

User's Guide Update



HDSP and HDSPe Series

Windows Driver 4.x

incl. TotalMix FX

New Features and Functions

for

**Multiface Digiface RPM
HDSP 9632 HDSP 9652 HDSP AES-32 HDSP MADI
HDSPe AIO HDSPe RayDAT HDSPe AES HDSPe MADI
HDSPe MADIface**

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Appendix

RME news, driver updates and further product information are available on the RME website:

<http://www.rme-audio.com>

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Windows Driver 4.x

▶ **General**

1. Overview

The unified Windows driver of the RME HDSP and HDSPe series audio interfaces supports many different units, from the very first PCI-based Digiface up to the PCIe-based HDSPe AES. That makes it possible to use any combination of them (excluding the RPM) as one ASIO device.

The Digiface started back in 2001 as the world's first professional portable multitrack interface, and the first Hammerfall DSP (HDSP) interface ever. The HDSP series driver supports all interfaces released since then:

- Digiface, Multiface and RPM via CardBus, ExpressCard, PCI or PCIe card
- Direct PCI interfaces HDSP 9632, HDSP 9652, HDSP AES-32, HDSP MADI
- Direct PCI Express interfaces HDSPe AIO, HDSPe AES, HDSPe RayDAT, HDSPe MADI
- External PCI Express Interface HDSPe MADIface

The DSP in HDSP refers to the introduction of TotalMix, a practically unlimited mixing/routing engine with full ASIO Direct Monitoring support, with the DSP cost-efficiently realized within the interface's main chip, an FPGA.

The HDSP series drivers have seen all Windows generations from 98 up to Windows 8.1. Over a period of more than 13 years, the basic driver design had to be changed several times, at one point even the firmware of the interfaces, to gain best performance out of the ever changing hardware and operating systems.

The new driver generation 4.x has several interesting aspects. For example, it brings back the old 'Interleaved' option for WDM operation in an easier to understand and more flexible way. It also no longer waits for Microsoft to come up with a working sample rate control for professional multichannel audio interfaces, instead it implements complete unload/reload of WDM devices for full control under Windows 7 and 8. But even if only ASIO is used, the driver 4.x has something unique to offer: TotalMix FX. Yes, we ported the latest TotalMix FX back to all devices released since 2001! Of course there is no EQ, no Echo, no Reverb, no Dynamics, as the hardware can not render these. Still there are many advantages of TotalMix FX in comparison to the previous TotalMix:

- choice of mono and stereo channels
- improved graphics including zoom states
- OSC remote control
- separate control room section, Cue, flexible talkback for all outputs, 4 Mute and Solo groups, Recall, External Input, local and global TrimGains/Post support with exclusion, Layout Presets to hide channels or MIDI remote functionality, 2 Row mode, multiple remote support, assignable F-key commands, Windows/Mac compatible mixer files, Matrix with Mono/Stereo mode, PFL mode, and and and...

The list is long - and getting longer as TM FX is still being worked on. We can only encourage you to read the chapters describing TotalMix FX in detail.

2. System Requirements

- Driver 4.x runs under Windows XP or higher, 32 and 64 bit systems

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Windows Driver 4.x

▶ Driver Installation and Operation

3. Driver Installation and Update

First time installation: To simplify installation it is recommended to first install the drivers before the card is put into the computer. But it will also work the other way round.

Insert the RME Driver CD into your CD-ROM drive. The driver installer is located in the directory **WDM**. Start *rmeinstaller.exe* and follow the instructions of the installer. After installation put the PCI or PCIe card into the computer as described in the original manual, chapter Hardware Installation. Upon boot Windows detects the new hardware and installs the driver automatically.

After a reboot, the icons of TotalMix FX and Settings dialog appear in the notification area.



Driver Updates from 3.x series drivers

As usual driver updates do not require the removal of the existing drivers. Since version 4.03 the automatic start of the old TotalMix is removed during the driver installation. The program itself stays in the directory Windows\System32. If desired it can be deleted manually (*hdspmix.exe*). While the new driver is fully compatible to the old TotalMix, and as long as there is no window open (TM just sitting in the notification area) it doesn't interfere with TotalMix FX. RME still recommends not to use the old TotalMix anymore.

4. Major Changes in 4.0

Compared to the last public driver 3.42, version 4.0 has these changes:

- Changing the sample rate now unloads and reloads all existing WDM devices
- Extended configuration of WDM devices includes: global choice between multi-channel (up to 8 channels) or stereo (2 channels) WDM devices. Via 'Configure' a table is shown which allows any of these devices to be activated or deactivated. It is no longer required to activate the first WDM device. The dialog 'Configure' can be switched to the Speaker view, where any of the currently active WDM devices can be assigned with the Speaker property. This includes multiple Speaker assignments.
- The number of WDM devices can be set to 0, effectively disabling the WDM functionality and all its side effects
- Improved DirectSound compatibility and operation, especially in Surround/multi-channel modes
- Improved sync error display for external clocking
- TotalMix FX (1.02 or up) instead of TotalMix
- TotalMix / TotalMix FX can now read the hardware level meter information simultaneously with DIGICheck, giving valid readings

5. Configuring the HDSP or HDSPe Interface

This update to the manual addresses the whole HDSP and HDSPe series. The screenshots on the next pages are examples, your particular interface will show some differences. The text describes only the new or changed options which are missing in the current manuals. For all other options please refer to the interface's original manual.

5.1 Settings Dialog

Configuration of the interface is done via its own settings dialog. The panel 'Settings' can be opened:

- by clicking on the hammer symbol in the Task Bar's notification area

The mixer of the interface, TotalMix FX, can be opened:



- by clicking on the mixer's FX icon in the Task Bar's notification area

The hardware offers a number of helpful, well thought-of practical functions and options which affect how the card operates - it can be configured to suit many different requirements, like:

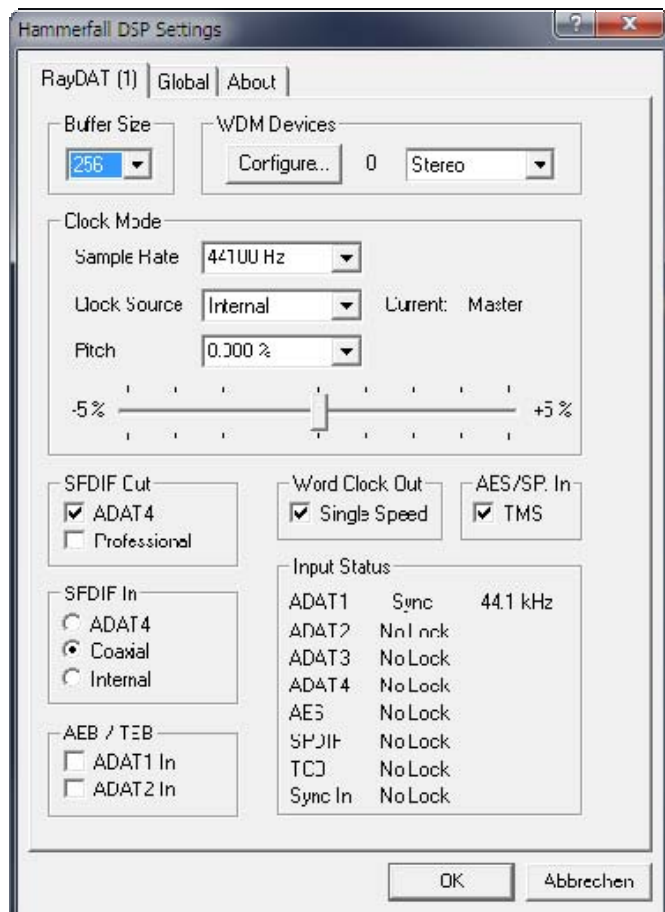
- Latency (Buffer Size)
- WDM device configuration
- Current sample rate
- Synchronization behaviour
- Configuration of digital I/Os
- Input selection
- State of input and output

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.

