User's Guide

USB.MADI

USB 2.0 Interface Module
For compatible SFP MADI slots
64 Channels Record, 64 Channels Playback
24 Bit / 192 kHz Digital Audio
TotalMix 64 x 64 Matrix Router
Drivers for Windows and macOS
Class Compliant Mode

General

Installation and Operation - Windows

Installation and Operation - macOS

TotalMix FX

Class Compliant Mode

Miscellaneous

User's Guide

USB.MADI

- **General**

1. Introduction

Thank you for choosing the USB.MADI. This unique accessory for compatible MADI SFP slots turns audio devices into audio interfaces, to record, manage, edit and playback up to 64 channels of incoming and outgoing audio data with a computer.

Based on RME's proven USB 2 hardware including sophisticated Windows and Mac drivers, as well as the unique TotalMix, the USB.MADI offers numerous unique features, such as sophisticated settings dialogs, a superior and very flexible mixer and monitoring solution, and access to additional tools such as remote control and audio analysis.

Drivers are available for Windows 10 / 11 (Intel, ARM) and macOS 11 or up (Intel / Mx).

2. Package Contents

Please check that your USB.MADI package contains each of the following:

- USB.MAD - SFP transceiver

3. System Requirements

- Windows 10 or up, macOS 11 or up
- USB 2.0 or higher port (requires computer with at least Intel Core i5 CPU)

Current compatibility list of DirectOut devices (firmware updates required):

PRODIGY Series (A Slot, B Slot)
MAVEN.A
ACE
ANDIAMO 3
EXBOX.MD / EXBOX.RAV

or the MADI modules:
Slot A: MADI2.SRC.IO / MADI4.IO / MADI4.SRC.IO
Slot B: SFP.IO

4. Brief Description and Characteristics

- All settings can be changed in real-time
- Buffer sizes/latencies from 32 up to 8192 samples selectable
- 64 channels @ 48 kHz, 32 channels @ 96 kHz, 16 channels @ 192 kHz
- USB-C socket
- Class Compliant operation at full channel count
- TotalMix for latency-free submixes and perfect ASIO Direct Monitoring
- TotalMix FX: 4096 channel mixer with 46 bit internal resolution
- Up to 64 individual submixes
- Internal Loopback function
- 1 x MIDI I/O (MIDI over MADI)
- USB error analysis, displayed in the Settings dialog

5. First Usage – Quick Start

5.1 Hardware

The USB.MADI in SFP format has a standard USB 2.0 socket in C format, for connection to the computer. Ensure undisturbed operation by using high-quality USB cables. USB extensions and USB hubs should be avoided.

CC Mode: This driver-less mode can be used on Mac OS X, macOS, iOS, iPadOS and Linux. Activation is done by flashing the CC firmware into the USB.MADI via RME's FUT (Flash Update Tool).

Note: TotalMix FX is only available in Class Compliant mode when using DriverKit driver 4.30 or higher on macOS.

5.2 Quick Start

After the driver installation (chapter 6 / 13) the USB.MADI has to be connected to a computer.

Note that the USB.MADI is not bus-powered, therefore will not be found by the OS until plugged into any SFP MADI slot. Check, Settings dialog and TM FX will be available then. For audio data transfer a compatible SFP slot is required (see chapter 3), otherwise no playback data or input data will be shown on TM FX level meters, reach a recording software or be played out to the host device.

Some basic and OS-specific options, like sample rate and clock source are available in the Settings dialog of the RME Windows and macOS drivers. In CC mode under macOS sample rate and clock source are set in the Audio MIDI Setup, window Audio. Other options may be configured directly in the used host device.

! *USB.MADI uses the native MADI frame format to detect and switch its sample-rate multiplier. Therefore, the following conditions have to be met for proper operation:*

- Operation at 4 FS (192 kHz) is only available if the host device supports *MADI high-speed mode* (PRODIGY, MAVEN.A, ANDIAMO, ACE).
- In legacy mode 96k Frame needs to be set to switch USB.MADI into 2 FS.
- If the MADI port is configured to use S/MUX format USB.MADI will always remain at 1 FS. These settings are accessible in the tab *Output Formats* of globcon.

TotalMix FX remembers all settings, and loads these automatically when the USB.MADI drivers are loaded.

User's Guide

USB.MADI

- **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/downloads**. driver_madiface_win_1017.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 USB.MADI using a USB 2.0 cable. Windows detects the new hardware as **USB.MADI** 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.

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

6.2 Uninstalling the Drivers

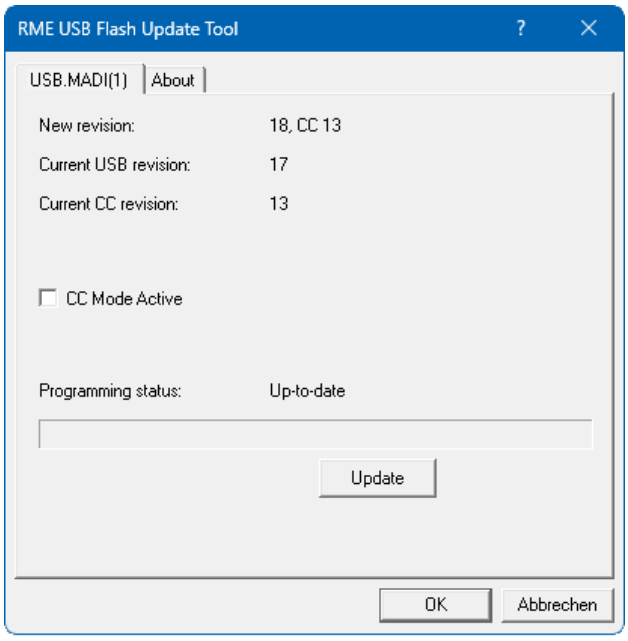
A de-installation of the driver files is not necessary. Thanks to full Plug & Play support, the driver files will not be loaded after the hardware has been removed.

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 firmware of the USB.MADI to the latest version. It requires an already installed driver.

Download the latest version from the RME website at **http://rme.to/usbe**. Unzip the downloaded file and start the program **fut.exe** under Windows. The tool displays the device's current version and whether it needs an update. If so, then simply press the 'Update' button. A progress bar will indicate when the flash process is finished.



After the update the USB.MADI needs to be reset. This is done by powering down the device or by removing the SFP module for a few seconds. A reboot of the computer is not necessary.

When the update fails (status: failure), the unit's Safety BIOS will be used from the next boot on, the unit stays fully functional. The flash process should then be tried again.

7. Configuring the USB.MADI

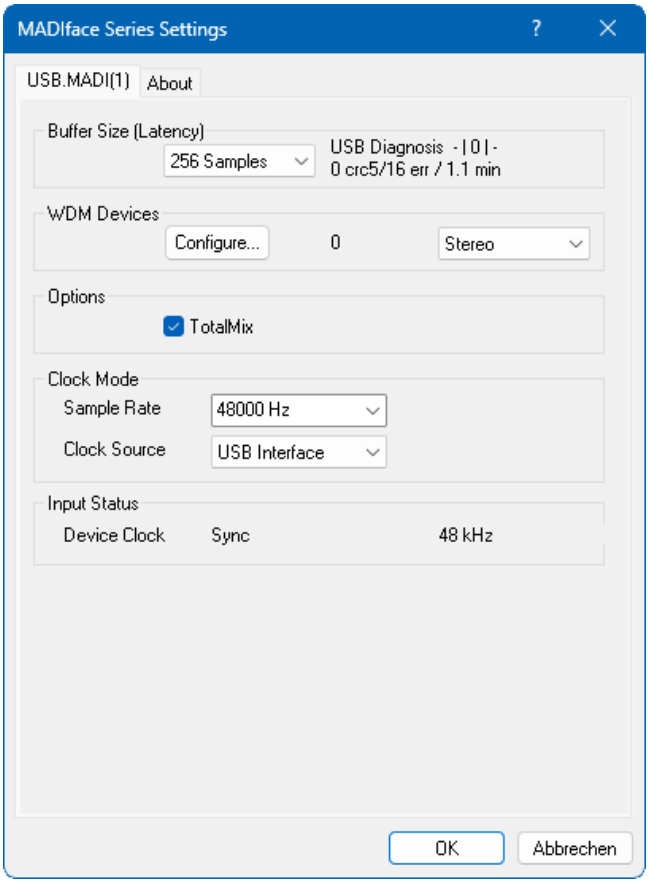
7.1 Settings Dialog

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

The mixer of the USB.MADI, **TotalMix FX**, can be opened by clicking on the TotalMix symbol in the Task Bar's system tray.

The following is available in the Settings dialog:

- ASIO Latency
- USB error analysis
- Configuration of the WDM devices
- Configuration of the hardware
- Clock status
- Display of current sample rate



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** includes information about the current driver and firmware version plus four more options:

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 for the USB.MADI.

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 workaround removes all higher channels, which 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 USB.MADI

Buffer Size
The setting *Buffer Size* determines the latency between incoming and outgoing ASIO and WDM data, as well as affecting system stability (see chapter 7.1). 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 28.

WDM Devices
Allows to freely set which I/Os are available as WDM devices, whether these are stereo or multi-channel devices (up to 8 channels), and whether one or multiple of the currently active WDM devices should have the *Speaker* property. USB.MADI provides a maximum of 64 stereo WDM devices, or 16 multichannel devices. More details are found in chapter 7.2.

Options
TotalMix
Removing the checkmark completely disables TotalMix FX. All input and output data is going straight to record/coming from playback, with no mixing or routing involved.

