FALSE to deactivate it.
void StringTableSetShuffle (int)	Returns TRUE , if Shuffle Mode is activated, otherwise FALSE .
void StringTableToggleShuffle ()	Toggles the Shuffle Mode .

5.2 Static Color Effects (SCE)

5.2.1 SCE Bounce

Functions Provided By SCE Bounce

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetBorder (float value)	Sets the Border of objects. Valid values range from <i>0.01</i> to <i>100</i> .
float GetBorder ()	Returns the currently set Border .
void SetPixelBorder (int value)	Sets the Border of objects in pixels based on the object size.
int GetPixelBorder ()	Returns the currently set Border in pixels.
void SetOuterGlow (float value)	Sets the Outer Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetOuterGlow ()	Returns the currently set Outer Glow .
void SetPixelOuterGlow (int value)	Sets the Outer Glow of objects in pixels based on the object size.
int GetPixelOuterGlow ()	Returns the currently set Outer Glow in pixels.
void SetInnerGlow (float value)	Sets the Inner Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetInnerGlow ()	Returns the currently set Inner Glow .
void SetPixelInnerGlow (int value)	Sets the Inner Glow of objects in pixels based on the object size.
int GetPixelInnerGlow ()	Returns the currently set Inner Glow in pixels.
void SetCount (int value)	Sets the object Count value, which is the number of the displayed shapes. Valid values for <i>value</i> range from <i>1</i> to <i>100</i> .
int GetCount ()	Returns the current object Count .
void SetPoints (int value)	Sets the Points count value, which is the number of points per object. This only applies to the line and the curve shape. Valid values for <i>value</i> range from <i>1</i> to <i>20</i> .
int GetPoints ()	Returns the current Points count.
void SetWidth (float value)	Sets the Width value, which is the width of the shapes, in percent of the matrix size (depending on the shape alignment). The width <i>value</i> means the minimum shape width, if the shape width distribution is not uniform. Valid values for <i>value</i> range from <i>0.01</i> to <i>100</i> .
float GetWidth ()	Returns the current Width of the shapes in percent. The return value means the minimum shape width, if the shape width distribution is not uniform.

void SetPixelWidth (int value)	Sets the Width value, which is the width of the shapes, in pixels. The width value means the minimum shape width, if the shape width distribution is not uniform. Valid values for value range from 1 to the matrix size (depending on the shape alignment).
int GetPixelWidth ()	Returns the current Width of the shapes in pixels. The return value means the minimum shape width, if the shape width distribution is not uniform.
void SetWidthMax (float value)	Sets the Maximum Width value, which is the maximum width of the shapes, in percent of the matrix size (depending on the shape alignment). The maximum width value only applies, if the shape width distribution is not uniform. Valid values for value range from 0.01 to 100 .
float GetWidthMax ()	Returns the current Maximum Width of the shapes in percent.
void SetPixelWidthMax (int value)	Sets the Maximum Width value, which is the maximum width of the shapes, in pixels. The maximum width value only applies, if the shape width distribution is not uniform. Valid values for value range from 1 to the matrix size (depending on the shape alignment).
int GetPixelWidthMax ()	Returns the current Maximum Width of the shapes in pixels.
void SetWidthDistribution (int value)	Sets the Width Distribution value, which defines how the range between the current minimum and the current maximum shape width is applied to the shapes. See » here for a list of constants.
int GetWidthDistribution ()	Returns the current Width Distribution of the shapes. See » here for a list of constants.
void SeedRandomWidth ()	Randomizes the widths of the shapes. Same as SetWidthDistribution (DIST_RND).
void SetHeight (float value)	Sets the Height value, which is the height of the shapes, in percent of the matrix size (depending on the shape alignment). The height value means the minimum shape height, if the shape height distribution is not uniform. Valid values for value range from 0.01 to 100.
float GetHeight ()	Returns the current Height of the shapes in percent. The return value means the minimum shape height, if the shape height distribution is not uniform.
void SetPixelHeight (int value)	Sets the Height value, which is the height of the shapes, in pixels. The height value means the minimum shape height, if the shape height distribution is not uniform. Valid values for value range from 1 to the matrix size (depending on the shape alignment).
int GetPixelHeight ()	Returns the current Height of the shapes in pixels. The return value means the minimum shape height, if the shape height distribution is not uniform.
void SetHeightMax (float value)	Sets the Maximum Height value, which is the maximum height of the shapes, in percent of the matrix size (depending on the shape alignment). The maximum height value only applies, if the shape height distribution is not uniform. Valid values for value range from 0.01 to 100 .
float GetHeightMax ()	Returns the current Maximum Height of the shapes in percent.
void SetPixelHeightMax (int value)	Sets the Maximum Height value, which is the maximum height of the shapes, in pixels. The maximum height value only applies, if the shape height distribution is not uniform. Valid values for value range from 1 to the matrix size (depending on the shape alignment).
int GetPixelHeightMax ()	Returns the current Maximum Height of the shapes in pixels.

void SetHeightDistribution (int value)	Sets the Height Distribution value, which defines how the range between the current minimum and the current maximum shape height is applied to the shapes. See »here for a list of constants.
int GetHeightDistribution ()	Returns the current Height Distribution of the shapes. See »here for a list of constants.
void SeedRandomHeight ()	Randomizes the heights of the shapes. Same as SetHeightDistribution(DIST_RND) .
void SetDepth (float value)	Sets the Depth value, which is the depth of the shapes, in percent of the matrix size (depending on the shape alignment). The depth value means the minimum shape depth, if the shape depth distribution is not uniform. Valid values for value range from 0.01 to 100.
float GetDepth ()	Returns the current Depth of the shapes in percent. The return value means the minimum shape depth, if the shape depth distribution is not uniform.
void SetPixelDepth (int value)	Sets the Depth value, which is the depth of the shapes, in pixels. The depth value means the minimum shape depth, if the shape depth distribution is not uniform. Valid values for value range from 1 to the matrix size (depending on the shape alignment).
int GetPixelDepth ()	Returns the current Depth of the shapes in pixels. The return value means the minimum shape depth, if the shape depth distribution is not uniform.
void SetDepthMax (float value)	Sets the Maximum Depth value, which is the maximum depth of the shapes, in percent of the matrix size (depending on the shape alignment). The maximum depth value only applies, if the shape depth distribution is not uniform. Valid values for value range from 0.01 to 100.
float GetDepthMax ()	Returns the current Maximum Depth of the shapes in percent.
void SetPixelDepthMax (int value)	Sets the Maximum Depth value, which is the maximum depth of the shapes, in pixels. The maximum depth value only applies, if the shape depth distribution is not uniform. Valid values for value range from 1 to the matrix size (depending on the shape alignment).
int GetPixelDepthMax ()	Returns the current Maximum Depth of the shapes in pixels.
void SetDepthDistribution (int value)	Sets the Depth Distribution value, which defines how the range between the current minimum and the current maximum shape depth is applied to the shapes. See »here for a list of constants.
int GetDepthDistribution ()	Returns the current Depth Distribution of the shapes. See »here for a list of constants.
void SeedRandomDepth ()	Randomizes the depths of the shapes. Same as SetDepthDistribution(DIST_RND) .
void SetFadeOut (int value)	Sets the Fade Out value, which defines how long the progressively drawn shapes stay visible. Valid values for value range from 0 to 1000.
int GetFadeOut ()	Returns the current Fade Out .
void SetCollision (int value)	Use value TRUE to activate Collision , which means that colliding shapes bounce of each other. This applies to all shapes except the line and the curve shape. Use value FALSE to deactivate collision.
int GetCollision ()	Returns TRUE , if Collision is activated, otherwise FALSE .
void ToggleCollision ()	Activates or deactivates Collision , depending on the current state.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetObjects (int count)	Use SetCount (int value) instead.
int GetObjects ()	Use GetCount () instead.
void SetSize (int size)	Use SetWidth (float value), SetHeight (float value) and SetDepth (float value) instead (the width, height, and depth of the shapes are independent from each other now).
int GetSize ()	Use GetWidth (), GetHeight () and GetDepth () instead (the width, height, and depth of the shapes are independent from each other now).

5.2.2 SCE Capture

Functions Provided By SCE Capture

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses the BPM control. Learn more »[Using BPM Control](#)
- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)
- This Effect uses the Position Controls. Learn more »[Using Position Controls](#)

Function	Description
void SetExtrusion (float value)	Sets the Extrusion value in percent of the matrix size (depending on the current look-at type).
float GetExtrusion ()	Returns the current Extrusion value in percent of the matrix size (depending on the current look-at type).
void SetPixelExtrusion (int value)	Sets the Extrusion value in pixels.
int GetPixelExtrusion ()	Returns the current Extrusion value in pixels.
void SetRotation (int angle)	Sets the Rotation globally for all images of the Image List. It is possible to rotate the images by multiples of 90°. This function is equal to the rotation button provided by the GUI of the effect. Valid values for <i>angle</i> are 0, 90, 180, and 270.
int GetRotation ()	Returns the currently set Rotation .

void SetTiling (int enable)	Disables Tile Mode if <i>enable</i> is set to FALSE , otherwise the Tile Mode will be enabled via TRUE .
int GetTiling ()	Returns TRUE if Tile Mode is enabled, otherwise FALSE .
void ToggleTiling ()	Enables Tile Mode or uses the default setting, depending on the current state.
void SetSeamless (int enable)	Disables Seamless if <i>enable</i> is FALSE , otherwise it will be enabled.
int GetSeamless ()	Returns TRUE if Seamless is enabled, otherwise FALSE .
void ToggleSeamless ()	Enables Seamless or uses the default setting, depending on the current state.
float GetImageWidth ()	Returns the image width of the current image in percent of the matrix width.
float GetImageHeight ()	Returns the image height of the current image in percent of the matrix height.
float GetImageDepth ()	Returns the image depth of the current image in percent of the matrix depth.
int GetImagePixelWidth ()	Returns the image width of the current image in pixels.
int GetImagePixelHeight ()	Returns the image height of the current image in pixels.
int GetImagePixelDepth ()	Returns the image depth of the current image in pixel.
float GetCurrentPositionX ()	Returns the X-position of the current image in percent of the matrix width.
float GetCurrentPositionY ()	Returns the Y-position of the current image in percent of the matrix height.
float GetCurrentPositionZ ()	Returns the Z-position of the current image in percent of the matrix depth.
int GetCurrentPixelPositionX ()	Returns the X-position of the current image in pixels.
int GetCurrentPixelPositionY ()	Returns the Y-position of the current image in pixels.
int GetCurrentPixelPositionZ ()	Returns the Z-position of the current image in pixels.
int GetLoaded ()	Returns TRUE if a capture device is selected and started, otherwise FALSE .
void SetStretchMode (int mode)	Sets the Stretch mode. See below for details.
int GetStretchMode ()	Returns the Stretch mode. See below for details.
void SetGrayscale (int enable)	Disables Grayscale if <i>enable</i> is set to FALSE . Otherwise it can be enabled using TRUE .
int GetGrayscale ()	Returns TRUE if Stretch mode is enabled, otherwise FALSE .
void ToggleGrayscale ()	Enables Stretch mode or uses the default setting, depending on the current state.
void SetRgbw (int enable)	Disables the RGB-To-RGBW mode if <i>enable</i> is FALSE , otherwise it can be enabled using TRUE .
int GetRgbw ()	Returns TRUE if RGB-To-RGBW mode is enabled, otherwise FALSE .
void ToggleRgbw ()	Enables RGB-To-RGBW mode or uses the default setting, depending on the current state.
void SetFilteringMode (int mode)	Sets the Filtering mode. See below for details.

int GetFilteringMode()	Returns the Filtering mode. See below for details.
-------------------------------	---

Stretch Mode Constants

Value	Description
int STRETCH_MODE_NONE	Sets the stretch mode to None (no stretching).
int STRETCH_MODE_MATRIX	Sets the stretch mode to Matrix (stretches to the current aspect ratio of the matrix).
int STRETCH_MODE_ORIGINAL	Sets the stretch mode to Original (stretches to the original aspect ratio of the source).
int STRETCH_MODE_4_TO_3	Sets the stretch mode to 4:3 .
int STRETCH_MODE_16_TO_9	Sets the stretch mode to 16:9 .

Filtering Mode Constants

Value	Description
int FILTERING_MODE_NEAREST_NEIGHBOR	Sets the Filtering Mode to None (no filtering).
int FILTERING_MODE_LINEAR	Sets the Filtering Mode to Linear (may require additional performance).

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void SetExtrude (float extrude)	Use void SetExtrusion (float value) instead.
float GetExtrude ()	Use float GetExtrusion () instead.
void SetPixelExtrude (int extrude)	Use void SetPixelExtrusion (int value) instead.
int GetPixelExtrude ()	Use int GetPixelExtrusion () instead.
void SetContinuous (int enable)	Use void SetSeamless (int enable) instead.
int GetContinuous ()	Use int GetSeamless () instead.

void ToggleContinuous ()	Use void ToggleSeamless () instead.
void SetGreyscale (int enable)	Use void SetGrayscale (int enable) instead.
int GetGreyscale ()	Use int GetGrayscale () instead.
void ToggleGreyscale ()	Use void ToggleGrayscale () instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **SCE Video** has been split into **SCE Capture** as well as **SCE Video** in MADRIX 3.X. The following functions are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetTile (int)	Use void SetTiling (int enable) instead.
int GetTile (void)	Use int GetTiling () instead.
void SetGrey (int enable)	Use void SetGrayscale (int enable) instead.
int GetGrey (void)	Use int GetGrayscale () instead.
void SetRgbToRgbw (int enable)	Use void SetRgbw (int enable) instead.
int GetRgbToRgbw ()	Use int GetRgbw () instead.
color GetFilterColor ()	Use color GetColor () instead.
void SetFilterColor (color)	Use void SetColor (color) instead.
int GetPixelImageWidth ()	Use int GetImagePixelWidth () instead.
int GetPixelImageHeight ()	Use int GetImagePixelHeight () instead.
void SetFilterColor (color)	Use void SetColor (color) instead.
color GetFilterColor ()	Use color GetColor () instead.

5.2.3 SCE Clouds

Functions Provided By SCE Clouds

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses the Color Gradient Dialog. Learn more »[Using Color Gradient Dialog](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)

Function	Description
void SetFrequency (float value)	Sets the Frequency for the effect.
float GetFrequency ()	Returns the current Frequency value.
void SetStretchX (float value)	Sets the Stretch factor regarding X.
float GetStretchX ()	Returns the current Stretch factor for X.
void SetStretchY (float value)	Sets the Stretch factor regarding Y.
float GetStretchY ()	Returns the current Stretch factor for Y.
void SetStretchZ (float value)	Sets the Stretch factor regarding Z.
float GetStretchZ ()	Returns the current Stretch factor for Z.
void SetStretch (float value, float value, float value)	Sets the Stretch value for X, Y, and Z.
void SetContrast (int value)	Sets the Contrast value for the effect.
int GetContrast ()	Returns the current Contrast value.
void SetDetail (int value)	Sets the Detail value for the effect.
int GetDetail ()	Returns the current Detail value.
void SetDistinction (int value)	Sets the Distinction value for the effect.
int GetDistinction ()	Returns the current Distinction value.
void SetDisplayMode (int mode)	Sets the Display Mode . See below for a list of constants.
int GetDisplayMode ()	Returns the current Display Mode . See below for a list of constants.
void Generate ()	Creates the effect anew.

Mode Constants

This effect offers various modes. The function [SetDisplayMode](#) can be used to change them. The following values can be used as parameter:

Constant	Description
int DISPLAY_MODE_LOW_CONTRAST	Sets the display mode Low Contrast .
int DISPLAY_MODE_MEDIUM_CONTRAST	Sets the display mode Medium Contrast .
int DISPLAY_MODE_HIGH_CONTRAST	Sets the display mode High Contrast .
int DISPLAY_MODE_OUTLINE	Sets the display mode Outline .
int DISPLAY_MODE_CLUSTER	Sets the display mode Cluster .

5.2.4 SCE Color

Functions Provided By SCE Color

This effect uses the following functions:

- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)

5.2.5 SCE Color Change

Functions Provided By SCE Color Change

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)

Function	Description
void SetChangeTime (float value)	Sets the fade Time for the effect in seconds.
float GetChangeTime ()	Returns the fade Time of the effect in seconds.

5.2.6 SCE Color Scroll

Functions Provided By SCE Color Scroll

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses the the BPM Control. Learn more »[Using BPM Control](#)

Function	Description
void SetStepWidth (float value)	Sets the Step value, which is the number of pixels the effect should scroll per frame using percentage values.
float GetStepWidth ()	Returns the Step in percentage.
void SetPixelStepWidth (int value)	Sets the Step value, which is the number of pixels the effect should scroll per frame using pixel values.
int GetPixelStepWidth ()	Returns the Step in pixels.
void SetColorWidth (float value)	Sets the Color Width value, which means the width of the single stripes using percentage values.
float GetColorWidth ()	Returns the Color Width , the width of a stripe, in percentage.
void SetPixelColorWidth (int value)	Sets the Color Width value, which means the width of the single stripes using pixel values.
int GetPixelColorWidth ()	Returns the Color Width , the width of a stripe, in pixels.
void SetCrossWidth (float value)	Sets the Cross Width value using percentage values.
float GetCrossWidth ()	Returns the Cross Width in percentage.
void SetPixelCrossWidth (int value)	Sets the Cross Width value using pixel values.
int GetPixelCrossWidth ()	Returns the Cross Width in pixels.
void SetCrossAxes (int value)	Sets the Cross Axis value. See below for a list of constants.
int GetCrossAxes ()	Returns the Cross Axis . See below for a list of constants.

Cross Axis Constants

Constant	Description
int AXIS_ONE	Sets the direction cross mode to Axis 1 .
int AXIS_TWO	Sets the direction cross mode to Axis 2 .
int AXES_ONE_AND_TWO	Sets the direction cross mode to Axes 1 And 2 .

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
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void SetVectorStepWidth (float value)	Use SetStepWidth (float value) with percentage values instead.
float GetVectorStepWidth ()	Use GetStepWidth () instead. But GetStepWidth() returns a floating point percentage value instead of a floating point normalized value like GetVectorStepWidth().
void SetVectorOffset (float value)	Use SetColorWidth (float value) with percentage values instead.
float GetVectorOffset ()	Use GetColorWidth () instead. But GetColorWidth() returns a floating point percentage value instead of a floating point normalized value like GetVectorOffset().
void SetPixelOffset (int value)	Use SetPixelColorWidth (int value) instead.
int GetPixelOffset ()	Use GetPixelColorWidth () instead.
void SetVectorXOffset (float offset)	Use SetCrossWidth (float value) with percentage values instead.
float GetVectorXOffset ()	Use GetCrossWidth () instead. But GetCrossWidth() returns a floating point percentage value instead of a floating point normalized value like GetVectorXOffset().
void SetPixelXOffset (int offset)	Use SetPixelCrossWidth (int value) instead.
int GetPixelXOffset ()	Use GetPixelCrossWidth () instead.
void SetCrossed (int enable)	Use SetDirectionCrossMode (int value) instead.
int GetCrossed ()	Use GetDirectionCrossMode () instead.

5.2.7 SCE Counter

Functions Provided By SCE Counter

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses the Position Controls. Learn more »[Using Position Controls](#)

- This Effect uses the String Table. Learn more »[Using String Table](#)

Function	Description
void SetPitch (float value)	Sets the Pitch value in percent.
float GetPitch ()	Returns the current Pitch value.

void SetScaleX (float value)	Sets the Scale factor regarding X.
float GetScaleX ()	Returns the current Scale factor for X.
void SetScaleY (float value)	Sets the Scale factor regarding Y.
float GetScaleY ()	Returns the current Scale factor for Y.
void SetScaleZ (float value)	Sets the Scale factor regarding Z.
float GetScaleZ ()	Returns the current Scale factor for Z.
void SetScale (float value, float value, float value)	Sets the Scale value for X, Y, and Z.
void SetFadeIn (int value)	Sets the first <i>int</i> value of the Fade slider.
int GetFadeIn ()	Returns the current first value of the Fade slider.
void SetFadeOut (int value)	Sets the second <i>int</i> value of the Fade slider.
int GetFadeOut ()	Returns the current second value of the Fade slider.
void SetInterpolationIn (int value)	Sets the first <i>int</i> value of the Interpolation slider.
int GetInterpolationIn ()	Returns the current first value of the Interpolation slider.
void SetInterpolationOut (int value)	Sets the second <i>int</i> value of the Interpolation slider.
int GetInterpolationOut ()	Returns the current second value of the Interpolation slider.
void SetAutoStart (int value)	Sets the Autostart option. Use TRUE to activate Autostart. Use FALSE to deactivate it.
int GetAutoStart ()	Returns TRUE , if Autostart is activated, otherwise FALSE .
void ToggleAutoStart ()	Toggles Autostart .
void Start ()	Forces a start.
void SetEndMode (int mode)	Sets the <i>mode</i> for the last element. See below for a list of constants.
(int mode) GetEndMode ()	Returns the current <i>mode</i> for the last element.
void SetTextAlignmentHorizontal (int alignment)	Sets the horizontal text <i>alignment</i> of elements. See below for a list of constants.
int GetTextAlignHorizontal ()	Returns the current horizontal text alignment of elements.
void SetTextAlignmentVertical (int alignment)	Sets the vertical text <i>alignment</i> of elements. See below for a list of constants.
int GetTextAlignmentVertical ()	Returns the current vertical text alignment of elements.
void SetInterpolationType1 (int type)	Sets the Interpolation Type 1 . See below for a list of constants.
int GetInterpolationType1 ()	Returns the current Interpolation Type 1 .
void SetInterpolationType2 (int type)	Sets the Interpolation Type 2 . See below for a list of constants.
int GetInterpolationType2 ()	Returns the current Interpolation Type 2 .
void SetRotation (int angle)	Sets the Rotation globally for all elements of the String Table. It is possible to rotate the elements by multiples of 90°. This function is equal to the rotation button provided by the GUI of the effect. Valid values for <i>angle</i> are 0, 90, 180, and 270.
int GetRotation ()	Returns the current Rotation value.
void SetFilteringMode (int mode)	Sets the Filtering mode. See below for details.

mode GetFilteringMode()	Returns the Filtering mode.
void SetExtrusion (float value)	Sets the Extrusion value in percent of the matrix size (depending on the current look-at type).
float GetExtrusion()	Returns the current Extrusion value in percent of the matrix size (depending on the current look-at type).
void SetPixelExtrusion (int value)	Sets the Extrusion value in pixels.
int GetPixelExtrusion()	Returns the current Extrusion value in pixels.

Last Element Mode Constants

Constant	Description
int ENDMODE_MOVE	Sets the Last Element Mode to Move .
int ENDMODE_STAY	Sets the Last Element Mode to Stay .
int ENDMODE_CLEAR	Sets the Last Element Mode to Clear .

Horizontal Text Alignment Constants

Constant	Description
int TEXT_ALIGNMENT_HORIZONTAL_LEFT	Sets the Horizontal Text Alignment to Left .
int TEXT_ALIGNMENT_HORIZONTAL_CENTER	Sets the Horizontal Text Alignment to Center .
int TEXT_ALIGNMENT_HORIZONTAL_RIGHT	Sets the Horizontal Text Alignment to Right .

Vertical Text Alignment Constants

Constant	Description
int TEXT_ALIGNMENT_VERTICAL_TOP	Sets the Vertical Text Alignment to Top .
int TEXT_ALIGNMENT_VERTICAL_CENTER	Sets the Vertical Text Alignment to Center .

int <code>TEXT_ALIGNMENT_VERTICAL_BOTTOM</code>	Sets the Vertical Text Alignment to Bottom .
---	---

Filtering Mode Constants

Value	Description
int <code>FILTERING_MODE_NEAREST_NEIGHBOR</code>	Sets the Filtering Mode to None (no filtering).
int <code>FILTERING_MODE_LINEAR</code>	Sets the Filtering Mode to Linear (may require additional performance).

Interpolation Type Constants

Constant	Description
int <code>INTERPOLATION_TYPE_LINEAR</code>	Sets the Interpolation Type to Linear .
int <code>INTERPOLATION_TYPE_EASE_BOUNCE_IN</code>	Sets the Interpolation Type to Ease In Bounce .
int <code>INTERPOLATION_TYPE_EASE_BOUNCE_OUT</code>	Sets the Interpolation Type to Ease Out Bounce .
int <code>INTERPOLATION_TYPE_EASE_BOUNCE_INOUT</code>	Sets the Interpolation Type to Ease In Out Bounce .
int <code>INTERPOLATION_TYPE_EASE_CIRC_IN</code>	Sets the Interpolation Type to Ease In Circular .
int <code>INTERPOLATION_TYPE_EASE_CIRC_OUT</code>	Sets the Interpolation Type to Ease Out Circular .
int <code>INTERPOLATION_TYPE_EASE_CIRC_INOUT</code>	Sets the Interpolation Type to Ease In Out Circular .
int <code>INTERPOLATION_TYPE_EASE_CUBIC_IN</code>	Sets the Interpolation Type to Ease In Cubic .
int <code>INTERPOLATION_TYPE_EASE_CUBIC_OUT</code>	Sets the Interpolation Type to Ease Out Cubic .
int <code>INTERPOLATION_TYPE_EASE_CUBIC_INOUT</code>	Sets the Interpolation Type to Ease In Out Cubic .
int <code>INTERPOLATION_TYPE_EASE_SINE_IN</code>	Sets the Interpolation Type to Ease In Sinusoidal .
int <code>INTERPOLATION_TYPE_EASE_SINE_OUT</code>	Sets the Interpolation Type to Ease Out Sinusoidal .

int <code>INTERPOLATION_TYPE_EASE_SINE_INOUT</code>	Sets the Interpolation Type to Ease In Out Sinusoidal .
int <code>INTERPOLATION_TYPE_EASE_EXPO_IN</code>	Sets the Interpolation Type to Ease In Exponential .
int <code>INTERPOLATION_TYPE_EASE_EXPO_OUT</code>	Sets the Interpolation Type to Ease Out Exponential .
int <code>INTERPOLATION_TYPE_EASE_EXPO_INOUT</code>	Sets the Interpolation Type to Ease In Out Exponential .

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void <code>SetExtrude</code> (float value)	Use void <code>SetExtrusion</code> (float value) instead.
float <code>GetExtrude</code> ()	Use float <code>GetExtrusion</code> () instead.

5.2.8 SCE Drops

Functions Provided By SCE Drops

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses the Size Control. Learn more »[Using Size Control](#)

Function	Description
void <code>SetSpeedVariance</code> (int value)	Sets the Speed Variance value , which means a random value between 0 and 500 percent. This value will multiply with the current BPM value.
int <code>GetSpeedVariance</code> ()	Returns the current Speed Variance .

void SetLength (float value)	Sets the Length value, which defines how long the trace of the shapes is, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetLength ()	Returns the current Length in percent.
void SetPixelLength (int value)	Sets the Length value, which defines how long the trace of the shapes is, in pixels.
int GetPixelLength ()	Returns the current Length in pixels.
void SetLengthOffset (float value)	Set the Length Offset value between the shapes of the trace, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetLengthOffset ()	Returns the current Length Offset in percent.
void SetPixelLengthOffset (int value)	Set the Length Offset value between the shapes of the trace, in pixels.
int GetPixelLengthOffset ()	Returns the current Length Offset in pixels.
void SetPitch1 (float value)	Sets the Pitch value for axis one (depending on the direction), which is the distance of the shapes, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetPitch1 ()	Returns the current Pitch for axis one in percent.
void SetPixelPitch1 (int value)	Sets the Pitch value for axis one (depending on the direction), which is the distance of the shapes, in pixels.
int GetPixelPitch1 ()	Returns the current Pitch for axis one in pixels.
void SetPitch2 (float value)	Sets the Pitch value for axis two (depending on the direction), which is the distance of the shapes, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetPitch2 ()	Returns the current Pitch for axis two in percent.
void SetPixelPitch2 (int value)	Sets the Pitch value for axis two (depending on the direction), which is the distance of the shapes, in pixels.
int GetPixelPitch2 ()	Returns the current Pitch for axis two in pixels.
void SetAlphaMix (int value)	Sets the Alpha Mix value, which defines the variance of the shapes' alpha channel, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetAlphaMix ()	Returns the current Alpha Mix in percent.
void SetInvert (int value)	Use <i>value</i> TRUE to invert the shape's positions. Use <i>value</i> FALSE to use the default setting.
int GetInvert ()	Returns TRUE , if the shape's positions are inverted, otherwise FALSE .
void ToggleInvert ()	Inverts the shape's positions or uses the default setting, depending on the current state.
void SetMirror (int value)	Use <i>value</i> TRUE to mirror the shape's positions. Use <i>value</i> FALSE to use the default setting.
int GetMirror ()	Returns TRUE , if the shape's positions are mirrored, otherwise FALSE .
void ToggleMirror ()	Mirrors the shape's positions or uses the default setting, depending on the current state.
void SetCount (int value)	Sets the Count value, which defines how much shapes are displayed at once. Valid values for <i>value</i> range from 1 to 100.
int GetCount ()	Returns the current Count .

void SetGeneratorType (int value)	Sets the Generator Type . See below for a list of constants.
int GetGeneratorType ()	Returns the current Generator Type . See below for a list of constants.

Generator Type Constants

Constant	Description
int GENERATOR_TYPE_RANDOM	Sets the generator type to Random .
int GENERATOR_TYPE_LINEAR	Sets the generator type to Linear .
int GENERATOR_TYPE_PING_PONG	Sets the generator type to Ping Pong .

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetPixelWidth (int value)	Use SetPixelSizeX (int value) instead.
int GetPixelWidth ()	Use GetPixelSizeX () instead.
void SetStep (int value)	Use SetPixelLengthOffset (int value) instead.
int GetStep ()	Use GetPixelLengthOffset () instead.
void SetPitch (int value)	Use SetPixelPitch1 (int value) instead.
int GetPitch ()	Use GetPixelPitch1 () instead.

5.2.9 SCE Explosions

Functions Provided By SCE Explosions

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM control. Learn more »[Using BPM Control](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetExplosionSize (int size)	Sets the Explosion Size of a single explosion.
int GetExplosionSize ()	Returns the current Explosion Size of a single explosion.
void SetShapeSize (int size)	Sets the Shape Size of single objects.
int GetShapeSize ()	Returns the current Shape Size of single objects.
void SetGravity (float gravity)	Sets the Gravity value for the effect.
float GetGravity ()	Returns the currently set Gravity .
void SetFadeOut (int fadeout)	Sets the size of a Fade Out tail.
int GetFadeOut ()	Returns the currently set Fade Out value.
void SetShapeCount (int count)	Sets the number of objects within an explosion.
int GetShapeCount ()	Returns the currently set number of objects of an explosion.
void SetRocketCount (int count)	Sets the number of rockets or explosions displayed by the effect at the same time in Fireworks mode and Explosion mode.
int GetRocketCount ()	Returns the currently set number of rockets or explosions.
void FireRocket (int posX, int posY, int posZ, int explPosX, int explPosY, int explPosZ, int ParticleCtn, int explSize, int explShape, int drawShape, color Col, color sparkleCol)	Manually creates a firework. <i>posX</i> is the X-coordinate, <i>posY</i> is the Y-coordinate, <i>posZ</i> is the Z-coordinate, <i>explPosX</i> is the end-coordinate of the fireworks explosion in X, <i>explPosY</i> is the end-coordinate of the fireworks explosion in Y, <i>explPosZ</i> is the end-coordinate of the fireworks explosion in Z, <i>ParticleCtn</i> is the number of objects, <i>explSize</i> is the size of the fireworks explosion, <i>explShape</i> is the type of the fireworks explosion, <i>drawShape</i> is the shape of the objects, <i>Col</i> is the color of the effect, <i>sparkleCol</i> is the color of the sparkle part.
void Detonate (int explPosX, int explPosY, int explPosZ, int ParticleCtn, int explSize, int explShape, int drawShape, color Col, color sparkleCol)	Manually creates an explosion. <i>explPosX</i> is the end-coordinate of the explosion in X, <i>explPosY</i> is the end-coordinate of the explosion in Y, <i>explPosZ</i> is the end-coordinate of the explosion in Z, <i>ParticleCtn</i> is the number of objects, <i>explSize</i> is the size of the explosion, <i>explShape</i> is the type of the explosion, <i>drawShape</i> is the shape of the objects, <i>Col</i> is the color of the effect, <i>sparkleCol</i> is the color of the sparkle part.
void SetExplosionMode (int mode)	Sets the Explosion Mode . See below for details.
int GetExplosionMode ()	Returns which Explosion Mode is set.
void SetExplosionShape (int shape)	Sets the type of an explosion. See below for details.

int GetExplosionShape ()	Returns which type of explosion is selected.
void SetDrawShape (int shape)	Sets the type of objects of an explosion. See below for details.
int GetDrawShape ()	Returns which object shape is set.
void SetSparkleColorMode (int mode)	Sets the type of color mode of the Color Table for the Sparkle.
int GetSparkleColorMode ()	Returns which color mode is set for the Color Table of the Sparkle.
int GetSparkleColorCount ()	Returns the number of colors in the Color Table of the Sparkle.
void RemoveSparkleColor (int)	Removes a color from the Sparkle Color Table.
void SetSparkleColor (int index, color c)	Sets the color values for a color at a certain position (<i>index</i>) in the Sparkle Color Table.
color GetSparkleColor (int index)	Returns which color is set for a certain color at a certain position (<i>index</i>) in the Sparkle Color Table.
void AddSparkleColor (int index, color c)	Adds color <i>c</i> at position <i>index</i> to the Sparkle Color Table.
void SetOuterGlow (float value)	Sets the Outer Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetOuterGlow ()	Returns the currently set Outer Glow .
void SetPixelOuterGlow (int value)	Sets the Outer Glow of objects in pixels based on the object size.
int GetPixelOuterGlow ()	Returns the currently set Outer Glow in pixels.
void SetInnerGlow (float value)	Sets the Inner Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetInnerGlow ()	Returns the currently set Inner Glow .
void SetPixelInnerGlow (int value)	Sets the Inner Glow of objects in pixels based on the object size.
int GetPixelInnerGlow ()	Returns the currently set Inner Glow in pixels.

Explosion Mode Constants

This effect uses various color modes. The function [SetExplosionMode](#) can be used to change them. The following values can be used as parameter:

Constant	Description
int MODE_EXPLOSIONS	Sets the Explosion mode.
int MODE_FIREWORKS	Sets the Fireworks mode.

Explosion Shape Constants

This effect uses various color modes. The function [SetExplosionShape](#) can be used to change them. The following values can be used as parameter:

Constant	Description
int EXPLOSION_SHAPE_SPHERE	Sets the Sphere type of explosion.
int EXPLOSION_SHAPE_SPHERE_GLOW	Sets the glowing sphere type of explosion.
int EXPLOSION_SHAPE_SPIRAL	Sets the spiral type of explosion.
int EXPLOSION_SHAPE_RADIAL	Sets the radial type of explosion.
int EXPLOSION_SHAPE_DIAMOND	Sets the diamond type of explosion.
int EXPLOSION_SHAPE_STAR	Sets the star type of explosion.
int EXPLOSION_SHAPE_RANDOM	Sets a random type of explosion.