Several status displays provide the user with precise information about the system's current status, and the status of all digital signals.



The tab **About** provides information about the current driver and firmware version.

5.1.1 The Main Tab

Buffer Size

The setting *Buffer Size* determines the latency between incoming and outgoing ASIO and WDM data, as well as affecting system stability. While ASIO can use any offered buffer size, WDM is limited to 256 (XP) or 512 samples (Win 7/8). The driver handles this automatically, higher settings are only applied to ASIO while WDM will stay at 256/512 internally.

WDM Devices

Allows to freely set which I/Os are available as WDM devices, if these are stereo or multi-channel devices (up to 8 channels), and if one or multiple of the currently active WDM devices should have the Speaker property. More details are found in chapter 6.

Clock Mode

Sample Rate

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

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

Clock Source

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

Pitch

More information on Pitch is available in chapter 5.1.3.

5.1.2 The Global Tab

This tab includes several options that work on all currently installed cards.

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 interface.

Optimize Multi-Client Mixing

Default: off. Checking this option removes short noise bursts when multi-client playback starts, but will also introduce a small additional CPU load.

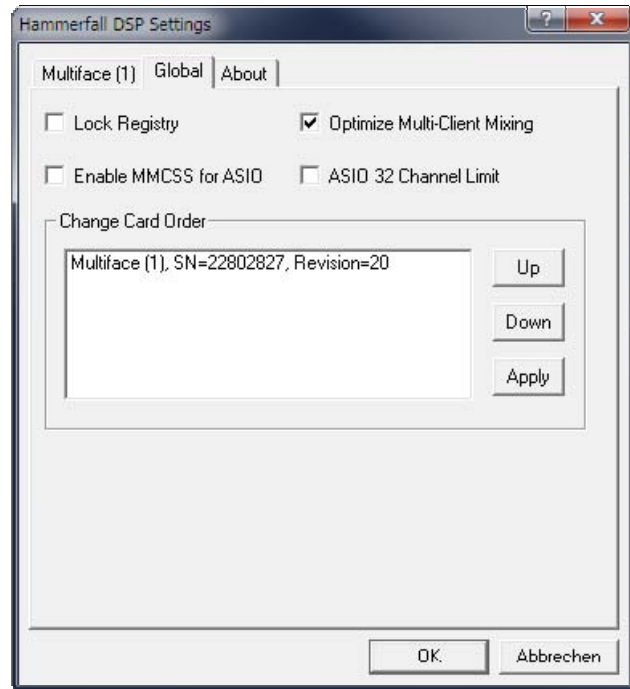
Enable MMCSS for ASIO activates support with higher priority for the ASIO driver. Note: At this time, activating this option seems to be useful only with the latest Cubase/Nuendo at higher load. With other software this option can decrease performance. The change becomes active after an ASIO reset. Therefore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

ASIO 32 Channel Limit

Default: off. Checking this option limits the number of ASIO I/Os on interfaces with high channel counts to 32. Reducing the number of ASIO channels is required for older versions of ProTools to prevent them from crashing on start-up.

Change Card Order


This dialog lists all cards currently installed in the system and controlled by the driver. Their order can then be changed by selecting a card and using the up/down arrows. Confirm the operation with the Apply button. This feature comes in handy if different cards are installed and a specific one of them should always be the first in the ASIO channel list.




5.1.3 Settings Dialog – Pitch

Usually soundcards and audio interfaces generate their internal clock (master mode) by a quartz. Therefore the internal clock can be set to 44.1 kHz or 48 kHz, but not to a value in between. SteadyClock, RME's sensational Low Jitter Clock System, is based on a Direct Digital Synthesizer (DDS). This superior circuitry can generate nearly any frequency with highest precision.

DDS has been implemented into RME's interfaces with regard to the needs of professional video applications, as well as to maximum flexibility. The section Pitch includes both a list of typical video frequencies (so called pull up/pull down at 0.1% and 4%) and a fader to freely change the basic sample rate in steps of 1 Hz (!) over a range of +/- 5%.

 *The Pitch function requires the interface to be in clock mode Master! The frequency setting will only be applied to this one specific card!*

 *Changing the sample rate during record/playback often results in a loss of audio, or brings up warning messages of the audio software. Therefore the desired sample rate should be set at least coarsely before starting the software.*

Coarse

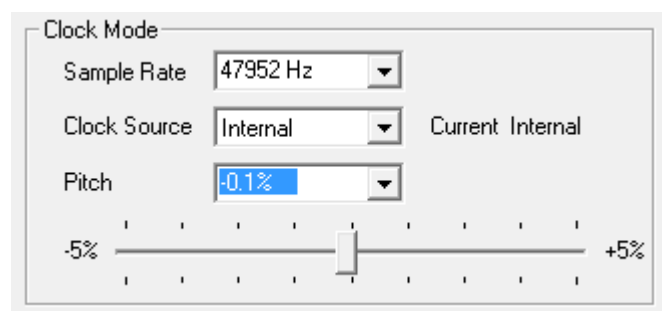
Coarse modification in steps of 50 Hz is done by clicking with the mouse to the left and right of the fader knob.

Fine

Fine modification in steps of 1 Hz is done by using the left/right cursor keys.

Reset

Ctrl key plus left mouse click.



Application examples

Pitch allows for a simultaneous change of speed and tune during record and playback. From alignment to other sources up to creative effects – everything is possible.

Pitch enables you to intentionally de-tune the complete DAW. This way, the DAW can match instruments which have a wrong or unchangeable tuning.

Pitch allows for the change of the sample rate of all WDM devices at the same time. Since Vista this is no longer possible via the audio program, thus requires a manual reconfiguration of all WDM devices. Changing the sample rate from the Settings dialog solves this problem.

5.2 Clock Modes - Synchronisation

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



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

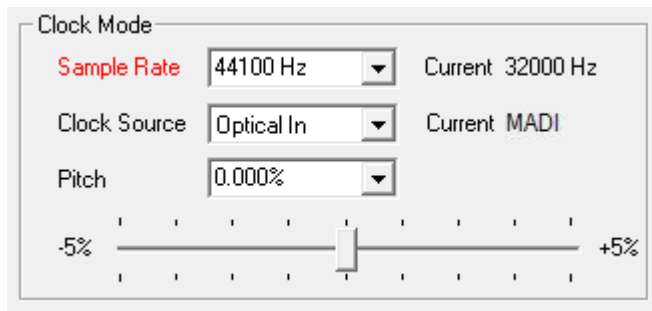
RME interfaces utilize a very user-friendly, intelligent clock control, called **AutoSync**. In AutoSync mode, the system constantly scans the digital input for a valid signal. If any valid signal is found, the card switches from the internal quartz (*Clock Mode – Current Internal*) to a clock extracted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

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

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

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

Under WDM the unit will (has to) set the sample rate. Therefore the error shown to the right can occur. A stable signal with a sample rate of 32 kHz is detected at the Word Clock input (Sync), but Windows audio had been set to 44100 Hz before. The red colour of the text label signals the error condition, and prompts the user to set 32000 Hz manually as sample rate.