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
Available options: USB Interface, Device. With *USB Interface* the USB.MADI specifies the sample rate, with *Device* the sample rate of the host device (PRODIGY, MAVEN, ACE, EXBOX) is used.

Input Status
Device Clock shows the current clock status. If different sample rates are set for USB and the device, or if they are the same but not synchronized, Lock appears. If they are the same and synchronized, Sync appears. Only when Sync is displayed crack-free recording and playback is possible. The third column shows the sample rate recognized by the USB.MADI (coarse measurement, 32 kHz, 44.1 kHz, 48 kHz etc.).

Since the USB.MADI communicates with the host via MADI, additional information about the channel format (48k frame, 96k frame, 192k frame) and the number of channels (64 channels, 56 channels) is displayed.

7.2 Option WDM Devices

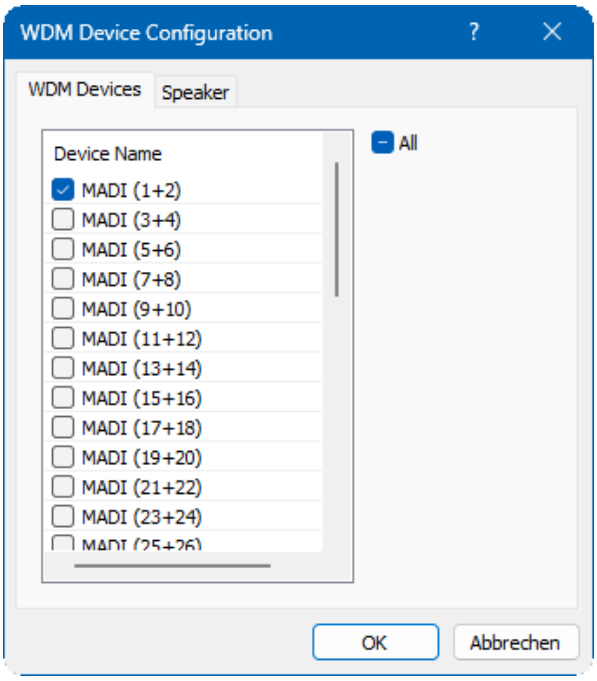
The WDM Devices configuration has one button to enter the edit dialog, a status display showing the number of currently enabled WDM devices, and a listbox to select between *Stereo* or *Multi-Channel* devices.

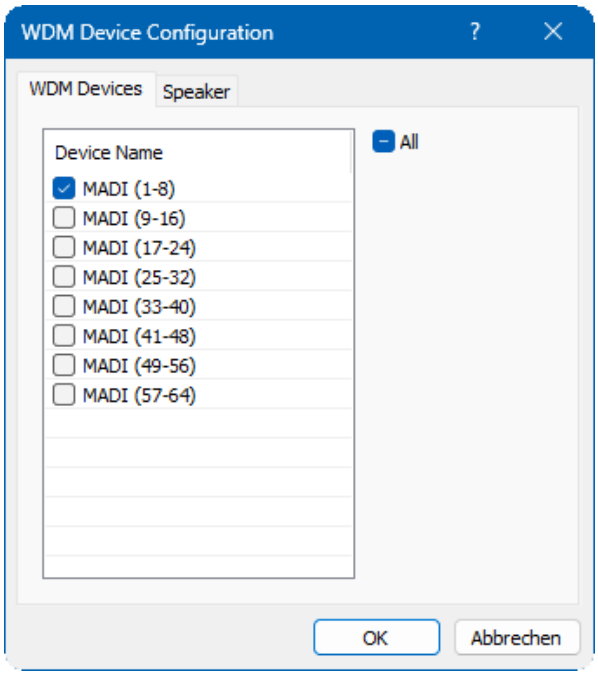
The number represents both record and playback devices, so '1' means one input and one output device.

The screenshot to the right shows the stereo WDM devices available with the USB.MADI. Here only the first stereo device had been activated. Any can be activated. Also only higher numbered devices might be active. For example using 25+26 for system based audio does not require to activate the prior stereo devices. Only 25+26 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 32 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 USB.MADI after selecting 'Multi-Channel' in the WDM Devices listbox and hitting *WDM Configure*. In this example the device 1-8 is 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.

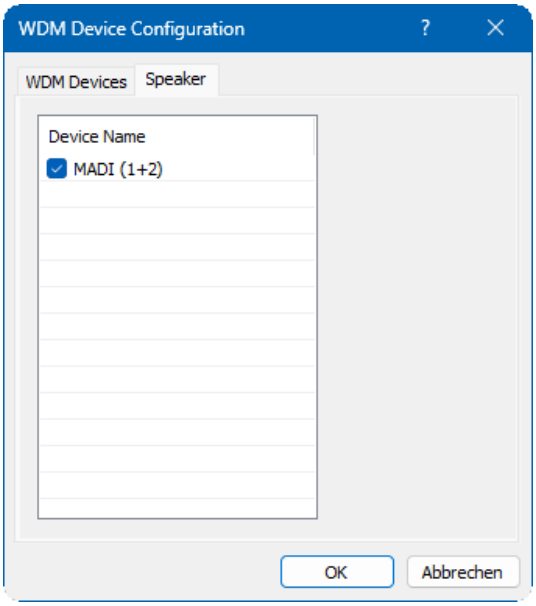
Please note that configuring the WDM device to a specific surround mode in the control panel Sound requires the device to have the Speaker property. See next page.

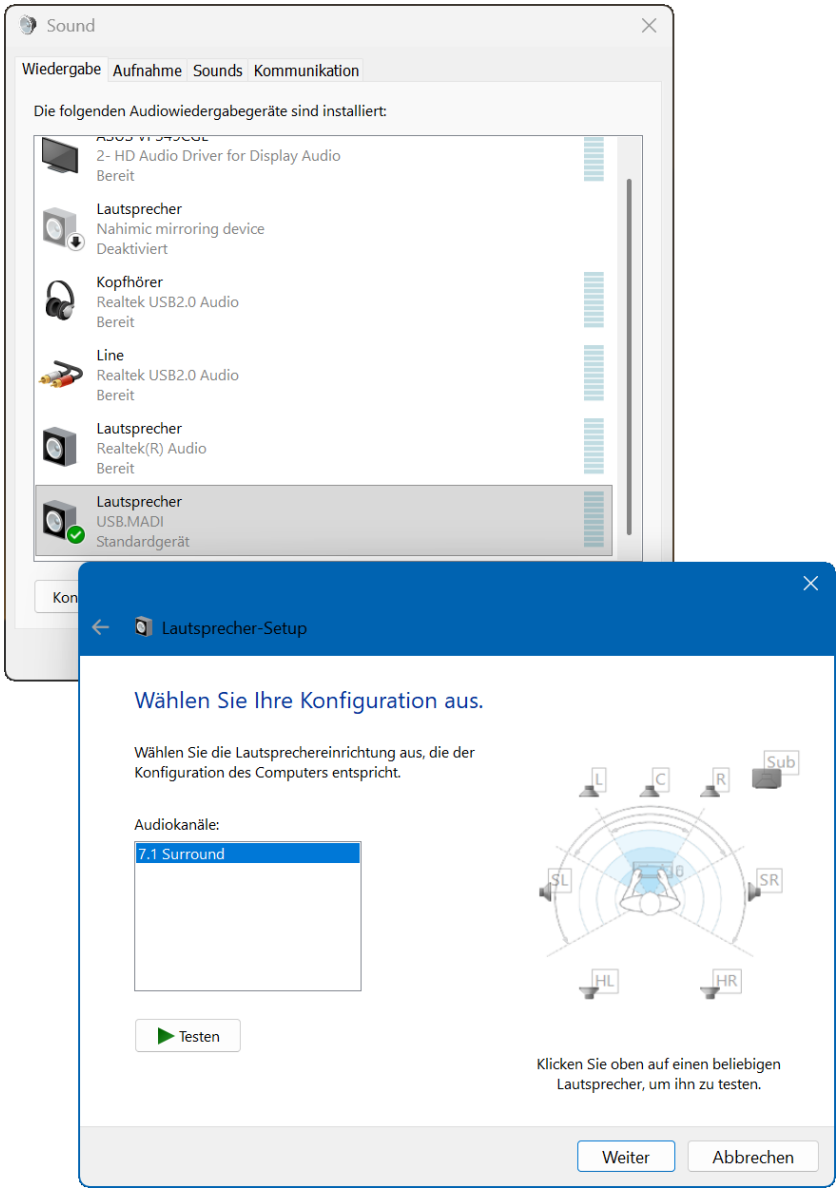
Again the checkbox *All* to the right allows for a quick check/uncheck of all devices.

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, and the speakers also don't get numbered or renamed 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, USB.MADI must be selected as output device. This can often be found in the *Options, Preferences* or *Settings* menus as *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 USB.MADI comes with extensive support for system audio, setting it to be the *Default Device* for playback could cause synchronisation issues and noise.

Increasing the number and/or size of audio buffers may prevent the audio signal from breaking up, but also increases latency.

Note: The driver of the USB.MADI 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 takes a few seconds, record/playback should not be started directly 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)

AC-3 / DTS
Popular DVD software players can send their audio data stream to any AC-3/DTS capable receiver via the USB.MADI.

! *The sample rate must be set to 48 kHz, or the software will only playback a stereo 2-channel downmix via SPDIF.*

In some cases the USB.MADI output device has to be selected in >*Control Panel / Sound / Playback*< and be set as *Default,* or the software will not 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 multi-channel data stream to a USB.MADI output channel.