5.2.10 SCE Fill Drops

Functions Provided By SCE Fill Drops

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)
- This Effect uses the Size Control. Learn more »[Using Size Control](#)

Function	Description
void SetBorder (float value)	Sets the Border of objects. Valid values range from <i>0.01</i> to <i>100</i> .
float GetBorder ()	Returns the currently set Border .
void SetPixelBorder (int value)	Sets the Border of objects in pixels based on the object size.
int GetPixelBorder ()	Returns the currently set Border in pixels.
void SetOuterGlow (float value)	Sets the Outer Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetOuterGlow ()	Returns the currently set Outer Glow .
void SetPixelOuterGlow (int value)	Sets the Outer Glow of objects in pixels based on the object size.
int GetPixelOuterGlow ()	Returns the currently set Outer Glow in pixels.
void SetInnerGlow (float value)	Sets the Inner Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .

float GetInnerGlow ()	Returns the currently set Inner Glow .
void SetPixelInnerGlow (int value)	Sets the Inner Glow of objects in pixels based on the object size.
int GetPixelInnerGlow ()	Returns the currently set Inner Glow in pixels.
void SetColorMix (int value)	Use value TRUE to activate the Color Mix . When Color Mix is activated, every shape has its own color depending on the » Color Table Mode . Use value FALSE to use the default setting.
int GetColorMix ()	Returns TRUE if the Color Mix is enabled, otherwise FALSE .
void ToggleColorMix ()	Enables or disables the Color Mix depending on the current state.
void SetFillTime (float value)	Sets the Fill Time value which defines how long it takes to fill the whole matrix with shapes.
float GetFillTime ()	Returns the current Fill Time .
void SetDuration (float value)	Sets the Duration value which defines how long the completely filled matrix is displayed.
float GetDuration ()	Returns the current Duration .
void SetPitch1 (float value)	Sets the Pitch 1 value, in percent.
float GetPitch1 ()	Returns the Pitch 1 value, in percent.
void SetPixelPitch1 (int value)	Sets the Pitch 1 value, in pixels.
int GetPixelPitch1 ()	Returns the Pitch 1 value, in pixels.
void SetPitch2 (float value)	Sets the Pitch 2 value, in percent.
float GetPitch2 ()	Returns the Pitch 2 value, in percent.
void SetPixelPitch2 (int value)	Sets the Pitch 2 value, in pixels.
int GetPixelPitch2 ()	Returns the Pitch 2 value, in pixels.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **SCE Color Fill** has been split into several effects in MADRIX 3.X, such as **SCE Fill Drops** (which corresponds to the former Color Fill mode "Drops"). The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetPitch (int pitch)	Use SetPixelPitch1 (float value) or SetPixelPitch2 (float value) instead.
int GetPitch ()	Use GetPixelPitch1 () or GetPixelPitch2 () instead.

5.2.11 SCE Fill Random

Functions Provided By SCE Fill Random

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)
- This Effect uses the Size Control. Learn more »[Using Size Control](#)

Function	Description
void SetColorMix (int value)	Use <i>value</i> TRUE to activate the Color Mix . When Color Mix is activated, every shape has its own color depending on the » Color Table Mode . Use <i>value</i> FALSE to use the default setting.
int GetColorMix ()	Returns TRUE if the Color Mix is enabled, otherwise FALSE .
void ToggleColorMix ()	Enables or disables the Color Mix depending on the current state.
void SetFillTime (float value)	Sets the Fill Time <i>value</i> which defines how long it takes to fill the whole matrix with shapes.
float GetFillTime ()	Returns the current Fill Time .
void SetDuration (float value)	Sets the Duration <i>value</i> which defines how long the completely filled matrix is displayed.
float GetDuration ()	Returns the current Duration .
void SetPitchX (float value)	Sets the Pitch X <i>value</i> in percent which defines the X-aligned distance between shapes.
float GetPitchX ()	Returns the current Pitch X in percent.
void SetPitchY (float value)	Sets the Pitch Y <i>value</i> in percent which defines the Y-aligned distance between shapes.
float GetPitchY ()	Returns the current Pitch Y in percent.
void SetPitchZ (float value)	Sets the Pitch Z <i>value</i> in percent which defines the Z-aligned distance between shapes.
float GetPitchZ ()	Returns the current Pitch Z in percent.
void SetPitch (float value, float value, float value)	Sets the Pitch X, Y, Z <i>values</i> in percent which define the distances between shapes.
void SetPixelPitchX (int value)	Sets the Pitch X <i>value</i> in pixels, which defines the X-aligned distance between shapes.
int GetPixelPitchX ()	Returns the current Pitch X in pixels.
void SetPixelPitchY (int value)	Sets the Pitch Y <i>value</i> in pixels, which defines the Y-aligned distance between shapes.
int GetPixelPitchY ()	Returns the current Pitch Y in pixels.
void SetPixelPitchZ (int value)	Sets the Pitch Z <i>value</i> in pixels, which defines the Z-aligned distance between shapes.
int GetPixelPitchZ ()	Returns the current Pitch Z in pixels.

void SetPixelPitch (int value, int value, int value)	Sets the Pitch X, Y, Z values in pixels which define the distances between shapes.
void SetBorder (float value)	Sets the Border of objects. Valid values range from <i>0.01</i> to <i>100</i> .
float GetBorder ()	Returns the currently set Border .
void SetPixelBorder (int value)	Sets the Border of objects in pixels based on the object size.
int GetPixelBorder ()	Returns the currently set Border in pixels.
void SetOuterGlow (float value)	Sets the Outer Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetOuterGlow ()	Returns the currently set Outer Glow .
void SetPixelOuterGlow (int value)	Sets the Outer Glow of objects in pixels based on the object size.
int GetPixelOuterGlow ()	Returns the currently set Outer Glow in pixels.
void SetInnerGlow (float value)	Sets the Inner Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetInnerGlow ()	Returns the currently set Inner Glow .
void SetPixelInnerGlow (int value)	Sets the Inner Glow of objects in pixels based on the object size.
int GetPixelInnerGlow ()	Returns the currently set Inner Glow in pixels.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **SCE Color Fill** has been split into several effects in MADRIX 3.X, such as **SCE Fill Random** (which corresponds to the former Color Fill mode "Random"). The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetMixColor (int value)	Use SetColorMix (int value) instead.
int GetMixColor ()	Use GetColorMix () instead.
void SetDelayTime (float value)	Use SetDuration (float value) instead.
float GetDelayTime ()	Use GetDuration () instead.
void SetWidth (int value)	Use SetPixelSizeX (int value) and SetPixelSizeY (int value) instead.
int GetWidth ()	Use GetPixelSizeX () and GetPixelSizeY () instead.

5.2.12 SCE Fill Snake

Functions Provided By SCE Fill Snake

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)
- This Effect uses the Size Control. Learn more »[Using Size Control](#)

Function	Description
void SetColorMix (int value)	Use <i>value</i> TRUE to activate the Color Mix . When Color Mix is activated, every shape has its own color depending on the » Color Table Mode . Use <i>value</i> FALSE to use the default setting.
int GetColorMix ()	Returns TRUE if the Color Mix is enabled, otherwise FALSE .
void ToggleColorMix ()	Enables or disables the Color Mix depending on the current state.
void SetFillTime (float value)	Sets the Fill Time <i>value</i> which defines how long it takes to fill the whole matrix with shapes.
float GetFillTime ()	Returns the current Fill Time .
void SetDuration (float value)	Sets the Duration <i>value</i> which defines how long the completely filled matrix is displayed.
float GetDuration ()	Returns the current Duration .
void SetPitchX (float value)	Sets the Pitch X <i>value</i> in percent which defines the X-aligned distance between shapes.
float GetPitchX ()	Returns the current Pitch X in percent.
void SetPitchY (float value)	Sets the Pitch Y <i>value</i> in percent which defines the Y-aligned distance between shapes.
float GetPitchY ()	Returns the current Pitch Y in percent.
void SetPitchZ (float value)	Sets the Pitch Z <i>value</i> in percent which defines the Z-aligned distance between shapes.
float GetPitchZ ()	Returns the current Pitch Z in percent.
void SetPitch (float value, float value, float value)	Sets the Pitch X, Y, Z <i>values</i> in percent which define the distances between shapes.
void SetPixelPitchX (int value)	Sets the Pitch X <i>value</i> in pixels, which defines the X-aligned distance between shapes.
int GetPixelPitchX ()	Returns the current Pitch X in pixels.
void SetPixelPitchY (int value)	Sets the Pitch Y <i>value</i> in pixels, which defines the Y-aligned distance between shapes.
int GetPixelPitchY ()	Returns the current Pitch Y in pixels.
void SetPixelPitchZ (int value)	Sets the Pitch Z <i>value</i> in pixels, which defines the Z-aligned distance between shapes.
int GetPixelPitchZ ()	Returns the current Pitch Z in pixels.

void SetPixelPitch (int value, int value, int value)	Sets the Pitch X, Y, Z values in pixels which define the distances between shapes.
void SetStartCorner (int mode)	Sets the Start Corner . See below for a list of constants.
int GetStartCorner ()	Returns the Start Corner . See below for a list of constants.
void SetOrientation (int mode)	Sets the Orientation Mode . See below for a list of constants.
int GetOrientation ()	Returns the Orientation Mode . See below for a list of constants.
void SetCircle (int enable)	Use value TRUE to activate the Circle Mode . Use value FALSE to use the default setting.
int GetCircle ()	Returns TRUE if the Circle Mode is enabled, otherwise FALSE .
void ToggleCircle ()	Enables or disables the Circle Mode depending on the current state.
void SetCenter (int enable)	Use value TRUE to activate the Center Mode . Use value FALSE to use the default setting.
int GetCenter ()	Returns TRUE if the Center Mode is enabled, otherwise FALSE .
void ToggleCenter ()	Enables or disables the Center Mode depending on the current state.
void SetMirror (int enable)	Use value TRUE to activate the Mirror Mode . Use value FALSE to use the default setting.
int GetMirror ()	Returns TRUE if the Mirror Mode is enabled, otherwise FALSE .
void ToggleMirror ()	Enables or disables the Mirror Mode depending on the current state.
void SetBorder (float value)	Sets the Border of objects. Valid values range from <i>0.01</i> to <i>100</i> .
float GetBorder ()	Returns the currently set Border .
void SetPixelBorder (int value)	Sets the Border of objects in pixels based on the object size.
int GetPixelBorder ()	Returns the currently set Border in pixels.
void SetOuterGlow (float value)	Sets the Outer Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetOuterGlow ()	Returns the currently set Outer Glow .
void SetPixelOuterGlow (int value)	Sets the Outer Glow of objects in pixels based on the object size.
int GetPixelOuterGlow ()	Returns the currently set Outer Glow in pixels.
void SetInnerGlow (float value)	Sets the Inner Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetInnerGlow ()	Returns the currently set Inner Glow .
void SetPixelInnerGlow (int value)	Sets the Inner Glow of objects in pixels based on the object size.
int GetPixelInnerGlow ()	Returns the currently set Inner Glow in pixels.

Start Corner Constants

Constant	Description
int <code>START_CORNER_FRONT_TOP_LEFT</code>	Sets the Start Corner to Front Top Left .
int <code>START_CORNER_FRONT_TOP_RIGHT</code>	Sets the Start Corner to Front Top Right .
int <code>START_CORNER_FRONT_BOTTOM_LEFT</code>	Sets the Start Corner to Front Bottom Left .
int <code>START_CORNER_FRONT_BOTTOM_RIGHT</code>	Sets the Start Corner to Front Bottom Right .
int <code>START_CORNER_BACK_TOP_LEFT</code>	Sets the Start Corner to Back Top Left .
int <code>START_CORNER_BACK_TOP_RIGHT</code>	Sets the Start Corner to Back Top Right .
int <code>START_CORNER_BACK_BOTTOM_LEFT</code>	Sets the Start Corner to Back Bottom Left .
int <code>START_CORNER_BACK_BOTTOM_RIGHT</code>	Sets the Start Corner to Back Bottom Right .

Orientation Mode Constants

Constant	Description
int <code>ORIENTATION_XYZ</code>	Sets the Orientation Mode to XYZ Orientation .
int <code>ORIENTATION_XZY</code>	Sets the Orientation Mode to XZY Orientation .
int <code>ORIENTATION_YXZ</code>	Sets the Orientation Mode to YXZ Orientation .
int <code>ORIENTATION_YZX</code>	Sets the Orientation Mode to YZX Orientation .
int <code>ORIENTATION_ZYX</code>	Sets the Orientation Mode to ZYX Orientation .
int <code>ORIENTATION_ZXY</code>	Sets the Orientation Mode to ZXY Orientation .

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **SCE Color Fill** has been split into several effects in MADRIX 3.X, such as **SCE Fill Snake** (which corresponds to the former Color Fill mode "Snake"). The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetMixColor (int value)	Use SetColorMix (int value) instead.
int GetMixColor ()	Use GetColorMix () instead.
void SetWidth (int value)	Use SetPixelSizeX (int value) and SetPixelSizeY (int value) instead.
int GetWidth ()	Use GetPixelSizeX () and GetPixelSizeY () instead.

5.2.13 SCE Fill Solid

Functions Provided By SCE Fill Solid

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)

Function	Description
void SetStepWidth (float value)	Sets the Step value, which is the number of pixels the effect should scroll per frame using percentage values.
float GetStepWidth ()	Returns the Step in percentage.
void SetPixelStepWidth (int value)	Sets the Step value, which is the number of pixels the effect should scroll per frame using pixel values.
int GetPixelStepWidth ()	Returns the Step in pixels.
void SetColorWidth (float value)	Sets the Color Width value, which means the width of the single stripes using percentage values.
float GetColorWidth ()	Returns the Color Width , the width of a stripe, in percentage.
void SetPixelColorWidth (int value)	Sets the Color Width value, which means the width of the single stripes using pixel values.
int GetPixelColorWidth ()	Returns the Color Width , the width of a stripe, in pixels.
void SetCrossWidth (float value)	Sets the Cross Width value using percentage values.
float GetCrossWidth ()	Returns the Cross Width in percentage.
void SetPixelCrossWidth (int value)	Sets the Cross Width value using pixel values.

int GetPixelCrossWidth ()	Returns the Cross Width in pixels.
void SetCrossAxes (int value)	Sets the Cross Axis value. See below for a list of constants.
int GetCrossAxes ()	Returns the Cross Axis . See below for a list of constants.
void SetColorMix (int value)	Use value TRUE to activate the Color Mix . When Color Mix is activated, stripes with distinct colors depending on the »Color Table Mode are generated. Use value FALSE to use the default setting.
int GetColorMix ()	Returns TRUE if the Color Mix is enabled, otherwise FALSE .
void ToggleColorMix ()	Enables or disables the Color Mix depending on the current state.
void SetFillTime (float value)	Sets the Fill Time value which defines how long it takes to fill the whole matrix.
float GetFillTime ()	Returns the current Fill Time .
void SetDuration (float value)	Sets the Duration value which defines how long the completely filled matrix is displayed.
float GetDuration ()	Returns the current Duration .

Cross Axis Constants

Constant	Description
int AXIS_ONE	Sets the direction cross mode to Axis 1 .
int AXIS_TWO	Sets the direction cross mode to Axis 2 .
int AXES_ONE_AND_TWO	Sets the direction cross mode to Axes 1 And 2 .

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **SCE Color Fill** has been split into several effects in MADRIX 3.X, such as **SCE Fill Solid** (which corresponds to the former Color Fill mode "Flat"). The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetMixColor (int value)	Use SetColorMix (int value) instead.
int GetMixColor ()	Use GetColorMix () instead.
void SetDelayTime (float value)	Use SetDuration (float value) instead.
float GetDelayTime ()	Use GetDuration () instead.

5.2.14 SCE Fire

Functions Provided By SCE Fire

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses the Color Gradient. Learn more »[Using Color Gradient](#)
- This Effect uses the BPM control. Learn more »[Using BPM Control](#)

Function	Description
void SetHeight (int height)	Sets the Height of the flames.
int GetHeight ()	Returns the current Height .

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **SCE Fire** has been changed in MADRIX 3.X. The following functions are not supported anymore. Please follow the hints to migrate your macros.

Function	Description
void SetHeight (int height)	Use void SetHeight (int height). The function now uses a value range of 1 to 100.
int GetHeight ()	Use int GetHeight (). The function now returns a value range of 1 to 100.

5.2.15 SCE Flames

Functions Provided By SCE Flames

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses the Gradient Dialog. Learn more »[Using Gradient Dialog](#)
- This Effect uses the BPM control. Learn more »[Using BPM Control](#)

Function	Description
void SetHeight (int height)	Sets the Height of the flames.
int GetHeight ()	Returns the current Height .
void SetWidth (int width)	Sets the Width of the flames.
int GetWidth ()	Returns the Width of the flames.
void SetDepth (int depth)	Sets the Depth of the flames.
int GetDepth ()	Returns the Depth of the flames.
void SetIntensity (int intensity)	Sets the Intensity of the flames.
int GetIntensity ()	Returns the currently used Intensity for the flames.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **SCE Fire** has been changed in MADRIX 3.X. The following functions are not supported anymore. Please follow the hints to migrate your macros.

Function	Description
void SetFlameSize (int size)	Use void SetHeight (int height) instead.
int GetFlameSize ()	Use int GetHeight () instead.

5.2.16 SCE Fluid

Functions Provided By SCE Fluid

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the Gradient Dialog. Learn more »[Using Gradient Dialog](#)
- This Effect uses the BPM control. Learn more »[Using BPM Control](#)

Function	Description
void SetRadius (int radius)	Sets the Radius for every new impulse.
int GetRadius ()	Returns the Radius for every new impulse.
void SetVorticity (int vorticity)	Sets the Vorticity for the effect.
int GetVorticity ()	Returns the Vorticity .
void SetDensity (int density)	Sets the Density for every new impulse.
float GetDensity ()	Returns the Density for every new impulse.
void SetVelocity (int velocity)	Sets the Velocity for every new impulse.
int GetVelocity ()	Returns the Velocity for every new impulse.
void SetDuration (int duration)	Sets the Duration for every new impulse.
int GetDuration ()	Returns the Duration for every new impulse.
void SetFade (int fade)	Sets the Fade for the effect.
int GetFade ()	Returns the Fade value.
void SetDeceleration (int deceleration)	Sets the Deceleration for the effect.
int GetDeceleration ()	Returns the Deceleration value.
void SetColorMode (int mode)	Sets the Color Mode for the effect. See below for details.
int GetColorMode ()	Returns which Color Mode is set.

Color Mode Constants

This effect uses various color modes. The function [SetColorMode](#) can be used to change them. The following values can be used as parameter:

Constant	Description
int MODE_COLOR_TABLE	Sets the Color Table mode.
int MODE_GRADIENT	Sets the Color Gradient mode.

5.2.17 SCE Gradient

Functions Provided By SCE Gradient

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Color Gradient. Learn more »[Using Color Gradient](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)

Function	Description
void SetAngle (int value)	Sets the Angle value in degrees.
float GetAngle ()	Returns the Angle in degrees.
void SetCrossWidth (float value)	Sets the Cross Width value using percentage values.
float GetCrossWidth ()	Returns the Cross Width in percentage.
void SetPixelCrossWidth (int value)	Sets the Cross Width value using pixel values.
int GetPixelCrossWidth ()	Returns the Cross Width in pixels.
void SetCrossAxes (int value)	Sets the Cross Axis value. See below for a list of constants.
int GetCrossAxes ()	Returns the Cross Axis . See below for a list of constants.

Cross Axis Constants

Constant	Description
int AXIS_ONE	Sets the direction cross mode to Axis 1 .
int AXIS_TWO	Sets the direction cross mode to Axis 2 .
int AXES_ONE_AND_TWO	Sets the direction cross mode to Axes 1 And 2 .

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **SCE Color Ramp** has been renamed to **SCE Gradient** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetCrossed (int enable)	Use SetDirectionCrossMode (int value) instead.
int GetCrossed ()	Use GetDirectionCrossMode () instead.

Example

This macro sets the direction to **DIRECTION_RADIAL** when the effect is started. Before the effect is rendered, the angle will be increased by 1 until 360 degrees is achieved. Then, it starts again with 0 degrees. As a result, the effect looks like a rotating radial gradient.

```
@scriptname="Radial Gradient - Rotated";
@author="inoage GmbH";
@version="";
@description="";

int degree;

void InitEffect()
{
    SetDirection(DIRECTION_RADIAL);
    degree = 0;
}

void PreRenderEffect()
{
    degree = (degree+1)%360;
    SetAngle(degree);
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}
```

5.2.18 SCE Graph

Functions Provided By SCE Graph

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

- This Effect uses Text. Learn more »[Using Text](#)

Function	Description
Height	
void SetHeight (float value)	Sets the Height value, which is the height of the shapes in percent of the matrix size (depending on the look-at type). The Height value means the minimum shape height if the shape height distribution is not uniform. Valid values for value range from 0.01 to 100.
float GetHeight ()	Returns the current Height of the shapes in percent. The return value means the minimum shape height if the shape height distribution is not uniform.
void SetPixelHeight (int value)	Sets the Height value, which is the height of the shapes, in pixels. The Height value means the minimum shape height if the shape height distribution is not uniform. Valid values for value range from 1 to the matrix size (depending on the look-at type).
int GetPixelHeight ()	Returns the current Height of the shapes in pixels. The return value means the minimum shape height if the shape height distribution is not uniform.
void SetHeightMax (float value)	Sets the Maximum Height value, which is the maximum height of the shapes, in percent of the matrix size (depending on the look-at type). The Maximum Height value only applies if the shape height distribution is not uniform. Valid values for value range from 0.01 to 100.
float GetHeightMax ()	Returns the current Maximum Height of the shapes in percent.
void SetPixelHeightMax (int value)	Sets the Maximum Height value, which is the maximum height of the shapes, in pixels. The maximum height value only applies if the shape height distribution is not uniform. Valid values for value range from 1 to the matrix size (depending on the look-at type).
int GetPixelHeightMax ()	Returns the current Maximum Height of the shapes in pixels.
void SetHeightDistribution (int value)	Sets the Height Distribution value, which defines how the range between the current minimum and the current maximum shape height is applied to the shapes. See » here for a list of constants.
int GetHeightDistribution ()	Returns the current Height Distribution of the shapes. See » here for a list of constants.
void SeedRandomHeight ()	Randomizes the heights of the shapes. Same as SetHeightDistribution(DIST_RND) .
Width/Depth	
void SetWidth (float value, int register)	Sets the Width value for register <i>reg</i> , which is the width of the shapes, in percent of the matrix size (depending on the look-at type). The Width value means the minimum shape width if the shape width distribution is not uniform. Valid values for value range from 0.01 to 100. Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1. The width value for register REGISTER_Z1 actually controls the depth of the shapes.
float GetWidth (int register)	Returns the current Width of the shapes for register <i>reg</i> in percent. The return value means the minimum shape width if the shape width distribution is not uniform. Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1. The return value for register REGISTER_Z1 actually represents the depth of the shapes.

void SetPixelWidth (int value, int register)	Sets the Width value for register <i>reg</i> , which is the width of the shapes, in pixels. The Width value means the minimum shape width if the shape width distribution is not uniform. Valid values for <i>value</i> range from 1 to the matrix size (depending on the look-at type). Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1 . The width value for register REGISTER_Z1 actually controls the depth of the shapes.
int GetPixelWidth (int reg)	Returns the current Width of the shapes for register <i>reg</i> in pixels. The return value means the minimum shape width if the shape width distribution is not uniform. Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1 . The return value for register REGISTER_Z1 actually represents the depth of the shapes.
void SetWidthMax (float value, int register)	Sets the Maximum Width value for register <i>reg</i> , which is the maximum width of the shapes, in percent of the matrix size (depending on the look-at type). The Maximum Width value only applies if the shape width distribution is not uniform. Valid values for <i>value</i> range from 0.01 to 100. Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1 . The maximum width value for register REGISTER_Z1 actually controls the maximum depth of the shapes.
float GetWidthMax (int register)	Returns the current Maximum Width of the shapes for register <i>reg</i> in percent. Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1 . The return value for register REGISTER_Z1 actually represents the maximum depth of the shapes.
void SetPixelWidthMax (int value, int register)	Sets the Maximum Width value for register <i>reg</i> , which is the maximum width of the shapes, in pixels. The maximum width value only applies, if the shape width distribution is not uniform. Valid values for <i>value</i> range from 1 to the matrix size (depending on the look-at type). Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1 . The maximum width value for register REGISTER_Z1 actually controls the maximum depth of the shapes.
int GetPixelWidthMax (int register)	Returns the current Maximum Width of the shapes for register <i>reg</i> in pixels. Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1 . The return value for register REGISTER_Z1 actually represents the maximum depth of the shapes.
void SetWidthDistribution (int value, int register)	Sets the width Distribution value for register <i>reg</i> , which defines how the range between the current minimum and the current maximum shape width is applied to the shapes. See » here for a list of constants. Valid values for <i>reg</i> are REGISTER_X1 and REGISTER_Z1 . The width distribution value for register REGISTER_Z1 actually controls the depth distribution of the shapes.
int GetWidthDistribution (int register)	Returns the current width Distribution of the shapes for register <i>reg</i> . See » here for a list of constants. Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1 . The return value for register REGISTER_Z1 actually represents the depth distribution of the shapes.
void SeedRandomWidth (int register)	Randomizes the widths of the shapes for register <i>reg</i> . Is the same as SetWidthDistribution (DIST_RND , <i>reg</i>). Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1 .
Pitch	

void SetPitch (float value, int register)	Sets the Pitch value for register <i>reg</i> , which is the distance of the shapes, in percent of the matrix size (depending on the look-at type). The pitch <i>value</i> means the minimum pitch, if the pitch distribution is not uniform. Valid values for <i>value</i> range from 0.01 to 100. Valid values for <i>reg</i> are REGISTER_X1 , for which the Pitch <i>value</i> controls the X-distance, and REGISTER_Z1 for the Z-distance.
float GetPitch (int register)	Returns the current Pitch of the shapes for register <i>reg</i> in percent. The return value means the minimum pitch if the pitch distribution is not uniform. Valid values for <i>reg</i> are REGISTER_X1 , for which the return value represents the X-distance, and REGISTER_Z1 for the Z-distance.
void SetPixelPitch (int value, int register)	Sets the Pitch value for register <i>reg</i> , which is the distance of the shapes, in pixels. The pitch <i>value</i> means the minimum pitch if the pitch distribution is not uniform. Valid values for <i>value</i> range from 1 to the matrix size (depending on the look-at type). Valid values for <i>reg</i> are REGISTER_X1 , for which the Pitch <i>value</i> controls the X-distance, and REGISTER_Z1 for the Z-distance.
int GetPixelPitch (int register)	Returns the current Pitch of the shapes for register <i>reg</i> in pixels. The return value means the minimum pitch if the pitch distribution is not uniform. Valid values for <i>reg</i> are REGISTER_X1 , for which the return value represents the X-distance, and REGISTER_Z1 for the Z-distance.
void SetPitchMax (float value, int register)	Sets the Maximum Pitch value for register <i>reg</i> , which is the maximum distance of the shapes, in percent of the matrix size (depending on the look-at type). The maximum pitch <i>value</i> only applies if the pitch distribution is not uniform. Valid values for <i>value</i> range from 0.01 to 100. Valid values for <i>reg</i> are REGISTER_X1 , for which the maximum pitch <i>value</i> controls the maximum X-distance, and REGISTER_Z1 for the maximum Z-distance.
float GetPitchMax (int register)	Returns the current Maximum Pitch of the shapes for register <i>reg</i> in percent. Valid values for <i>reg</i> are REGISTER_X1 , for which the return value represents the maximum X-distance, and REGISTER_Z1 for the maximum Z-distance.
void SetPixelPitchMax (int value, int register)	Sets the Maximum Pitch value for register <i>reg</i> , which is the maximum distance of the shapes, in pixels. The maximum pitch <i>value</i> only applies if the pitch distribution is not uniform. Valid values for <i>value</i> range from 1 to the matrix size (depending on the look-at type). Valid values for <i>reg</i> are REGISTER_X1 , for which the maximum pitch <i>value</i> controls the maximum X-distance, and REGISTER_Z1 for the maximum Z-distance.
int GetPixelPitchMax (int register)	Returns the current Maximum Pitch of the shapes for register <i>reg</i> in pixels. Valid values for <i>reg</i> are REGISTER_X1 , for which the return value represents the maximum X-distance, and REGISTER_Z1 for the maximum Z-distance.
void SetPitchDistribution (int value, int register)	Sets the Pitch Distribution value for register <i>reg</i> , which defines how the range between the current minimum and the current maximum pitch is applied to the shapes. See »here for a list of constants. Valid values for <i>reg</i> are REGISTER_X1 , for which the pitch distribution <i>value</i> controls the X-distance distribution, and REGISTER_Z1 for the Z-distance distribution.

int GetPitchDistribution (int register)	Returns the current Pitch Distribution of the shapes for register <i>reg</i> . See » here for a list of constants. Valid values for <i>reg</i> are REGISTER_X1 , for which the return value represents the X-distance distribution, and REGISTER_Z1 for the Z-distance distribution.
void SeedRandomPitch (int register)	Randomizes the pitches of the shapes for register <i>reg</i> . Is the same as SetPitchDistribution (DIST_RND , <i>reg</i>). Valid values for <i>reg</i> are REGISTER_X1 or REGISTER_Z1 .
Functional Parameters	
void SetFrequency (float value, int register)	Sets the Frequency value for register <i>reg</i> , which defines the number of periods of the graph function. The frequency <i>value</i> means the minimum frequency if the frequency distribution is not uniform. Valid values for <i>value</i> range from 0 to 100. See below for a list of register constants.
float GetFrequency (int register)	Returns the current Frequency for register <i>reg</i> . The return value means the minimum frequency if the frequency distribution is not uniform. See below for a list of register constants.
void SetFrequencyMax (float value, int register)	Sets the Maximum Frequency value for register <i>reg</i> , which defines the maximum number of periods of the graph function. The maximum frequency <i>value</i> only applies if the frequency distribution is not uniform. Valid values for <i>value</i> range from 0 to 100. See below for a list of register constants.
float GetFrequencyMax (int register)	Returns the current Maximum Frequency for register <i>reg</i> . See below for a list of register constants.
void SetFrequencyDistribution (int value, int register)	Sets the Frequency Distribution value for register <i>reg</i> , which defines how the range between the current minimum and the current maximum frequency is applied to the shapes. See » here for a list of constants. See below for a list of register constants.
int GetFrequencyDistribution (int register)	Returns the current Frequency Distribution for register <i>reg</i> . See » here for a list of constants. See below for a list of register constants.
void SeedRandomFrequency (int register)	Randomizes the frequencies for register <i>reg</i> . Same as SetFrequencyDistribution (DIST_RND , <i>reg</i>). See below for a list of register constants.
void SetAmplitude (float value, int register)	Sets the Amplitude value for register <i>reg</i> , which defines how wide the shapes oscillate, in percent of the matrix size (depending on the look-at type). The amplitude <i>value</i> means the minimum amplitude if the amplitude distribution is not uniform. Valid values for <i>value</i> range from -1000 to 1000. See below for a list of register constants.
float GetAmplitude (int register)	Returns the current Amplitude for register <i>reg</i> in percent. The return value means the minimum amplitude if the amplitude distribution is not uniform. See below for a list of register constants.
void SetPixelAmplitude (int value, int register)	Sets the Amplitude value for register <i>reg</i> , which defines how wide the shapes oscillate, in pixels. The amplitude <i>value</i> means the minimum amplitude if the amplitude distribution is not uniform. Valid values for <i>value</i> range between - and + ten times the matrix size (depending on the look-at type). See below for a list of register constants.
int GetPixelAmplitude (int register)	Returns the current Amplitude for register <i>reg</i> in pixels. The return value means the minimum amplitude if the amplitude distribution is not uniform. See below for a list of register constants.

void SetAmplitudeMax (float value, int register)	Sets the Maximum Amplitude value for register <i>reg</i> , which defines how wide the shapes oscillate, in percent of the matrix size (depending on the look-at type). The maximum amplitude value only applies if the amplitude distribution is not uniform. Valid values for value range from -1000 to 1000. See below for a list of register constants.
float GetAmplitudeMax (int register)	Returns the current Maximum Amplitude for register <i>reg</i> in percent. See below for a list of register constants.
void SetPixelAmplitudeMax (int value, int register)	Sets the Maximum Amplitude value for register <i>reg</i> , which defines how wide the shapes oscillate, in pixels. The maximum amplitude value only applies if the amplitude distribution is not uniform. Valid values for value range between - and + ten times the matrix size (depending on the look-at type). See below for a list of register constants.
int GetPixelAmplitudeMax (int register)	Returns the current Maximum Amplitude for register <i>reg</i> in pixels. See below for a list of register constants.
void SetAmplitudeDistribution (int value, int register)	Sets the Amplitude Distribution value for register <i>reg</i> , which defines how the range between the current minimum and the current maximum amplitude is applied to the shapes. See »here for a list of constants. See below for a list of register constants.
int GetAmplitudeDistribution (int register)	Returns the current Amplitude Distribution for register <i>reg</i> . See »here for a list of constants. See below for a list of register constants.
void SeedRandomAmplitude (int register)	Randomizes the amplitudes for register <i>reg</i> . Is the same as SetAmplitudeDistribution (DIST_RND , <i>reg</i>). See below for a list of register constants.
void SetPhase (float value, int register)	Sets the Phase value for register <i>reg</i> , which defines an offset for the graph function, in percent of the wavelength. Valid values for value range from 0 to 100. See below for a list of register constants.
float GetPhase (int register)	Returns the current Phase for register <i>reg</i> in percent. See below for a list of register constants.
void SetPeak (float value, int register)	Sets the Peak value for register <i>reg</i> , which defines a threshold for the graph function, in percent of the wavelength. This only applies to the Triangle and the Square function type. Valid values for value range from 0 to 100. See below for a list of register constants.
float GetPeak (int register)	Returns the current Peak for register <i>reg</i> in percent. See below for a list of register constants.
void SetFunctionType (int value, int register)	Sets the Function Type value for register <i>reg</i> , which defines the base function for the graph. See »here for a list of constants. See below for a list of register constants.
int GetFunctionType (int register)	Returns the current Function Type for register <i>reg</i> . See »here for a list of constants. See below for a list of register constants.
Others	
void ClearRegister (int register)	Sets all functional parameters for register <i>reg</i> to their defaults. See below for a list of register constants. For REGISTER_X1 and REGISTER_Z1 , the values for height, width/depth and pitch are reset, too.

Register Constants

Constant	Description
int REGISTER_X1	Selects register 1 for X-Axis.
int REGISTER_X2	Selects register 2 for X-Axis.
int REGISTER_X3	Selects register 3 for X-Axis.
int REGISTER_Z1	Selects register 1 for Z-Axis.
int REGISTER_Z2	Selects register 2 for Z-Axis.
int REGISTER_Z3	Selects register 3 for Z-Axis.
int REGISTER_P1	Selects register 1 for extruded phase.
int REGISTER_P2	Selects register 2 for extruded phase.
int REGISTER_P3	Selects register 3 for extruded phase.