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

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

6. WDM Configuration

6.1 Background

In the older manuals one will find this explanation why it makes sense to get rid of some WDM devices:

WDM Devices

Not before Vista the OS had been capable of handling more than 32 WDM stereo devices. Therefore under W2k/XP it often makes sense to intentionally limit their number. Otherwise some channels or MIDI ports might vanish from the system.

Today Microsoft gives us even more reasons to deactivate WDM devices that are unused. One particular issue is that on any device change, but also on simple device queries (like during the start of Cubase/Nuendo) the *audioendpoint builder* is started, visible as *svchost.exe* in the task manager, blocking a whole CPU core for some time. On older computers with Dual Core CPU a simple change from 44 to 48 kHz will cause one core to be fully blocked, equalling 50% CPU load, for more than a minute. The start of Cubase is blocked at the MIDI screen for more than 3 minutes with a RayDAT card.

The duration of this CPU load increases with the number of WDM devices (no matter if 2 or 8 channel ones). The less the quicker your CPU is back to normal – and with 0 WDM devices you won't even notice anything.

On a more modern i7 3770 computer with Z77 chipset and Windows 7/64 the CPU load is only around 12% (8 cores, still Cubendo wait and wait...), and under Windows 8.1 Microsoft reduced the load duration by 50%. Better, but not good enough!

In real-world operation you will also sometimes find the *svchost.exe* process hanging forever – only a reboot will fix this completely.

On a more positive note: server based computers (x chipset) do not seem to suffer from this effect. But this kind of computer is expensive and not widely used as DAW system.

Therefore a flexible WDM configuration is required that can minimize these effects. All current RME drivers now support deactivating unused WDM devices. If you just need one for listening to whatever Media player then simply disable all other devices, reducing the *svchost* illness easily. If you don't need WDM, because ASIO is all that you use, then deactivate them all. ASIO and MIDI will still work.

The *Speaker* property of a WDM device changes its name to: *Speaker*. Many years ago, software relying on Windows' own sound system used the speaker configuration in the Sound control panel to decide whether it can playback surround or not. One had to set the device to 5.1 mode or similar before it would work. These days this scheme seems to be no longer necessary, the software just checks whether the device is only stereo or a multi-channel one, no matter if its called speaker or not. The *Speaker* property became a renaming feature for home entertainment users.

So while most users can disregard this function, some will use software that needs the property. We are even aware of custom software that needs more than one 'Speaker' to work correctly. Driver version 4.x gives the user the freedom to configure whatever is needed to work properly.

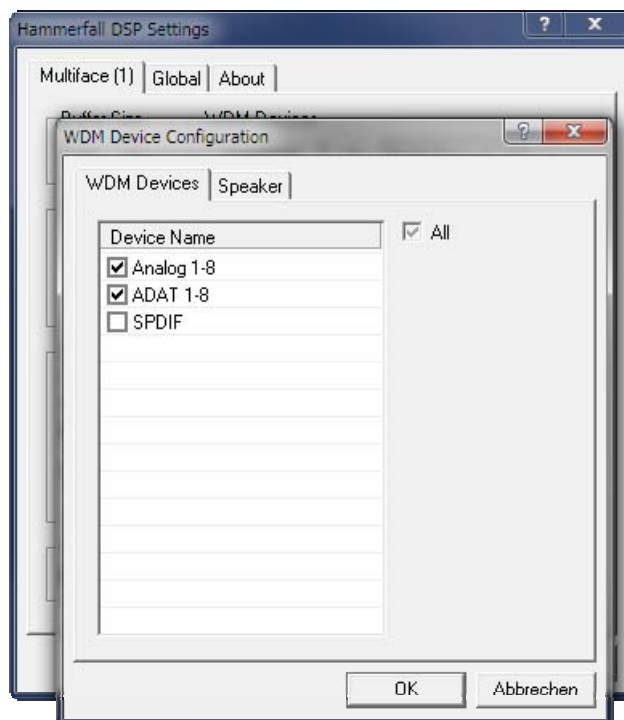
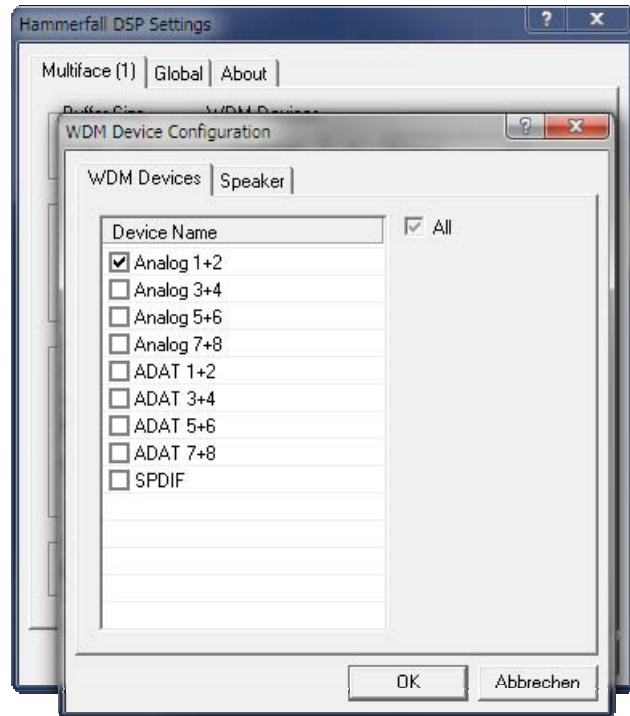
6.2 Option WDM Devices

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 Multiface, and that only Analog 1/2 has been activated. Any number can be activated. Also only higher numbered devices might be active. For example using the ADAT output for system based audio does not require to activate the 4 analog stereo devices. Only ADAT 1/2 will show up in the Windows Sound control panel.