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

Multichannel
DVD software player can also operate as software decoder, sending a DVD's multichannel data stream directly to the outputs of the USB.MADI. For this to work select the WDM playback device 'Loudspeaker' of the USB.MADI 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 USB.MADI. 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 USB.MADI to be used as system playback device is against our recommendation, as professional interfaces should not be disturbed by system events. Make sure to reassign 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 USB.MADI. So when using AutoSync and/or word clock, the playback speed and pitch follows the incoming clock signal.

8.3 Channel Count under WDM

The USB.MADI supports a maximum of 32 stereo and 8 8-channel devices. Configuration is done via the Settings dialog - WDM Devices, as Stereo or Multi-channel devices.

In Double Speed (88.2 kHz, 96 kHz) the total number of channels is halved to 32. In Quad Speed (176.4 kHz, 192 kHz) the number of channels is halved again to 16.

8.4 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.

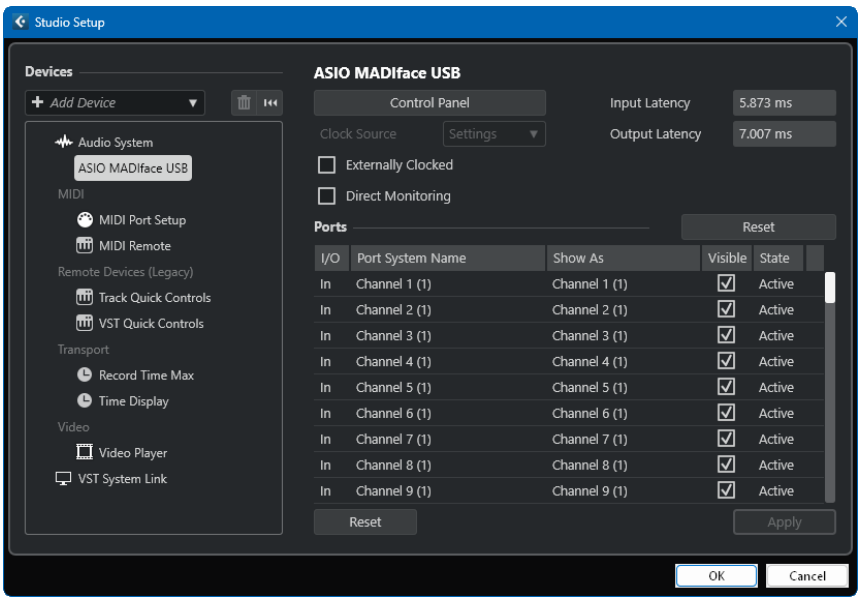
RME's sophisticated tool *DigiCheck NG* is an exception to this rule. It operates like an ASIO host, using a special technique to access playback channels directly. Therefore DigiCheck is able to analyse and display playback data from any software, no matter which format it uses.

9. Operation under ASIO

9.1 General

Start the ASIO software and select **ASIO MADIface USB** as the audio I/O device or the audio driver.

The USB.MADI supports *ASIO Direct Monitoring* (ADM).



9.2 Channel Count under ASIO

In Single Speed Speed (44.1 and 48 kHz) 64 input and output channels each are available. Double Speed (88.2 and 96kHz) reduces the number of available channels to 32 each. Quad Speed (176.4 and 192kHz) reduces the number of available channels to 16 each.

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.

Mono channels	Double Speed	Quad Speed
MADI (1 to 16)	MADI (1 to 16)	MADI (1 to 16)
MADI (17 to 32)	MADI (17 to 32)	MADI (17 to 32)
MADI (33 to 64)	MADI (33 to 64)	MADI (33 to 64)

9.3 Known Problems

If a computer does not provide sufficient CPU-power and/or sufficient USB-bus transfer rates, then drop outs, crackling and noise will appear. Such effects can often be avoided by using a higher buffer setting/latency in the Settings dialog of the USB.MADI. Furthermore PlugIns should be deactivated temporarily to make sure they do not cause these problems. More information can be found in chapter 28.

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 USB.MADI 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 USB.MADI. They all have to be in sync. Else a periodically repeated noise will be heard.

USB.MADI supports *ASIO Direct Monitoring* (ADM). Please note that not every program supports 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.

10. Using more than one Interface

The current driver supports up to three RME USB devices of the MADIface series. All units have to be in sync, i.e. have to receive valid digital sync information.

- If the USB.MADI is set to clock mode internal, all others have to be set to clock mode slave, and have to be synced from the master. The clock modes of all units have to be set up correctly in the MADIface Series Settings dialog.

- If all units are fed with synchronous signals, 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 units as one.

Note: TotalMix is part of the hardware of each RME 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 NG

The DigiCheck NG software is a unique utility developed for testing, measuring and analysing digital audio streams. Although this Windows software is fairly self-explanatory, it still includes a comprehensive online help. DigiCheck NG 0.93 operates as multi-client ASIO host, therefore can be used in parallel to any software, with both inputs and outputs (!). These are the currently available functions:

- **Level Meter**. High precision 24-bit resolution, 2/8/64 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 NG is constantly updated. The latest version is always available on RME's website **www.rme-audio.com**, section **Downloads / Software**.

12. Hotline – Troubleshooting

The input signal cannot be monitored in real-time

- ASIO Direct Monitoring has not been enabled within the DAW, and/or monitoring has been disabled globally (TotalMix Options).

Crackle during record or playback

- Increase the number and size of buffers in the 'Settings' dialog or in the application.
- Try different cables (coaxial) to rule out any defects here.
- Check the Settings dialog for displayed Errors.

Driver installation and Settings dialog/TotalMix work, but a playback or record is not possible

- 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 errors.

User's Guide

USB.MADI

- **Installation and Operation - macOS**

13. Driver and Firmware - macOS

13.1 Driver Installation

The Flash Update Tool updates the firmware of the USB.MADI to the latest version. It requires an already installed driver.

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 USB.MADI 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 *Installating the Fireface USB kernel extension driver.rtf* or *Installing the Fireface DK USB driver.rtf* in the respective downloaded driver archive contains all details.

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 app **RME USB Series Flash Tool** updates the firmware of the USB.MADI to the latest version. It requires an already installed RME USB driver.

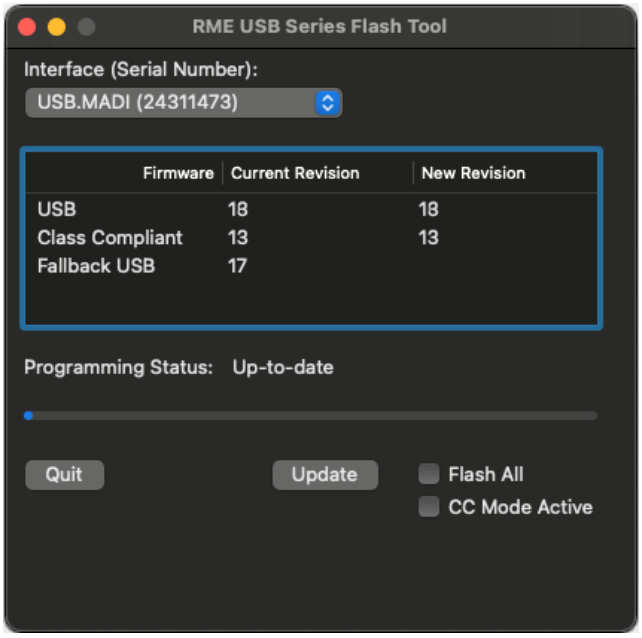
Download the latest version from the RME website at **http://rme.to/usbe.** Unpack the downloaded file then start the app **Fireface USB Flash**. The Flash Update Tool displays the current revision of the USB.MADI firmware, and whether it needs an update or not. If so, simply press the 'Update' button. A progress bar will indicate when the flash process is finished (Verify Ok).

After the update the unit needs to be reset. This is done by switching off the host or removing it from the SFP slot for a few seconds. 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.

The option *CC Mode Active* switches the USB.MADI to class-compliant mode. Reflashing with this option deselected switches it back to normal mode for operation with RME's Windows and Mac drivers.

When the update fails (status: failure), the unit's Safety BIOS will be used from the next boot on, the unit stays fully functional. The flash process can then be tried again on a different computer



14. Configuring the USB.MADI

14.1 Settings Dialog

Configuring the USB.MADI is done via its own *Settings* dialog. Start the app **Fireface USB Settings**. The mixer of the USB.MADI can be configured by starting the app **Totalmix**.

The following is available in the *Settings* dialog:

- Hardware configuration
- Clock status
- Current sample rate
- Latency
- Channel count
- USB error state

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 unit to be configured.

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

Sample Rate
Display of the currently active sample rate.

