



# Multiverter

## Digital Format Converter

### MVR-64

User's Manual

**(en)**

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## 1. GENERAL

### 1.1. Foreword

Thank you for purchasing one of the most innovative digital audio converters on the market. The multiverter was designed with true vendor independence and interoperability in mind, with the idea to make all your gear interact seamlessly.

Please note that due to the complex nature of such a product we decided to introduce functionality step-by-step, so you will find some functions described in this manual marked "available as firmware update". We will continue to supply firmware updates to continuously improve the functionality of the device.

Please don't hesitate to tell us your feedback, thoughts and ideas, we try hard to make the multiverter your most valuable tool!

### 1.2. Box Contents

- MVR-64 multiverter device
- One AC power cable (country specific)
- This manual

### 1.3. Conventions used in this manual

- A button on the front of the device is shown like this: **Set**
- A particular LED on the front of the device is shown like this:  **WCLK**



A section marked with an warning sign mark tells you that the information is particularly important to avoid damage or malfunction.



Filled circles with an exclamation mark indicates an action that must be performed ("Required")



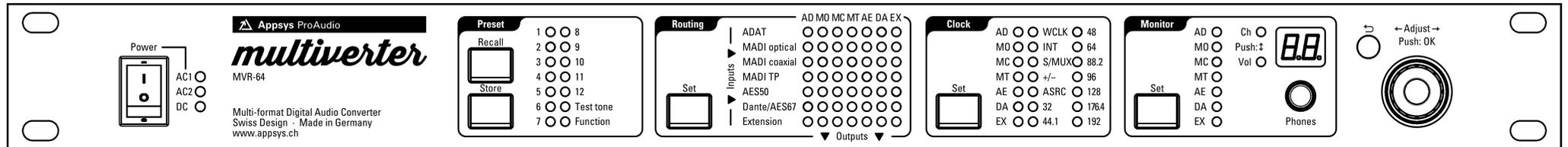
A section marked with a prohibited sign tells you that the action indicated is prohibited ("Prohibited")



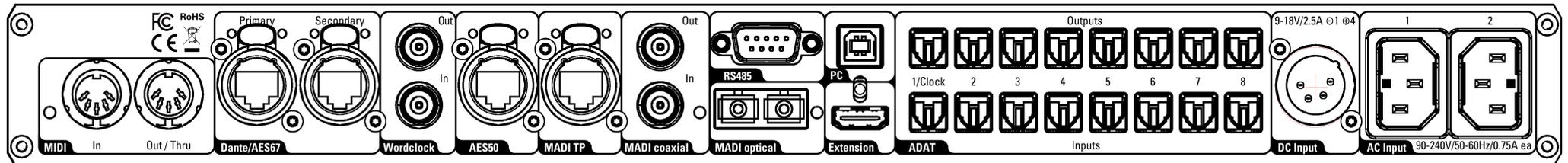
A section marked with a "information" icon indicates a useful tip.

## 2. INTRODUCTION

### 2.1. Front panel



### 2.2. Rear panel



## 2.3. Overview

The multiverter is a unique device which allows you to convert digital audio data between the most popular formats (ADAT, MADI optical, MADI coaxial, MADI-TP, AES50, and Dante - plus other formats via break-out boxes). All inputs can freely be routed to all of the outputs in a “matrix” fashion: When a connection in the matrix is made, all input channels are 1:1 routed to the output interface.<sup>1</sup> Even multiple simultaneous conversions are possible, with a super low latency down to 3 samples (interface dependent).

Up to 64 channels per conversion are supported at single speed (x1) modes (32/44.1/48kHz), up to 32 channels at double-speed (x2) modes (64/88.2/96kHz) and up to 16 channels at quad-speed (x4) modes (128/176.4/192kHz).

The device is prepared for headamp remote control (Yamaha, Behringer, MIDAS)\*.

Diagnostics are made simple by an integrated headphones amplifier and a test tone generator. Three power inlets allow operation from either AC or DC (battery pack) with full redundancy.

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<sup>1</sup> Channel-wise routing (combining channels from different interfaces into one output) is currently unsupported due to the lack of a control software. We will provide one in the future.

