

User Guide



MADIface XT II

Channels Galore!

USB 3 / USB 2.0 Digital I/O System
24 Bit / 192 kHz Digital Audio
192 Channels Triple MADi Interface
AES/EBU I/O
2 + 4 Channels Analog I/O
196 x 198 Matrix Router
3 x MIDI embedded in MADi
1 x MIDI I/O

Safety Instructions and Proper use



Read the manual carefully and completely before using the device. Pay attention to the following information on how to use and operate the MADiface XT II safely. Improper use can lead to loss of warranty claims (see warranty statement on page 118).

Proper Use

The MADiface XT II is a digital interface for professional audio applications for use with CE approved class B computers.



To comply with the European CE standard, the MADiface XT II must be used with CE approved Class B computers. All connecting cables must be shielded. The computer and all cables connected to the MADiface XT II must be properly grounded. Operation with non-certified computers and cables may cause interference to other devices as well as the MADiface XT II.



Do not open chassis

No user serviceable parts inside. Refer service to qualified service personnel.



To reduce the risk of fire or electric shock do not expose this device to rain or moisture. Prevent moisture and water from entering the device. Never leave a pot with liquid on top of the device. Do not use this product near water, i. e. swimming pool, bathtub or wet basement. Danger of condensation inside – don't turn on before the device has reached room temperature.



Installation

Surface may become hot during operation – ensure sufficient ventilation. Avoid direct sun light and do not place it near other sources of heat, like radiators or stoves. When mounting in a rack, leave some space between this device and others for ventilation.



Unauthorized servicing/repair voids warranty. Only use accessories specified by the manufacturer.

	Important Safety Instructions	2
	General	
1	Introduction	8
2	Package Contents	8
3	System Requirements	8
4	Brief Description and Characteristics	8
5	First Usage – Quick Start	
5.1	Connectors – Controls - Display	9
5.2	Quick Start	10
5.3	Menu and Navigation	11
5.4	Overview Menu Structure	11
	Driver Installation and Operation - Windows	
6	Driver and Firmware - Windows	
6.1	Driver Installation	14
6.2	Uninstalling the Drivers	14
6.3	Firmware Update	14
7	Configuring the MADiface XT	
7.1	Settings Dialog – Main Tab	15
7.2	Option WDM Devices	18
8	Operation and Usage	
8.1	Playback	20
8.2	DVD Playback (AC-3 / DTS)	20
8.3	Multi-client Operation	21
8.4	Digital Recording	21
8.5	Analog Recording	22
8.6	Clock Modes – Synchronization	22
9	Operation under ASIO	
9.1	General	23
9.2	Channel Count under ASIO	24
9.3	Known Problems	24
10	Using multiple MADiface XT	25
11	DIGICheck Windows	25
12	Hotline – Troubleshooting	26
	Driver Installation and Operation - Mac OS X	
13	Driver and Firmware – Mac OS X	
13.1	Driver Installation	28
13.2	Uninstalling the Drivers	28
13.3	Firmware Update	28
14	Configuring the MADiface XT	
14.1	Settings Dialog	29
14.2	Clock Modes – Synchronization	32
15	Mac OS X FAQ	
15.1	MIDI doesn't work	33
15.2	Repairing Disk Permissions	33
15.3	Supported Sample Rates	33
15.4	Channel Count under Core Audio	33
15.5	Various Information	34
16	Using multiple MADiface XT	34
17	DIGICheck NG Mac	35
18	Hotline – Troubleshooting	36

Usage and Operation

19 Front Panel Controls

19.1	Overviews	38
19.2	Encoders	38
19.3	Menu Keys MIC/GAIN and MIX	39
19.4	Channel Menu	39
19.5	Setup Menu	41
19.5.1	Options Menu	41
19.5.2	Setups Menu	44
19.6	Clock	44

Inputs and Outputs

20 Analog Inputs / Outputs

20.1	Mic / Line In (XLR / TRS)	46
20.2	Phantom Power	46
20.3	AutoSet	46
20.4	Balanced Line Outputs	47
20.5	Line - Headphones	47

21 Digital Inputs and Outputs

21.1	MADI I/O	48
21.2	AES / EBU	48
21.3	MIDI	49
21.4	D-sub Pinout	49

22 Word Clock

22.1	Word Clock Input and Output	50
22.2	Technical Description and Background	51
22.3	Cables and Termination	52
22.4	General Operation	52

Stand-Alone Operation

23 Operation and Usage – Stand-alone mode

23.1	General	54
23.2	Settings at the Unit	54
23.3	Store / Load Setups at the Unit	54
23.4	Storing Setups from the Computer	54
23.5	ARC Options	55

24 Examples

24.1	2/4-Channel AD/DA-Converter	55
24.2	2-Channel Mic Preamp	55
24.3	194-Channel Monitor Mixer	55
24.4	Analog and Digital Inserter	55
24.5	3-Port MADI Router with Monitoring	56

TotalMix FX

25	Routing and Monitoring – TotalMix FX	
25.1	Overview	58
25.2	The User Interface	60
25.3	The Channel	61
25.3.1	Settings	63
25.3.2	Equalizer	64
25.3.3	Room EQ	66
25.3.4	Dynamics	67
25.4	Section Control Room	68
25.5	The Control Strip	69
25.5.1	View Options	70
25.5.2	Snapshots - Groups	71
25.5.3	Channel Layout – Layout Presets	72
25.5.4	Scroll Location Markers	73
25.6	Reverb and Echo	74
25.7	Preferences	77
25.7.1	Store Settings for All Users	78
25.8	Settings	79
25.8.1	Mixer Page	79
25.8.2	MIDI Page	80
25.8.3	OSC Page	81
25.8.4	Aux Devices	82
25.9	Hotkeys and Usage	83
25.10	Menu Options	84
25.11	Menu Window	85
26	The Matrix	
26.1	Overview	86
26.2	Elements of the Matrix View	86
26.3	Operation	86
27	Tips and Tricks	
27.1	ASIO Direct Monitoring (Windows)	87
27.2	Copy a Submix	87
27.3	Doubling the Output Signal (Mirror)	87
27.4	Delete a Submix	87
27.5	Copy and Paste everywhere	88
27.6	Recording a Submix - Loopback	89
27.7	MS Processing	89
27.8	Program start options (Windows)	89
28	MIDI Remote Control	
28.1	Overview	90
28.2	Mapping	90
28.3	Setup	91
28.4	Operation	91
28.5	Standard MIDI Control	92
28.6	Stand-alone MIDI Control	93
28.7	Loopback Detection	95
28.8	OSC (Open Sound Control)	95
29	DAW Mode	95
30	TotalMix Remote	96

Class Compliant Mode

31	General – Class Compliant mode	100
32	System Requirements	100
33	Operation	101
33.1	Useful Hints	101
33.2	Class Compliant under Windows and macOS	102
34	Supported Inputs and Outputs	103
35	Front panel Operation	103
36	Audio Routing and Processing	103
37	Setups	104

Technical Reference

38	Technical Specifications	
38.1	Analog	106
38.2	Digital Inputs	107
38.3	Digital Outputs	107
38.4	Digital	108
38.5	MIDI	108
38.6	General	108
39	Technical Background	
39.1	MADI Basics	109
39.2	Lock and SyncCheck	110
39.3	Latency and Monitoring	110
39.4	USB Audio	112
39.5	DS – Double Speed	113
39.6	QS – Quad Speed	114
39.7	SteadyClock	115
39.8	Terminology	116

Miscellaneous

40	Accessories	118
41	Warranty	118
42	Appendix	119
43	CE / FCC Compliance	120

User's Guide



MADIface XT II

► General

1. Introduction

Thank you for choosing the MADiface XT II. This unique audio system is the premier solution to transfer analog and huge amounts of digital audio channels directly to a computer from practically any source. Numerous unique features, well thought-out configuration dialogs, an industry-leading mixing engine and monitoring solution, professional DSP effects and class-leading analog circuits with latest digital converters offer a quick, comfortable and efficient use of the MADiface XT II

The updated MADiface XT II offers improved analog I/Os, Room EQ, and USB 3 Class Compliant operation with transmission of all 394 channels.

Drivers are available for Windows 7 to 11 (Intel, ARM), Mac OS X x86 (Intel) and macOS (Intel, Mx).

RME's high-performance philosophy guarantees maximum system performance by executing as many functions as possible not in the driver (i.e. the CPU), but directly within the audio hardware.

2. Package Contents

Please check that your MADiface XT II package contains each of the following:

- MADiface XT II
- AES/MIDI breakout cable
- Cable USB 3, 1.8 m (6 ft)
- External power supply with DC locking type connector

3. System Requirements

- Windows 7 or up, Intel Mac OS X (10.6 or up)
- 1 x USB 3.0 port, or
- 1 x USB 2.0 port (requires computer with at least Intel Core i5 CPU)

4. Brief Description and Characteristics

- All settings can be changed in real-time
- Buffer sizes/latencies from 32 up to 8192 samples selectable
- 196/198 channels 48 kHz/24 bit record/playback
- 100/102 channels 96 kHz/24 bit record/playback
- 52/54 channels 192 kHz/24 bit record/playback
- Clock modes slave and master
- Automatic and intelligent master/slave clock control
- SteadyClock: Jitter-immune, super-stable digital clock
- SyncAlign guarantees sample aligned and never swapping channels
- SyncCheck tests and reports the synchronization status of input signals
- TotalMix for latency-free submixes and perfect ASIO Direct Monitoring
- TotalMix: 4096 channel mixer with 46 bit internal resolution
- TotalMix FX: 3-band EQ, Low Cut, Reverb, Echo, Compressor, Expander, Auto Level
- TotalMix FX Room EQ: 9-band PEQ with Delay and Volume Calibration
- 1 x MIDI I/O, 16 channels high-speed MIDI
- 3 x MIDI over MADI I/O
- Full stand-alone operation including MIDI remote and ARC USB
- Hi-power low impedance headphone output

5. First Usage – Quick Start

5.1 Connectors – Controls – Display

The front of the MADiface XT has 2 XLR/TRS line and microphone inputs, a stereo line/headphone output, two rotary encoders with push functionality, four menu keys, a graphical colour display, and six status LEDs.

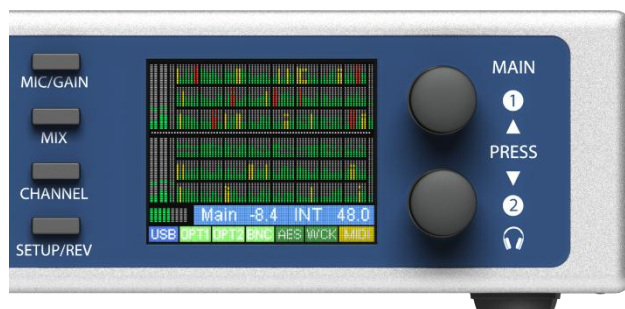
The Neutrik combo sockets of the two **Mic/Line** inputs provide XLR and 6.3 mm / 1/4" TRS connection. They have LEDs for Signal (SIG), Overload (Clip) and phantom power (48V).

The separated headphone output can also operate as high-quality, unbalanced line output.



The display main screen (Global Level Meters) shows the current state of interface mode (USB 2 yellow, USB 3 blue), the sync state of MADI and AES inputs, and incoming and outgoing MIDI data.

The four **keys**, the two **encoders 1 and 2**, the high-resolution and clear colour display, and a well thought-out menu structure enable the user to quickly change and configure the device's settings completely without a computer. Help notes and clear markers in the display guide the user through all functions.



The rotary encoder **1** and **2** set the monitoring volume of the rear and front output directly at the device. Watch the display for further information.

The rear panel of the MADiface XT II has two balanced analog outputs, word clock I/O, MADI coaxial I/O, two MADI optical I/O, USB 3 port (compatible to USB 2), MIDI/AES I/O D-sub for breakout cable, the power socket and a power switch.

Balanced Line Level Outputs. 2 balanced analog outputs via XLR.

Word Clock I/O. BNC. In menu *Options – Clock* the input can be set to be terminated with 75 Ohms.

MIDI I/O and AES/EBU I/O. D-sub connector for the included breakout cable with XLR for AES I/O and 5-pin DIN for MIDI I/O.

MADI I/O coaxial: Standard coaxial MADI ports.

MADI I/O optical: 2 x standard optical MADI ports.

Remote. Connector for the optional Advanced Remote Control USB (ARC USB) when the MADiface XT II is used in stand-alone and Class Compliant mode. This port can also be used alternatively to the connection of the ARC USB to the computer.

USB 3.0. USB socket for connection to the computer. Compatible to **USB 2.0** (reduced channel count, only MADI 1 available).

POWER (switch): Turns the MADIface XT on and off.

Socket for power connection. The locking type jack fits the locking type DC connector on the included power supply. After inserting the connector carefully turn it so that it locks.

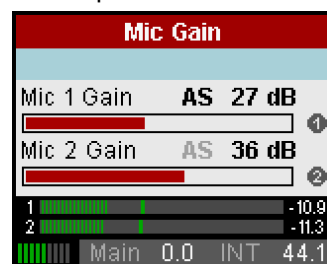


The included hi-performance switch mode power supply operates in the range of 100V to 240V AC. It is short-circuit-proof, has an integrated line-filter, is fully regulated against voltage fluctuations, and suppresses mains interference.

5.2 Quick Start

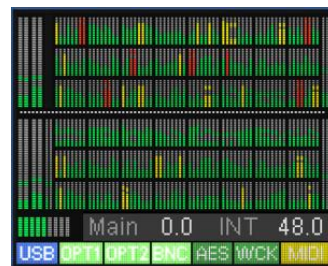
After the driver installation (chapter 6 / 13) connect the TRS or the XLR inputs with the analog signal source. The input gain can be adjusted in TotalMix FX (Input Channel Settings, Gain), assuring the highest signal to noise ratio will be achieved. Also try to achieve an optimum input level by adjusting the source itself. Raise the source's output level until the peak level meters in TotalMix reach about -3 dB.

The signal level of the front inputs can also be optimized directly at the MADIface XT. The key MIC/GAIN gives direct access to this setting, which is then controlled by the encoders 1 and 2. Two LEDs beside the inputs jacks indicate signal and overload.



All digital inputs show their current state already on the global level meter screen. No signal (label dark), signal (label flashing red) and sync state (label constantly lit) are easy to see and to understand. The Settings dialog in Windows and Mac OS X includes a more detailed analysis of the input signal state.

The upper part of the display shows all input levels: Analog 1/2, AES, 64 channels of MADI ports 1, 2 and 3, on the far right the two FX input channels (Aux Send). In the lower part the output levels of Analog 1/2, AES, Phones, 64 channels of the MADI ports 1, 2 and 3. On the far right the two FX output channels.

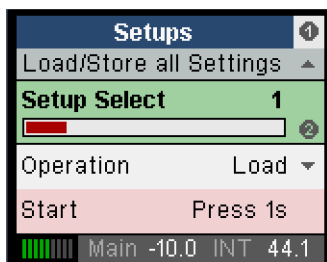


This is followed by the current utilization of the DSP, the volume value of Main Out or Phones, the clock status and the current sample rate.

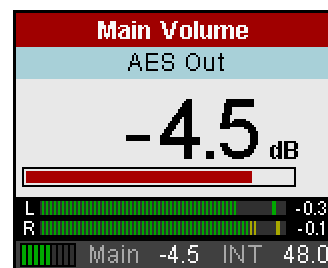
The bottom line shows the input status of USB, MADI 1-3, AES, word clock and MIDI.

The digital outputs of the MADIface XT II provide AES/EBU (SPDIF compatible) and MADI signals at the corresponding ports. They can be set up in different ways in the menu SETUP/REV, Options, MADI Settings, or the driver's Settings dialog.

The output level of the current Main output (as selected in TM FX) and Phones (locked to the front output) can be adjusted right from the front. While in the global level meter screen simply turn encoder 1 or 2. More options, like balance, phase, mute or stereo/mono are available in the CHANNEL menu.

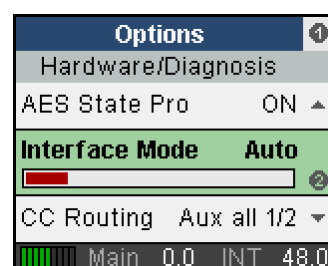


The MADIface XT II can store and load its current state into 6 different memory slots, called Setups. With this, the MADIface XT II can be used stand-alone after setting it up accordingly, replacing lots of dedicated devices (see chapter 24).



In online mode some settings are greyed out, as these should be changed only at the computer in Settings dialog or TotalMix. These include the choice of sample rate and the mix settings.

The factory setting for the Interface Mode, Auto, will use USB 2 or 3 automatically, depending on the detected interface. For Class Compliant operation the interface mode has to be set manually while not connected to the computer via USB. This is done under SETUP/REV, Options, Hardware/Diagnosis, Interface Mode.

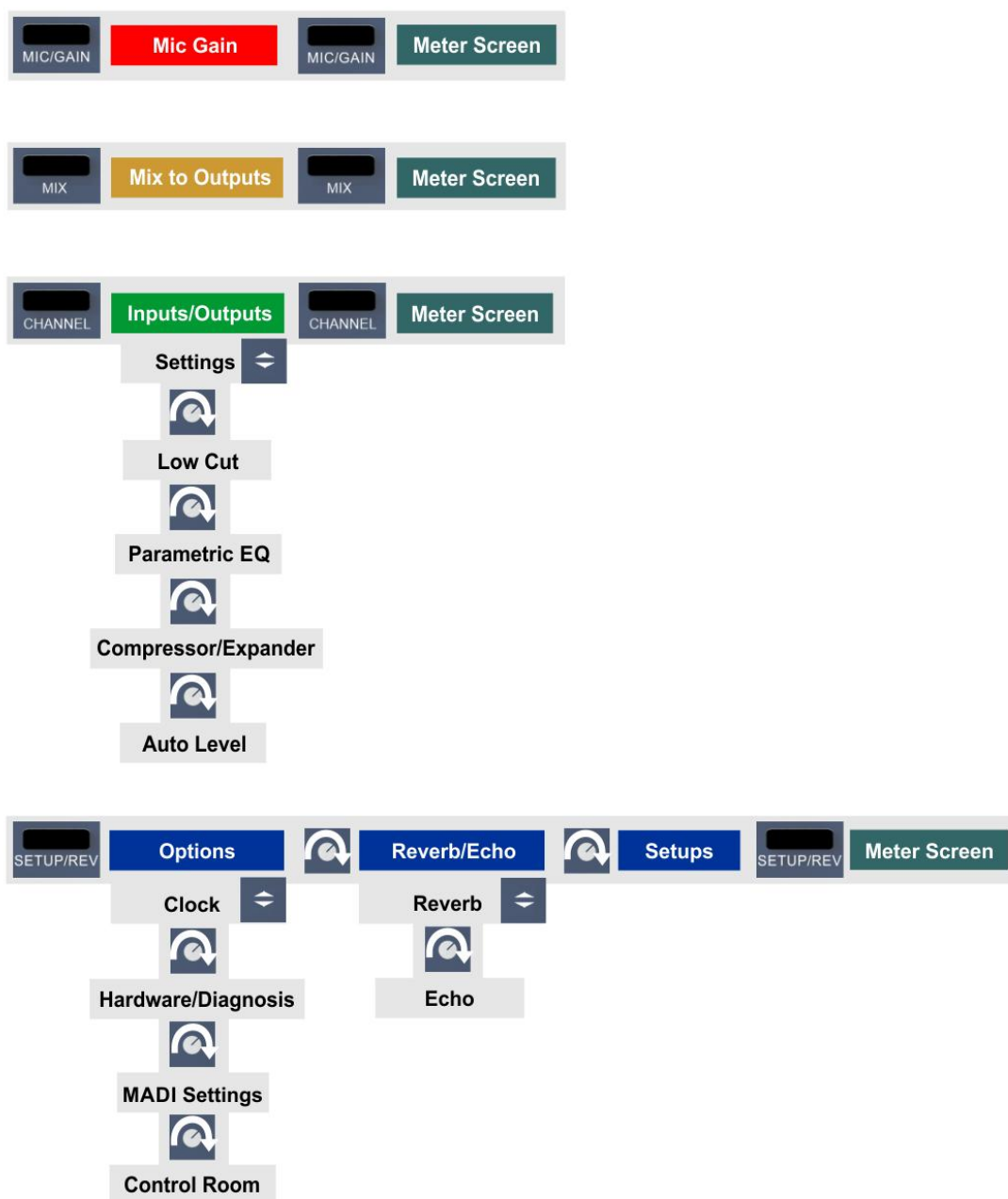


5.3 Menu and Navigation

The MADIface XT II has a simple and clear menu structure, for fast and efficient operation directly at the device. In most cases, however, all settings will be done via the Settings dialog and TotalMix FX of the host computer. The operation on the device is typically limited to a direct adjustment of the monitoring volume (loudspeaker and headphones) and the microphone gain. In stand-alone mode, all settings are available directly on the device.

Navigation through the menus of the display and control of the settings is done via four quick select buttons and two rotary encoder with push function. The quick select buttons MIC/GAIN, MIX, CHANNEL and SETUP/REV are described in chapter 19.1.

5.4 Overview Menu Structure



User's Guide



MADIface XT II

► Driver Installation and Operation - Windows

6. Driver and Firmware - Windows

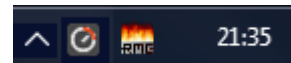
6.1 Driver Installation

To simplify installation it is recommended to first install the drivers before the unit is connected to the computer. But it will also work the other way round.

RME is constantly improving the drivers. Please download the latest drivers from the RME website at <http://rme.to/usbe>, driver_madiface_win_10.15.zip or newer. Unzip the downloaded file and start the driver installation with *rmeinstaller.exe*.

Start *rmeinstaller.exe* and follow the instructions of the installer. After installation connect computer and MADiface XT II using a USB 2 or USB 3.0 cable. Windows detects the new hardware as **MADiface XT** and installs the drivers automatically.

After a reboot, the icons of TotalMix FX and Settings dialog appear in the notification area. If not a click on the chevron leads to the settings that control the icon display.



Note on Windows 7: the MADiface XT II requires a newer TotalMix FX than included in the Windows 7 driver, namely version 1.95 or higher. However, it can be downloaded individually from the RME website and replaced manually after the driver installation.

Driver Updates do not require to remove the existing drivers. Simply install the new driver over the existing one.

6.2 Uninstalling the Drivers

A de-installation of the driver files is not necessary. Thanks to full Plug & Play support, the driver files will not be loaded after the hardware has been removed.

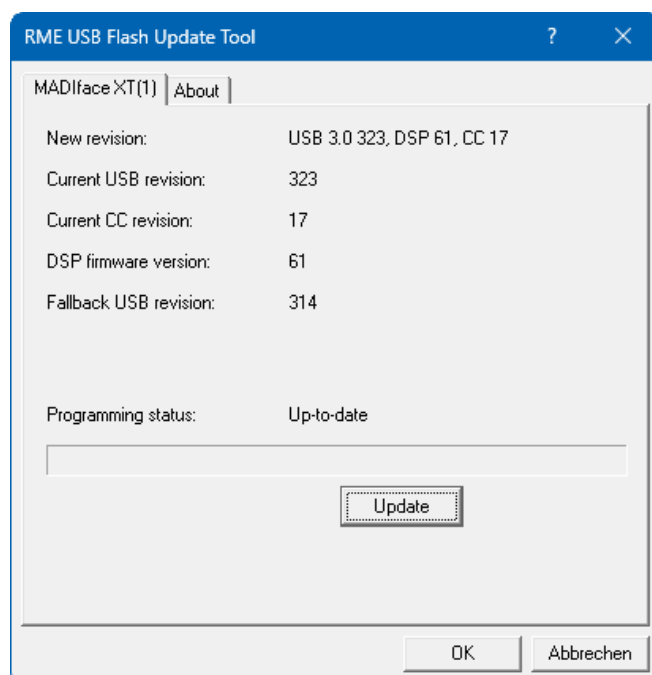
For an uninstall start the RME installer (*rmeinstaller.exe*) and select *Uninstall the last installed driver package*.

6.3 Firmware Update

The Flash Update Tool updates the MADiface XT II to the latest firmware version. It requires an already installed driver.

Download the latest version from the RME website at <http://rme.to/usbe>. Unpack the downloaded file then start **fut.exe**. The Flash Update Tool displays the current revision of the MADiface XT II and whether it needs an update or not. If so, then simply press the 'Update' button. A progress bar will indicate when the flash process is finished.

After the update the MADiface XT needs to be reset. This is done by powering it down for a few seconds. A reboot of the computer is not necessary.



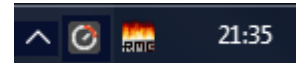
When the update fails (status: failure), the card's second BIOS will be used from the next cold boot on (Secure BIOS Technology). Therefore the card stays fully functional. The flash process should then be tried again on a different computer.

7. Configuring the MADiface XT

7.1 Settings Dialog – Main Tab

Configuration of the MADiface XT is done via its own settings dialog. The panel **Settings** can be opened by clicking on the fire or hammer symbol in the Task Bar's system tray.

The mixer of the MADiface XT II, **TotalMix FX**, can be opened by clicking on the DSP FX symbol in the Task Bar's system tray.



The hardware of the MADiface XT II offers a number of helpful, well thought-of practical functions and options which affect how the card operates. The Settings dialog includes options for:

- Latency
- WDM Device Configuration
- Configuration of digital I/Os
- Synchronization behaviour
- State of input and output
- Operation of the DSP

Any changes made in the Settings dialog are applied immediately - confirmation (e.g. by clicking on OK or exiting the dialog) is not required.

However, settings should not be changed during playback or record if it can be avoided, as this can cause unwanted noises. Also, please note that even in 'Stop' mode, several programs keep the recording and playback devices open, which means that any new settings might not be applied immediately.

The tab **About** provides information about the current driver version of the MADiface XT. The USB driver also has four more options there:

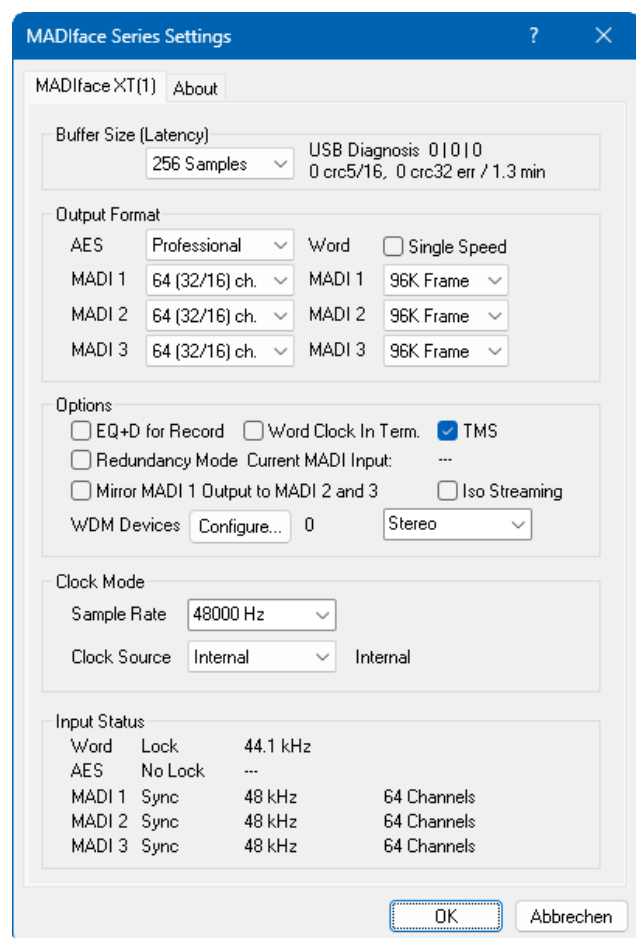
Lock Registry

Default: off. Checking this option brings up a dialog to enter a password. Changes in the Settings dialog are no longer written to the registry. As the settings are always loaded from the registry when starting the computer, this method provides an easy way to define an initial state of the MADiface XT.

Enable MMCSS for ASIO activates support with higher priority for the ASIO driver. Note: At this time, activating this option seems to be useful only with the latest Cubase/Nuendo at higher load. With other software this option can decrease performance. The change becomes active after an ASIO reset. Therefore it is easy to quickly check which setting works better.

Limit ASIO to 32 Channels

Some software crashes when presented with more than 32 ASIO channels. This option limits the ASIO driver to 32 channels, but all I/Os can still be accessed and used via TotalMix FX.



Sort ASIO Devices

Changes the order only of the ASIO channels when using more than one interface.

Main Tab MADiface XT

Buffer Size (Latency)

The setting *Buffer Size* determines the latency between incoming and outgoing ASIO and WDM data, as well as affecting system stability (see chapter 9.1). While ASIO can use any offered buffer size, WDM is limited to 512 samples. The driver handles this automatically, higher settings are only applied to ASIO.

USB Diagnosis and Errors does not refer to buffer errors, but USB transmission errors. The display will be reset on any start of a playback/record. More information is found in chapter 39.4.

Output Format

AES

The channel status of the AES output signal can be set to *Consumer* or *Professional*. For further details please refer to chapter 21.2.

Word

The *word clock output* signal equals the current sample rate. Selecting *Single Speed* causes the output signal to always stay within the range of 32 kHz to 48 kHz. So at 96 kHz and 192 kHz sample rate, the output word clock is 48 kHz.

Only in stand-alone mode: When clocked via the *word clock input* the sample rate of the sample rate of the MADiface XT directly follows the incoming signal across Single, Double and Quad Speed. A word clock signal at 192 kHz therefore results in an internal sample rate of 192 kHz. This feature is also called *Follow Clock*. With Single Speed active the word clock input adapts to the frequency ranges. So 48 kHz word clock synchronizes the internal clock to 48 kHz, 96 kHz and 192 kHz.

MADI 1/2/3

Defines the format of the MADI output signal. MADI can be a 56 or 64 channel signal, at Double Speed 32/28, at Quad Speed 16/14 channels.

Sample frequencies higher than 48 kHz can also be transmitted using the normal 48K frame. Alternatively, the native 96K frame is available as an output format. 96K frame only supports Double Speed, i.e. 88.2 and 96 kHz. This format therefore enables automatic switching from Single to Double Speed in the MADI receiver.

Options

EQ+D for Record

Switches EQ and Dynamics of all input channels into the recording path. In case Loopback has been activated the EQ and Dynamics of the Output channel are within the recording path. See also chapter 27.6.

Word Clock In Term.

Checking this option terminates the word input internally with 75 Ohms.

TMS

TMS activates the transmission of Channel Status data and Track Marker information from the AES and MADI input signal.

Redundancy Mode

With redundancy mode active the number of input channels is reduced to 68 (analog plus AES plus 1 x MADI). The two other MADI ports serve as fail safe inputs, used as soon as the signal on the current MADI input fails. This setting is also a perfect choice if the card is used as single MADI I/O, saving resources and providing simpler channel selection dialogs.

Mirror MADI1 Output to MADI2/3

This option provides a quick and simple solution to mirror the first MADI output to outputs 2 and 3. The channel count is reduced to 2+4+64 channels (AES, 4 x analog, one MADI port). All the data routed and mixed to MADI port 1 is sent to MADI port 2/3 as well.

Iso(chronous) Streaming (USB 3 only)

The XT uses a special transmission mode with error correction to record data. In case the XT's default mode does not work *Isochronous Streaming* can be tried. This is the standard's native mode for audio transmission and should work with any USB 3 host controller. See also chapter 39.4.

WDM Devices

Allows to freely set which I/Os are available as WDM devices, if these are stereo or multi-channel devices (up to 8 channels), and if one or multiple of the currently active WDM devices should have the Speaker property. More details are found in chapter 7.2.

Clock Mode

Sample Rate

Sets the currently used sample rate. Offers a central and comfortable way of configuring the sample rate of all WDM devices to the same value, as since Vista the audio software is no longer allowed to set the sample rate. However, an ASIO program can still set the sample rate by itself.

During record/playback the selection is greyed out, so no change is possible.

Clock Source

The unit can be configured to use its own clock (Internal = Master), or one of the input signals (Word, MADI, AES). If the selected source isn't available (No Lock), the unit will change to the next available one (RME's AutoSync function). If none is available then the internal clock is used. The current clock source is displayed to the right of the selection dropdown.

Input Status

Displays the state of all five input signals:

- Clock state (No Lock, Lock, Sync)
- Sample rate (coarse)
- Channel format (64 or 56 channels)

Sync Check

RME's exclusive *SyncCheck* technology provides an easy to use check and display of the current clock status. The clock state column indicates whether no signal (No Lock), a valid signal (Lock) or a valid *and* synchronous signal (Sync) is present at each of the digital inputs.