Options

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

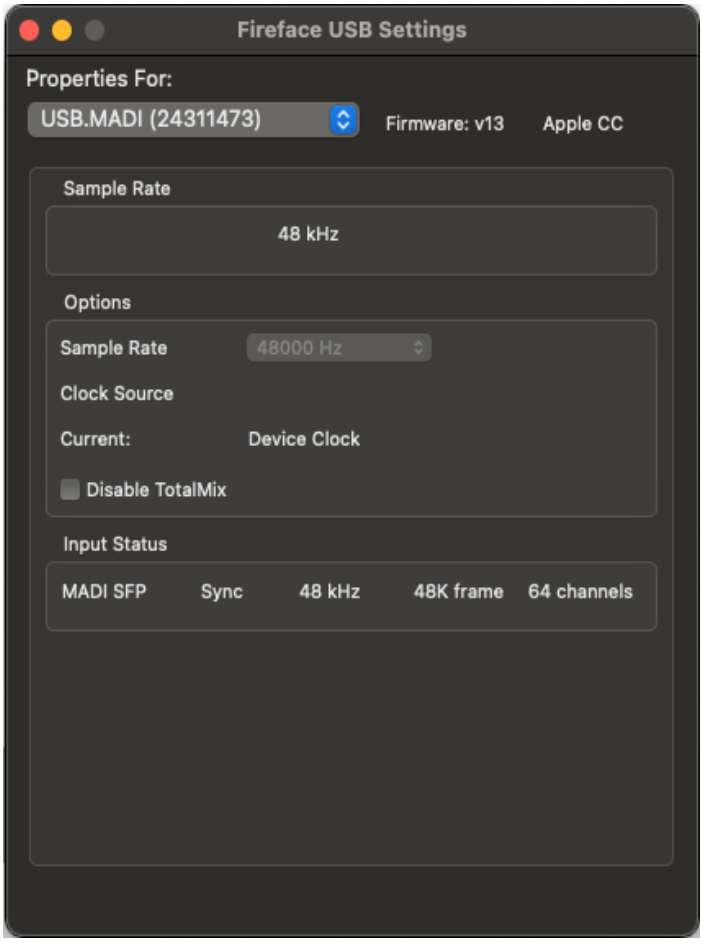
Available options: USB Interface, Device. With *USB Interface* the USB.MADI specifies the sample rate, with *Device* the sample rate of the host device (PRODIGY, MAVEN, ACE, EXBOX) is used.

Current Clock

Displays the currently used clock, USB Interface or Device.

Disable TotalMix

D*isable TotalMix* completely disables TotalMix FX. All input and output data is going straight to record / coming from playback, with no mixing or routing involved.



Input Status

If different sample rates are set for USB and the device, or if they are the same but not synchronized, *Lock* appears. If they are the same and synchronized, *Sync* appears. Only when Sync is displayed click-free recording and playback is possible. The third column shows the sample rate detected by the USB.MADI (coarse recognition, 44.1 kHz, 48 kHz etc.),

Since the USB.MADI communicates with the host via MADI, additional information about the channel format (48k frame, 96k frame, 192k frame) and the number of channels (64 channels, 56 channels) is displayed.

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 fewer 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 Channel Count under Core Audio

In Single Speed Speed (44.1 and 48 kHz) 64 input and output channels each are available. Double Speed (88.2 and 96kHz) reduces the number of available channels to 32 each. Quad Speed (176.4 and 192kHz) reduces the number of available channels to 16 each.

It is not easy to change the number of Core Audio devices without a reboot of the computer. So when the USB.MADI changes to Double Speed (88.2/96 kHz) or Quad Speed mode (176.4/192 kHz) all channels stay present, but are partly inactive.

14.3 Various Information

The driver of the USB.MADI requires at least macOS 11.

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 USB.MADI 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.

15. Using more than one Interface

macOS supports the usage of more than one audio device within the 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 USB.MADI. All units have to be in sync, i.e. have to receive valid sync information (by feeding synchronized signals).

- If the USB.MADI is set to clock mode Internal (Master - USB Interface), all others have to be set to clock mode Slave, and have to be synced from the master. The clock modes of all units have to be set up correctly in their 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 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.

16. 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, 2/8/64 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**.

17. Hotline – Troubleshooting

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 USB.MADI 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 application.
- Try different cables (coaxial or optical) to rule out any defects here.
- Check the Settings dialog for displayed Errors.

Driver installation and Settings dialog/TotalMix work, but a playback or record is not possible

- 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.

User's Guide

USB.MADI

TotalMix FX

18. Routing and Monitoring

18.1 Overview

The USB.MADI includes a powerful digital real-time mixer, *TotalMix FX,* 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. However, the USB.MADI does not have a DSP, so there are no FX available.

Here are some typical applications for TotalMix:

- Setting up delay-free submixes (headphone mixes). The USB.MADI allows for up to 32 fully independent stereo submixes. On an analog mixing desk, this would equal 64 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 via a single stereo output. The ASIO multi-client driver supports the usage of several programs at the same time. When done on different playback channels TotalMix provides the means to mix and monitor these on a single stereo output.

- 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.

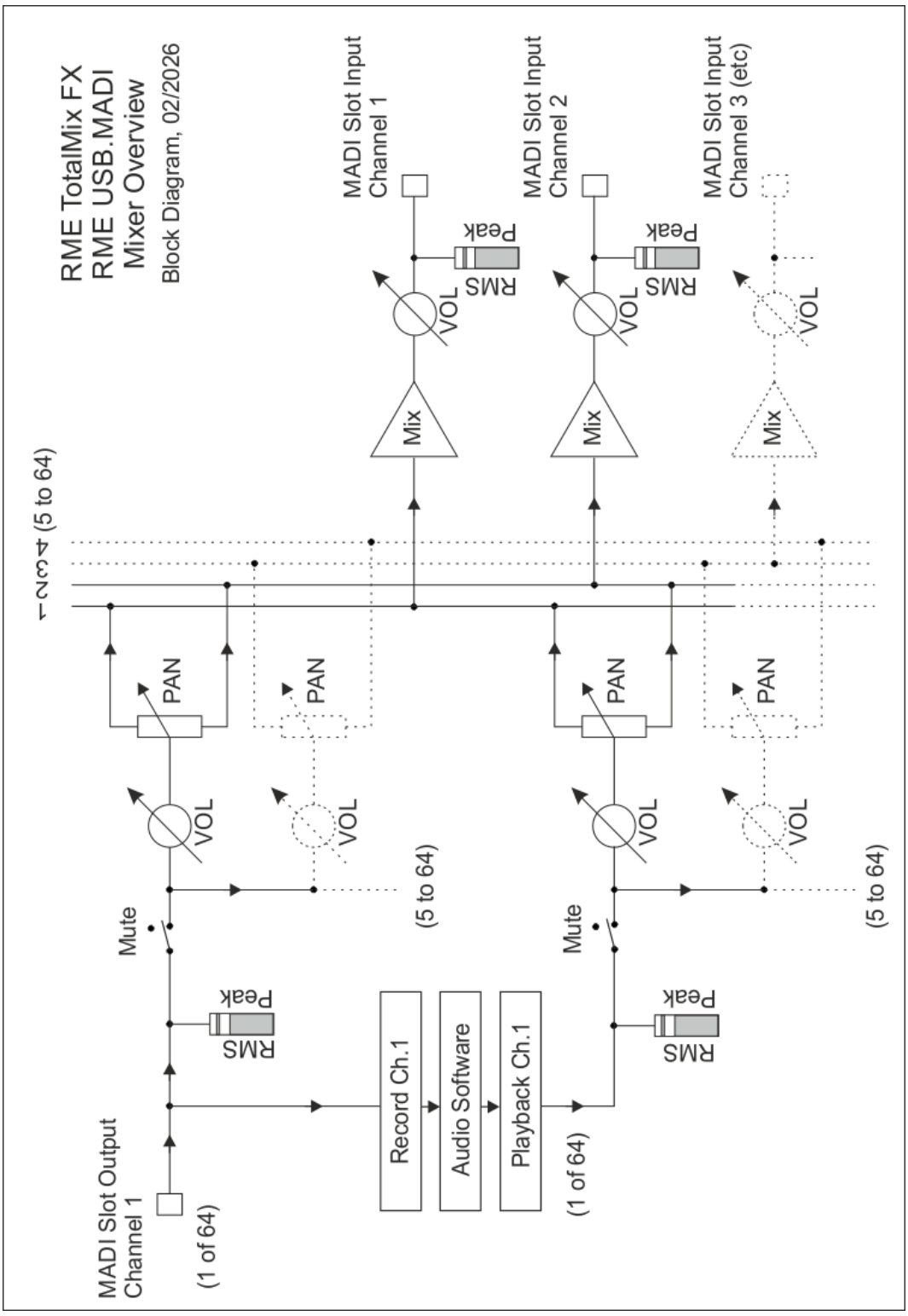
Every single input channel, playback channel and hardware output features a Peak and RMS level meter, calculated in hardware. These level displays are very useful to determine the presence and routing destinations of the audio signals.

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 unaltered. 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).

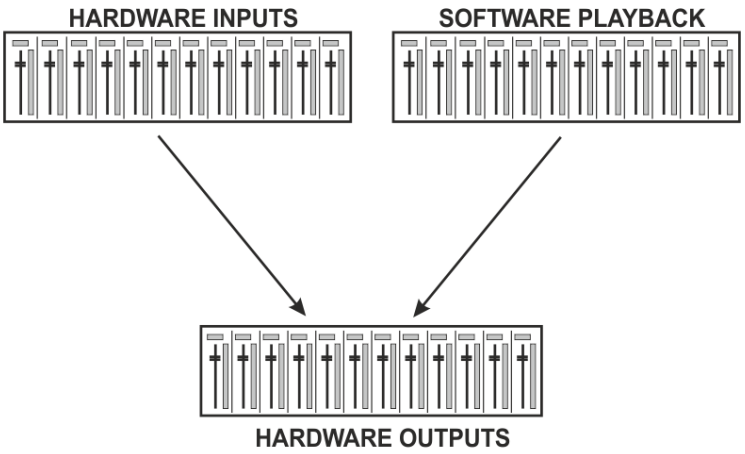
- The hardware input signal can be passed on as often as desired, even with different levels. This is a big difference to conventional mixing desks, where the channel fader always controls the level for all routing destinations simultaneously.

- 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 outputs are connected post-fader, thus displaying the actual output level.