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



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

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

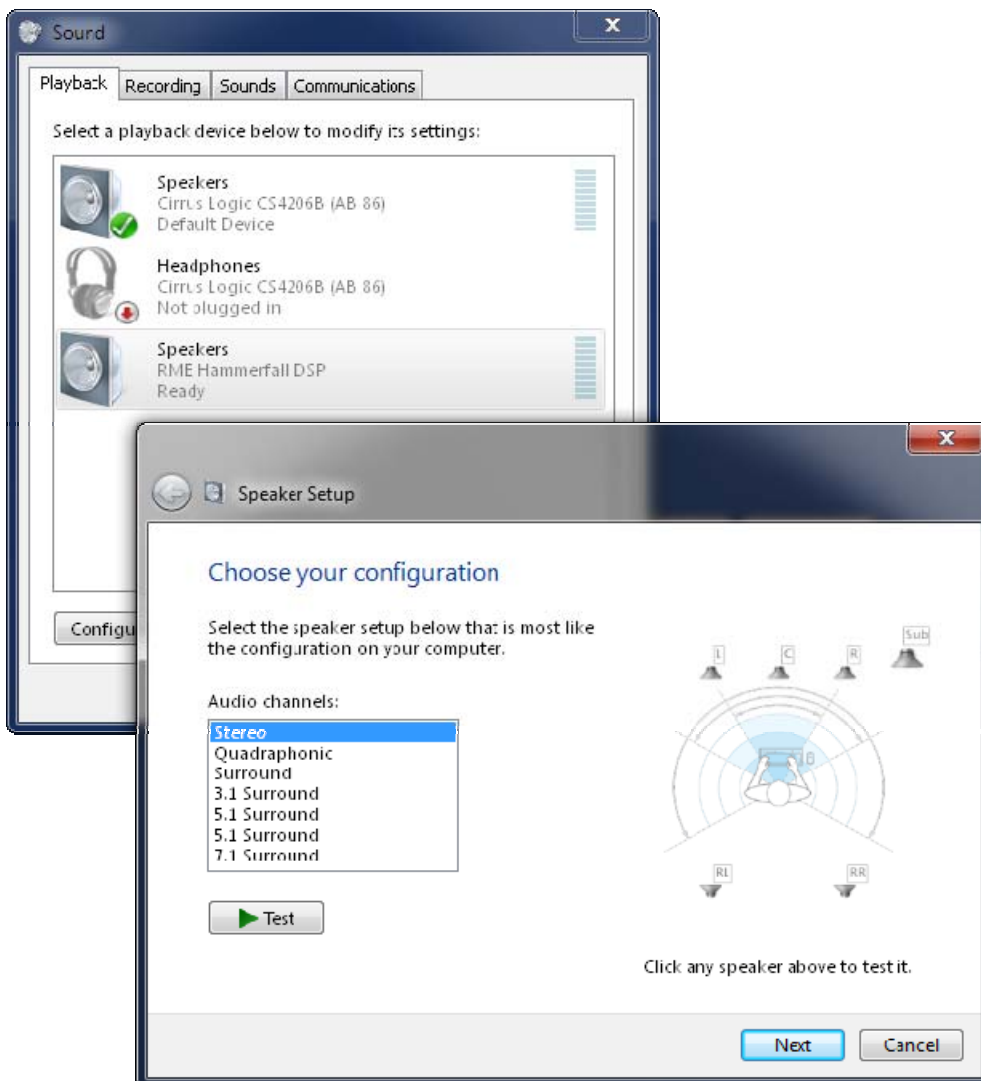
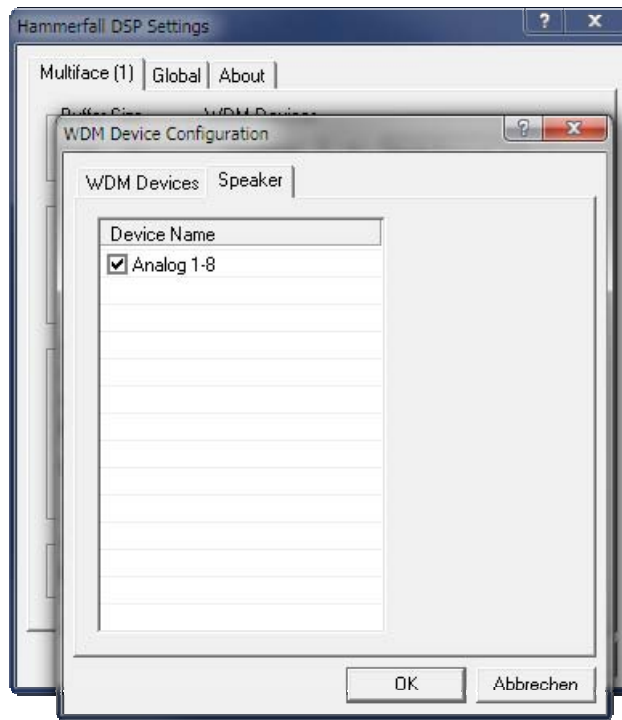
Please note that configuring the WDM device to a specific surround mode in the control panel Sound requires the device to have the Speaker property. See next page.

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

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

Please note that defining more than one device as Speaker usually makes no sense, 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. You can now assign any surround mode, from stereo to 7.1, in the Windows Sound control panel by selecting the playback device and clicking the Configure button.



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Windows Driver 4.x

▶ **TotalMix FX**

7. TotalMix: Routing and Monitoring

7.1 Overview

TotalMix FX is the next generation digital real-time mixer, based on RME's unique, sample-rate independent **TotalMix** technology. It allows for practically unlimited mixing and routing operations, with all inputs and playback channels simultaneously, to any hardware outputs.

Here are some typical applications for TotalMix:

- Setting up numerous delay-free submixes (headphone mixes).
- 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.

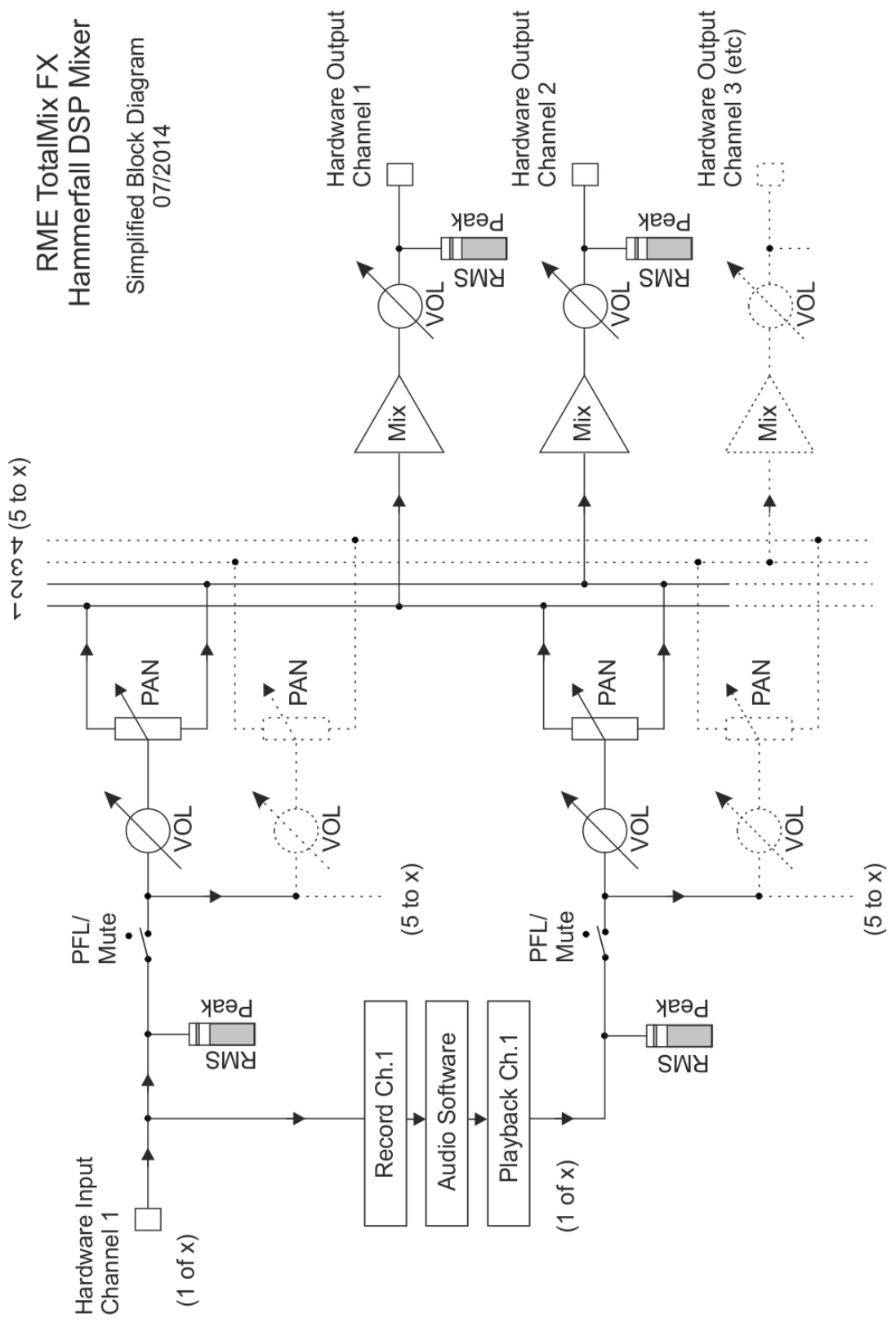
Every single input channel, playback channel and hardware output features a Peak and RMS level meter, calculated in hardware*. These level displays are very useful to determine the presence and routing destinations of the audio signals.