\* Not supported in firmware package <= 1.3. Functionality will be supplied later via firmware update

## 2.4. Operating Principles

The device has been designed for fast and simple operation, with a no-frills everything-at-a glance concept. Most settings are directly accessible without the need to walk through lengthy menus:

- To change a setting, first push the appropriate rectangular button (e.g. **Set**). You have now entered "Menu" mode, indicated by a yellow blinking cursor.
- Move the cursor by turning the encoder (rotary knob) left or right to move it to the desired setting.
- When the cursor is at the beginning or end of the column or line, continue turning to make it wrap around.
- Push the encoder knob (or push the appropriate menu button again) to confirm your changes. To return to the previous state without making any changes, push the **↶ Back** button.
- When the device is normal operation (i.e. not within a menu), turning the encoder knob changes "Volume" or "Channel" of the monitor headphones, while pushing the encoder toggles between "Volume" and "Channel" mode.

### 3. CONNECTIONS OVERVIEW

This chapter gives you an overview of all connections on the back of the device. Please refer to 9. Specifications for full characteristics of each port.

#### 3.1. AC Power

Mains AC inlet, 90-240VAC, 0.75A max.

Together with the DC power port, the inputs are full redundant. If any of the inputs fail, the other takes immediately over. During the switchover process, full operational state is maintained (i.e. no interruptions in the audio flow).

#### 3.2. DC Power

Battery / DC inlet, nominal 9-18V, tolerates up to 30V.

Maximum current 2.5A, typical operating current < 1A, standby current ca. 10mA.

Use this port

- to operate independently from AC power, e.g. from a camera battery pack in the field
- as battery backup if the AC input(s) fail. To prevent the backup battery from draining while AC power is present, keep the voltage below 16 volts.

#### 3.3. ADAT

Eight ADAT input/output ports with 8 channels each (4 channels in SMUX mode). The ports are mapped to the channels as follows:

Port	1	2	3	4	5	6	7	8
Channels	1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64
Channels (SMUX)	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32

If ADAT is used as Clock Source, Input port 1 must be connected, and is used as master clock.

#### 3.4. PC/USB

The USB port is used for firmware update, and as Remote Control Port for the PC in the future. It is NOT capable of passing audio data!



To interface the audio system of the multiverter to a computer, connect is using Ethernet to the Dante port and use the Dante Virtual Soundcard software.

### 3.5. RS485

The RS485 port is prepared to send and receive Yamaha Headamp Remote control information\*.

### 3.6. Extension

This port is designed to connect break-out boxes to support other, non-built-in protocols and standards (e.g. AVB), or to connect additional ports for system extension.

Please contact us for the scheduled availability of break-out boxes.



Two multiverterers can be connected together via the extension port when a larger number of different ports is required.

Note: Although this port makes use of a standard HDMI connector, it is NOT compatible with HDMI devices. Don't connect HDMI equipment there! The HDMI connector was chosen because cables are ubiquitous and can easily be replaced (and also because the electrical characteristics are perfectly suited for this purpose).

### 3.7. MADI optical

This port carries MADI data, according to the "optical" transmission method specified in AES10.

The yellow LED indicates the current status:

- Off: No incoming MADI data detected
- On: Incoming MADI detected, but no valid system clock
- Flashing: Incoming MADI and valid system clock detected

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\* Not implemented in firmware package <=1.3. Functionality will be supplied later via firmware update

The port is prepared to handle also MIDI control data (MIDI over MADI) compatible to RME gear\*.



Where possible, use the "MADI optical" connection rather than BNC or TP connections to reduce the chances of noise/interference and to increase reach.

### 3.8. MADI BNC

This port carries MADI data according to the "coaxial" transmission method specified in AES10.

The yellow LED indicates the current status:

- Off: No incoming MADI data detected
- On: Incoming MADI detected, but no valid system clock
- Flashing: Incoming MADI and valid system clock detected

The port is prepared to handle also MIDI control data (MIDI over MADI) compatible to RME gear\*.

### 3.9. MADI TP

This port carries MADI data, according to the "MADI over Twisted Pair cabling" method specified in the draft for the upcoming AES10 standard (AES-X-213).