RME TotalMix FX
RME USB.MADI
Mixer Overview
Block Diagram, 02/2026
MADI Slot Input
Channel 1
MADI Slot Input
Channel 2
MADI Slot Input
Channel 3 (etc)
Peak
RMS
VOL
Mix
PAN
(5 to 64)
Mute
MADI Slot Output
Channel 1
(1 of 64)
Record Ch.1
Audio Software
Playback Ch.1
(1 of 64)

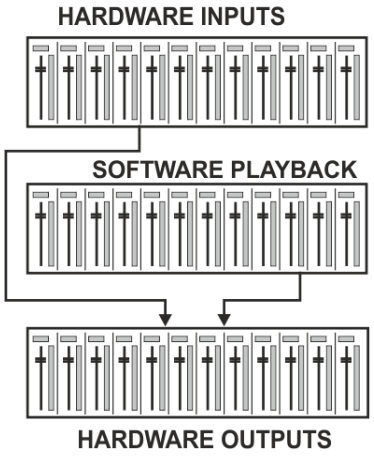
18.2 The User Interface

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 USB.MADI provides 64 input channels, 64 software playback channels, and 64 hardware output channels:



TotalMix can be used in the above view (View Options **2 Rows**). 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 field, 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 field, 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.

18.3 The Channels

A single channel can be switched between mono and stereo mode. The mode is set in the channel settings panel (tool symbol).

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 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 −∞ 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 −∞ the current routing will be shown in bold letters, but not have an arrow in the front.

Trim Gains. After a click on the **T** symbol 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 fader's 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 USB.MADI there are 64 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 View Options / Show the function Trim Gains can be globally switched on and off for all channels. This 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* and *paste the input mix*. 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 is offered.

18.3.1 Settings

A click on the tool symbol opens the channel's **Settings** panel with differing elements.

Stereo. Switches the channel to mono or stereo mode.

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

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: the functions 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 three more options:

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. With this any hardware output can be controlled and listened to through the monitoring output very conveniently. Using the option *Assign / Cue to* in the Control Room section, Cue can also be used with any of the Phones outputs.

18.4 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 and Talkback 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 the Settings dialog (F3).

Recall. Sets the gain value defined in the Settings dialog.

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

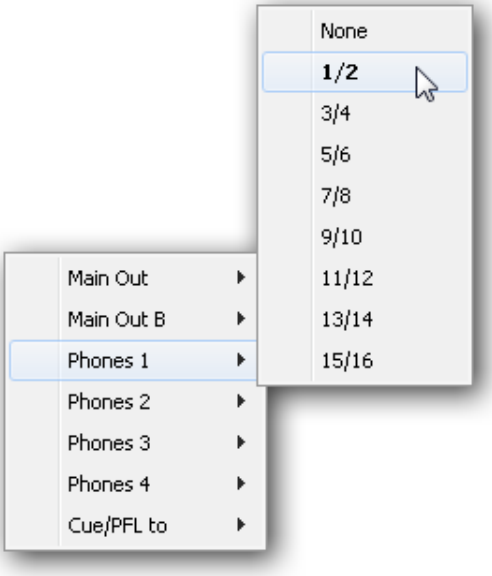
Mono. Mixes left and right channel. Useful to check for mono compatibility and phase problems.

Talkback. A click on this button will dim all signals on the *Phones* outputs by an amount set up in the Preferences dialog. At the same time the control room's microphone signal (source defined in Preferences) 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.

Assign. Allows to define the Main Out, Main Out B, and up to four Phones outs. The listbox includes all 130 hardware output channels.

The output for the Cue signal, which is usually Main, can also be set to one of the outputs *Phones* 1-4. The setting *Cue/PFL to* controls the PFL monitoring.



18.5 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. Still using the menu entry *Window, Hide Control Strip*, the Control Strip is shifted out of the visible area to gain more space for other elements.

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. Not functional with the USB.MADI.

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.

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.

18.5.1 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, 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 sub-mixes 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.** Not functional with the USB.MADI.

- **RMS Level.** The numerical level display in the channels displays peak or RMS.

Show

- **FX.** Not functional with the USB.MADI.

- **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.

18.5.2 Snapshots - Groups

Snapshots. Snapshots include all mixer settings, but no graphical elements like window positions, window size, number of windows, visible settings, scroll states 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.

Eight different mixes can be stored under individual names in the Snapshot section. A click on any of the eight 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 most top or lowest 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.

18.5.3 Channel Layout - Layout Presets

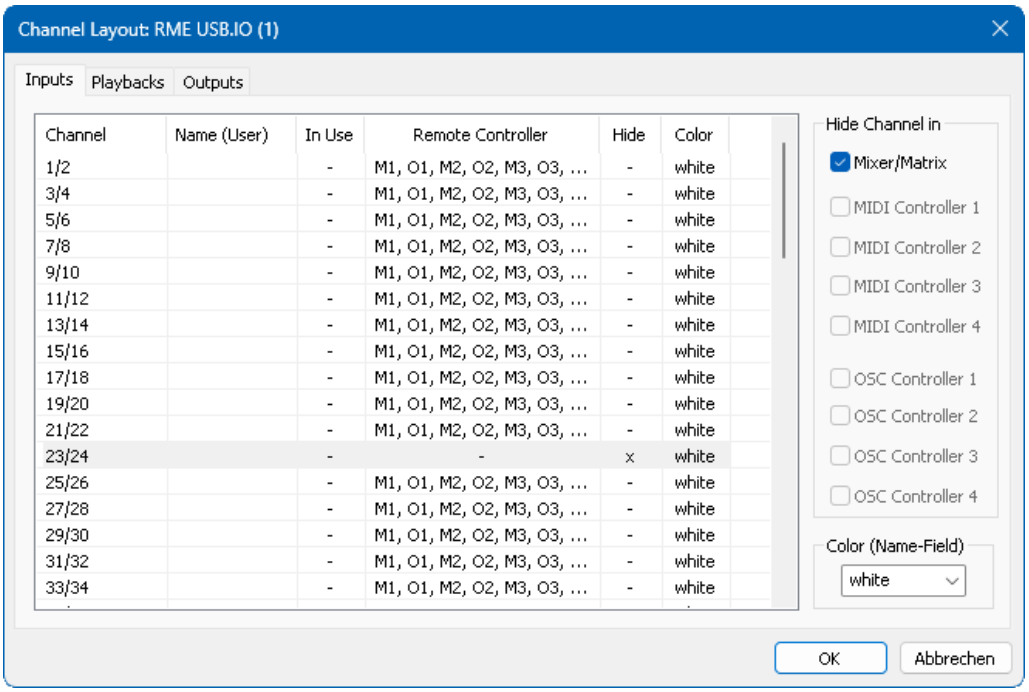
To maintain overview within TotalMix FX channels can be hidden. Channels can also be excluded from being remoted. Under *Options / Channel Layout* a dialog lists all I/Os with their current state. Selecting one or several channels enables the options to the right:

- **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 5 to 11, when channels 3 and 4 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.

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 channels 23/24 have been made invisible. If these are not used this is an easy way to remove them from the mixer completely.

A double click onto any line opens the edit field for the *Name (User)* column. 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!*

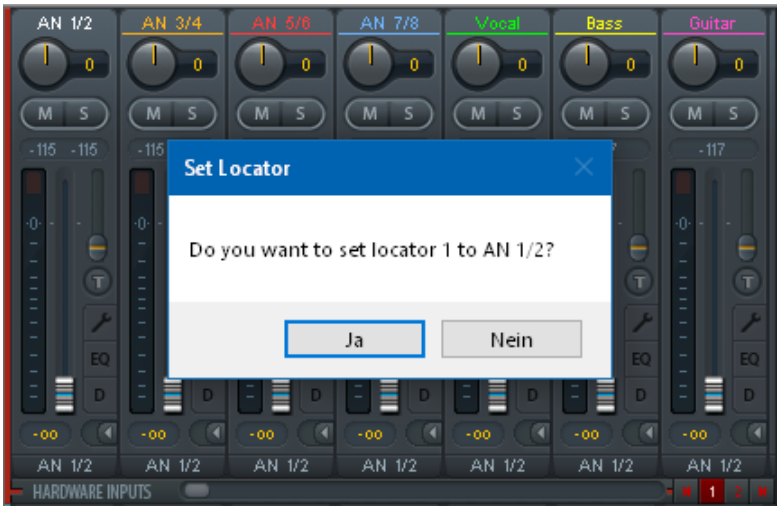
The button *Sub* activates another useful special view. When in *Submix view*, Sub will cause all channels to disappear that are not part of the currently selected Submix/Hardware Output. Sub temporarily shows the mix based on all channels from Inputs and Playback row, independent from the current Layout 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.

18.5.4 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.

Location markers are stored in the Workspace.



18.6 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.**
- **FX Send follows Main Out.** Not available for the USB.MADI - no FX.

- **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).