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void ResetRegister (int register)	Use void ClearRegister (int register) instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetModeHeight (int mode)	Use SetHeightDistribution (int value) instead.
int GetModeHeight ()	Use GetHeightDistribution () instead.
void SetWidth (int value)	Use SetWidth (float value, REGISTER_X1) instead.
int GetWidth ()	Use GetWidth (REGISTER_X1) instead.
void SetWidthMax (int value)	Use SetWidthMax (float value, REGISTER_X1) instead.
int GetWidthMax ()	Use GetWidthMax (REGISTER_X1) instead.

void SetModeWidth (int mode)	Use SetWidthDistribution (int value, REGISTER_X1) instead.
int GetModeWidth ()	Use GetWidthDistribution (REGISTER_X1) instead.
void SetPitch (int value)	Use SetPitch (float value, REGISTER_X1) instead.
int GetPitch ()	Use GetPitch (REGISTER_X1) instead.
void SetPitchMax (int value)	Use SetPitchMax (float value, REGISTER_X1) instead.
int GetPitchMax ()	Use GetPitchMax (REGISTER_X1) instead.
void SetModePitch (int mode)	Use SetPitchDistribution (int value, REGISTER_X1) instead.
int GetModePitch ()	Use GetPitchDistribution (REGISTER_X1) instead.
void SetFrequency (int index, float value)	Use SetFrequency (float value, int reg) with one of the above mentioned register constants for <i>reg</i> instead. Note that the order of the parameters has changed (<i>index</i> corresponds to <i>reg</i> now).
float GetFrequency (int index)	Use GetFrequency (int reg) with one of the above mentioned register constants for <i>reg</i> instead.
void SetFrequencyMax (float value)	Use SetFrequencyMax (float value, REGISTER_X1) instead.
float GetFrequencyMax ()	Use GetFrequencyMax (REGISTER_X1) instead.
void SetModeFrequency (int mode)	Use SetFrequencyDistribution (int value, REGISTER_X1) instead.
int GetModeFrequency ()	Use GetFrequencyDistribution (REGISTER_X1) instead.
void SetPeak (int index, int value)	Use SetPeak (float value, int reg) with one of the above mentioned register constants for <i>reg</i> instead. Note that the order of the parameters has changed (<i>index</i> corresponds to <i>reg</i> now).
int GetPeak (int index)	Use GetPeak (int reg) with one of the above mentioned register constants for <i>reg</i> instead.
void SetGraphMode (int index, int mode)	Use SetFunctionType (int value, int reg) with one of the above mentioned register constants for <i>reg</i> instead. Please note that the order of the parameters has changed (<i>index</i> corresponds to <i>reg</i> now).
int GetGraphMode (int index)	Use GetFunctionType (int reg) with one of the above mentioned register constants for <i>reg</i> instead.
MODE_UNIFORM	Use DIST_UNIFORM instead.
MODE_LINEAR	Use DIST_LINEAR instead.
MODE_QUADRATIC	Use DIST_QUADRATIC instead.
MODE_SQRT	Use DIST_SQRT instead.
MODE_CUBIC	Use DIST_CUBIC instead.
MODE_RANDOM	Use DIST_RND instead.
MODE_NONE	SetFunctionType (int value, int reg) and GetFunctionType (int reg) do not support this mode anymore. Set the Amplitude and the Maximum Amplitude of register <i>reg</i> to 0 in order to deactivate the base function of the register.
MODE_SINE	Use WAVE_TYPE_SINE instead.
MODE_COSINE	Use WAVE_TYPE_COSINE instead.
MODE_TRIANGLE	Use WAVE_TYPE_TRIANGLE instead.

<code>MODE_SQUARE</code>	Use <code>WAVE_TYPE_SQUARE</code> instead.
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5.2.19 SCE Image

Functions Provided By SCE Image

The following table provides an overview over all functions the effect provides.

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses the BPM control. Learn more »[Using BPM Control](#)
- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)
- This Effect uses the Position Controls. Learn more »[Using Position Controls](#)

- This Effect uses the Image List. Learn more »[Using Image Table](#)

Function	Description
void SetExtrusion (float value)	Sets the Extrusion value in percent of the matrix size (depending on the current look-at type).
float GetExtrusion ()	Returns the current Extrusion value in percent of the matrix size (depending on the current look-at type).
void SetPixelExtrusion (int value)	Sets the Extrusion value in pixels.
int GetPixelExtrusion ()	Returns the current Extrusion value in pixels.
void SetRotation (int angle)	Sets the Rotation globally for all images of the Image List. It is possible to rotate the images by multiples of 90°. This function is equal to the rotation button provided by the GUI of the effect. Valid values for <i>angle</i> are 0, 90, 180, and 270.
int GetRotation ()	Returns the currently set Rotation .
void SetTiling (int enable)	Disables Tile Mode if <i>enable</i> is set to FALSE , otherwise the Tile Mode will be enabled via TRUE .
int GetTiling ()	Returns TRUE if Tile Mode is enabled, otherwise FALSE .
void ToggleTiling ()	Enables Tile Mode or uses the default setting, depending on the current state.
void SetSeamless (int enable)	Disables Seamless if <i>enable</i> is FALSE , otherwise it will be enabled.
int GetSeamless ()	Returns TRUE if Seamless is enabled, otherwise FALSE .
void ToggleSeamless ()	Enables Seamless or uses the default setting, depending on the current state.

float GetImageWidth ()	Returns the image width of the current image in percent of the matrix width.
float GetImageHeight ()	Returns the image height of the current image in percent of the matrix height.
float GetImageDepth ()	Returns the image depth of the current image in percent of the matrix depth.
int GetImagePixelWidth ()	Returns the image width of the current image in pixels.
int GetImagePixelHeight ()	Returns the image height of the current image in pixels.
int GetImagePixelDepth ()	Returns the image depth of the current image in pixel.
float GetCurrentPositionX ()	Returns the X-position of the current image in percent of the matrix width.
float GetCurrentPositionY ()	Returns the Y-position of the current image in percent of the matrix height.
float GetCurrentPositionZ ()	Returns the Z-position of the current image in percent of the matrix depth.
int GetCurrentPixelPositionX ()	Returns the X-position of the current image in pixels.
int GetCurrentPixelPositionY ()	Returns the Y-position of the current image in pixels.
int GetCurrentPixelPositionZ ()	Returns the Z-position of the current image in pixels.
void SetPlaybackRate (float value)	Sets the Playback Rate of the image list. E.g., a <i>value</i> of 2.0 means that the image list will be running 2x faster than the original speed.
float GetPlaybackRate ()	Returns the current Playback Rate of image list.
void SetCurrentImage (int index)	Sets the specified image, using the <i>index</i> , as the currently displayed image.
int GetCurrentImage ()	Return the currently displayed image.
void SetStretchMode (int mode)	Returns the Stretch mode. See below for details.
int GetStretchMode ()	Returns the Stretch mode. See below for details.
void SetGrayscale (int enable)	Disables Grayscale if <i>enable</i> is set to FALSE . Otherwise it can be enabled using TRUE .
int GetGrayscale ()	Returns TRUE if Grayscale mode is enabled, otherwise FALSE .
void ToggleGrayscale ()	Enables Grayscale mode or uses the default setting, depending on the current state.
void SetGreyscale (int enable)	Is the same as SetGrayscale (int enable).
int GetGreyscale ()	Is the same as GetGrayscale ().
void ToggleGreyscale ()	Is the same as ToggleGrayscale ().
void SetRgwb (int enable)	Disables the RGB-To-RGBW mode if <i>enable</i> is FALSE . Otherwise it can be enabled using TRUE .
int GetRgwb ()	Returns TRUE if RGB-To-RGBW mode is enabled, otherwise FALSE .
void ToggleRgwb ()	Enables RGB-To-RGBW mode or uses the default setting, depending on the current state.
void SetFilteringMode (int mode)	Sets the Filtering mode. See below for details.
int GetFilteringMode ()	Returns the Filtering mode. See below for details.

Stretch Mode Constants

Value	Description
int <code>STRETCH_MODE_NONE</code>	Sets the stretch mode to None (no stretching).
int <code>STRETCH_MODE_MATRIX</code>	Sets the stretch mode to Matrix (stretches to the current aspect ratio of the matrix).
int <code>STRETCH_MODE_ORIGINAL</code>	Sets the stretch mode to Original (stretches to the original aspect ratio of the source).
int <code>STRETCH_MODE_4_TO_3</code>	Sets the stretch mode to 4:3 .
int <code>STRETCH_MODE_16_TO_9</code>	Sets the stretch mode to 16:9 .

Filtering Mode Constants

Value	Description
int <code>FILTERING_MODE_NEAREST_NEIGHBOR</code>	Sets the Filtering Mode to None (no filtering).
int <code>FILTERING_MODE_LINEAR</code>	Sets the Filtering Mode to Linear (may require additional performance).

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **SCE Bitmap** has been renamed to **SCE Image** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function / Constant	Description
void <code>SetAnimationSpeed</code> (float value)	Use void <code>SetPlaybackRate</code> (float value) instead.
float <code>GetAnimationSpeed</code> ()	Use float <code>GetPlaybackRate</code> () instead.
int <code>GetImageCount</code> ()	Use int <code>GetImageListCount</code> () instead. Learn more » Using Image Table
void <code>SetTile</code> (int enable)	Use void <code>SetTiling</code> (int enable) instead.
int <code>GetTile</code> ()	Use int <code>GetTiling</code> () instead.
void <code>SetGrey</code> (int enable)	Use void <code>SetGrayscale</code> (int enable) instead.

int GetGrey()	int GetGrayscale() instead.
void SetRgbToRgwb (int enable)	void SetRgwb (int enable) instead.
int GetRgbToRgwb()	Use int GetRgwb() instead.
color GetFilterColor()	Use color GetColor() instead.
void SetFilterColor (color)	Use void SetColor (color) instead.
int GetPixelImageWidth()	Use int GetImagePixelWidth() instead.
int GetPixelImageWidth()	Use int GetImagePixelHeight() instead.

5.2.20 SCE Level Color Simulator

Functions Provided By SCE Level Color Simulator

This effect uses the following functions:

- This Effect uses the Gradient Dialog. Learn more »[Using Gradient Dialog](#)
- This Effect uses Directions. Learn more »[Using Directions](#)

Function	Description
void SetFadeIn (int value)	Sets the Fade In value. Hint: This value needs to be higher than the Fade Out value or the same.
int GetFadeIn ()	Returns the Fade In value.
void SetFadeOut (int value)	Sets the Fade Out value. Hint: This value needs to be lower than the Fade In value or the same.
int GetFadeOut ()	Returns the Fade Out value.
void SetMode (int value)	Sets the Mode . See below for a list of constants.
int GetMode ()	Returns the current Generator Type . See below for a list of constants.

Mode Constants

Constant	Description
int MODE_MONO	Sets the mode to Mono .
int MODE_STEREO_LINEAR	Sets the mode to Stereo Linear .
int MODE_STEREO_RADIAL	Sets the mode to Stereo Radial .

5.2.21 SCE Metaballs

Functions Provided By SCE Metaballs

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetCount (int value)	Sets the Count of shapes.
int GetCount ()	Retrieves the current Count of shapes.
void SetSize (int value)	Sets the Size value, which is the size of the shapes in percent of the matrix size (depending on the look-at type). The Size value means the minimum shape size if the shape size distribution mode is not uniform.

int GetSize()	Returns the current Size of the shapes in percent. The return value means the minimum shape size if the shape size distribution mode is not uniform.
void SetSizeMin (int value)	Is the same as SetSize .
int GetSizeMin ()	Is the same as GetSize .
void SetSizeMax (int value)	Sets the Maximum Size value , which is the maximum size of the shapes in percent of the matrix size (depending on the look-at type). The Maximum Size value only applies if the shape size distribution mode is not uniform.
int GetSizeMax ()	Returns the current Maximum Size of the shapes in percent.
void SetSizeScale (float value)	Sets the Size Scale factor of the shapes. This feature is only supported when the size distribution mode is DIST_RND .
float GetSizeScale ()	Retrieves the current Size Scale factor.
void SetSizeDistribution (int value)	Sets the Size Distribution value which defines how the range between the current minimum and the current maximum shape size is applied to the shapes. See » here for a list of constants.
int GetSizeDistribution ()	Returns the current Size Distribution of the shapes. See » here for a list of constants.
void SeedRandomSize ()	Randomizes the sizes of the shapes. Is the same as SetSizeDistribution(DIST_RND) .
void SetOuterGlow (int value)	Sets the value for the Outer Glow of shapes. This feature is only supported by specific shape types.
int GetOuterGlow ()	Returns the value of the Outer Glow of shapes.
void SetInnerGlow (int value)	Sets the value for the Inner Glow of shapes. This feature is only supported by specific shape types.
int GetInnerGlow ()	Returns the value of the Inner Glow of shapes.
void SetBorder (int value)	Sets the Border size of shapes. This feature is only supported by specific shape types.
int GetBorder ()	Returns the Border size of shapes.
void SetColorMixingMode (int value)	Sets the Color Mixing Mode . This feature is only supported when the color table includes more than one color or when the color table is in random mode. Furthermore the color mixing link must be disabled. See below for a list of constants.
int GetColorMixingMode ()	Returns the current Color Mixing Mode .
void SetColorMixingSharpness (int value)	Sets the Color Mixing Sharpness . This feature is only supported when the color table includes more than one color or when the color table is in random mode. See below for a list of constants.
int GetColorMixingSharpness ()	Returns the current Color Mixing Sharpness .
void SetColorMixingLink (int value)	Use value TRUE to activate the Color Mixing Link . When Color Mixing Link is activated, the auto adjustment for the color mixing mode is enabled. Use value FALSE to use the default setting.
int GetColorMixingLink ()	Returns TRUE if the Color Mixing Link is enabled, otherwise FALSE .
void ToggleColorMixingLink ()	Enables or disables the Color Mixing Link , depending on the current state.
SetMotionType (int value)	Sets the Motion Type . See below for a list of constants.

int GetMotionType ()	Returns the current Motion Type .
void SetInfluence (float value)	Sets the Influence value. This feature is only supported by the motion type MOTION_TYPE_SWARM .
float GetInfluence ()	Returns the current Influence value.
void SetSeparation (float value)	Sets the Separation value. This feature is only supported by the motion type MOTION_TYPE_SWARM .
float GetSeparation ()	Returns the current Separation value.

Color Mixing Mode Constants

Constant	Description
int COLOR_MIXING_MODE_CIRCLE	Sets the color mixing mode to Circle .
int COLOR_MIXING_MODE_SQUARE	Sets the color mixing mode to Square .
int COLOR_MIXING_MODE_DIAMOND	Sets the color mixing mode to Diamond .

Color Mixing Sharpness Constants

Constant	Description
int COLOR_MIXING_SHARPNESS_VERY _BLURRY	Sets the color mixing sharpness to Very Blurry .
int COLOR_MIXING_SHARPNESS_BLUR RY	Sets the color mixing sharpness to Blurry .
int COLOR_MIXING_SHARPNESS_SLIG HTLY_BLURRY	Sets the color mixing sharpness to Slightly Blurry .
int COLOR_MIXING_SHARPNESS_MEDI UM	Sets the color mixing sharpness to Medium .
int COLOR_MIXING_SHARPNESS_SLIG HTLY_CLEAR	Sets the color mixing sharpness to Slightly Clear .
int COLOR_MIXING_SHARPNESS_CLEA R	Sets the color mixing sharpness to Clear .

int COLOR_MIXING_SHARPNESS_VERY_CLEAR	Sets the color mixing sharpness to Very Clear .
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Motion Type Constants

Constant	Description
int MOTION_TYPE_RANDOM	Sets the motion type to Random .
int MOTION_TYPE_SWARM	Sets the motion type to Swarm .

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetMaxSize (int value)	Use SetSizeMax (int value) instead.
int GetMaxSize ()	Use GetSizeMax () instead.
void SetMode (int mode)	Use SetSizeDistribution (int distribution) instead.
MODE_UNIFORM	Use DIST_UNIFORM instead.
MODE_LINEAR	Use DIST_LINEAR instead.
MODE_QUADRATIC	Use DIST_QUADRATIC instead.
MODE_SQRT	Use DIST_SQRT instead.
MODE_CUBIC	Use DIST_CUBIC instead.
MODE_RANDOM	Use DIST_RND instead.
int GetMode ()	Use GetSizeDistribution () instead.
void SetScale (float value)	Use SetSizeScale (float value) instead.
float GetScale ()	Use GetSizeScale () instead.
void SetColorMix (int colormix)	Use SetColorMixingMode (int mixingmode) instead.
MODE_CIRCLE	Use COLOR_MIXING_MODE_CIRCLE instead.
MODE_RECTANGLE	Use COLOR_MIXING_MODE_SQUARE instead.
MODE_DIAMOND	Use COLOR_MIXING_MODE_DIAMOND instead.
int GetColorMix ()	Use GetColorMixingMode () instead.

void SetSharpness (int sharpness)	Use SetColorMixingSharpness (int sharpness) instead.
MODE_VERY_BLURRY	Use COLOR_MIXING_SHARPNESS_VERY_BLURRY instead.
MODE_BLURRY	Use COLOR_MIXING_SHARPNESS_BLURRY instead.
MODE_SLIGHTLY_BLURRY	Use COLOR_MIXING_SHARPNESS_SLIGHTLY_BLURRY instead.
MODE_MEDIUM	Use COLOR_MIXING_SHARPNESS_MEDIUM instead.
MODE_SLIGHTLY_CLEAR	Use COLOR_MIXING_SHARPNESS_SLIGHTLY_CLEAR instead.
MODE_CLEAR	Use COLOR_MIXING_SHARPNESS_CLEAR instead.
MODE_VERY_CLEAR	Use COLOR_MIXING_SHARPNESS_VERY_CLEAR instead.
int GetSharpness ()	Use GetColorMixingSharpness () instead.
void SetColorMixLink (int value)	Use SetColorMixingLink (int value) instead.
int GetColorMixLink ()	Use GetColorMixingLink () instead.
void SeedRandom ()	Use SeedRandomSize () instead.

5.2.22 SCE Noise

Functions Provided By SCE Noise

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)
- This Effect uses the Size Control. Learn more »[Using Size Control](#)

Function	Description
void SetBorder (float value)	Sets the Border of objects. Valid values range from <i>0.01</i> to <i>100</i> .
float GetBorder ()	Returns the currently set Border .
void SetPixelBorder (int value)	Sets the Border of objects in pixels based on the object size.
int GetPixelBorder ()	Returns the currently set Border in pixels.
void SetOuterGlow (float value)	Sets the Outer Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetOuterGlow ()	Returns the currently set Outer Glow .
void SetPixelOuterGlow (int value)	Sets the Outer Glow of objects in pixels based on the object size.

int GetPixelOuterGlow ()	Returns the currently set Outer Glow in pixels.
void SetInnerGlow (float value)	Sets the Inner Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetInnerGlow ()	Returns the currently set Inner Glow .
void SetPixelInnerGlow (int value)	Sets the Inner Glow of objects in pixels based on the object size.
int GetPixelInnerGlow ()	Returns the currently set Inner Glow in pixels.
void SetFrequency (float value)	Sets the Frequency for the effect.
float GetFrequency ()	Returns the current Frequency value.
void SetPitchX (float value)	Sets the Pitch X value in percent which defines the X-aligned distance between objects.
float GetPitchX ()	Returns the current Pitch X in percent.
void SetPitchY (float value)	Sets the Pitch Y value in percent which defines the Y-aligned distance between objects.
float GetPitchY ()	Returns the current Pitch Y in percent.
void SetPitchZ (float value)	Sets the Pitch Z value in percent which defines the Z-aligned distance between objects.
float GetPitchZ ()	Returns the current Pitch Z in percent.
void SetPitch (float value, float value, float value)	Sets the Pitch X, Y, Z values in percent which define the distances between objects.
void SetPixelPitchX (int value)	Sets the Pitch X value in pixels, which defines the X-aligned distance between objects.
int GetPixelPitchX ()	Returns the current Pitch X in pixels.
void SetPixelPitchY (int value)	Sets the Pitch Y value in pixels, which defines the Y-aligned distance between objects.
int GetPixelPitchY ()	Returns the current Pitch Y in pixels.
void SetPixelPitchZ (int value)	Sets the Pitch Z pixel in pixels, which defines the Z-aligned distance between objects.
int GetPixelPitchZ ()	Returns the current Pitch Z in pixels.
void SetPixelPitch (int value, int value, int value)	Sets the Pitch X, Y, Z values in pixels which define the distances between objects.
void SetVariace1 (int value)	Sets the Minimum Variance for the effect.
int GetVariance1 ()	Returns the current Minimum Variance value.
void SetVariance2 (int value)	Sets the Maximum Variance for the effect.
int GetVariance2 ()	Returns the current Maximum Variance value.
void SetAlphaMix (int value)	Sets the Alpha Mix value, which defines the variance of the objects' alpha channel, in percent. Valid values for <i>value</i> range from <i>0</i> to <i>100</i> .
int GetAlphaMix ()	Returns the current Alpha Mix in percent.
void Generate ()	Creates the effect anew.
void SetMinimumSize (int value)	Sets the Minimum Size for objects.
int GetMinimumSize ()	Returns the current Minimum Size value.
void SetRecolor (int value)	Sets the Recolor option. Use TRUE to activate it. Use FALSE to deactivate it.

int GetRecolor ()	Returns TRUE if Recolor is enabled, otherwise FALSE .
void ToggleRecolor ()	Toggles Recolor .
void SetReshape (int value)	Sets the Reshape option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetReshape ()	Returns TRUE if Reshape is enabled, otherwise FALSE .
void ToggleReshape ()	Toggles Reshape .
void SetResize (int value)	Sets the Resize option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetResize ()	Returns TRUE if Resize is enabled, otherwise FALSE .
void ToggleResize ()	Toggles Resize .
void SetFade (int value)	Sets the Fade option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetFade ()	Returns TRUE if Fade is enabled, otherwise FALSE .
void ToggleFade ()	Toggles Fade .

5.2.23 SCE Plasma

Functions Provided By SCE Plasma

This effect uses the following functions:

- This Effect uses the Color Gradient. Learn more »[Using Color Gradient](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)

5.2.24 SCE Pulse / Stroboscope

Functions Provided By SCE Pulse / Stroboscope

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)

Function	Description
void SetRatio (float value)	Sets the Ratio value.

float GetRatio()	Returns the Ratio value.
void SetFade (int enable)	Sets the Fade option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetFade ()	Returns TRUE , if Fade is activated, otherwise FALSE .
void ToggleFade ()	Toggles the Fade option.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetFrequency (int frequency)	Use SetBpm (float value) instead. 60 BPM are 1Hz. A frequency of 18 Hz equals 1080 BPM.
int GetFrequency ()	Use GetBpm () instead. Divide the returned value by 60 to get the frequency value in Hz.
void SetOnTime (float time)	Use SetRatio (float value) instead. A Ratio of 80% means an on-time of 0.2s and an off-time of 0.8s with 60 BPM (1Hz).
float GetOnTime ()	Use GetRatio () instead.
void SetOffTime (float time)	Use SetRatio (float value) instead. A Ratio of 80% means an on-time of 0.2s and an off-time of 0.8s with 60 BPM (1Hz).
float GetOffTime ()	Use GetRatio () instead.
void SetMode (int mode)	Use SetRatio (float value) instead. A value of 50.0 equals the old PULSE mode.
int GetMode ()	Use GetRatio () instead. A value of 50.0 equals the old PULSE mode.

5.2.25 SCE Screen Capture

Functions Provided By SCE Screen Capture

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses the BPM control. Learn more »[Using BPM Control](#)
- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)
- This Effect uses the Position Controls. Learn more »[Using Position Controls](#)

Function	Description
void SetExtrusion (float value)	Sets the Extrusion value in percent of the matrix size (depending on the current look-at type).
float GetExtrusion ()	Returns the current Extrusion value in percent of the matrix size (depending on the current look-at type).
void SetPixelExtrusion (int value)	Sets the Extrusion value in pixels.
int GetPixelExtrusion ()	Returns the current Extrusion value in pixels.
void SetRotation (int angle)	Sets the Rotation globally for all images of the Image List. It is possible to rotate the images by multiples of 90°. This function is equal to the rotation button provided by the GUI of the effect. Valid values for <i>angle</i> are 0, 90, 180, and 270.
int GetRotation ()	Returns the currently set Rotation .
void SetTiling (int enable)	Disables Tile Mode if <i>enable</i> is set to FALSE , otherwise the Tile Mode will be enabled via TRUE .
int GetTiling ()	Returns TRUE if Tile Mode is enabled, otherwise FALSE .
void ToggleTiling ()	Enables Tile Mode or uses the default setting, depending on the current state.
void SetSeamless (int enable)	Disables Seamless if <i>enable</i> is FALSE , otherwise it will be enabled.
int GetSeamless ()	Returns TRUE if Seamless is enabled, otherwise FALSE .
void ToggleSeamless ()	Enables Seamless or uses the default setting, depending on the current state.
float GetImageWidth ()	Returns the image width of the current image in percent of the matrix width.
float GetImageHeight ()	Returns the image height of the current image in percent of the matrix height.
float GetImageDepth ()	Returns the image depth of the current image in percent of the matrix depth.
int GetImagePixelWidth ()	Returns the image width of the current image in pixels.
int GetImagePixelHeight ()	Returns the image height of the current image in pixels.

int GetImagePixelDepth ()	Returns the image depth of the current image in pixel.
float GetCurrentPositionX ()	Returns the X-position of the current image in percent of the matrix width.
float GetCurrentPositionY ()	Returns the Y-position of the current image in percent of the matrix height.
float GetCurrentPositionZ ()	Returns the Z-position of the current image in percent of the matrix depth.
int GetCurrentPixelPositionX ()	Returns the X-position of the current image in pixels.
int GetCurrentPixelPositionY ()	Returns the Y-position of the current image in pixels.
int GetCurrentPixelPositionZ ()	Returns the Z-position of the current image in pixels.
void SetStretchMode (int mode)	Sets the Stretch mode. See below for details.
int GetStretchMode ()	Returns the Stretch mode. See below for details.
void SetGrayscale (int enable)	Disables Grayscale if <i>enable</i> is set to FALSE . Otherwise it can be enabled using TRUE .
int GetGrayscale ()	Returns TRUE if Stretch mode is enabled, otherwise FALSE .
void ToggleGrayscale ()	Enables Stretch mode or uses the default setting, depending on the current state.
void SetGreyscale (int enable)	Is the same as SetGrayscale (int enable).
int GetGreyscale ()	Is the same as GetGrayscale ().
void ToggleGreyscale ()	Is the same as ToggleGrayscale ().
void SetRgbw (int enable)	Disables the RGB-To-RGBW mode if <i>enable</i> is FALSE , otherwise it can be enabled using TRUE .
int GetRgbw ()	Returns TRUE if RGB-To-RGBW mode is enabled, otherwise FALSE .
void ToggleRgbw ()	Enables RGB-To-RGBW mode or uses the default setting, depending on the current state.
void SetFilteringMode (int mode)	Sets the Filtering mode. See below for details.
int GetFilteringMode ()	Returns the Filtering mode. See below for details.
void SetCaptureCoordinateTop (int coordinate)	Sets the Top coordinate of the capture area.
int GetCaptureCoordinateTop ()	Returns the currently set Top coordinate of the capture area.
void SetCaptureCoordinateLeft (int coordinate)	Sets the Left coordinate of the capture area.
int GetCaptureCoordinateLeft ()	Returns the currently set Left coordinate of the capture area.
void SetCaptureAreaWidth (int width)	Sets the Width of the capture area.
int GetCaptureAreaWidth ()	Returns the currently set Width of the capture area.
void SetCaptureAreaHeight (int height)	Sets the Height of the capture area.
int GetCaptureAreaHeight ()	Returns the currently set Height of the capture area.
void SetCaptureArea (int left, int top, int width, int height)	Sets the whole capture area with its left and top coordinates as well as the required width and height .
void SetCaptureFrameRate (float value)	Sets the Capture Frame Rate to use for screen capturing. The default value is 50.0.

float GetCaptureFrameRate()	Returns the currently set Capture Frame Rate .
void SetAeroOff()	Activates Aero Off .
int GetAeroOff()	Returns if Aero Off is enabled (1) or disabled (0).

Stretch Mode Constants

Value	Description
int STRETCH_MODE_NONE	Sets the stretch mode to None (no stretching).
int STRETCH_MODE_MATRIX	Sets the stretch mode to Matrix (stretches to the current aspect ratio of the matrix).
int STRETCH_MODE_ORIGINAL	Sets the stretch mode to Original (stretches to the original aspect ratio of the source).
int STRETCH_MODE_4_TO_3	Sets the stretch mode to 4:3 .
int STRETCH_MODE_16_TO_9	Sets the stretch mode to 16:9 .

Filtering Mode Constants

Value	Description
int FILTERING_MODE_NEAREST_NEIGHBOR	Sets the Filtering Mode to None (no filtering).
int FILTERING_MODE_LINEAR	Sets the Filtering Mode to Linear (may require additional performance).

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void SetNoAero (int enable)	Use void SetAeroOff() instead.
int GetNoAero ()	Use int GetAeroOff() instead.
void ToggleNoAero ()	Has been removed.

5.2.26 SCE Shapes

Functions Provided By SCE Shapes

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetFade (float value)	Sets the Fade value, which defines how fast the shapes disappear in BPM. Valid values for <i>value</i> range from 1 to 3000.
float GetFade ()	Returns the current Fade in BPM.
void SetSize (float value)	Sets the Size value, which is the size of the shapes, in percent of the matrix size (depending on the shape alignment). The size <i>value</i> means the minimum shape size if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 0.01 to 1000.
float GetSize ()	Returns the current Size of the shapes in percent. The return value means the minimum shape size if the shape size distribution mode is not uniform.
void SetPixelSize (int value)	Sets the Size value, which is the size of the shapes, in pixels. The size <i>value</i> means the minimum shape size, if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 1 to ten times the matrix size (depending on the shape alignment).
int GetPixelSize ()	Returns the current Size of the shapes in pixels. The return value means the minimum shape size if the shape size distribution mode is not uniform.
void SetSizeMax (float value)	Sets the Maximum Size value, which is the maximum size of the shapes, in percent of the matrix size (depending on the shape alignment). The maximum size <i>value</i> only applies if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 0.01 to 1000.
float GetSizeMax ()	Returns the current Maximum Size of the shapes in percent.
void SetPixelSizeMax (int value)	Sets the Maximum Size value, which is the maximum size of the shapes, in pixels. The maximum size <i>value</i> only applies if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 1 to ten times the matrix size (depending on the shape alignment).
int GetPixelSizeMax ()	Returns the current Maximum Size of the shapes in pixels.
void SetSizeDistribution (int value)	Sets the size Distribution value, which defines how the range between the current minimum and the current maximum shape size is applied to the shapes. See » here for a list of constants.
int GetSizeDistribution ()	Returns the current size Distribution of the shapes. See » here for a list of constants.
void SeedRandomSize ()	Randomizes the sizes of the shapes. Is the same as SetSizeDistribution (DIST_RND).

void SetPitch1 (float value)	Sets the Pitch 1 value, which is the x-distance of the shapes, in percent of the matrix size. Valid values for <i>value</i> range from 0.01 to 100.
float GetPitch1 ()	Returns the current Pitch 1 of the shapes in percent.
void SetPixelPitch1 (int value)	Sets the Pitch 1 value, which is the x-distance of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the matrix size.
int GetPixelPitch1 ()	Returns the current Pitch 1 of the shapes in pixels.
void SetPitch2 (float value)	Sets the Pitch 2 value, which is the y-distance of the shapes, in percent of the matrix size. Valid values for <i>value</i> range from 0.01 to 100.
float GetPitch2 ()	Returns the current Pitch 2 of the shapes in percent.
void SetPixelPitch2 (int value)	Sets the Pitch 2 value, which is the y-distance of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the matrix size.
int GetPixelPitch2 ()	Returns the current Pitch 2 of the shapes in pixels.
void SetPitch3 (float value)	Sets the Pitch 3 value, which is the z-distance of the shapes, in percent of the matrix size. Valid values for <i>value</i> range from 0.01 to 100.
float GetPitch3 ()	Returns the current Pitch 3 of the shapes in percent.
void SetPixelPitch3 (int value)	Sets the Pitch 3 value, which is the z-distance of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the matrix size.
int GetPixelPitch3 ()	Returns the current Pitch 3 of the shapes in pixels.
void SetPitch (float x, float y, float z)	Sets the pitches 1, 2 and 3 of the shapes at once, in percent of the matrix size. Valid values for <i>x</i> , <i>y</i> and <i>z</i> range from 0.01 to 100.
void SetPixelPitch (int x, int y, int z)	Sets the pitches 1, 2 and 3 of the shapes at once, in pixels. Valid values for <i>x</i> , <i>y</i> and <i>z</i> range from 1 to the matrix size.
void SetBorder (float value)	Sets the Border value, which is the line width of the shapes, in percent of the shape size. Valid values for <i>value</i> range from 0.01 to 100.
float GetBorder ()	Returns the current Border of the shapes in percent.
void SetPixelBorder (int value)	Sets the Border value, which is the line width of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the shape size.
int GetPixelBorder ()	Returns the current Border of the shapes in pixels.
void SetAlphaMix (int value)	Sets the Alpha Mix value, which defines the variance of the shapes' alpha channel, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetAlphaMix ()	Returns the current Alpha Mix in percent.
void SetCount (int value)	Sets the Count value, which defines how much shapes are created at once. Valid values for <i>value</i> range from 1 to 100. Use BPM and Fade as well to control how much shapes are displayed.
int GetCount ()	Returns the current Count .
void SetOuterGlow (float value)	Sets the Outer Glow of objects. Valid values range from 0.00 to 100.
float GetOuterGlow ()	Returns the currently set Outer Glow .
void SetPixelOuterGlow (int value)	Sets the Outer Glow of objects in pixels based on the object size.
int GetPixelOuterGlow ()	Returns the currently set Outer Glow in pixels.
void SetInnerGlow (float value)	Sets the Inner Glow of objects. Valid values range from 0.00 to 100.

float GetInnerGlow ()	Returns the currently set Inner Glow .
void SetPixelInnerGlow (int value)	Sets the Inner Glow of objects in pixels based on the object size.
int GetPixelInnerGlow ()	Returns the currently set Inner Glow in pixels.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetVectorWidth (float vWidth)	Use SetSize (float value) instead. Note that the unit of <i>vWidth</i> changed from normalized values to percent.
float GetVectorWidth ()	Use GetSize () instead. Note that the unit of the return value changed from normalized values to percent.
void SetPixelWidth (int iWidth)	Use SetPixelSize (int value) instead.
int GetPixelWidth ()	Use GetPixelSize () instead.
void SetVectorBorder (float vBorder)	Use SetBorder (float value) instead. Note that the unit of <i>vBorder</i> changed from normalized values to percent.
float GetVectorBorder ()	Use GetBorder () instead. Note that the unit of the return value changed from normalized values to percent.

5.2.27 SCE Simple Shape

Functions Provided By SCE Simple Shape

This effect uses the following functions:

- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)
- This Effect uses the Size Control. Learn more »[Using Size Control](#)
- This Effect uses the Position Control. Learn more »[Using Position Control](#)

Function	Description
void SetBorder (float value)	Sets the Border of objects. Valid values range from <i>0.01</i> to <i>100</i> .
float GetBorder ()	Returns the currently set Border .
void SetPixelBorder (int value)	Sets the Border of objects in pixels based on the object size.
int GetPixelBorder ()	Returns the currently set Border in pixels.

void SetOuterGlow (float value)	Sets the Outer Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetOuterGlow ()	Returns the currently set Outer Glow .
void SetPixelOuterGlow (int value)	Sets the Outer Glow of objects in pixels based on the object size.
int GetPixelOuterGlow ()	Returns the currently set Outer Glow in pixels.
void SetInnerGlow (float value)	Sets the Inner Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetInnerGlow ()	Returns the currently set Inner Glow .
void SetPixelInnerGlow (int value)	Sets the Inner Glow of objects in pixels based on the object size.
int GetPixelInnerGlow ()	Returns the currently set Inner Glow in pixels.
void SetOuterGlowInterpolationType (int type)	Sets the Outer Glow Interpolation Type . See below for a list of constants.
float GetOuterGlowInterpolationType ()	Returns the current Outer Glow Interpolation Type .
void SetInnerGlowInterpolationType (int type)	Sets the Inner Glow Interpolation Type . See below for a list of constants.
int GetInnerGlowInterpolationType ()	Returns the current Inner Glow Interpolation Type .
void SetProportion (float value)	Sets the Proportion of objects. Valid values range from <i>0.01</i> to <i>100</i> .
float GetProportion ()	Returns the currently set Proportion .
void SetDiagonals (float value)	Sets the Diagonals of objects. Valid values range from <i>0.01</i> to <i>100</i> .
float GetDiagonals ()	Returns the currently set Diagonals .