7.2 Option WDM Devices

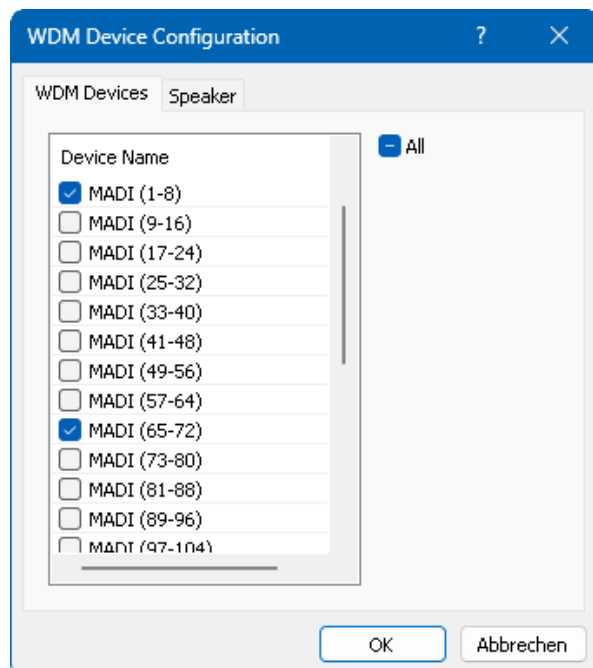
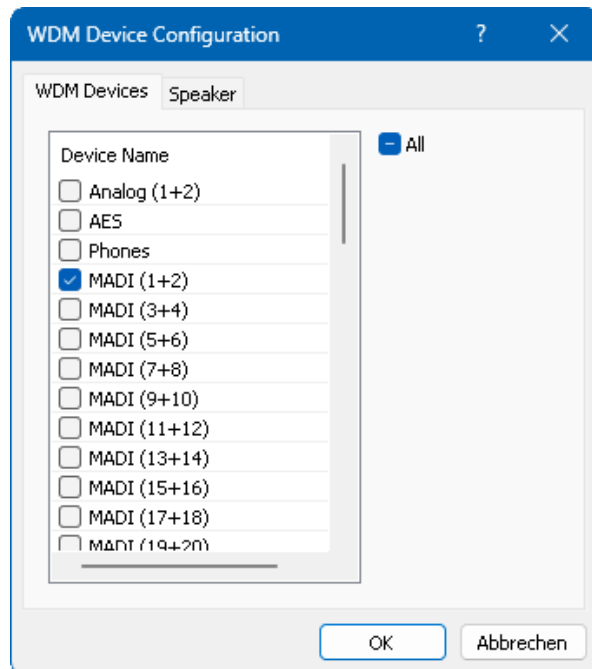
The field WDM Devices has one button to enter the configuration dialog, a status display showing the number of currently enabled WDM devices, and a listbox to select between *Stereo* or *Multi-Channel* devices.

The number represents both record and playback devices, so '1' means one input and one output device.

The screenshot to the right shows the stereo WDM devices available with the XT II, and that only MADI 1/2 has been activated. Any number can be activated. Also only higher numbered devices might be active. For example using the second MADI port for system based audio does not require to activate all 32 stereo devices of MADI 1. Only MADI 65+66 will show up in the Windows Sound control panel.

The checkbox *All* to the right allows for a quick check/uncheck of all devices.

Warning! Activating all 99 stereo devices will most probably freeze your computer! Activate only the ones which are really needed!



The screenshot to the left shows the multi-channel WDM devices available with the MADIface XT after selecting 'Multi-Channel' in the WDM Devices listbox and hitting *WDM Configure*. In this example the devices *MADI 1 to 8* and *MADI 65 to 72* are active.

Using a multi-channel WDM device allows for the use of multi-channel playback with specialized software as well as Surround sound from DVD or Blu-Ray player software.

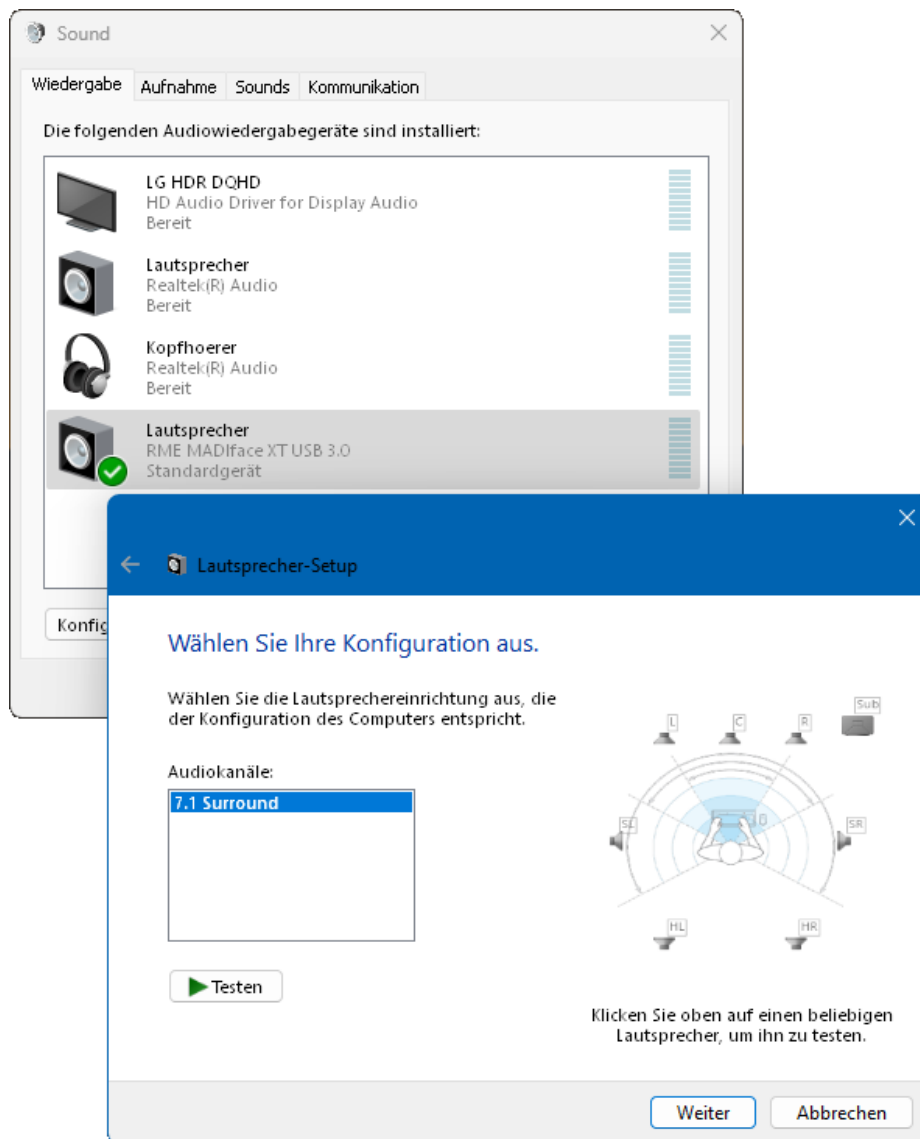
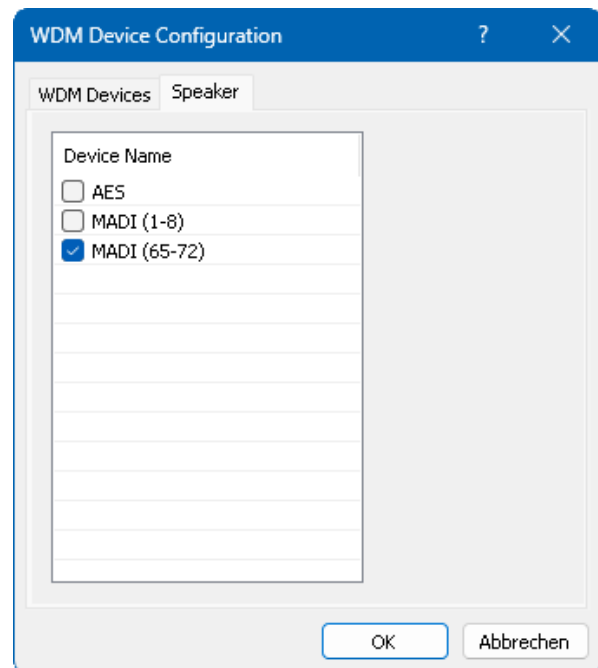
Please note that configuring the WDM device to a specific surround mode in the control panel Sound requires the device to have the Speaker property. See next page.

Again the checkbox *All* to the right allows for a quick check/uncheck of all devices.

Changing to the tab *Speaker* presents a list of all currently activated WDM devices. Any of these can now get the Speaker property.

Please note that defining more than one device as Speaker usually makes no sense, as the speakers don't get numbered or re-named in Windows, so it is impossible to find out which one is which.

After leaving the dialog with OK the WDM devices are reloaded so Windows sees their new properties. In the *Sound - Playback - Configure* control panel, a 2-channel device now appears for stereo and a 7.1 device for multichannel



8. Operation and Usage

8.1 Playback

In the audio application being used, the MADiface XT II must be selected as output device. This can often be found in the *Options*, *Preferences* or *Settings* menus under *Playback Device*, *Audio Devices*, *Audio* etc.

! WDM playback devices are not available if the number of WDM devices is set to 0 in the Settings dialog.

We recommend switching all system sounds off (via >Control Panel /Sounds<). Although the MADiface XT II comes with extensive support for system audio, setting it to be the *Default Device* for playback could cause problems when working with ASIO.

Increasing the number and/or size of audio buffers may prevent the audio signal from breaking up, but also increases latency i.e. output is delayed. For synchronized playback of audio and MIDI (or similar), be sure to activate the checkbox 'Get position from audio driver'.

Note: The driver of the MADiface XT includes a feature to set the sample rate globally for all its WDM devices, within the Settings dialog, see chapter 7.1. As the change within the system requires some time, record/playback should not be started immediately, but only after at least 5 seconds after a change.

Tip: the current CPU load can be used to determine if the audio subsystem has finished the re-configuration.

8.2 DVD-Playback (AC-3/DTS)

Popular DVD software players can send their audio data stream to any AC-3/DTS capable receiver via the AES output of the MADiface XT.

! The sample rate must be set to 48 kHz in the MADiface Settings dialog, or the software will only playback the down-mixed analog signal via AES/SPDIF.

In some cases a MADiface output device has to be selected in >Control Panel / Sound / Playback< and be set as *Default* for the software to recognize it.

The DVD software's audio properties now show the options 'SPDIF Out' or similar. When selecting it, the software will transfer the non-decoded digital multichannel data stream to the MADiface XT.

Note: The AC-3' signal sounds like chopped noise at highest level. The device *Loudspeaker* do not support digital AC-3/DTS playback.

An output to the MADI channels is possible as well. A successful decoding requires a MADI to AES converter like the **RME ADI-642**, converting the playback signals to stereo AES3 or SPDIF.

Multichannel

DVD software player can also operate as software decoder, sending a DVD's multichannel data stream directly to the outputs of the MADiface XT. For this to work select the WDM playback device 'Loudspeaker' of the MADiface XT as in chapter 7.2 as 8 channel device

The playback software's audio properties now list several multichannel modes. If one of these is selected, the software sends the decoded analog multichannel data to the MADiface XT. TotalMix can then be used to play back via any desired output channels.

The typical channel assignment for surround playback is:

1 – Left 2 – Right 3 – Center 4 - LFE (Low Frequency Effects)
5 - SL (Surround Left) 6 - SR (Surround Right)

Note 1: Selecting the MADiface to be used as system playback device is against our recommendation, as professional interfaces should not be disturbed by system events. Make sure to re-assign the selection after usage or disable any system sounds (tab Sounds, scheme 'No audio').

Note 2: The DVD player will be synced backwards from the MADiface. So when using AutoSync and/or word clock, the playback speed and pitch follows the incoming clock signal.

8.3 Multi-client Operation

RME audio interfaces support multi-client operation. Several programs can be used at the same time. The formats ASIO and WDM can even be used on the same playback channels simultaneously. As WDM uses a real-time sample rate conversion (ASIO does not), all active ASIO software has to use the same sample rate.

However, a better overview is maintained by using the channels exclusively. This is no limitation at all, because TotalMix allows for any output routing, and therefore a playback of multiple software on the same hardware outputs.

Inputs can be used from an unlimited number of WDM and ASIO software at the same time, as the driver simply sends the data to all applications simultaneously.

RME's sophisticated tool *DIGICheck* is an exception to this rule. It operates like an ASIO host, using a special technique to access playback channels directly. Therefore DIGICheck is able to analyse and display playback data from any software, no matter which format it uses.

8.4 Analog Recording

For recordings via the analog inputs the corresponding record device has to be chosen (MADiface XT Analog (1+2)).

The level of the front-side analog inputs can be optimized via TotalMix (Input Channel Settings, Gain), or directly at the MADiface XT by the key MIC/GAIN and the encoders 1/2. Here a signal and clip LED provide useful information about the current level state.

A further optimization can be achieved by adjusting the source itself. Raise the source's output level until the peak level meters in TotalMix reach about -3 dB.

Further information is found in chapter 20.

It often makes sense to monitor the input signal or send it directly to the output. This can be done at zero latency using **TotalMix FX** (see chapter 25).

An *automated* control of real-time monitoring can be achieved by Steinberg's ASIO protocol with RME's ASIO drivers and all ASIO 2.0 compatible programs. When 'ASIO Direct Monitoring' has been switched on, the input signal is routed in real-time to the output whenever a recording is started (punch-in).

8.5 Digital Recording

Unlike analog soundcards which produce empty wave files (or noise) when no input signal is present, digital interfaces always need a valid input signal to start recording.

Taking this into account, RME added a comprehensive I/O signal status display to the MADiface XT, showing sample frequency, lock and sync status for every input.

The sample frequency shown in the fields Clock Mode and Input Status is useful as a quick display of the current configuration of the unit and the connected external equipment. If no sample frequency is recognized, it will read 'No Lock'.

Input Status			
Word	Lock	44.1 kHz	
AES	No Lock	---	
MADI 1	Sync	48 kHz	56 Channels
MADI 2	Sync	48 kHz	64 Channels
MADI 3	Sync	48 kHz	64 Channels

This way, configuring any suitable audio application for digital recording is simple. MADiface XT displays the current sample frequency of the currently used input. This parameter can then be changed in the application's audio properties (or similar) dialog.

8.6 Clock Modes - Synchronisation

In the digital world, all devices must be either Master (clock source) or Slave (clock receiver). Whenever several devices are linked within a system, there must always be a single master clock.

! *A digital system can only have one master! If the Fireface's clock mode is set to 'Master', all other devices must be set to 'Slave'.*

The MADiface XT utilizes a very user-friendly, intelligent clock control, called **AutoSync**. In AutoSync mode, the system constantly scans the digital input for a valid signal. If any valid signal is found, the card switches from the internal quartz (*Clock Mode* – Current Internal) to a clock extracted from the input signal (*Clock Mode* – Current MADI, Word or AES). The difference to a usual slave mode is that whenever the clock reference fails, the system will automatically use its internal clock and operate in clock mode Master.

AutoSync guarantees that normal record and record-while-play will always work correctly. In certain cases however, AutoSync may cause feedback in the digital carrier, so synchronization breaks down. To remedy this, switch the XT's clock mode to 'Internal'.

RME's exclusive **SyncCheck** technology enables an easy to use check and display of the current clock status. *Input Status* indicates whether there is a valid signal (Lock, No Lock) for each input (Word, MADI, AES), or if there is a valid *and* synchronous signal (Sync). See chapter 39.2.

Via *Clock Source* a preferred input can be defined. As long as the card sees a valid signal there, this input will be designated as the sync source, otherwise the other inputs will be scanned in turn. If none of the inputs are receiving a valid signal, the MADiface automatically switches clock mode to 'Master'.

With WDM the unit will (has to) set the sample rate. Therefore the error shown to the right can occur. A stable signal with a sample rate of 44.1 kHz is detected at the Word Clock input, but Windows audio had been set to 44100 Hz before. The red colour of the text label signals the error condition, and prompts the user to set 44.1 kHz manually as sample rate.

Clock Mode		
Sample Rate	48000 Hz	Current 44100 Hz
Clock Source	Word	Word

Under ASIO the audio software sets the sample rate, so that such an error will usually not happen – but it can too. In slave mode the external sample rate has priority. Feeding 44.1 kHz will prevent the ASIO software to set 48 kHz – obviously, as the only way to do so would be to enter a different clock mode (Master/Internal).

In practice, SyncCheck provides the user with an easy way of checking whether all digital devices connected to the system are properly configured. With SyncCheck, finally anyone can master this common source of error, previously one of the most complex issues in the digital studio world.

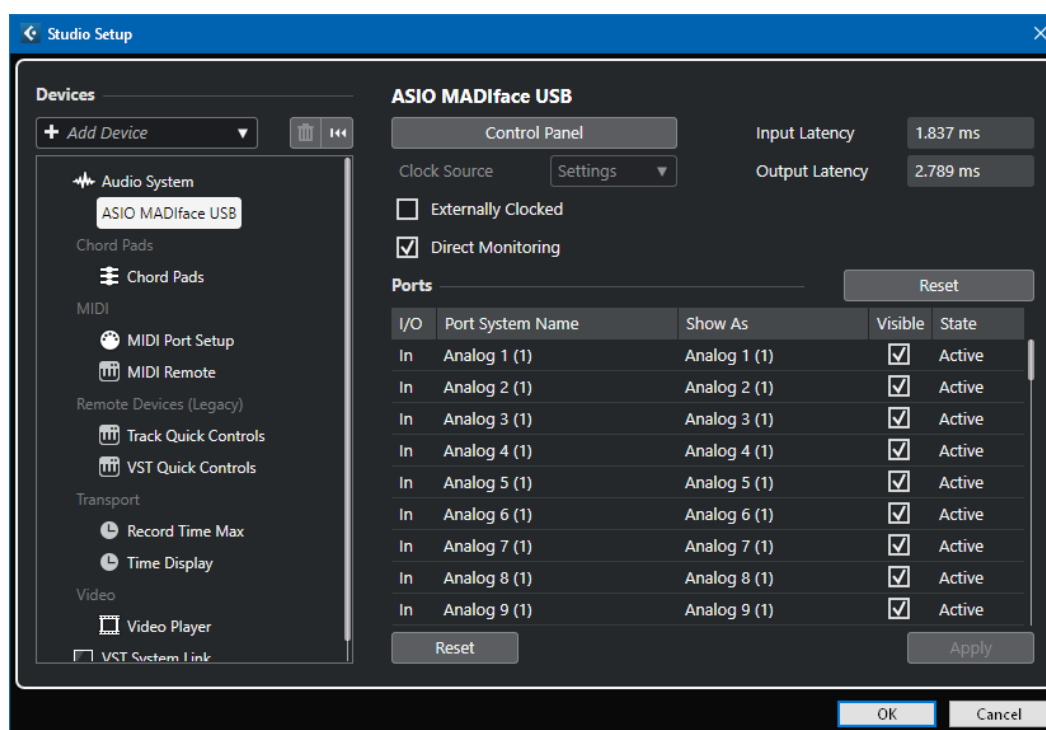
9. Operation under ASIO

9.1 General

Start the ASIO software and select **ASIO MADiface USB** as the audio I/O device.

MADiface XT supports *ASIO Direct Monitoring* (ADM).

Its MIDI I/Os can be used with both MME MIDI and DirectMusic MIDI.



9.2 Channel Count under ASIO

At a sample rate of 88.2 or 96 kHz the number of MADi channels per port is reduced to 32 (Double Speed), and 16 at a sample rate of 176.4 and 192 kHz (Quad Speed).

Note: When changing the sample rate range between Single, Double and Quad Speed the number of channels presented from the ASIO driver will change too. This may require a reset of the I/O list in the audio software.

Single Speed	Double Speed	Quad Speed
MADI1: 1 to 64	MADI1: 1 to 32	MADI1: 1 to 16
MADI2: 65 to 124	MADI2: 33 to 64	MADI2: 17 to 32
MADI3: 125 to 124	MADI3: 125 to 156	MADI3: 33 to 48
Analog 1/2: 193/194	Analog 1/2: 193/194	Analog 1/2: 193/194
AES: 195/196	AES: 195/196	AES: 195/196
Phones: 197/198	Phones: 197/198	Phones: 197/198

9.3 Known Problems

If a computer does not provide sufficient CPU-power, and/or sufficient USB or PCI bus transfer rates, and/or sufficient PCIe-bus transfer rates, then drop outs, crackling and noise will appear. Raising the buffer size in the Settings dialog of the MADiface XT helps in most cases. It is also recommended to deactivate all PlugIns to verify that these are not the reason for such effects. Further information is found in chapter 39.4.

Another common source of trouble is incorrect synchronization. ASIO does not support asynchronous operation, which means that the input and output signals not only have to use the same sample frequency, but also have to be in sync. All devices connected to the MADiface XT must be properly configured for Full Duplex operation. As long as SyncCheck (in the Settings dialog) only displays *Lock* instead of *Sync*, the devices have not been set up properly!

The same applies when using more than one MADiface XT - they all have to be in sync. Else a periodically repeated noise will be heard.

MADiface XT supports *ASIO Direct Monitoring* (ADM). Please note that not all programs support ADM completely or error-free. The most often reported problem is the wrong behaviour of panorama in a stereo channel. Also try to avoid setting the TotalMix FX hardware outputs (third row) to mono mode. This will most likely break ADM compatibility.

In case of a drift between audio and MIDI, or in case of a fixed deviation (MIDI notes placed close before or behind the correct position), the settings in Cubase/Nuendo have to be changed. At the time of print the option 'Use System Timestamp' should be activated. The MADiface supports both MME MIDI and DirectMusic MIDI. It depends on the used application which one will work better.

10. Using multiple MADiface XT

The current driver supports operation of up to three MADiface XT. All units have to be in sync, i.e. have to receive valid sync information either via word clock or by using AutoSync and feeding synchronized signals.

- If one of the XTs is set to clock mode Master, all others have to be set to clock mode Slave, and have to be synced from the master, for example by feeding word clock. The clock modes of all units have to be set up correctly in their Settings dialogs.
- If all units are fed with a synchronous clock, i.e. all units show *Sync* in their Settings dialog, all channels can be used at once. This is especially easy to handle under ASIO, as the ASIO driver presents all cards as one.

Note: TotalMix is part of the hardware of each unit. Up to three mixers are available, but these are separated and can't interchange data. Therefore a global mixer for all units is not possible.

11. DIGICheck Windows

The DIGICheck software is a unique utility developed for testing, measuring and analysing digital audio streams. Although this software is fairly self-explanatory, it still includes a comprehensive online help. DIGICheck 5.96 operates as multi-client ASIO host, therefore can be used in parallel to any software with both inputs and outputs (!). The following is a short summary of the currently available functions:

- **Level Meter.** High precision 24-bit resolution, 2/8/198 channels. Application examples: Peak level measurement, RMS level measurement, over-detection, phase correlation measurement, dynamic range and signal-to-noise ratios, RMS to peak difference (loudness), long term peak measurement, input check. Oversampling mode for levels higher than 0 dBFS. Vertical and horizontal mode. Slow RMS and RLB weighting filter. Supports visualization according to the K-system.
- **Spectral Analyser.** World wide unique 10-, 20- or 30-band display in analog bandpass-filter technology. 192 kHz-capable!
- **Vector Audio Scope.** World wide unique Goniometer showing the typical afterglow of an oscilloscope-tube. Includes Correlation meter and level meter.
- **Totalyser.** Spectral Analyser, Level Meter and Vector Audio Scope in a single window.
- **Surround Audio Scope.** Professional Surround Level Meter with extended correlation analysis, ITU weighting and ITU summing meter.
- **ITU1770/EBU R128 Meter.** For standardized loudness measurements.
- **Bit Statistics & Noise.** Shows the true resolution of audio signals as well as errors and DC offset. Includes Signal to Noise measurement in dB and dBA, plus DC measurement.
- **Channel Status Display.** Detailed analysis and display of SPDIF and AES/EBU Channel Status data.
- **Global Record.** Long-term recording of all channels at lowest system load.
- **Completely multi-client.** Open as many measurement windows as you like, on any channels and inputs or outputs!

A newer version for more up-to-date hardware, called **DigiCheck NG**, is also available. It is freely scalable, offers multi-instrument windows, and includes further instruments, like *VU-Meter*, *Spectroscope*, *Oscilloscope* and *Frequency Measurement*.

DIGICheck is free but works only with RME interfaces. It is constantly improved and updated. The latest version is available on RME's website www.rme-audio.com, section **Downloads / Software**.

12. Hotline – Troubleshooting

The newest information can always be found on our website www.rme-audio.com, section FAQ, Latest Additions.

The interface and drivers have been installed correctly, but playback does not work:

- Check whether the MADiface XT appears in the Device Manager. When the device has a yellow exclamation mark, then there is a conflict.

The input signal cannot be monitored in real-time

- ASIO Direct Monitoring has not been enabled, and/or monitoring has been disabled globally (wrong mix setup in TotalMix)

Playback works, but record doesn't

- Check that there is a valid signal at the input. If so, the current sample frequency is displayed in the Settings dialog.
- Check whether the MADiface XT has been selected as recording device in the audio application.
- Check whether the sample frequency set in the audio application ('Recording properties' or similar) matches the input signal.

Crackle during record or playback

- Increase the number and size of buffers in the 'Settings' dialog or in the application.
- Try different cables (coaxial or optical) to rule out any defects here.
- Check that cables/devices have not been connected in a closed loop. If so, set the system's clock mode to 'Internal'.

Windows boot time became much worse since the MADiface XT has been added

- Deactivate all WDM devices that are unused in the Settings dialog. If only ASIO is used disable all.

User's Guide



MADIface XT II

► Driver Installation and Operation – Mac OS X

13. Driver and Firmware – Mac OS X

13.1 Driver Installation

After the MADiface XT II has been connected to the computer and switched on install the drivers matching your current macOS.

RME is constantly improving the drivers. Please download the latest drivers from the RME website at <http://rme.to/usbe>. Unzip the downloaded file and start the driver installation by double-clicking **Fireface USB xxx.pkg** or **Fireface USB DK xxx.pkg**.

During driver installation the programs **Totalmix** (TotalMix FX) and **Fireface USB Settings** are copied to the Applications folder. They will automatically start into the dock if a MADiface is connected. After installation reboot the computer.

Driver Updates do not require to remove the existing drivers. Simply install the new driver over the existing one.

Important note on driver installation: RME offers both a Kernel Extension and a DK driver (DriverKit). The installation of these two differs significantly and also depends on the computer architecture (Intel/Apple Silicon) and the macOS version. Due to the many variants, as well as several changes in the last macOS, the document *Installing the Fireface USB kernel extension driver.rtf* or *Installing the Fireface DK USB driver.rtf* in the respective downloaded driver archive contains all details.

The current DriverKit driver in conjunction with the latest firmware also allows the device to be operated in Class Compliant mode, using macOS's own audio driver, but with the Settings dialog and TotalMix FX still controlling the UFX III. This hybrid mode is particularly useful to tackle performance issues.

13.2 Uninstalling the Drivers

For latest information on uninstallation see text file in the downloaded driver archive.

For older versions: In case of problems the driver files can be deleted manually by dragging them to the trash bin:

/Applications/Fireface USB Settings
/Applications/Totalmix
/System/Library/Extensions/FirefaceUSB.kext
/Users/username/Library/Preferences/de.rme-audio.TotalmixFX.plist
/Users/username/Library/Preferences/de.rme-audio.Fireface_USB_Settings.plist
/Library/LaunchAgents/de.rme-audio.firefaceUSBAgent.plist

Under the latest Mac OS the User/Library folder is not visible in the Finder. To unhide it start Finder, click on the menu item Go. Hold down the option (alt) key, then click on Library.

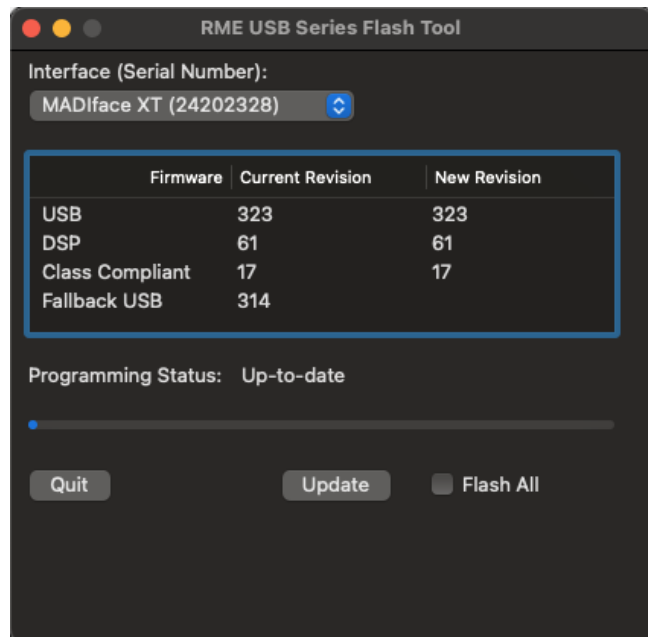
13.3 Firmware Update

The Flash Update Tool updates the MADiface XT to the latest firmware version. It requires an already installed driver.

Start the program **RME USB Series Flash Tool**. The Flash Update Tool displays the current revision of the MADiface XT's firmware, and whether it needs an update or not. If so, then simply press the 'Update' button. A progress bar will indicate when the flash process is finished.

After the update the MADiface XT needs to be reset. Power down the XT for a few seconds to do so. A reboot of the computer is not necessary.

To reduce the time needed for the flash process the tool updates only the parts of the firmware that are present in a newer version. The option *Flash All* forces the tool to update all parts.



When the update fails (status: failure), the card's second BIOS will be used from the next cold boot on (Secure BIOS Technology). Therefore the card stays fully functional. The flash process should then be tried again on a different computer.

14. Configuring the MADiface XT

14.1 Settings Dialog

Configuring the MADiface XT is done via its own settings dialog. The panel 'Settings' can be opened by clicking on the hammer or flame icon in the dock. The mixer of the MADiface XT, TotalMix FX, can be opened by clicking on the DSP FX icon in the dock.

The MADiface hardware offers a number of helpful, well thought-of practical functions and options which affect how the card operates - it can be configured to suit many different requirements. The following is available in the 'Settings' dialog:

- Configuration of digital I/Os
- Hardware Options
- Synchronization behaviour
- Current sample rate
- State of inputs and outputs

Any changes performed in the Settings dialog are applied immediately - confirmation (e.g. by exiting the dialog) is not required.

However, settings should not be changed during playback or record if it can be avoided, as this can cause unwanted noises.

Use the drop down menu **Properties For** to select the card to be configured.

To the right the current firmware and driver version is shown.

Output Format

AES

The channel status of the AES output signal can be set to *Consumer* or *Professional*. For further details please refer to chapter 21.2.

MADI 1/2/3

Defines the format of the MADI output signal. MADI can be a 56 or 64 channel signal, at Double Speed 32/28, at Quad Speed 16/14 channels.

96 kHz

Word I/O

The *word clock output* signal equals the current sample rate. Selecting *Single Speed* causes the output signal to always stay within the range of 32 kHz to 48 kHz. So at 96 kHz and 192 kHz sample rate, the output word clock is 48 kHz.

When clocked via the *word clock input* the sample rate of the MADIface XT and Core Audio directly follow the incoming signal across Single, Double and Quad Speed. A word clock signal at 192 kHz therefore results in an internal and OS sample rate of 192 kHz. This feature is also called *Follow Clock*. With Single Speed active the word clock input adapts to the frequency ranges. So 48 kHz word clock synchronizes the internal clock to 48 kHz, 96 kHz and 192 kHz.

MADI 1/2/3

Sample rates higher than 48 kHz can also be transmitted using the normal 48K frame. Alternatively, the native 96K frame is available as an output format. 96K frame only supports Double Speed, i.e. 88.2 and 96 kHz. This format therefore enables automatic switching from Single to Double speed in the MADI receiver.

Options

EQ+D for Record

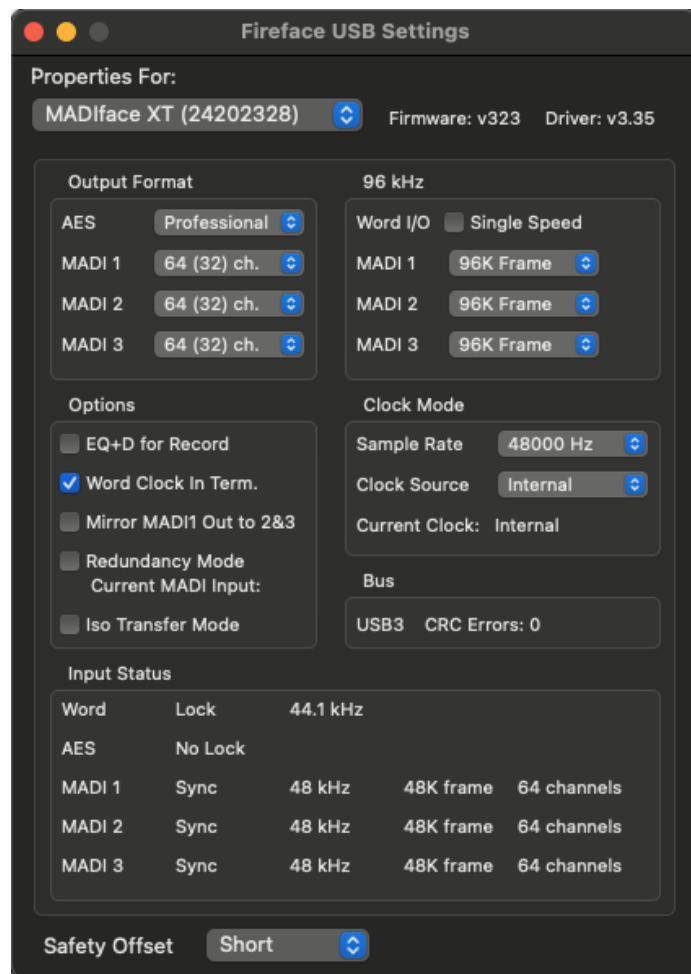
Switches EQ and Dynamics of all input channels into the recording path. In case Loopback has been activated the EQ and Dynamics of the output channels are within the recording path. See also chapter 27.6.

Word Clock In Term.

Checking this option terminates the word clock input internally with 75 Ohms.

Mirror MADI1 Output to MADI2 and 3

This option provides a quick and simple solution to mirror the first MADI output to outputs 2 and 3. The outputs are reduced to 2+4+64 channels (AES, 4 x analog, one MADI port). All the data routed and mixed to MADI port 1 is sent to MADI port 2 and 3 as well.