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

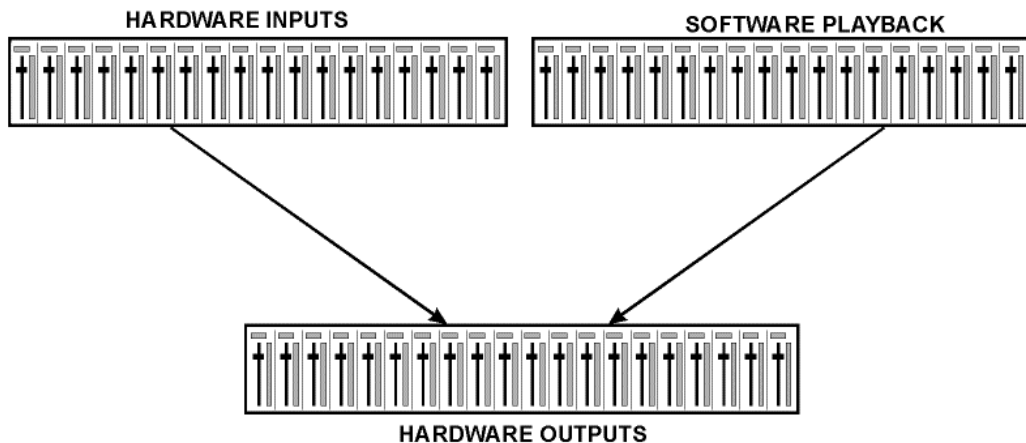
* Multiface, Digiface and RPM can only show peak levels in the third row.

RME TotalMix FX
 Hammerfall DSP Mixer
 Simplified Block Diagram
 07/2014

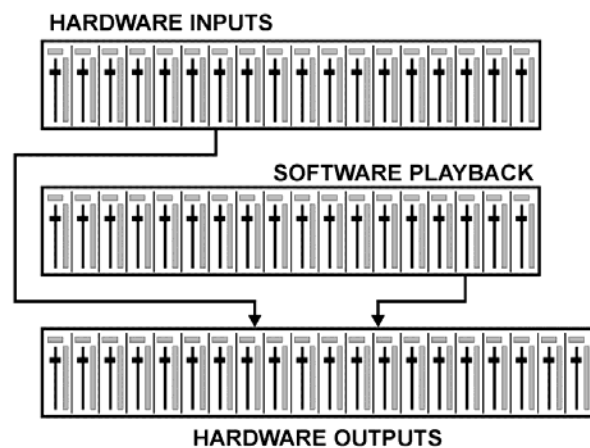


7.2 The User Interface

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:



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



- Top row: Hardware inputs. The level shown is that of the input signal*, i. e. fader independent. Via fader and routing 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): simply click on the hardware output channel where you want to have an audio signal. This channel turns brighter, means it is selected as current submix. Now move the faders up from all sources - input and playback channels - that you want to hear at the submix output.

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

* In Loopback mode, Multiface, Digiface and RPM will show the loopback signal level.

7.3 The Channels

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

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

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

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

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

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



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

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

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

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



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

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

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



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

Note that the fader button is automatically 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 Multiface there are 9 stereo Aux sends, shown alternately as single fader within the channel strip. The high number of Aux sends enables multiple and fully independent routings.

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

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



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

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. Not available in some interfaces.

Phase L. Inverts the phase of the left channel by 180°. Not available in some interfaces.

Phase R. Inverts the phase of the right channel by 180°. Not available in some interfaces.

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 further 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. Not available in some interfaces.



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

7.4 Section Control Room

In the section Control Room the menu *Assign* defines the **Main Out** which is used for listening in the studio. For this output the functions Dim, Recall, Mono, Talkback and External In 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 at any time.

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

Note: The Phones connector of Multiface and Digiface is an additional mixer output not connected to any WDM or ASIO channel. Use the Cue function to monitor any output directly, or to activate ADM with the phones output.

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.

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

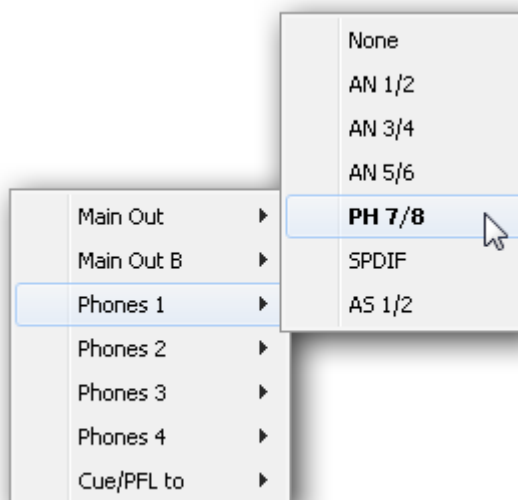
Mono. Mixes left and right channel. Useful to check for mono compatibility and phase problems.

Talkback. A click on this button will dim all signals on the *Phones* outputs by an amount set up in the 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 (Speaker B), and up to four Phones outs. The choice is limited, as at 96 or 192 kHz operation some channels like ADAT are not available anymore.

The output for the Cue signal, which is usually Main, can also be set to one of the Phones outputs. This setting also controls the PFL monitoring. The Cue/PFL monitoring is also set up in this dialog.



7.5 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.

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

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.

7.5.1 View Options

The field **Show** 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 submixes simultaneously, without the need to change between them. Here one works with the routings fields of the input and playback channels only, which then show different routing destinations.



Level Meters

- **Post FX.** Not available.
- **RMS Level.** The numerical level display in the channels displays peak or RMS.

Show

- **FX.** Not available.
- **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.

7.5.2 Snapshots - Groups

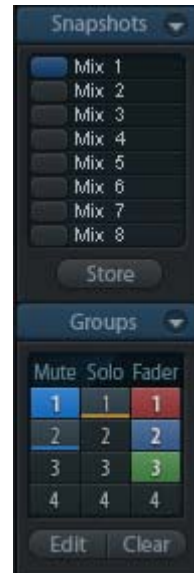
Snapshots. Snapshots include all mixer settings, but no graphical elements like window positions, window size, number of windows, visible settings, scroll states etc. Only the state wide/narrow of the channels is registered. Moreover the Snapshot is only temporarily stored. Loading a Workspace causes 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 most 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.