Interpolation Type Constants

Constant	Description
int INTERPOLATION_TYPE_LINEAR	Sets the Interpolation Type to Linear .
int INTERPOLATION_TYPE_EASE_BOUNCE_IN	Sets the Interpolation Type to Ease In Bounce .
int INTERPOLATION_TYPE_EASE_BOUNCE_OUT	Sets the Interpolation Type to Ease Out Bounce .
int INTERPOLATION_TYPE_EASE_BOUNCE_INOUT	Sets the Interpolation Type to Ease In Out Bounce .
int INTERPOLATION_TYPE_EASE_CIRC_IN	Sets the Interpolation Type to Ease In Circular .
int INTERPOLATION_TYPE_EASE_CIRC_OUT	Sets the Interpolation Type to Ease Out Circular .
int INTERPOLATION_TYPE_EASE_CIRC_INOUT	Sets the Interpolation Type to Ease In Out Circular .
int INTERPOLATION_TYPE_EASE_CUBIC_IN	Sets the Interpolation Type to Ease In Cubic .

int <code>INTERPOLATION_TYPE_EASE_CUBIC_OUT</code>	Sets the Interpolation Type to Ease Out Cubic .
int <code>INTERPOLATION_TYPE_EASE_CUBIC_INOUT</code>	Sets the Interpolation Type to Ease In Out Cubic .
int <code>INTERPOLATION_TYPE_EASE_SINE_IN</code>	Sets the Interpolation Type to Ease In Sinusoidal .
int <code>INTERPOLATION_TYPE_EASE_SINE_OUT</code>	Sets the Interpolation Type to Ease Out Sinusoidal .
int <code>INTERPOLATION_TYPE_EASE_SINE_INOUT</code>	Sets the Interpolation Type to Ease In Out Sinusoidal .
int <code>INTERPOLATION_TYPE_EASE_EXPO_IN</code>	Sets the Interpolation Type to Ease In Exponential .
int <code>INTERPOLATION_TYPE_EASE_EXPO_OUT</code>	Sets the Interpolation Type to Ease Out Exponential .
int <code>INTERPOLATION_TYPE_EASE_EXPO_INOUT</code>	Sets the Interpolation Type to Ease In Out Exponential .

5.2.28 SCE Starfield

Functions Provided By SCE Starfield

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetLength (int value)	Sets the Length value, which defines how long the trace of the shapes is. Valid values for <i>value</i> range from 1 to 1000.
int GetLength ()	Returns the current Length .
void SetCount (int value)	Sets the Count value, which is the number of the displayed shapes. Valid values for <i>value</i> range from 1 to 1000.
int GetCount ()	Returns the current Count .
void SetSize (float value)	Sets the Size value, which is the size of the shapes in percent of the matrix size (depending on the look-at type). The Size value means the minimum shape size if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 0.01 to 1000.

float GetSize()	Returns the current Size of the shapes in percent. The return value means the minimum shape size if the shape size distribution mode is not uniform.
void SetPixelSize (int value)	Sets the size <i>value</i> , which is the size of the shapes, in pixels. The size <i>value</i> means the minimum shape size if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 1 to ten times the matrix size (depending on the look-at type).
int GetPixelSize()	Returns the current Size of the shapes in pixels. The return value means the minimum shape size, if the shape size distribution mode is not uniform.
void SetSizeMax (float value)	Sets the Maximum Size <i>value</i> , which is the maximum size of the shapes in percent of the matrix size (depending on the look-at type). The Maximum Size <i>value</i> only applies if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 0.01 to 1000.
float GetSizeMax()	Returns the current Maximum Size of the shapes in percent.
void SetPixelSizeMax (int value)	Sets the Maximum Size <i>value</i> , which is the maximum size of the shapes, in pixels. The Maximum Size <i>value</i> only applies if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 1 to ten times the matrix size (depending on the look-at type).
int GetPixelSizeMax()	Returns the current Maximum Size of the shapes in pixels.
void SetSizeDistribution (int value)	Sets the Size Distribution <i>value</i> , which defines how the range between the current minimum and the current maximum shape size is applied to the shapes. See » here for a list of constants.
int GetSizeDistribution()	Returns the current Size Distribution of the shapes. See » here for a list of constants.
void SeedRandomSize()	Randomizes the sizes of the shapes. Same as SetSizeDistribution (DIST_RND).
void SetRotation (int value)	Sets the Rotation <i>value</i> , which is the rotation of the flight paths, in degrees. The Rotation <i>value</i> means the minimum rotation if the rotation distribution is not uniform. Valid values for <i>value</i> range from -3600 to 3600.
int GetRotation()	Returns the current Rotation of the flight paths in degrees. The return value means the minimum rotation if the rotation distribution is not uniform.
void SetRotationMax (int value)	Sets the Maximum Rotation <i>value</i> , which is the maximum rotation of the flight paths, in degrees. The Maximum Rotation <i>value</i> only applies if the rotation distribution is not uniform. Valid values for <i>value</i> range from -3600 to 3600.
int GetRotationMax()	Returns the current Maximum Rotation of the flight paths in degrees.
void SetRotationDistribution (int value)	Sets the Rotation Distribution <i>value</i> , which defines how the range between the current minimum and the current maximum rotation is applied to the flight paths. See » here for a list of constants.
int GetRotationDistribution()	Returns the current Rotation Distribution of the flight paths. See » here for a list of constants.
void SeedRandomRotation()	Randomizes the rotations of the flight paths. Same as SetRotationDistribution (DIST_RND).
void SetDistortion (int value)	Sets the Distortion <i>value</i> , which defines how deep the 3D space appears. Valid values for <i>value</i> range from 1 to 100.

int GetDistortion ()	Returns the current Rotation Distribution .
void SetInvert (int value)	Use <i>value</i> TRUE to invert the flight paths, which means that the objects move from near to far. Use <i>value</i> FALSE to use the default setting, which is from far to near.
int GetInvert ()	Returns TRUE , if the objects move from near to far, otherwise FALSE .
void ToggleInvert ()	Inverts the flight paths or uses the default setting, depending on the current state.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetWidth (int width)	Use SetSize (float value) instead.
int GetWidth ()	Use GetSize () instead.
void SetDepth (int depth)	Use SetDistortion (int value) instead.
int GetDepth ()	Use GetDistortion () instead.
void SetRotation (int rotation)	The unit of the value <i>rotation</i> changed from percent to degrees.
int GetRotation ()	The unit of the return value changed from percent to degrees.
DIR_OUTWARDS	SetDirection (int direction) and GetDirection () do not support this special direction anymore. Use SetInvert (FALSE) instead.
DIR_INWARDS	SetDirection (int direction) and GetDirection () do not support this special direction anymore. Use SetInvert (TRUE) instead.

5.2.29 SCE Swarm

Functions Provided By SCE Swarm

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)
- This Effect uses the Size Control. Learn more »[Using Size Control](#)

Function	Description
void SetBorder (float value)	Sets the Border of objects. Valid values range from <i>0.01</i> to <i>100</i> .
float GetBorder ()	Returns the currently set Border .
void SetPixelBorder (int value)	Sets the Border of objects in pixels based on the object size.
int GetPixelBorder ()	Returns the currently set Border in pixels.
void SetOuterGlow (float value)	Sets the Outer Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetOuterGlow ()	Returns the currently set Outer Glow .
void SetPixelOuterGlow (int value)	Sets the Outer Glow of objects in pixels based on the object size.
int GetPixelOuterGlow ()	Returns the currently set Outer Glow in pixels.
void SetInnerGlow (float value)	Sets the Inner Glow of objects. Valid values range from <i>0.00</i> to <i>100</i> .
float GetInnerGlow ()	Returns the currently set Inner Glow .
void SetPixelInnerGlow (int value)	Sets the Inner Glow of objects in pixels based on the object size.
int GetPixelInnerGlow ()	Returns the currently set Inner Glow in pixels.
void SetBounce (int enable)	Disables Bounce Mode if <i>enable</i> is set to FALSE , otherwise the Bounce Mode will be enabled via TRUE .
int GetBounce ()	Returns TRUE if Bounce Mode is enabled, otherwise FALSE .
void ToggleBounce ()	Disables Bounce Mode or uses the default setting, depending on the current state.
void SetCount (int value)	Sets the Count value, which defines how much objects are created at once.
int GetCount ()	Returns the current Count value.
void SetInfluence (float value)	Sets the Influence value.
float GetInfluence ()	Returns the current Influence value.
void SetSeparation (float value)	Sets the Separation value.
float GetSeparation ()	Returns the current Separation value.
void SetImitation (float value)	Sets the Imitation value.

float GetImitation ()	Returns the current Imitation value.
void SetLength (float value)	Sets the Length value.
float GetLength ()	Returns the current Length value.

5.2.30 SCE Ticker / Scrolling Text

Functions Provided By SCE Ticker / Scrolling Text

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)
- This Effect uses the Position Controls. Learn more »[Using Position Controls](#)

Function	Description
void SetExtrusion (float value)	Sets the Extrusion value in percent of the matrix size (depending on the current look-at type).
float GetExtrusion ()	Returns the current Extrusion value in percent of the matrix size (depending on the current look-at type).
void SetPixelExtrusion (int value)	Sets the Extrusion value in pixels.
int GetPixelExtrusion ()	Returns the current Extrusion value in pixels.
void SetRotation (int angle)	Sets the Rotation globally for all images of the Image List. It is possible to rotate the images by multiples of 90°. This function is equal to the rotation button provided by the GUI of the effect. Valid values for <i>angle</i> are 0, 90, 180, and 270.
int GetRotation ()	Returns the currently set Rotation .
void SetTiling (int enable)	Disables Tile Mode if <i>enable</i> is set to FALSE , otherwise the Tile Mode will be enabled via TRUE .
int GetTiling ()	Returns TRUE if Tile Mode is enabled, otherwise FALSE .
void ToggleTiling ()	Enables Tile Mode or uses the default setting, depending on the current state.
void SetSeamless (int enable)	Disables Seamless if <i>enable</i> is FALSE , otherwise it will be enabled.
int GetSeamless ()	Returns TRUE if Seamless is enabled, otherwise FALSE .
void ToggleSeamless ()	Enables Seamless or uses the default setting, depending on the current state.
float GetImageWidth ()	Returns the image width of the current image in percent of the matrix width.

float GetImageHeight ()	Returns the image height of the current image in percent of the matrix height.
float GetImageDepth ()	Returns the image depth of the current image in percent of the matrix depth.
int GetImagePixelWidth ()	Returns the image width of the current image in pixels.
int GetImagePixelHeight ()	Returns the image height of the current image in pixels.
int GetImagePixelDepth ()	Returns the image depth of the current image in pixel.
float GetCurrentPositionX ()	Returns the X-position of the current image in percent of the matrix width.
float GetCurrentPositionY ()	Returns the Y-position of the current image in percent of the matrix height.
float GetCurrentPositionZ ()	Returns the Z-position of the current image in percent of the matrix depth.
int GetCurrentPixelPositionX ()	Returns the X-position of the current image in pixels.
int GetCurrentPixelPositionY ()	Returns the Y-position of the current image in pixels.
int GetCurrentPixelPositionZ ()	Returns the Z-position of the current image in pixels.
void SetText (string text)	Sets the Text the effect displays.
string GetText ()	Retrieves the Text shown by the effect.
void SetTextSplittingMode (int mode)	Sets the text Splitting mode. See below for further details.
int GetTextSplittingMode ()	Returns the current text Splitting mode. See below for further details.
void SetReverseCharacters (int enable)	Disables Reverse Characters if <i>enable</i> is set to FALSE . Otherwise, use TRUE .
int GetReverseCharacters ()	Returns TRUE if Reverse Characters is active, otherwise FALSE is returned.
void SetReverseWords (int enable)	Disables Reverse Characters if <i>enable</i> is set to FALSE . Otherwise, use TRUE .
int GetReverseWords ()	Returns TRUE if Reverse Characters is active, otherwise FALSE is returned.
int GetFontWidth ()	Returns the Width of the currently used font.
void SetFontWidth (int width)	Sets the Width of the font.
int GetFontHeight ()	Returns the Height of currently used font.
void SetFontHeight (int height)	Sets the Height of the font.
int GetFontItalic ()	Returns if the font used is in italics .
void SetFontItalic (int value)	Sets the font in italics (<i>value</i> = TRUE) or not (<i>value</i> = FALSE).
int GetFontUnderline ()	Returns if the currently used font is underlined .
void SetFontUnderline (int value)	Sets underlining for the font (<i>value</i> = TRUE) or not (<i>value</i> = FALSE).
int GetFontStrikeOut ()	Returns if the a strikeout font is used.
void SetFontStrikeOut (int value)	Sets strikeout for the font (<i>value</i> = TRUE) or not (<i>value</i> = FALSE).
int GetFontWeight ()	Returns the Weight of the currently used font.

void SetFontWeight (int value)	Sets the Weight of the font. Valid values for <i>value</i> range from 0 to 1000.
string GetFontFaceName ()	Returns the Name of the font currently in use.
void SetFontFaceName (string name)	Sets which font to use. Use the exact font name. A maximum of 31 characters is allowed for <i>string</i> . Example: SetFontFaceName("Arial");
void SetStretchMode (int mode)	Sets the Stretch mode. See below for details.
int GetStretchMode ()	Returns the Stretch mode. See below for details.
void SetFilteringMode (int mode)	Sets the Filtering mode. See below for details.
int GetFilteringMode ()	Returns the Filtering mode. See below for details.

Stretch Mode Constants

Value	Description
int STRETCH_MODE_NONE	Sets the stretch mode to None (no stretching).
int STRETCH_MODE_MATRIX	Sets the stretch mode to Matrix (stretches to the current aspect ratio of the matrix).
int STRETCH_MODE_ORIGINAL	Sets the stretch mode to Original (stretches to the original aspect ratio of the source).
int STRETCH_MODE_4_TO_3	Sets the stretch mode to 4:3 .
int STRETCH_MODE_16_TO_9	Sets the stretch mode to 16:9 .

Filtering Mode Constants

Value	Description
int FILTERING_MODE_NEAREST_NEIGHBOR	Sets the Filtering Mode to None (no filtering).
int FILTERING_MODE_LINEAR	Sets the Filtering Mode to Linear (may require additional performance).

Text Mode Constants

The ticker effect supports different modes. The given text can be interpreted as a whole sentence, as single words, or even single characters. With the function [SetTextSplittingMode](#) it is possible to set the mode using the following parameters:

Constant	Description
int <code>MODE_SENTENCE</code>	Sets the sentence mode (<i>Splitting None</i>).
int <code>MODE_WORD</code>	Sets the word mode (<i>Splitting Words</i>).
int <code>MODE_CHAR</code>	Sets the character mode (<i>Splitting Characters</i>).

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Define	Description
void <code>SetTextMode</code> (int mode)	Use void <code>SetTextSplittingMode</code> (int mode) instead.
void <code>GetTextMode</code> (int mode)	Use int <code>GetTextSplittingMode</code> () instead.
void <code>SetReverseWord</code> (int enable)	Use void <code>SetReverseWords</code> (int enable) instead.
int <code>GetReverseWord</code> ()	Use int <code>GetReverseWords</code> () instead.
void <code>SetReverseSentence</code> (int enable)	Use void <code>SetReverseCharacters</code> (int enable) instead.
int <code>GetReverseSentence</code> ()	Use int <code>GetReverseCharacters</code> () instead.
void <code>SetTextColor</code> (color col)	Use void <code>SetColor</code> (color col) instead.
color <code>GetTextColor</code> ()	Use color <code>GetColor</code> () instead.
<code>TM_SENTENCE</code>	Use <code>MODE_SENTENCE</code> instead.
<code>TM_WORD</code>	Use <code>MODE_WORD</code> instead.
<code>TM_CHAR</code>	Use <code>MODE_CHAR</code> instead.
void <code>SetPixelTextOffset</code> (int x, int y)	Use void <code>SetPixelPosition</code> (int x, int y, int z) instead.
int <code>GetPixelTextOffsetX</code> ()	Use int <code>GetPixelPositionX</code> () instead.
int <code>GetPixelTextOffsetY</code> ()	Use int <code>GetPixelPositionY</code> () instead.
int <code>GetPixelTextPosX</code> ()	Use int <code>GetCurrentPixelPositionX</code> () instead.
int <code>GetPixelTextPosY</code> ()	Use int <code>GetCurrentPixelPositionY</code> () instead.
void <code>SetSmooth</code> (int enable)	Use void <code>SetStep</code> (int enable) instead.
int <code>GetSmooth</code> ()	Use int <code>GetStep</code> () instead.
int <code>GetPixelTextWidth</code> ()	Use int <code>GetImagePixelWidth</code> () instead.
int <code>GetPixelTextHeight</code> ()	Use int <code>GetImagePixelHeight</code> () instead.
void <code>SetDir</code> (int)	Use void <code>SetDirection</code> (int) instead.

void **SetStop**(int)Use void **SetDirection**(**DIRECTION_NONE**) instead.

Full Example 1

The following example writes the current time onto the matrix. Furthermore, it moves the text from side to side.

```

time g_time = GetTime();

void InitEffect()
{
    SetText("Hallo Dresden");
    SetDirection(DIRECTION_TOP);
}

void PreRenderEffect()
{
    time t = GetTime();

    int diff = t.sec - g_time.sec;

    if(diff > 0 || diff < 0) {
        g_time = t;
        string s;
        if(g_time.hour < 10) {
            s += "0";
        }
        s += (string)g_time.hour;
        s += ":";

        if(g_time.min < 10)
            s += "0";
        s += (string)g_time.min;

        s += ".";

        if(g_time.sec < 10)
            s += "0";
        s += (string)g_time.sec;

        SetText(s);
    }

    if(GetDirection() == DIRECTION_LEFT) {
        if(GetCurrentPixelPositionX() < 0) {
            SetDirection(DIRECTION_RIGHT);
        }
    } else if(GetDirection() == DIRECTION_RIGHT) {
        if(GetCurrentPixelPositionX() > GetMatrixWidth() - GetImagePixelWidth()) {
            SetDirection(DIRECTION_LEFT);
        }
    } else {
        SetDirection(DIRECTION_LEFT);
    }
}

```

```
}

void PostRenderEffect()
{
    int i = 128;
    ClearAlpha(i);
    WriteText(GetText());
}

int compareTimes(time t1, time t2)
{
    int result = 0;
    if(t1.hour < t2.hour)
        result = -1;
    else if(t1.hour > t2.hour)
        result = 1;
    else {
        if(t1.min < t2.min)
            result = -1;
        else if(t1.min > t2.min)
            result = 1;
        else {
            if(t1.sec < t2.sec)
                result = -1;
            else if(t1.sec > t2.sec)
                result = 1;
        }
    }

    return(result);
}
```

Full Example 2

This example includes SetText and GetTime.

»[Full Example 2](#)

Example 3

This example creates a digital clock and therefore displays the current time using the SCE Ticker Effect.

```
@scriptname="macro clock with sce_ticker";
@author="sven";
@version="1.0";
@description="write the current time into the ticker text fields";

void InitEffect()
```

```

{
}

void PreRenderEffect()
{
    time t = GetTime();
    SetText(ZeroString(t.hour) + ":" + ZeroString(t.min) + ":" + ZeroString(t.sec));
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

string ZeroString(int value)
{
    if(value<10)
        return "0"+(string)value;
    return (string)value;
}

```

5.2.31 SCE Tubes

Functions Provided By SCE Tubes

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)

Function	Description
void SetFade (int value)	Sets the Fade value.
int GetFade ()	Returns the Fade value.
void SetSize1 (float value)	Sets the Size 1 value
float GetSize1 ()	Returns the Size 1 value.
void SetPitch1 (float value)	Sets the Pitch 1 value
float GetPitch1 ()	Returns the Pitch 1 value.
void SetSize2 (float value)	Sets the Size 2 value
float GetSize2 ()	Returns the Size 2 value.
void SetPitch2 (float value)	Sets the Pitch 2 value

float GetPitch2 ()	Returns the Pitch 2 value.
void SetAlphaMix (int value)	Sets the Alpha Mix value.
int GetAlphaMix ()	Returns the Alpha Mix value.
void SetInvert (int value)	Sets the Invert option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetInvert ()	Returns TRUE , if the Invert option is activated, otherwise FALSE .
void ToggleInvert ()	Toggle the Invert option.
void SetMirror (int value)	Sets the Mirror option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetMirror ()	Returns TRUE , if the Mirror option is activated, otherwise FALSE .
void ToggleMirror ()	Toggle the Mirror option.
void SetTubesVertical (int value)	Use TRUE to activate vertical Tubes . Use FALSE to deactivate it.
int GetTubesVertical ()	Returns TRUE if vertical Tubes are activated, otherwise FALSE .
void ToggleTubesVertical ()	Toggle vertical Tubes .
void SetTubesHorizontal (int value)	Use TRUE to activate horizontal Tubes . Use FALSE to deactivate it.
int GetTubesHorizontal ()	Returns TRUE if horizontal Tubes are activated, otherwise FALSE .
void ToggleTubesHorizontal ()	Toggle horizontal Tubes .
void SetTubesDepth (int value)	Use TRUE to activate depth Tubes . Use FALSE to deactivate it.
int GetTubesDepth ()	Returns TRUE if depth Tubes are activated, otherwise FALSE .
void ToggleTubesDepth ()	Toggle depth Tubes .
void SetCount (int value)	Sets the Count value.
int GetCount ()	Returns the Count value.
void SetGeneratorType (int value)	Sets the Generator Type . See below for a list of constants.
int GetGeneratorType ()	Returns the current Generator Type . See below for a list of constants.

Generator Type Constants

Constant	Description
int GENERATOR_TYPE_RANDOM	Sets the generator type to Random .
int GENERATOR_TYPE_LINEAR	Sets the generator type to Linear .
int GENERATOR_TYPE_PING_PONG	Sets the generator type to Ping Pong .

5.2.32 SCE Video

Functions Provided By SCE Video

This effect uses the following functions:

Note: Certain functions may not work due to restrictions and limitations of the video codec. (E.g. the Bounce Playback is only available for the QuickTime codec formats.)

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)
- This Effect uses the Position Controls. Learn more »[Using Position Controls](#)

Function	Description
void SetExtrusion (float value)	Sets the Extrusion value in percent of the matrix size (depending on the current look-at type).
float GetExtrusion ()	Returns the current Extrusion value in percent of the matrix size (depending on the current look-at type).
void SetPixelExtrusion (int value)	Sets the Extrusion value in pixels.
int GetPixelExtrusion ()	Returns the current Extrusion value in pixels.
void SetRotation (int angle)	Sets the Rotation globally for all images of the Image List. It is possible to rotate the images by multiples of 90°. This function is equal to the rotation button provided by the GUI of the effect. Valid values for <i>angle</i> are 0, 90, 180, and 270.
int GetRotation ()	Returns the currently set Rotation .
void SetTiling (int enable)	Disables Tile Mode if <i>enable</i> is set to FALSE , otherwise the Tile Mode will be enabled via TRUE .
int GetTiling ()	Returns TRUE if Tile Mode is enabled, otherwise FALSE .
void ToggleTiling ()	Enables Tile Mode or uses the default setting, depending on the current state.
void SetSeamless (int enable)	Disables Seamless if <i>enable</i> is FALSE , otherwise it will be enabled.
int GetSeamless ()	Returns TRUE if Seamless is enabled, otherwise FALSE .
void ToggleSeamless ()	Enables Seamless or uses the default setting, depending on the current state.
float GetImageWidth ()	Returns the image width of the current image in percent of the matrix width.
float GetImageHeight ()	Returns the image height of the current image in percent of the matrix height.
float GetImageDepth ()	Returns the image depth of the current image in percent of the matrix depth.

int GetImagePixelWidth()	Returns the image width of the current image in pixels.
int GetImagePixelHeight()	Returns the image height of the current image in pixels.
int GetImagePixelDepth()	Returns the image depth of the current image in pixel.
float GetCurrentPositionX()	Returns the X-position of the current image in percent of the matrix width.
float GetCurrentPositionY()	Returns the Y-position of the current image in percent of the matrix height.
float GetCurrentPositionZ()	Returns the Z-position of the current image in percent of the matrix depth.
int GetCurrentPixelPositionX()	Returns the X-position of the current image in pixels.
int GetCurrentPixelPositionY()	Returns the Y-position of the current image in pixels.
int GetCurrentPixelPositionZ()	Returns the Z-position of the current image in pixels.
void SetAutostart (int enable)	Disables Automatic Start if <i>enable</i> is set to FALSE . Otherwise, auto start can be enabled using TRUE .
int GetAutostart()	Returns TRUE if Automatic Start is enabled, otherwise FALSE .
void SetLoopingMode (int mode)	Sets the Looping mode. See below for details.
int GetLoopingMode()	Returns the Looping mode. See below for details.
int GetVideoLoaded()	Returns TRUE if a video is already loaded.
int GetVideoRunning()	Returns TRUE if video Playback is active, otherwise FALSE .
void StartVideo()	Starts video Playback .
void StopVideo()	Stops video Playback .
time GetVideoLength()	Returns the Length of the video as time structure. The structure is filled up with the hours, minutes, and seconds. If no video is loaded, 0 is returned.
void SetVideoTime (time t)	Sets the current Time Position of the video playback. If no video is loaded, nothing happens. See below for further details.
time GetVideoTime()	Returns the current Time of the video playback.
void StartVideoBackward()	Starts playing the video backwards . Is only available with QuickTime video files.
void SetVideoStartTime (time t)	Sets the Start Time of the video. The video starts playing from this position.
time GetVideoStartTime()	Returns the position at which the video starts playing.
void SetVideoEndTime (time t)	Sets the End Time of the video. The video ends playing at this position.
time GetVideoEndTime()	Returns the position at which the video stops playing.
void SetVideoPlaybackRate (float rate)	Sets the Playback Rate of the video. E.g., a <i>value</i> of 2.0 means that the video will be running 2x faster than the original speed.
float GetVideoPlaybackRate()	Returns the current video Playback Rate .
void StepForward()	Steps the video one frame forward.
void StepBackward()	Steps the video one frame backward.
void SetStretchMode (int mode)	Returns the Stretch mode. See below for details.

int GetStretchMode()	Returns the Stretch mode. See below for details.
void SetGrayscale (int enable)	Disables Grayscale if <i>enable</i> is set to FALSE . Otherwise it can be enabled using TRUE .
int GetGrayscale()	Returns TRUE if Grayscale mode is enabled, otherwise FALSE .
void ToggleGrayscale()	Enables Grayscale mode or uses the default setting, depending on the current state.
void SetGreyscale (int enable)	Is the same as SetGrayscale (int enable).
int GetGreyscale()	Is the same as GetGrayscale ().
void ToggleGreyscale()	Is the same as ToggleGrayscale ().
void SetRgbw (int enable)	Disables the RGB-To-RGBW mode if <i>enable</i> is FALSE , otherwise it can be enabled using TRUE .
int GetRgbw()	Returns TRUE if RGB-To-RGBW mode is enabled, otherwise FALSE .
void ToggleRgbw()	Enables RGB-To-RGBW mode or uses the default setting, depending on the current state.
void SetFilteringMode (int mode)	Sets the Filtering mode. See below for details.
int GetFilteringMode()	Returns the Filtering mode. See below for details.

Stretch Mode Constants

Value	Description
int STRETCH_MODE_NONE	Sets the stretch mode to None (no stretching).
int STRETCH_MODE_MATRIX	Sets the stretch mode to Matrix (stretches to the current aspect ratio of the matrix).
int STRETCH_MODE_ORIGINAL	Sets the stretch mode to Original (stretches to the original aspect ratio of the source).
int STRETCH_MODE_4_TO_3	Sets the stretch mode to 4:3 .
int STRETCH_MODE_16_TO_9	Sets the stretch mode to 16:9 .

Filtering Mode Constants

Value	Description
int FILTERING_MODE_NEAREST_NEIGHBOR	Sets the Filtering Mode to None (no filtering).
int FILTERING_MODE_LINEAR	Sets the Filtering Mode to Linear (may require additional performance).

Looping Mode Constants

This effect uses various color modes. The function [SetLoopingMode](#) can be used to change them. The following values can be used as parameter:

Constant	Description
int <code>PLAYBACK_MODE_NORMAL</code>	Sets the playback mode to Normal (no looping).
int <code>PLAYBACK_MODE_LOOP</code>	Sets the playback mode to Loop (forward or backward looping).
int <code>PLAYBACK_MODE_BOUNCE</code>	Sets the playback mode to Bounce (changing the playback direction when reaching the video end or start time).

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function / Constant	Description
void <code>SetVideoPlaySpeed</code> (float speed)	Use void <code>SetVideoPlaybackRate</code> (float rate) instead.
float <code>GetVideoPlaySpeed</code> ()	Use float <code>GetVideoPlaybackRate</code> () instead.
void <code>SeekVideo</code> (int sec)	Use void <code>SetVideoTime</code> (time t) instead.
void <code>SetLoop</code> (int mode)	Use void <code>SetPlaybackMode</code> (int mode) instead.
int <code>GetLoop</code> ()	Use int <code>GetPlaybackMode</code> () instead.
void <code>SetVideoAspektRatio</code> (int mode)	Use <code>SetStretchMode</code> (int mode) instead.
<code>NO_LOOP</code>	Use <code>PLAYBACK_MODE_NORMAL</code> instead.
<code>F_LOOP</code>	Use <code>PLAYBACK_MODE_LOOP</code> instead.
<code>FB_LOOP</code>	Use <code>PLAYBACK_MODE_BOUNCE</code> instead.
void <code>SetTile</code> (int)	Use void <code>SetTiling</code> (int) instead.
int <code>GetTile</code> (void)	Use int <code>GetTiling</code> () instead.
void <code>SetGrey</code> (int enable)	Use void <code>SetGrayscale</code> (int enable) instead.
int <code>GetGrey</code> (void)	Use int <code>GetGrayscale</code> () instead.
void <code>SetRgbToRgwb</code> (int enable)	Use void <code>SetRgwb</code> (int enable) instead.
int <code>GetRgbToRgwb</code> ()	Use int <code>GetRgwb</code> () instead.
color <code>GetFilterColor</code> ()	Use color <code>GetColor</code> () instead.

void SetFilterColor (color)	Use void SetColor (color) instead.
int GetPixelImageWidth ()	Use int GetImagePixelWidth () instead.
int GetPixelImageHeight ()	Use int GetImagePixelHeight () instead.

Setting the Time for Video Playback

If a video is loaded that has a length of 2:45:00 for example, the following source code would set the playback position to 1:25:30.

```
time t = {1, 25, 30};
SetVideoTime(t);
```

Note: If the given time is higher than the length of the video, the time is set to the end of the video.

[SetVideoTime](#)

5.2.33 SCE Wave / Radial

Functions Provided By SCE Wave/Radial

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Direction](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)
- This Effect uses the BPM control. Learn more »[Using BPM Control](#)
- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)
- This Effect uses the Position Controls. Learn more »[Using Position Controls](#)

void SetLength (int value)	Sets the Length of the wave/radial, which is the wavelength in percent of the matrix size (depending on the current direction and the current shape).
int GetLength ()	Returns the current Length of the wave/radial.
void SetWidth (int value)	Sets the Width of the wave/radial, which stretches or compresses the periodic part of the wave function in percent of the wavelength.
int GetWidth ()	Returns the current Width of the wave/radial.

void SetCount (int value)	Sets the Count of tails. This feature is only supported by shape type SHAPE_TYPE_WAVE_RADAR and SHAPE_TYPE_WAVE_HELIX .
int GetCount ()	Returns the current Count of tails.
void SetFactor (int value)	Sets the distortion Factor of the wave.
int GetFactor ()	Returns the current distortion Factor of the wave.
void SetAmplitude (int value)	Sets the Amplitude value of the distortion factor. This feature is only supported when the distortion factor is higher than 0.
int GetAmplitude ()	Return the current Amplitude of the distortion factor.
void SetPeak (int value)	Sets the Peak value of the wave. This feature is only supported by wave type WAVE_TYPE_TRIANGLE .
int GetPeak ()	Returns the Peak value of the wave.
void SetWaveType (int wavetype)	Sets the Wave Type . See » here for a list of constants.
int GetWaveType ()	Returns the current Wave Type . See » here for a list of constants.
void SetPhaseMode (int phasemode)	Use value PHASE_MODE_ON to activate Phase Mode . When Phase Mode is activated the color's green and blue color values will be phase-shifted. Use value PHASE_MODE_OFF to use the default settings.
int GetPhaseMode ()	Returns PHASE_MODE_ON if Phase Mode is enabled, otherwise PHASE_MODE_OFF .
void TogglePhaseMode ()	Enables or disables the Phase Mode depending on the current state.
void SetGoingInDirection (int direction)	Use value GOING_IN_DIRECTION to activate Going In Direction . Use value GOING_OUT_DIRECTION to use the default settings. This feature is supported for all shape types, except for SHAPE_TYPE_WAVE_LINEAR .
int GetGoingInDirection ()	Returns GOING_IN_DIRECTION if Going In Direction is enabled, otherwise GOING_OUT_DIRECTION .
void ToggleGoingInDirection ()	Enables or disables the Going In Direction depending on the current state.
void SetClockwiseRotation (int rotation)	Use value CLOCKWISE_ROTATION to activate Clockwise Rotation . Use value COUNTER_CLOCKWISE_ROTATION to use the default settings. This feature is only supported by shape type SHAPE_TYPE_WAVE_RADAR and SHAPE_TYPE_WAVE_HELIX .
int GetClockwiseRotation ()	Returns CLOCKWISE_ROTATION if Clockwise Rotation is enabled, otherwise COUNTER_CLOCKWISE_ROTATION .
void ToggleClockwiseRotation ()	Enables or disables Clockwise Rotation depending on the current state.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effects SCE Wave and SCE Radial have been renamed and combined into **SCE Wave / Radial** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function / Constant	Description
void SetVectorCenter (float x, float y)	Use SetPosition (float x, float y, float z) instead. The new values x, y and z are in percent.
float GetVectorCenterX ()	Use GetPositionX () instead. The new return value is in percent.
float GetVectorCenterY ()	Use GetPositionY () instead. The new return value is in percent.
void SetEffectMode (int mode)	Use SetShapeType (int shapetype) instead.
EFFECT_CIRCLE	Use SHAPE_TYPE_WAVE_CIRCLE instead.
EFFECT_RADAR	Use SHAPE_TYPE_WAVE_RADAR instead.
EFFECT_HELIX	Use SHAPE_TYPE_WAVE_HELIX instead.
int GetEffectMode ()	Use GetShapeType () instead.
void SetMonochrome ()	Use SetPhaseMode (int phasemode) with phase mode PHASE_MODE_ON instead.
int GetMonochrome ()	Use GetPhaseMode () instead.
void SetPhase ()	Use SetPhaseMode (int phasemode) with phase mode PHASE_MODE_OFF instead.
int GetPhase ()	Use GetPhaseMode () instead.
void SetCurveMode (int curvemode)	Use SetWaveType (int wavetype) instead.
CURVE_SIN / EFFECT_SINE_WAVE	Use WAVE_TYPE_SINE instead.
CURVE_ABSSIN / EFFECT_ABS_SINE	Use WAVE_TYPE_SINE_ABSOLUTE instead.

<code>CURVE_SAWTOOTH_DOWN / EFFECT_SAWTOOTH_DOWN</code>	Use <code>WAVE_TYPE_SAWTOOTH_DOWNWARDS</code> instead.
<code>CURVE_SAWTOOTH_UP / EFFECT_SAWTOOTH_UP</code>	Use <code>WAVE_TYPE_SAWTOOTH_UPWARDS</code> instead.
<code>CURVE_TRIANGLE / EFFECT_TRIANGLE</code>	Use <code>WAVE_TYPE_TRIANGLE</code> instead.
<code>CURVE_PHASE</code>	Use <code>SetPhaseMode(int phasemode)</code> with <code>phasemode PHASE_MODE_ON</code> instead.
int <code>GetCurveMode()</code>	Use <code>GetWaveType()</code> instead.
void <code>SetRotation(int clockwise)</code>	Use <code>SetClockwiseRotation(int clockwise)</code> instead.
<code>ROTATION_CW</code>	Use <code>CLOCKWISE_ROTATION</code> instead.
<code>ROTATION_CCW</code>	Use <code>COUNTER_CLOCKWISE_ROTATION</code> instead.
int <code>GetRotation()</code>	Use <code>GetClockwiseRotation()</code> instead.
void <code>SetVectorLength(int value)</code>	Use <code>SetLength(int value)</code> instead. The new value is in percent.
int <code>GetVectorLength()</code>	Use <code>GetLength()</code> instead. The new return value is in percent.
void <code>SetDirection(int direction)</code>	Used to cover multiple uses for SCE Wave and SCE Radial. <code>SetDirection()</code> can still be used to change the direction of the effect. See »here for a list of constants. Use <code>SetGoingInDirection(int direction)</code> to change the going in or going out direction.
<code>DIR_OUTWARDS</code>	Use <code>GOING_OUT_DIRECTION</code> instead.
<code>DIR_INWARDS</code>	Use <code>GOING_IN_DIRECTION</code> instead.