Redundancy Mode

With redundancy mode active the number of input channels is reduced to 68 (AES plus analog plus one MADI). The two other MADI ports are used as fail safe inputs and are used as soon as the signal on the 'Current MADI Input' fails. This setting is also a perfect choice if the card is used as single MADI I/O, saving resources and providing simpler channel selection dialogs.

Isochronous Streaming (USB 3 only)

The XT uses a special transmission mode with error correction to record data. In case the XT's default mode does not work *Isochronous Streaming* can be tried. This is the standard's native mode for audio transmission and should work with any USB 3 controller. See also chapter 39.4.

Clock Mode

Sample Rate

Used to set the current sample rate. This is the same setting as in the Audio MIDI Setup, just added here for your convenience.

Clock Source

The unit can be configured to use its own clock (Internal = Master), or one of the input signals (Word, MADI, AES). If the selected source isn't available (No Lock), the unit will change to the next available one (this behaviour is called AutoSync). If none is available then the internal clock is used. The current clock source is displayed as *Current Clock*.

BUS

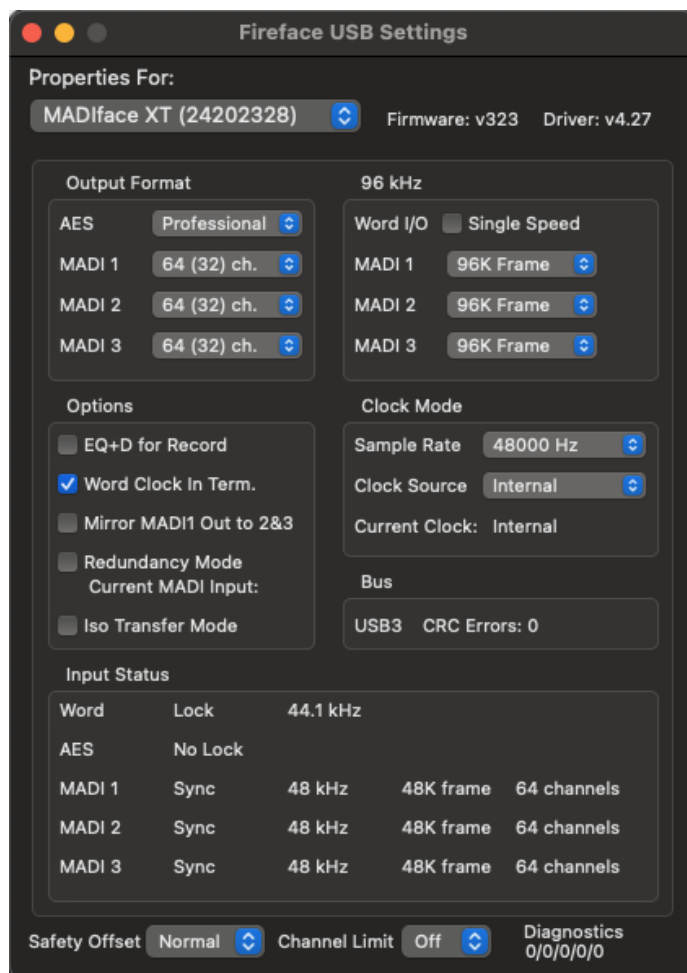
Shows the current USB transmission mode (USB2, USB3) and their transmission errors (CRC error). See chapter 39.4.

Input Status

Displays the state of the current input signal:

- Clock state (No Lock, Lock, Sync)
- Sample rate (coarse)
- MADI Frame format (48K or 96K)
- Channel format (64 or 56 channels)

RME's exclusive *SyncCheck* technology provides an easy to use check and display of the current clock status. The clock state column indicates whether no signal (No Lock), a valid signal (Lock) or a valid *and* synchronous signal (Sync) is present at each of the digital clock source inputs.



Safety Offset

Allows the audio subsystem to be adapted to the computer performance. Short reduces the latency due to a smaller safety offset, but can lead to clicks or dropouts. The *Large* option gives maximum security against such effects.

Channel Limit (DriverKit only)

Allows for USB performance optimization by transmitting less channels (8, 16, 32). The change is performed in real-time, but many apps require a restart to correctly recognize the changed status and to resume recording and playing audio without issues.

Diagnostics (DriverKit only)

Counters for various error states. These are explained in detail in the integrated help section of the Settings dialog.

14.2 Clock Modes - Synchronisation

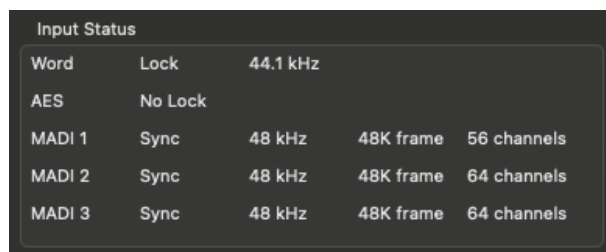
In the digital world, all devices must be either Master (clock source) or Slave (clock receiver). Whenever several devices are linked within a system, there must always be a single master clock.

! *A digital system can only have one master! If the MADiface's clock mode is set to 'Master', all other devices must be set to 'Slave'.*

The MADiface XT utilizes a very user-friendly, intelligent clock control, called **AutoSync**. In AutoSync mode, the system constantly scans the digital input for a valid signal. If any valid signal is found, the card switches from the internal quartz (*Clock Mode – Current Internal*) to a clock extracted from the input signal (*Clock Mode – Current MADI, Word or AES*). The difference to a usual slave mode is that whenever the clock reference fails, the system will automatically use its internal clock and operate in clock mode Master.

AutoSync guarantees that normal record and record-while-play will always work correctly. In certain cases however, AutoSync may cause feedback in the digital carrier, so synchronization breaks down. To remedy this, switch the MADiface clock mode to 'Internal'.

RME's exclusive **SyncCheck** technology enables an easy to use check and display of the current clock status. *Input Status* indicates whether there is a valid signal (Lock, No Lock) for each input (Word, MADI, AES), or if there is a valid *and* synchronous signal (Sync). See chapter 39.2.



Input Status				
Word	Lock	44.1 kHz		
AES	No Lock			
MADI 1	Sync	48 kHz	48K frame	56 channels
MADI 2	Sync	48 kHz	48K frame	64 channels
MADI 3	Sync	48 kHz	48K frame	64 channels

Via *Clock Source* a preferred input can be defined. As long as the card sees a valid signal there, this input will be designated as the sync source, otherwise the other inputs will be scanned in turn. If none of the inputs are receiving a valid signal, the card automatically switches clock mode to 'Master'.

In practice, SyncCheck provides the user with an easy way of checking whether all digital devices connected to the system are properly configured. With SyncCheck, finally anyone can master this common source of error, previously one of the most complex issues in the digital studio world.

15. Mac OS X FAQ

15.1 MIDI doesn't work

In some cases the applications do not show the MIDI port. The reason for this is usually visible within the **Audio MIDI Setup – MIDI window**. It displays no RME MIDI device, or the device is greyed out and therefore inactive. Mostly, removing the greyed out device and searching for MIDI devices again will solve the problem.

The MADiface XT USB MIDI is class compliant. Therefore it comes without a driver. OS X recognizes it as MIDI device and will be using it with the driver included in its operating system.

15.2 Repairing Disk Permissions

Repairing permission can solve problems with the installation process - plus many others. To do this, launch **Disk Utility** located in **Utilities**. Select your system drive in the drive/volume list to the left. The **First Aid** tab to the right now allows you to check and repair disk permissions.

15.3 Supported Sample Rates

RME's Mac OS X driver supports all sample rates provided by the hardware. This includes **32 kHz** and **64 kHz**, and even **128 kHz**, **176.4 kHz** and **192 kHz**.

But not any software will support all the hardware's sample rates. The hardware's capabilities can easily be verified in the **Audio MIDI Setup – Audio Window**. Select the MADiface XT. A click on **Format** will list the supported sample rates.

15.4 Channel Count under Core Audio

At a sample rate of 88.2 or 96 kHz the number of MADI channels per port is reduced to 32 (Double Speed), and 16 at a sample rate of 176.4 and 192 kHz (Quad Speed).

Changing the number of Core Audio channels on the fly is not without issues. Therefore whenever the MADiface XT changes into Double Speed (88.2/96 kHz) or Quad Speed mode (176.4/192 kHz) all channels stay present, but become partly inactive.

Single Speed	Double Speed	Quad Speed
MADI1: 1 to 64	MADI1: 1 to 32	MADI1: 1 to 16
MADI2: 65 to 124	MADI2: 33 to 64	MADI2: 17 to 32
MADI3: 125 to 124	MADI3: 125 to 156	MADI3: 33 to 48
Analog 1/2: 193/194	Analog 1/2: 193/194	Analog 1/2: 193/194
AES: 195/196	AES: 195/196	AES: 195/196
Phones: 197/198	Phones: 197/198	Phones: 197/198

15.5 Various Information

Drivers for older operating systems that support the original MADiface XT also recognize the MADiface XT II. However, the XT II requires a newer TotalMix FX, version 1.95 or higher. This app can be downloaded individually from the RME website and replaced manually after the driver installation.

Programs that don't support card or channel selection will use the device chosen as **Input** and **Output** in the **System Preferences – Sound** panel.

Via **Launchpad – Other – Audio MIDI Setup** the MADiface XT can be configured for the system wide usage in more detail.

Programs that don't support channel selection will always use channels 1/2, the first stereo pair. To access other inputs, use the following workaround with TotalMix: route the desired input signal to output channels 1/2. In the channel settings of outputs 1/2 activate *Loopback*. Result: the desired input signal is now available at input channel 1/2, without further delay/latency.

Use **Configure Speakers** to freely configure the stereo or multichannel playback to any available channels.

16. Using multiple MADiface XT

OS X supports the usage of more than one audio device by the same audio software. This is done via the Core Audio function **Aggregate Devices**, which allows to combine several devices into one. This function is found in the Audio MIDI Setup – Audio window. Click the + sign in the lower left.

The current driver supports up to three MADiface. All units have to be in sync, i.e. have to receive valid sync information either via word clock or by feeding synchronized signals.

- If one of the units is set to clock mode Master, all others have to be set to clock mode Slave, and have to be synced from the master, for example by feeding word clock. The clock modes of all units have to be set up correctly in the Settings dialog.
- If all units are fed with a synchronous clock, i.e. all units show *Sync* in their Settings dialog, all channels can be used at once.

Note: TotalMix is part of the hardware of each MADiface. Up to three mixers are available, but these are separated and can't interchange data. Therefore a global mixer for all units is not possible.

17. DigiCheck NG Mac

The DigiCheck software is a unique utility developed for testing, measuring and analysing digital audio streams. Although this software is fairly self-explanatory, it still includes a comprehensive online help. DigiCheck NG v0.93 operates in parallel to any software. Using the DriverKit driver it can visualize both input and playback data. The Kernel Extension driver supports read out of the input data. DigiCheck NG is freely scalable, and with its multi-instrument windows very flexible in configuration.

The following is a short summary of the currently available functions:

- **Level Meter.** High precision 24-bit resolution, 2/8/198 channels. Application examples: Peak level measurement, RMS level measurement, over-detection, phase correlation measurement, dynamic range and signal-to-noise ratios, RMS to peak difference (loudness), long term peak measurement, input check. Oversampling mode for levels higher than 0 dBFS. Vertical and horizontal mode. Slow RMS and RLB weighting filter. Supports visualization according to the K-System.
- **Program Meters.** VU meters with multiple configuration options.
- **Spectral Analyser.** World wide unique 10-, 20- or 30-band display in analog bandpass filter technology. 192 kHz-capable!
- **Vector Audio Scope.** World wide unique Goniometer showing the typical afterglow of a oscilloscope-tube. Includes Correlation meter and level meter.
- **Totalyser.** Spectral Analyser, Level Meter and Vector Audio Scope in a single window.
- **Surround Audio Scope.** Professional Surround Level Meter with extended correlation analysis, ITU weighting and ITU summing meter.
- **ITU1770/EBU R128 Meter.** For standardized loudness measurements.
- **Bit Statistics & Noise.** Shows the true resolution of audio signals as well as errors and DC offset. Includes Signal to Noise measurement in dB and dBA, plus DC measurement.
- **Frequency Measurement.** Finds frequencies within an audio signal.
- **Oscilloscope.** Professional Digital Storage Oscilloscope with up to 8 channels.
- **Spectroscope.** Outstanding spectral analysis in re-assignment technology, with numerous display options.
- **Completely multi-client.** Open as many measurement windows as you like, on any channels and inputs or outputs!

DIGiCheck is constantly updated. The latest version is always available on RME's website www.rme-audio.com, section **Downloads / Software**.

18. Hotline – Troubleshooting

The newest information can always be found on our website www.rme-audio.com, section FAQ, latest Additions.

Playback works, but record doesn't:

- Check that there is a valid signal at the input.
- Check whether the MADiface XT has been selected as recording device in the audio application.
- Check whether the sample frequency set in the audio application ('Recording properties' or similar) matches the input signal.
- Check that cables/devices have not been connected in a closed loop. If so, set the card's clock mode to Internal.

Crackle during record or playback:

- Increase the number and size of buffers in the application.
- Try different cables to rule out any defects here.

The card and drivers have been installed correctly, but playback does not work:

- Is MADiface XT listed in the System Report, PCI or USB? (Vendor 10EE, Device ID 3FC7).
- Has MADiface XT been selected as current playback device in the audio application?
- While recognition and control of the device are low bandwidth applications, playback/record needs the full USB transmission performance. Therefore, defective USB cables with limited transmission bandwidth can cause such an error scheme.

Possible causes for a MADiface not working

- The USB cable is not, or not correctly inserted into the socket

User's Guide



MADIface XT II

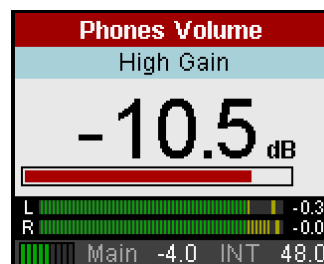
► Usage and Operation

19. Front Panel Controls

19.1 Overview

The output level of the current Main output (as selected in TotalMix FX) and Phones (locked to the front output) can be adjusted directly with encoder 1 and 2 when the level meter overview is shown in the display. Simply turn encoder 1 or 2 to bring up the according screen.

More options, like balance, phase, mute or stereo/mono are available in the CHANNEL menu.



The four menu keys offer quick access to a simple menu structure. Pressing any of these keys again exits the current menu and returns to the level meter overview.

MIC/GAIN. Mic Gain. Setting the gain for the inputs 1 and 2 with the encoders 1 and 2.

MIX. Brings up the Mix screen. Note that changes to the current mix state can not be performed at the unit when it is connected to a computer! These settings are available at the device to adjust or modify a routing/mixing when the unit is used stand-alone.

CHANNEL. This menu gives access to all inputs and outputs of the MADiface XT. Encoder 1 selects the input, then output to be configured. Encoder 2 selects the function that is to be modified: *Settings*, *Low Cut*, *Parametric EQ Compressor/Expander* and *Auto Level*. Settings are shown in chapter 19.4. All others have the same settings that are found in TotalMix FX, see descriptions in chapter 25.

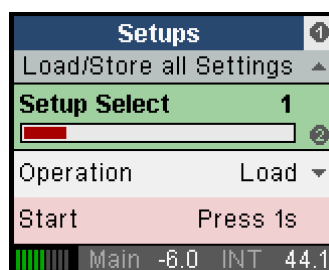
SETUP/REV. Encoder 1 selects Setups, Options and Reverb/Echo. Options has the subpages *Clock*, *MADI Settings*, *Hardware/Diagnosis* and *Control Room*. Reverb/Echo has the subpages *Reverb* and *Echo*. The subpages are selected with encoder 2.

19.2 Encoders

The encoders can be turned endlessly, but also pressed, adding a key function. Their current functionality is clearly shown in the display. In general turning them either changes the current parameter, or moves the selection/cursor horizontally to the next page. Pressing the encoders moves the selection/cursor vertically, up with 1 and down with 2, as indicated by the arrows in the display.

On the Mic Gain page brought up by the MIC/GAIN key pressing encoder 1 and 2 activates the AutoSet function. The label AS in the display changes from light gray to solid black (see picture in chapter 19.3).

Example: Press the key SETUP. The menu *Setups* is now shown the display. The number 1 within the circle on the right side indicates that by turning encoder 1 more pages are available. In this case only one, *Options*. Setups itself has no further sub-pages. By pressing encoder 2 the cursor moves down, by pressing encoder 1 it moves back up. On a selected field or entry, the 2 to the right indicates that the current parameter can be changed by turning encoder 2.

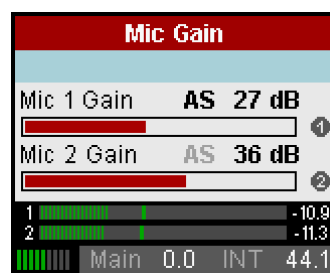


On the Options page several sub-pages exist, therefore a 2 is shown on the right side of those sub-pages. By turning encoder 2 the pages *Clock*, *MIDI Sources*, *General Settings* and *Digital Routing* are shown. The arrow under the 2 indicates that pressing encoder 2 the corresponding page is entered, and settings can be changed then.

19.3 Menu Keys MIC/GAIN and MIX

MIC/GAIN

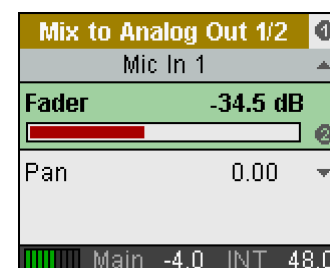
This key brings up the *Mic Gain* screen, where the gain can be directly controlled with encoder 1 and 2. Pressing encoder 1 and 2 activates the AutoSet function. The label AS in the display changes from light gray to solid black.



MIX. Brings up the Mix screen. Note that changes to the current mix state can not be performed at the unit when it is connected to a computer! This feature is a means to be able to adjust or modify a routing/mixing when the unit is used stand-alone.

Proceed as follows:

Turn encoder 1 and select the desired output, for example *Mix to Analog Out 1/2*. Now turn encoder 2 for the signal that should be routed/mixed to Analog Out 1/2 – for example *Mic In 1*. Press encoder 2 one time, so *Fader* gets selected. Turn encoder 2 to adjust the gain for this routing, equalling the fader position of the Mic In 1 input with selected Submix AN 1/2 in TotalMix FX.



As with the other three keys pressing MIX a second time returns the display to the global level meter screen showing all inputs, outputs and FX send/return levels, DSP load meter, current interface mode, digital input state of all 5 inputs and MIDI state.

19.4 Channel Menu

All channels have the following entries in Settings:

Mute

Mutes a channel. Allows to remove a signal without the need to change the current gain/volume setting.

Channel Type

Mono / Stereo.

Phase Invert

Phase Invert changes the polarity (180°). Useful to fix wrongly soldered cables or to eliminate sound and phase errors.

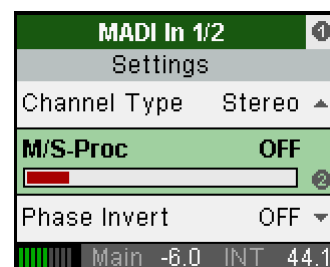
All input channels have these additional entries:

FX Send

Sets the level of the signal sent to the FX bus which feeds Echo and Reverb effect.

M/S-Proc

Activates M/S processing within the stereo channel. Monaural information is sent to the left channel, stereo information to the right.



Mic In 1 and 2 have these additional entries:

Pre Amp Gain

Sets the current gain/amplification. Choices are 0 dB up to +75 dB in steps of 1 dB.

+48V

Activates phantom power for condenser microphones or special accessories (Alva Test Plug). Phantom power should only be activated when condenser microphones that require such a power supply are used, and only in the specific channel. Additionally always make sure the microphone is plugged in first before the phantom power is switched on. The MADiface turns on the phantom power smoothly (soft start). Connecting and disconnecting microphones while phantom power is active causes a high voltage surge, which can destroy the sensitive microphone input stage.

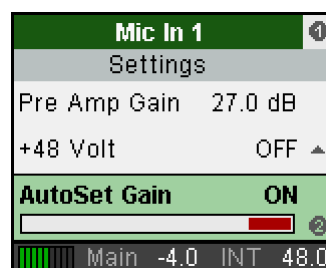
Phantom power is only applied to the XLR socket, the inner TRS contacts do not carry any voltage.

AutoSet Gain

Automatic overload protection by gain reduction in case of overload. **AutoSet** tries to keep a headroom of 6 dB. Levels higher than -6 dBFS will permanently reduce the gain. To check set the channels to a high gain and apply an input signal. The displayed gain will quickly decrease to a gain that is appropriate. While AutoSet in the XT is not exactly the same as in the RME Micstasy (with extreme overloads distortion will occur for the fraction of a second before the level is set correctly), it works quite well in real-world applications and will prevent distorted recordings reliably.

AutoSet can be activated in CHANNEL as well as on the Mic Gain screen: a push on encoder 1 and 2 activates AutoSet. The label AS in the display changes from light gray to black.

To avoid shifts in panorama AutoSet should work in stereo mode (ganged), so that gain changes of one channel are also applied to the other one. This function is activated by setting *Channel Type* to *Stereo*. Other than all other channels Mic will still have two entries. But TotalMix FX changes to a stereo channel, and AutoSet is linked between both channels.



As soon as AutoSet reduces the gain the label AS, shown in the Mic Gain screen, changes its color from black to blue.

All output channels have these additional entries:

Volume

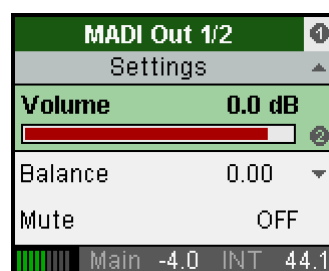
Sets the output level from -64.5 dB up to +6 dB, in steps of 0.5 dB. Mute (-∞) is also available.

Balance

Adjustable from -1 (left) through 0 (middle) to +1 (right). Greyed out on mono channels

FX Return

Amount of Reverb/Echo mixed to the current output. Parameters are the same as with volume.



Crossfeed. Adjustable to 5 levels. Can be activated on a maximum of 6 stereo channels. Cross-feed uses the Bauer Binaural method for stereo loudspeaker simulation for headphones. This method, adopted from the ADI-2 series, creates a similar listening impression with headphones as with a normal loudspeaker setup.

Volume Cal. L, Volume Cal. R (Volume Calibration Left/Right)

Changes the channel output level in the range +3 dB to -24 dB, in steps of 0.1 dB.

Link to Main

Default: Off. Realizes a synchronized output level adjustment for stand-alone mode. All linked channel's output volume will be set together with the output defined as Main (via SETUP/REV - Options - Control Room, Main Out), and thus with Encoder 1 or the optional ARC USB. In principle, this corresponds to a fader group in TotaMix FX.

Note: Unlike in TotalMix FX, all linked channels are set to the same fader/volume value as the current Main fader, i.e. all outputs are on the same level. If individual levels are required, these can be realized via Volume Calibration, see above.

Only Analog Out 1/2 and Phones Out

Ref Level

Setting the reference level of the analog outputs. Analog 1/2 Out provides +4 dBu, +13 dBu, +19 dBu and +24 dBu. Phones Out offers Low (corresponds to +4 dBu) and High (corresponds to +19 dBu).

19.5 Setup Menu

SETUP offers several options to configure the device. Encoder 1 changes between *Options*, *Set-ups* and *Reverb/Echo*. The sub-menus in *Options*, *Control Room*, *Clock*, *MADI Settings* and *Hardware/Diagnosis*, are accessed with encoder 2.

19.5.1 Options Menu

The page **Clock** has the following entries:

Clock Source

Only adjustable in stand-alone mode! Choices are INT (Internal, Master), WCK (word clock), AES, MADI 1 to 3.

Sample Rate

Choices are 32, 44.1, 48, 64, 88.2, 96, 128, 176.4 and 192 kHz. Setting the correct sample rate is partly also necessary in slave mode, with external clocking via MADI. Only with AES the real current sample rate can be detected. With MADI the user has to inform the unit, whether the input signal is in the Single, Double or Quad Speed range.

WCK Alw. Single

Word Clock Always Single Speed. Choices are On or Off.

WCK Term.

Word clock termination for the word clock input – On or Off.

These options are explained in detail in chapter 19.6.

Options	
Clock	
Clock Source	INT
Sample Rate	44.1k
WCK Alw. Sing	OFF
Ph1 -8.5 Ph2 -10	INT 44.1

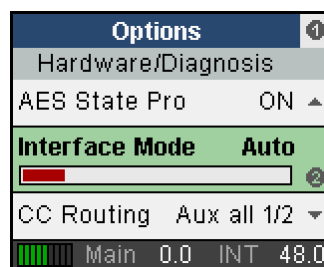
The page *Hardware/Diagnosis* has the following entries:

AES State Pro

On – channel status Professional. Off – channel status Consumer.

Interface Mode

Available options: Auto, USB 2, USB 3, CC (Class Compliant). In USB 2 mode the number of transmitted channels is reduced to 70 (only one MADI I/O is available for rec/play).



CC-Routing

Available options: Straight, Aux first, Aux mirror, Aux all 1/2. Eases the use of the MADIface XT II in Class Compliant mode without TotalMix FX. **Straight:** All USB playback channels are routed 1:1 to the corresponding hardware outputs. **Aux mirror:** The Aux channels Analog 1/2 (193/194), AES (195/196) and Phones (197/198) output the signal of the MADI channels 1-6. **Aux all 1/2:** MADI playback channels 1/2 are also played out on all Aux channels. This makes it possible to use the AES, XLR line and headphone outputs even with a simple 2-channel playback on the first two channels.

Standalon. MIDI

Device reacts on MIDI commands when in stand-alone mode: Available options: Off, MADI 1, MADI 2, MADI 3.

MIDI Thru (DIN)

The MIDI data at the DIN input can optionally be looped through to MIDI outputs. Available options: Off, MADI 1, MADI 2, MADI 3.

Standalone ARC

Available options: Volume, 1s on, normal. See chapter 23.5

Lock Keys. OFF, KEYS, ALL. Allows to disable only the four front buttons or also the two encoders. Press SETUP/REV key for 2 seconds to unlock.

Remap Keys. OFF, ON. Allows 25 different functions/actions to be assigned to the four quick select buttons on the device for offline/stand-alone operation. In online mode with TotalMix FX, as many as 52 different functions/actions are available.

The configuration for **offline/stand-alone operation** is done in the following four entries:

MIC/GAIN, REC/PLAY, CHAN/MIX, SETUP/REV. Available functions/actions:

Default, Setup 1-6, DIM, Recall, Mute Enable, Main Mute, Main Out Low Cut, Main Out EQ, Main Out Dynamics, Main Out AutoLevel, Main Out Room EQ, Phones Mute, Phones Low Cut, Phones EQ, Phones Dynamics, Phones AutoLevel, Reverb enable, Echo enable, TotalMix.

The original function of the key on the device, calling up the menu, is still possible by pressing the key on the device for a longer time (1 s).

Online mode: If *TotalMix* is selected in these entries, the buttons are used to call up the action assigned in TotalMix FX. The configuration is carried out directly in TotalMix FX, in the ARC & Key Commands dialog. The buttons are labelled A (MIC/GAIN), B (MIX), C (CHANNEL) and D (SETUP/REV) here.

Remap Keys is not only useful for stand-alone operation and direct access to some hardware functions, but can also be used to open/close the TotalMix window (selection in the device: *TotalMix*. Selection in TotalMix FX: *Toggle TotalMix Windows*).

Note: Some offline functions also control the display in TotalMix FX automatically, for example Mute and Dim.

LCD Contrast

Adjusting the contrast of the display.

Test Results

Please ignore. No user related data.

SW Version

Shows the current version number and date of the internal DSP software.

The page *MADI Settings* has the following entries:

MADI 1/2/3 Format

Can be set to 56 or 64 channels.

MADI 1/2/3 Frame

Can be set to 48K or 96K.

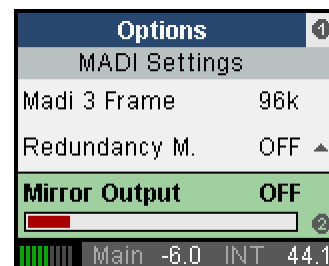
Redundancy M

Redundancy Mode for MADI input.

Mirror Output

Copy mode for the MADI outputs, MADI 1 to MADI 2 and 3.

These options are explained in detail in chapter 7.1 / 14.1.



The page *Control Room* has the following entries:

Main Out

Defines the mixer's Main output.

Mute Enable

Options: On, Off. Master Mute function that controls all currently active mutes. Allows to build a mute group in stand-alone mode. In online mode controls the Master Mute button in TotalMix FX.

Dim Reduction

Defines the amount of Dim on the Main output.

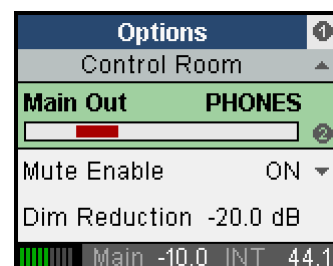
Dim Active

Activates Dim on the Main output.

Recall Volume

Stores a volume value which can be is called by the Recall button on the external remote (ARC).

These options are explained in detail in chapter 25.4.



19.5.2 Setups Menu

The page *Setups, Load/Store all Settings*, has the following entries:

Setup Select

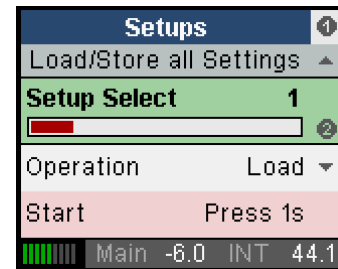
Choices are memory slots 1 to 6 and Factory (factory default).

Operation

Choices are Load and Store.

Start

Press 1s. Pressing and holding encoder 2 for at least one second triggers the action selected in Operation.



These options are explained in detail in chapter 23..

19.6 Clock

Source and frequency of the unit's clock are configured in *Options – Clock*. Clock Source offers several choices for the current clock source: internal clock or external clock (WCK = Word clock, AES, MADI 1-3). Sample Rate sets the sample rate for both external and internal clock.

WCK, AES, MADI 1-3 (Slave Mode)

Activates the corresponding input as clock reference. In case of a missing or invalid clock source signal the display of the current sample rate in the lower right corner of the display turns to red, then the unit changes to its internal clock.

INT (Master Mode)

Activates the internal clock.

! *With a setting of INT (internal clock) it is mandatory that the clock rate of the sources is synchronous to the MADIface. Therefore the external device has to be synchronized to the MADIface word clock output or AES/MADI output.*

The MADIface XT thus has to be master, all devices connected to it must be slave. In order to avoid clicks and drop outs due to faulty or missing synchronicity, a special process called *Sync-Check* compares the incoming data and the MADIface's internal clock. The sync state is indicated by a flashing (error) or constantly lit (OK) field in the display.

A selection of Double and Quad Speed is also possible when using external clock (Slave). If the MADIface should operate at 192 kHz, but receives a synchronous word clock of 48 kHz, set Sample Rate to that value. This way, AD/DA-conversion and digital outputs are configured to operate in the frequency ranges Single Speed, Double Speed or Quad Speed.

In slave mode, the AES input always offers Follow Clock functionality, from Single to Quad Speed.

In slave mode, the MADI input automatically switches the device from Single to Double Speed when the 96K frame format is detected. When returning to 48K frame, however, automatic switching is no longer possible as it is not known which sample rate is present. Switching must then be done manually via the sample rate setting (see above).

WCK Always Single Speed

If this option is set to Off, the MADIface XT II follows the incoming word clock signal, from 32 kHz to 192 kHz. At the same time, the device outputs word clock in the range 32 kHz to 192 kHz, depending on the sample rate.

User's Guide



MADiface XT II

► Inputs and Outputs

20. Analog Inputs / Outputs

20.1 Mic / Line In (XLR / TRS)

The MADiface XT has 2 balanced XLR/TRS inputs on the front panel.

! *When using unbalanced cables make sure to connect pin 3 (-) to 1 (ground). Otherwise noise may occur, caused by the unconnected negative input pin.*

The pin assignment follows international standards. With XLR, pin 2 is + or hot, pin 3 is – or cold, pin 1 is ground. Pin 1 is connected to the chassis directly at the socket (AES48).

XLR Mic and TRS Line have a gain range of 75 dB in steps of 1 dB. The TRS input gain range is shifted by 6 dB to support +24 dBu balanced operation (SMPTE). TRS also has a higher input impedance (6.6 kOhm).

The AD-converter in the MADiface XT reaches full scale already at an input level of –57 dBu (Gain 75 dB, XLR input), but also at +24 dBu (Gain 0 dB, TRS input). Therefore the inputs are both sophisticated microphone and line types.

20.2 Phantom Power

The LED **+48V** indicates activated phantom power for the XLR input. Phantom power should only be activated when using condenser microphones which require such a power supply.

! *Connecting and disconnecting microphones while phantom power is active causes a high voltage surge, which can destroy the microphone input stage! Switch phantom power off before connecting/disconnecting any external device.*

The MADiface turns on the phantom power smoothly during one second, from 0 to 48 Volts. This technique is advantageous for the connected microphone as well as the MADiface.

The phantom power of the MADiface is short-circuit proof. With a maximum load the internal voltage from the power supply does not drop below 47 Volts.

20.3 AutoSet

Some preamps include limiters in order to prevent clipping, especially of the A/D converter stage. Such a circuitry is not feasible for the MADiface XT, because it would spoil the mic preamp's excellent technical data.

But as the MADiface's gain is controlled completely digitally, the device can set it automatically, thus providing perfect protection from overload with no degradation of the audio signal, which does not have to pass any additional electronic circuits.