7.5.3 Channel Layout - Layout Presets

To maintain overview within TotalMix FX channels can be hidden. Channels can also be excluded from being remotod. 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:

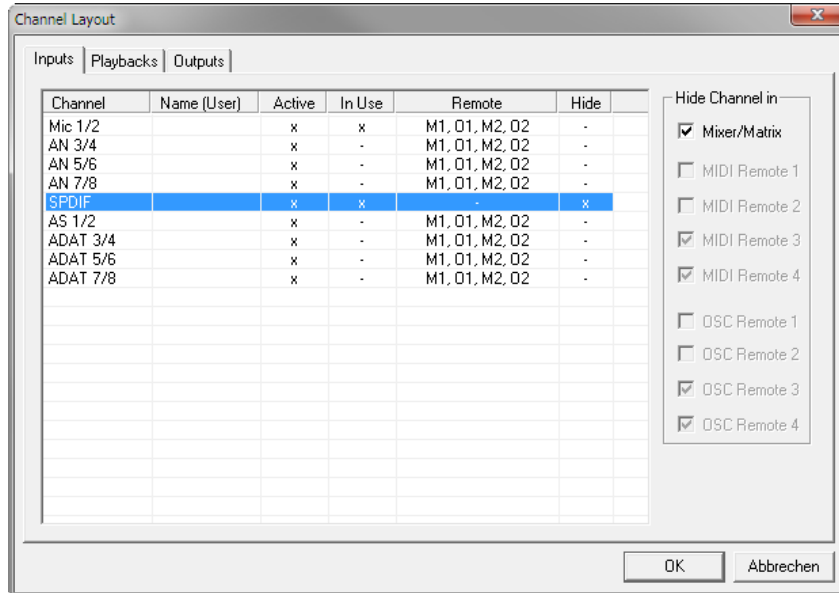
- **Hide Channel in Mixer/Matrix.** The selected channels are no longer shown in TotalMix FX, nor are they available via MIDI or OSC remote control.
- **Hide Channel in MIDI Remote 1-4.** The selected channels are hidden for MIDI remote (CC and Mackie Protocol).
- **Hide Channel in OSC Remote 1-4.**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

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

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

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

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



Rows Inputs, Playbacks and Outputs are set up individually by the tabs at the top. *Active* indicates currently available channels. At higher sample rates many ADAT channels are no longer active. *In Use* shows which channels are currently used in the mixing process.

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

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.

7.5.4 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.



Application Examples

While originally added to improve navigation in the HDSPe MADI FX (having 196 channels that never fit on any screen), the scroll location markers are also helpful with units having much less channels:

- When the TotalMix FX window is intentionally made small in width, so only a few channels are shown.
- When some or all setting panels are open. Then all relevant settings are always visible, but require a lot of space horizontally.

7.6 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.** Not available.
- **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.
- **Disable double click fader action.** Prevents unintentional gain settings, for example when using sensitive touchpads.

Dynamic Meters

Not available.

Snapshots

- **Do not load Main volume/balance.** The values stored in the Snapshot are not loaded for the Main Out, so the current setting is not changed.

Device Handling

- **Always init DSP devices with TotalMix FX settings.** For the HDSP and HDSPe series: not available. TotalMix FX always loads the last mix state into the interface.
- **Count MADI Channels per port.** Not available.
- **Disable ASIO Direct Monitoring.** Disables ASIO Direct Monitoring (ADM) within TotalMix FX.

Graphics

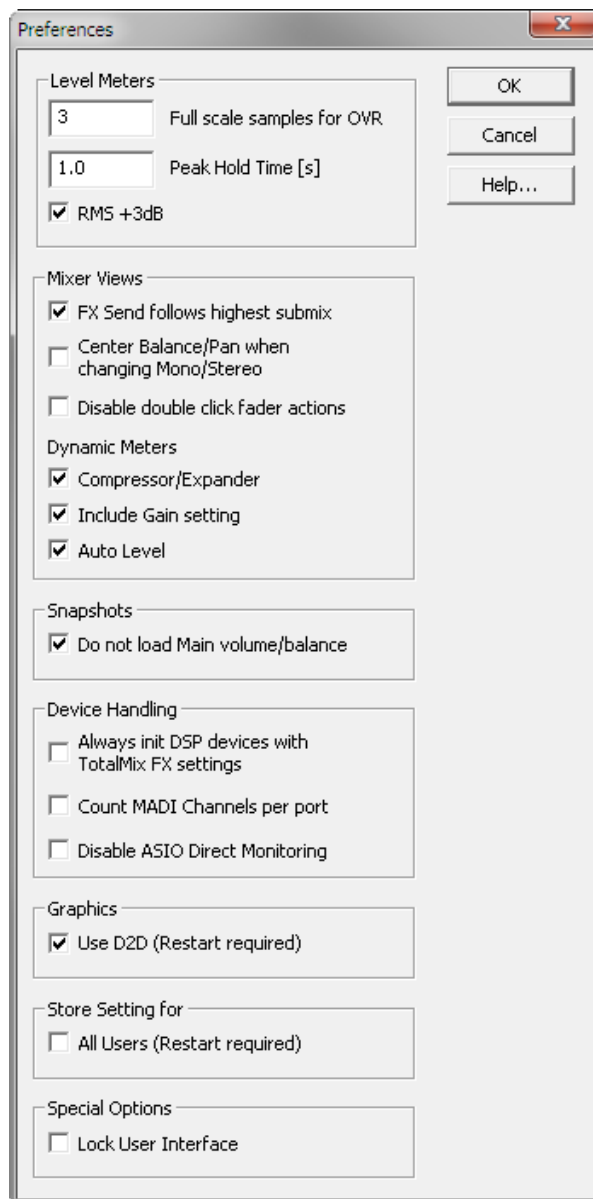
- **Use D2D (Change requires restart).** Default on. Can be deactivated to use a compatible but CPU-taxing graphics mode, in case graphics problems show up.

Store Setting for

- **All Users (Restart required).** See next chapter.

Special Options

- **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.



7.6.1 Store for Current or 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

Vista/7/8: C:\Users\Username\AppData\Local\TotalMixFX

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 User* directory. An admin could even write protect the file **lastHDSPname1.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).

7.7 Settings

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

7.7.1 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

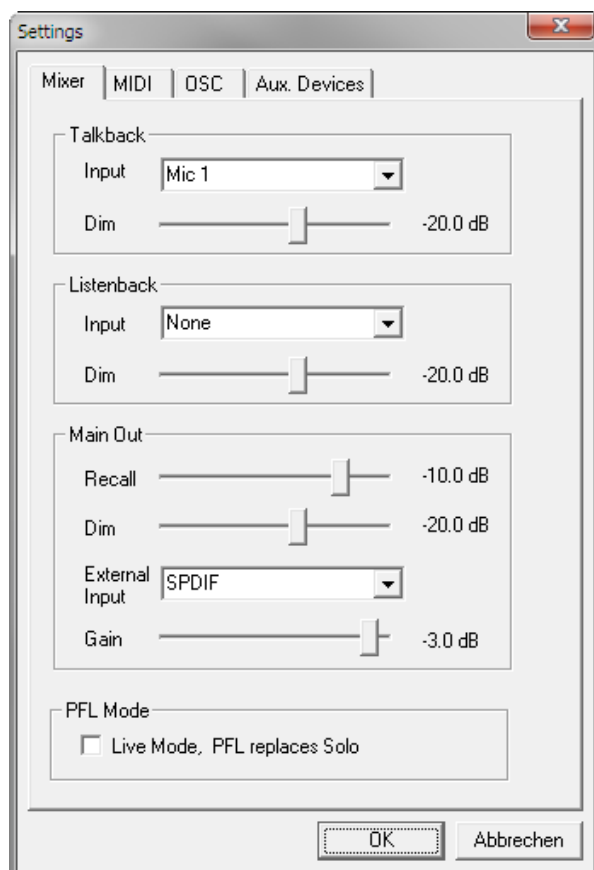
- **Input.** Selects the input channel of the Listenback signal (microphone in recording room). Default: None.
- **Dim.** Amount of attenuation of the signals routed to the *Main Out* in dB.

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.