5.3 Sound2Light Effects (S2L)

5.3.1 S2L Drops

Functions Provided By S2L Drops

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses the Size Control. Learn more »[Using Size Control](#)

Function	Description
void SetSpeedVariance (int value)	Sets the Speed Variance <i>value</i> , which means a random value between 0 and 500 percent. This value will multiply with the current BPM value.
int GetSpeedVariance ()	Returns the current Speed Variance .
void SetLength (float value)	Sets the Length <i>value</i> , which defines how long the trace of the shapes is, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetLength ()	Returns the current Length in percent.
void SetPixelLength (int value)	Sets the Length <i>value</i> , which defines how long the trace of the shapes is, in pixels.
int GetPixelLength ()	Returns the current Length in pixels.
void SetLengthOffset (float value)	Set the Length Offset <i>value</i> between the shapes of the trace, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetLengthOffset ()	Returns the current Length Offset in percent.
void SetPixelLengthOffset (int value)	Set the Length Offset <i>value</i> between the shapes of the trace, in pixels.
int GetPixelLengthOffset ()	Returns the current Length Offset in pixels.
void SetPitch1 (float value)	Sets the Pitch <i>value</i> for axis one (depending on the direction), which is the distance of the shapes, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetPitch1 ()	Returns the current Pitch for axis one in percent.
void SetPixelPitch1 (int value)	Sets the Pitch <i>value</i> for axis one (depending on the direction), which is the distance of the shapes, in pixels.

int GetPixelPitch1()	Returns the current Pitch for axis one in pixels.
void SetPitch2 (float value)	Sets the Pitch value for axis two (depending on the direction), which is the distance of the shapes, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetPitch2()	Returns the current Pitch for axis two in percent.
void SetPixelPitch2 (int value)	Sets the Pitch value for axis two (depending on the direction), which is the distance of the shapes, in pixels.
int GetPixelPitch2()	Returns the current Pitch for axis two in pixels.
void SetAlphaMix (int value)	Sets the Alpha Mix value, which defines the variance of the shapes' alpha channel, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetAlphaMix()	Returns the current Alpha Mix in percent.
void SetInvert (int value)	Use <i>value</i> TRUE to invert the shape's positions. Use <i>value</i> FALSE to use the default setting.
int GetInvert()	Returns TRUE , if the shape's positions are inverted, otherwise FALSE .
void ToggleInvert()	Inverts the shape's positions or uses the default setting, depending on the current state.
void SetMirror (int value)	Use <i>value</i> TRUE to mirror the shape's positions. Use <i>value</i> FALSE to use the default setting.
int GetMirror()	Returns TRUE , if the shape's positions are mirrored, otherwise FALSE .
void ToggleMirror()	Mirrors the shape's positions or uses the default setting, depending on the current state.
void SetAmplification (int value)	Sets the Amplification value, which controls how much shapes are created by defining a factor for the incoming audio data, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetAmplification()	Returns the current Amplification in percent.
void SetShift (int value)	Sets the Shift value, which controls the mapping between the incoming audio data and the shapes' positions by defining an offset, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetShift()	Returns the current Shift in percent.
void SetGeneratorType (int value)	Sets the Generator Type . See below for a list of constants.
int GetGeneratorType()	Returns the current Generator Type . See below for a list of constants.
void SetSensitivity (int value)	Sets the Sensitivity value, which controls how much shapes are created by defining a threshold for the incoming audio data, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetSensitivity()	Returns the Sensitivity value.

Generator Type Constants

Constant	Description
int <code>GENERATOR_TYPE_EQ</code>	Sets the generator type to EQ .
int <code>GENERATOR_TYPE_LEVEL_MONO</code>	Sets the generator type to Level Mono .
int <code>GENERATOR_TYPE_LEVEL_STEREO</code>	Sets the generator type to Level Stereo .

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void <code>SetAmplify</code> (int value)	Use void <code>SetAmplification</code> (int value) instead.
int <code>GetAmplify</code> ()	Use int <code>GetAmplification</code> () instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **S2L EQ Drops** has been renamed to **S2L Drops** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void <code>SetPixelWidth</code> (int value)	Use <code>SetPixelSizeX</code> (int value) instead.
int <code>GetPixelWidth</code> ()	Use <code>GetPixelSizeX</code> () instead.
void <code>SetStep</code> (int value)	Use <code>SetPixelLengthOffset</code> (int value) instead.
int <code>GetStep</code> ()	Use <code>GetPixelLengthOffset</code> () instead.
void <code>SetPitch</code> (int value)	Use <code>SetPixelPitch1</code> (int value) instead.
int <code>GetPitch</code> ()	Use <code>GetPixelPitch1</code> () instead.
void <code>SetSens</code> ()	Use <code>SetSensitivity</code> (int value) instead.
int <code>GetSens</code> ()	Use <code>GetSensitivity</code> () instead.

void SetBands (int value)	Use SetPitch1 (float value) and SetPitch2 (float value) instead. If you like to see no gaps or overlapping tubes use SetSize1 (float value) and SetSize2 (float value) with the same values as the pitch values.
int GetBands ()	Use GetPitch1 () and GetPitch2 () instead.
void SetUseLevel (int value)	Use SetAlphaMix (int value) with a value of 100 instead.
int GetUseLevel ()	Use GetAlphaMix () instead.

5.3.2 S2L EQ / Spectrum

Functions Provided By S2L EQ / Spectrum

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Gradient Dialog. Learn more »[Using Gradient Dialog](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetDrop (int value)	Sets the Drop value.
float GetDrop ()	Returns the Drop value.
void SetFade (int value)	Sets the Fade value.
int GetFade ()	Returns the Fade value.
void SetWidth1 (float value)	Sets the Width 1 value.
float GetWidth1 ()	Returns the Width 1 value.
void SetPixelWidth1 (int value)	Sets the Width 1 in pixels.
int GetPixelWidth1 ()	Returns the Width 1 in pixels.
void SetPitch1 (float value)	Sets the Pitch 1 value.
float GetPitch1 ()	Returns the Pitch 1 value.
void SetPixelPitch1 (int value)	Sets the Pitch 1 in pixels.
int GetPixelPitch1 ()	Returns the Pitch 1 in pixels.
void SetWidth2 (float value)	Sets the Width 2 value.
float GetWidth2 ()	Returns the Width 2 value.
void SetPixelWidth2 (int value)	Sets the Width 2 in pixels.
int GetPixelWidth2 ()	Returns the Width 2 in pixels.
void SetPitch2 (float value)	Sets the Pitch 2 value.

int GetPitch2()	Returns the Pitch 2 value.
void SetPixelPitch2 (int value)	Sets the Pitch 2 in pixels.
int GetPixelPitch2()	Returns the Pitch 2 in pixels.
void SetLogarithmic (int value)	Sets the Logarithmic option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetLogarithmic()	Returns TRUE , if the Logarithmic option is activated, otherwise FALSE .
void ToggleLogarithmic()	Toggles the Logarithmic option.
void SetAmplification (int value)	Sets the Amplification value.
int GetAmplification()	Returns the Amplification value.
void SetInvert (int value)	Sets the Invert option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetInvert()	Returns TRUE , if the Invert option is activated, otherwise FALSE .
void ToggleInvert()	Toggle the Invert option.
void SetMirror (int value)	Sets the Mirror option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetMirror()	Returns TRUE , if the Mirror option is activated, otherwise FALSE .
void ToggleMirror()	Toggle the Mirror option.
void SetColorMode (int value)	Sets the Color Mode . See below for a list of constants.
int GetColorMode()	Returns the current Color Mode . See below for a list of constants.
void SetDRC (int value)	Sets the DRC option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetDRC()	Returns TRUE , if the DRC option is activated, otherwise FALSE .
void ToggleDRC()	Toggle the DRC option.
void SetShift (int value)	Sets the Shift value.
int GetShift()	Returns the Shift value.

Color Mode Constants

Constant	Description
int COLOR_MODE_MONOCHROME	Sets the color mode to Monochrome .
int COLOR_MODE_BAND	Sets the color mode to Band .
int COLOR_MODE_MATRIX	Sets the color mode to Matrix .

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void SetAmplify (int value)	Use void SetAmplification (int value) instead.
int GetAmplify ()	Use int GetAmplification () instead.
void SetViewLog (int value)	Use void SetLogarithmic (int value) instead.
int GetViewLog ()	Use int GetLogarithmic () instead.
void ToggleViewLog ()	Use void ToggleLogarithmic () instead.
void SetPushHF (int value)	Use void SetDRC (int value) instead.
int GetPushHF ()	Use int GetDRC () instead.
void TogglePushHF ()	Use void ToggleDRC () instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **S2L Equalizer** has been renamed to **S2L EQ / Spectrum** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetDoubleOutToIn (int value)	Use SetDirection (int value) instead.
int GetDoubleOutToIn ()	Use GetDirection () instead.
void SetDoubleInToOut (int value)	Use SetDirection (int value) instead.
int GetDoubleInToOut ()	Use GetDirection () instead.
void SetBands (int value)	Use SetPitch1 (float value) and SetPitch2 (float value) instead. If you would like to see no gabs or overlapping tubes use SetWidth1 (float value) and SetWidth2 (float value) with the same values as the pitch values.
int GetBands ()	Use GetPitch1 () and GetPitch2 () instead.
void SetMonochrome (int value)	Use SetColorMode (COLOR_MODE_MONOCHROME) instead.
int GetMonochrome ()	Use GetColorMode () instead.
void SetBandMode (int value)	Use SetColorMode (COLOR_MODE_BAND) instead.
int GetBandMode ()	Use GetColorMode () instead.
void SetDrawMode (int value)	Use SetDirection (int value) and SetShapeType (int value) instead.
int GetDrawMode ()	Use GetDirection () and GetShapeType () instead.

5.3.3 S2L Frequency Flash

Functions provided By S2L Frequency Flash

This effect uses the following functions:

- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)

Function	Description
void SetFadeIn (int fade)	Sets the Fade In value. This value represents Beats Per Minute (BPM).
int GetFadeIn ()	Returns the current Fade In value.
void SetFadeOut (int fade)	Sets the Fade Out value. This value represents Beats Per Minute (BPM).
int GetFadeOut ()	Returns the current Fade Out value.
void SetSensitivity (int value)	Set the Sensitivity value.
int GetSensitivity ()	Returns the Sensitivity value.
void SetMinBand (int index)	Sets the Minimum Band that should be included in the effect calculation. The given value is an index, which describes the band that should be used. The table below provides an overview over available values and the appropriate band.
int GetMinBand ()	Returns the specifier of the current Minimum Band . See below for further details.
void SetMaxBand (int index)	Set the Maximum Band that should be included in the effect calculation. The given value is an index which describes the band that should be used. The table below provides an overview over available values and the appropriate band.
int GetMaxBand ()	Returns the specifier of the current Maximum Band . See below for further details.

Frequency Bands

This effect allows to select the frequency bands which should be used to calculate the flash. The functions [SetMinBand](#) and [SetMaxBand](#) may be used to set the minimum band and the maximum band. Both use an identifier value between 0 and 21 which describes one of the following frequency bands:

Value	Frequency Band in Hz
0	5
1	40
2	57
3	75
4	99
5	133
6	175
7	239
8	318
9	425
10	567
11	766
12	1013
13	1352
14	1832
15	2441
16	3269
17	4315
18	5769
19	7749
20	10.299
21	13.007

Example

The source code below would select 57 Hz as minimum band and 567 Hz as maximum band. Furthermore the color red is set with a fade in value of 3000 BPM and a fade out value of 120 BPM.

```
@scriptname="";
@author="";
@version="";
@description="";

void InitEffect()
{
    SetColor(RED);
    SetFadeIn(3000);
}
```



```

    SetFadeOut(120);
    SetMinBand(2);
    SetMaxBand(10);
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetFade (int value)	Use SetFadeIn (int value) and SetFadeOut (int value) instead.
int GetFade ()	Use GetFadeIn () and GetFadeOut () instead.
void SetSens (int sens)	Use SetSensitivity (int value) instead.
int GetSens ()	Use GetSensitivity () instead.

5.3.4 S2L Level Color

Functions Provided By S2L Level Color

This effect uses the following functions:

- This Effect uses the Gradient Dialog. Learn more »[Using Gradient Dialog](#)
- This Effect uses Directions. Learn more »[Using Directions](#)

Function	Description
void SetFadeIn (int value)	Sets the Fade In value.
int GetFadeIn ()	Returns the Fade In value.
void SetFadeOut (int value)	Sets the Fade Out value.
int GetFadeOut ()	Returns the Fade Out value.
void SetMode (int value)	Sets the Mode . See below for a list of constants.
int GetMode ()	Returns the current Mode . See below for a list of constants.
void SetAmplification (int value)	Sets the Amplification value.
int GetAmplification ()	Returns the Amplification value.

Mode Constants

Constant	Description
int MODE_MONO	Sets the mode to Mono .
int MODE_STEREO_LINEAR	Sets the mode to Stereo Linear .
int MODE_STEREO_RADIAL	Sets the mode to Stereo Radial .

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void SetAmplify (int value)	Use void SetAmplification (int value) instead.
int GetAmplify ()	Use int GetAmplification () instead.

5.3.5 S2L Level Color Scroll

Functions Provided By S2L Level Color Scroll

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Gradient Dialog. Learn more »[Using Gradient Dialog](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses the the BPM Control. Learn more »[Using BPM Control](#)

Function	Description
void SetStepWidth (float value)	Sets the Step value, which is the number of pixels the effect should scroll per frame using percentage values.
float GetStepWidth ()	Returns the Step in percentage.
void SetPixelStepWidth (int value)	Sets the Step value, which is the number of pixels the effect should scroll per frame using pixel values.
int GetPixelStepWidth ()	Returns the Step in pixels.
void SetColorWidth (float value)	Sets the Color Width value, which means the width of the single stripes using percentage values.
float GetColorWidth ()	Returns the Color Width , the width of a stripe, in percentage.
void SetPixelColorWidth (int value)	Sets the Color Width value, which means the width of the single stripes using pixel values.
int GetPixelColorWidth ()	Returns the Color Width , the width of a stripe, in pixels.
void SetCrossWidth (float value)	Sets the Cross Width value using percentage values.
float GetCrossWidth ()	Returns the Cross Width in percentage.
void SetPixelCrossWidth (int value)	Sets the Cross Width value using pixel values.
int GetPixelCrossWidth ()	Returns the Cross Width in pixels.
void SetCrossAxes (int value)	Sets the Cross Axis value. See below for a list of constants.
int GetCrossAxes ()	Returns the Cross Axis . See below for a list of constants.
void SetAmplification (int value)	Sets the Amplification value.
int GetAmplification ()	Returns the Amplification value.
void SetLogarithmic (int value)	Sets the Logarithmic option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetLogarithmic ()	Returns TRUE , if the Logarithmic option is activated, otherwise FALSE .
void ToggleLogarithmic ()	Toggles the Logarithmic option.

Cross Axis Constants

Constant	Description
int AXIS_ONE	Sets the direction cross mode to Axis 1 .
int AXIS_TWO	Sets the direction cross mode to Axis 2 .
int AXES_ONE_AND_TWO	Sets the direction cross mode to Axes 1 And 2 .

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void SetAmplify (int value)	Use void SetAmplification (int value) instead.
int GetAmplify ()	Use int GetAmplification () instead.
void SetViewLog (int value)	Use void SetLogarithmic (int value) instead.
int GetViewLog ()	Use int GetLogarithmic () instead.
void ToggleViewLog ()	Use void ToggleLogarithmic () instead.

5.3.6 S2L Level Meter

Functions Provided By S2L Level Meter

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Gradient Dialog. Learn more »[Using Gradient Dialog](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetDrop (int value)	Sets the Drop value.
float GetDrop ()	Returns the Drop value.
void SetFade (int value)	Sets the Fade value.
int GetFade ()	Returns the Fade value.
void SetWidth1 (float value)	Sets the Width 1 value.
float GetWidth1 ()	Returns the Width 1 value.
void SetPixelWidth1 (int value)	Sets the Width 1 in pixels.
int GetPixelWidth1 ()	Returns the Width 1 in pixels.
void SetPitch1 (float value)	Sets the Pitch 1 value.
float GetPitch1 ()	Returns the Pitch 1 value.
void SetPixelPitch1 (int value)	Sets the Pitch 1 in pixels.
int GetPixelPitch1 ()	Returns the Pitch 1 in pixels.
void SetWidth2 (float value)	Sets the Width 2 value.

float GetWidth2()	Returns the Width 2 value.
void SetPixelWidth2 (int value)	Sets the Width 2 in pixels.
int GetPixelWidth2()	Returns the Width 2 in pixels.
void SetPitch2 (float value)	Sets the Pitch 2 value.
int GetPitch2()	Returns the Pitch 2 value.
void SetPixelPitch2 (int value)	Sets the Pitch 2 in pixels.
int GetPixelPitch2()	Returns the Pitch 2 in pixels.
void SetLogarithmic (int value)	Sets the Logarithmic option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetLogarithmic()	Returns TRUE , if the Logarithmic option is activated, otherwise FALSE .
void ToggleLogarithmic()	Toggles the Logarithmic option.
void SetAmplification (int value)	Sets the Amplification value.
int GetAmplification()	Returns the Amplification value.
void SetInvert (int value)	Sets the Invert option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetInvert()	Returns TRUE , if the Invert option is activated, otherwise FALSE .
void ToggleInvert()	Toggle the Invert option.
void SetMirror (int value)	Sets the Mirror option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetMirror()	Returns TRUE , if the Mirror option is activated, otherwise FALSE .
void ToggleMirror()	Toggle the Mirror option.
void SetColorMode (int value)	Sets the Color Mode . See below for a list of constants.
int GetColorMode()	Returns the current Color Mode . See below for a list of constants.
void SetMono (int value)	Sets the Mono option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetMono()	Returns TRUE , if the Mono option is activated, otherwise FALSE .
void ToggleMono()	Toggle the Mono option.

Color Mode Constants

Constant	Description
int COLOR_MODE_MONOCHROME	Sets the color mode to Monochrome .
int COLOR_MODE_BAND	Sets the color mode to Band .
int COLOR_MODE_MATRIX	Sets the color mode to Matrix .

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void SetAmplify (int value)	Use void SetAmplification (int value) instead.
int GetAmplify ()	Use int GetAmplification () instead.
void SetViewLog (int value)	Use void SetLogarithmic (int value) instead.
int GetViewLog ()	Use int GetLogarithmic () instead.
void ToggleViewLog ()	Use void ToggleLogarithmic () instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetDoubleOutToIn (int value)	Use SetDirection (int value) instead.
int GetDoubleOutToIn ()	Use GetDirection () instead.
void SetDoubleInToOut (int value)	Use SetDirection (int value) instead.
int GetDoubleInToOut ()	Use GetDirection () instead.
void SetBands (int value)	Use SetPitch1 (float value) and SetPitch2 (float value) instead. If you would like to see no gabs or overlapping tubes use SetWidth1 (float value) and SetWidth2 (float value) with the same values as the pitch values.
int GetBands ()	Use GetPitch1 () and GetPitch2 () instead.
void SetMonochrome (int value)	Use SetColorMode (COLOR_MODE_MONOCHROME) instead.
int GetMonochrome ()	Use GetColorMode () instead.
void SetBandMode (int value)	Use SetColorMode (COLOR_MODE_BAND) instead.
int GetBandMode ()	Use GetColorMode () instead.

5.3.7 S2L Level Shape

Functions Provided By S2L Level Shape

This effect uses the following functions:

- This Effect uses the Gradient Dialog. Learn more »[Using Gradient Dialog](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetDrop (int value)	Sets the Drop value.
float GetDrop ()	Returns the Drop value.
void SetAmplification (int value)	Sets the Amplification value.
int GetAmplification ()	Returns the Amplification value.
void SetLimitMin (int value)	Sets the Limit minimum value.
int GetLimitMin ()	Returns the Limit minimum value.
void SetLimitMax (int value)	Sets the Limit maximum value.
int GetLimitMax ()	Returns the Limit maximum value.
void SetOuterGlow (int value)	Sets the Outer Glow value.
int GetOuterGlow ()	Returns the Outer Glow value.
void SetInnerGlow (int value)	Sets the Inner Glow value.
int GetInnerGlow ()	Returns the Inner Glow value.
void SetBorder (int value)	Sets the Border value.
int GetBorder ()	Returns the Border value.
void SetLogarithmic (int value)	Sets the Logarithmic option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetLogarithmic ()	Returns TRUE , if the Logarithmic option is activated, otherwise FALSE .
void ToggleLogarithmic ()	Toggles the Logarithmic option.
void SetMono (int value)	Sets the Mono option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetMono ()	Returns TRUE , if the Mono option is activated, otherwise FALSE .
void ToggleMono ()	Toggle the Mono option.
void SetColorMode (int value)	Sets the Color Mode . See below for a list of constants.
int GetColorMode ()	Returns the current Color Mode . See below for a list of constants.
void SetDisplayMode (int value)	Sets the Display Mode . See below for a list of constants.
int GetDisplayMode ()	Returns the current Display Mode . See below for a list of constants.

Color Mode Constants

Constant	Description
int COLOR_MODE_MONOCHROME	Sets the color mode to Monochrome .
int COLOR_MODE_BAND	Sets the color mode to Band .
int COLOR_MODE_MATRIX	Sets the color mode to Matrix .

Display Mode Constants

Constant	Description
int <code>DISPLAY_MODE_CLIP</code>	Sets the display mode to Clip .
int <code>DISPLAY_MODE_FIT</code>	Sets the display mode to Fit .
int <code>DISPLAY_MODE_STRETCH</code>	Sets the display mode to Stretch .

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void <code>SetAmplify</code> (int value)	Use void <code>SetAmplification</code> (int value) instead.
int <code>GetAmplify</code> ()	Use int <code>GetAmplification</code> () instead.
void <code>SetViewLog</code> (int value)	Use void <code>SetLogarithmic</code> (int value) instead.
int <code>GetViewLog</code> ()	Use int <code>GetLogarithmic</code> () instead.
void <code>ToggleViewLog</code> ()	Use void <code>ToggleLogarithmic</code> () instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **S2L Level Ring** has been renamed to **S2L Level Shape** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void <code>SetFade</code> (int fade)	Use <code>SetDrop</code> (int value) with inverted values instead.
int <code>GetFade</code> ()	Use <code>GetDrop</code> () instead and interpret the values inverted.

5.3.8 S2L Shapes

Functions Provided By S2L Shapes

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetFade (float value)	Sets the Fade value, which defines how fast the shapes disappear in BPM. Valid values for <i>value</i> range from 1 to 3000.
float GetFade ()	Returns the current Fade in BPM.
void SetSize (float value)	Sets the Size value, which is the size of the shapes, in percent of the matrix size (depending on the shape alignment). The size <i>value</i> means the minimum shape size if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 0.01 to 1000.
float GetSize ()	Returns the current Size of the shapes in percent. The return value means the minimum shape size if the shape size distribution mode is not uniform.
void SetPixelSize (int value)	Sets the Size value, which is the size of the shapes, in pixels. The size <i>value</i> means the minimum shape size, if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 1 to ten times the matrix size (depending on the shape alignment).
int GetPixelSize ()	Returns the current Size of the shapes in pixels. The return value means the minimum shape size if the shape size distribution mode is not uniform.
void SetSizeMax (float value)	Sets the Maximum Size value, which is the maximum size of the shapes, in percent of the matrix size (depending on the shape alignment). The maximum size <i>value</i> only applies if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 0.01 to 1000.
float GetSizeMax ()	Returns the current Maximum Size of the shapes in percent.
void SetPixelSizeMax (int value)	Sets the Maximum Size value, which is the maximum size of the shapes, in pixels. The maximum size <i>value</i> only applies if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 1 to ten times the matrix size (depending on the shape alignment).
int GetPixelSizeMax ()	Returns the current Maximum Size of the shapes in pixels.
void SetSizeDistribution (int value)	Sets the size Distribution value, which defines how the range between the current minimum and the current maximum shape size is applied to the shapes. See » here for a list of constants.
int GetSizeDistribution ()	Returns the current size Distribution of the shapes. See » here for a list of constants.
void SeedRandomSize ()	Randomizes the sizes of the shapes. Is the same as SetSizeDistribution (DIST_RND).

void SetPitch1 (float value)	Sets the Pitch 1 value, which is the x-distance of the shapes, in percent of the matrix size. Valid values for <i>value</i> range from 0.01 to 100.
float GetPitch1 ()	Returns the current Pitch 1 of the shapes in percent.
void SetPixelPitch1 (int value)	Sets the Pitch 1 value, which is the x-distance of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the matrix size.
int GetPixelPitch1 ()	Returns the current Pitch 1 of the shapes in pixels.
void SetPitch2 (float value)	Sets the Pitch 2 value, which is the y-distance of the shapes, in percent of the matrix size. Valid values for <i>value</i> range from 0.01 to 100.
float GetPitch2 ()	Returns the current Pitch 2 of the shapes in percent.
void SetPixelPitch2 (int value)	Sets the Pitch 2 value, which is the y-distance of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the matrix size.
int GetPixelPitch2 ()	Returns the current Pitch 2 of the shapes in pixels.
void SetPitch3 (float value)	Sets the Pitch 3 value, which is the z-distance of the shapes, in percent of the matrix size. Valid values for <i>value</i> range from 0.01 to 100.
float GetPitch3 ()	Returns the current Pitch 3 of the shapes in percent.
void SetPixelPitch3 (int value)	Sets the Pitch 3 value, which is the z-distance of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the matrix size.
int GetPixelPitch3 ()	Returns the current Pitch 3 of the shapes in pixels.
void SetPitch (float x, float y, float z)	Sets the pitches 1, 2 and 3 of the shapes at once, in percent of the matrix size. Valid values for <i>x</i> , <i>y</i> and <i>z</i> range from 0.01 to 100.
void SetPixelPitch (int x, int y, int z)	Sets the pitches 1, 2 and 3 of the shapes at once, in pixels. Valid values for <i>x</i> , <i>y</i> and <i>z</i> range from 1 to the matrix size.
void SetBorder (float value)	Sets the Border value, which is the line width of the shapes, in percent of the shape size. Valid values for <i>value</i> range from 0.01 to 100.
float GetBorder ()	Returns the current Border of the shapes in percent.
void SetPixelBorder (int value)	Sets the Border value, which is the line width of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the shape size.
int GetPixelBorder ()	Returns the current Border of the shapes in pixels.
void SetAlphaMix (int value)	Sets the Alpha Mix value, which defines the variance of the shapes' alpha channel, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetAlphaMix ()	Returns the current Alpha Mix in percent.
void SetSensitivity (int value)	Sets the Sensitivity value, which controls how much shapes are created by defining a threshold for the incoming audio data, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetSensitivity ()	Returns the current Sensitivity in percent.
void SetShift (int value)	Sets the Shift value, which controls the mapping between the incoming audio data and the shapes' positions by defining an offset, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetShift ()	Returns the current Shift in percent.
void SetAmplification (int value)	Sets the Amplification value, which controls how much shapes are created by defining a factor for the incoming audio data, in percent. Valid values for <i>value</i> range from 0 to 100.

int GetAmplification ()	Returns the current Amplification in percent.
void SetInvert (int value)	Use <i>value</i> TRUE to invert the shapes' positions. Use <i>value</i> FALSE to use the default setting.
int GetInvert ()	Returns TRUE , if the shapes' positions are inverted, otherwise FALSE .
void ToggleInvert ()	Inverts the shapes' positions or uses the default setting, depending on the current state.
void SetMirror (int value)	Use <i>value</i> TRUE to mirror the shapes' positions. Use <i>value</i> FALSE to use the default setting.
int GetMirror ()	Returns TRUE , if the shapes' positions are mirrored, otherwise FALSE .
void ToggleMirror ()	Mirrors the shapes' positions or uses the default setting, depending on the current state.

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void SetAmplify (int value)	Use void SetAmplification (int value) instead.
int GetAmplify ()	Use int GetAmplification () instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **S2L EQ Shapes** has been renamed to **S2L Shapes** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetVectorWidth (float vWidth)	Use SetSize (float value) instead. Note that the unit of <i>vWidth</i> changed from normalized values to percent.
float GetVectorWidth ()	Use GetSize () instead. Note that the unit of the return value changed from normalized values to percent.
void SetPixelWidth (int iWidth)	Use SetPixelSize (int value) instead.
int GetPixelWidth ()	Use GetPixelSize () instead.
void SetVectorBorder (float vBorder)	Use SetBorder (float value) instead. Note that the unit of <i>vBorder</i> changed from normalized values to percent.
float GetVectorBorder ()	Use GetBorder () instead. Note that the unit of the return value changed from normalized values to percent.

void SetVectorPitch (float vPitch)	Use SetPitch1 (float value), SetPitch2 (float value) and SetPitch3 (float value) instead (the x-, y- and z-distance of the shapes are independent from each other now). Please note that the unit of <i>vPitch</i> changed from normalized values to percent.
float GetVectorPitch ()	Use GetPitch1 (), GetPitch2 () and GetPitch3 () instead (the x-, y- and z-distance of the shapes are independent from each other now). Please note that the unit of the return value changed from normalized values to percent.
void SetPixelPitch (int iPitch)	Use SetPixelPitch1 (int value), SetPixelPitch2 (int value) and SetPixelPitch3 (int value) instead (the x-, y- and z-distance of the shapes are independent from each other now).
int GetPixelPitch ()	Use GetPixelPitch1 (), GetPixelPitch2 () and GetPixelPitch3 () instead (the x-, y- and z-distance of the shapes are independent from each other now).
void SetSens (int sens)	Use SetSensitivity (int value) instead. Please note that the interpretation of <i>sens</i> is inverted now (0 corresponds to 100 and vice versa).
int GetSens ()	Use GetSensitivity () instead. Please note that the interpretation of the return value is inverted now (0 corresponds to 100 and vice versa).
void SetUseLevel (int enable)	The usage of the audio level is not toggled anymore, but accounted continuously. Use SetAlphaMix (int value) with <i>value</i> 0 to deactivate the usage of the audio level. Use <i>value</i> 100 to fully account the audio level.
int GetUseLevel ()	The usage of the audio level is not toggled anymore, but accounted continuously. Use GetAlphaMix (int value) instead. If the return value is 0, the usage of the audio level is deactivated. If it is 100, the audio level is fully accounted.

5.3.9 S2L Tubes

Functions Provided By S2L Tubes

This effect uses the following functions:

- This Effect uses the Color Controls. Learn more [»Using Color Controls](#)

Function	Description
void SetFade (int value)	Sets the Fade value.
int GetFade ()	Returns the Fade value.
void SetSize1 (float value)	Sets the Size 1 value
float GetSize1 ()	Returns the Size 1 value.
void SetPitch1 (float value)	Sets the Pitch 1 value
float GetPitch1 ()	Returns the Pitch 1 value.
void SetSize2 (float value)	Sets the Size 2 value

float GetSize2 ()	Returns the Size 2 value.
void SetPitch2 (float value)	Sets the Pitch 2 value
float GetPitch2 ()	Returns the Pitch 2 value.
void SetAlphaMix (int value)	Sets the Alpha Mix value.
int GetAlphaMix ()	Returns the Alpha Mix value.
void SetInvert (int value)	Sets the Invert option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetInvert ()	Returns TRUE , if the Invert option is activated, otherwise FALSE .
void ToggleInvert ()	Toggle the Invert option.
void SetMirror (int value)	Sets the Mirror option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetMirror ()	Returns TRUE , if the Mirror option is activated, otherwise FALSE .
void ToggleMirror ()	Toggle the Mirror option.
void SetTubesVertical (int value)	Use TRUE to activate vertical Tubes . Use FALSE to deactivate it.
int GetTubesVertical ()	Returns TRUE if vertical Tubes are activated, otherwise FALSE .
void ToggleTubesVertical ()	Toggle vertical Tubes .
void SetTubesHorizontal (int value)	Use TRUE to activate horizontal Tubes . Use FALSE to deactivate it.
int GetTubesHorizontal ()	Returns TRUE if horizontal Tubes are activated, otherwise FALSE .
void ToggleTubesHorizontal ()	Toggle horizontal Tubes .
void SetTubesDepth (int value)	Use TRUE to activate depth Tubes . Use FALSE to deactivate it.
int GetTubesDepth ()	Returns TRUE if depth Tubes are activated, otherwise FALSE .
void ToggleTubesDepth ()	Toggle depth Tubes .
void SetSensitivity (int value)	Sets the Sensitivity value.
int GetSensitivity ()	Returns the Sensitivity value.
void SetShift (int value)	Sets the Shift value.
int GetShift ()	Returns the Shift value.
void SetAmplification (int value)	Sets the Amplification value.
int GetAmplification ()	Returns the Amplification value.
void SetGeneratorType (int value)	Sets the Generator Type . See below for a list of constants.
int GetGeneratorType ()	Returns the current Generator Type . See below for a list of constants.

Generator Type Constants

Constant	Description
int GENERATOR_TYPE_EQ	Sets the generator type to EQ .
int GENERATOR_TYPE_LEVEL_MONO	Sets the generator type to Level Mono .
int GENERATOR_TYPE_LEVEL_STEREO	Sets the generator type to Level Stereo .

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void SetAmplify (int value)	Use void SetAmplification (int value) instead.
int GetAmplify ()	Use int GetAmplification () instead.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **S2L EQ Tubes** has been renamed to **S2L Tubes** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetSens (int value)	Use SetSensitivity (int value) instead.
int GetSens ()	Use GetSetSensitivity () instead.
void SetDirection (int value)	Use SetTubesVertical (int value), SetTubesHorizontal () and SetTubesDepth () instead.
int GetDirection ()	Use GetTubesVertical (), GetTubesHorizontal () and GetTubesDepth () instead.
void SetBandCount (int value)	Use SetPitch1 (float value) and SetPitch2 (float value) instead. If you like to see no gaps or overlapping tubes use SetSize1 (float value) and SetSize2 (float value) with the same values as the pitch values.
int GetBandCount ()	Use GetPitch1 () and GetPitch2 () instead.
void SetUseLevel (int value)	Use SetAlphaMix (int value) with a value of 100 instead.
int GetUseLevel ()	Use GetAlphaMix () instead.

5.3.10 S2L Waveform

Functions Provided By S2L Waveform

This effect uses the following functions:

- This Effect uses the Color Gradient. Learn more »[Using Color Gradient](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses Look-At Types. Learn more »Using [Look-At Types](#)

Function	Description
void SetTimeSlot (float value)	Sets the Time Slot value, which is the length of the displayed wave data, in seconds. This function also automatically sets the BPM to the corresponding value. Valid values for <i>value</i> range from 0.01 to 9999.
float GetTimeSlot ()	Returns the current Time Slot in seconds.
void SetChannelMode (int value)	Sets the Channel Mode value, which defines the displayed audio channels. See below for a list of constants.
int GetChannelMode ()	Returns the current Channel Mode . See below for a list of constants.

Channel Mode Constants

Constant	Description
int CHANNEL_MODE_STEREO	Selects Stereo mode, which displays the left channel and the right channel at the same time.
int CHANNEL_MODE_MONO	Selects Mono mode, which is the average of the left channel and the right channel.
int CHANNEL_MODE_LEFT	Selects the Left channel only.
int CHANNEL_MODE_RIGHT	Selects the Right channel only.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetChannelView (int view)	Use SetChannelMode (int value) instead.
int GetChannelView ()	Use GetChannelMode () instead.
void SetShiftOutwards (int enable)	Use SetDirection (int value) with <i>value</i> DIRECTION_X_AXIS_EXPLODE or DIRECTION_Y_AXIS_EXPLODE instead to activate outwards movement. Use any other available direction to deactivate it.
int GetShiftOutwards ()	Use GetDirection () instead. If it returns DIRECTION_X_AXIS_EXPLODE or DIRECTION_Y_AXIS_EXPLODE , outwards movement is currently activated. Otherwise, it is currently deactivated.
void SetShiftInwards (int enable)	Use SetDirection (int value) with <i>value</i> DIRECTION_X_AXIS_IMPLODE or DIRECTION_Y_AXIS_IMPLODE instead to activate inwards movement. Use any other available direction to deactivate it.

int GetShiftInwards()	Use GetDirection() instead. If it returns DIRECTION_X_AXIS_IMPLODE or DIRECTION_Y_AXIS_IMPLODE , inwards movement is currently activated. Otherwise, it is currently deactivated.
CHM_STEREO	Use CHANNEL_MODE_STEREO instead.
CHM_MONO	Use CHANNEL_MODE_MONO instead.
CHM_LEFT	Use CHANNEL_MODE_LEFT instead.
CHM_RIGHT	Use CHANNEL_MODE_RIGHT instead.

5.3.11 S2L Wavegraph

Functions Provided By S2L Wavegraph

This effect uses the following functions:

- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses Look-At Types. Learn more »Using [Look-At Types](#)

Function	Description
void SetTimeSlot (float value)	Sets the Time Slot value, which is the length of the displayed wave data, in seconds. This function also automatically sets the BPM to the corresponding value. Valid values for <i>value</i> range from 0.01 to 9999.
float GetTimeSlot ()	Returns the current Time Slot in seconds.
void SetChannelMode (int value)	Sets the Channel Mode value, which defines the displayed audio channels. See below for a list of constants.
int GetChannelMode ()	Returns the current Channel Mode . See below for a list of constants.

Channel Mode Constants

Constant	Description
int CHANNEL_MODE_STEREO	Selects Stereo mode, which displays the left channel and the right channel at the same time.
int CHANNEL_MODE_MONO	Selects Mono mode, which is the average of the left channel and the right channel.
int CHANNEL_MODE_LEFT	Selects the Left channel only.
int CHANNEL_MODE_RIGHT	Selects the Right channel only.

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetChannelView (int view)	Use SetChannelMode (int value) instead.
int GetChannelView ()	Use GetChannelMode () instead.
void SetShiftOutwards (int enable)	Use SetDirection (int value) with <i>value</i> DIRECTION_X_AXIS_EXPLODE or DIRECTION_Y_AXIS_EXPLODE instead to activate outwards movement. Use any other available direction to deactivate it.
int GetShiftOutwards ()	Use GetDirection () instead. If it returns DIRECTION_X_AXIS_EXPLODE or DIRECTION_Y_AXIS_EXPLODE , outwards movement is currently activated. Otherwise, it is currently deactivated.
void SetShiftInwards (int enable)	Use SetDirection (int value) with <i>value</i> DIRECTION_X_AXIS_IMPLODE or DIRECTION_Y_AXIS_IMPLODE instead to activate inwards movement. Use any other available direction to deactivate it.

int GetShiftInwards()	Use GetDirection() instead. If it returns DIRECTION_X_AXIS_IMPLODE or DIRECTION_Y_AXIS_IMPLODE , inwards movement is currently activated. Otherwise, it is currently deactivated.
CHM_STEREO	Use CHANNEL_MODE_STEREO instead.
CHM_MONO	Use CHANNEL_MODE_MONO instead.
CHM_LEFT	Use CHANNEL_MODE_LEFT instead.
CHM_RIGHT	Use CHANNEL_MODE_RIGHT instead.

5.4 Music2Light Effects (M2L)

5.4.1 M2L Color Change

Functions Provided By M2L Color Change

This effect uses the following functions:

- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)
- This Effect uses the M2L Color Table. Learn more »[Using M2L Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)

Function	Description
void SetFade (int value)	Sets the Fade value.
int GetFade ()	Returns the Fade value.

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **M2L Color Fade** has been renamed to **M2L Color Change** in MADRIX 3.X.

5.4.2 M2L Color Scroll

Functions Provided By M2L Color Scroll

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)
- This Effect uses the M2L Color Table. Learn more »[Using M2L Color Table](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)

Function	Description
void SetStepWidth (float value)	Sets the Step value, which is the number of pixels the effect should scroll per frame using percentage values.
float GetStepWidth ()	Returns the Step in percentage.
void SetPixelStepWidth (int value)	Sets the Step value, which is the number of pixels the effect should scroll per frame using pixel values.
int GetPixelStepWidth ()	Returns the Step in pixels.
void SetColorWidth (float value)	Sets the Color Width value, which means the width of the single stripes using percentage values.
float GetColorWidth ()	Returns the Color Width , the width of a stripe, in percentage.
void SetPixelColorWidth (int value)	Sets the Color Width value, which means the width of the single stripes using pixel values.
int GetPixelColorWidth ()	Returns the Color Width , the width of a stripe, in pixels.
void SetCrossWidth (float value)	Sets the Cross Width value using percentage values.
float GetCrossWidth ()	Returns the Cross Width in percentage.
void SetPixelCrossWidth (int value)	Sets the Cross Width value using pixel values.
int GetPixelCrossWidth ()	Returns the Cross Width in pixels.
void SetCrossAxes (int value)	Sets the Cross Axis value. See below for a list of constants.
int GetCrossAxes ()	Returns the Cross Axis . See below for a list of constants.
void SetSensitivity (int value)	Sets the Sensitivity value.
int GetSensitivity ()	Returns the current Sensitivity .

Cross Axis Constants

Constant	Description
int AXIS_ONE	Sets the direction cross mode to Axis 1 .
int AXIS_TWO	Sets the direction cross mode to Axis 2 .
int AXES_ONE_AND_TWO	Sets the direction cross mode to Axes 1 And 2 .

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
-------------------	-------------

void SetStep (int step)	Use SetStepWidth (float value) instead.
int GetStep ()	Use GetStepWidth () instead.
void SetXOffset (int offset)	Use SetCrossWidth (float value) with percentage values instead.
int GetXOffset ()	Use GetCrossWidht () instead.

5.4.3 M2L Drops

Functions Provided By M2L Drops

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)
- This Effect uses the BPM Control. Learn more »[Using BPM Control](#)
- This Effect uses the Size Control. Learn more »[Using Size Control](#)

Function	Description
void SetSpeedVariance (int value)	Sets the Speed Variance <i>value</i> , which means a random value between 0 and 500 percent. This value will multiply with the current BPM value.
int GetSpeedVariance ()	Returns the current Speed Variance .
void SetLength (float value)	Sets the Length <i>value</i> , which defines how long the trace of the shapes is, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetLength ()	Returns the current Length in percent.
void SetPixelLength (int value)	Sets the Length <i>value</i> , which defines how long the trace of the shapes is, in pixels.
int GetPixelLength ()	Returns the current Length in pixels.
void SetLengthOffset (float value)	Set the Length Offset <i>value</i> between the shapes of the trace, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetLengthOffset ()	Returns the current Length Offset in percent.
void SetPixelLengthOffset (int value)	Set the Length Offset <i>value</i> between the shapes of the trace, in pixels.
int GetPixelLengthOffset ()	Returns the current Length Offset in pixels.
void SetPitch1 (float value)	Sets the Pitch <i>value</i> for axis one (depending on the direction), which is the distance of the shapes, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.

float GetPitch1 ()	Returns the current Pitch for axis one in percent.
void SetPixelPitch1 (int value)	Sets the Pitch value for axis one (depending on the direction), which is the distance of the shapes, in pixels.
int GetPixelPitch1 ()	Returns the current Pitch for axis one in pixels.
void SetPitch2 (float value)	Sets the Pitch value for axis two (depending on the direction), which is the distance of the shapes, in percent of the matrix size (depending on the direction). Valid values for <i>value</i> range from 0.0 to 100.0.
float GetPitch2 ()	Returns the current Pitch for axis two in percent.
void SetPixelPitch2 (int value)	Sets the Pitch value for axis two (depending on the direction), which is the distance of the shapes, in pixels.
int GetPixelPitch2 ()	Returns the current Pitch for axis two in pixels.
void SetAlphaMix (int value)	Sets the Alpha Mix value, which defines the variance of the shapes' alpha channel, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetAlphaMix ()	Returns the current Alpha Mix in percent.
void SetInvert (int value)	Use <i>value</i> TRUE to invert the shape's positions. Use <i>value</i> FALSE to use the default setting.
int GetInvert ()	Returns TRUE , if the shape's positions are inverted, otherwise FALSE .
void ToggleInvert ()	Inverts the shape's positions or uses the default setting, depending on the current state.
void SetMirror (int value)	Use <i>value</i> TRUE to mirror the shape's positions. Use <i>value</i> FALSE to use the default setting.
int GetMirror ()	Returns TRUE , if the shape's positions are mirrored, otherwise FALSE .
void ToggleMirror ()	Mirrors the shape's positions or uses the default setting, depending on the current state.
void SetGeneratorType (int value)	Sets the Generator Type . See below for a list of constants.
int GetGeneratorType ()	Returns the current Generator Type . See below for a list of constants.

Function	Description
void SetToneRangeMin (int index)	Sets the minimum Tone Range for the effect with the help of 128 MIDI notes. Valid values for <i>index</i> range from 0 to 127. » Valid parameters (Notes)
int GetToneRangeMin ()	Returns the currently set minimum Tone Range .
void SetToneRangeMax (int index)	Sets the maximum Tone Range for the effect with the help of 128 MIDI notes. Valid values for <i>index</i> range from 0 to 127. » Valid parameters (Notes)
int GetToneRangeMax ()	Returns the currently set maximum Tone Range .

Generator Type Constants

Constant	Description
int GENERATOR_TYPE_TONE	Sets the generator type to Tone .
int GENERATOR_TYPE_INTERVAL	Sets the generator type to Interval .
int GENERATOR_TYPE_BASS_TYPE	Sets the generator type to Bass Type .

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **M2L Interval Drops** has been renamed to **M2L Drops** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetPixelWidth (int value)	Use SetPixelSizeX (int value) instead.
int GetPixelWidth ()	Use GetPixelSizeX () instead.
void SetStep (int value)	Use SetPixelLengthOffset (int value) instead.
int GetStep ()	Use GetPixelLengthOffset () instead.
void SetPitch (int value)	Use SetPixelPitch1 (int value) instead.
int GetPitch ()	Use GetPixelPitch1 () instead.
void SetUseBass (int value)	Use SetGeneratorType (GENERATOR_TYPE_BASS_TYPE) instead.
int GetUseBass ()	Use GetGeneratorType () instead.

5.4.4 M2L Note Flash

Functions provided By M2L Note Flash

This effect uses the following functions:

- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)

Function	Description
void SetFadeIn (int fade)	Sets the Fade In value. This value represents Beats Per Minute (BPM).
int GetFadeIn ()	Returns the current Fade In value.
void SetFadeOut (int fade)	Sets the Fade Out value. This value represents Beats Per Minute (BPM).
int GetFadeOut ()	Returns the current Fade Out value.
void SetSensitivity (int value)	Set the Sensitivity value.
int GetSensitivity ()	Returns the Sensitivity value.
void SetMinBand (int index)	Sets the Minimum Band that should be included in the effect calculation. The given value is an index, which describes the band that should be used. The table below provides an overview over available values and the appropriate band.
int GetMinBand ()	Returns the specifier of the current Minimum Band . See below for further details.
void SetMaxBand (int index)	Set the Maximum Band that should be included in the effect calculation. The given value is an index which describes the band that should be used. The table below provides an overview over available values and the appropriate band.
int GetMaxBand ()	Returns the specifier of the current Maximum Band . See below for further details.

Frequency Bands

This effect allows to select the frequency bands which should be used to calculate the flash. The functions [SetMinBand](#) and [SetMaxBand](#) may be used to set the inimum band and the maximum band. Both use an identifier value between 0 and 10, which describes one of the following frequency bands:

Value	Minimum Band	Maximum Band
0	C-1 (8.2 Hz)	B-1 (15.5 Hz)
1	C0 (16.4 Hz)	B0 (30.9 Hz)
2	C1 (32.7 Hz)	B1 (61.9 Hz)
3	C2 (65.4 Hz)	B2 (123.8 Hz)
4	C3 (130.8 Hz)	B3 (247.5 Hz)
5	C4 (261.6 Hz)	B4 (495 Hz)
6	C5 (523.2 Hz)	B5 (990 Hz)
7	C6 (1047 Hz)	B6 (1980 Hz)
8	C7 (2093 Hz)	B7 (3960 Hz)
9	C8 (4186 Hz)	B8 (7920 Hz)
10	C9 (8448 Hz)	G9 (12672 Hz)

Example

The source code below would select C0 as minimum band and B1 as maximum band. Furthermore, the color white is set with a fade-in value of 3000 BPM and a fade-out value of 120 BPM.