NOTE: Several proprietary implementations of "MADI over Twisted Pair" exist prior to standardization. Most of them are incompatible to the method specified in AES-X-213.

The LEDs indicates the current status:

- Yellow: Link detected
- Green: Input data valid and system clock valid

This port can also be used as second AES50 port (adapter cable and altered setting required – see 8.2 Parameter settings, and 10.1 AES50/MADI-TP Pin swap adapter cable). This second port may be used

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\* Not implemented in firmware package <= 1.3. Functionality will be supplied later via firmware update

either as standalone port (48ch) or in channel aggregation mode, meaning that both AES50 ports are treated as one single interface with the first port carrying channels 1-48/1-32 (1-24/1-16@96kHz) and the second port carries channels 49-64/33-64(25-32/17-32@96kHz).

### 3.10. AES50

This port carries Behringer/MIDAS compatible digital audio data (48ch@48kHz, 24ch@96kHz). It is also prepared to transmit control data from and to Behringer/MIDAS preamps (i.e. for remote gain control).\*

The LEDs indicates the current status:

- Yellow: Link detected
- Green: Input data valid and system clock valid



To use more than 48/24 channels with AES50, the MADI-TP port can be configured to work as second (aggregate) AES50 port which carries the rest of channels.

This port can be switched to work as second MADI-TP port (see 8.2 Parameter settings, and 10.1 AES50/MADI-TP Pin swap adapter cable).

### 3.11. Wordclock

The wordclock *input* accepts a square wave signal in the frequency of the sample rate. x2 and x4 modes are automatically detected when the square wave has x2/x4 frequency, and can be manually set when the square wave has x1 frequency.

A 75 ohms termination resistor can internally be switched but is OFF by default. Altering the setting requires opening of the device, please contact us for further information.

The wordclock *output* is a square wave signal (50% duty cycle) and is able to drive up to two 75 ohm resistors in parallel. Its frequency is either identical to the sample rate or always x1 (see 8.2 Parameter settings).

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\* Not implemented in firmware package <= 1.3. Functionality will be supplied later via firmware update.

### 3.12. Dante/AES67

The “Primary” and “Secondary” ports are standard gigabit Ethernet ports, designed to connect to Dante Digital Audio Network.

AES67 mode is alternative to Dante mode and can be set in the Dante Controller Software.

This port provides also remote control via standard TCP/IP (telnet)\*.

The port LEDs indicates the current status:

- Yellow: Link detected
- Green: Input data valid and system clock valid

Please refer to the [Audinate website](#) for information about Dante Technology, the latest Dante Controller drivers and related information.

By default, the ports are configured to act as switch (which allows daisy chaining), but can be changed using the Dante Controller Software as redundant ports for parallel connection.

### 3.13. MIDI

The MIDI port is designed to receive and send remote control information to the multiverter.\*

The yellow LED near the port flashes when incoming MIDI data is detected.

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\* Not implemented in firmware package <= 1.3 .Functionality will be supplied later via firmware update.

## 4. PRESETS

All settings (excluding headphones level) can be individually stored in one of the 12 preset locations, and may be recalled at any time later. The settings are stored in non-volatile memory and are retained for years even if the device is switched off or the power cable is unplugged.

### 4.1. Recall

To recall a preset:

- Push the **Recall** button from the "Preset" menu.
- Select the desired storage location  to  by turning the encoder left or right.
- Note: The presets "Test tone" and "Function" have special purposes. See 8. Advanced Topics.
- Confirm the selected location by pushing the encoder, or push the  **Back** button to cancel the operation.

### 4.2. Store

To store a preset:

- Push the **Store** button in the "Preset" menu.
- Select the desired storage location  to  by turning the encoder left or right.
- Confirm the selected location by pushing the encoder, or push the  **Back** button to cancel the operation.

### 4.3. Changed presets

When a preset is recalled, the corresponding location  to  is lit green. If any setting is changed afterwards (except for headphones level), the LED turns red to indicate that the current setting differs from the recalled preset. If you want your changes to be reflected also in the stored preset, just store the preset again. Otherwise, the changes are overwritten the next time a preset is recalled.