PFL Mode

- **Live Mode, PFL replaces Solo.** PFL means Pre Fader Listening. This feature is very useful when operating TotalMix in a live environment, as it allows to quickly listen/monitor any of the inputs by hitting the Solo button. The monitoring happens on the output set for the Cue signal via the Assign dialog.



7.7.2 MIDI Page

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

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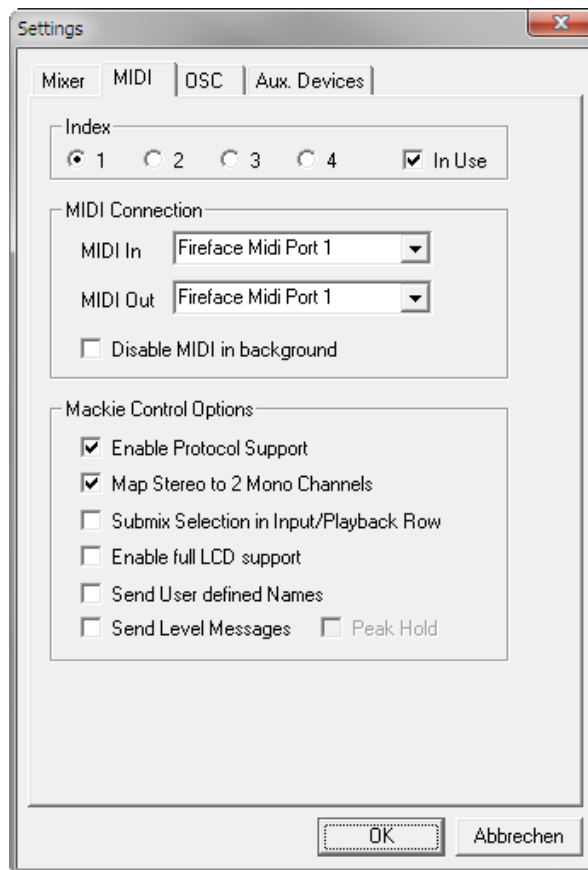
Select one of four settings pages and thus remote controls. Settings are remembered automatically. To activate or deactivate any of the four remote controls check or uncheck 'In Use'.

MIDI Remote Control

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

Mackie Control Options

- **Enable Protocol Support.** When disabled TM FX will only react on the Control Change commands of chapter 10.5.
- **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.

7.7.3 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

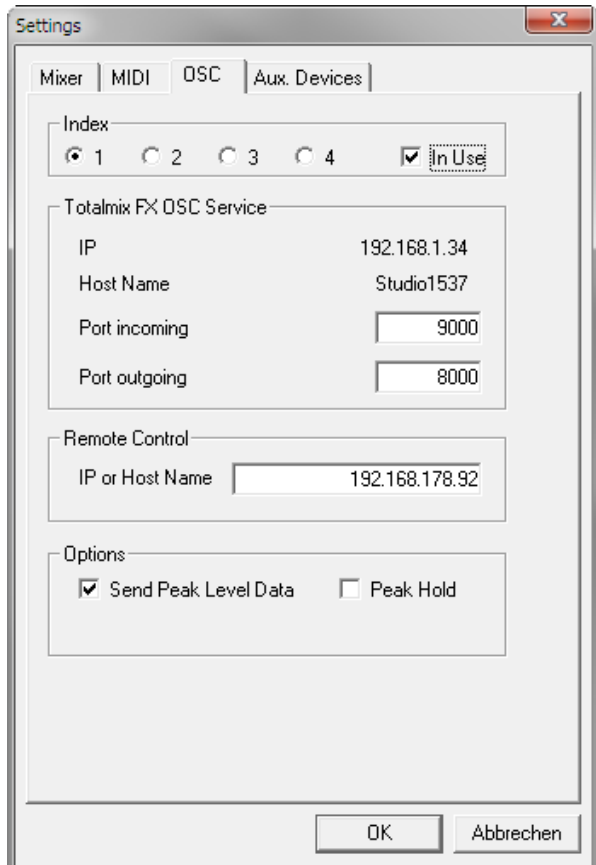
- **IP.** Shows the network address of the computer running TotalMix FX (local host). This address must be entered on the remote side.
- **Host Name.** Local computer name.
- **Port incoming.** Must match the remote entry 'Port outgoing'. Typical values are 7001 or 8000.
- **Port outgoing.** Must match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



7.7.4 Aux Devices

The RME OctaMic XTC is a highly flexible hi-quality 8-channel microphone, line and instrument preamp with integrated AD-conversion to ADAT, AES/EBU and MADI, plus 4 channels of DA-conversion for monitoring. It can be used as universal front-end for nearly any RME interface as well as other interfaces.

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

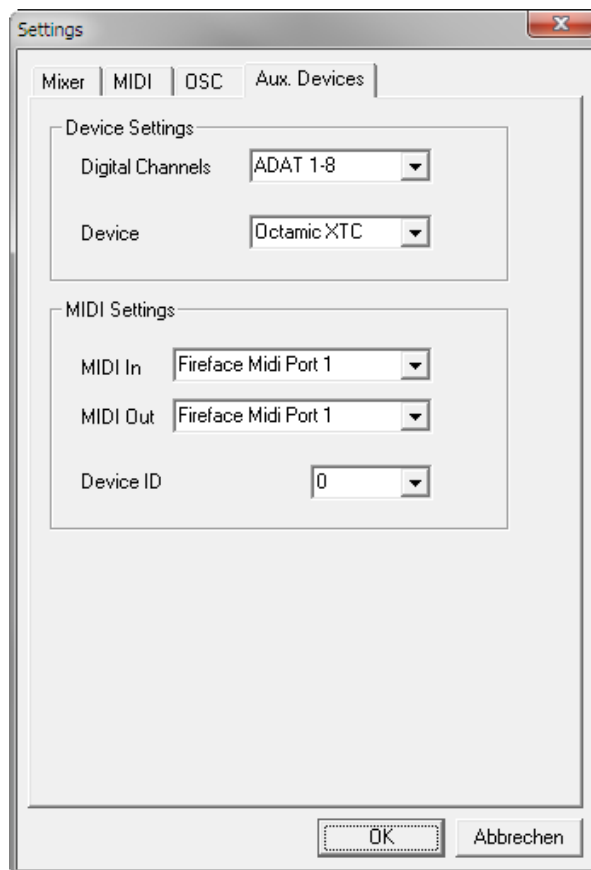
TotalMix FX version 0.99 or higher will show the panel *Aux Devices* which has all the settings to activate remote functionality.

Device Settings

- **Digital Channels.** Select where the OctaMic XTC sends its 8 analog channels to. This will be one or more ADAT inputs of the audio interface.
- **Device.** At this time only the OctaMic XTC is supported and can be chosen.

MIDI Settings

- **MIDI In.** Set the currently used MIDI connection to OctaMic XTC.
- **MIDI Out.** Set the currently used MIDI connection to OctaMic XTC.
- **Device ID.** Default 0. This setting relates to the current choice in Digital Channels.



When using more than one OctaMic XTC these must have different Device IDs (configuration is done at the OctaMic XTC). *Aux Devices* supports to set different Device IDs to the 8-channel blocks as well. Storing the setting is done automatically when selecting a Device ID. To check the current assignments toggle the two 8-channel blocks.

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

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



7.8 Hotkeys and Usage

TotalMix FX has many hotkeys and mouse/hotkey combinations to speed up and simplify the usage.