Since AutoSet operates as overload protection and not as 'compressor', there is no automatic gain increase. AutoSet only reduces gain. And with AutoSet activated, the gain can still be changed manually. The currently highest possible value can not be exceeded, because AutoSet will reduce the gain in real-time during the manual change.

In practice, there are two possible ways to work with AutoSet:

- Gain of all channels is set to a rather high value, e.g. 60 dB. Then a rehearsal with maximum acoustic level is performed. Thereafter AutoSet is switched off.
- As above, with AutoSet permanently active.

There are good reasons for both of these alternatives. Thanks to the flexible threshold setting and easy manual correction of set values, the MADiface XT is fit for all applications.

AutoSet can be activated in Mic Gain, a push on encoder 1 and 2 activates AutoSet. The label AS in the display changes from light gray to black.

To avoid shifts in panorama AutoSet should work ganged with related channels, so that gain changes of one channel are also applied to the other one. For using ganged AutoSet the input channels Mic1/2 have to be set to stereo mode in TotalMix FX.

As soon as AutoSet reduces gain the label AS, shown in the front display, changes its color from black to blue.

20.4 Balanced Line Outputs

The short circuit protected, low impedance balanced line outputs of Analog 1/2 use male XLR jacks on the back of the unit. The maximum balanced output level is +24 dBu.

! *The electronic driver circuit of the XLR outputs does not operate servo-balanced! When connecting unbalanced equipment, make sure pin 3 of the XLR output is not connected. A connection to ground will cause higher THD (distortion)!*

When used unbalanced the maximum output level is 6 dB lower.

20.5 Line - Headphones

MADiface XT II offers a hi-quality analog monitor output on the front, via 6.3 mm (1/4") TRS jack.

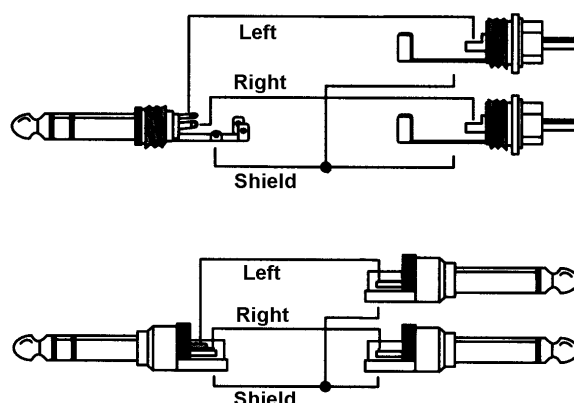
Two discrete hardware output levels are available (setting in TotalMix Output Channel Settings, Level, High or Low). High corresponds to the +19 dBu setting of the other channels, Low to the +4 dBu setting. They can therefore also be used as high-quality, unbalanced line outputs.

The outputs have a particularly low impedance (1 Ohm) and are therefore ideal for headphones.

The output level is set - in addition to the High/Low preselection - via TotalMix (Hardware Output, Phones), or directly on the device using encoder 2. The monitor volume can therefore be changed very quickly.

In case the output should operate as line out, an adapter TRS plug to RCA phono plugs, or TRS plug to TS plugs is required.

The pin assignment follows international standards. The left channel is connected to the tip, the right channel to the ring of the TRS jack/plug.



21. Digital Inputs and Outputs

21.1 MAD1 I/O

The BNC input is built according to AES10-1991. The input impedance is 75 Ohm. It will operate error-free from about 180 mVpp on.

The optical input and output uses a FDDI (ISO/IEC 9413-3) compatible optical module, according to AES10-1991. More information can be found in chapter 39.1, MAD1 Basics.

MADIface XT includes automatic input selection (Redundancy Mode). In case the current input signal fails, the unit switches to the other input immediately. This mode, called redundancy operation, offers improved safety against errors on the transmission line. Switching the inputs is done in less than a sample and - provided the input signal fails abruptly – click free.

The BNC output is built according to AES10-1991. The output's impedance is 75 Ohm. The output voltage will be 600 mVpp when terminated with 75 Ohm.

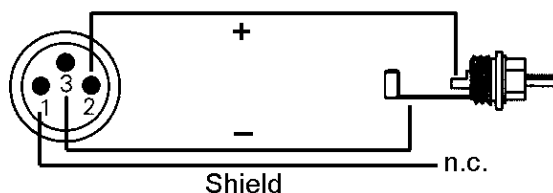
In *MADI1 output mirror mode* output 2 and 3 hold the same signal as MADI port 1. This mode allows for distributing a signal to three destinations, or redundant operation of the output.

21.2 AES/EBU

The XLR AES/EBU input and output is transformer-balanced and ground-free. The incoming channel status is ignored. Connection is accomplished using balanced cables with XLR plugs.

Input

Thanks to a highly sensitive input stage SPDIF coaxial can be fed too by using a simple cable adapter phono/XLR. To achieve this, pins 2 and 3 of a male XLR plug are connected individually to the two pins of a phono plug. The cable shielding is only connected to pin 1 of the XLR - not to the phono plug.



Output

Using the cable adapter XLR/phono described above, devices with coaxial SPDIF interface can be connected to the AES output of the MADIface XT as well. Note that most consumer equipment with phono (SPDIF) inputs will only accept signals having a Channel Status 'Consumer' format. The Consumer status is activated in the Settings dialog. In Consumer mode the output voltage is reduced as well, as SPDIF calls for a lower voltage than AES/EBU.

The output signal coding of the MADIface XT has been implemented according to AES3-1992 Amendment 4:

- 32 / 44.1 / 48 kHz, 64 / 88.2 / 96 kHz, 176.4 / 192 kHz depending on the current sample rate
- Audio use
- No Copyright, Copy permitted
- Format Professional or Consumer
- Category General, Generation not indicated
- 2-Channel, No Emphasis
- Aux Bits Audio use, 24 Bit
- Origin: MAXT

21.3 MIDI

The MADIface XT offers one MIDI I/O via 5-pin DIN connectors. The MIDI port is added to the system by the driver. Using MIDI capable software, the port can be accessed under the name *XT MIDI Port 1*.

All RME MADI devices support the invisible transmission of MIDI via MADI. MIDI data can be transmitted from/to other RME devices with MADI ports, without any additional line or cabling between computer (MADI interface) and external units. These ports can be accessed under the name *XT MIDI Port 2, 3 and 4*.

The MIDI ports support multi-client operation. A MIDI input signal can be received from several programs at the same time. Even the MIDI output can be used by multiple programs simultaneously. However, due to the limited bandwidth of MIDI, this kind of application will often show various problems.

Note: The MIDI input field in the display signals any kind of MIDI activity, including MIDI Clock, MTC and Active Sensing. The latter is sent by most keyboards every 0.3 seconds.

21.4 D-sub Pinout

Pin assignment of the 9-pin D-type connector, breakout cable MIDI / AES

Pin	Name	Pin	Name	Pin	Name
1	MIDI In (4)	4	AES Out +	7	MIDI Out (5)
2	MIDI Out (4)	5	GND	8	AES In -
3	AES In +	6	MIDI In (5)	9	AES Out -

22. Word Clock

22.1 Word Clock Input and Output

SteadyClock guarantees an excellent performance in all clock modes. Based on the highly efficient jitter suppression, the MADiface XT refreshes and cleans up any clock signal, and provides it as reference clock at the BNC output (see chapter 39.8).

Input

The MADiface XT word clock input is active when *Clock Source* in the Settings dialog has been switched to *Word Clock*, and a valid word clock signal is present. The signal at the BNC input can be Single, Double or Quad Speed, the MADiface XT automatically adapts to it. As soon as a valid signal is detected the Settings dialog shows either Lock or Sync (see chapter 39.2).

Thanks to RME's *Signal Adaptation Circuit*, the word clock input still works correctly even with heavily mis-shaped, dc-prone, too small or overshoot-prone signals. Thanks to automatic signal centering, 300 mV (0.3V) input level is sufficient in principle. An additional hysteresis reduces sensitivity to 1.0 V, so that over- and undershoots and high frequency disturbances don't cause a wrong trigger.

The word clock input is shipped as high impedance type (not terminated). The Settings dialog allows to activate internal termination (75 Ohms). Activate the option *Word Clock Input Term*.

Output

The word clock output of the MADiface XT is constantly active, providing the current sample frequency as word clock signal. As a result, in master mode the provided word clock is defined by the currently used software or the pitch setting. In slave mode the provided frequency is identical to the one present at the currently chosen clock input. When the current clock signal fails, the MADiface XT switches to master mode and adjusts itself to the next, best matching frequency (44.1 kHz, 48 kHz etc.).

Selecting *Single Speed* in the Settings dialog causes the output signal to always stay within the range of 32 kHz to 48 kHz. So at 96 kHz sample rate, the output word clock is 48 kHz.

The received word clock signal can be distributed to other devices by using the word clock output. With this the usual T-adapter can be avoided, and the MADiface XT operates as *Signal Refresher*. This kind of operation is highly recommended, because

- input and output are phase-locked and in phase (0°) to each other
- *SteadyClock* removes nearly all jitter from the input signal
- the exceptional input (1 Vpp sensitivity instead of the usual 2.5 Vpp, dc cut, *Signal Adaptation Circuit*) plus *SteadyClock* guarantee a secure function even with highly critical word clock signals

Thanks to a low impedance, but short circuit proof output, the MADiface XT delivers 4 Vpp to 75 Ohms. For wrong termination with 2 x 75 Ohms (37.5 Ohms), there are still 3.2 Vpp fed into the network.

22.2 Technical Description and Usage

In the analog domain one can connect any device to another device, a synchronisation is not necessary. Digital audio is different. It uses a clock, the sample frequency. The signal can only be processed and transmitted when all participating devices share the same clock. If not, the signal will suffer from wrong samples, distortion, crackle sounds and drop outs.

AES/EBU, SPDIF, ADAT and MADI are self-clocking, an additional word clock connection in principle isn't necessary. But when using more than one device simultaneously problems are likely to happen. For example any self-clocking will not work in a loop cabling, when there is no 'master' (main clock) inside the loop. Additionally the clock of all participating devices has to be synchronous. This is often impossible with devices limited to playback, for example CD players, as these have no SPDIF input, thus can't use the self clocking technique as clock reference.

In a digital studio synchronisation is maintained by connecting all devices to a central sync source. For example the mixing desk works as master and sends a reference signal, the word clock, to all other devices. Of course this will only work as long as all other devices are equipped with a word clock or sync input, thus being able to work as slave (some professional CD players indeed have a word clock input). Then all devices get the same clock and will work in every possible combination with each other.

! *A digital system can only have one master! If the MADIface XT's clock mode is set to 'Master', all other devices must be set to 'Slave'.*

But word clock is not only the 'great problem solver', it also has some disadvantages. The word clock is based on a fraction of the really needed clock. For example SPDIF: 44.1 kHz word clock (a simple square wave signal) has to be multiplied by 256 inside the device using a special PLL (to about 11.2 MHz). This signal then replaces the one from the quartz crystal. Big disadvantage: because of the high multiplication factor the reconstructed clock will have great deviations called jitter. The jitter of a word clock is multiple times higher than the one of a quartz based clock.

The actual end of these problems is offered by the **SteadyClock** technology of the MADIface XT. Combining the advantages of modern and fastest digital technology with analog filter techniques, re-gaining a low jitter clock signal of 22 MHz from a slow word clock of 44.1 kHz is no problem anymore. Additionally, jitter on the input signal is highly rejected, so that even in real world usage the re-gained clock signal is of highest quality.

This is especially true when extracting the word clock out of a MADI signal. Caused by the MADI format itself, such a signal will have around 80 ns of jitter, which is reduced to about 1 ns by SteadyClock.

22.3 Cabling and Termination

Word clock signals are usually distributed in the form of a network, split with BNC T-adapters and terminated with resistors. We recommend using off-the-shelf BNC cables to connect all devices, as this type of cable is used for most computer networks. You will find all the necessary components (T-adapters, terminators, cables) in most electronics and/or computer stores. The latter usually carries 50 Ohms components. The 75 Ohms components used for word clock are part of video technology (RG59).

Ideally, the word clock signal is a 5 Volt square wave with the frequency of the sample rate, of which the harmonics go up to far above 500 kHz. To avoid voltage loss and reflections, both the cable itself and the terminating resistor at the end of the chain should have an impedance of 75 Ohm. If the voltage is too low, synchronization will fail. High frequency reflection effects can cause both jitter and sync failure.

Unfortunately there are still devices on the market which provide a word clock output that can only be called unsatisfactory. If the output breaks down to 3 Volts when terminating with 75 Ohms, you have to take into account that a device, of which the input only works from 2.8 Volts and above, does not function correctly already after 3 meter cable length. So it is not astonishing that because of the higher voltage, word clock networks are in some cases more stable and reliable if cables are not terminated at all. In some cases the 75 Ohms are built into the device and cannot be switched off. In this case the network load is often 2×75 Ohms, and the user is forced to buy a special word clock distributor (such a device is generally recommended for bigger studios).

Therefore it seems of advantage to design outputs of word clock as low impedance types, but all word clock inputs as high impedance types, in order to not weaken the signal on the chain.

The MADIface XT word clock input can be high-impedance or terminated internally, ensuring maximum flexibility. If termination is necessary (e.g. because the card is the last device in the chain), activate the option *Word Clock In Term.* in the Settings dialog.

In case the MADIface XT resides within a chain of devices receiving word clock, plug a T-adapter into its BNC input jack, and the cable supplying the word clock signal to one end of the adapter. Connect the free end to the next device in the chain via a further BNC cable. The last device in the chain should be terminated using another T-adapter and a 75 Ohm resistor (available as short BNC plug). Of course devices with internal termination do not need T-adaptor and terminator plug.

! *Due to the outstanding SteadyClock technology of the MADIface XT, we recommend not to pass the input signal via T-adapter, but to use the card's word clock output instead. Thanks to SteadyClock, the input signal will both be freed from jitter and - in case of loss or drop out – be reset to a valid frequency.*

22.4 Operation

The green WCK field on the display will light up as soon as a word clock signal is detected. To change to word clock as clock source, activate the Clock Source Word in the field *Clock Mode* within the Settings dialog. The status display *Current* changes to *Word* as soon as a valid signal is present at the BNC jack. This message has the same meaning as the green status display, but appears on the monitor, i.e. the user can check immediately whether a valid word clock signal is present and is currently being used.

User's Guide



MADIface XT II

▶ Stand-Alone Operation

23. Operation and Usage

23.1 General

Using the two rotary encoders and the clear colour display the MADiface XT II can be configured and set up completely at the device. Additionally an internal memory allows for the permanent storage of six different states of the unit. Therefore the MADiface XT II is able to operate fully stand-alone, without any connected computer. In stand-alone operation it can transform into totally different devices by the simple click of a button. Furthermore TotalMix FX, and with this the application examples shown below, can also be controlled via MIDI, see chapter 28.6, *Stand-Alone MIDI Control*.

23.2 Settings at the Unit

The MADiface XT has a simple menu structure, depending on the button pressed.

MIC/GAIN. Page Mic Gain. Setting the gain for the inputs 1/2 using encoder 1 and 2.

MIX. Brings up the Mix page. Note that changes to the current mix state can not be performed at the unit when it is connected to a computer. Mix gives access to the whole submix of the specific output. Any input routed to that output can be modified in level and panorama. Encoder 1 selects the mixing target, encoder 2 selects the source.

CHANNEL. Encoder 1 selects the input and output to be configured, encoder 2 selects the function to be configured. These are *Settings*, *Low Cut*, *Parametric EQ Compressor/Expander* and *Auto Level*, *Room EQ Left*, *Room EQ Right*.

SETUP/REV. Encoder 1 selects Setups, Options and Reverb/Echo. Options has the subpages *Clock*, *Hardware/Diagnosis*, *Control Room* and *MADI Settings*. Reverb/Echo has the subpages *Reverb* and *Echo*. The subpages are selected with encoder 2.

23.3 Store / Load Setups at the Unit

After hitting the key SETUP/REV, turning encoder 1 changes to *Setups*. First select the preferred memory slot, then the desired process (load or store). The load/store process is completed by pushing encoder 2 for more than one second.

The MADiface XT has six memory slots for free usage, plus one fixed slot to load a *Factory* setup performing a factory reset of the unit:

23.4 Storing Setups from the Computer

Setups can also be loaded into the unit from the computer. As the Setups are usually generated at the computer the final step of transmission offers a convenient workflow. In TotalMix FX use *Options / Store current state into device* to select the desired storage place (Setup) within the unit.

23.5 ARC Options

In the menu *SETUP/REV - Options - Hardware/Diagnosis* there are additional settings for the optional ARC USB (Advanced Remote Control). When connected directly to the MADiface XT II the following options are available:

Standalone ARC Volume. Deactivates all keys. Only the encoder wheel works, with a fixed assignment to Main Volume.

This option is also a safety function in case the ARC USB is connected to the MADiface XT II, but operated online (with computer). When the system goes offline (computer removed, sleep state...) the functions on the keys change, because online mode changed to stand-alone mode. Operating the keys then could activate unintended functionality or changes.

Standalone ARC 1 s op

Each key has to be pressed for one second to activate the programmed functionality. This safety function prevents unintentional changes. It can be stored within the Setups, activating this mode automatically when such a Setup is loaded. When loading a Setup where this function had not been active this mode is automatically deactivated at the MADiface XT II.

Standalone ARC normal

Normal operation of the ARC USB.

24. Examples

24.1 2/4-Channel AD/DA-Converter

TotalMix allows you to quickly configure routing from the analog inputs to the AES and MADI outputs, as well as routing from the AES and MADI inputs to the analog outputs. This turns the MADiface XT into a high-quality 2/4-channel AD/DA converter.

It is very easy to create such a setup. First, it is recommended to perform a *Total Reset* via the Options menu. Then select the AES output in the third row and set the faders of analog inputs 1/2 in the first row to 0 dB. Next, select Analog 1/2 in the third row and push up the AES faders in the first row. This way one could also quickly set up monitoring of all or specific I/Os for the headphone output.

24.2 2-Channel Mic Preamp

Use TotalMix to route the two microphone inputs directly to the analog outputs. This turns the MADiface XT into a 2-channel microphone preamp. The AD- and DA-conversion will cause a small delay of the signals of around 0.17 ms (at 192 kHz, see chapter 39.3). But this is nothing to worry about, as it is the same delay that would be caused by changing the microphone's position by about 5.6 centimeter (2 inches).

24.3 194-channel Monitor Mixer

TotalMix allows ANY configuration of all I/Os of the MADiface. For example, set up the device as monitor mixer for 2 analog signals, 194 digital via AES and 3 x MADI or any number in-between. Additionally, TotalMix lets you set up ANY submixes, so all existing outputs can be used for different and independent monitorings of the input signals. The perfect monitoring/surveillance solution for multiple MADI streams!

24.4 Analog and Digital Inserter

As TotalMix allows for any routing of the input signals, the MADIface XT can be used to insert AES or analog into any place of the three MADI streams. Those can be passed through, so the signal is either unchanged (refreshed), newly mixed/routed/levelled, or parts are replaced.

24.5 3-port MADI Router with Monitoring

The Matrix in TotalMix enables you to route and link all inputs and outputs completely freely. All the above functionalities are even available simultaneously, can be mixed and combined in many ways. Simply said: the MADIface XT is a perfect digital routing matrix!

User's Guide



MADiface XT II

▶ TotalMix FX

25. Routing and Monitoring – TotalMix FX

25.1 Overview

The MADiface XT includes a powerful digital real-time mixer, the *Hammerfall DSP mixer*, based on RME's unique, sample-rate independent **TotalMix** technology. It allows for practically unlimited mixing and routing operations, with all inputs and playback channels simultaneously, to any hardware outputs.

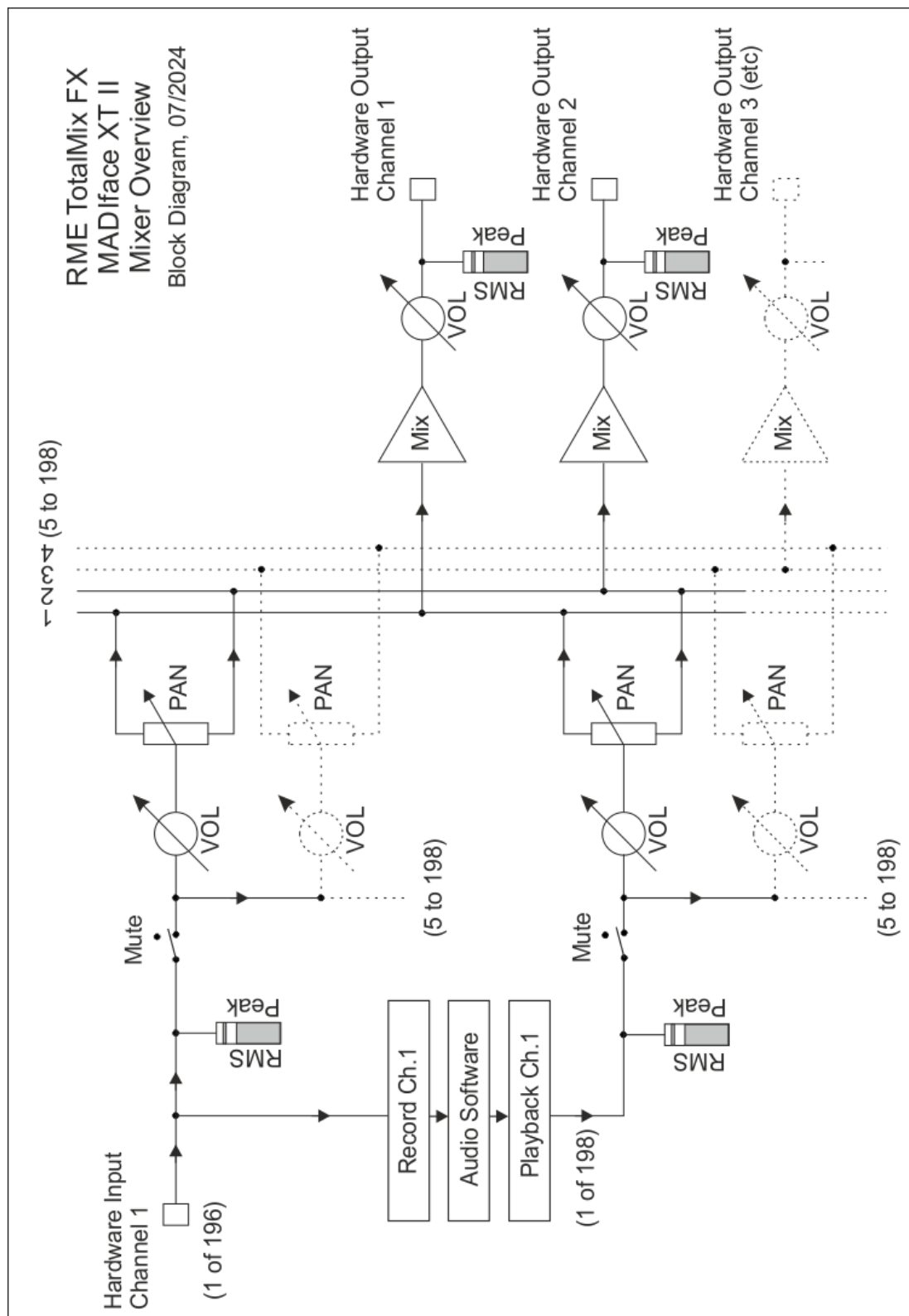
Here are some typical applications for TotalMix:

- Setting up delay-free submixes (headphone mixes). The MADiface XT allows for up to 99 (!) fully independent stereo submixes. On an analog mixing desk, this would equal 198 (!) Aux sends.
- Unlimited routing of inputs and outputs (free utilisation, patchbay functionality).
- Distributing signals to several outputs at a time. TotalMix offers state-of-the-art splitter and distributor functions.
- Simultaneous playback of different programs using only one stereo output. The ASIO multi-client driver handles several programs at the same time, even identical playback channels. TotalMix provides the means to mix and monitor these on a single stereo output, even when originating on different playback channels.
- Mixing of the input signal to the playback signal (complete ASIO Direct Monitoring). RME not only is *the* pioneer of ADM, but also offers the most complete implementation of the ADM functions.
- Integration of external devices. Use TotalMix to insert external effects devices, be it in the playback or in the record path. Depending on the current application, the functionality equals insert or effects send and effects return, for example as used during real-time monitoring when adding some reverb to the vocals.

Every single input channel, playback channel and hardware output features a Peak and RMS level meter, calculated in hardware (hardware output is Peak only). These level displays are very useful to determine the presence and routing destinations of the audio signals.

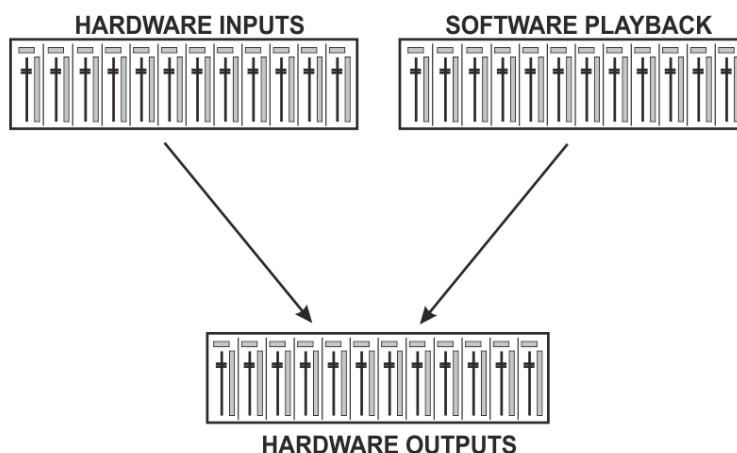
For a better understanding of the TotalMix mixer you should know the following:

- As shown in the block diagram (next page), the record signal usually stays un-altered. TotalMix does not reside within the record path, and does not change the record level or the audio data to be recorded (exception: loopback mode).
- The hardware input signal can be passed on as often as desired, even with different levels. This is a big difference to conventional mixing desks, where the channel fader always controls the level for all routing destinations simultaneously.
- The level meter of inputs and playback channels are connected pre-fader, to be able to visually monitor where a signal is currently present. The level meters of the hardware's outputs are connected post-fader, thus displaying the actual output level.



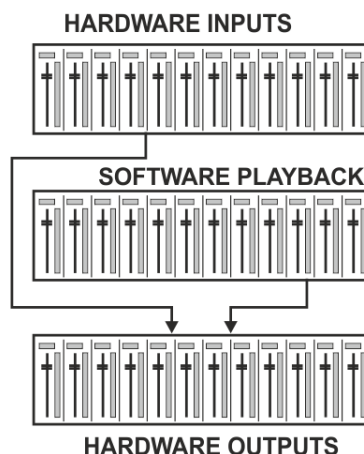
25.2 The User Interface

The visual design of the TotalMix mixer is a result of its capability to route hardware inputs and software playback channels to any hardware output. The MADiface XT provides 196 input channels, 198 software playback channels, and 198 hardware output channels:



TotalMix can be used in the above view (View Options **2 Row**). However, the default is a vertical alignment in three rows as known from an Inline desk, so that the row *Software Playback* equals the *Tape Return* of a real mixing desk:

- Top row: Hardware inputs. The level shown is that of the input signal, i. e. fader independent. Via fader and routing menu, any input channel can be routed and mixed to any hardware output (bottom row).
- Middle row: Playback channels (playback tracks of the audio software). Via fader and routing menu, any playback channel can be routed and mixed to any hardware output (third row).
- Bottom row (third row): Hardware outputs. Here, the total level of the output can be adjusted. This may be the level of connected loudspeakers, or the necessity to reduce the level of an overloaded submix.



Usage in mode Submix View (Default)

Click on the Hardware Output channel in the third row where the audio signal is supposed to show up. This channel turns brighter, means it is selected as current submix. Now move the faders up from all sources – these are the input and playback channels, in the first and second row. That's it. The input (monitoring) and playback (DAW software) audio signals are now available at that very output, which can be verified immediately from the level meters reacting accordingly.

The following chapters explain step by step all functions of the user interface.

25.3 The Channels

A single channel can be switched between mono and stereo mode. The mode is set in the channel settings.

Channel name. The name field is the preferred place to select a channel by a mouse click. A double click opens a dialog to assign a different name. The original name will be shown when activating the option *Names* in the View Options.

Panorama. Routes the input signal freely to the left and right routing destination (lower label, see below). The level reduction in center position is -3 dB.

Mute and Solo. Input channels and playback channels each have a mute and solo button.

Numerical level display. Shows the current RMS or Peak level, updated twice per second. OVR means overload. The setting Peak/RMS is changed in the View Options.

Level meter. The meter shows both peak values (zero attack, 1 sample is enough for a full scale display) by means of a yellow line, and mathematically correct RMS values by means of a green bar. The RMS display has a relatively slow time constant, so that it shows the average loudness quite well. Overs are shown in red at the top of the bar. In the Preferences dialog (F2) the Peak Hold time, the over detection and the RMS reference can be set.

Fader. Determines the gain/level of the signal routed to the current routing destination (lower label). Please note that this fader is not *the* fader of the channel, but only the fader of the current routing. Compared to a standard mixing desk TotalMix does not have a channel fader, but only Aux Sends, as many as there are hardware outputs. Therefore TotalMix can create as many different Submixes as there are hardware outputs. This concept is understood best in the Submix View, but more on that later.

Below the fader the **Gain** is shown in a numerical display field, according to the current fader position. The fader can be:

- dragged with the left mouse button pressed
- moved by the mouse wheel
- set to 0 dB and $-\infty$ by a double click. The same happens with a single click plus held down Ctrl key.
- adjusted in fine mode by mouse drag and mouse wheel when holding the Shift key down

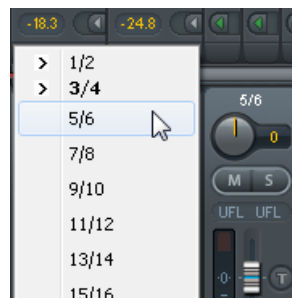
A Shift-click on a fader adds the fader to the **temporary fader group**. All faders now marked yellow are ganged, and move simultaneously in a relative way. The temporary fader group is deleted by a click on the F symbol in the upper right of the window.

The **arrow symbol** at the bottom minimizes the channel width to that of the level meters. Another click maximizes it again. A mouse click with held Ctrl key causes all channels to the right to enlarge and minimize at once.



The lowest field shows the current **routing target**. A mouse click opens the routing window to select a routing target. The list shows all activated routings of the current channel by arrows in front of the listed entries. The current one is shown in bold letters.

An arrow is only shown with an activated routing. A routing is seen as activated when audio data is sent. As long as the fader is set to $-\infty$ the current routing will be shown in bold letters, but not have an arrow in the front.



Trim Gain. After a click on the **T**-button one channel's faders are all synchronized. Instead of changing only a single routing the fader affects all the channel's active routings. For a better overview the faders currently not visible are indicated by orange triangles beside the fader path. When moving the fader the triangles also move to a new position, equalling the faders new settings.

Note that the fader button is set to the highest routing gain of all routings so that best control is offered. The gain (fader knob position) of the currently active routing (the submix selected in the third row) is shown as white triangle.

Background: TotalMix has no fixed channel fader. In case of the MADiface XT there are 99 stereo Aux sends, shown alternately as single fader within the channel strip. The high number of Aux sends enables multiple and fully independent routings.

In some cases it is necessary to synchronize the gain changes of these routings. An example is the Post fader function, where a change of the singer's volume shall be performed identical to the volume change of the signal sent to the reverb device, so that the reverb level keeps its relation to the original signal. Another example is the signal of a guitar that is routed to different submixes, means hardware outputs, which gets much too loud during the solo part, and therefore needs to be reduced in volume on all outputs simultaneously. After a click on the Trim button this can be done easily and with a perfect overview.

As all channel's routings change simultaneously when Trim is active, this mode basically causes the same behaviour as a trim pot within the input channel, affecting the signal already before the mixer. That's how this function got its name.



In the View Options / Show the function Trim Gains can be globally switched on and off for all channels. The global Trim mode is recommended when using TotalMix FX as live mixing desk.

The Context Menu. With a right click on the input, playback and output channels their context menus provide advanced functionality (these menus are also available in the Matrix, but only directly on the channel labels). The entries are self-explanatory and automatically adjust to where the click is performed. On all of these the first entry opens the *Channel Layout* dialog. The input channels offer *Clear*, *Copy input*, *paste the input mix* and *paste its FX*. On a playback channel *Copy*, *Paste* and *Clear the playback mix* are available. On an output channel *Copy* and *Mirror* functionality for the current submix and *copying* of the FX settings is offered.

25.3.1 Settings

A click on the tool symbol opens the channel's **Settings** panel. It includes these elements:

Stereo. Switches the channel to mono or stereo mode.

48V (only channels Mic 1/2). Activates phantom power at the corresponding input. Serves as power supply for high quality condenser mics. This option should stay off with other sources to prevent failure by spikes.

Gain (only channels Mic 1/2). Sets the gain for the two front inputs. The knob can be adjusted by dragging the mouse or by the mouse wheel. This also works when the mouse has been moved over the two gain displays. Then the gain can be changed separately for left and right channel, even when the channel is in stereo mode.

AutoSet (only channels Mic 1/2). Activates an automatic gain reduction preventing overloads caused by too high gain settings. See chapter 20.3 for details.

Width. Defines the stereo width. 1.00 equals full stereo, 0.00 mono, -1.00 swapped channels.

FX Send. Setting the level of the signal sent to the FX bus which feeds Echo and Reverb. The current setting is also visible with closed channel settings, because knob and small fader are synchronized. To make this function as useful as possible FX Send is locked to the highest submix, thus imitating the *Aux Post Fader* function of a standard mixing desk. When moving the big fader both knob and small fader will move. This way the reverb signal keeps the correct relation to the dry signal.