### 4.4. Auto-Store

In addition to the presets stored in locations 1-12, the multiverter remembers **always** the current setting, even when power cycled or left unpowered for a long time. This means that you can always reset the multiverter and have the settings fully restored by switching it off and on.

## 5. ROUTING

The routing matrix indicates the interfaces between conversions are currently active.

- A green LED means that a connection is made between the two interfaces, and a conversion is currently in progress.
- A red LED means that a connection is made, but inactive because the input or clock signals are missing.
- A yellow LED means that a test tone is currently output instead of the input signal.



Routing is easy if you think this way:  
"I want this input mapped to this output"

To make or break a connection in the Routing matrix:

- Push the **Set** button in the "Routing" menu
- A yellow blinking cursor indicates the current position within the matrix. Move it by turning the encoder to the desired point where you want to make or break a connection.
- At the beginning or end of the line, continue to turn to the right to make the cursor wrap around to the previous or next line.
- Push the encoder or press the **Set** button to make/break a connection. When the cursor blinks yellow/red or yellow/green, the connection has been made; when the cursor blinks yellow/dark, the connection was broken.
- To exit the routing matrix, push the **↩ Back** button.

## 6. CLOCK SOURCE

This selects the source for the multiverter's master clock. In general, all components within a digital audio system must reference to the same master clock to ensure that all components run synchronously.

The multiverter can use any of the interfaces as clock source, or alternatively it can act as clock master using its internal, high-quality clock synthesizer.

To set the clock source:

- Push the **Set** button in the "Clock" menu.
- Move the yellow blinking cursor to the desired clock source.
- Push the encoder or press the **Set** button to select the interface, or press **↵ Back** to cancel.
- Depending on the selection, you will be asked to provide additional information:
- When the clock source is set to internal **INT**, you will be asked for the sample frequency where the internal clock should run at. Choose one from the **32kHz** to **192kHz**, or press **↵ Back** to return to the clock source selection.
- When MADI optical **MO**, MADI coaxial **MC**, MADI-TP **MT** or BNC wordclock **WCLK** is chosen, you need to set if the multiverter should run in x1 (32/44.1/48kHz), in x2 (64/88.2/96kHz) or in x4 (128/176.4/192kHz) mode. Choose the desired mode and push the encoder to confirm, or press **↵ Back** to return to the clock source selection.

### 6.1. Dante Clock



From Firmware 1.3 and above, the Dante clock settings are made automatically depending on the current multiverter's clock settings.

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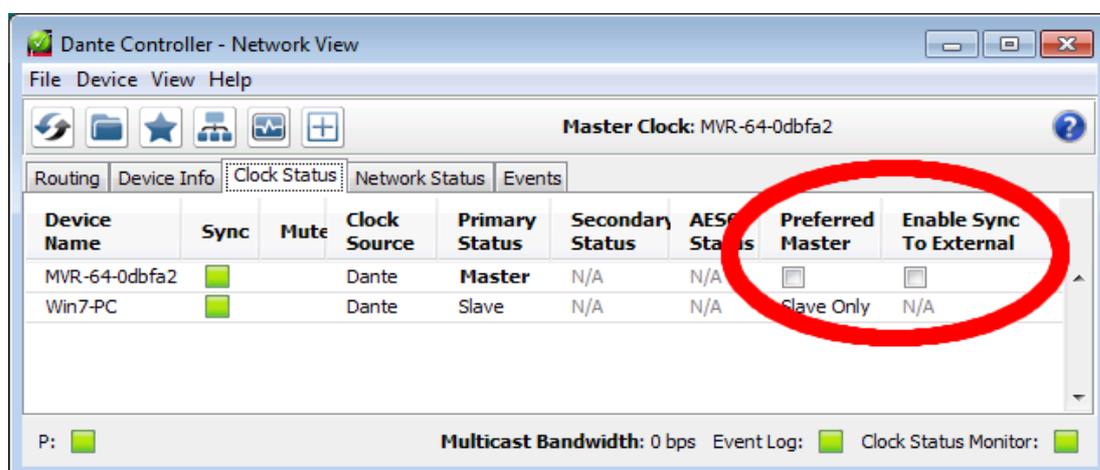
**Only firmware 1.2 and below:**

**The Dante clock settings must be set in two locations:**

In the multiverter, and in the Dante controller software.