```

@scriptname=" ";
@author=" ";
@version=" ";
@description=" ";

void InitEffect()
{
    SetColor(WHITE);
    SetFadeIn(3000);
    SetFadeOut(120);
    SetMinBand(1);
    SetMaxBand(2);
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

}

5.4.5 M2L Shapes

Functions Provided By M2L Shapes

This effect uses the following functions:

- This Effect uses the Color Table. Learn more »[Using Color Table](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetFade (float value)	Sets the Fade value, which defines how fast the shapes disappear in BPM. Valid values for <i>value</i> range from 1 to 3000.
float GetFade ()	Returns the current Fade in BPM.
void SetSize (float value)	Sets the Size value, which is the size of the shapes, in percent of the matrix size (depending on the shape alignment). The size <i>value</i> means the minimum shape size if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 0.01 to 1000.
float GetSize ()	Returns the current Size of the shapes in percent. The return value means the minimum shape size if the shape size distribution mode is not uniform.
void SetPixelSize (int value)	Sets the Size value, which is the size of the shapes, in pixels. The size <i>value</i> means the minimum shape size, if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 1 to ten times the matrix size (depending on the shape alignment).
int GetPixelSize ()	Returns the current Size of the shapes in pixels. The return value means the minimum shape size if the shape size distribution mode is not uniform.
void SetSizeMax (float value)	Sets the Maximum Size value, which is the maximum size of the shapes, in percent of the matrix size (depending on the shape alignment). The maximum size <i>value</i> only applies if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 0.01 to 1000.
float GetSizeMax ()	Returns the current Maximum Size of the shapes in percent.
void SetPixelSizeMax (int value)	Sets the Maximum Size value, which is the maximum size of the shapes, in pixels. The maximum size <i>value</i> only applies if the shape size distribution mode is not uniform. Valid values for <i>value</i> range from 1 to ten times the matrix size (depending on the shape alignment).
int GetPixelSizeMax ()	Returns the current Maximum Size of the shapes in pixels.
void SetSizeDistribution (int value)	Sets the size Distribution value, which defines how the range between the current minimum and the current maximum shape size is applied to the shapes. See » here for a list of constants.
int GetSizeDistribution ()	Returns the current size Distribution of the shapes. See » here for a list of constants.

void SeedRandomSize ()	Randomizes the sizes of the shapes. Is the same as SetSizeDistribution(DIST_RND) .
void SetPitch1 (float value)	Sets the Pitch 1 value, which is the x-distance of the shapes, in percent of the matrix size. Valid values for <i>value</i> range from 0.01 to 100.
float GetPitch1 ()	Returns the current Pitch 1 of the shapes in percent.
void SetPixelPitch1 (int value)	Sets the Pitch 1 value, which is the x-distance of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the matrix size.
int GetPixelPitch1 ()	Returns the current Pitch 1 of the shapes in pixels.
void SetPitch2 (float value)	Sets the Pitch 2 value, which is the y-distance of the shapes, in percent of the matrix size. Valid values for <i>value</i> range from 0.01 to 100.
float GetPitch2 ()	Returns the current Pitch 2 of the shapes in percent.
void SetPixelPitch2 (int value)	Sets the Pitch 2 value, which is the y-distance of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the matrix size.
int GetPixelPitch2 ()	Returns the current Pitch 2 of the shapes in pixels.
void SetPitch3 (float value)	Sets the Pitch 3 value, which is the z-distance of the shapes, in percent of the matrix size. Valid values for <i>value</i> range from 0.01 to 100.
float GetPitch3 ()	Returns the current Pitch 3 of the shapes in percent.
void SetPixelPitch3 (int value)	Sets the Pitch 3 value, which is the z-distance of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the matrix size.
int GetPixelPitch3 ()	Returns the current Pitch 3 of the shapes in pixels.
void SetPitch (float x, float y, float z)	Sets the pitches 1, 2 and 3 of the shapes at once, in percent of the matrix size. Valid values for <i>x</i> , <i>y</i> and <i>z</i> range from 0.01 to 100.
void SetPixelPitch (int x, int y, int z)	Sets the pitches 1, 2 and 3 of the shapes at once, in pixels. Valid values for <i>x</i> , <i>y</i> and <i>z</i> range from 1 to the matrix size.
void SetBorder (float value)	Sets the Border value, which is the line width of the shapes, in percent of the shape size. Valid values for <i>value</i> range from 0.01 to 100.
float GetBorder ()	Returns the current Border of the shapes in percent.
void SetPixelBorder (int value)	Sets the Border value, which is the line width of the shapes, in pixels. Valid values for <i>value</i> range from 1 to the shape size.
int GetPixelBorder ()	Returns the current Border of the shapes in pixels.
void SetAlphaMix (int value)	Sets the Alpha Mix value, which defines the variance of the shapes' alpha channel, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetAlphaMix ()	Returns the current Alpha Mix in percent.
void SetSensitivity (int value)	Sets the Sensitivity value, which controls how much shapes are created by defining a threshold for the incoming audio data, in percent. Valid values for <i>value</i> range from 0 to 100.
int GetSensitivity ()	Returns the current Sensitivity in percent.
void SetInvert (int value)	Use <i>value</i> TRUE to invert the shapes' positions. Use <i>value</i> FALSE to use the default setting.
int GetInvert ()	Returns TRUE , if the shapes' positions are inverted, otherwise FALSE .

void ToggleInvert ()	Inverts the shapes' positions or uses the default setting, depending on the current state.
void SetMirror (int value)	Use <i>value</i> TRUE to mirror the shapes' positions. Use <i>value</i> FALSE to use the default setting.
int GetMirror ()	Returns TRUE , if the shapes' positions are mirrored, otherwise FALSE .
void ToggleMirror ()	Mirrors the shapes' positions or uses the default setting, depending on the current state.
Function	Description
void SetToneRangeMin (int index)	Sets the minimum Tone Range for the effect with the help of 128 MIDI notes. Valid values for <i>index</i> range from 0 to 127. » Valid parameters (Notes)
int GetToneRangeMin ()	Returns the currently set minimum Tone Range .
void SetToneRangeMax (int index)	Sets the maximum Tone Range for the effect with the help of 128 MIDI notes. Valid values for <i>index</i> range from 0 to 127. » Valid parameters (Notes)
int GetToneRangeMax ()	Returns the currently set maximum Tone Range .

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **M2L Single Tone Shapes** has been renamed to **M2L Shapes** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void SetVectorWidth (float vWidth)	Use SetSize (float value) instead. Note that the unit of <i>vWidth</i> changed from normalized values to percent.
float GetVectorWidth ()	Use GetSize () instead. Note that the unit of the return value changed from normalized values to percent.
void SetPixelWidth (int iWidth)	Use SetPixelSize (int value) instead.
int GetPixelWidth ()	Use GetPixelSize () instead.
void SetVectorBorder (float vBorder)	Use SetBorder (float value) instead. Note that the unit of <i>vBorder</i> changed from normalized values to percent.
float GetVectorBorder ()	Use GetBorder () instead. Note that the unit of the return value changed from normalized values to percent.
void SetVectorPitch (float vPitch)	Use SetPitch1 (float value), SetPitch2 (float value) and SetPitch3 (float value) instead (the x-, y- and z-distance of the shapes are independent from each other now). Please note that the unit of <i>vPitch</i> changed from normalized value to percent.
float GetVectorPitch ()	Use GetPitch1 (), GetPitch2 () and GetPitch3 () instead (the x-, y- and z-distance of the shapes are independent from each other now). Please note that the unit of the return value changed from normalized value to percent.

void SetPixelPitch (int iPitch)	Use SetPixelPitch1 (int value), SetPixelPitch2 (int value) and SetPixelPitch3 (int value) instead (the x-, y- and z-distance of the shapes are independent from each other now).
int GetPixelPitch ()	Use GetPixelPitch1 (), GetPixelPitch2 () and GetPixelPitch3 () instead (the x-, y- and z-distance of the shapes are independent from each other now).
void SetSens (int sens)	Use SetSensitivity (int value) instead. Please note that the interpretation of <i>sens</i> is inverted now (0 corresponds to 100 and vice versa).
int GetSens ()	Use GetSensitivity () instead. Please note that the interpretation of the return value is inverted now (0 corresponds to 100 and vice versa).

5.4.6 M2L Single Tone Spectrum

Functions Provided By M2L Single Tone Spectrum

This effect uses the following functions:

- This Effect uses Directions. Learn more »[Using Directions](#)
- This Effect uses the Gradient Dialog. Learn more »[Using Gradient Dialog](#)
- This Effect uses Look-At Types. Learn more »[Using Look-At Types](#)
- This Effect uses Shapes. Learn more »[Using Shapes](#)

Function	Description
void SetDrop (int value)	Sets the Drop value.
float GetDrop ()	Returns the Drop value.
void SetFade (int value)	Sets the Fade value.
int GetFade ()	Returns the Fade value.
void SetWidth1 (float value)	Sets the Width 1 value.
float GetWidth1 ()	Returns the Width 1 value.
void SetPixelWidth1 (int value)	Sets the Width 1 in pixels.
int GetPixelWidth1 ()	Returns the Width 1 in pixels.
void SetPitch1 (float value)	Sets the Pitch 1 value.
float GetPitch1 ()	Returns the Pitch 1 value.
void SetPixelPitch1 (int value)	Sets the Pitch 1 in pixels.
int GetPixelPitch1 ()	Returns the Pitch 1 in pixels.
void SetWidth2 (float value)	Sets the Width 2 value.
float GetWidth2 ()	Returns the Width 2 value.

void SetPixelWidth2 (int value)	Sets the Width 2 in pixels.
int GetPixelWidth2 ()	Returns the Width 2 in pixels.
void SetPitch2 (float value)	Sets the Pitch 2 value.
int GetPitch2 ()	Returns the Pitch 2 value.
void SetPixelPitch2 (int value)	Sets the Pitch 2 in pixels.
int GetPixelPitch2 ()	Returns the Pitch 2 in pixels.
void SetLogarithmic (int value)	Sets the Logarithmic option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetLogarithmic ()	Returns TRUE , if the Logarithmic option is activated, otherwise FALSE .
void ToggleLogarithmic ()	Toggles the Logarithmic option.
void SetAmplification (int value)	Sets the Amplification value.
int GetAmplification ()	Returns the Amplification value.
void SetInvert (int value)	Sets the Invert option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetInvert ()	Returns TRUE , if the Invert option is activated, otherwise FALSE .
void ToggleInvert ()	Toggle the Invert option.
void SetMirror (int value)	Sets the Mirror option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetMirror ()	Returns TRUE , if the Mirror option is activated, otherwise FALSE .
void ToggleMirror ()	Toggle the Mirror option.
void SetColorMode (int value)	Sets the Color Mode . See below for a list of constants.
int GetColorMode ()	Returns the current Color Mode . See below for a list of constants.
void SetDRC (int value)	Sets the DRC option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetDRC ()	Returns TRUE , if the DRC option is activated, otherwise FALSE .
void ToggleDRC ()	Toggle the DRC option.
void SetShift (int value)	Sets the Shift value.
int GetShift ()	Returns the Shift value.
Function	Description
void SetToneRangeMin (int index)	Sets the minimum Tone Range for the effect with the help of 128 MIDI notes. Valid values for <i>index</i> range from 0 to 127. » Valid parameters (Notes)
int GetToneRangeMin ()	Returns the currently set minimum Tone Range .
void SetToneRangeMax (int index)	Sets the maximum Tone Range for the effect with the help of 128 MIDI notes. Valid values for <i>index</i> range from 0 to 127. » Valid parameters (Notes)
int GetToneRangeMax ()	Returns the currently set maximum Tone Range .

Color Mode Constants

Constant	Description
int <code>COLOR_MODE_MONOCHROME</code>	Sets the color mode to Monochrome .
int <code>COLOR_MODE_BAND</code>	Sets the color mode to Band .
int <code>COLOR_MODE_MATRIX</code>	Sets the color mode to Matrix .

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void <code>SetAmplify</code> (int value)	Use void <code>SetAmplification</code> (int value) instead.
int <code>GetAmplify</code> ()	Use int <code>GetAmplification</code> () instead.
void <code>SetViewLog</code> (int value)	Use void <code>SetLogarithmic</code> (int value) instead.
int <code>GetViewLog</code> ()	Use int <code>GetLogarithmic</code> () instead.
void <code>ToggleViewLog</code> ()	Use void <code>ToggleLogarithmic</code> () instead.
void <code>SetPushHF</code> (int value)	Use void <code>SetDRC</code> (int value) instead.
int <code>GetPushHF</code> ()	Use int <code>GetDRC</code> () instead.
void <code>TogglePushHF</code> ()	Use void <code>ToggleDRC</code> () instead.

5.4.7 M2L Tubes

Functions Provided By M2L Tubes

This effect uses the following functions:

- This Effect uses the Color Controls. Learn more »[Using Color Controls](#)

Function	Description
void <code>SetFade</code> (int value)	Sets the Fade value.
int <code>GetFade</code> ()	Returns the Fade value.
void <code>SetSize1</code> (float value)	Sets the Size 1 value
float <code>GetSize1</code> ()	Returns the Size 1 value.
void <code>SetPitch1</code> (float value)	Sets the Pitch 1 value

float GetPitch1 ()	Returns the Pitch 1 value.
void SetSize2 (float value)	Sets the Size 2 value
float GetSize2 ()	Returns the Size 2 value.
void SetPitch2 (float value)	Sets the Pitch 2 value
float GetPitch2 ()	Returns the Pitch 2 value.
void SetAlphaMix (int value)	Sets the Alpha Mix value.
int GetAlphaMix ()	Returns the Alpha Mix value.
void SetInvert (int value)	Sets the Invert option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetInvert ()	Returns TRUE , if the Invert option is activated, otherwise FALSE .
void ToggleInvert ()	Toggle the Invert option.
void SetMirror (int value)	Sets the Mirror option. Use TRUE to activate it. Use FALSE to deactivate it.
int GetMirror ()	Returns TRUE , if the Mirror option is activated, otherwise FALSE .
void ToggleMirror ()	Toggle the Mirror option.
void SetTubesVertical (int value)	Use TRUE to activate vertical Tubes . Use FALSE to deactivate it.
int GetTubesVertical ()	Returns TRUE if vertical Tubes are activated, otherwise FALSE .
void ToggleTubesVertical ()	Toggle vertical Tubes .
void SetTubesHorizontal (int value)	Use TRUE to activate horizontal Tubes . Use FALSE to deactivate it.
int GetTubesHorizontal ()	Returns TRUE if horizontal Tubes are activated, otherwise FALSE .
void ToggleTubesHorizontal ()	Toggle horizontal Tubes .
void SetTubesDepth (int value)	Use TRUE to activate depth Tubes . Use FALSE to deactivate it.
int GetTubesDepth ()	Returns TRUE if depth Tubes are activated, otherwise FALSE .
void ToggleTubesDepth ()	Toggle depth Tubes .
void SetGeneratorType (int value)	Sets the Generator Type . See below for a list of constants.
int GetGeneratorType ()	Returns the current Generator Type . See below for a list of constants.
Function	Description
void SetToneRangeMin (int index)	Sets the minimum Tone Range for the effect with the help of 128 MIDI notes. Valid values for <i>index</i> range from 0 to 127. » Valid parameters (Notes)
int GetToneRangeMin ()	Returns the currently set minimum Tone Range .
void SetToneRangeMax (int index)	Sets the maximum Tone Range for the effect with the help of 128 MIDI notes. Valid values for <i>index</i> range from 0 to 127. » Valid parameters (Notes)
int GetToneRangeMax ()	Returns the currently set maximum Tone Range .

Generator Type Constants

Constant	Description
int <code>GENERATOR_TYPE_TONE</code>	Sets the generator type to Tone .
int <code>GENERATOR_TYPE_INTERVAL</code>	Sets the generator type to Interval .
int <code>GENERATOR_TYPE_BASS_TYPE</code>	Sets the generator type to Bass Type .

MADRIX 2.X To MADRIX 3.X Migration Hints

The MADRIX 2.X effect **M2L Interval Tubes** has been renamed to **M2L Tubes** in MADRIX 3.X. The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Function/Constant	Description
void <code>SetUseBass</code> (int value)	Use <code>SetGeneratorType</code> (<code>GENERATOR_TYPE_BASS_TYPE</code>) instead.
int <code>GetUseBass</code> ()	Use <code>GetGeneratorType</code> () instead.
void <code>SetDirection</code> (int value)	Use <code>SetTubesVertical</code> (int value), <code>SetTubesHorizontal</code> () and <code>SetTubesDepth</code> () instead.
int <code>GetDirection</code> ()	Use <code>GetTubesVertical</code> (), <code>GetTubesHorizontal</code> () and <code>GetTubesDepth</code> () instead.
void <code>SetPixelWidth</code> (int value)	Use <code>SetSize1</code> (float value) and <code>SetSize2</code> (float value) instead. If you like to see no gabs or overlapping tubes use <code>SetPitch1</code> (float value) and <code>SetPitch2</code> (float value) with the same values as the size values.
int <code>GetPixelWidth</code> ()	Use <code>GetSize1</code> () and <code>GetSize2</code> () instead.
void <code>SetVectorWidth</code> (float value)	Use <code>SetSize1</code> (float value) and <code>SetSize2</code> (float value) instead. If you like to see no gabs or overlapping tubes use <code>SetPitch1</code> (float value) and <code>SetPitch2</code> (float value) with the same values as the size values.
float <code>GetVectorWidth</code> ()	Use <code>GetSize1</code> () and <code>GetSize2</code> () instead.

//PART F

Storage Place Macro

6 Storage Place Macro

6.1 Overview

Introduction

- Storage Place Macros affect effects placed in Storage Places.
- That means the complete effect including all of its Layers is affected.
- Storage Place Macros are stored together with a MADRIX Setup file.
- Moreover, it is possible to save macros as separate files. The file extension of a macro is *.*mms*. The extension of a compiled macro is *.mcm*.



Editor - Controls the corresponding Macro Editor.



Macro - Allows you to configure and manage a Macro. At the same time this means that no Macro is running or included.



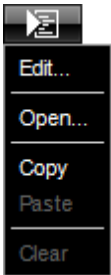
Deactivated [Macro Included] - A macro is included/inserted in the Macro Editor, but the macro is currently not running.

Left Mouse Click - Click once to activate the Macro.



Activated - A macro has been compiled and is currently running.

Left Mouse Click - Click once to deactivate the Macro.



Right Mouse Click - Opens the context menu.

Edit... - Opens the Macro Editor to write, edit, include, and compile Macros.

Open... - Allows you to load a Macro from an external file [of the file type *.mms and *.mcm]. Once loaded, the Macro will automatically be activated.

Copy - Allows you to copy the Macro to the clipboard of the computer.

Paste - Allows you to paste the Macro from the clipboard into the currently selected Macro Editor. If the copied Macro is running, the new Macro will be automatically activated as well. If the copied Macro is deactivated, the new Macro will be automatically deactivated as well.

Clear - Deletes all content of the Macro Editor and thereby deactivates and erases any Macro.

Functions Called By MADRIX

Overview

There are several functions called by MADRIX in order to let the macro react to different events.

- `void InitEffect()`
- `void PreRenderEffect()`
- `void PostRenderEffect()`
- `void MatrixSizeChanged()`

If a function is not needed by a macro, it is not necessary to implement it. Regarding *InitEffect*, *PreRenderEffect*, and *PostRenderEffect* a message is printed out if one of them is missing. This is not an error, but only information for the developer of the script.

InitEffect

(Automatically included in a new macro)

InitEffect is called by MADRIX whenever the macro needs to be initialized. This is the case after compiling and starting a new macro or when the user pressed the **Start** button of the »[Script Editor](#). A macro can assume that any global variable is initialized with 0 and that any global array is empty as long as it has not been initialized with a value.

This function is the right place to initialize global variables, reset any arrays, set the speed of an effect, or whatever is necessary to (re)start the macro.

PreRenderEffect

(Automatically included in a new macro)

This function is called before *PostRenderEffect*. It may be used if the macro has to initialize any settings before an effect is rendered.

```
void InitEffect()
{
}
void PreRenderEffect()
{
    color c = {random(0, 255), random(0, 255)}; Clear(c);
}
```

This example uses the function *PreRenderEffect* to fill the matrix and after initializing a random color for this task.

Note: The matrix, which the macro manipulates, is the same matrix that the effect uses to calculate its own effect. The effect may rely on the output being the input for the next frame with undefined behavior.

Also note: Mapping operations done in *PostRenderEffect* will effect the next frame, but not the current one. To control the current frame, please use *PreRenderEffect*

PostRenderEffect

(Automatically included in a new macro)

This function is called after an effect has been rendered completely. Certain functions might want to be called. That could be a filter, for example.

MatrixSizeChanged

(Automatically included in a new macro)

MatrixSizeChanged is called after the size of the matrix has been changed. This may be due to a change to the matrix settings or because a new map setting was set, e.g. caused by the call of a map function.

Standard Outline

When you open the Storage Place Macro Editor, the empty standard macro will look like this:

```
@scriptname=" ";
@author=" ";
@version=" ";
@description=" ";

void InitEffect()
{

}

void PreRenderEffect()
{

}

void PostRenderEffect()
{

}

void MatrixSizeChanged()
{
    InitEffect();
}
```

}

6.2 Functions

Specific Resources

- » [Functions called by MADRIX](#)
- [Storage Place Macro: Available Functions](#)
- [Constants](#)

General Resources

- » [Keyword Search](#)
- » [List Of Functions \(Alphabetical Order\)](#)
- » [List Of Functions \(Grouped\)](#)
- » [List Of Global Variables and Constants](#)
- » [List Of Operations](#)
- » [List Of Structures](#)
- » [Table Of Frequencies](#)
- » [Table Of Notes](#)

Available Functions

Standard Functions

- For non-specific functions, see » [List of Functions \(Alphabetical Order\)](#)

Functions Provided By The Storage Place Macro

- These functions are neither available in the MAS Script Effect, nor in Macros for effects, nor in the Main Output Macro.
- Each Storage Place can have its own Storage Place Macro.