The level of the signal sent to the effects can be controlled by the *FX In* level meters of the FX window. It becomes visible after a click on FX in the View Options.

MS Proc. Activates M/S processing within the stereo channel. Monaural information is sent to the left channel, stereo information to the right.

Phase L. Inverts the phase of the left channel by 180°.

Phase R. Inverts the phase of the right channel by 180°.

Note: Width, MS Proc, Phase L and Phase R affect all routings of the respective channel.



Besides Stereo/Mono, Phase L und Phase R the settings of the Hardware Outputs have further options:

Level. Sets the reference levels of the 4 analog outputs. The available settings for Analog 1/2 are +4 dBu, +13 dBu, +19 dBu and +24 dBu. The outputs Phones have a Low and High setting to choose from.

FX Return. The effect signal (Echo and Reverb) is mixed to the respective hardware output by the duo knob/small fader.

Crossfeed. Adjustable to 5 levels. Can be activated on a maximum of 6 stereo channels. Crossfeed uses the Bauer Binaural method for stereo loudspeaker simulation for headphones. This method, adopted from the ADI-2 series, creates a similar listening impression with headphones as with a normal loudspeaker setup.

Room EQ. Opens a window with 9-band Parametric Equalizer, Delay and Volume Calibration. See chapter 25.3.3.

Talkback. Activates this channel as receiver and output of the Talkback signal. This way Talkback can be sent to any outputs, not only the Phones in the Control Room section. Another application could be to send a certain signal to specific outputs by the push of a button.



No Trim. Sometimes channels need to have a fixed routing and level, which should not be changed in any case. An example is the stereo mixdown for recording of a live show. With *No Trim* active, the routing to this output channel is excluded from the Trim Gains function, therefore is not changed unintentionally.

Loopback. Sends the output data to the driver as record data. The corresponding submix can be recorded then. This channel's hardware input sends its data only to TotalMix, no longer to the recording software. In the input channel an orange dot indicates active loopback.



Another difference to the input and playback channels is the **Cue** button instead of Solo. A click on Cue sends the respective Hardware Output's audio to the **Main** Out, or any of the Phones outputs (option *Assign / Cue to* in the Control Room section). With this any hardware output can be controlled and listened to through the monitoring output very conveniently.

25.3.2 Equalizer

A click on EQ opens the 3-band parametric equalizer, PEQ. Available in all input and output channels it affects all the channel's routings (pre fader). The panel also includes a low cut which can be activated separately.

EQ. Activated by the EQ button.

Type. Band 1 and 3 can operate in Bell (peak), Shelving (shelf), High-Pass and Low-Pass mode. The middle band is fixed to Bell mode.

Gain. All three bands can change their amplification between +20 dB to -20 dB.

Freq. The filter's center frequency is adjustable between 20 Hz and 20 kHz. While in Bell mode the center frequency is adjusted, in shelving mode the cut-off point (-3 dB) will be changed.

Q. The Quality factor of the filter is adjustable from 0.4 (wide) to 9.9 (narrow).

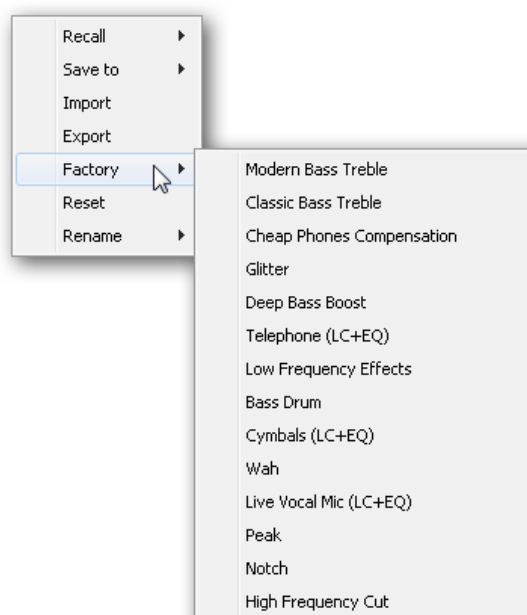
Lo Cut. Activated by the button Lo Cut. The slope of the high-pass filter is adjustable between 6, 12, 18 and 24 dB per octave. The cut-off point (-3 dB) is adjustable between 20 Hz and 500 Hz.

The frequency graphics give a precise overview of the filter results. Overlapping filters influence each other. This can be used to achieve more than 20 dB amplitude, or to generate difficult frequency response optimizations.

Note: TotalMix has internal headroom of 24 dB. Extreme boosts with overlapping filters can therefore cause an internal overload. In any case such an overload is displayed by the Over LED of the channel's level meter.

Preset. Settings of the EQ and the Low Cut can be stored, loaded, and copied between channels at any time. A click on Preset opens a menu with several entries:

- **Recall:** Presets stored before by the user can be selected and loaded
- **Save to:** There are 16 storage places available (EQ Preset 1 to 16)
- **Import:** Loads a previously stored TM EQ file (.tmeq)
- **Export:** Stores the current state as TM EQ file (.tmeq)
- **Factory:** Includes 14 examples for the creative use of Low Cut and Equalizer
- **Reset:** Resets the Low Cut and EQ to have zero influence (Gain 0 dB)
- **Rename:** The EQ Presets 1 to 16 can be renamed. The changes will be shown in both lists Recall and Save to.



Notes on the EQ Presets

Copy between channels: The EQ Preset menu of all channels is identical. If an EQ setup is stored via Save to on one of the 16 storage places, it is then also available in any other channel via Recall.

Copy between Snapshots: The Presets are not saved in Snapshots, therefore do not change when a different Snapshot is loaded. Presets are saved in Workspaces and also loaded with these.

Copy between Workspaces: is done by the export and import function of the Preset menu. Important and useful Presets should always be saved as TM EQ file, so that they can not get lost even on accidental overwrite.

Factory Presets: loaded like all Presets the settings of both Low Cut and EQ simultaneously. The current state, On or Off, is neither saved nor activated on load. With this a preset can be loaded anytime, but will not become active before the user decides to switch the EQ and/or LC on – except they had been active already before the load process. For this reason some Factory Presets have special names. For example Telephone (LC+EQ) will sound much better when the LC has been activated additionally to the EQ, as the LC is set to an unusual high frequency of 500 Hz here.

25.3.3 Room EQ

Almost everything written in the previous chapter also applies to the Room EQ. It is based on the technology and design of the 3-band PEQ, but offers 9 bands and is specifically intended for room correction – which is why it is only available in the output channels. As a 'fixed speaker correction', it is typically not part of the mixing, its settings thus only saved in the Workspace. But Room EQs can also be loaded via Snapshot using the *Load Room EQs with Snapshot* option in Preferences.

Here the gain of the filters can be adjusted in steps of 0.1 dB (3-band PEQ: 0.5 dB).

- In the *Options - Reset Mix* menu, there are additional options: *Clear channel effects without Room EQ* and *Total Reset without Room EQ*.
- The Room EQ is located directly behind the 3-band PEQ and can be recorded via Loopback.
- The Room EQ preset files have the extension .tmreq and are not compatible with those of the 3-band EQ (.tmeq).
- A maximum of 20 channels of Room EQ or 10 stereo channels of Room EQ can be used.
- The button Room EQ only switches this one on and off. Delay and Vol.Cal are off at 0 ms and 0 dB, otherwise they are always on. This is also signaled by the Room EQ button lighting up orange within in the channel settings panel.
- The Room EQ can work on mono and stereo output channels and can also be set differently for each channel, see screenshot below.

Delay offers a delay of 0 ms up to 42 ms, in steps of 0.01 ms, at all supported sample rates.

Vol.Cal changes the channel output level in the range +3 dB to -24 dB, in steps of 0.1 dB.

Quick Configuration Tips

Gain to 0 dB: Ctrl - left mouse button. Any parameter values: Double-click and type in the value. Quick adjustment via mouse or mouse wheel: Hold down Shift.



25.3.4 Dynamics

A click on D opens the **Dynamics** panel with Compressor, Expander and Auto Level. They are available in all input and output channels, and affects all routings of the respective channel.

Dynamics. Activated by this button.

Thresh. Threshold where Compressor or Expander start to work. The Compressor is adjustable from -60 dB to 0 dB, the Expander is adjustable from -99 dB to -30 dB.

Ratio. Ratio of input to output signal. Defines the intensity of the signal processing. Adjustable from 1 to 10.

Gain. Gain stage to compensate a loss in level caused by the Compressor. Adjustable from -30 to +30 dB. With inactive Compressor (Threshold 0 dB, Gain 1:1) this function can also be used as universal digital gain stage.

Attack. Defines the rise time for the control voltage of Compressor/Expander. Adjustable from 0 ms to 200 ms.

Release. Defines the release time for the control voltage of Compressor and Expander. Adjustable from 100 ms to 999 ms.

The amplitude graphics gives a precise overview of the level changes caused by the current settings of Compressor and Expander. The white dot shows the level of the input signal and with this whether the signal is within the processing range or not. The small light blue lines in the level meter show the currently active gain reduction. Settings for these *Dynamic Meters* are found in the Preferences dialog (F2).

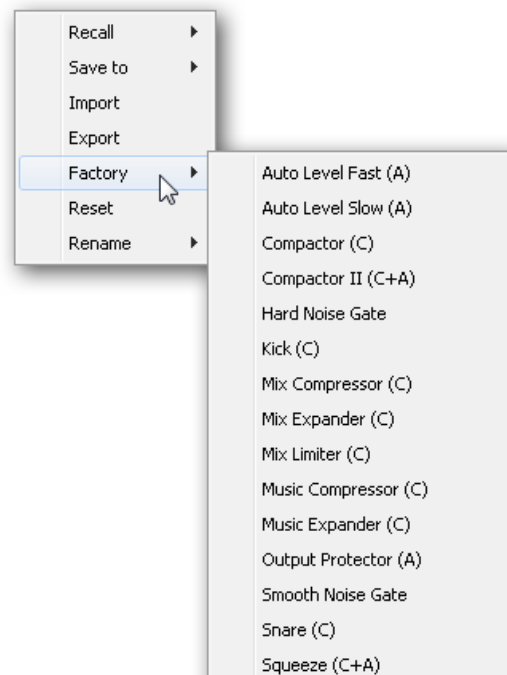
Auto Level. Activated by this button.

Max. Gain. Defines the maximum amplification of the input signal. Adjustable from 0 dB to 18 dB.

Headroom. To minimize short-time overloads and clipping of the signal peaks Auto Level can be set to operate at a fixed offset to 0 dBFS. Adjustable from 3 dB to 12 dB.

Rise Time. Defines the speed of a level increase after a level reduction. Adjustable from 0.1 s to 9.9 s.

Preset. Includes the same functions as described on the previous page for the Equalizer. The names of the Factory Presets make clear whether Compressor, Auto Level or both (C+A) have to be switched on.



25.4 Section Control Room

In the section Control Room the menu *Assign* is used to define the **Main Out** which is used for listening in the studio. For this output the functions Dim, Recall, Mono, Talkback, External In and Mute FX are automatically applied.

Additionally the channel will be shifted from the Hardware Outputs into the Control Room section, and renamed *Main*. The same happens when assigning Main Out B or the Phones. The original name can be displayed by the function Names in the View Options - *Show* at any time.

Phones 1 to 4 will have Dim (set in Settings) and a special routing applied when Talkback is activated. Also putting them beside the Main Out increases the overview within the output section greatly.

Dim. The volume will be reduced by the amount set in Settings (F3).

Recall. Sets the gain value defined in Settings.

Speaker B. Switches playback from Main Out to Main Out B. The faders of the channels Main and Speaker B can be ganged via Link.

Mono. Mixes left and right channel. Useful to check for mono compatibility and phase problems.

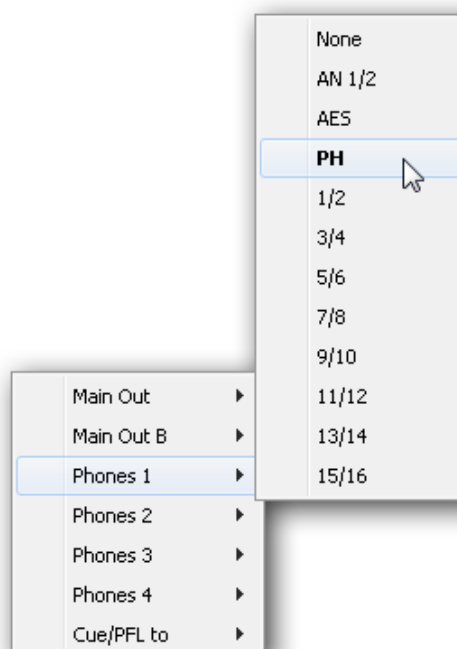
Talkback. A click on this button will dim all signals on the *Phones* outputs by an amount set up in the Settings dialog. At the same time the control room's microphone signal (source defined in Settings) is sent to the *Phones*. The microphone level is adjusted with the channel's input fader.

External Input. Switches Main monitoring from the mix bus to the stereo input defined in the Settings dialog (F3). The relative volume of the stereo signal is adjusted there as well.

Mute FX. Mutes Reverb and Echo on the Main Out, to hear the mix without those effects.

Assign. Allows to define the Main Out, Main Out B (Speaker B), and up to four Phones outs.

The output for the Cue signal, which is usually Main, can also be set to one of four *Phones* outputs. The setting *Cue/PFL to* also controls the PFL monitoring.



25.5 The Control Strip

The Control Strip on the right side is a fixed element. It combines different functions that are either required globally, or constantly used, and therefore should not be hidden in a menu. It can still be hidden via the top menu *Window – Hide Control Strip*.

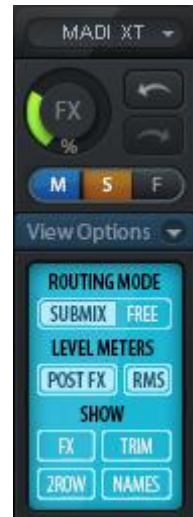
The areas described in the following chapters can be minimized by a click on the arrow in their title bar.

Device selection. Select the unit to be controlled in case more than one is installed on the computer.

FX - DSP Meter. Shows the DSP load caused by activated EQ, Low Cut, Compressor, Auto Level, Echo and Reverb. The DSP of the MADiface XT has an automatic load limiter. If no DSP resources are left further effects can not be activated. When switching to DS and QS modes effects will be deactivated automatically until the DSP is not overloaded anymore.

Undo / Redo. With the unlimited Undo and Redo changes of the mix can be undone and redone, at any time. Undo/Redo does not cover graphical changes (window size, position, channels wide/narrow etc.), and also no changes to the Presets. The accidental overwrite of an EQ Preset can not be made undone.

Undo/Redo also operates across Workspaces. Therefore a completely differently set up mixer view can be loaded via Workspace, and with a single click on Undo the previous internal mixer state is returned – but the new mixer view stays.



Global Mute Solo Fader.

Mute. Global Mute operates in a pre fader style, muting all currently activated routings of the channel. As soon as any Mute button is pressed, the *Mute Master* button lights up in the Control Strip area. With this button all selected mutes can be switched off and on again. One can comfortably set up a mute group or activate and deactivate several mute buttons simultaneously.

Solo. As soon as any Solo button is pressed, the *Solo Master* button lights up in the Control Strip area. With this button all selected Solos are switched off and on again. Solo operates as Solo-in-Place, post fader style, as known from common mixing desks. A typical limitation for mixing desks, Solo working only globally and only for the Main Out, does not exist in TotalMix. Solo is always activated for the current submix only.

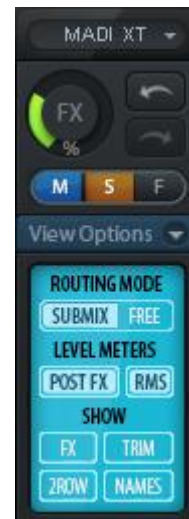
Fader. A Shift-click on a fader adds the fader to the **temporary fader group**. All faders now marked yellow are ganged, and move simultaneously in a relative way. The temporary fader group is deleted by a click on the F symbol.

25.5.1 View Options

View Options. This area combines different functions of routing, the level meters and the mixer view.

Routing Mode

- **Submix.** The Submix view (default) is the preferred view and delivers the quickest overview, operation and understanding of TotalMix. The click on one of the Hardware Output channels selects the respective submix, all other outputs are darkened. At the same time all routing fields are set to this channel. With Submix view, it is very easy to generate a submix for any output: select the output channel, then adjust the fader and pans of first and second row – finished.
- **Free.** The Free view is for advanced users. It is used to edit several submixes simultaneously, without the need to change between them. Here one works with the routings fields of the input and playback channels only, which then show different routing destinations.



Level Meters

- **Post FX.** Switches all level meters before (pre) or after (post) the effects. Level changes by these can be easily checked using this feature. Additionally the input signal can be checked for overloads. It is recommended to use Post FX as default setting, as the extreme reduction of a signal by LC/EQ is very seldom. Also all over displays of all level meters operate both pre and post, efficiently preventing overloads going unnoticed.
- **RMS.** The numerical level display in the channels displays peak or RMS.

Show

- **FX.** Opens the window to set up the effects Reverb and Echo.
- **Trim.** Activates all Trim buttons on all channels. TotalMix thus behaves like a conventional, simple mixing desk. Each fader affects all active routings of the channel simultaneously, as if the fader were a trim-pot in the hardware input.
- **2 Row.** Switches the mixer view to 2 rows. Hardware Inputs and Software Playbacks are placed side by side. This view saves a lot of space, especially in height.
- **Names.** Display of the original names of channels when they had been renamed by the user.

25.5.2 Snapshots - Groups

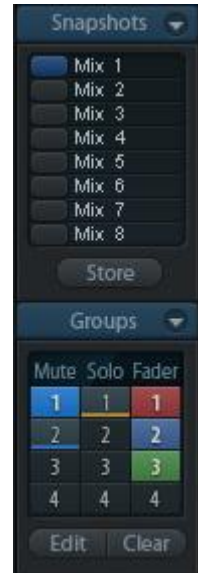
Snapshots. Snapshots include all mixer settings, but no graphical elements like window positions, window size, number of windows, visible EQs or Settings, scroll states, Presets etc. Only the state wide/narrow of the channels is registered. Moreover the Snapshot is only temporarily stored. Loading a Workspace causes the loss of all stored Snapshots, when these all had not been saved before in a Workspace, or separately via *File / Save Snapshot as*. Via *File / Load Snapshot* the mixer states can be loaded individually.

8 different mixes can be stored under individual names in the Snapshot section. A click on any of the 8 buttons loads the corresponding Snapshot. A double click on the name field opens the dialog *Input Name* to edit the name. As soon as the mixer state is changed the button starts flashing. A click on Store lets all buttons flash, whereby the last loaded one, the base of the current state, flashes inversely. The storage finishes by clicking the desired button (means storage place). The storage process is exited by another click on the flashing Store button.

The area Snapshots can be minimized by a click on the arrow in the title bar.

Groups. The area Groups provides 4 storage places each for fader, mute and solo groups. The groups are valid per Workspace, being active and usable in all 8 Snapshots. But with this they are also lost when loading a new workspace, in case they have not been saved before in a different Workspace.

Note: The Undo function will help in case of an accidental overwrite or deletion of the groups.



TotalMix uses flashing signals to guide you through the group setup. After a click on Edit and click on the desired storage place all desired functions for this group have to be activated or selected. The storage process is finished by another click on Edit.

When setting up a fader group make sure to not add faders that are at the top or low position, except all faders of that group have this position.

The Mute groups operate – other than the global mute – exclusively for the current routing. This way you can not mute signals on all outputs unintentionally. Instead signals can be muted on specific submixes by the push of a button.

A solo group operates exactly like the global solo, signals outside the current routing are not affected.

25.5.3 Channel Layout - Layout Presets

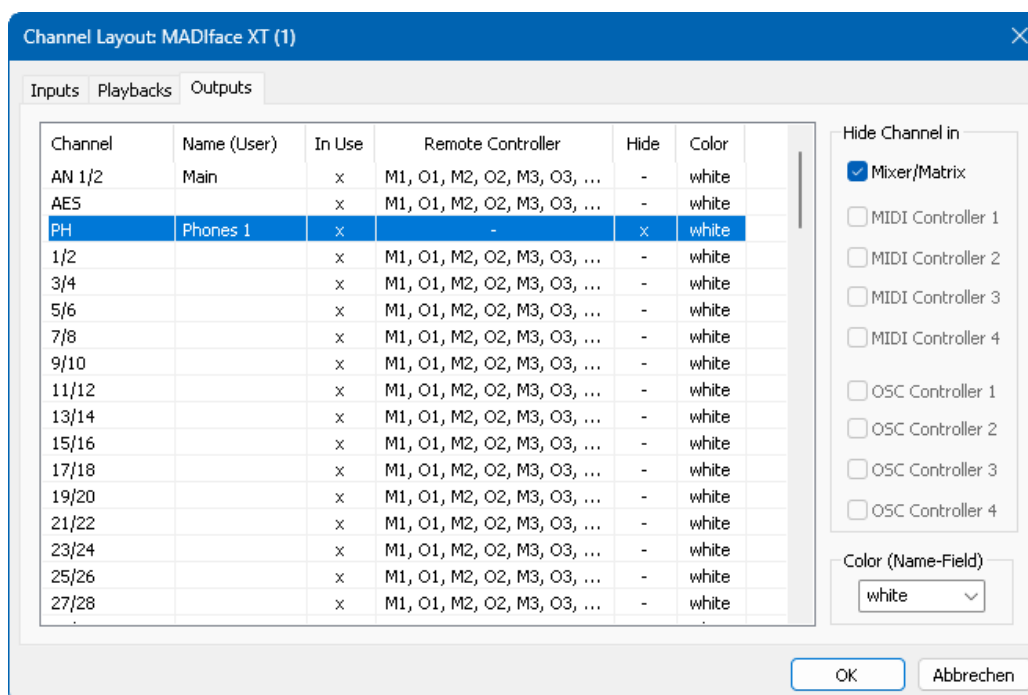
To maintain overview within TotalMix FX channels can be hidden. Channels can also be excluded from being remotied. Under *Options / Channel Layout* a dialog lists all I/Os with their current state. Selecting one or several channels enables the options to the right:

- **Hide Channel in Mixer/Matrix.** The selected channels are no longer shown in TotalMix FX, nor are they available via MIDI or OSC remote control.
- **Hide Channel in MIDI Remote 1-4.** The selected channels are hidden for MIDI remote (CC and Mackie Protocol).
- **Hide Channel in OSC Remote 1-4.** The selected channels are hidden for OSC remote control.

Hidden channels in Mixer/Matrix are still fully functional. An existing routing/mixing/FX processing stays active. But as the channel is no longer visible it can not be edited anymore. At the same time the hidden channels are removed from the list of remote controllable channels, to prevent them from being edited unnoticed.

Hidden channels in *MIDI Remote x* are removed from the list of remote controllable channels. Within an 8-channel block of a Mackie compatible control they are skipped. The control therefore is no longer bound to consecutive orders. For example it will control channels 1, 2, and 6 to 11, when channels 3 to 5 are hidden.

The same can be done for OSC. With unnecessary channels made invisible for the OSC remote the more important channels are available as one block on the remote.



The dialog can be called directly from TotalMix by a right mouse click on any channel. The corresponding channel will then be preselected in the dialog.

The rows *Inputs*, *Playbacks* and *Outputs* are set up individually by the tabs at the top. *In Use* shows which channels are currently used in the mixing process.

In the above example the Phones output channel has been made invisible. When the Phones output is not used this is an easy way to remove it from the mixer completely. A more complex setup would be to only show all channels of the drum section, the horn section or the violins.

A double click onto any line opens the edit field for the *Name (User)* column. Editing channel names in this dialog is quick, Enter jumps to the next line. The names of the channels in the Control Room section can only be changed this way.

After clicking on a field in the *Color* column, the color of the channel name can be changed. The locator picture below shows the effect and the available colors.

After finishing those settings the whole state can be stored as **Layout Preset**. A click on *Store* and the desired memory slot makes the current channel layout recallable anytime. The button *All* makes all channels temporarily visible again.



With a simple click on a button it will then be possible to easily switch views of only the channels involved with the mixing of the drum section, the horn section, the violins, or any other useful view. An optimized remote layout can be activated here as well, with or without visible changes. Double-click the default slot name to enter any other name.

! *Layout Presets are stored within the Workspace, so make sure to save the current state before loading a different Workspace!*

The button *Sub* activates another useful special view. When in *Submix view*, Sub will cause all channels to disappear that are not part of the currently selected Submix/Hardware Output. Sub temporarily shows the mix based on all channels from Inputs and Playback row, independent from the current Layout Preset. That makes it very easy to see and to verify which channels are mixed/routed to the current output. Sub makes checking and verifying of mixes, but also the mix editing itself, a lot easier, and maintains perfect overview even with lots of channels.

25.5.4 Scroll Location Markers

Another feature to improve overview and working with TotalMix FX are *scroll location markers* (TotalMix view only). These are displayed automatically when the horizontal size of the TotalMix FX window is smaller than the channel display requires. Shown on the right side of the scrollbar of each row they have four elements:

- **Arrow to the left.** A left mouse click let the channels scroll to the very first one, or most left.
- **1.** Marker number 1. Scroll to the desired position and perform a right mouse click on 1. A dialog comes up with precise information. Once stored, a left mouse click will scroll the channels to the stored position.
- **2.** Marker number 2. See 1 for details.
- **Arrow to the right.** A left mouse click let the channels scroll the last one, or most right.

Scroll location markers are stored in the Workspace.



25.6 Reverb and Echo

A click on FX in the *View Options / Mixer Setup* brings up the Output FX panel. Here all parameters for the effects Reverb and Echo are adjusted.

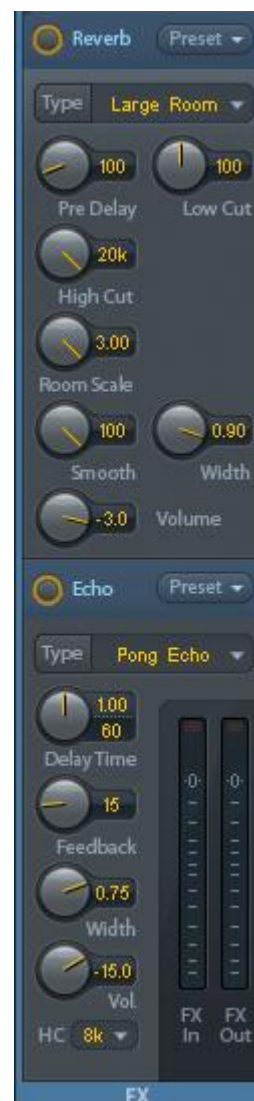
Reverb. Activated by the On button.

Type. Lists different reverb types for selection. Available are:

- **Rooms Small, Medium, Large, Walls.** Room simulation of rooms in different size and behaviour.
- **Shorty** provides a short, rich and warm reverb.
- **Attack** slaps back.
- **Swagger** enriches and blows up the original sound source.
- **Old School** is just that.
- **Echoistic** has a heavy echo part within the reverb sound which brings some nice stereo effect as well.
- **8plus9** is a mixture of Old School and Echoistic.
- **Grand Wide** stands for a wide and open room and space.
- **Thicker** can be used as short reverb to enrich the original signal.
- **Space** has the most sizzle and longest reverb time.
- **Envelope.** Reverb effect where the volume course (envelope) is freely adjustable.
- **Gated.** Simpler version of the Envelope reverb for cut reverb effects.

Please note that all these reverb types are extremely flexible due to the available Smooth and Room Scale controls. Most of them can be used as short and long reverb, and sound totally different with Smooth turned to maximum or minimum.

TotalMix FX comes with factory presets and default values for all reverb types to ensure a fast setup time and quick results. Please take the time to experiment with them with different signals and different settings, to learn how different they can sound and can be used.



General Settings

PreDelay. Delay of the reverb signal. Adjustable from 0 ms up to 999 ms.

Low Cut. High-pass filter *before* the reverb generation, removes low frequency signals which should not cause a reverb sound. Adjustable from 20 Hz up to 500 Hz.

High Cut. Low-pass filter *after* the reverb generation. A reduction of the treble often lets the reverb sound more natural. Adjustable from 5 kHz up to 20 kHz.

Smooth. Softens the reverb effect, affects stereo width, density and sound colour. Adjustable from 0 up to 100.

Width. Adjusts the stereo width of the reverb signal from 100 (stereo) to 0 (mono).

Volume. Adjusts the level of the reverb effects signal sent to the FX return bus.

Special Settings for Room Types

Room Scale. Determines the size of the room, thus changing density and length of the reverb effect. Adjustable from 0.5 up to 3.0.

Special Settings for Envelope and Gated

Attack. Length of time for the volume increase of the reverb signal. Also called rise time. Adjustable from 5 ms up to 400 ms.

Hold. Length of time for the fixed volume part of the reverb signal. Adjustable from 5 ms up to 400 ms.

Release. Length of time for the volume decrease of the reverb signal. Adjustable from 5 ms up to 400 ms.

Special Settings for Space

Reverb Time. Sets the duration of the reverb referenced to a volume drop of 20 dB. Adjustable from 0.1 s up to 4.9 s.

High Damp. Sets the treble damping over time for the reverb signal. In principle, this is a low-pass filter like High Cut. Because of the operation principle of this reverb it shows a slightly different behaviour. Adjustable from 5 kHz up to 20 kHz.

Echo. Activated by the On button.

Type. Lists different echo algorithms for selection. Available are:

- **Stereo Echo.** Separated echo generators on left and right channel. As a result the echo follows the sound source within the stereo field.
- **Stereo Cross.** Echo generator on left and right channel with cross coupled feedback which is only working for the stereo parts of the input signal. In case the input signal is only left or right the Stereo Cross acts exactly like the Pong Echo.
- **Pong Echo.** Generates an echo that jumps between left and right channel, independent from the source signal's stereo position.

Settings

Delay Time. Sets the delay time for the first echo.

BPM. A double click on the lower value field offers a delay adjustment as *Beats Per Minute*.

Feedback. Feedback to produce further echoes.

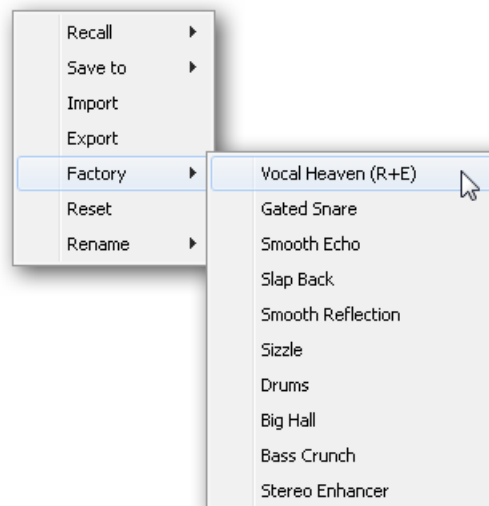
Width. Adjusts the stereo width of the echo signal from 100 (stereo) to 0 (mono).

Volume. Adjusts the level of the echo effects signal sent to the FX return bus.

High Cut (HC). Option for more natural sound or intentional damping of the delayed signal.

Preset. Settings of the Reverb and the Echo can be stored, loaded, and copied between channels at any time. A click on Preset opens a menu with several entries:

- **Recall:** Presets stored before by the user can be selected and loaded
- **Save to:** There are 16 storage places available (Reverb/Echo Preset 1 to 16)
- **Import:** Loads a previously stored TM FX Reverb file (.tmrv) or a TM FX Echo file (.tmeo)
- **Export:** Stores the current state as TM FX Reverb file (.tmrv) or as TM FX Echo file (.tmeo)
- **Factory:** Includes 10 examples for the configuration of the Reverb
- **Reset:** Resets the Reverb or Echo
- **Rename:** The Presets 1 to 16 can be renamed. The changes will be shown in both lists Recall and Save to.



25.7 Preferences

The dialog Preferences can be opened via the *Options* menu or directly via F2.

Level Meters

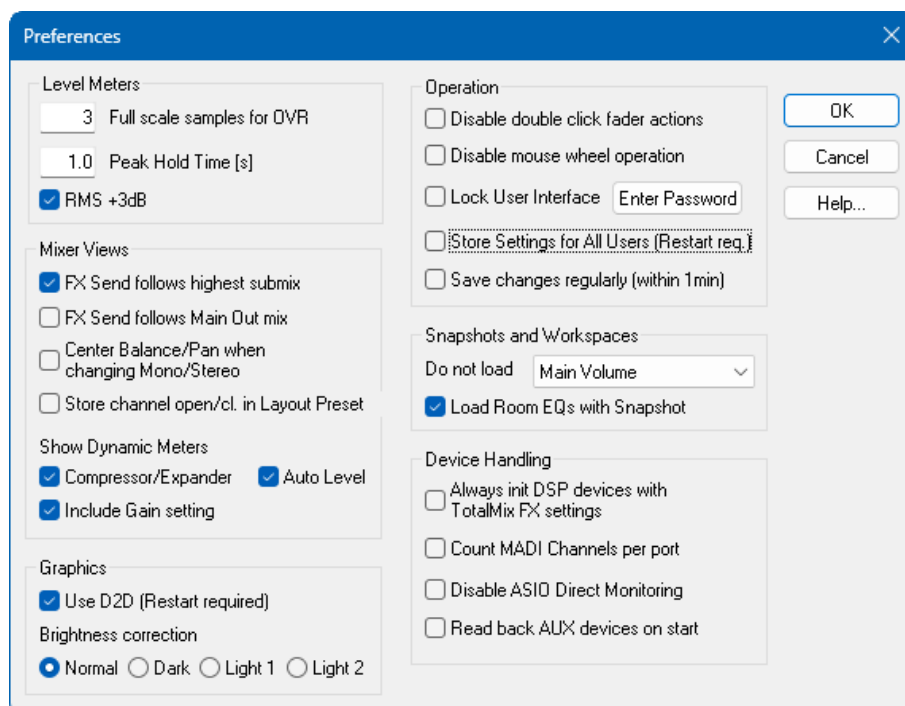
- **Full scale samples for OVR.** Number of consecutive samples to trigger an over detection (1 to 10).
- **Peak Hold Time.** Hold time of the peak value. Adjustable from 0.1 up to 9.9 s.
- **RMS +3 dB.** Shifts the RMS value by +3 dB, so that full scale level is identical for Peak and RMS at 0 dBFS.