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

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

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

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

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

Clicking on one of the channel settings buttons (slim/normal, settings) 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** 1 to 8 (not on the numeric keypad!) will load the corresponding Snapshot.

The right mouse button selects a Hardware Output. At the same time a context menu is displayed having these options:

Clear Submix. Deletes the whole submix of the selected output. All inputs and playbacks of this routing will be set to $-\infty$.

Copy Submix. Copies the whole submix of the selected output into memory. All input and playback faders from that routing will be included.

Paste Submix. Writes the previously copied submix on to the now selected output.

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

Preferences: Opens a dialog box to configure several functions of the level meters and the mixer. See chapter 7.6.

Settings. Opens a dialog box to configure several functions like Talkback, Listenback, Main Out and the MIDI Remote Control. See chapter 7.7.

Channel Layout. Opens a dialog to hide channels visually and from remote. See chapter 7.5.3.

Key Commands. Opens a dialog box to configure the computer's keyboard keys F4 to F8.

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

- **Straight playback with all to Main Out.** All Playback channels are routed 1:1 to the Hardware Outputs. Simultaneously all playbacks are mixed down to the Main Out. The faders in the third row are not changed.
- **Straight Playback.** All Playback channels are routed 1:1 to the Hardware outputs. The faders in the third row are not changed.
- **Clear all submixes.** Deletes all submixes.
- **Clear channel effects.** Not available.
- **Reset output volumes.** All faders of the third row will be set to 0 dB, Main and Speaker B to -10 dB.
- **Reset channel names.** Removes all names assigned by the user.
- **Total Reset.** Playback routing 1:1 with mixdown to Main Out. Switches off all other functions.

8. The Matrix

8.1 Overview

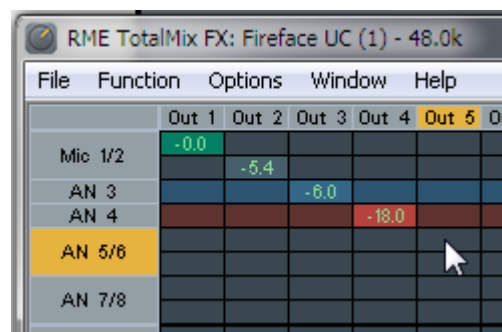
The mixer window of TotalMix looks and operates similar to mixing desks, as it is based on a conventional stereo design. The matrix display presents a different method of assigning and routing channels, based on a single channel or monaural design. The matrix view has the look and works like a conventional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

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

8.2 Elements of the Matrix View

The visual design of the TotalMix Matrix is mainly determined by the architecture of the HDSP system:

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



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

8.3 Operation

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

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

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

9. Tips and Tricks

9.1 ASIO Direct Monitoring

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.

9.2 Copy a Submix

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

9.3 Delete a Submix

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

9.4 Doubling the Output Signal

If a mix should be sent out via two different hardware outputs, the most elegant way is to use a permanently activated *Cue*. Set up the mixdown on the routing to the Main Out, use Copy Submix to copy the final mix to the other output, then activate Cue on this other output. The output signal, and with this the complete mixdown, will then be played back from two stereo outputs simultaneously – the Main Out and the other Hardware Output. Even better: the faders of both outputs are still active, so the signal level can be adjusted individually.

9.5 Recording a Submix - Loopback

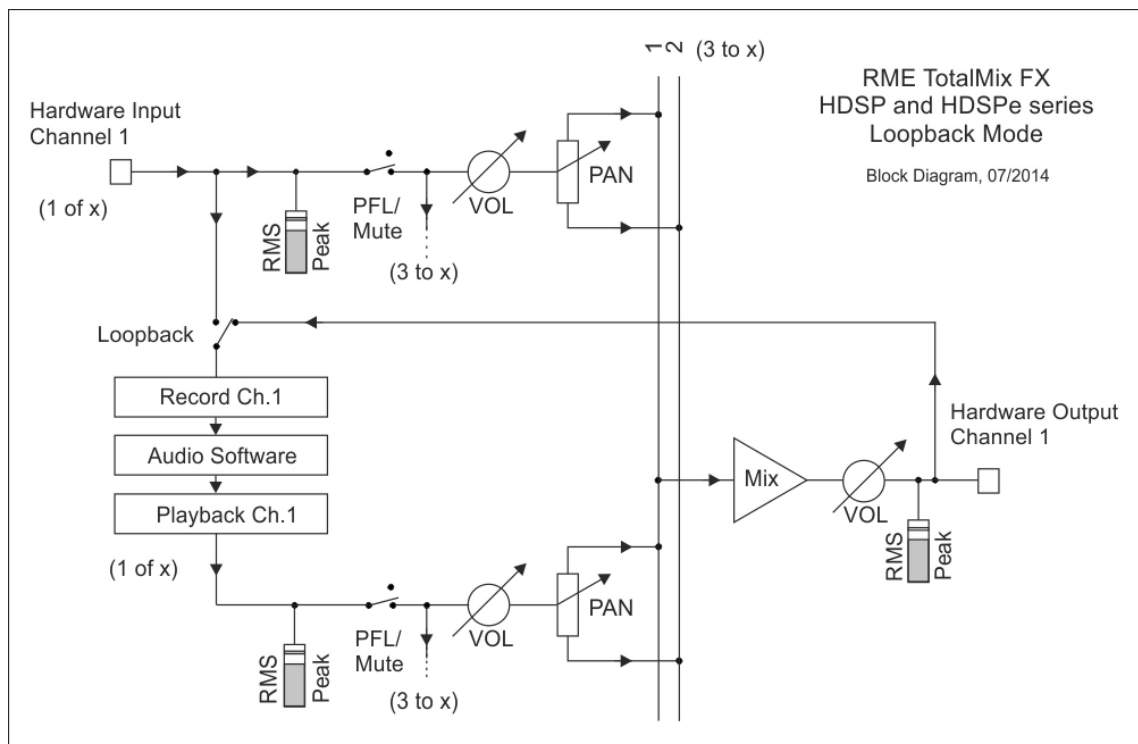
This chapter is not valid for the HDSP MADI, please refer to the original manual (no internal loopback available).

HDSP and HDSPe systems include 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, complete 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 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.

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

Mixing several input signals into one record channel

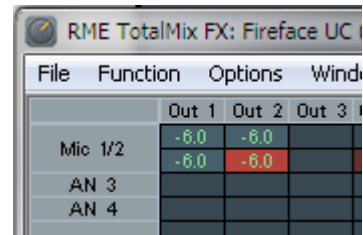
In some cases it is useful to record several sources into only one track. For example when using two microphones recording instruments and loudspeakers, TotalMix' Loopback mode saves an external mixing desk. Simply route/mix the input signals to the same output (third row), then redefine this output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

9.6 MS Processing

This chapter is not valid for the HDSP MADI, please refer to the original manual (no internal MS processing available).

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 $L-R$.



	Out 1	Out 2	Out 3
Mic 1/2	-6.0	-6.0	
AN 3	-6.0	-6.0	
AN 4			

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.

10. MIDI Remote Control

10.1 Overview

TotalMix FX 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 RME interface 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.

10.2 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
SEL(1-8) + DYNAMICS	Activate Trim mode
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	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.

10.3 Setup

Open the Preferences dialog (menu Options or F3). 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.

10.4 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.

10.5 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 RME interface 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 / **H 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: 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 (as required by the HDSP MADI).

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.

10.6 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.

10.7 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 7.7.3.

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

http://www.rme-audio.de/download/osc_table_totalmix.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/download/tosc_tm_ipad_template.zip

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