Function	Description
Effect Functions (Incl. All Layers)	
float GetSpeedMaster()	Retrieves the value of the <i>Speed Master</i> .

void SetSpeedMaster (float <i>value</i>)	Sets the <i>value</i> for the Speed Master . Valid values range from -10.0 to 10.0.
int GetPause ()	Retrieves the status of the Pause function.
void SetPause (int <i>state</i>)	Sets the Storage Place to Pause mode or not. Valid values are PAUSE or NOPAUSE . » Description
void TogglePause ()	Toggles the status of the Pause function.
string GetDescription ()	Retrieves the currently used Description of the Storage Place.
void SetDescription (string <i>text</i>)	Allows to name the Storage Place. The string variable <i>text</i> must be set in quotation marks. E.g. SetDescription("Storage Place 1");
int GetSubMaster ()	Retrieves the current value of the Submaster .
void SetSubMaster (int <i>value</i>)	Sets the Submaster value. Valid values range from 0 to 255.
int GetFilter ()	Returns which Filter Effect (FX) is applied to the Storage Place.
void SetFilter (int <i>filter</i>)	Applies a Filter Effect (FX) to the Storage Place. Valid values for <i>filter</i> are » Filters
void SetSpeedPitch (float <i>value</i>)	Sets the Pitch value , which defines an additional multiplicative factor for the speed of the Storage. Valid values for <i>value</i> range from -10 to 10. Setting <i>value</i> lower than 0 lets most effects run backwards.
float GetSpeedPitch ()	Returns the current Pitch .
Layer Functions (For Single Layers)	
int GetLayerCount ()	Retrieves the currently used number of Layers.
int LayerGetBlind (int <i>number</i>)	Retrieves if the specified Layer is used in Blind Mode . » Description Layer indexing (<i>number</i>) starts with 0.
void LayerSetBlind (int <i>number</i> , int <i>value</i>)	Sets Blind Mode for a specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
void LayerToggleBlind (int <i>number</i>)	Toggles Blind Mode for a specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
int LayerGetSolo (int <i>number</i>)	Retrieves if the specified Layer is used in Solo Mode . » Description Layer indexing (<i>number</i>) starts with 0.
void LayerSetSolo (int <i>number</i> , int <i>value</i>)	Sets Solo Mode for a specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
void LayerToggleSolo (int <i>number</i>)	Toggles Solo Mode for a specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
int LayerGetSubMaster (int <i>number</i>)	Retrieves the value of the Submaster of a specified Layer. Layer indexing (<i>number</i>) starts with 0.
void LayerSetSubMaster (int <i>number</i> , int <i>value</i>)	Sets the value of the Submaster of a specified Layer. Layer indexing (<i>number</i>) starts with 0.
int LayerGetOpacity (int <i>number</i>)	Retrieves the Opacity of the specified Layer. Layer indexing (<i>number</i>) starts with 0.
void LayerSetOpacity (int <i>number</i> , int <i>value</i>)	Sets the Opacity value of the specified Layer. Layer indexing (<i>number</i>) starts with 0.
int LayerGetMixMode (int <i>number</i>)	Retrieves the currently used Mix Mode of the specified Layer. Valid values are described » here . Layer indexing (<i>number</i>) starts with 0.
void LayerSetMixMode (int <i>number</i> , int <i>value</i>)	Sets the Mix Mode for the specified Layer. Valid values are described » here . Layer indexing (<i>number</i>) starts with 0.

int LayerGetLink (int number)	Retrieves if Link Mode is enabled for the specified Layer. Layer indexing (<i>number</i>) starts with 0.
void LayerSetLink (int number, int value)	Enables Link Mode for the specified Layer. Layer indexing (<i>number</i>) starts with 0.
void LayerToggleLink (int number)	Toggles Link Mode for the specified Layer. Layer indexing (<i>number</i>) starts with 0.
int LayerGetFilter (int number)	Returns which Filter Effect (FX) is applied to the specified Layer. Layer indexing (<i>number</i>) starts with 0.
void LayerSetFilter (int number, int value)	Applies a Filter Effect (FX) to the specified Layer. Layer indexing (<i>number</i>) starts with 0. Valid values for <i>filter</i> are » Filters
int LayerGetStep (int number)	Retrieves if the specified Layer uses stepped rendering. » Description Layer indexing (<i>number</i>) starts with 0.
void LayerSetStep (int number, int value)	Sets the stepped rendering mode for the specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
void LayerToggleStep (int number)	Toggles the stepped rendering mode for the specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
int LayerGetAsync (int number)	Retrieves if the specified Layer uses asynchronous rendering. » Description Layer indexing (<i>number</i>) starts with 0.
void LayerSetAsync (int number, int value)	Sets the asynchronous rendering mode for the specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
void LayerToggleAsync (int number)	Toggles the asynchronous rendering mode for the specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
float LayerGetFrameId (int number)	Returns the Frame ID of the current frame for the specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
void LayerSetFrameId (int number, float value)	Sets the Frame ID of the current frame for the specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
float LayerGetFrameSteps (int number)	Returns the number of frames which are between this and the last call of the specified Layer. » Description Layer indexing (<i>number</i>) starts with 0.
float LayerGetFrameCount (int number)	Retrieves the number of frames used by the specified Layer. Layer indexing (<i>number</i>) starts with 0.
Mapping Functions (For Single Layers)	
int LayerMapDlgIsMapped (int number)	Retrieves if the specified Layer is mapped. Layer indexing (<i>number</i>) starts with 0.
void LayerMapDlgSetMapVector (int number, float x, float y, float w, float h)	Maps the effect of the specified Layer to a certain area of the matrix using relative values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.
void LayerMapDlgSetMapVector3D (int number, float x, float y, float z, float w, float h, float d)	Maps the effect of the specified Layer to a certain area of the matrix in 3D using relative values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> , <i>y</i> , and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.

<p>void LayerMapDlgSetMapPixel(int number, int x, int y, int w, int h);</p>	<p>Maps the effect of the specified Layer to a certain area of the matrix using pixel values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.</p>
<p>void LayerMapDlgSetMapPixel3D(int number, int x, int y, int z, int w, int h, int d);</p>	<p>Maps the effect of the specified Layer to a certain area of the matrix in 3D using pixel values. Layer indexing (<i>number</i>) starts with 0. <i>x</i>, <i>y</i>, and <i>z</i> describe the coordinates. <i>w</i>, <i>h</i>, and <i>d</i> describe width, height, and depth.</p>
<p>void LayerMapDlgGetMapVector(int number, float map[])</p>	<p>Retrieves the map settings for a specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>map[]</i>).</p> <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = width (Size X) ▪ map[3] = height (Size Y)
<p>void LayerMapDlgGetMapVector3D(int number, float map[])</p>	<p>Retrieves the map settings for a specified Layer in 3D using relative values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>map[]</i>).</p> <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = Z-coordinate (Position Z) ▪ map[3] = width (Size X) ▪ map[4] = height (Size Y) ▪ map[5] = depth (Size Z)
<p>void LayerMapDlgGetMapPixel(int number, int map[])</p>	<p>Retrieves the map settings for a specified Layer using pixel values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>map[]</i>).</p> <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = width (Size X) ▪ map[3] = height (Size Y)

void LayerMapDlgGetMapPixel3D (int number, int map[])	Retrieves the map settings for a specified Layer in 3D using pixel values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>map[]</i>). <ul style="list-style-type: none"> ▪ map[0] = X-coordinate (Position X) ▪ map[1] = Y-coordinate (Position Y) ▪ map[2] = Z-coordinate (Position Z) ▪ map[3] = width (Size X) ▪ map[4] = height (Size Y) ▪ map[5] = depth (Size Z)
void LayerMapDlgSetTileVector (int number, float x, float y, float w, float h)	Tiles the effect of the specified Layer to a certain area using relative values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.
void LayerMapDlgSetTileVector3D (int number, float x, float y, float z, float w, float h, float d)	Tiles the effect of the specified Layer in a certain area in 3D using relative values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> , <i>y</i> , and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.
void LayerMapDlgSetTilePixel (int number, int x, int y, int w, int h)	Tiles the effect of the specified Layer in a certain area using pixel values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> and <i>y</i> describe the coordinates. <i>w</i> and <i>h</i> describe width and height, respectively.
void LayerMapDlgSetTilePixel3D (int number, int x, int y, int z, int w, int h, int d)	Tiles the effect of the specified Layer in a certain area using pixel values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> , <i>y</i> and <i>z</i> describe the coordinates. <i>w</i> , <i>h</i> , and <i>d</i> describe width, height, and depth.
void LayerMapDlgGetTileVector (int number, float tile[])	Retrieves the Tiling settings for a specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>tile[]</i>). <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = width (Size X) ▪ tile[3] = height (Size Y)

<p>void LayerMapDlgGetTileVector3D(int number, float tile[])</p>	<p>Retrieves the Tiling settings for a specified Layer in 3D using relative values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>tile[]</i>).</p> <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = Z-coordinate (Position Z) ▪ tile[3] = width (Size X) ▪ tile[4] = height (Size Y) ▪ tile[5] = depth (Size Z)
<p>void LayerMapDlgGetTilePixel(int number, int tile[])</p>	<p>Retrieves the Tiling settings for a specified Layer using pixel values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>tile[]</i>).</p> <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = width (Size X) ▪ tile[3] = height (Size Y)
<p>void LayerMapDlgGetTilePixel3D(int number, int tile[])</p>	<p>Retrieves the Tiling settings for a specified Layer in 3D using pixel values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>tile[]</i>).</p> <ul style="list-style-type: none"> ▪ tile[0] = X-coordinate (Position X) ▪ tile[1] = Y-coordinate (Position Y) ▪ tile[2] = Z-coordinate (Position Z) ▪ tile[3] = width (Size X) ▪ tile[4] = height (Size Y) ▪ tile[5] = depth (Size Z)
<p>void LayerMapDlgSetMapMode(int number, int mode)</p>	<p>Sets the Map Mirror Mode of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of constants.</p>
<p>void LayerMapDlgSetTileMode(int number, int mode)</p>	<p>Sets the Tile Mode of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of Tile Mode constants.</p>
<p>int LayerMapDlgGetMapMode(int number)</p>	<p>Retrieves the currently used Map Mirror Mode of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of constants.</p>
<p>int LayerMapDlgGetTileMode(int number)</p>	<p>Retrieves the currently used Tile Mode of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of Tile Mode constants.</p>
<p>void LayerMapDlgSetTileOffsetVector(int number, float x, float y)</p>	<p>Sets the Tiling Offset of the specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> describes Offset X, while <i>y</i> represents Offset Y.</p>

void LayerMapDlgSetTileOffsetVector3D (int number, float x, float y, float z)	Sets the Tiling Offset of the specified Layer in 3D using relative values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> describes Offset X, <i>y</i> describes Offset Y, while <i>z</i> represents Offset Z.
void LayerMapDlgSetTileOffsetPixel (int number, int x, int y)	Sets the Tiling Offset of the specified Layer using pixel values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> describes Offset X, while <i>y</i> represents Offset Y.
void LayerMapDlgSetTileOffsetPixel3D (int number, int x, int y, int z)	Sets the Tiling Offset of the specified Layer in 3D using pixel values. Layer indexing (<i>number</i>) starts with 0. <i>x</i> describes Offset X, <i>y</i> describes Offset Y, while <i>z</i> represents Offset Z.
void LayerMapDlgGetTileOffsetVector (int number, float offset[])	Retrieves the Tiling Offset of the specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y)
void LayerMapDlgGetTileOffsetVector3D (int number, float offset[])	Retrieves the Tiling Offset of the specified Layer in 3D using relative values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) ▪ offset[2] = Z-coordinate (Offset Z)
void LayerMapDlgGetTileOffsetPixel (int number, int offset[])	Retrieves the Tiling Offset of the specified Layer using pixel values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y)
void LayerMapDlgGetTileOffsetPixel3D (int number, int offset[])	Retrieves the Tiling Offset of the specified Layer in 3D using pixel values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>offset[]</i>). <ul style="list-style-type: none"> ▪ offset[0] = X-coordinate (Offset X) ▪ offset[1] = Y-coordinate (Offset Y) ▪ offset[2] = Z-coordinate (Offset Z)
void LayerMapDlgSetRotationXVector (int number, float value)	Sets the Rotation value for the X-axis of the specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0.
void LayerMapDlgSetRotationXDegree (int number, int value)	Sets the Rotation value for the X-axis of the specified Layer using degree values. Layer indexing (<i>number</i>) starts with 0.
float LayerMapDlgGetRotationXVector (int number)	Retrieves the Rotation for the X-axis of the specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0.
int LayerMapDlgGetRotationXDegree (int number)	Retrieves the Rotation for the X-axis of the specified Layer using degree values. Layer indexing (<i>number</i>) starts with 0.

void LayerMapDlgSetRotationXMode (int number, int mode)	Sets the Rotation mode for the X-axis of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of rotation mode constants.
int LayerMapDlgGetRotationXMode (int number)	Retrieves the Rotation mode for the X-axis of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of rotation mode constants.
void LayerMapDlgSetRotationYVector (int number, float value)	Sets the Rotation value for the Y-axis of the specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0.
void LayerMapDlgSetRotationYDegree (int number int value)	Sets the Rotation value for the Y-axis of the specified Layer using degree values. Layer indexing (<i>number</i>) starts with 0.
float LayerMapDlgGetRotationYVector (int number)	Retrieves the Rotation for the Y-axis of the specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0.
int LayerMapDlgGetRotationYDegree (int number)	Retrieves the Rotation for the Y-axis of the specified Layer using degree values. Layer indexing (<i>number</i>) starts with 0.
void LayerMapDlgSetRotationYMode (int number, int mode)	Sets the Rotation mode for the Y-axis of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of rotation mode constants.
int LayerMapDlgGetRotationYMode (int number)	Retrieves the Rotation mode for the Y-axis of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of rotation mode constants.
void LayerMapDlgSetRotationZVector (int number, float value)	Sets the Rotation value for the Z-axis of the specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0.
void LayerMapDlgSetRotationZDegree (int number int value)	Sets the Rotation value for the Z-axis of the specified Layer using degree values. Layer indexing (<i>number</i>) starts with 0.
float LayerMapDlgGetRotationZVector (int number)	Retrieves the Rotation value for the Z-axis of the specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0.
int LayerMapDlgGetRotationZDegree (int number)	Retrieves the Rotation value for the Z-axis of the specified Layer using degree values. Layer indexing (<i>number</i>) starts with 0.
void LayerMapDlgSetRotationZMode (int number, int mode)	Sets the Rotation mode for the Z-axis of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of rotation mode constants.
int LayerMapDlgGetRotationZMode (int number)	Retrieves the Rotation mode for the Z-axis of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of rotation mode constants.
void LayerMapDlgSetRotationVector (int number, float x, float y, float z)	Sets the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0.
void LayerMapDlgSetRotationDegree (int number, int x, int y, int z)	Sets the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the specified Layer using degree values. Layer indexing (<i>number</i>) starts with 0.
void LayerMapDlgGetRotationVector (int number, float rot[])	Retrieves the Rotation values for axes <i>x</i> , <i>y</i> , and <i>z</i> of the specified Layer using relative values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>rot[]</i>). <ul style="list-style-type: none"> ▪ rot[0] = X-coordinate (X-Axis) ▪ rot[1] = Y-coordinate (Y-Axis) ▪ rot[2] = Z-coordinate (Z-Axis)

<p>void LayerMapDlgGetRotationDegree(int number, int rot[])</p>	<p>Retrieves the Rotation values for axes <i>x</i>, <i>y</i>, and <i>z</i> of the specified Layer using degree values. Layer indexing (<i>number</i>) starts with 0. The values are saved in an array (<i>rot[]</i>).</p> <ul style="list-style-type: none"> ▪ rot[0] = X-coordinate (X-Axis) ▪ rot[1] = Y-coordinate (Y-Axis) ▪ rot[2] = Z-coordinate (Z-Axis)
<p>void LayerMapDlgSetRotationMode(int number, int x, int y, int z)</p>	<p>Sets the Rotation mode for axes <i>x</i>, <i>y</i>, and <i>z</i> of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of rotation mode constants.</p>
<p>void LayerMapDlgGetRotationMode(int number, int mode[])</p>	<p>Retrieves the Rotation mode for axes <i>x</i>, <i>y</i>, and <i>z</i> of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list tile rotation mode constants. The values are saved in an array (<i>mode[]</i>).</p> <ul style="list-style-type: none"> ▪ mode[0] = X-coordinate (X-Axis) ▪ mode[1] = Y-coordinate (Y-Axis) ▪ mode[2] = Z-coordinate (Z-Axis)
<p>void LayerMapDlgSetAntiAliasing(int number, int aaLevel)</p>	<p>Sets the Anti-Aliasing mode of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of anti-aliasing mode constants.</p>
<p>int LayerMapDlgGetAntiAliasing(int number)</p>	<p>Retrieves the Anti-Aliasing mode of the specified Layer. Layer indexing (<i>number</i>) starts with 0. See below for a list of anti-aliasing mode constants.</p>

Remarks

All functions affecting the map and tile options, such as `LayerMapDlgSetMapVector()`, will be applied one frame later!

Constants

Constant	Description
int PAUSE	Activates a Storage Place to be paused. To be used with SetPause
int NOPAUSE	Deactivates the pausing mode of a Storage Place. To be used with SetPause

Map Mirror Mode Constants

Constant	Description
int <code>MAP_MIRROR_NONE</code>	Sets no Mirror Mode.
int <code>MAP_MIRROR_H</code>	Mirrors the content of the matrix horizontally.
int <code>MAP_MIRROR_V</code>	Mirrors the content of the matrix vertically.
int <code>MAP_MIRROR_HV</code>	Mirrors the content of the matrix horizontally and vertically.
int <code>MAP_MIRROR_D</code>	Mirrors the content of the matrix in the depth.
int <code>MAP_MIRROR_HD</code>	Mirrors the content of the matrix horizontally and in the depth.
int <code>MAP_MIRROR_VD</code>	Mirrors the content of the matrix vertically and in the depth.
int <code>MAP_MIRROR_HVD</code>	Mirrors the content of the matrix horizontally, vertically, and in the depth.

Map Tile Mode Constants

Constant	Description
int <code>MAP_TILE_NONE</code>	Sets no Tile Mode.
int <code>MAP_TILE_REPEAT</code>	Repeats tiles on the mapped matrix.
int <code>MAP_TILE_MIRROR_H</code>	Mirrors tiles horizontally.
int <code>MAP_TILE_MIRROR_V</code>	Mirrors tiles vertically.
int <code>MAP_TILE_MIRROR_HV</code>	Mirrors tiles horizontally and vertically.
int <code>MAP_TILE_MIRROR_D</code>	Mirrors tiles in the depth.
int <code>MAP_TILE_MIRROR_HD</code>	Mirrors tiles horizontally and in the depth.
int <code>MAP_TILE_MIRROR_VD</code>	Mirrors tiles vertically and in the depth.
int <code>MAP_TILE_MIRROR_HVD</code>	Mirrors tiles horizontally, vertically, and in the depth.

Map Rotation Mode Constants

Constant	Description
int <code>MAP_ROTATION_FIXED</code>	The rotation value is fixed and not animated.

Constant	Description
int <code>MAP_ROTATION_LOOP</code>	The rotation value is used for a looped animation.

Map Anti-Aliasing Mode Constants

Constant	Description
int <code>MAP_AA_NONE</code>	Sets no anti-aliasing.
int <code>MAP_AA_2X</code>	Sets simple anti-aliasing (requires some performance).
int <code>MAP_AA_4X</code>	Sets complex anti-aliasing (requires a lot performance).

MADRIX 2.X To MADRIX 3.X Migration Hints

The following functions and constants are not supported anymore. Please follow the hints to migrate your macros.

Functions and Constants	Description
void <code>SetLayerBlind</code> (int number, int state)	Use <code>LayerSetBlind</code> (int number, int value) instead.
int <code>GetLayerBlind</code> (int number)	Use <code>LayerGetBlind</code> (int number) instead.
void <code>SetLayerSolo</code> (int number, int state)	Use <code>LayerSetSolo</code> (int number, int value) instead.
int <code>GetLayerSolo</code> (int number)	Use <code>LayerGetSolo</code> (int number) instead.
void <code>SetLayerSubMaster</code> (int number, int value)	Use <code>LayerSetSubMaster</code> (int number, int value) instead.
int <code>GetLayerSubMaster</code> (int number)	Use <code>LayerGetSubMaster</code> (int number) instead.
void <code>SetLayerOpacity</code> (int number, int value)	Use <code>LayerSetOpacity</code> (int number, int value) instead.
int <code>GetLayerOpacity</code> (int number)	Use <code>LayerGetOpacity</code> (int number) instead.
void <code>SetLayerMixMode</code> (int number, int mode)	Use <code>LayerSetMixMode</code> (int number, int value) instead.
int <code>GetLayerMixMode</code> (int number)	Use <code>LayerGetMixMode</code> (int number) instead.
void <code>SetLayerLink</code> (int number, int state)	Use <code>LayerSetLink</code> (int number, int value) instead.
int <code>GetLayerLink</code> (int number)	Use <code>LayerGetLink</code> (int number) instead.
void <code>SetLayerFilter</code> (int number, int mode)	Use <code>LayerSetFilter</code> (int number, int value) instead.
int <code>GetLayerFilter</code> (int number)	Use <code>LayerGetFilter</code> (int number) instead.

void EnableLayerFrameFade (int number, int value)	Use LayerSetStep (int number, int value) instead. Please note that the interpretation of value is inverted now (deactivated stepped rendering corresponds approximately to an activated frame fade and vice versa).
int IsLayerFrameFadeEnabled (int number)	Use LayerGetStep (int number) instead. Please note that the interpretation of the return value is inverted now (deactivated stepped rendering corresponds approximately to an activated frame fade and vice versa).
void SetLayerFrameId (int number, float value)	Use LayerSetFrameId (int number, float value) instead.
float GetLayerFrameId (int number)	Use LayerGetFrameId (int number) instead.
float GetLayerFrameSteps (int number)	Use LayerGetFrameSteps (int number) instead.
float GetLayerFrameCount (int number)	Use LayerGetFrameCount (int number) instead.
int IsLayerMapped (int number)	Use LayerMapDlgIsMapped (int number) instead.
void MapLayerEffectVector (int number, float x, float y, float w, float h)	Use LayerMapDlgSetMapVector (int number, float x, float y, float w, float h) instead.
void MapLayerEffectPixel (int number, int x, int y, int w, int h)	Use LayerMapDlgSetMapPixel (int number, int x, int y, int w, int h) instead.
void GetLayerMapVector (int number, float map[])	Use LayerMapDlgGetMapVector (int number float map[]) instead.
void GetLayerMapPixel (int number, int map[])	Use LayerMapDlgGetMapPixel (int number, int map[]) instead.
void MapLayerTileEffectVector (int number, float x, float y, float w, float h)	Use LayerMapDlgSetTileVector (int number, float x, float y, float w, float h) instead.
void MapLayerTileEffectPixel (int number, int x, int y, int w, int h)	Use LayerMapDlgSetTilePixel (int number, int x, int y, int w, int h) instead.
void GetLayerMapTileEffectVector (int number, float map[])	Use LayerMapDlgGetTileVector (int number, float tile[]) instead.
void GetLayerMapTileEffectPixel (int number, int map[])	Use LayerMapDlgGetTilePixel (int number, int tile[]) instead.
void SetLayerMapModeMirror (int number, int state)	Use LayerMapDlgSetMapMode (int number, int mode) instead.
void SetLayerMapModeTile (int number, int state)	Use LayerMapDlgSetTileMode (int number, int mode) instead.
int GetLayerMapModeMirror (int number)	Use LayerMapDlgGetMapMode (int number) instead.
int GetLayerMapModeTile (int number)	Use LayerMapDlgGetTileMode (int number) instead.
void SetLayerVectorTileOffset (int number, float x, float y)	Use LayerMapDlgSetTileOffsetVector (int number, float x, float y) instead.
void SetLayerPixelTileOffset (int number, int x, int y)	Use LayerMapDlgSetTileOffsetPixel (int number, int x, int y) instead.
void GetLayerVectorTileOffset (int number, float map[])	Use LayerMapDlgGetTileOffsetVector (int number, float offset[]) instead.
void GetLayerPixelTileOffset (int number, int map[])	Use LayerMapDlgGetTileOffsetPixel (int number, int offset[]) instead.
void SetLayerVectorMapRotation (int number, float value, int anim)	Use LayerMapDlgSetRotationZVector (int number, float value) and LayerMapDlgSetRotationZMode (int number, int mode) instead.

void SetLayerDegreeMapRotation (int number, int value, int anim)	Use LayerMapDlgSetRotationZDegree (int number int value) and LayerMapDlgSetRotationZMode (int number, int mode) instead.
float GetLayerVectorMapRotation (int number)	Use LayerMapDlgGetRotationZVector (int number) instead.
int GetLayerDegreeMapRotation (int number)	Use LayerMapDlgGetRotationZDegree (int number) instead.
int IsLayerMapRotation (int number)	Use LayerMapDlgGetRotationZMode (int number) instead.
MAP_ANIM_OFF	Use MAP_ROTATION_FIXED instead.
MAP_ANIM_ON	Use MAP_ROTATION_LOOP instead.

//PART G

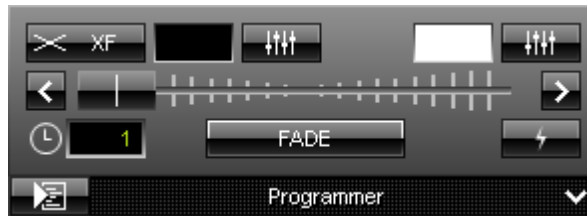
Main Output Macro

7 Main Output Macro

7.1 Overview

Introduction

- Main Output macros can be used to manipulate the final output of MADRIX. This also includes the Cue List, Master, and Audio Input Level among others.
- Main Output macros are stored together with a MADRIX Setup file.
- It is possible to save macros as separate files. The file extension of a macro is *.mms*. The extension of a compiled macro is *.mcm*.



Editor - Controls the corresponding Macro Editor.



Macro - Allows you to configure and manage a Macro. At the same time this means that no Macro is running or included.



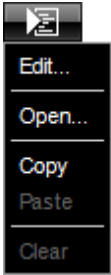
Deactivated [Macro Included] - A macro is included/inserted in the Macro Editor, but the macro is currently not running.

Left Mouse Click - Click once to activate the Macro.



Activated - A macro has been compiled and is currently running.

Left Mouse Click - Click once to deactivate the Macro.



Right Mouse Click - Opens the context menu.

Edit... - Opens the Macro Editor to write, edit, include, and compile Macros.

Open... - Allows you to load a Macro from an external file [of the file type *.mms and *.mcm]. Once loaded, the Macro will automatically be activated.

Copy - Allows you to copy the Macro to the clipboard of the computer.

Paste - Allows you to paste the Macro from the clipboard into the currently selected Macro Editor. If the copied Macro is running, the new Macro will be automatically activated as well. If the copied Macro is deactivated, the new Macro will be automatically deactivated as well.

Clear - Deletes all content of the Macro Editor and thereby deactivates and erases any Macro.

Functions Called By MADRIX

Overview

There are several functions called by MADRIX in order to let the macro react to different events.

- `void InitEffect()`
- `void PreRenderEffect()`
- `void PostRenderEffect()`
- `void MatrixSizeChanged()`

If a function is not needed by a macro, it is not necessary to implement it. Regarding *InitEffect*, *PreRenderEffect*, and *PostRenderEffect* a message is printed out if one of them is missing. This is not an error, but only information for the developer of the script.

InitEffect

(Automatically included in a new macro)

InitEffect is called by MADRIX whenever the macro needs to be initialized. This is the case after compiling and starting a new macro or when the user pressed the **Start** button of the »[Script Editor](#). A macro can assume that any global variable is initialized with 0 and that any global array is empty as long as it has not been initialized with a value.

This function is the right place to initialize global variables, reset any arrays, set the speed of an effect, or whatever is necessary to (re)start the macro.

PreRenderEffect

(Automatically included in a new macro)

This function is called before *PostRenderEffect*. It may be used if the macro has to initialize any settings before an effect is rendered.

```
void InitEffect()
{
}
void PreRenderEffect()
{
    color c = {random(0, 255), random(0, 255)}; Clear(c);
}
```

This example uses the function *PreRenderEffect* to fill the matrix and after initializing a random color for this task.

PostRenderEffect

(Automatically included in a new macro)

This function is called after an effect has been rendered completely. Certain functions might want to be called. That could be a filter, for example.

MartrixSizeChanged

(Automatically included in a new macro)

MatixSizeChanged is called after the size of the virtual LED matrix has been changed. This may be due to a change to the matrix settings.

Standard Outline

When you open the Main Output Macro Editor, the empty standard macro will look like this:

```
@scriptname="";
@author="";
@version="";
@description="";

void InitEffect()
{

}

void PreRenderEffect()
{

}

void PostRenderEffect()
{

}
```

```
void MatrixSizeChanged()  
{  
    InitEffect();  
}
```

7.2 Functions

Specific Resources

- »[Functions called by MADRIX](#)
- [Main Output Macro: Available Functions](#)
- [Constants](#)
- [Deprecated Functions](#)

General Resources

- »[Keyword Search](#)
- »[List Of Functions \(Alphabetical Order\)](#)
- »[List Of Functions \(Grouped\)](#)
- »[List Of Global Variables and Constants](#)
- »[List Of Operations](#)
- »[List Of Structures](#)
- »[Table Of Frequencies](#)
- »[Table Of Notes](#)

Available Functions

Standard Functions

- For non-specific functions, see »[List of Functions \(Alphabetical Order\)](#)
- The Main Output macro offers special functions to reflect the features available to the user in the user interface of MADRIX, like the Freeze function or the Cue List.

Functions Provided By The Main Output Macro

These functions are not available in the MAS Script Effect, in the Macros for Effects, and not in the Storage Place Macro.

Function	Description
General	
int GetFadeType()	Returns the current Fade Type . » Example

void SetFadeType (int fadetype)	Sets the Fade Type . See below for valid constants for <i>fadetype</i> . » Example
color GetFadeColor ()	Returns the color that is selected for the color-fade. » Example
void SetFadeColor (color fadecolor)	Sets the color of the color-fade. » Example
float GetFadeTime ()	Returns the Fade Time in seconds that is used for an autofade between Left and Right. » Example
void SetFadeTime (float fadetime)	Sets the Fade Time in seconds. Valid values range from 0 to 3600. » Example
int GetFadeValue ()	Returns the value/position of the crossfader. » Example
void SetFadeValue (int value)	Sets the value for the position of the crossfader. Valid values range from 0 to 255. » Example
int GetFreeze ()	Returns the status of the Freeze function. » Example
void SetFreeze (int freeze/unfreeze)	Sets the Freeze function to be activated or deactivated. » Example
int GetMasterFader ()	Returns the value/position of the Master , which determines the brightness of the Main Output. » Example
void SetMasterFader (int value)	Sets the value of the Master . Valid values range from 0 to 255. » Example
int GetAudioFader ()	Returns the value/position of the Audio Input Level . » Example
void SetAudioFader (int value)	Sets the value of the Audio Input Level . Valid values range from 0 to 255. » Example
int GetStorageSpeedMaster (int storage)	Returns the value of the Speed Master for Storage Left or Storage Right. Valid values are STORAGE_LEFT , STORAGE_RIGHT , and a speed range from -10.0 to 10.0 for the return value. » Example
void SetStorageSpeedMaster (int storage, float speed)	Sets the value of the Speed Master for a specific Storage Place. Valid values are STORAGE_LEFT , STORAGE_RIGHT . » Example
int GetStoragePause (int storage)	Returns the status of the Pause function of Storage Left or Storage Right. Valid values are STORAGE_LEFT , STORAGE_RIGHT . » Example
void SetStoragePause (int storage, int mode)	Sets the Pause mode to be activated or deactivated for Storage Left or Storage Right. Valid values are STORAGE_LEFT , STORAGE_RIGHT for <i>storage</i> as well as PAUSE , NOPAUSE . » Example
void GetStoragePlace (int storage)	Returns the currently selected Storage Place of Storage Left or Storage Right with a value between 0 and 255 (Indexing starts with 0). Valid values are for <i>storage</i> STORAGE_LEFT , STORAGE_RIGHT . » Example
void SetStoragePlace (int storage, int place, int mode)	Set a specific Storage Place to be activated/selected in Storage Left or Storage Right. Valid values are STORAGE_LEFT , STORAGE_RIGHT for <i>storage</i> , and a <i>place</i> between 0 and 255 (Indexing starts with 0). The third value is optional and valid parameters are: WITH_AUTOFADE , WITHOUT_AUTOFADE . Activated by default is WITH_AUTOFADE . (When the currently selected Storage Place can be seen in the output window and a new Storage Place without automatic fade is set with this function, automatic fade will still be used (WITHOUT_AUTOFADE will be overwritten) to provide a smooth fade on the output.) » Example
int GetStorageSubMaster (int storage)	Returns the value of the Submaster of Storage Left or Storage Right. Valid values are STORAGE_LEFT , STORAGE_RIGHT . » Example
void SetStorageSubMaster (int storage, int value)	Sets the Submaster of Storage Left or Storage Right. Valid values for <i>storage</i> are STORAGE_LEFA , STORAGE_RIGHT , and a value range from 0 to 255 for the <i>value</i> . » Example

int GetStorageFullState (int storage, int place)	Returns 1 if the standard settings of a Storage Place of either Storage Left or Storage Right have been modified, i.e. if an effect has been set up on a Storage Place. Valid values for <i>storage</i> are STORAGE_LEFA , STORAGE_RIGHT . <i>place</i> describes the Storage Place between 0 and 255 (Indexing starts with 0). Returns 0 if the specified Storage Place remains unchanged.
void SetFilterColor (color c, int index)	Sets the color that will be used for the Color Filter of the Main Output, Storage Left, or Storage Right. Valid values for <i>index</i> are LEFT , RIGHT , MAIN » List Of Structures » List of Global Constants
color GetFilterColor (int index)	Retrieves the color that is currently set for the Color Filter of the Main Output, Storage Left, or Storage Right. » List Of Structures » List of Global Constants
void SetBlackout (int mode)	Activates or deactivates a Blackout of the Main Output. Valid values for <i>mode</i> are BLACKOUT_OFF or BLACKOUT_ON .
int GetBlackout ()	Returns if the Blackout is active or not.
void SetStorageFilter (int storage, int filter)	Applies a Filter Effect (FX) to the Storage Place. Valid values for <i>storage</i> are STORAGE_LEFT , STORAGE_RIGHT . Valid values for <i>filter</i> are » Filters
int GetStorageFilter ()	Returns which Filter Effect (FX) is applied to the Storage Place.
void ImportStoragePlace (int storage, int place, string name)	Automatically loads a single MADRIX Storage Place file . Valid values for <i>storage</i> are STORAGE_LEFT , STORAGE_RIGHT . Valid values for <i>place</i> are 0 to 255 (Indexing starts with 0). Valid values for <i>name</i> are *.mspz file names and the specific location on the harddisk; for example: "C : \Effect.mspz". It is recommended to only use this function in <code>InitEffect()</code> .
void ImportStorage (int storage, string name)	Automatically loads a complete Storage file . Valid values for <i>storage</i> are STORAGE_LEFT , STORAGE_RIGHT . Valid values for <i>name</i> are *.mstz file names and the specific location on the harddisk; for example: "C : \Storage.mstz". It is recommended to only use this function in <code>InitEffect()</code> .
int ImportPatch (string file)	Automatically loads a Patch file . Valid values for <i>file</i> are *.mpz file names and the specific location on the harddisk in inverted commas; for example: "C:\Patch01.mpz". The function returns an integer value. Valid values for <i>int</i> are 1 (loaded successfully) and 0 (failed to load). It is recommended to only use this function in <code>InitEffect()</code> - Please remove <code>InitEffect()</code> from <code>MatrixSizeChanged()</code> in this case! If used in other parts of the Macro, <code>MatrixSizeChanged()</code> should be included in <code>InitEffect()</code> .
void Filter (int filter)	Renders a filter over the matrix. » Valid parameters (Filters) » Description
int GetAutoGainControl ()	Returns if the Automatic Gain Control (AGC) is enabled (AGC) or not (NOAGC).
void SetAutoGainControl (int mode)	Sets the Automatic Gain Control (AGC) function to be activated or deactivated. Valid constants for <i>mode</i> are AGC or NOAGC .
int GetStrobe ()	Returns if the Main Output Strobe is activated (STROBE) or not (NOSTROBE).
void SetStrobe (int mode)	Sets the Main Output Strobe function to be activated or deactivated. Valid constants for <i>mode</i> are STROBE or NOSTROBE .
color GetStrobeColor ()	Returns the currently used color for the Main Output Strobe .
void SetStrobeColor (struct color)	Sets the Main Output Strobe color. » List Of Structures » List of Global Constants

int GetStrobeValue ()	Returns the Main Output Strobe frequency factor. Valid values range from 2 to 10. 2 represents a frequency of 25 Hz. 10 represents a frequency of 5 Hz.
void SetStrobeValue (int value)	Sets the Main Output Strobe frequency factor. Valid values for <i>value</i> range from 2 to 10. 2 represents a frequency of 25 Hz. 10 represents a frequency of 5 Hz.
int GetStorage (int storage)	Returns the currently selected Storage ID of Storage Left or Storage Right with a value between 0 and 255 (Indexing starts with 0). Valid values for <i>storage</i> are STORAGE_LEFT , STORAGE_RIGHT .
void SetStorage (int storage, int storageID)	Sets the Storage ID. Valid values for <i>storage</i> are STORAGE_LEFT , STORAGE_RIGHT , and a value range from 0 to 255 for <i>storageID</i> (Indexing starts with 0).
Cue List	
void CuelistStop ()	Stop the Cue List. » Example
void CuelistPlay ()	Start the Cue List. Only applies when a Duration is set, otherwise, CuelistGo () is executed. » Example
void CuelistGo ()	Jump ahead one step in the Cue List. » Example
void CuelistBack ()	Goes Back one step in the Cue List. » Example
void CuelistGoto (int cuelistentry)	Go to a specific Cue List entry. » Example
int CuelistCurrentCue ()	Returns the currently used Cue in the Cue List. A return value of -1 means that the Cue List is not running. A return value of 0 means that Cue 1 is active, a value of 1 means that Cue 2 is active, and so on. » Example
index CuelistCurrentCue ()	Returns the currently playing Cue number. <i>index</i> starts with 0. » Example
int CuelistCount ()	Returns the total number of Cues in the Cue List. » Example
void CuelistCueAllOccupied ()	Performs a Cue All .
void CuelistNew (int cues)	Creates a new and empty Cue List and adds a number of new Cues as defined by <i>cues</i> . By default, <i>cues</i> has a value of 0. » Example
int CuelistProgress ()	Returns the current location of the progress bar. Values range from 0 to 100.
void CueAdd ()	Adds a new Cue to the Cue List with default (i.e. empty) settings.
void CueDelete (int index)	Removes the specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0.
void CueDeleteAll ()	Removes all Cues from the Cue List.
void CueDeleteCurrent ()	Removes the Description selected Cue from the Cue List.
void CueSetDescription (int index, string)	Sets a new description <i>string</i> for the specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
string CueGetDescription (int index)	Returns the Description of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
void CueSetDate (int index , int year, int month, int day)	Sets the Date with <i>year</i> , <i>month</i> , <i>day</i> for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0.
int CueGetDateYear (int index)	Returns the year that is set as Date of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
int CueGetDateMonth (int index)	Returns the month that is set as Date of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example

int CueGetDateDay (int index)	Returns the day that is set as Date of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
void CueSetDateWeekday (int index, int day)	Sets a weekday as Date for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. A <i>day</i> value of 1 sets Monday, 2 sets Tuesday, 3 sets Wednesday, 4 sets Thursday, 5 sets Friday, 6 sets Saturday, 7 sets Sunday, while 8 sets Daily. » Example
int CueGetDateWeekday (int index)	Returns the weekday that is set as Date of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
void CueSetDateString (int index , string)	Sets the Date for a specified Cue with <i>index</i> as Cue number as <i>string</i> as shown in the Cue List (e.g. "2014/09/26"). <i>index</i> starts with 0.
string CueGetDateString (int index)	Returns the Date of a specified Cue with <i>index</i> as Cue number as <i>string</i> as shown in the Cue List. <i>index</i> starts with 0. » Example
void CueSetTimeCode (int index, int hours, int minutes, int seconds, int frames)	Sets the Time Code for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0.
int CueGetTimeCodeHour (int index)	Returns the hours value of the Time Code of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
int CueGetTimeCodeMinute (int index)	Returns the minutes value of the Time Code of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
int CueGetTimeCodeSecond (int index)	Returns the seconds value of the Time Code of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
int CueGetTimeCodeFrame (int index)	Returns the frames value of the Time Code of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
void CueSetTimeCodeString (int index, string)	Sets the Time Code for a specified Cue with <i>index</i> as Cue number as <i>string</i> as shown in the Cue List (e.g. "01:10:24:25"). <i>index</i> starts with 0.
string CueGetTimeCodeString (int index)	Returns the Time Code of a specified Cue with <i>index</i> as Cue number as <i>string</i> as shown in the Cue List. <i>index</i> starts with 0. » Example
void CueSetDuration (int index, int hours, int minutes, int seconds, int frames)	Sets the Duration for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
int CueGetDurationHour (int index)	Returns the hours value of the Duration of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
int CueGetDurationMinute (int index)	Returns the minutes value of the Duration of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
int CueGetDurationSecond (int index)	Returns the seconds value of the Duration of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
int CueGetDurationFrame (int index)	Returns the frames value of the Duration of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
void CueSetDurationString (int index, string)	Sets the Duration for a specified Cue with <i>index</i> as Cue number as <i>string</i> as shown in the Cue List (e.g. "02:00:00:00"). <i>index</i> starts with 0.
string CueGetDurationString (int index)	Returns the Duration of a specified Cue with <i>index</i> as Cue number as <i>string</i> as shown in the Cue List. <i>index</i> starts with 0. » Example
void CueSetFollow (int index, int followcue)	Activates or deactivates the Follow Cue for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. A value of 0 for <i>followcue</i> turns Follow Cue off. Any other higher value for <i>followcue</i> specifies the cue number that should be set as Follow Cue . » Example
int CueGetFollowCue (int index)	Returns the cue number that is set as Follow Cue of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0.