Mixer Views

- **FX Send follows highest Submix.** Locks the FX Send knob to the channel fader. As TotalMix supports multiple routings per channel, a definition is needed which fader (only one is visible) is the one that FX Send will follow. This is always the one with the highest fader position, means the highest gain.
- **FX Send follows Main Out mix.** Locks the FX Send knob to the channel fader only for the Main Out submix. This is a typical Live feature, where the FX Send is always tied to the fader for the most important output - the Main Out. When adjusting other submixes the FX send will not follow the fader movement.
- **Center Balance/Pan when changing Mono/Stereo.** When switching a stereo channel into two mono channels the pan-pots are set fully left and right. This option will set them to center instead.
- **Store channel open/close in Layout Preset.** Also loads the state of the channel panels (Setting/EQ/Dyn).

Show Dynamic Meters

- **Compressor/Expander.** Activates the display of the Compressor/Expander's gain reduction as thin blue line in the level meters of the corresponding channel.
- **Auto Level.** Activates the display of the variable amplification of the Auto Leveler. As Auto Level can both amplify and attenuate the audio signal, depending on its configuration, the display can show negative (typical gain reduction) as well as positive (above 0 dB, amplification) values.
- **Include Gain setting.** The currently set fixed amplification value (by the Gain knob) is included in the display. This can lead to positive values, with the display limited to +6 dB. In case the option Compressor/Expander is deactivated this option is also not available, therefore grayed out.



Graphics

- **Use D2D (Change requires restart).** Default on. Can be deactivated to use a compatible but CPU-taxing graphics mode, in case graphics problems show up.
- **Brightness correction.** Set TotalMix FX screen brightness to your taste, matching the monitor setting or the environment.

Operation

- **Disable double click fader action.** Prevents unintentional gain settings, for example when using sensitive touchpads.
- **Disable mouse wheel operation.** Prevents unintentional changes when using the mouse wheel.
- **Lock User Interface.** Default off. Can be activated to freeze the current mix state. Faders, buttons and knobs relating to the mix state can not be moved anymore.
- **Enter Password (Windows only).** Secures the locked user interface with an additional password.
- **Store Setting for All Users (Restart required).** See next chapter.
- **Save changes regularly (within 1 min).** TotalMix FX saves the current state in the `laststatexxx.xml` file every minute instead of only at the end of the session.

Snapshots and Workspaces

- **Do not load - Main Volume, Main/Phones Volumes, Control Room Settings.** The selected values stored in the Snapshot are not loaded, so the current setting is not changed.
- **Load Room EQs with Snapshot.** More flexible use of the Room EQ. By default, loading is only possible with workspaces.

Device Handling

- **Always init DSP devices with TotalMix FX settings.** Used to suppress the mismatch message after using the unit stand-alone. Settings in the unit are lost.
- **Count MADI Channels per port.** Channels shown in TotalMix are counted 1 to 64 three times.
- **Disable ASIO Direct Monitoring.** Disables ASIO Direct Monitoring (ADM) for the MADIface XT within TotalMix FX.
- **Read back AUX devices on start.** Transfers the settings of the AUX devices to TotalMix FX. Respective settings in TotalMix FX will be overwritten.

25.7.1 Store Settings for All Users

TotalMix FX stores all settings, workspaces and snapshots for the *current user* in:

XP: `C:\Documents and Settings\Username\Local Settings\Application Data\TotalMixFX`

Since Vista: `C:\Users\Username\AppData\Local\TotalMixFX`

Mac Current User: `user/Library/Application Support/RME TotalMix FX`

Mac All Users: `/Library/Application Support/RME TotalMix FX`

Current User ensures that when workstations are used by multiple persons they all find their own settings. In case the settings should be identical or given for any user, TotalMix FX can be changed to use the *All Users* directory instead of *Username* when checking this option.

An admin could even write protect the file **lastMADIfaceXT1.xml**, which results in a complete reset to that file's content whenever TotalMix FX is restarted. The xml-file is updated on exit, so simply set up TotalMix as desired and exit it (right mouse click on the symbol in the notification area), then change the file attribute.

25.8 Settings

The dialog Settings can be opened via the *Options* menu or directly via F3.

25.8.1 Mixer Page

On the mixer page some typical settings for the mixer operation are set, like Talkback source, Dim amount when Talkback is active, the stored main volume or the input used for the External Input function.

Talkback

- **Input.** Selects the input channel of the Talkback signal (microphone in control room). Default: None.
- **Dim.** Amount of attenuation of the signals routed to the *Phones* in dB.

Listenback

- **Input.** Selects the input channel of the Listenback signal (microphone in recording room). Default: None.
- **Dim.** Amount of attenuation of the signals routed to the *Main Out* in dB.

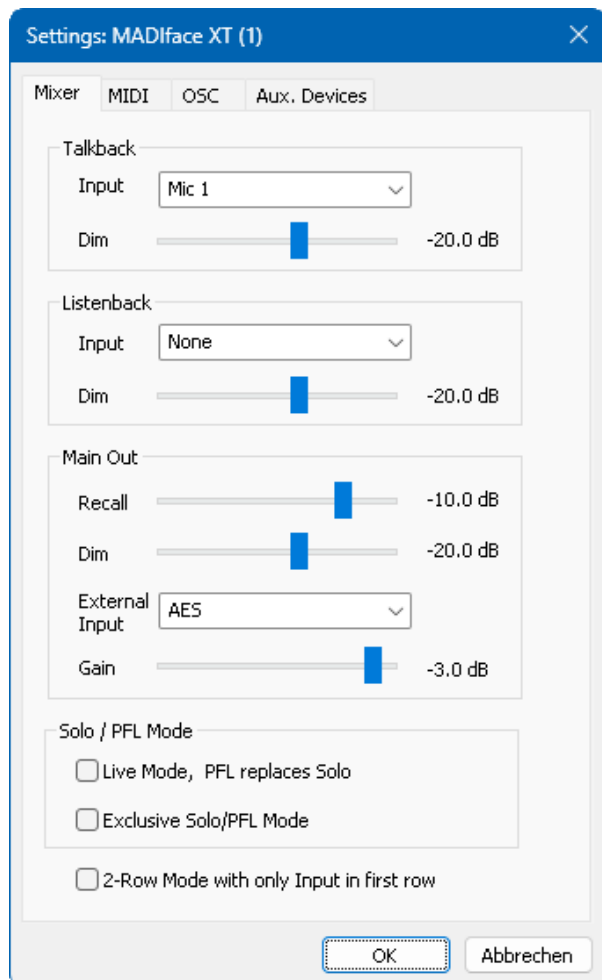
Main Out

- **Recall.** User defined listening volume, activated by the Recall button at the unit or in TotalMix.
- **Dim.** Amount of attenuation for the Main Out in dB.
- **External Input.** Selects the stereo input that replaces the mix signal on the Main Out when activated. The volume of the stereo signal is adjusted by the slider Gain.

Solo/PFL Mode

- **Live Mode, PFL replaces Solo.** PFL means Pre Fader Listening. This feature is very useful when operating TotalMix in a live environment, as it allows to quickly listen/monitor any of the inputs by hitting the Solo button. The monitoring happens on the output set for the *Cue/PFL* signal via the Assign dialog.
- **Exclusive Solo/PFL Mode.** Only a single Solo or PFL can be active at a time. Activating a different one automatically deactivates the previous one.
- **2-Row Mode with only Input in first row.** The Software Playback channels are shifted to the lower row, beside the Hardware Outputs.

Note: The Talkback signal goes to all output channels that have Talkback activated in their channel settings (default for Phones in the Control Room section). The Listenback signal only goes to the current Main Out. In addition to input gain, the volume of both signals can also be adjusted via their channel faders. Unlike Talkback and Listenback, the External Input signal can be routed, mixed and monitored at any time. With External Input active, however, routing to the current Main Out takes place independently of the channel fader setting, with the gain selected in Settings.



25.8.2 MIDI Page

The MIDI page has four independent settings for up to four MIDI remote controls, using CC commands or the Mackie Control protocol.

Index

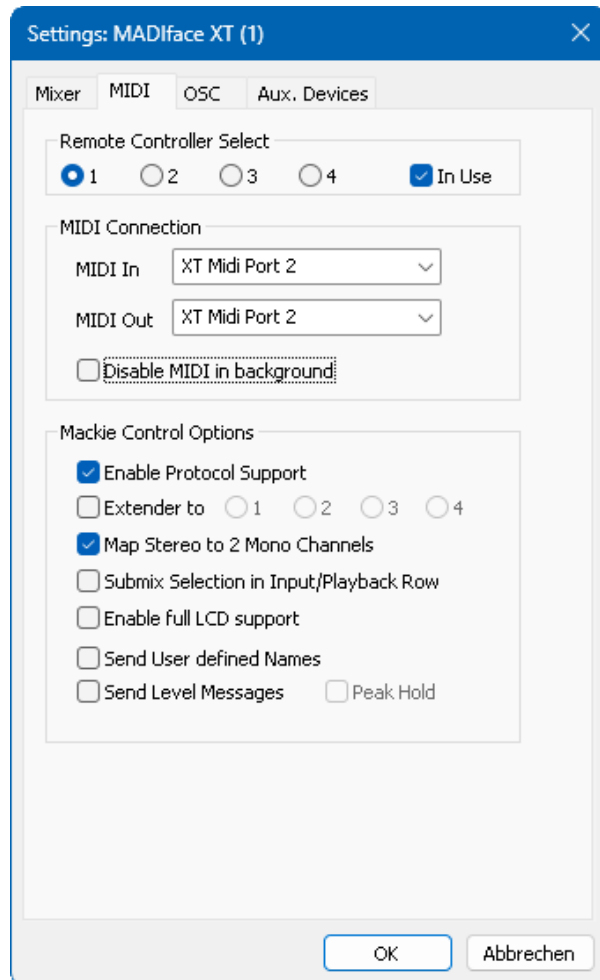
Select one of four settings pages and thus remote controls. Settings are remembered automatically. To activate or deactivate any of the four remote controls check or uncheck 'In Use'.

MIDI Remote Control

- **MIDI In.** Input where TotalMix receives MIDI Remote data.
- **MIDI Out.** Output where TotalMix sends MIDI Remote data.
- **Disable MIDI in background.** Deactivates MIDI Remote Control as soon as another application is in the focus, or when TotalMix has been minimized.

Mackie Control Options

- **Enable Protocol Support.** When disabled TM FX will only react on the Control Change commands of chapter 28.5.
- **Extender to.** Sets the current remote to be an extender to the main remote. Both remotes will be shown as one block and navigate simultaneously.
- **Map Stereo to 2 Mono Channels.** One fader controls one (mono) channel. Should be disabled when stereo channels are used.
- **Submix Selection in Input/Playback Row.** Enables a selection of the submix when in first row, without having to change to the third row first. However, when using both mono and stereo channels, first and third row usually do not match anymore, so the selection often becomes unclear this way.
- **Enable full LCD support.** Activates full Mackie Control LCD support with eight channel names and eight volume/pan values.
- **Send User defined Names.** Channel names defined by the user will be sent to the remote device via MIDI and – if supported – shown in its display.
- **Send Level Messages.** Activates the transmission of the level meter data. *Peak Hold* activates the peak hold function as set up for the TotalMix level meters in the preferences.



Note: When MIDI Out is set to NONE then TotalMix FX can still be controlled by Mackie Control MIDI commands, but the 8-channel block is not marked as remote target.

25.8.3 OSC Page

The OSC page has four independent settings for up to four MIDI remote controls via Open Sound Control (OSC). This is a network based remote protocol that can be used for example by Apple's iPad with the app *TouchOSC* or *Lemur* to wirelessly remote control TotalMix FX running on a Mac or Windows computer.

Index

Select one of four settings pages and thus remote controls. Settings are remembered automatically. To activate or deactivate any of the four remote controls check or uncheck 'In Use'.

TotalMix FX OSC Service

- **IP.** Shows the network address of the computer running TotalMix FX (local host). This address must be entered on the remote side.
- **Host Name.** Local computer name.
- **Port incoming.** Must match the remote entry 'Port outgoing'. Typical values are 7001 or 8000.
- **Port outgoing.** Must match the remote entry 'Port incoming'. Typical values are 9001 or 9000.

Remote Control

- **IP or Host name.** Enter the IP or host name of the remote control. Please note that the IP number usually works better than the host name.

Options

- **Send Peak Level.** Activates the transmission of the peak level meter data. *Peak Hold* activates the peak hold function as set up for the TotalMix level meters in the preferences.
- **Lock Remote to submix.** When activated the current remote control can only modify the submix selected from the drop-down list. This prevents havoc in multi-remote monitoring environments.
- **Number of faders per bank.** Available choices are 8 (default), 12, 16, 24, 32 and 48. Note that when working in underperforming networks, especially wireless, a higher number of faders might not work as smooth as expected.
- **Compatibility (Mode).** Since version 1.96, TotalMix FX uses an extended OSC command set. If problems occur with TotalMix-based controllers, the previous command set can be used (select TotalMix 1.90). See also chapter 28.8.

Settings: MADiface XT (1)

Mixer MIDI AUX Devices OSC

Remote Controller Select

1 2 3 4 In Use

Totalmix FX OSC Service

IP 192.168.178.166

Host Name XPS9530

Port incoming 7001

Port outgoing 9001

Remote Controller Address

IP or Host Name 192.168.178.92

Options

☐ Send Peak Level Data ☐ Peak Hold

☐ Lock Remote to submix AN 1/2

Number of faders per bank 8

Compatibility (Mode) TotalMix 1.96

OK Cancel

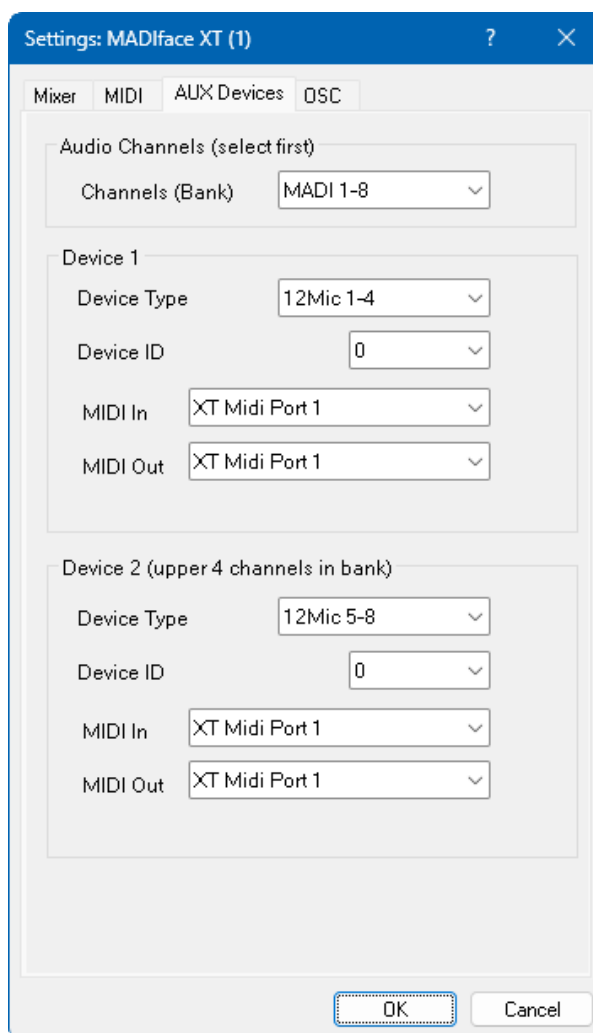
25.8.4 Aux Devices

RME's OctaMic XTC, 12Mic, 12Mic-D and AVB Tool offer flexible hi-quality microphone, line and instrument preamps with integrated AD-conversion to ADAT, AES/EBU and MADI. They can be used as universal front-end for the MADiface XT and other RME interfaces.

To simplify operation the most important input parameters (gain, 48V, mute, AutoSet) can be controlled directly from the TotalMix FX input channels. This special remote control uses MIDI of any format (DIN, USB, MIDI over MADI).

Device Settings

- **Digital Channels.** Select where the 4 or 8 analog input channels come in. With the MADiface XT this will be any of the MADI 8-channel blocks.
- **Device Type.** Select the external unit. Currently supported are OctaMic XTC, 12Mic, 12Mic-D and the AVB Tool.
- **Device ID.** Default 0. This setting relates to the current choice of Digital Channels.
- **MIDI In.** Set the currently used MIDI connection to the external device.
- **MIDI Out.** Set the currently used MIDI connection to the external device.



When using more than one external device of the same type these must have different Device IDs (configuration is done at the device).

When using the 12-channel 12Mic, three 4-channel entries are used instead of one 8-channel entry. The screenshot shows the settings for channels 1-4 and 5-8. Channels 9-12 (etc.) appear when the next bank is selected under Channels (Bank), MADI 9-16.

The screenshot to the right shows what happens as soon as the above settings have been confirmed with OK. The MADI channels show new elements for phantom power, Inst/PAD, Gain and AutoSet. Control operates bidirectional, so changing the gain at the unit will be mirrored in the TotalMix channels. Changing the gain in TotalMix FX will set the gain in the unit, which is also shown on the unit's display.

For the remote to work the XTC's currently used MIDI I/Os have to be set to *Control*. More details are found in the manual of the OctaMic XTC.



25.9 Hotkeys and Usage

TotalMix FX has many hotkeys and mouse/hotkey combinations to speed up and simplify the usage. The below description refers to Windows. On Mac substitute *Ctrl* in the below list with the command key (⌘).

The **Shift** key enables a fine-tuning of the gain with all faders and in the Matrix. On all knobs it will speed up the setting.

A click on a **fader** with held down **Shift** key adds the fader to the temporary fader group.

A click in the **fader path** with held down **Ctrl** key will let the fader jump to 0 dB, at the next click to $-\infty$. Same function: Double click of the mouse.

Clicking on one of the **Panorama** or **Gain** knobs with held down **Ctrl** key lets the knob jump to center position. Same function: Double click of the mouse.

Clicking on the **Panorama** knob with held down **Shift** key lets the knob jump to fully left, with **Shift-Ctrl** to fully right.

Clicking on one of the channel settings buttons (slim/normal, Settings, EQ, Dynamics) with held down **Ctrl** key lets all channels to the right change their state. For example all panels can be opened/closed simultaneously.

A **double click** of the mouse on a knob or its numerical field opens the according *Input Value* dialog. The desired value can then be set by keyboard.

Dragging the mouse from a parameter field increases (move up) or decreases (move down) the value in the field.

Ctrl-N opens the dialog *Function Select* to open a new TotalMix window.

Ctrl-W opens the dialog *File Open* of the operating system to load a TotalMix Workspace file.

The key **W** starts the dialog *Workspace Quick Select* for a direct selection or storage of up to 30 Workspaces.

The key **M** switches the active window to Mixer view. The key **X** switches the active window to Matrix view. **Ctrl-M** opens a new Mixer window, **Ctrl-X** opens a new Matrix window. Another Ctrl-M or Ctrl-X closes the new window again.

F1 opens the online help. The Level Meter setup dialog can be opened with **F2** (same as in DIGICheck). The dialog Preferences is opened with **F3**.

Alt-F4 closes the current window.

Alt and **number** keys 1 to 8 (not on the numeric keypad!) will load the corresponding Workspace from the Workspace Quick Select feature (hotkey W).

25.10 Menu Options

Deactivate Screensaver: When active (checked) any activated Windows screensaver will be disabled temporarily.

Always on Top: When active (checked) the TotalMix window will always be on top of the Windows desktop. Note: This function may result in problems with windows containing help text, as the TotalMix window will even be on top of those windows, so the help text isn't readable.

Enable MIDI /OSC Control: Activates external MIDI control of the TotalMix mixer. In Mackie Protocol mode the channels which are currently under MIDI control are indicated by a colour change of the name field.

Submix linked to MIDI / OSC control (1-4). The 8-channel group follows the currently selected submix, means Hardware Output, when a different submix is chosen on the remote as well as when doing this in TotalMix. When using multiple windows it can be useful to deactivate this feature for specific windows. The view will not change then.

Preferences: Opens a dialog box to configure several functions of the level meters and the mixer. See chapter 25.7.

Settings. Opens a dialog box to configure several functions like Talkback, Listenback, Main Out and the MIDI Remote Control. See chapter 25.8.

Channel Layout. Hide channels visually and from remote. See chapter 25.5.3.

ARC & Key Commands. Opens a window to configure the programmable buttons of the Standard, Advanced and Advanced Remote USB, and of the computer's keyboard keys F4 to F8.

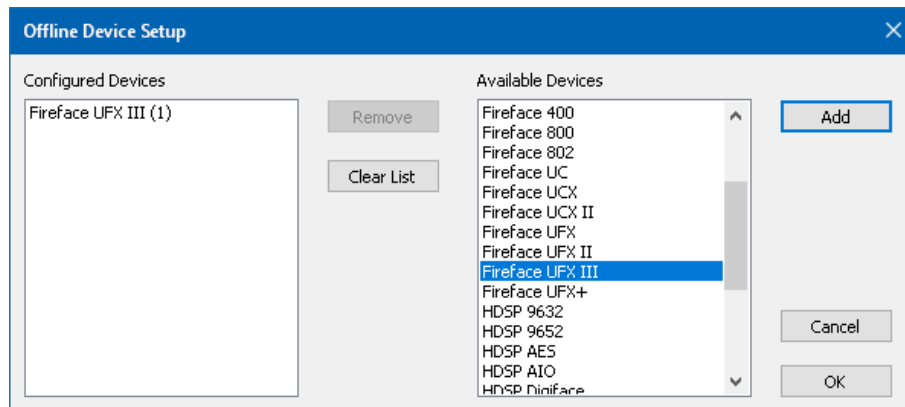
Reset Mix. Offers several options to reset the mixer state:

- **Straight playback with all to Main Out.** All Playback channels are routed 1:1 to the Hardware Outputs. Simultaneously all playbacks are mixed down to the Main Out. The faders in the third row are not changed.
- **Straight Playback.** All Playback channels are routed 1:1 to the Hardware outputs. The faders in the third row are not changed.
- **Clear all submixes.** Deletes all submixes.
- **Clear channel effects.** Switches off all EQs, Low Cuts, Reverb, Echo, Dynamics and Stereo Width and sets their knobs to default position.
- **Clear channel effects w/o Room EQ.** Does not reset Room EQ.
- **Set output volumes.** All third row faders will be set to 0 dB, Main and Speaker B to -10 dB.
- **Reset channel names.** Removes all names assigned by the user.
- **Set all channels mono.** Reconfigures all TotalMix FX channels to mono mode.
- **Set all channels stereo.** Reconfigures all TotalMix FX channels to stereo mode.
- **Set inputs mono / outputs stereo (ADM).** Preferred setup for best ASIO Direct Monitoring compatibility. In most cases mono hardware outputs will break ADM. Mono inputs are in most cases compatible. If not wrong panning might occur.

- **Total Reset.** Playback routing 1:1 with mixdown to Main Out. Switches off all other functions.
- **Total Reset w/o Room EQ.** Does not reset Room EQ.

Operational Mode. Defines TotalMix FX basic operational mode. Choices are *Full Mode* (default, mixer active, all routing options available), and *Digital Audio Workstation Mode* (straight playback routing, no input mix). See chapter 29 for details.

Offline Device Setup. Makes all devices supported by TotalMix FX available offline. This 'demo' mode can load and save workspaces, and thus also allows offline editing and visual inspection of workspaces and snapshots.



Setup: Select the desired devices and add them to the list of Configured Devices by clicking *Add*. Close the dialog by clicking *OK*.

Mixer and Matrix can now be opened even without a connected device. The device selection is done on the top right via the device selection field in the Control Strip.

Note: Offline devices may cause interference due to double assignments. This can be avoided by selecting the option *Disable when device is offline* for each individual offline device in the ARC USB Settings under *Usage of PC connected ARC USB*.

Network Remote Settings. Settings to remote control TotalMix FX by TotalMix Remote via network. See chapter 30.

Store current state into device. The unit can store up to 6 setups (the current state) in its own memory. This function has been developed especially for the stand-alone mode operation, where there are no playback channels. Therefore using it under Windows, Mac or iOS will result in incomplete setups.

25.11 Menu Window

Zoom Options 100%, 135%, 200%. Depending on the size of the monitor and the current resolution TotalMix FX might be much too small and the controls too tiny to easily operate them. Together with the 2 Row mode these options give a lot of different window sizes that suit all monitors and resolutions currently existing.

Hide Control Strip. Shifts the Control Strip out of the visible area to gain more space for other elements.

26. The Matrix

26.1 Overview

The mixer window of TotalMix looks and operates similar to mixing desks, as it is based on a conventional stereo design. The matrix display presents a different method of assigning and routing channels, based on a single channel or monaural design. The matrix view of the MADiface XT has the look and works like a conventional patchbay, adding functionality way beyond comparable hardware and software solutions. While most patchbays will allow you to connect inputs to outputs with just the original level (1:1, or 0 dB, as known from mechanical patchbays), TotalMix allows you to use a freely definable gain value per crosspoint.

Matrix and TotalMix are different ways of displaying the same processes. Because of this both views are always fully synchronized. Each change in one view is immediately reflected in the other view as well.

26.2 Elements of the Matrix View

The visual design of the Matrix is based on the architecture of the MADiface XT system:

- **Horizontal labels.** All hardware outputs
- **Vertical labels.** All hardware inputs. Below are all playback channels.
- **Green 0.0 dB field.** Standard 1:1 routing
- **Dark grey field with number.** Shows the current gain value as dB
- **Blue field.** This routing is muted
- **Red field.** Phase 180° (inverted)
- **Dark grey field.** No routing.

	Out193	Out194	Out195	Out196	Out197
Mic 1/2	0.0	-5.5			
AES L			-18.0		
AES R				-3.0	
1/2					
3/4					

To maintain overview when the window size has been reduced, the labels are floating. They won't leave the visible area when scrolling. They won't leave the visible area when scrolling. A right mouse click on the labels brings up the context menu with the exact same options as in the mixer view: Copy / Mirror / Paste / Clear input channels and submixes.

26.3 Operation

Using the Matrix is a breeze. It is very easy to identify the current crosspoint, because the outer labels light up in orange according to the mouse position.

- If input 1 is to be routed to output 1, use the mouse and click one time on crosspoint **In 1 / Out 1** with held down Ctrl key. Two green 0.0 dB field pop in, another click removes them.
- To change the gain (equals the use of a different fader position, see simultaneous display of the mixer view), drag the mouse up or down, starting from the gain field. The value within the field changes accordingly. The corresponding fader in the mixer view is moving simultaneously, in case the currently modified routing is visible.
- On the right side is the Control Strip from the mixer window, adapted to the Matrix. The button for the temporary fader group is missing as well as all View options, as they don't make sense here. Instead the button *Mono Mode* lets you decide whether all the actions performed in the Matrix are valid for two channels or just one.

The Matrix not always replaces the mixer view, but it significantly enhances the routing capabilities and - more important - is a brilliant way to get a fast overview of all active routings. It shows you in a glance what's going on. And since the Matrix operates monaural, it is very easy to set up specific routings with specific gains.

Further notes on operation

- A double click on a crosspoint toggles between 0.0 dB and mute.
- Holding down Ctrl while clicking on one of the surrounding labels, or a double click on these activates/deactivates mute for all horizontal or vertical crosspoints.
- Holding down Shift while clicking on one of the surrounding labels activates/deactivates Phase for all horizontal or vertical crosspoints.

27. Tips and Tricks

27.1 ASIO Direct Monitoring (Windows)

Programs that support ADM (ASIO Direct Monitoring - Samplitude, Sequoia, Cubase, Nuendo etc.) send control commands to TotalMix. This is directly shown by TotalMix. When a fader is moved in the ASIO host the corresponding fader in TotalMix will move too. TotalMix reflects all ADM gain and pan changes in real-time.

But: the faders only move when the currently activated routing (the selected submix) corresponds to the routing in the ASIO host. The Matrix on the other hand will show any change, as it shows all possible routings in one view.

27.2 Copy a Submix

TotalMix allows you to copy complete submixes to other outputs. In case a complex submix is need with only a few changes on a different output, the whole submix can be copied to that output. Right click with the mouse on the original submix output, means Hardware Output. In the context menu select Copy Submix. Then right click on the new submix output, choose Paste Submix in the context menu. Now fine tune the submix.

27.3 Doubling the Output Signal (Mirror)

If a mix should be sent out via two (or more) different hardware outputs simply mirror that mix to any number of other outputs. A right click on the original output brings up the option to *Copy/Mirror <name>*. Another right click on the new output, then selecting *Mirror of Output <name>* will paste the whole submix and then synchronize it automatically to any future changes. The outputs now always send out the same signals, but their main volume (fader) and the EQ settings stay fully independent.

27.4 Delete a Submix

The easiest and quickest way to delete complex routings is by selection of the according output channel in the mixer view by a right mouse click, and selection of the menu entry *Clear Submix*. As TotalMix FX includes an unlimited undo the delete process can be undone without any problem.

27.5 Copy and Paste everywhere

The above three tips use functions found in the right click context menu available on all channels of the TotalMix FX mixer view. These menus are also available in the Matrix, but only directly on the channel labels. They are self-explanatory and automatically adjust to where the click is performed. The input channels offer *Clear*, *Copy input*, *Paste the input mix* and *Paste its FX*. On a playback channel *Copy*, *Paste* and *Clear the playback mix* are available. On an output channel *Copy* and *Mirror* functionality for the current submix and *copying* of the FX settings is offered.

These options are very advanced and mighty tools to quickly do the impossible. Still there is no need to fear breaking something, as a simple click (or several) on the Undo button will get you back to where you started!

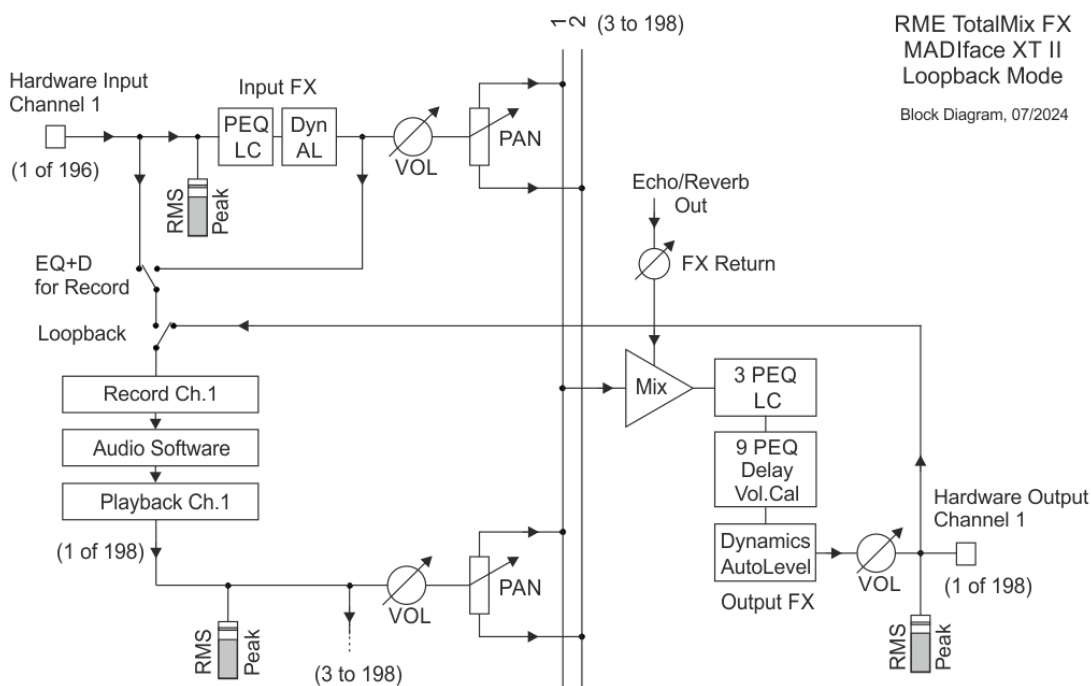
27.6 Recording a Submix - Loopback

TotalMix includes an internal loopback function, from the Hardware Outputs to the recording software. Instead of the signal at the hardware input, the signal at the hardware output is sent to the record software. This way, submixes can be recorded without an external loopback cable. Also the playback from a software can be recorded by another software.

The function is activated by the **Loopback** button in the Settings panel of the Hardware Outputs. In loopback mode, the signal at the hardware input of the corresponding channel is no longer sent to the recording software, but still passed through to TotalMix. Therefore TotalMix can be used to route this input signal to any hardware output. Using the subgroup recording, the input can still be recorded on a different channel.

As each of the 99 stereo hardware outputs can be routed to the record software, and none of these hardware inputs get lost, TotalMix offers an overall flexibility and performance not rivalled by any other solution.

The risk of feedbacks, a basic problem of loopback methods, is low, because the feedback can not happen within the mixer, only when the audio software is switched into monitoring mode.



The block diagram shows how the software's input signal is played back, and fed back from the Hardware Output to the software input.