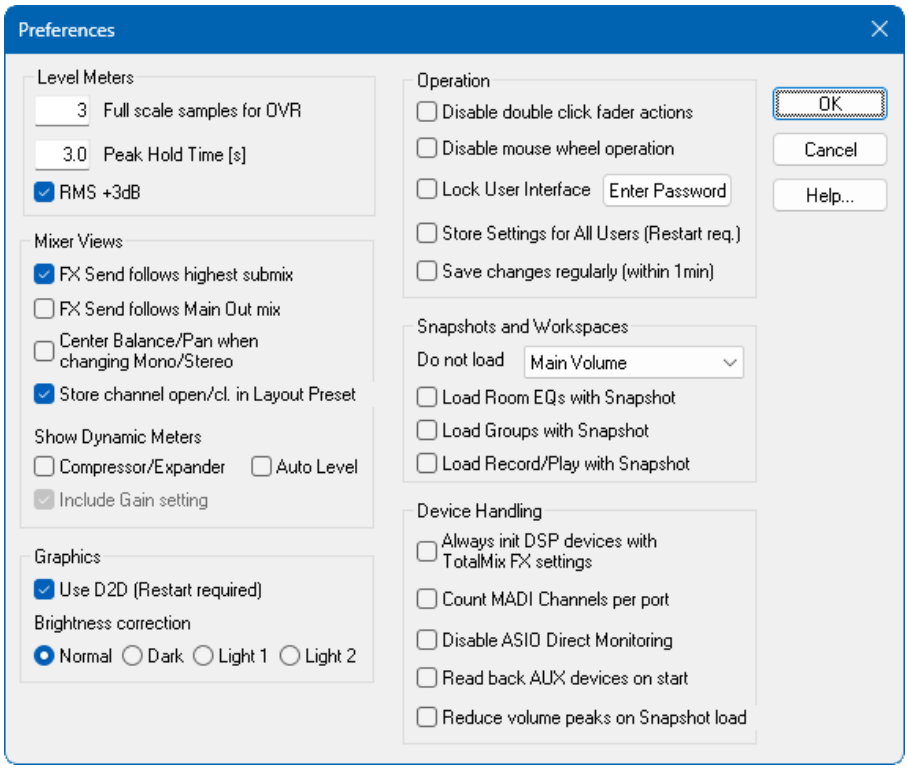
Show Dynamic Meters
Not available for the USB.MADI.

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.** Not available for the USB.MADI.
- **Load Group with Snapshot.** Loads Fader/Mute/Solo groups per Snapshot.
- **Load Record/Play with Snapshot.** Not available for the USB.MADI.

Device Handling
- **Always init DSP devices with TotalMix FX settings.** For the USB.MADI: always on, as the unit does not store any. When connecting to a computer TotalMix FX will immediately load its settings into the USB.MADI.
- **Count MADI Channels per port.** Not available for the USB.MADI.
- **Disable ASIO Direct Monitoring.** Disables ASIO Direct Monitoring (ADM) for the USB.MADI within TotalMix FX.
- **Read back AUX devices on start.** Not available for the USB.MADI.
- **Reduce volume peaks on Snapshot load.** Not available for the USB.MADI.



18.6.1 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 several people 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*.

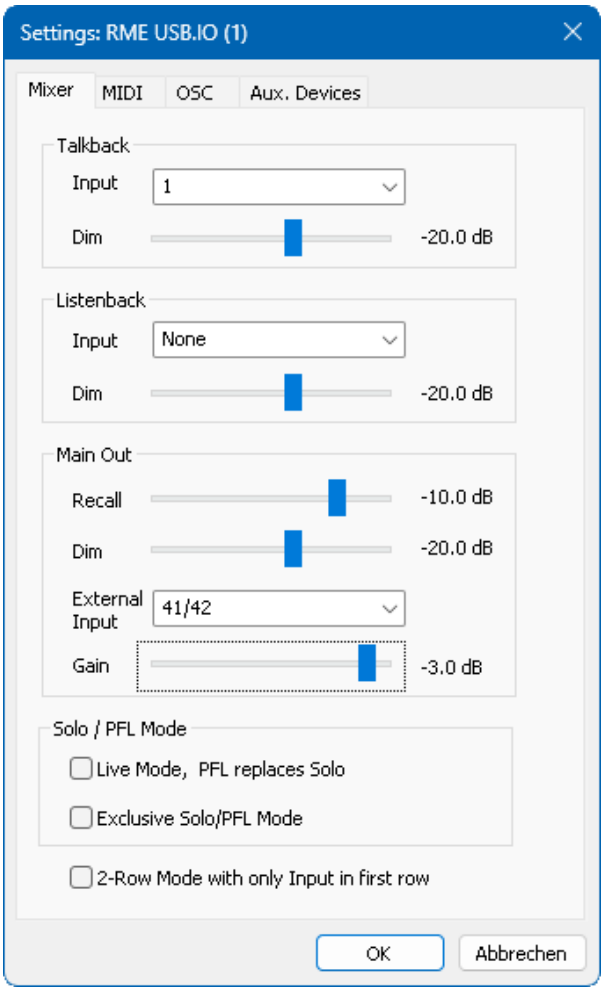
An admin could even write protect the file **lastRMEUSB.MADI1.xml**, which results in a complete reset to that file's content whenever TotalMix FX is restarted. The xml-file is updated on exit, so simply set up TotalMix as desired and exit it (right mouse click on the symbol in the notification area), then change the file attribute.

18.7 Settings

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

18.7.1 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. 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.

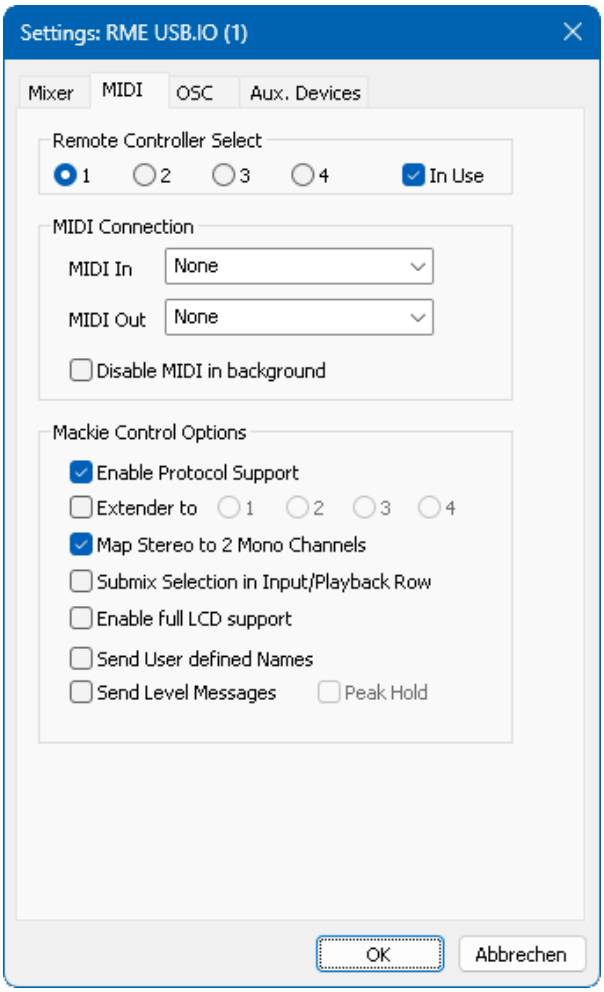
18.7.2 MIDI Page

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 Connection
- **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.

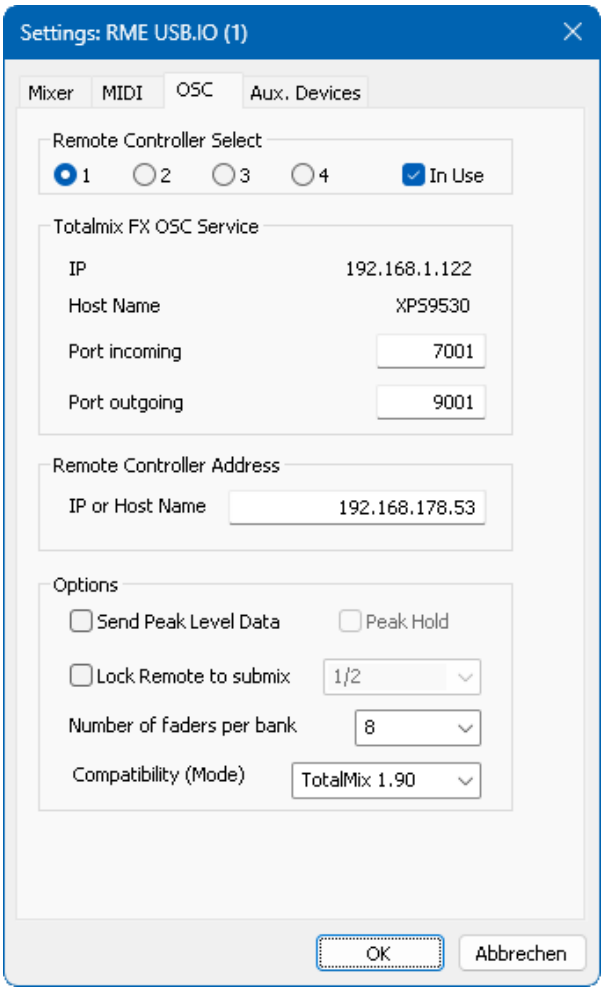
Mackie Control Options
- **Enable Protocol Support.** When disabled TM FX will only react on the Control Change commands of chapter 21.5.
- **Extender to.** Sets the current remote to be an extender to the main remote. Both remotes will be shown as one block and navigate simultaneously.
- **Map Stereo 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.

18.7.3 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 21.7.

18.7.4 Aux Devices

Not available for the USB.MADI.

18.8 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 −∞. 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 tp 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) with held down **Shift** key lets all channels to the right change their state. For example all settings 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).

18.9 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 controller (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 18.6.

Settings. Opens a dialog box to configure several functions like Talkback, Listenback, Main Out and the MIDI Remote Control. See chapter 18.7.

Channel Layout. Hide channels visually and exclude them from remote. See chapter 18.5.3.

ARC & Key Commands. Opens a dialog to configure the computer's keyboard keys F4 to F8, and the buttons of the optional ARC USB.