The multiverter can use any of the interfaces as clock source, or alternatively it can act as clock master using its internal, high-quality clock synthesizer.

- When the clock source is Dante (☀ **DA**) the  **Enable sync to external** option must **not** be set. In this case, the clock master can either be the multiverter's Dante module, or another Dante node on the network.
- When the clock source is set to anything **other** than Dante (and hence the Dante network slaves itself to something non-Dante),  **Enable sync to external** must be set. In this case, the multiverter's Dante module takes its clock from some an external (read: non-Dante) sources and feeds it into the Dante network, acting as clock master within the Dante network. That's why  **Preferred Master** should also be checked.



Picture 1: Clock options in Dante Controller

## 7. MONITOR

The “Monitor” section controls the headphone amplifier which allows you to listen to any channel received on the inputs.

To select a particular input to listen to:

- Press the **Set** button in the “Monitor” menu.
- Move the yellow blinking cursor to the desired interface.
- Push the encoder or press the **Set** button to select the interface, or press **↶ Back** to cancel.

To select a channel:

- Make sure that **☀ Ch** mode is selected. If not, push the encoder once.
- Rotate the encoder left to decrease the channel, or right to increase the channel.



You can adjust if mono (same channel on both ears) or stereo signals are output on the headphones.

- Mono mode: Both L and R speakers play the same mono channel. The 7-segment display changes in steps of 1.
- Stereo mode: odd channels = L, even channels = R. The 7-segment displays only the left channel numbers and changes in steps of 2.

Please refer to 8.2. Parameter settings how to change modes.

To change the volume:

- Make sure that **☀ Vol** mode is selected. If not, push the encoder once.
- Rotate the encoder left to decrease the volume, or right to increase the volume.



With Firmware 1.3 and above, an extra gain (+6/+12/+24dB) can be added for the headphones output to ease monitoring of silent signals.  
Note: When extra headphone gain is selected, clipping may occur at large volume levels.

## 8. ADVANCED TOPICS

### 8.1. Test tone mode

For diagnostic purposes, the multiverter is able to play a test tone (1kHz, -20dB sine wave) on all outputs which are currently active. This feature is especially helpful to determine problems in your signal flow, as it does not rely on any external sources (except for the clock).

To enter test tone mode:

- Push the blue **Recall** button
- Move the cursor to  **Test tone** by turning the encoder left or right
- Confirm your selection by pushing the encoder, or push  **Back** to cancel the operation.
- The test tone mode is now active. All outputs which are active in the Routing matrix are replaced by the test tone signal (indicated by yellow lit LEDs in the Routing area).

To exit test tone mode:

- Push the blue **Recall** button
- Move the cursor to "Test tone" by turning the encoder left or right
- De-select Test tone mode by pushing the encoder, or push  **Back** to cancel the operation.

### 8.2. Parameter settings

The multiverter offers fine-tuning of various parameters and seldom used settings via the "Function" item in the Preset menu. The "index" indicates the parameter to change, while the corresponding "value" reflects its current setting. **A complete list of "index/value" pairs can be found in the table below.**

The "index" is indicated by  **1** to  **12** in the "Preset" menu, while the corresponding "value" is displayed in the 7-segment display.

To adjust a particular value:

- Push the blue **Recall** button
- Move the cursor to  **Function** by turning the encoder left or right
- Confirm by pushing the encoder (or push  **Back** to cancel the operation).
- The  **Function** LED should now be lit.
- Move the cursor to the desired index  **1** to  **12**
- Confirm by pushing the encoder (or push  **Back** to cancel the operation)
- The current value is displayed in the 7-segment display. Rotate the encoder to change the value, and push it to confirm.