The block diagram also shows why with activated Loopback the EQ of the Hardware Output is now within the record path. With Loopback active the EQ of the input is not in the record path, only in the monitoring path, even when the Option *EQ+D for Record* is activated.

Note: The phones output has no matching input, therefore does not support Loopback.

Recording a Software's playback

In real world application, recording a software's output with another software will show the following problem: The record software tries to open the same playback channel as the playback software (already active), or the playback one has already opened the input channel which should be used by the record software.

This problem can easily be solved. First make sure that all rules for proper multi-client operation are met (not using the same record/playback channels in both programs). Then route the playback signal via TotalMix to a hardware output in the range of the record software, and activate Loopback for recording.

Mixing several input signals into one record channel

In some cases it is useful to record several sources into only one track. For example when using two microphones recording instruments and loudspeakers, TotalMix' Loopback mode saves an external mixing desk. Simply route/mix the input signals to the same output (third row), then re-define this output into a record channel via Loopback. This way any number of input channels from different sources can be recorded into one single track.

27.7 MS Processing

The mid/side principle is a special positioning technique for microphones, which results in a mid signal on one channel and a side signal on the other channel. These information can be transformed back into a stereo signal quite easily. The process sends the monaural mid channel to left and right, the side channel too, but phase inverted (180°) to the right channel. For a better understanding: the mid channel represents the function $L+R$, while the side channel represents $L-R$.

RME TotalMix FX: MADiface

File Function Options Width

		Out193	Out194	Out195	
Mic 1/2		-6.1	-11.6		
		-6.1	-11.6		
AES					

During record the monitoring needs to be done in 'conventional' stereo. Therefore TotalMix also offers the functionality of a M/S-decoder. Activation is done in the Settings panel of the Hardware Input and Software Playback channels via the **MS Proc** button.

The M/S-Processing automatically operates as M/S encoder or decoder, depending on the source signal format. When processing a usual stereo signal, all monaural information will be shifted into the left channel, all stereo information into the right channel. Thus the stereo signal is M/S encoded. This yields some interesting insights into the mono/stereo contents of modern music productions. Additionally some very interesting methods of manipulating the stereo base and generating stereo effects come up, as it is then very easy to process the side channel with Low Cut, Expander, Compressor or Delay.

The most basic application is the manipulation of the stereo width: a change of the level of the side channel allows to manipulate the stereo width from mono to stereo up to extended.

27.8 Program start options (Windows only)

Under Windows TotalMix FX supports command line options. Appending the file name of a workspace loads it. Example: *TotalMixFX.exe path\startworkspace.tmws*. For automated loading, the parameter */nc* can be used to suppress the confirmation dialog of loading the workspace.

28. MIDI Remote Control

28.1 Overview

TotalMix can be remote controlled via MIDI. It is compatible to the widely spread Mackie Control protocol, so TotalMix can be controlled with all hardware controllers supporting this standard. Examples are the Mackie Control, Tascam US-2400 or Behringer BCF 2000.

Additionally, the stereo output faders (lowest row) which are set up as *Main Out* in the Control Room section can also be controlled by the standard **Control Change Volume** via **MIDI channel 1**. With this, the main volume of the MADiface XT is controllable from nearly any MIDI equipped hardware device.

MIDI remote control always operates in View *Submix* mode, even when the View Option *Free* is currently selected in TotalMix FX.

28.2 Mapping

TotalMix supports the following Mackie Control surface elements*:

Element:	Meaning in TotalMix:
Channel faders 1 – 8	volume
Master fader	Main Out channel fader
V-Pots 1 – 8	pan
pressing V-Pot knobs	pan = center
CHANNEL LEFT or REWIND	move one channel left
CHANNEL RIGHT or FAST FORWARD	move one channel right
BANK LEFT or ARROW LEFT	move eight channels left
BANK RIGHT or ARROW RIGHT	move eight channels right
ARROW UP or Assignable1/PAGE+	move one row up
ARROW DOWN or Assignable2/PAGE-	move one row down
EQ	Master Mute
PLUGINS/INSERT	Master Solo
STOP	Dim Main Out
PLAY	Talkback
PAN	Mono Main Out
FLIP	Speaker B
DYN/INSTRUMENT	TrimGains
MUTE Ch. 1 – 8	Mute
SOLO Ch. 1 – 8	Solo
SELECT Ch. 1 – 8	Select
REC Ch. 1 – 8	select output bus (Submix)
RECORD	Recall
F1 - F8	load Snapshot 1 - 8
F9	select Main Out
F10 - F12	select Cue Phones 1 - 3

*Tested with Behringer BCF2000 Firmware v1.07 in Mackie Control emulation for Steinberg mode and with Mackie Control under Mac OS X.

28.3 Setup

Open the Settings dialog (menu Options or F3). On the MIDI tab select the MIDI Input and MIDI Output port where your controller is connected to.

When no feedback is needed select NONE as MIDI Output.

Check *Enable MIDI Control* in the Options menu.

28.4 Operation

The channels being under Mackie MIDI control are indicated by a colour change of the name field, black turns to brown.

The 8-fader block can be moved horizontally and vertically, in steps of one or eight channels.

Faders can be selected to gang them.

In Submix View mode, the current routing destination (output bus) can be selected via REC Ch. 1 – 8. This equals the selection of a different output channel in the lowest row by a mouse click when in Submix View. In MIDI operation it is not necessary to jump to the lowest row to perform this selection. This way even the routing can be easily changed via MIDI.

Full LC Display Support: This option in Preferences (F3) activates complete Mackie Control LCD support with eight channel names and eight volume/pan values. When *Full LC Display Support* is turned off, only a brief information about the first fader of the block (channel and row) is sent. This brief information is also available on the LED display of the Behringer BCF2000.

Disable MIDI in Background (menu Options, Settings) disables the MIDI control as soon as another application is in the focus, or in case TotalMix has been minimized. This way the hardware controller will control the main DAW application only, except when TotalMix is in the foreground. Often the DAW application can be set to become inactive in background too, so that MIDI control is switched between TotalMix and the application automatically when switching between both applications.

TotalMix also supports the 9th fader of the Mackie Control. This fader (labelled Master) will control the stereo output faders (lowest row) which are set up as *Main Out* in the Control Room section.

Extender support (Settings, tab MIDI) enables the use of the special Extender mixing desk, but also the addition of any other Mackie compatible remote. Setting the main remote as number 2 and the extender as number 1 will cause the extender to be on the left side. Using this function the remotes will be shown as one fader block and navigate as one.

28.5 MIDI Control

The hardware output which is set up as *Main Out* can be controlled by the standard **Control Change Volume** via **MIDI channel 1**. With this, the main volume of the MADiface XT is controllable from nearly any MIDI equipped hardware device.

Even if you don't want to control all faders and pans, some buttons are highly desired to be available in 'hardware'. These are mainly the *Talkback* and the *Dim* button, and the monitoring options (listen to Phones submixes). Fortunately a Mackie Control compatible controller is not required to control these buttons, as they are steered by simple Note On/Off commands on MIDI channel 1.

The notes are (hex / decimal / keys):

Dim: 5D / 93 / **A 6**

Mono: 2A / 42 / **#F 2**

Talkback: 5E / 94 / **#A 6**

Recall: 5F / 95 / **B 6**

Speaker B: 32 / 50 / **D3**

Cue Main Out: 3E / 62 / **D 4**

Cue Phones 1: 3F / 63 / **#D 4**

Cue Phones 2: 40 / 64 / **E 4**

Cue Phones 3: 41 / 65 / **F 4**

Cue Phones 4: 42 / 66 / **#F 4**

Snapshot 1: 36 / 54 / **#F 3**

Snapshot 2: 37 / 55 / **G 3**

Snapshot 3: 38 / 56 / **#G 3**

Snapshot 4: 39 / 57 / **A 3**

Snapshot 5: 3A / 58 / **#A 3**

Snapshot 6: 3B / 59 / **B 3**

Snapshot 7: 3C / 60 / **C 4**

Snapshot 8: 3D / 61 / **#C 4**

Trim Gains: 2D / 45 / **A 2**

Master Mute: 2C / 44 / **#G 2**

Master Solo: 2B / 43 / **G 2**

Note: The hex value is standardized, the key is not. If it doesn't work try all notes one octave lower.

Note: Switching off Mackie Protocol support in *Settings / Mackie Control Options* will also disable the above simple MIDI note commands, as they are part of the Mackie protocol.

Furthermore all faders of all three rows can be controlled via simple **Control Change** commands. The format for the Control Change commands is:

Bx yy zz

x = MIDI channel

yy = control number

zz = value

The first row in TotalMix is addressed by MIDI channels 1 up to 4, the middle row by channels 5 up to 8 and the bottom row by channels 9 up to 12.

16 Controller numbers are used: 102 up to 117 (= hex 66 to 75). With these 16 Controllers (= faders) and 4 MIDI channels each per row, up to 64 faders can be controlled per row.

Examples for sending MIDI strings:

- Set input 1 to 0 dB: B0 66 68
- Set input 17 to maximum attenuation: B1 66 0
- Set playback 1 to maximum: B4 66 7F
- Set Output 16 to 0 dB: B8 75 68

Note: Sending MIDI strings requires to use programmer's logic for the MIDI channel, starting with 0 for channel 1 and ending with 15 for channel 16.

Further functions:

- Trim Gains On: BC 66 xx (BC = MIDI channel 13, xx = any value)
- Trim Gains Off: BC 66 xx or select a submix

Select submix (fader) in third row:

- channel 1/2: BC 68/69 xx
 - channel 3/4: BC 6A/6B xx
- etc.

Input Gain control is available via CC9, value range as the gain itself (up to 60). The MIDI channel determines the controlled channel, from 1 to 16 (XT: only 1/2). For this to work, *Enable MIDI Control* in the Options menu has to be activated.

The **Reverb** and **Echo User Presets** can be changed via MIDI CC: B2 0C nn for Reverb preset 1 to 16, B3 0C nn for Echo preset 1 to 16

28.6 Stand-Alone MIDI Control

When not connected to a computer, the MADiface XT II can be controlled directly via MIDI. The **stand-alone MIDI control mode** is activated in the unit's menu *Options - Hardware/Diagnosis, Standalone MIDI*.

Note: When not needed the stand-alone MIDI operation should not be active, as the unit will react on MIDI notes after power-on, and will also send MIDI notes.

Control is performed via both the **Mackie Control protocol** and some **standard** MIDI functions (see below). In stand-alone mode not all functions known from TotalMix are available, because some of them aren't hardware, but software routines. Functions like *Talkback*, *Mono*, *Solo*, *relative* ganging of the faders, *Monitor Main* and *Monitor Phones* are realized by complex software code, therefore not available in stand-alone MIDI control operation.

Still many functions, and especially the most important functions to control the MADiface XT II, are implemented in hardware, thus available also in stand-alone mode:

- All faders and pans of the first and third row
- Mute of the input signal per channel
- Ganging via 'Select'
- Choice of the routing destination, i.e. the current submix
- Sending of LED and display data to the MIDI controller

The second row (software playback) is skipped. The MADiface XT II sends display data as brief information, enabling an easy navigation through lines and rows. Other data like PAN and miscellaneous status LEDs are supported as well.

In stand-alone mode the unit always operates in **View Submix** mode. Only this way the routing destination can be changed, and several mixdowns/submixes can be set up quickly and easily. If the current TotalMix setup is transferred into the Fireface via 'Flash current mixer state', the currently selected submix output is also pre-configured in the hardware for stand-alone MIDI remote operation.

Mackie Control Protocol

The stand-alone operation supports the following Mackie Control surface elements*:

*Tested with Behringer BCF2000 Firmware v1.07 in Mackie Control emulation for Steinberg mode.

Element:	Meaning in Fireface:
Channel faders 1 – 8	volume
V-Pots 1 – 8	pan
pressing V-Pot knobs	pan = center
CHANNEL LEFT or REWIND	move one channel left
CHANNEL RIGHT or FAST FORWARD	move one channel right
BANK LEFT or ARROW LEFT	move eight channels left
BANK RIGHT or ARROW RIGHT	move eight channels right
ARROW UP or Assignable1/PAGE+	move one row up
ARROW DOWN or Assignable2/PAGE-	move one row down
STOP	Dim Main Out
EQ	Master Mute
MUTE Ch. 1 – 8	Mute
SELECT Ch. 1 – 8	Select
REC Ch. 1 – 8	select output bus (current submix)
F1 – F6	load Setup 1 - 6

Additionally the following functions are available via simple MIDI notes on MIDI channel 1:

Dim: 5D / 93 / **A 6**

Setup 1: 36 / 54 / **#F 3**

Setup 2: 37 / 55 / **G 3**

Setup 3: 38 / 56 / **#G 3**

Setup 4: 39 / 57 / **A 3**

Setup 5: 3A / 58 / **#A 3**

Setup 6: 3B / 59 / **B 3**

Loading the Setups stored in the device enables a quick configuration change of the MADIface XT. With this any possible operation state can be activated by the push of a button at any time.

28.7 Loopback Detection

The Mackie Control protocol requires feedback of the received commands, back to the hardware controller. So usually TotalMix will be set up with both a MIDI input and MIDI output. Unfortunately any small error in wiring and setup will cause a MIDI feedback loop here, which then completely blocks the computer (the CPU).

To prevent the computer from freezing, TotalMix sends a special MIDI note every 0.5 seconds to its MIDI output. As soon as it detects this special note at the input, the MIDI functionality is disabled. After fixing the loopback, check *Enable MIDI Control* under Options to reactivate the TotalMix MIDI.

28.8 OSC (Open Sound Control)

Besides simple MIDI notes, the Mackie Protocol and Control Change commands, TotalMix FX can also be controlled by the Open Sound Control, OSC. For details on setup and usage see chapter 25.8.3.

An OSC implementation chart can be downloaded from the RME website:

http://www.rme-audio.de/downloads/osc_table_totalmix_new.zip

RME offers a free iPad template for the iOS app TouchOSC (by Hexler, available in the Apple App-Store):

http://www.rme-audio.de/downloads/tosc_tm_ipad_template.zip

The RME forum hosts further information, more templates (iPhone...) and lots of useful user feedback.

29. DAW Mode

Users that work exclusively with their DAW software, and don't want to use TotalMix FX for additional routing tasks, need a way to be sure that TotalMix FX currently doesn't change the DAW's routing. While *Reset Mix* can do so, those users would be better served with a very simple surface that offers the interface's hardware controls (gain, phantom control, instrument...), but guarantees a straight 1:1 routing for all playback channels, and has no hardware monitoring of the input channels (which is then done by the DAW software).

For such cases TotalMix FX includes an alternative operating mode. It can be booted into the so called *DAW mode*. This simplified interface is for anyone performing all monitoring and routing within the DAW. The DAW mode restarts TM FX into a light version with just two rows, no playback row, and no mixing faders in the input row. Routing is 1:1 only. Just the hardware controls (if existing) and hardware output levels are available.

To change the current mode go to the menu, Options, and click on *Operational Mode*. Choices are *Full Mode* (default, mixer active, all routing options available), and *Digital Audio Workstation Mode* (straight playback routing, no input mix).

Several useful, advanced features are still available in TotalMix FX in DAW mode:

- Talkback, External Input
- Phones definition and handling with Talkback
- Speaker A / B
- All FX (EQ, Dynamics, Echo, Reverb)
- Mute and Solo
- Cue / PFL

30. TotalMix Remote

TotalMix Remote is a remote control for TotalMix FX v1.50 and up, to control the hardware mixer and effects in RME audio interfaces. TotalMix Remote mirrors the current state of the host system on the iPad and Windows/Mac computers - the entire mixing state, the complete routing, all FX settings, up to the level meters, and everything in real-time. TotalMix Remote supports up to three hosts with multiple interfaces each, allowing Apple's popular iPad and Windows/Mac computers to adjust all the mixer and FX settings from a distance, via Ethernet and WiFi.

Supported Hardware

TotalMix Remote communicates with TotalMix FX 1.50 or up. Any RME hardware that can be used with TotalMix FX is supported automatically.

Quick Start

On the host (the computer with the connected audio interface) go to the TotalMix FX menu *Options, Network Remote Settings*. Click *Enable TotalMix Remote Server* to start this service. Under Windows a Firewall warning will come up. Allow TotalMix FX or it won't work. This dialog also shows the host's IP, like 192.168.1.45.

Make sure both host and remote computer / iPad reside in the same network. Start TotalMix Remote on the remote computer / iPad (not on the host!). On the iPad, tap on the gear symbol in the upper right corner, then on *Host Connection Settings*. On Windows / Mac either the dialog comes up automatically or can be called from the *Search Connected Hosts* dialog. Type in the **host's** IP address (like 192.168.1.45) into the IP field of *Host Connection 1*, and make sure it is activated. The port defaults to 7009 and usually must not be changed. In case this port is unexpectedly occupied a warning message will be issued. Choose a different port then. Under Windows a Firewall warning will come up. Allow TotalMix Remote or it won't work.

Network Remote Settings

TotalMix Remote Server

☒ Enable TotalMix Remote Server

IP: 192.168.1.45

Host Name: XPS15

Port (in/out): 7009

☒ Enable User Management

Fireface UCX (1)

Name	Password	Rights	Submix
Angus Admin	*****	Edit Submix Do All	PH 7/8
Phil Malcolm	*****	Edit Submix Edit Submix	AN 5/6 AN 3/4
Brian		View only	

Buttons: Add, Edit, Delete

Tap Done on top or click Ok. In the mixer view the state should change from *offline* to *connected* within a few seconds.

The Add button provides access to the user-management that can be configured in detail. Here users can be defined, with and without a password, and the rights can be assigned to viewing only, changing a specific sub-mix, or full access. For example, using TotalMix FX as a monitor controller for all band members, user-management prevents the bassist from changing the guitarist's monitor mix. Or the drummer making himself too loud. Etc.

Edit Network Remote User Setting

User Name: Stage Monitor (at least 4 characters)

Password (leave empty for none): ***** (repeat) different!

☐ View

Rights: Do All, View, Edit Submix (selected)

Fireface UCX (1) SPDIF

Buttons: OK, Cancel

Tip

The remotes have the option *Sync Channel Layouts* active as default (in Preferences). This option transfers the Layout Presets and the current Channel Layout state from host to remote. Apart from the channel width state this option makes a mirror-style setup most easy. But when using the remote as individual setup, make sure to disable this option to have independent Layout Presets on the remote.

Limitations

- Mixer View & GUI. When connected the remote computer / iPad will immediately have the complete routing and FX settings of the host, including mono and stereo channels, but not the host's GUI setup, like panel states open/closed of Settings/EQ/Dynamic, FX panel visibility, 2-Row or 3-Row mode and channel width. Channel width states can be stored as usual per Snapshot and completely as Workspace, locally on the remote computer. They need to be loaded manually after loading a Workspace on the host in case a 100% identical view is required.
- Workspaces. The Remote shows the Quick Workspaces (hotkey W on Windows/Mac) stored on the host, and allows to remotely load them. It is not possible to save complete Workspaces with mixer state from the Remote, or on the Remote. The Workspaces saved locally include GUI information only (Channel state wide/narrow, Channel Layouts, window size and position) and further local settings, to be able to have personalized views on the remote computer, independent from the view on the host.
- Real-time behaviour. Can suffer when the network is overloaded or the WiFi reception is insufficient. Level Meters will stutter then and faders do not move smoothly.
- Background operation on iPad - is not possible. This should not be a problem as the Remote doesn't need to do anything in background, and when called up very quickly reconnects and synchronizes its state.
- State. Is shown in the upper right corner (offline or connected), or the Mac/Windows title bar.

Downloads

Remote Windows

http://www.rme-audio.de/download/tmfx_win_remote.zip

Remote Mac

http://www.rme-audio.de/download/tmfx_mac_remote.zip

iPad

From the Apple App Store, search for 'TotalMix Remote'. This app is free.

User's Guide



MADIface XT II

▶ Class Compliant Mode

31. General

The MADiface XT II operates in three different modes: **driver-based USB2/3**, **stand-alone** mode, and **Class Compliant** mode. The latter describes a standard that is natively supported by operating systems like Windows, Mac OS X and Linux. No proprietary drivers are required, the device will be directly recognized when the CC firmware is loaded. The natively available features will be limited in comparison to those provided by the RME driver for the MADiface XT II. For example there will be no hardware settings, no (Total) Mix and no settings for the effects.

The Class Compliant mode can be activated and deactivated directly at the unit, as long as it is not connected via USB: SETUP/REV, Options, Hardware/Diagnosis, Interface Mode, CC.

Neither Windows nor Mac Class Compliant support is relevant, though, since there are dedicated and matured drivers for both OS X and Windows, which provide ALL the device's features at lowest latencies. The main reason for implementing Class Compliant mode was to enable a driverless usage under Linux, and to provide an exceptional hardware frontend to the Apple iPad®.

The MADiface XT II provides the iPad with the professional analog I/O connections it lacks. Superb microphone preamps with EQ, dynamics, even with the AutoSet feature, in addition to professional balanced line outputs, and hi-power headphone outputs which also excel with high impedance phones. Plus level and gain adjustments, AES and MADI I/O, reverb, echo, zero latency monitoring, digitally via USB, without any limitation in quality, at up to 96 kHz and 24 bit. And of course a Sysex-capable double MIDI I/O.

The MADiface XT II not only supports USB 2 Class Compliant, but also USB 3.0, for example when connected to an iPad Pro via USB-C. In principle, all 196 input and 198 output channels are then available. However, most apps currently do not support more than 24 channels.

32. System requirements

- MADiface XT II in Class Compliant mode
- Any Apple iPad with at least iOS 6
- iPhone with iOS 7 or up
- Apple iPad Camera Connection Kit or Lightning to USB adapter
- iPad Pro: USB-B to USB-C cable, USB 2 or USB 3 version

33. Operation

In factory default setting *Interface Mode – Auto* the MADiface XT II will not automatically switch to CC mode as soon as an iPad is connected. Instead it switches to mode USB 2, and the iPad shows a warning of an unsupported device. The CC mode always has to be activated manually!

Activation of the Class Compliant mode

Remove USB cable from the MADiface XT II. Press SETUP/REV. Turn encoder 1 until *Options* appears in the display. Turn encoder 2 until *Hardware/Diagnosis* appears. Push encoder 2 several times to select the entry *Interface Mode*. Turn encoder 2 to switch to CC mode. The MADiface XT II reboots, all LEDs light up, after which it will be in Class Compliant mode.

The option *CC Routing* offers various routings of the playback signals. See chapter 36.

Connect the USB cable to the MADiface XT II and the Lightning to USB adapter. Start the iPad and plug-in the adapter. If everything works as expected, the unit will enter CC host mode, indicated by the CC notification in the USB field of the display. Audio playback will automatically be performed by the MADiface XT II, using MADI channels 1/2. If the CC routing *Aux All 1/2* is activated, also on the analog outputs 1/2 and the headphone output.

Apps that support MIDI and are ready for Core MIDI will offer dialogs to select the desired MADiface XT MIDI inputs and outputs.

33.1 Useful hints

If the unit is not in CC mode, the iPad will detect an incompatible USB device, and display a message saying “Cannot Use Device – The connected USB device is not supported”.



No sound: Incorrect output gain settings or wrong routing, see chapter 36. Note that the iPhone/iPad volume control is inactive during USB operation.

If the unit does not enter Host mode: Remove and reconnect the Connection Kit.

Since 2016 Apple offers another version of the *USB to Lightning Adapter*, called *Lightning to USB 3 Camera Adapter*. It has an additional Lightning port for power supply that charges the iPhone/iPad even when used with the MADiface XT II.

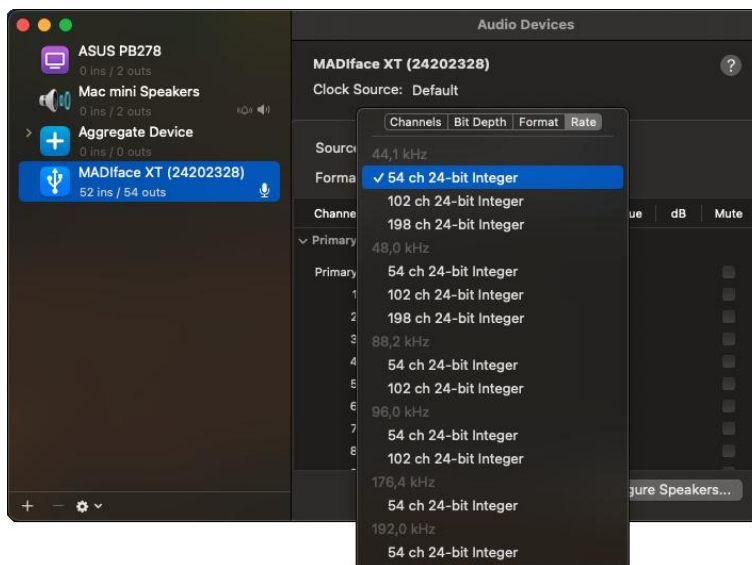
The iPad Pro with its USB-C socket operates as regular USB host. Therefore, no adapter is needed, only a matching cable (USB-C to USB-B). Powered USB hubs can be used as well.

33.2 Class Compliant Mode under Windows and macOS

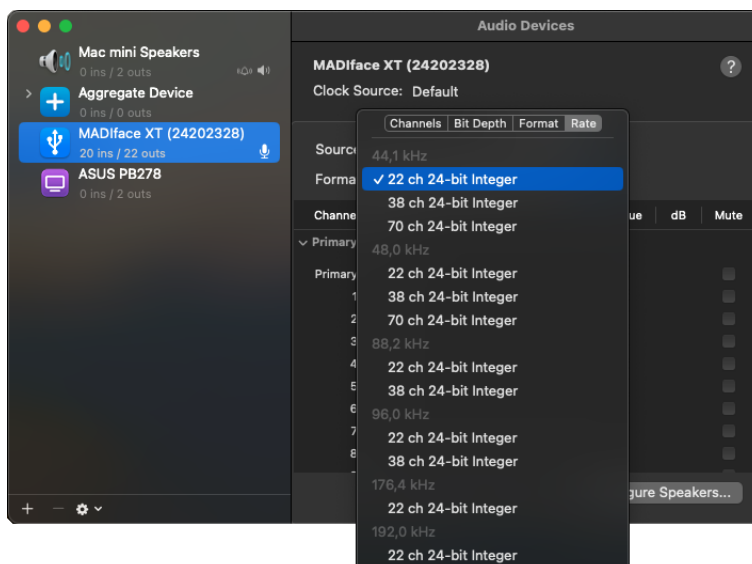
The USB 2 Class Compliant mode of the MADiface XT II (70 channels playback) is currently not fully compatible to Windows 11. The USB 3 Class Compliant mode of the MADiface XT is currently not supported by Windows at all.

macOS can be used in Class Compliant mode, although without Settings dialog and TotalMix FX it makes not much sense to do so. At least one can use the *Audio MIDI Setup* to check the available CC modes.

With USB 3 the Audio window in the Audio MIDI Setup lists three available modes: 54, 102 and 198 channels, with the respective sample rates (picture to the right).



The picture to the right shows the available modes with USB 2: 22, 38 and 70 channels, with the respective sample rates.



iOS/iPadOS

These modes also exist when connecting an iPad, but cannot be freely used and assigned by iOS and iPadOS. It is up to the application alone whether certain sample rates and channel numbers are available. Most iPad DAWs are limited to 24 channels, which are also available at 96 kHz in *Cubasis* with USB 3, and 22 channels with USB 2 (see pic above). Stereo players like *Neutron* use all sample rates of the MADiface XT II, and even recognize its 198 channels with USB 3.0. A mixed playlist with music from 44.1 kHz to 192 kHz is played by *Neutron* with the original sample rates on channels 1/2 without any problems.

34. Supported Inputs and Outputs

With macOS any of the available modes will work, depending on the choice in the Audio MIDI Setup.

When connected to an iPad, the analog mic/line input 1 works with mono apps, inputs 1 and 2 with stereo apps (both dual mono and stereo), and up to 8 inputs with 8-channel applications like *MultiTrack DAW* and *Music Studio*. *Garage Band* supports all inputs, but only two at a time. *Auria* and *Cubasis* can record 24 inputs simultaneously.

Playback will use the rear-side analog outputs 1 and 2, or even more channels if the app supports such operation. The MADiface XT II can optionally copy the playback channels MAD1 1/2 to the analog outputs and AES, for easier monitoring (CC routing *Aux all 1/2*). The current routing can easily be checked and verified with the level meter display. All outputs can be processed independently (volume, EQ, dynamics, FX return).

The MADiface XT II (and with it the iPad) will be synchronized to an external digital sample rate if there is a valid digital input signal. With a wrong sample rate heavy audio noise will occur. Without an AES or MAD1 input signal the MADiface XT II enters master mode and uses the sample rate set by Mac OS X or iOS (the app in use).

While the MIDI I/Os will send and receive Sysex messages, not all apps are ready to do this. The app *Midi Tool Box* can be used to verify the XT's Sysex function.

35. Front panel operation

The front panel operation is identical to the one under Windows and OS X, or standalone operation. The display therefore gives the usual easy access to all features and offers a quick editing of: input gains, playback levels, routing and monitoring, echo, reverb, EQ, dynamics, sample rate, status of the outputs (AES, MAD1), and much more.

36. Audio Routing and Processing

In Class Compliant mode, the MADiface XT II features operation very similar to normal operation with TotalMix FX, with two major differences:

- There is no second TotalMix row (no software playback channels), hence no individual routing or mixing of playback channels*. These will always be connected either straight to the physical outputs (CC-Routing Straight), or have an additional signal copy from MAD1 1/2 to Analog, AES and Phones (CC-Routing Aux all 1/2), making the headphone outputs work.

Both modes can be activated at any time and do not influence the mixer state loaded via the Setups, as they only influence the playback routing. The current routing can easily be checked and verified with the level meter display.

- The input effects EQ/Dyn will always be active in the recording path

The MADiface XT II can be pre-configured for CC mode via TotalMix FX under Windows/Mac by saving up to 6 configurations into its setup memory, see next chapter.

The input signal will pass through all activated functions of the TM FX input channel, namely settings, EQ, and Dynamics, and is then sent to the iPhone/iPad. Like under Windows and Mac, the input fader setting controls direct monitoring to the specified outputs. The FX send control for echo/reverb is also active.

! As in normal TotalMix FX use, the options Stereo Width, MS Proc and Phase L/R are NOT within the recording path, but in the monitor path. This is technically determined and can not be changed.

The iPad output signal passes through all activated functions of the TM FX hardware outputs, namely settings, EQ, and dynamics. The third row's fader sets the output level.

! Control Room Section settings are inactive. Configuring the Phones output is done by output Phones only!

Both modes can be activated at any time and do not influence the mixer state loaded via the Setups, as they only influence the playback routing. The current routing can easily be checked and verified with the level meter display.

Optional CC routing modes (*SETUP/REV – Options - Hardware/Diagnosis*) ease the use in Class Compliant mode without TotalMix FX:

Straight: All USB playback channels are routed 1:1 to the corresponding hardware outputs.

Aux mirror: The Aux channels Analog 1/2 (193/194), AES (195/196) and Phones (197/198) output the signal of the MADI channels 1-6.

Aux all 1/2: MADI playback channels 1/2 are also played out on all Aux channels. This makes it possible to use the AES, XLR line and headphone outputs even with a simple 2-channel playback on the first two channels.

37. Setups

TotalMix FX can transfer all current settings to the device (Options/Store Current State into Device). There are six memory slots (Setups) available. An example:

- Inputs with no processing, gain set to +30 dB and phantom power active. Outputs without processing, faders for 1/2 set to 0 dB, 9/10 at – 20 dB, clock mode master, saved in Setup 1.
- Inputs with Compressor, Factory Preset Mix Limiter (digital overload protection), gain set to +30 dB, no phantom power, outputs 1/2 with EQ (factory preset Modern Bass Treble), outputs 9/10 with EQ (factory preset Cheap Phones Compensation), faders for 1/2 at 0 dB, 9/10 at -20dB, clock mode AutoSync, saved in Setup 2.