void CueSetStorage (int index, int storage)	Sets the Storage number for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. <i>storage</i> starts with 0. » Example
int CueGetStorage (int index)	Returns the number that is set as Storage of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
void CueSetPlace (int index, int storageplace)	Sets the Storage Place number for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. <i>storageplace</i> starts with 0. » Example
int CueGetPlace (int index)	Returns the number that is set as Storage Place of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
void CueSetFadeType (int index, int fadetype)	Sets the Fade Type for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. Valid values for <i>fadetype</i> range from 0 to 15 or see below for valid constants for <i>fadetype</i> . » Example
int CueGetFadeType (int index)	Returns the currently set Fade Type of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
string CueGetFadeTypeString (int index)	Returns the Fade Type of a specified Cue with <i>index</i> as Cue number as <i>string</i> as shown in the Cue List. <i>index</i> starts with 0.
void CueSetFadeTime (int index , float fadetime)	Sets the Fade Time for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
float CueGetFadeTime (int index)	Returns the currently set Fade Time of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
string CueGetFadeTimeString (int index)	Returns the Fade Time of a specified Cue with <i>index</i> as Cue number as <i>string</i> as shown in the Cue List (e.g. "1.00"). <i>index</i> starts with 0.
void CueSetFadeColor (int index, color fadecolor)	Sets the Fade Color for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
color CueGetFadeColor (int index)	Returns the currently set Fade Color of a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. » Example
void CueSetGroupPreset (int index, int preset)	Sets the Group Preset <i>preset</i> for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0. Valid values for <i>preset</i> range from 1 to 256.
int CueGetGroupPreset (int index)	Returns the currently set Group Preset for a specified Cue with <i>index</i> as Cue number. <i>index</i> starts with 0.
int GetGroupCount ()	Returns the current number of Fixture Groups. » Example
int GetGroupIdByIndex (int index)	Returns the Fixture Group ID of a Fixture Group specified with <i>index</i> . The index refers to the MADRIX Group Control starting with 0; counted from left to right on the user interface.
int GetGroupDefaultValue (int ID)	Returns the Default Value of a Fixture Group specified with its Group ID as <i>ID</i> .
int GetGroupDefaultValueByIndex (int index)	Returns the Default Vale of a Fixture Group specified with <i>index</i> . The index refers to the Group Control starting with 0; counted from left to right on the user interface.
color GetGroupDisplayColor (int ID)	Returns the Display Color of a Fixture Group specified with its Group ID as <i>ID</i> .
color GetGroupDisplayColorByIndex (int index)	Returns the Display Color of a Fixture Group specified with <i>index</i> . The index refers to the Group Control starting with 0; counted from left to right on the user interface.
string GetGroupDisplayName (int ID)	Returns the Display Name of a Fixture Group specified with its Group ID as <i>ID</i> . » Example

string GetGroupDisplayNameByIndex (int index)	Returns the Display Name of a Fixture Group specified with <i>index</i> . The index refers to the Group Control starting with 0; counted from left to right on the user interface.
void SetGroupValue (int ID, int value)	Sets the <i>value</i> for a Fixture Group specified with its Group ID as <i>ID</i> . Valid values for <i>ID</i> and <i>value</i> range from 0 to 255. » Example
void SetGroupValueByIndex (int index, int value)	Sets the <i>value</i> for a Fixture Group specified with <i>index</i> . The index refers to the Group Control starting with 0; counted from left to right on the user interface. Valid values for <i>index</i> and <i>value</i> range from 0 to 255.
int GetGroupValue (int ID)	Returns the currently set value of a Fixture Group specified with its Group ID as <i>ID</i> . » Example
int GetGroupValueByIndex (int index)	Returns the currently set value of a Fixture Group specified with <i>index</i> . The index refers to the Group Control starting with 0; counted from left to right on the user interface.
void SetGroupFlashMode (int ID, int mode)	Disables Flash mode for a Fixture Group specified with its Group ID as <i>ID</i> if <i>mode</i> is set to FALSE (0). Otherwise it can be enabled using TRUE (1).
void SetGroupFlashModeByIndex (int index, int mode)	Disables Flash mode for a Fixture Group specified with <i>index</i> if <i>mode</i> is set to FALSE (0). Otherwise it can be enabled using TRUE (1). The index refers to the Group Control starting with 0; counted from left to right on the user interface.
int GetGroupFlashMode (int ID)	Returns TRUE if Flash mode is enabled for a Fixture Group specified with its Group ID as <i>ID</i> , otherwise FALSE .
int GetGroupFlashModeByIndex (int index)	Returns TRUE if Flash mode is enabled for a Fixture Group specified with <i>index</i> , otherwise FALSE . The index refers to the Group Control starting with 0; counted from left to right on the user interface.
void ToggleGroupFlashMode (int ID)	Enables Flash mode or uses the default setting for a Fixture Group specified with its Group ID as <i>ID</i> , depending on the current state.
void ToggleGroupFlashModeByIndex (int index)	Enables Flash mode or uses the default setting for a Fixture Group specified with <i>index</i> , depending on the current state. The index refers to the Group Control starting with 0; counted from left to right on the user interface.
void SetGroupFadeTime (float time)	Sets the Fade-In Time for the Group Control.
float GetGroupFadeTime ()	Returns the currently set Fade-In Time for the Group Control.
void SetGroupPreset (int preset)	Sets all current Fixture Group values as a Group Preset specified by <i>preset</i> . Indexing starts with 0.
void CallGroupPreset (int preset)	Calls a Group Preset specified by <i>preset</i> . Indexing starts with 0.

Constants

The following values (defines) must be used as parameters for the functions provided above.

Value	Description
Fade Types	
int CROSSFADE	Selects the Cross-fade XF as Fade Type.
int WHITEFADE	Selects the White-fade WF as Fade Type.
int BLACKFADE	Selects the Black-fade BF as Fade Type.
int COLORFADE	Selects the Color-fade CF with the currently selected color as Fade Type.
int X_WIPE	Selects the Wipe X as Fade Type.
int Y_WIPE	Selects the Wipe Y as Fade Type.
int Z_WIPE	Selects the Wipe Z as Fade Type.
int X_CROSS_WIPE	Selects the Wipe XC as Fade Type.
int Y_CROSS_WIPE	Selects the Wipe YC as Fade Type.
int Z_CROSS_WIPE	Selects the Wipe ZC as Fade Type.
int X_SLIDE	Selects the Slide X as Fade Type.
int Y_SLIDE	Selects the Slide Y Slide as Fade Type.
int Z_SLIDE	Selects the Slide Z Slide as Fade Type.
int X_CROSS_SLIDE	Selects the Slide XC as Fade Type.
int Y_CROSS_SLIDE	Selects the Slide YC as Fade Type.
int Z_CROSS_SLIDE	Selects the Slide ZC as Fade Type.
Freeze Function	
int FREEZE	Freezes the main output instantly. To be used with SetFreeze
int UNFREEZE	Unfreezes the main output. To be used with SetFreeze
Storage Area Selection	
int STORAGE_LEFT	Selects Storage Left.
int STORAGE_RIGHT	Selects Storage Right.
Automatic Fade Function	
int WITH_AUTOFADE	Activates automatic fade. To be used with SetStoragePlace
int WITHOUT_AUTOFADE	Deactivates automatic fade. To be used with SetStoragePlace
Pause Function	
int PAUSE	Activates a Storage Place to be paused. To be used with SetStoragePause
int NOPAUSE	Deactivates the pausing mode of a Storage Place. To be used with SetStoragePause
Blackout Function	
int BLACKOUT_ON	Activates the blackout of the output. To be used with SetBlackout
int BLACKOUT_OFF	Deactivates the blackout of the output. To be used with SetBlackout
Automatic Gain Control Function	
int AGC	Activates the Automatic Gain Control. To be used with SetAutoGainControl
int NOAGC	Deactivates the Automatic Gain Control. To be used with SetAutoGainControl

Deprecated Functions

Deprecated functions are outdated functions and should not be used anymore.

Function/Constant	Description
void SetFilterColor (color c)	Use void SetFilterColor (color c, int index) instead.
color GetFilterColor ()	Use color GetFilterColor (int index) instead.

7.3 Examples

GetFadeType

Select a different fade type while running this Main Output Macro and monitor the **Script Output** to see the result.

```
@scriptname="get fade type test";
@author="";
@version="";
@description="";

void InitEffect()
{

}

void PreRenderEffect()
{
    switch(GetFadeType())
    {
        case CROSSFADE: WriteText("CrossFade");break;
        case WHITEFADE: WriteText("WhiteFade");break;
        case BLACKFADE: WriteText("BlackFade");break;
        case COLORFADE: WriteText("ColorFade");break;
        case X_WIPE: WriteText("X Wipe");break;
        case Y_WIPE: WriteText("Y Wipe");break;
        case Z_WIPE: WriteText("Z Wipe");break;
        case X_CROSS_WIPE: WriteText("XC Wipe");break;
        case Y_CROSS_WIPE: WriteText("YC Wipe");break;
        case Z_CROSS_WIPE: WriteText("ZC Wipe");break;
        case X_SLIDE: WriteText("X Slide");break;
        case Y_SLIDE: WriteText("Y Slide");break;
        case Z_SLIDE: WriteText("Z Slide");break;
        case X_CROSS_SLIDE: WriteText("XC Slide");break;
        case Y_CROSS_SLIDE: WriteText("YC Slide");break;
        case Z_CROSS_SLIDE: WriteText("ZC Slide");break;
    }
}

void PostRenderEffect()
```

```
{}
```

»[Description](#)

SetFadeType

Watch the fade area while running the script to see how one of the first four fade types is selected in succession.

```
@scriptname="set fade type test";
@author="";
@version="";
@description="";

int Value=0;
void InitEffect()
{}

void PreRenderEffect()
{
    Value%=400;// range 0...200
    switch(Value)
    {
        case 0: SetFadeType(CROSSFADE);break;
        case 25: SetFadeType(WHITEFADE);break;
        case 50: SetFadeType(BLACKFADE);break;
        case 75: SetFadeType(COLORFADE);break;
        case 100: SetFadeType(X_WIPE);break;
        case 125: SetFadeType(Y_WIPE);break;
        case 150: SetFadeType(Z_WIPE);break;
        case 175: SetFadeType(X_CROSS_WIPE);break;
        case 200: SetFadeType(Y_CROSS_WIPE);break;
        case 225: SetFadeType(Z_CROSS_WIPE);break;
        case 250: SetFadeType(X_SLIDE);break;
        case 275: SetFadeType(Y_SLIDE);break;
        case 300: SetFadeType(Z_SLIDE);break;
        case 325: SetFadeType(X_CROSS_SLIDE);break;
        case 350: SetFadeType(Y_CROSS_SLIDE);break;
        case 375: SetFadeType(Z_CROSS_SLIDE);break;
    }
    Value++;
}

void PostRenderEffect()
{}

```

»[Description](#)

GetFadeColor

Select a different color for the Color-Fade while running the script and monitor the **Script Output** to see the result.

```
@scriptname="get fade color values";
@author="";
@version="";
@description="";

color c;
void InitEffect()
{}

void PreRenderEffect()
{
    c=GetFadeColor();
    WriteText("Red: "+(string)c.r+", Green: "+(string)c.g+", Blue: "+(string)c.b+",
    White:"+((string)c.w);
}

void PostRenderEffect()
{}

```

»[Description](#)

SetFadeColor

Monitor the color window next to the Color-Fade button to see the result as the Red color value is increased repeatedly.

```
@scriptname="set fade color red value";
@author="";
@version="";
@description="";

color c;
void InitEffect()
{}

void PreRenderEffect()
{
    c.r++;
    c.r%=256;// range 0...255
    SetFadeColor(c);
}

```



```
void PostRenderEffect()  
{  
}
```

»[Description](#)

GetFadeTime

Increase or decrease the Fade Time and monitor the **Script Output** while running the script.

```
@scriptname="get fade time";  
@author="";  
@version="";  
@description="";  
  
float fTime;  
void InitEffect()  
{  
}  
  
void PreRenderEffect()  
{  
    fTime=GetFadeTime();  
    WriteText("FadeTime: "+(string)fTime);  
}  
  
void PostRenderEffect()  
{  
}
```

»[Description](#)

SetFadeTime

Watch the Fade Time value while running the script.

```
@scriptname="set fade time";  
@author="";  
@version="";  
@description="";  
  
float fTime=0.0;  
void InitEffect()  
{  
}  
  
void PreRenderEffect()  
{  
    fTime+=0.1;  
    if(fTime>60.0)  
        fTime=0.0;// range 0...60  
}
```

```
    SetFadeTime(fTime);
}

void PostRenderEffect()
{}
```

»[Description](#)

GetFadeValue

Slide the crossfader from Left to Right or back and monitor the **Script Output** while running the script.

```
@scriptname="get fader value Left-Right";
@author="";
@version="";
@description="";

int fValue;
void InitEffect()
{

void PreRenderEffect()
{
    fValue=GetFadeValue();
    WriteText((string)fValue);
}

void PostRenderEffect()
{}
```

»[Description](#)

SetFadeValue

Watch the crossfader to see the result of the script.

```
@scriptname="set fader value Left-Right";
@author="";
@version="";
@description="";

int Value=0;
void InitEffect()
{

void PreRenderEffect()
{
    Value++;
```

```
Value%=256;// range 0...255
SetFadeValue(Value);
}

void PostRenderEffect()
{}
```

»[Description](#)

GetFreeze

To test this script, use the **Freeze** button and monitor the **Script Output** while running the script.

```
@scriptname="get freeze button test";
@author="";
@version="";
@description="";

void InitEffect()
{

void PreRenderEffect()
{
if(GetFreeze())
WriteText("Freeze button is pressed");
else
WriteText("Freeze button is not pressed");
}

void PostRenderEffect()
{}
```

»[Description](#)

SetFreeze

Watch the **Freeze** button to see the effect of the script.

```
@scriptname="freeze, unfreeze test";
@author="";
@version="";
@description="";

int Value=0;
void InitEffect()
{

void PreRenderEffect()
```

```
{
  Value++;
  Value%=100;// range 0...100
  switch(Value)
  {
    case 5: SetFreeze(FREEZE);break;
    case 55: SetFreeze(UNFREEZE);break;
  }
}

void PostRenderEffect()
{}
```

»[Description](#)

GetMasterFader

Adjust the **Master** while running the script and monitor the **Script Output**.

```
@scriptname="get fader value from master";
@author="";
@version="";
@description="";

void InitEffect()
{

}

void PreRenderEffect()
{
  WriteText("Master: "+(string)GetMasterFader());
}

void PostRenderEffect()
{}
```

»[Description](#)

SetMasterFader

Watch the **Master** closely to see the result of the script.

```
@scriptname="set master fader value";
@author="";
@version="";
@description="";

int Value=0;
void InitEffect()
```

```
{  
  
void PreRenderEffect()  
{  
    Value++;  
    Value%=256;// range 0...255  
    SetMasterFader(Value);  
}  
  
void PostRenderEffect()  
{
```

»[Description](#)

GetAudioFader

Adjust the **Audio Input Level** while running the script and monitor the **Script Output**.

```
@scriptname="get fader value from audio";  
@author="";  
@version="";  
@description="";  
  
void InitEffect()  
{  
  
void PreRenderEffect()  
{  
    WriteText("AudioFader: "+(string)GetAudioFader());  
}  
  
void PostRenderEffect()  
{
```

»[Description](#)

SetAudioFader

Monitor the **Audio Input Level** closely to see the result of the script.

```
@scriptname="set audio fader";  
@author="";  
@version="";  
@description="";  
  
int Value=0;  
void InitEffect()
```

```
{  
  
void PreRenderEffect()  
{  
    Value++;  
    Value%=256;// range 0...255  
    SetAudioFader(Value);  
}  
  
void PostRenderEffect()  
{
```

»[Description](#)

CuelistStop/CuelistPlay

To test this script, a **Cue List** with Duration and a minimum of 2 Cues is required.

```
@scriptname="cue list stop/start test";  
@author="";  
@version="";  
@description="";  
  
int Value=0;  
void InitEffect()  
{  
  
void PreRenderEffect()  
{  
    Value++;  
    Value%=500;// range 0...500  
    switch(Value)  
    {  
        case 10: CuelistStop();break;  
        case 260: CuelistPlay();break;  
    }  
}  
  
void PostRenderEffect()  
{
```

»[Description](#)

CuelistGo/CuelistBack

To test this script, a **Cue List** with Duration and a minimum of 2 Cues is required.

```
@scriptname="cue list go/back test";
```

```
@author="";
@version="";
@description="";

int Value=0;
void InitEffect()
{}

void PreRenderEffect()
{
    Value++;
    Value%=500;// range 0...500
    switch(Value)
    {
        case 10: CuelistGo();break;
        case 260: CuelistBack();break;
    }
}

void PostRenderEffect()
{}

```

»[Description](#)

CuelistGoto

To test this script, a **Cue List** with Duration and a minimum of 9 Cues is required.

```
@scriptname="cue list goto test";
@author="";
@version="";
@description="";

int Value=0;
void InitEffect()
{}

void PreRenderEffect()
{
    Value++;
    Value%=250;// range 0...250
    if(Value%50==0)
        CuelistGoto(Value/25); // skip 1,3,5,7,9,1,3,...
        //CuelistGoto(Value/50); // skip 1,2,3,4,5,6,1,2,...
}

void PostRenderEffect()
{}

```

»[Description](#)

CuelistCurrentCue

To test this script, create a Cue List, activate several Cues, and monitor the **Script Output**.

```
@scriptname="CurrentCue";
@author="inoage / info@madrix.com";
@version="";
@description="View current item from Cue List";

void InitEffect()
{

}

void PreRenderEffect()
{

}

void PostRenderEffect()
{
    WriteText((string)CuelistCurrentCue());
}
```

»[Description](#)

GetStorageSpeedMaster

Adjust the **Speed Master** Left or Right while running the script and monitor the **Script Output**.

```
@scriptname="get Speed Master test";
@author="";
@version="";
@description="";

void InitEffect()
{

}

void PreRenderEffect()
{
    WriteText("SpeedLeft:"+(string)GetStorageSpeedMaster(STORAGE_LEFT)
+" SpeedRight:"+(string)GetStorageSpeedMaster(STORAGE_RIGHT));
}

void PostRenderEffect()
{

}
```


»[Description](#)

SetStorageSpeedMaster

This script is best tested with the SCE Color Scroll effect. Monitor **Preview Left** and **Preview Right** as well as the **Speed Masters** to see the results of the script.

```
@scriptname="Speed Master test";
@author="";
@version="";
@description="";

float Value=0.0;
void InitEffect()
{}

void PreRenderEffect()
{
    Value+=0.1;
    if(Value>10.0)
        Value=-10.0;// range 0...255

    SetStorageSpeedMaster(STORAGE_LEFT,Value); // Storage Left
    SetStorageSpeedMaster(STORAGE_RIGHT,Value/2.0); // Storage Right
}

void PostRenderEffect()
{}
```

»[Description](#)

GetStoragePause

To test this script, press the 'Pause' button of Storage Area Left or Right and monitor the **Script Output**.

```
@scriptname="get storage pause test";
@author="";
@version="";
@description="";

void InitEffect()
{}

void PreRenderEffect()
{
    if(GetStoragePause(STORAGE_LEFT))
```

```
    WriteText("Storage Left Paused");
else
    WriteText("Storage Left Running");
if(GetStoragePause(STORAGE_RIGHT))
    WriteText("Storage Right Paused");
else
    WriteText("Storage Right Running");
}

void PostRenderEffect()
{}
```

»[Description](#)

SetStoragePause

This script is best tested with the SCE Color Scroll effect. Monitor the **Pause** buttons of Storage Left and Storage Right to see the effects of the script.

```
@scriptname="storage no-/pause test";
@author="";
@version="";
@description="";

int Value=0;
void InitEffect()
{

}

void PreRenderEffect()
{

    Value++;
    Value%=200;// range 0...200

    switch(Value)
    {
        case 10: SetStoragePause(STORAGE_LEFT,PAUSE);break;// Storage Left
        case 60: SetStoragePause(STORAGE_RIGHT,PAUSE);break;// Storage Right
        case 110: SetStoragePause(STORAGE_LEFT,NOPAUSE);break;// Storage Left
        case 160: SetStoragePause(STORAGE_RIGHT,NOPAUSE);break;// Storage Right
    }
}

void PostRenderEffect()
{}
```

»[Description](#)

GetStoragePlace

While running the script, select different Storage Places across Storage Left or Storage Right and monitor the **Script Output**. The currently selected Storage Place number minus 1 should be displayed.

```
@scriptname="get storage place test";
@author="";
@version="";
@description="";

void InitEffect()
{

}

void PreRenderEffect()
{
    WriteText("Storage Left:"+(string)GetStoragePlace(STORAGE_LEFT)
    +" Storage Right:"+(string)GetStoragePlace(STORAGE_RIGHT));
}

void PostRenderEffect()
{}
```

»[Description](#)

SetStoragePlace

Monitor the Effect Areas Left and Right as well as the two Storage Areas (Left and Right) to see the results of the script.

```
@scriptname="test setStoragePlace with and without autofade";
@author="";
@version="";
@description="";

int Value=0;
int place=0;
void InitEffect()
{
    SetFadeTime(1.0);// better for demonstration
}

void PreRenderEffect()
{
    Value++;
}
```

```

Value%=1000;// range 0...1000
switch(Value)
{
case 150: SetStoragePlace(STORAGE_LEFT,place,WITH_AUTOFADE);break;
// Storage Left with Autofade
case 300: SetStoragePlace(STORAGE_RIGHT,place,WITH_AUTOFADE);break;
// Storage Right with Autofade
case 450: place++;
case 600: SetStoragePlace(STORAGE_LEFT,place,WITHOUT_AUTOFADE);break;
// Storage Left without Autofade, if FaderValue not a place on Storage Left
case 750: SetStoragePlace(STORAGE_RIGHT,place,WITHOUT_AUTOFADE);break;
// Storage Right without autofade, if FaderValue not a place on Storage Right
case 900: place++;
}
if(place>59) // place range 0...59
    place=0;
}

void PostRenderEffect()
{}

```

»[Description](#)

GetStorageSubMaster

Adjust the **Submasters** of Storage Left and Storage Right (**SUB**) and monitor the **Script Output** while running the script.

```

@scriptname="storage submaster get test";
@author="";
@version="";
@description="";

int subLeft;
int subRight;
void InitEffect()
{}

void PreRenderEffect()
{
    subLeft=GetStorageSubMaster(STORAGE_LEFT);// Storage Left
    subRight=GetStorageSubMaster(STORAGE_RIGHT);// Storage Right
    WriteText("Submaster Left:" +(string)subLeft +" , Submaster Right:" +(string)subRight);
}

void PostRenderEffect()
{}

```

»[Description](#)

SetStorageSubMaster

Select an SCE Effect in both Effect Areas and monitor the two previews (Preview Left and Preview Right) while running the script.

```
@scriptname="storage submaster set test";
@author="";
@version="";
@description="";

int Value=0;
void InitEffect()
{}

void PreRenderEffect()
{
    Value++;
    Value%=256;// range 0...255

    SetStorageSubMaster(STORAGE_LEFT,Value);// Storage Left
    SetStorageSubMaster(STORAGE_RIGHT,255-Value);// Storage Right
    WriteText("SubLeft: "+(string)Value+", SubRight: "+(string)(255-Value));
}

void PostRenderEffect()
{}

```

»[Description](#)

Cue List - Various 1

This Macro creates a new Cue List and adds 8 new Cues. All 8 Cues will be given different settings that are increased each time. Make sure to open the Cue List before or after running this Script to see the result.

```
@scriptname="creating a cue list";
@author="inoage";
@version="MADRIX 3.3";
@description="";

void InitEffect()
{
    color fadeColor;
    CueListNew(8); //create a new Cue List and add 8 Cues
}

```

```

for(int i=0;i<8;i++)    // change the following settings for each Cue
{
    CueSetDescription(i, "Color"+ (string)(i+1));
    CueSetTimeCode(i, i+1,i+2,i+3,i+4);
    CueSetDuration(i, i+5,i+6,i+7,i+8);
    CueSetDateWeekday(i, i+1);
    CueSetFollow(i, (i+2)%9);
    CueSetStorage(i, (i%2));
    CueSetPlace(i, (i%4));
    CueSetFadeType(i, i);
    CueSetFadeTime(i, (float)i*10.0+10.0);
    fadeColor.r =i*10;
    fadeColor.r =i*15;
    fadeColor.r =i*20;
    CueSetFadeColor(i, fadeColor);
}
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

»[Description](#)

CueGetFadeColor

Make sure to create or load a Cue List first. This Main Output Macro analyzes the current Cue List and shows the currently set up Fade Color of each Cue in the **Script Output**.

```

@scriptname="analyze fade color of cues";
@author="inoage";
@version="MADRIX 3.3";
@description="";

void InitEffect()
{
    const int count = CuelistCount();
    if(count>0)
        WriteText("Cue List View");
    else
        WriteText("Cue List is empty!");
}

```

```

    for(int i=0;i<count;i++)
    {
        color c = CueGetFadeColor(i); //retrieve the Fade Color for every Cue in the Cue List
        WriteText( (string)i           + " | " + // number
                  "R:"+(string)c.r     + " | " +
                  "G:"+(string)c.g     + " | " +
                  "B:"+(string)c.b     + " | " +
                  "W:"+(string)c.w     + " | " );
    }
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

»[Description](#)

Cue List - Various 2

Make sure to create or load a Cue List first. This Main Output Macro analyzes the current Cue List and shows all Cues and their settings in the **Script Output**.

```

@scriptname="simple cue list view 1";
@author="inoage";
@version="MADRIX 3.3";
@description="";

void InitEffect()
{
    string sCueCurr;
    const int count = CuelistCount();
    const int CueCurrent = CuelistCurrentCue();
    if(count>0)
        WriteText("Cue List View");
    else
        WriteText("Cue List is empty!");

    for(int i=0;i<count;i++) //analyze all Cues
    {
        if(CueCurrent==i)

```

```

        sCueCurr = ">";
    else
        sCueCurr = " ";

    color c = CueGetFadeColor(i);
    WriteText( sCueCurr
               (string)i
               CueGetDescription(i)
               CueGetDateString(i)
               CueGetTimeCodeString(i)
               CueGetDurationString(i)
               (string)CueGetStorage(i)
               (string)CueGetPlace(i)
               (string)CueGetFadeType(i)
               (string)CueGetFadeTime(i)
               "R:"+(string)c.r
               "G:"+(string)c.g
               "B:"+(string)c.b
               "W:"+(string)c.w);
    }

}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

»[Description](#)

Cue List - Various 3

Make sure to create or load a Cue List first. This Main Output Macro analyzes the current Cue List and shows all Cues and their settings in the **Script Output**.

```

@scriptname="simple cue list view 2";
@author="inoage";
@version="MADRIX 3.3";
@description="";

void InitEffect()
{
    string sCueCurr;
    const int count = CuelistCount();
    const int CueCurrent = CuelistCurrentCue();
}

```



```

if(count>0)
    WriteText("Cuelist View");
else
    WriteText("Cuelist is empty");

for(int i=0;i<count;i++) //analyze all Cues
{
    if(CueCurrent==i)
        sCueCurr = ">";
    else
        sCueCurr = " ";

    string sTimecode = "--:--:--:--";
    if(CueGetTimeCodeHour(i)>=0)
        sTimecode = (string)CueGetTimeCodeHour(i) + ":" +
                    (string)CueGetTimeCodeMinute(i)+ ":" +
                    (string)CueGetTimeCodeSecond(i)+ ":" +
                    (string)CueGetTimeCodeFrame(i);

    string sDuration = "--:--:--:--";
    if(CueGetDurationHour(i)>=0)
        sDuration = (string)CueGetDurationHour(i) + ":" +
                    (string)CueGetDurationMinute(i)+ ":" +
                    (string)CueGetDurationSecond(i)+ ":" +
                    (string)CueGetDurationFrame(i);

    string sDate = "--/--/--";

    switch(CueGetDateWeekday(i))
    {
        default:sDate = (string)CueGetDateYear(i) + "/" +
                        (string)CueGetDateMonth(i) + "/" +
                        (string)CueGetDateDay(i);
                        break;
        case 8: sDate="daily"; break;
        case 7: sDate="Sun"; break;
        case 6: sDate="Sat"; break;
        case 5: sDate="Fri"; break;
        case 4: sDate="Thu"; break;
        case 3: sDate="Wed"; break;
        case 2: sDate="Tue"; break;
        case 1: sDate="Mon"; break;
        case 0: sDate="ERROR"; break;
    }

    color c = CueGetFadeColor(i);
    WriteText( sCueCurr
               (string)i
               CueGetDescription(i)
               sDate
               sTimecode
               sDuration
               (string)CueGetStorage(i)
               (string)CueGetPlace(i)
               (string)CueGetFadeType(i)
               (string)CueGetFadeTime(i)
               "R:"+ (string)c.r
               "G:"+ (string)c.g
               "B:"+ (string)c.b
               "W:"+ (string)c.w);
               + " " + // select current cue
               + " | " + // number
               + " | " + // cue description
               + " | " + // date string
               + " | " + // time code string
               + " | " + // duration string
               + " | " +
               + " | " +
               + " | " +
               + "s | " +
               + " | " +
               + " | " +
               + " | " +

```

```

    }
}

void PreRenderEffect()
{
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

»[Description](#)

Fixture Groups - Various 1

Set up different Fixture Groups first. This Main Output Macro analyzes specific Fixture Group information and shows their settings in the **Script Output**.

```

@scriptname="";
@author="inoage";
@version="3.4";
@description="get fixture groups' data";

int GroupValue;
int GroupId;
string GroupName;

void InitEffect()
{
    if(GetGroupCount(<1)
        WriteText("No groups have been set up!");
}

void PreRenderEffect()
{
    const int GroupCount = GetGroupCount();
    for(int i=0; i<GroupCount; i++)
    {
        GroupId = GetGroupIdByIndex(i);
        GroupName = GetGroupDisplayName(i);
        GroupValue = GetGroupValue(i);
        WriteText("Group: " + (string)(i)+ ", ID: " + (string)GroupId+ ", Name: " + (string)GroupName);
    }
}

void PostRenderEffect()

```

```

{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

»[Description](#)

SetGroupValue

Set up different Fixture Groups first. This Main Output Macro steadily increases the values for your Fixture Groups in the Group Control and starts from the beginning again when the maximum value is reached.

```

@scriptname="";
@author="";
@version="";
@description="set groups value";

int FrameCount;
int Value;

void InitEffect()
{
    if(GetGroupCount(<1)
        WriteText("No groups have been set up!");
    FrameCount=0;
}

void PreRenderEffect()
{
    const int GroupCount = GetGroupCount();
    for(int i=0; i<GroupCount; i++)
    {
        Value = FrameCount/(i+1);
        SetGroupValue(i, Value);
    }

    FrameCount++;
    FrameCount= FrameCount%256;
}

void PostRenderEffect()
{
}

void MatrixSizeChanged()
{
    InitEffect();
}

```

}

»[Description](#)

//PART H

Imprint And Copyright

8 Imprint And Copyright

Company And Address



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