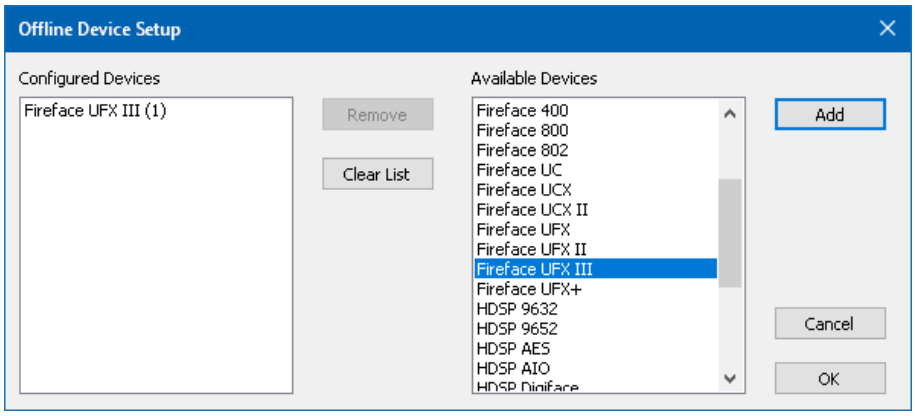
Reset Mix. Offers several options to reset the mixer state:

- **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.** Not valid for the USB.MADI.
- **Clear channel effects w/o Room EQ.** Not valid for the USB.MADI.
- **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.** Not valid for the USB.MADI.

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 22 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 23.

Store current state into device. Not valid for the USB.MADI.

18.10 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.

19. The Matrix

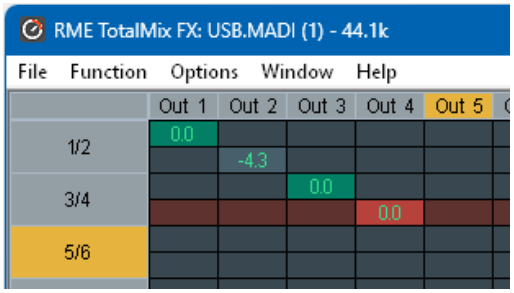
19.1 Overview

The mixer window of TotalMix looks and operates similar to mixing desks, as it is based on a conventional fader 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 USB.MADI 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. Therefore both views are always synchronized. A change in one view is immediately reflected in the other view.

19.2 Elements of the Matrix View

- **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.



To maintain overview when the window size has been reduced, the labels are floating. They won't leave the visible area when scrolling.

A right mouse click on the labels brings up the context menu with the same options as in the mixer view: Copy / Mirror / Paste /Clear input channels and submixes.

19.3 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 **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 if desired, 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.

20. Tips and Tricks

20.1 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. For best ADM compatibility use mono inputs and stereo outputs. This setup can be activated globally under Options, Reset Mix.

20.2 Copy a Submix

TotalMix allows you to copy complete submixes to other outputs. In case a complex submix is needed 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.

20.3 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 (faders) stay fully independent.

20.4 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 easily.

20.5 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* and *Paste the input mix*. 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 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!

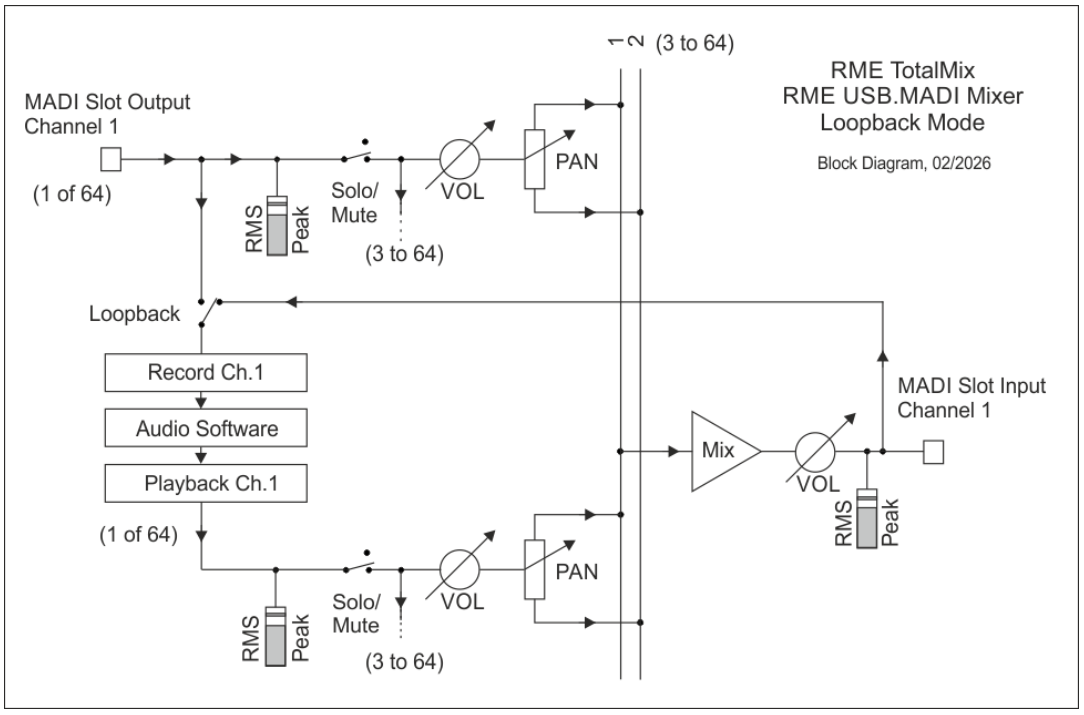
20.6 Recording a Submix - Loopback

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 64 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.

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.

To solve this 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 redefine 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.

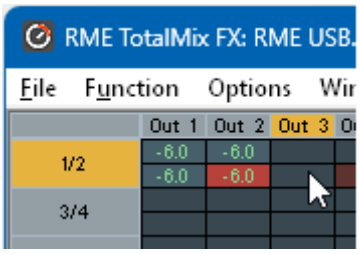
20.7 MS Processing

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.

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.

20.8 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.

21. MIDI Remote Control

21.1 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 USB.MADI 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.

21.2 Mapping

TotalMix supports the following Mackie Control surface elements*:

Element:	**Meaning in TotalMix:**
Channel faders 1 – 8	volume
Master fader	Main Monitor channel's faders
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.

21.3 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.

21.4 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.

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, 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 fader (lowest row) which is 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.

21.5 MIDI Control

The hardware output 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 USB.MADI 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 desirable 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 / **#G2**
Master Solo: 2B / 43 / **G2**

Note: The hex value is standardized, the key (note) 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 5 to maximum attenuation: B1 6A 0
- Set playback 1 to maximum: B4 66 7F
- Set Output 3 to 0 dB: B8 68 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.

21.6 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.

21.7 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 18.7.3.

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, and lots of useful user feedback.

22. 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 – not for the USB.MADI)
- Mute and Solo
- Cue / PFL

23. 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.

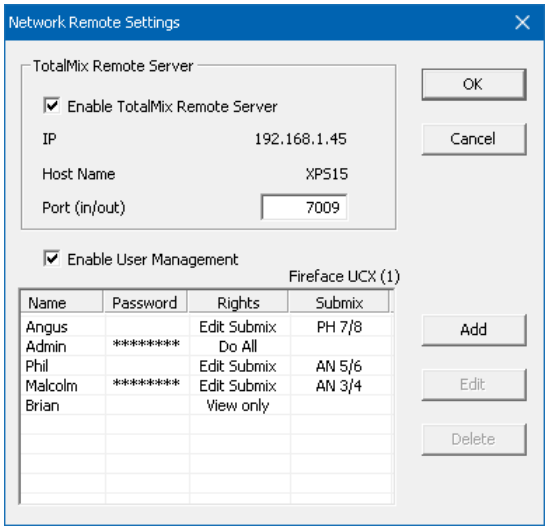
Supported Hardware

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

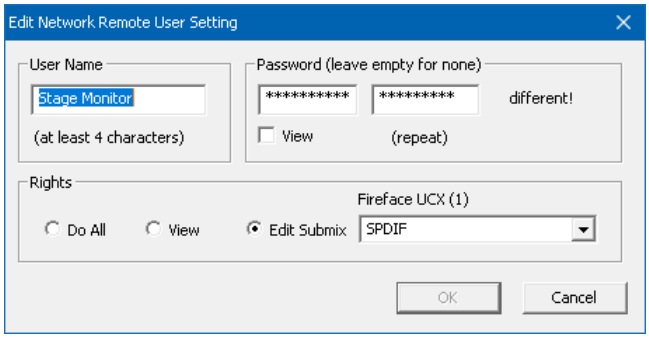
On the host (the computer with the connected audio interface) go to the TotalMix FX menu *Options, Network Remote Settings*. Click *Enable TotalMix Remote Server* to start this service. Under Windows a Firewall warning will come up. Allow TotalMix FX or it won't work. This dialog also shows the host's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



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 Total-Mix 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.



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

USB.MADI

Class Compliant Mode

24. General

The USB.MADI operates in two different modes: **driver-based USB 2.0** and **Class Compliant** with USB 2.0. 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 example there will be no hardware settings and no TotalMix.

Note: Under macOS, Class Compliant mode also works with the latest DriverKit drivers. The macOS audio driver is used, but the Settings dialog and TotalMix FX continue to control the USB.MADI.

! *The Class Compliant mode can be activated and deactivated only by flashing the respective CC or standard firmware into the USB.MADI.*

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®.