Via the menu *SETUP/REV*, Setups, one can switch between setups 1 and 2 at any time, alternating between entirely different configurations. Further examples would be activating reverb/echo, or temporary monitoring of the input signal. Very comfortable is the use of the Advanced Remote USB, as its buttons can load the Setups 1 to 6 directly

User's Guide



MADIface XT II

► Technical Reference

38. Technical Specifications

38.1 Analog

AD, Microphone/Line 1-2

- Input: XLR, electronically balanced
- Input impedance @ 1 kHz: 3.3 kOhm
- Signal to Noise ratio (SNR): 116 dB (AES17), 118.5 dBA
- Frequency response @ 44.1 kHz, -0.1 dB: 5 Hz – 20.8 kHz
- Frequency response @ 96 kHz, -0.5 dB: 3 Hz – 45.2 kHz
- Frequency response @ 192 kHz, -1 dB: 2 Hz - 89 kHz
- Filter: Short Delay Sharp, 5 / 5 / 6 samples delay
- THD: < -110 dB, < 0.00032 %
- THD+N: < -104 dB, < 0.00063 %
- Channel separation: > 110 dB
- Gain range: 75 dB
- Maximum input level, Gain 0 dB: +18 dBu
- Maximum input level, Gain 75 dB: -57 dBu
- CLIP LED: 0 dBFS
- SIG LED: -60 dBFS

AD, TRS

As Microphone/Line 1-2, but:

- Input: 6.3 mm TRS jack, balanced
- Input impedance: 6.6 kOhm balanced, 3.3 kOhm unbalanced
- Maximum input level TRS, Gain 0 dB: +24 dBu
- Maximum input level TRS, Gain 60 dB: -51 dBu

DA, Line Out 1-2

- Dynamic range (DR): 113.5 dB (AES17), 116 dBA
- Frequency response @ 44.1 kHz, -0.1 dB: 0 Hz – 20.2 kHz
- Frequency response @ 96 kHz, -0.5 dB: 0 Hz – 44.7 kHz
- Frequency response @ 192 kHz, -1 dB: 0 Hz – 78 kHz kHz
- Filter: Short Delay Sharp, 6 samples delay
- THD+N @ -1 dBFS: -105 dB, 0.0005 %
- Channel separation: > 110 dB
- Output: XLR balanced
- Output level switchable +24 dBu, +19 dBu, +13 dBu, +4 dBu
- Output impedance: 150 Ohm

DA, Phones 3/4

As DA Line Out, but:

- Output: 6.3 mm TRS jack, unbalanced
- Maximum output level @i 0 dBFS, High: +19 dBu
- Maximum output level @i 0 dBFS, Low: +4 dBu
- Output impedance: 1 Ohm
- Max output level per channel, 32 Ohm load, 0.1% THD: 210 mW (2.6 Vrms, +10,5 dBu)

38.2 Digital Inputs

MADI

- Coaxial via BNC, 75 Ohm, according to AES10-1991
- High-sensitivity input stage ($< 0.2 \text{ Vpp}$)
- Optical via FDDI duplex SC connector
- 62.5/125 and 50/125 compatible
- Accepts 56 channel and 64 channel mode, plus 96k Frame
- Standard: up to 64 channels 24 bit 48 kHz
- S/MUX: up to 32 channels 24 bit 96 kHz
- S/MUX4: up to 16 channels 24 bit 192 kHz
- Lock range: 25 kHz – 54 kHz
- Jitter suppression: $> 50 \text{ dB}$ ($> 315 \text{ Hz}$)

AES/EBU

- 1 x XLR, transformer-balanced, galvanically isolated, according to AES3-1992
- High-sensitivity input stage ($< 0.35 \text{ Vpp}$)
- SPDIF compatible (IEC 60958)
- Accepts Consumer and Professional format
- Lock range: 27 kHz – 200 kHz
- Jitter suppression: $> 50 \text{ dB}$ ($> 315 \text{ Hz}$)

Word Clock

- BNC, not terminated (4 kOhm)
- Switchable internal termination 75 Ohm
- Automatic Double/Quad Speed detection and conversion to Single Speed
- SteadyClock guarantees super low jitter synchronization even in varispeed operation
- Not effected by DC-offsets within the network
- Signal Adaptation Circuit: signal refresh through auto-center and hysteresis
- Overvoltage protection
- Level range: $1.2 \text{ Vss} - 5.6 \text{ Vpp}$
- Lock range: 28 kHz – 200 kHz
- Jitter suppression: $> 50 \text{ dB}$ ($> 315 \text{ Hz}$)

38.3 Digital Outputs

MADI

- Coaxial via BNC, 75 Ohm, according to AES10-1991
- Output voltage 450 mVpp
- Cable length: up to 100 m
- Optical via FDDI duplex SC connector
- 62.5/125 and 50/125 compatible
- Cable length: up to 2000 m
- Generates 56 channel and 64 channel mode, plus 96k Frame
- Standard: up to 64 channels 24 bit 48 kHz
- S/MUX / 96k Frame: up to 32 channels 24 bit 96 kHz
- S/MUX4: up to 16 channels 24 bit 192 kHz

AES/EBU

- XLR, transformer-balanced, galvanically isolated, according to AES3-1992
- Output level Professional 4.0 Vpp
- Format Professional according to AES3-1992 Amendment 4
- Output level Consumer 2.0 Vpp
- Format Consumer (SPDIF) according to IEC 60958
- Single Wire mode, sample rate 28 kHz up to 200 kHz

Word Clock

- BNC
- Max. output voltage: 5 Vpp
- Output voltage @ 75 Ohm termination: 4.0 Vpp
- Output impedance: 22 Ohm
- Frequency range: 28 kHz – 200 kHz

38.4 Digital

- Clocks: Internal, MADI In, Word Clock In, AES In
- Jitter suppression of external clocks: > 50 dB (> 315 Hz)
- Effective clock jitter influence on AD and DA conversion: near zero
- Input PLL ensures zero dropout, even at more than 100 ns jitter
- Supported sample rates: 28 kHz up to 200 kHz

38.5 MIDI

- 1 x MIDI I/O via breakout cable
- 3 x MIDI I/O via MADI
- Separate 128 byte FIFO for input and output
- MIDI state machine in hardware for reduced interrupt request load
- Invisible transmission via User bit of channel 56 (up to 48 kHz)
- Invisible transmission via User bit of channel 28 (up to 96 kHz)

38.6 General

- Power supply: external power supply
- Typical power consumption: 9 Watts
- Current at 12 Volt operating voltage, idle: 750 mA (9 Watts)
- Dimensions incl. rack ears, full depth (WxHxD): 265 x 44 x 159 mm (10.5" x 1.73" x 6.26")
- Dimensions without rack ears, body depth (WxHxD): 215 x 44 x 130 mm (8.5" x 1.73" x 5.1")
- Weight: 1.03 kg (2.2 lbs)
- Temperature range: +5° up to +50° Celsius (41° F up to 122°F)
- Relative humidity: < 75%, non condensing
- Included power supply: Internal switching PSU, 100 - 240 V AC, 2 A, 24 Watts

39. Technical Background

39.1 MADi Basics

MADI, the serial **M**ultichannel **A**udio **D**igital Interface, has been defined already in 1989 as an extension of the existing AES3 standard following several manufacturers' wish. The format also known as AES/EBU, a balanced bi-phase signal, is limited to two channels. Simply put, MADI contains 28 of those AES/EBU signals in serial, i. e. after one another, and the sample rate can still even vary by +/-12.5%. The limit which cannot be exceeded is a data rate of 100Mbit/s.

Because an exact sampling frequency is used in most cases, the 64 channel mode was introduced officially in 2001. It allows for a maximum sample rate of 48 kHz + ca. 1%, corresponding to 32 channels at 96 kHz, without exceeding the maximum data rate of 100 Mbit/s. The effective data rate of the port is 125 Mbit/s due to additional coding.

Older devices understand and generate only the 56 channel format. Newer devices often work in the 64 channel format, but offer still no more than 56 audio channels. The rest is being eaten up by control commands for mixer settings etc. RME's devices of the MADI series show that this can be done in a much better way, with an invisible transmission of 16 MIDI channels and the MADI signal still being 100% compatible.

For the transmission of the MADI signal, proved methods known from network technology were applied. Most people know unbalanced (coaxial) cables with 75 Ohms BNC plugs, they are not expensive and easy to get. The optical interface is much more interesting due to its complete galvanic separation, but for many users it is a mystery, because very few have ever dealt with huge cabinets full of professional network technology. Therefore here are some explanations regarding 'MADI optical'.

- The cables used are standard in computer network technology. They are thus not at all expensive, but unfortunately not available in every computer store.
- The cables have an internal fibre of only 50 or 62.5 µm diameter and a coating of 125 µm. They are called network cables 62.5/125 or 50/125, the former mostly being blue and the latter mostly being orange. Although in many cases not clearly labelled, these are always (!) glass fibre cables. Plastic fibre cables (POF, plastic optical fibre) can not be manufactured in such small diameters.
- The plugs used are also an industry standard and called SC. Please don't mix them up with ST connectors, which look similar to BNC connectors and are being screwed. Plugs used in the past (MIC/R) were unnecessarily big and are not being used any longer.
- The cables are available as a duplex variant (2 cables being glued together) or as a simplex variant (1 cable). The XT's optical module supports both variants.
- The transmission uses the multimode technique which supports cable lengths of up to almost 2 km. Single mode allows for much longer distances, but it uses a completely different fibre (8 µm). By the way, due to the wave-length of the light being used (1300 nm) the optical signal is invisible to the human eye.

39.2 Lock and SyncCheck

Digital signals consist of a carrier and the data. If a digital signal is applied to an input, the receiver has to synchronize to the carrier clock in order to read the data correctly. To achieve this, the receiver uses a PLL (Phase Locked Loop). As soon as the receiver meets the exact frequency of the incoming signal, it is locked. This **Lock** state remains even with small changes of the frequency, because the PLL tracks the receiver's frequency.

If a MADI signal is applied to the MADIface XT, the unit indicates LOCK, i. e. a valid input signal. This information is presented in the MADIface XT Settings dialog. In the status display *SyncCheck*, the state of all clocks is decoded and shown as simple text (No Lock, Lock, Sync).

Unfortunately, LOCK does not necessarily mean that the received signal is correct with respect to the clock which processes the read out of the embedded data. Example: The MADIface XT is set to 44.1 kHz internally (clock mode Master), and a mixing desk with MADI output is connected to the card's MADI input. The status display will show LOCK immediately, but usually the mixing desk's sample rate is generated internally (it is Master too), and thus slightly higher or lower than the MADIface XT internal sample rate. Result: When reading out the data, there will frequently be read errors that cause clicks and drop outs.

Also when using multiple clock signals, a simple LOCK is not sufficient. The above described problem can be solved elegantly by setting the MADIface XT from Master to AutoSync (its internal clock will then be the clock delivered by the mixing desk). But in case the card is clocked to word clock, this signal can also be un-synchronous, and there will again be a slight difference in the sample rate, and therefore clicks and drop outs.

In order to display those problems, the MADIface XT includes **SyncCheck**. It checks all clocks used for *synchronicity*. If they are not synchronous to each other, the status display will show LOCK. If they are synchronous to each other (i.e. absolutely identical), the status display will change to SYNC. In the example above it would have been obvious immediately that the entry LOCK is shown in *SyncCheck* instead of SYNC, right after connecting the mixing desk. With external synchronisation via word clock, both entries Word Clock and MADI must display SYNC.

In practice, SyncCheck allows for a quick overview of the correct configuration of all digital devices. So one of the most difficult and error-prone topics of the digital studio world finally becomes easy to handle.

39.3 Latency and Monitoring

The term **Zero Latency Monitoring** has been introduced by RME in 1998 for the DIGI96 series of audio cards. It stands for the ability to pass-through the computer's input signal at the interface directly to the output. Since then, the idea behind has become one of the most important features of modern hard disk recording. In the year 2000, RME published two ground-breaking Tech Infos on the topics *Low Latency Background*, which are still up-to-date: *Monitoring*, *ZLM and ASIO*, and *Buffer and Latency Jitter*, both found on the RME website.

How much Zero is Zero?

From a technical view there is no zero. Even the analog pass-through is subject to phase errors, equalling a delay between input and output. However, delays below certain values can subjectively be claimed to be a zero-latency. This applies to analog routing and mixing, and in our opinion also to RME's Zero Latency Monitoring. The term describes the digital path of the audio data from the input of the interface to its output. RME's digital receivers operate buffered, and together with TotalMix and the output via the transmitter cause a typical delay of 3 samples. At 44.1 kHz this equals about 68 µs (0.000068 s), and about 15 µs at 192 kHz.

Oversampling

While the delays of digital interfaces can be disregarded altogether, the analog inputs and outputs do cause a significant delay. Modern converter chips operate with 64 or 128 times oversampling plus digital filtering, in order to move the error-prone analog filters away from the audible frequency range as far as possible. This typically generates a delay of one millisecond. A playback and re-record of the same signal via DA and AD (loopback) then causes an offset of the newly recorded track of about 2 ms.

Low Latency!

The MADiface XT II uses AD and DA converters with an innovative digital filter, causing a delay of only a few samples. With 5 samples AD and 6 samples DA the delay caused by the conversion is only about a quarter of previous generations. The exact delays of the MADiface XT II converters are:

Sample rate kHz	44.1	48	88.2	96	176.4	192
AD (5 x 1/fs) ms	0.11	0.104				
AD (5 x 1/fs) ms			0.057	0.052		
AD (6 x 1/fs) ms					0.034	0.031
DA (6 x 1/fs) ms	0.136	0.125	0.068	0.063	0.034	0.031

Buffer Size (Latency)

Windows: This option found in the Settings dialog defines the size of the buffers for the audio data used in ASIO and WDM (see chapter 7 and 9).

Mac OS X: The buffer size is defined within the application. Only some do not offer any setting. For example iTunes is fixed to 512 samples.

General: A setting of 64 samples at 44.1 kHz causes a latency of 1.5 ms, for record and playback each. But when performing a digital loopback test no latency/offset can be detected. The reason is that the software naturally knows the size of the buffers, therefore is able to position the newly recorded data at a place equalling a latency-free system.

AD/DA Offset under ASIO and OS X: ASIO (Windows) and Core Audio (Mac OS X) allow for the signalling of an offset value to correct buffer independent delays, like AD- and DA-conversion or the Safety Buffer described below. An analog loopback test will then show no offset, because the application shifts the recorded data accordingly.

Because the MADiface XT is mainly a digital interface, and the delays introduced by external AD/DA-converters or other digital interfaces are unknown to unit and driver, the drivers include the digital offset values (+3 / +6 / +12 samples). Therefore the delays caused by external converters have to be taken care off in the record software, which usually means that the user has to enter specific offset values manually.

Safety Buffer

An additional small Safety Buffer on the playback side has proven to be very efficient and useful. Under Windows the MADiface XT uses a fixed additional buffer of 32 samples, which is added to the current buffer size. The main advantage is the ability to use lowest latency at highest CPU loads. Furthermore, the fixed buffer does not add to the latency jitter (see Tech Info), the subjective timing is extraordinary.

Core Audio's Safety Offset

Under OS X, every audio interface has to use a so called *Safety Offset* on record and playback, otherwise Core Audio won't operate click-free. The MADiface XT uses a Safety Offset of 24 samples, 12 sample with setting Short. This offset is signalled to the system, and the software can calculate and display the total latency of buffer size, hardware latency, Safety Offset and Safety Buffer for the current sample rate.

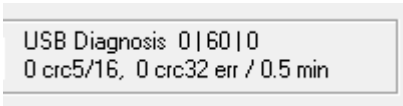
39.4 USB Audio

USB audio is in several ways different from PCI based audio interfaces. Thanks to the high speed of **USB 3**, typical problems of streamed (isochronous) data transmission can be circumvented. RME's proprietary USB 3 technology makes it possible to achieve performance similar to PCI Express, *IF* all participating components work perfectly. At this time USB 3 has got a bad reputation because many layouts, cables and connectors are designed badly and lower the maximum throughput. Typical problems are not or randomly detected devices, devices that fail as soon as data is transmitted, transmission errors and following (as required by the USB 3 standard) the reset of the host controller, guaranteeing a drop out for several seconds.

It is therefore not possible to guarantee reliable and highest performance of USB 3 operation with any computer and cable just because they claim to support USB 3. The real performance has to be evaluated on a per USB 3 port (!) and per cable base.

To make this as easy as possible, and to quickly signal problems, RME added an *extensive error detection and analysis* into the MADIface XT hardware, detecting errors during transmission via USB 2 and 3, and displaying them in the Settings dialog. Additionally the MADIface provides a special mechanism to continue recording and playback in case of drop-outs, and to correct the sample position in real-time.

While some errors shown here might not cause audible clicks and do not stop record/playback, the golden rule applies: *only zero errors are acceptable*. If errors show up use a different USB 3 port and exchange the USB 3 cable. Never use USB 3 cable extensions!



USB Diagnosis 0|60|0
0 crc5/16, 0 crc32 err / 0.5 min

The **Mac DriverKit driver** has a detailed *Diagnostics* display at the right bottom of the Settings dialog. There are 5 counters (left to right):

- USB transfer issues
- USB data issues
- Audio restarts caused by USB transfers
- Audio HAL issues
- Data delayed

Normally the counters should stay at zero. Single restarts can occur on sleep/wakeup, sample rate change or changes of safety offset option or transfer mode - all these are not problematic.

Audio HAL problems are typically caused by high load, leading to delayed write/read, e.g. at start of audio playback in Safari.

Data delayed is a problem caused by longer signal path to the USB port, e.g. when using Thunderbolt docks. Then a larger Safety Offset must be used.

When the first 2 USB counters count up, you should try another port, check/replace USB cable or check for ground loops.

MADiface XT USB 3 Compatibility Information

- Fully compatible to **Intel's USB 3** implementation which - on current Windows and Mac computers - is part of the chipset. USB 3 sockets that are connected via an internal cable (not directly soldered onto the motherboard) can cause transmission errors (shown in the Settings dialog).
- Fully compatible to **AMD's USB 3** implementation. USB 3 sockets that are connected via an internal cable (not directly soldered onto the motherboard) can cause transmission errors (shown in the Settings dialog).
- Compatible to **NEC / Renesas USB 3**. Real-world performance and error-free operation depend on the firmware version, driver version and the PCB layout of the respective extension card/motherboard.
- Fully compatible to **Fresco USB 3** chip.
- Fully compatible to **Via VL912**, very often used in USB 3 hubs

- **ASMedia** - not compatible. Newer versions and hubs are partly compatible
- **Etron EJ168A** - not compatible
- **Texas TUSB7340** - not compatible
- **Via VL800/805** - not compatible

The MADiface XT is capable of using two different transmission modes to record data. The XT defaults to *Bulk Mode*, which improves reliability of USB 3 audio tremendously and helps with both less than perfect cabling as well as critical layouts around the USB 3 chip. The standard's default is *Isochronous Streaming*, which is unreliable as per the standard (errors are to be expected!), unreliable in real-world operation, and not correctly supported by popular USB 3 chips. In very seldom cases, bulk mode can not keep up with the strict timing required for continuous audio streaming. Then, to make the XT work at all, isochronous mode must be used (but is still prone to clicks and drop-outs). To make the standard mode available as reference, firmware versions higher than 160 enable the activation of the isochronous mode in the Settings dialog.

The MADiface XT also supports **USB 2**. Good performance and click-free operation even at low buffer sizes are indeed possible on current computers. However, using older computers a simple stereo playback might cause a CPU load of more than 30%.

Best USB 2 performance is achieved by connecting the XT to its own bus, which should be no big problem as most USB 2.0 interfaces are a double bus design. A check in the Device Manager can be done as follows:

- Connect the MADiface to a USB 2 port
- Start the Device Manager, View set to Devices by Connection
- Select ACPI x86-based PC, Microsoft ACPI-Compliant System, expand PCI Bus

This branch normally includes two entries of a *USB2 Enhanced Host Controller*. A USB Root Hub can be seen, which then connects all USB devices, including the MADiface. By reconnecting to a different port this view shows at which of the two controllers the MADiface is connected. With multiple devices it can be checked if they are connected to the same controller.

Furthermore this information can be used to operate an external USB drive without disturbing the MADiface, by simply connecting the drive to the other controller.

A computer blocked for a short time – no matter if ASIO or WDM – will lose one or more data packets. Such problems can only be solved by increasing the buffer size (latency).

39.5 DS - Double Speed

Sample rates above 48 kHz were not always taken for granted, and are still not widely used because of the CD format (44.1 kHz) dominating everything. Before 1998 there were no receiver/transmitter circuits available that could receive or transmit more than 48 kHz. Therefore a work-around was used: instead of two channels, one AES line only carries one channel, whose odd and even samples are being distributed to the former left and right channels. By this, you get the double amount of data, i. e. also double sample rate. Of course in order to transmit a stereo signal two AES/EBU ports are necessary then.

This transmission mode is called *Double Wire* in the professional studio world, and is also known as *S/MUX* (abbreviation for *Sample Multiplexing*) in connection with the multichannel ADAT format.

With MADI, sample multiplexing is often used as well to offer sample rates higher than 48 kHz. The MADIface XT supports all formats. 96 kHz can be received and transmitted both as 48K Frame (using S/MUX) and as native 96K Frame.

In 48K Frame Double Speed mode, the MADIface XT distributes the data of one channel to two consecutive MADI channels. This reduces the available channel count from 64 to 32.

As the transmission of double rate signals with 48K Frame is done at standard sample rate (Single Speed), the MADI ports still operate at 44.1 kHz or 48 kHz.

39.6 QS – Quad Speed

Due to the small number of available devices that use sample rates up to 192 kHz, but even more due to a missing real world application (CD...), Quad Speed has had no broad success so far. An implementation of the ADAT format as double S/MUX (S/MUX4) results in only two channels per optical output. Devices using this method are few.

In earlier times the transmission of 192 kHz had not been possible via Single Wire, so once again sample multiplexing was used: instead of two channels, one AES line transmits only one half of a channel. A transmission of one channel requires two AES/EBU lines, stereo requires even four. This transmission mode is being called *Quad Wire* in the professional studio world. The AES3 specification does not mention Quad Wire.

With MADI, sample multiplexing is used as well to offer sample rates higher than 96 kHz. In fact, technical reasons require to use this method beyond 96 kHz. A 192K or 384K Frame format would not be fully compatible to the MADI standard. Therefore 192 kHz is supported as S/MUX4 only. So in 48K Frame Quad Speed mode, a MADI device distributes the data of one channel to four consecutive MADI channels. This reduces the available channel count from 64 to 16.

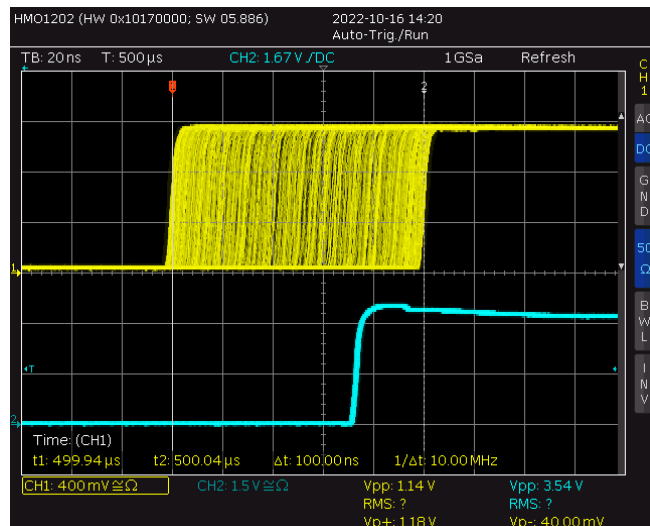
As the transmission of quad rate signals with 48K Frame is done at standard sample rate (Single Speed), the MADI ports still operate at 44.1 kHz or 48 kHz.

39.7 SteadyClock

RME's SteadyClock technology guarantees an excellent performance in all clock modes. Its highly efficient jitter suppression refreshes and cleans up any clock signal. Thanks to the efficient jitter suppression, the AD- and DA-conversion always operates on highest sonic level, being completely independent from the quality of the incoming clock signal.

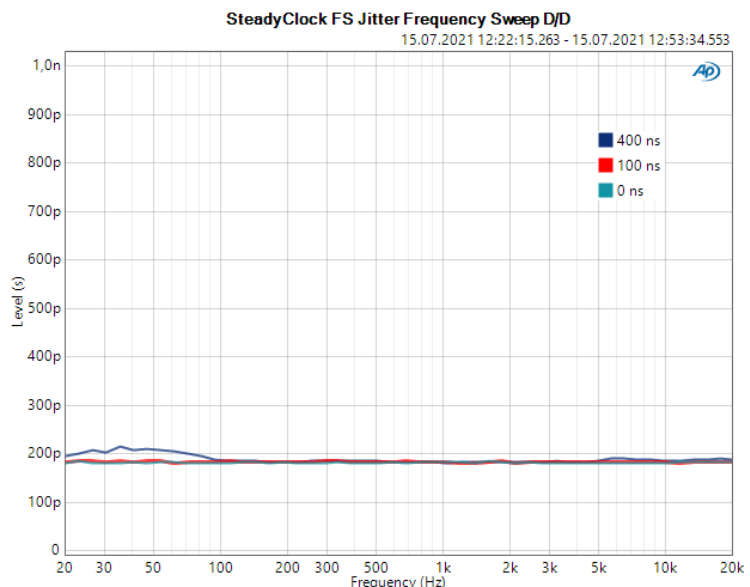
RME realizes modern circuit designs like hi-speed digital synthesizer, digital PLL and 800 MHz sample rate cost- and space-saving right within the FPGA. Combined with analog and digital filtering a professional clock technology is created that is second to none. Also SteadyClock reacts quite fast compared to other techniques. It locks in fractions of a second to the input signal, follows even extreme varipitch changes with phase accuracy, and locks directly within a range of 28 kHz up to 200 kHz.

The analysis of so-called *interface jitter* with the help of an oscilloscope shows how it works. The screenshot shows a very jittery SPDIF signal with about 50 ns jitter (top graph, yellow). SteadyClock turns this signal into a clean clock signal with less than 2 ns jitter (lower graph, blue). The signal processed by SteadyClock is not only used internally, but also used to clock the digital outputs. Therefore the refreshed and jitter-cleaned signal can be used as reference clock without hesitation. Additionally SteadyClock not only processes word clock, but any input signal – SPDIF, AES, ADAT, MADI...



The so-called *sampling jitter*, usually in the range of picoseconds, is also very low in the MADiface XT II. One way to show this is to send out a specially modulated 11.025 kHz sine from the analog output, then analyze the sampled result. Jitter products are shown in the measurement as symmetrical sidebands, like narrow needles. SteadyClock does not show obvious sidebands. Also remarkable is the identical performance when using internal or external clock – a typical SteadyClock feature. Check RME's YouTube channel for a video showing and explaining such measurements.

The further improved *SteadyClock FS* technology attenuates even lowest frequency jitter (>1 Hz), and provides an even higher jitter suppression at lowest self-jitter. Of course, this can also be proven by measurement. In this measurement, an AES signal with 0 ns (reference), 100 ns and 400 ns (!) jitter is applied, and the modulation frequency is swept in the range 20 Hz to 20 kHz in each case. At 50 Hz, approximately 210 ps can be detected, corresponding to a jitter suppression of > 65 dB. This is simply fantastic for such low frequencies.



39.8 Terminology

Single Speed

Sample rate range originally used in Digital Audio. Typical applications are 32 kHz (digital radio broadcast), 44.1 kHz (CD), and 48 kHz (DAT).

Double Speed

Doubles the original sample rate range, in order to achieve higher audio quality and improved audio processing. 64 kHz is practically never used, 88.2 kHz is quite rare in spite of certain advantages. 96 kHz is a common format. Sometimes called **Double Fast**.

Quad Speed

Doubles the double sample rate for ensuring hi-end audio quality and processing. 128 kHz is non-existent, 176.4 kHz is rare, if at all then 192 kHz is used, e.g. for DVD Audio.

Single Wire

Standard audio data transfer, where the audio signal's sample rate is equal to the rate of the digital signal. Used from 32 to 192 kHz. Sometimes called **Single Wide**.

Double Wire

Before 1998 there were no receiver/transmitter circuits available that could receive or transmit more than 48 kHz. Higher sample rates were transferred by splitting odd and even bits across the L/R channels of a single AES connection. This provides for twice the data rate, and hence twice the sample rate. A stereo signal subsequently requires two AES/EBU ports.

The Double Wire method is an industry standard today with different names, like **Dual AES**, **Double Wide**, **Dual Line** and **Wide Wire**. The AES3 specification uses the uncommon term *Single channel double sampling frequency mode*. When used with the ADAT format, the term *S/MUX* is commonly used. Double Wire not only works with Single Speed signals, but also with Double Speed. As an example, Pro Tools HD, whose AES receiver/transmitter only worked up to 96 kHz, used Double Wire to transmit 192 kHz. Four channels of 96 kHz turn into two channels of 192 kHz.

Quad Wire

Similar to Double Wire, with samples of one channel spread across four channels. This way single speed devices can transmit up to 192 kHz, but need two AES/EBU ports to transmit one channel. Also called **Quad AES**.

S/MUX

Since the ADAT hardware interface is limited to Single Speed, the Double Wire method is used for sample rates up to 96 kHz, but usually referred to as S/MUX (Sample Multiplexing). An ADAT port supports four channels this way. With MADI S/MUX is used as well, to transmit up to 96kHz although the 48K Frame format is used.

S/MUX4

The Quad Wire method allows to transmit two channels at up to 192 kHz via ADAT. The method is referred to as S/MUX4. With MADI S/MUX4 is used as well, to transmit up to 192 kHz although the 48K Frame format is used.

Note: All conversions of the described methods are lossless. The existing samples are just spread or re-united between the channels.

48K Frame

Most often used MADI format. Supports up to 64 channels at up to 48 kHz.

96K Frame

Frame format for up to 32 channels at up to 96 kHz. The advantage of this format against 48K Frame using S/MUX: the receiver can detect the real (double) sample rate on its own and immediately. With 48K Frame and S/MUX, the user has to set up the correct sample rate in all involved devices manually.

User's Guide



MADIface XT II

► Miscellaneous

40. Accessories

RME offers several optional components. Additionally parts of the MADIface XT II, like the special breakout cable, are available separately.

Part Number	Description
BOAESMIDI	AES/MIDI breakout cable
MADI0.5S	MADI Optical Cable, Simplex, 0.5 m (1.6 ft)
MADI1S	MADI Optical Cable, Simplex, 1 m (3.3 ft)
MADI3D	MADI Optical Cable, Duplex, 3 m (9.9 ft)
MADI6D	MADI Optical Cable, Duplex, 6 m (20 ft)
MADI10D	MADI Optical Cable, Duplex, 10 m (33 ft)
MADI20D	MADI Optical Cable, Duplex, 20 m (66 ft)
MADI50D	MADI Optical Cable, Duplex, 50 m (165 ft)
MCD100	MADI Optical multicore on drum, 100 m
MCD150	MADI Optical multicore on drum, 150 m
MCD300	MADI Optical multicore on drum, 300 m
RM19X	19", 1 unit height rack ears. These 19" rack ears are mounted at the left and right side of the XT. The unit can then be installed into a standard 19" rack.

41. Warranty

Each individual MADIface XT II undergoes comprehensive quality control and a complete test at IMM before shipping. The usage of high grade components should guarantee a long and trouble-free operation of the unit.

If you suspect that your product is faulty, please contact your local retailer.

Audio AG grants a limited manufacturer warranty of 6 months from the day of invoice showing the date of sale. The length of the warranty period is different per country. Please contact your local distributor for extended warranty information and service. Note that each country may have regional specific warranty implications.

In any case warranty does not cover damage caused by improper installation or maltreatment - replacement or repair in such cases can only be carried out at the owner's expense.

No warranty service is provided when the product is not returned to the local distributor in the region where the product had been originally shipped.

Audio AG does not accept claims for damages of any kind, especially consequential damage. Liability is limited to the value of the MADIface XT. The general terms of business drawn up by Audio AG apply at all times.

42. Appendix

RME news, driver updates and further product information are available on our website:
<https://www.rme-audio.com>

Worldwide distribution: Audio AG, Am Pfanderling 60, D-85778 Haimhausen, Tel.: (49) 08133 / 918170

Support via e-mail: support@rme-audio.com

List of international supporters: <https://www.rme-audio.de/support.html>

RME user forum: <https://forum.rme-audio.de>

Manufacturer: IMM electronics GmbH, Leipziger Strasse 32, D-09648 Mittweida

Trademarks

All trademarks, registered or otherwise, are the property of their respective owners. RME, DIGiCheck and Hammerfall are registered trademarks of RME Intelligent Audio Solutions. MADIface XT, OctaMic XTC, TMS, SyncAlign, ZLM, SyncCheck, SteadyClock and TotalMix are trademarks of RME Intelligent Audio Solutions. Alesis and ADAT are registered trademarks of Alesis Corp. ADAT optical is a trademark of Alesis Corp. Microsoft, Windows XP, Windows Vista, 7/8/10/11 are registered trademarks or trademarks of Microsoft Corp. Steinberg, Cubase and VST are registered trademarks of Steinberg Media Technologies GmbH. ASIO is a trademark of Steinberg Media Technologies GmbH.

Copyright © Matthias Carstens, 02/2026. Version 2.2

Current firmware version:
USB 323, DSP 61, CC 17

Current driver versions:
Windows 1.0.15, Mac OS depending on version: 4.27 (DK), 3.35 (KE), 3.223 (up to macOS 10)

TotalMix FX: 1.99

Although the contents of this User's Guide have been thoroughly checked for errors, RME can not guarantee that it is correct throughout. RME does not accept responsibility for any misleading or incorrect information within this guide. Lending or copying any part of the guide or the RME Driver CD, or any commercial exploitation of these media without express written permission from RME Intelligent Audio Solutions is prohibited. RME reserves the right to change specifications at any time without notice.

Note on Disposal

According to the guide line RL2002/96/EG (WEEE – Directive on Waste Electrical and Electronic Equipment), valid for all European countries, this product has to be recycled at the end of its lifetime.

In case a disposal of electronic waste is not possible, the recycling can also be done by IMM electronics GmbH, manufacturer of the MADIface XT II.

For this the device has to be sent **free to the door** to:

IMM electronics GmbH
Leipziger Straße 32
D-09648 Mittweida
Germany



Shipments not prepaid will be rejected and returned on the original sender's costs.

43. CE / FCC Compliance

CE

This device has been tested and found to comply with the limits of the European Council Directive on the approximation of the laws of the member states relating to electromagnetic compatibility according to RL2014/30/EU, and European Low Voltage Directive RL2014/35/EU.

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Responsible Party in USA:

Synthax United States, 6600 NW 16th Street, Suite 10, Ft Lauderdale, FL 33313

T.:754.206.4220

Trade Name: RME, Model Number: MADIface XT II

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: To comply with the limits of the Class B digital device, pursuant to Part 15 of the FCC Rules, this device must be operated with computer equipment certified to comply with Class B limits. All cables used to connect to the computer and peripherals must be shielded and grounded. Operation with non-certified computers or unshielded cables may cause interference to radio or television reception.

RoHS

This product has been soldered lead-free and fulfils the requirements of the RoHS directive.