25. System requirements

- USB.MADI in Class Compliant mode
- Any Apple iPad with at least iOS 9
- Apple iPad Camera Connection Kit or Lightning to USB adapter
- iPad Pro: USB-C to USB-C cable, USB 2 or USB 3 version

26. Operation

Connect computer or iPad with the USB.MADI using a Lightning to USB adapter or a USB-C to C cable. Start the iPad/computer and plug-in the adapter/cable. If everything works as expected, the unit will enter CC host mode, indicated by the module's USB LED. Audio playback will automatically be performed by the USB.MADI using channels 1/2.

26.1 Useful hints

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

Note that the 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 iPad even when used with the USB.MADI.

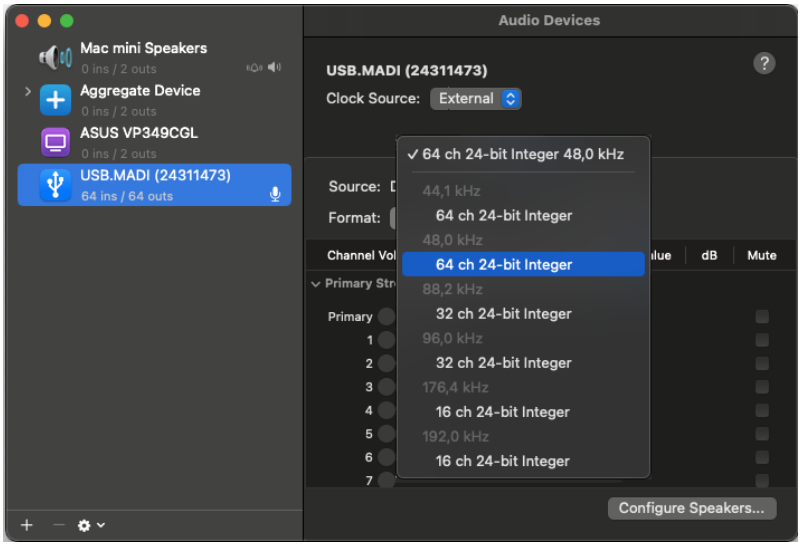
The iPad Pro with its USB-C socket operates as regular USB host. Therefore, no adapter is needed, only a matching cable (USB-C to USB-B). Even the use of powered USB hubs is possible.

26.2 Class Compliant Mode under Windows and macOS

The USB 2 Class Compliant mode of the USB.MADI (64 channel playback) is currently not fully compatible to Windows 11.

macOS can be used in Class Compliant mode, with DriverKit 4.30 or higher even using Settings dialog and TotalMix. The screenshot to the right shows the available CC modes in the *Audio MIDI Setup*.

The Audio window in the Audio MIDI Setup lists three available modes: 16, 32 and 64 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*. Stereo players like *Neutron* use all sample rates of the USB.MADI, and even recognize its 64 channels. 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.

27. 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 first channel works with mono apps, input channels 1 and 2 with stereo apps (both dual mono and stereo), and up to 8 input channels 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.

The USB.MADI (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. The current sample rate is set by Mac OS X or iOS (the app in use).

User's Guide

USB.MADI

Miscellaneous

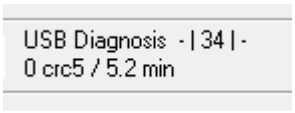
28. USB Audio

USB audio is in several ways different from PCI based audio interfaces. The USB.MADI even more, as it tries to use the USB standard's full potential. Transmitting 64 channels simultaneously in both directions therefore requires modern hardware. While the USB.MADI will work on older computers with for example a Core 2 Duo CPU and ICH 9 as USB hub, the CPU load is noticeable and DPC is raised from the underlying USB driver of the operating system. Newer computers, especially those already having USB 3 ports, usually show no such issues, as their raw performance handles the USB load with ease.

Low CPU load and click-free operation even at 64 samples buffer size are indeed possible on current computers. However, using older computers a simple stereo playback will already cause a CPU load of more than 30%.

A computer blocked for a short time – no matter if ASIO or WDM – will loose one or more data packets. Such problems can only be solved by increasing the buffer size (and with this the latency).

The USB.MADI features a unique data checking, detecting errors during transmission via USB and displaying them in the Settings dialog. Additionally the MADIface provides a special mechanism to continue recording and playback in spite of drop-outs, and to correct the sample position in real-time.



Like any audio interface the USB.MADI should have a data transmission to the computer as undisturbed as possible. The easiest way to guarantee this is to connect it 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 USB.MADI to a USB port
- Start the Device Manager, choose View 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 USB.MADI. By reconnecting to a different port this view now allows for a check at which of the two controllers the MADIface is connected. With multiple devices it can also 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 USB.MADI, by simply connecting the drive to the other controller.

Especially with notebooks it can happen that all internal devices and all the sockets/ports are connected to the same controller, with the second controller not used at all. In that case all devices have to use the same bus and interfere with each other.

Although the driver supports up to three devices, the USB 2.0 interface is already fully utilized with 64 audio channels. Therefore it is recommended to only use one USB.MADI per computer.

29. Warranty

(1) The warranty period shall be one year following delivery of the goods. This period shall not apply to the Principal's claims for damages resulting from loss of life, physical injury, or injury to health, or from deliberate or grossly negligent breaches of duty by the Contractor or its vicarious agents, which are subject to the usual relevant statutory limitation periods.
(2) The Principal shall carefully inspect the goods promptly upon receiving them. With respect to obvious defects or other defects that would have been apparent through prompt and careful examination, the goods shall be deemed approved by the Principal if the Contractor has not received a written notice of defects within seven business days following delivery. With respect to other defects, the goods shall be deemed approved by the Principal if the Contractor has not received a written notice of defects within seven business days following the point in time at which the defect appeared; in the event that the defect was already apparent to the Principal at an earlier point through normal use, however, this earlier point shall be applicable as the start of the notification period.
(3) In the event of material defects of the delivered goods, the Contractor is obligated and entitled, within a reasonable time period, to select initially between remediation or replacement of the goods. In the event of failure, i.e. the impossibility, unreasonableness, refusal, or unreasonable delay in remediation or replacement of the goods, the Principal is entitled to withdraw from the contract or to demand commensurate reduction in the purchase price.
(4) Should the Contractor be at fault for any defect, the Principal is entitled to demand compensation for damages under the conditions stipulated in Sec. 10 of DirectOut's GTC's.
(5) The Contractor is entitled to predicate the remedial performance upon the Principal's payment of the purchase price due. The Principal is entitled, however, to retain an appropriate portion of the purchase price in proportion to the defect.
(6) The Principal shall grant the Contractor the time and opportunity required to remedy the defect, and in particular shall hand over the rejected goods for examination. In the event of delivery of replacement goods, the Principal shall return the defective goods to the Contractor in accordance with the applicable statutory provisions. Remedial performance includes neither the removal of the defective goods nor their reinstallation, unless the Contractor was originally obligated to perform installation.
(7) The expenses incurred for examination and remedial performance, in particular costs for transport, infrastructure, labour, and materials (not: costs of removal and installation), shall be borne by the Contractor in the event that a defect is actually found. The Contractor may otherwise demand that the Principal reimburses it for the costs arising from unjustified demands for defect remediation (in particular costs of inspection, transport, infrastructure, labour, material, removal, and installation) unless the lack of defectiveness was not apparent to the Principal.
(8) In the event of defects in parts produced by other manufacturers that the Contractor cannot repair for reasons involving license rights or for other reasons, the Contractor may, at its discretion, elect either to assert its claims for compensation against the manufacturer and supplier on behalf of the Principal, or assign its claims to the Principal. Warranty claims shall only lie against the Contractor in the event of such defects in accordance with the other requirements and pursuant to these GT&Cs if judicial enforcement of the abovementioned claims against the manufacturer and supplier was unsuccessful or, e.g. in the event of insolvency, pointless. For the period in which legal proceedings are pending, the expiry of the Principal's relevant compensation claims against the Contractor is suspended.
(9) The warranty shall expire if the Principal modifies the goods or has them modified by third parties without the Contractor's approval, thus rendering remediation of the defect impossible or unreasonably difficult. In any case, the Principal must bear any additional defect remediation costs arising from the modification.
(10) The warranty does not cover any faults in the goods arising from incorrect installation or use, misuse, negligence, or other causes.
(11) A delivery of used objects agreed with the Principal in a specific case shall not be covered under any warranty against material defects.

30. Appendix

Contact

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Sales: sales@directout.eu
Support: support@directout.eu
www.directout.eu

Trademarks

Current driver version: Windows: 1.0.17. macOS depending on OS version: 4.30 (DK), 3.39 (KE)
Current firmware version: USB 18 CC 13
TotalMix FX: 1.991

31. Conformity & Certificates

Proper Use

The USB.MADI is a digital interface for professional audio applications for use with CE approved class B computers. To comply with the European CE standard, the USB.MADI must be used with CE approved Class B computers. All connecting cables must be shielded. The computer and the cable connected to the USB.MADI must be properly grounded. Operation with non-certified computers and cables may cause interference to other devices as well as the USB.MADI.

CE

This device complies with the basic requests of applicable EU guidelines. The appropriate procedure for approval has been carried out.

RoHS

(Restriction of the use of certain Hazardous Substances)
This device was constructed fulfilling the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU and 2015/863.

LUCID

(German Packaging Register)
LUCID-Reg -No.: DE1314118018883

WEEE
(Directive on Waste Electrical and Electronic Equipment)
Due to the directive 2002/96/EC for waste disposal this device must be recycled. For correct recycling please dispatch the device to:

DirectOut GmbH,
Hainichener Str. 66a
09648 Mittweida
Germany

Only stamped parcels will be accepted!
WEEE-Reg.-No. DE 64879540