Index	Purpose	Values (bold: default setting)
1	Headphones mode	<p><b>1 = Mono: Both L and R speakers of the headphones play the same monitor channel,. The channel indication ranges from 1 to 64 and changes in steps of 1.</b></p> <p>2 = Stereo: Odd channels are played on the L speaker and the subsequent even channel is played on the right speaker. The channel indication ranges from 1 to 63 and changes in steps of 2.</p> <p>Only with firmware &gt;= 1.3: Extra headphone gain</p> <p>3 = Mono, +6dB</p> <p>4 = Stereo, +6dB</p> <p>5 = Mono, +12dB</p> <p>6 = Stereo, +12dB</p> <p>7 = Mono, +24dB</p> <p>8 = Stereo, +24dB</p> <p><b>Note:</b> Clipping may occur at large volume levels when extra gain is selected.</p>
2	MADI optical transmit mode <sup>1</sup>	<p>0 = Transmit 56 channels, x2 will be sent as 48k frame</p> <p>1 = Transmit 56 channels, x2 will be sent as 96k frame</p> <p>2 = Transmit 64 channels, x2 will be sent as 48k frame</p> <p><b>3 = Transmit 64 channels, x2 will be sent as 96k frame</b></p>
3	MADI coaxial transmit mode <sup>1</sup>	<p>0 = Transmit 56 channels, x2 will be sent as 48k frame</p> <p>1 = Transmit 56 channels, x2 will be sent as 96k frame</p> <p>2 = Transmit 64 channels, x2 will be sent as 48k frame</p> <p><b>3 = Transmit 64 channels, x2 will be sent as 96k frame</b></p>
4	MADI-TP port operation mode	<p>0 = Transmit 56 channels, x2 will be sent as 48k frame</p> <p>1 = Transmit 56 channels, x2 will be sent as 96k frame</p> <p>2 = Transmit 64 channels, x2 will be sent as 48k frame</p> <p><b>3 = Transmit 64 channels, x2 will be sent as 96k frame</b></p> <p>4 = AES50 (standalone port)</p> <p>5 = AES50 (dual port mode 32+32: second port of link, channels 33-64)<sup>2</sup></p> <p>6 = AES50 (dual port mode 48+16: second port of link, channels 49-64)<sup>3</sup></p>
5	AES50 port operation mode	<p>0 = MADI-TP with 56 channels, 48k frame in x2 mode</p> <p>1 = MADI-TP with 56 channels, 96k frame in x2 mode</p> <p>2 = MADI-TP with 64 channels, 48k frame in x2 mode</p> <p>3 = MADI-TP with 64 channels, 96k frame in x2 mode</p> <p><b>4 = AES50 (standalone port)</b></p> <p>5 = AES50 (dual port mode 32+32: first port of link, channels 1-32)<sup>2</sup></p> <p>6 = AES50 (dual port mode 48+16: first port of link, channels 1-48)<sup>3</sup></p>
6	Wordclock output mode	<p><b>0 = Wordclock output frequency identical to sample rate</b></p> <p>1 = Wordclock output frequency is always single speed (base sample rate)</p>
7	Reserved	
8	Reserved	

1 Setting applies only to transmit function. Receive data format is automatically detected depending on the clock settings.

2 Channel assignment is 16+16 in 88.2/96kHz modes

3 Channel assignment is 24+8 in 88.2/96kHz modes

Index	Purpose	Values (bold: default setting)												
9	Reserved													
10	Display brightness	1...5. <b>Default: 5</b>												
11	Service menu	1 = Selftest (external cabling required, contact us for details) 2 = LED test: All LEDs should be lit yellow, 7-seg display should display 88 in green 99 = Reset to Factory Defaults												
12	Version info	Turn the encoder left or right to display the different version numbers in the 7-segment display: <table border="1" style="margin-left: 20px;"> <tr><td>☀ <b>AD</b></td><td>FPGA Firmware Major version</td></tr> <tr><td>☀ <b>MO</b></td><td>FPGA Firmware Minor version</td></tr> <tr><td>☀ <b>MC</b></td><td>Control Firmware Major version</td></tr> <tr><td>☀ <b>MT</b></td><td>Control Firmware Minor version</td></tr> <tr><td>☀ <b>AE</b></td><td>Hardware version Mainboard</td></tr> <tr><td>☀ <b>DA</b></td><td>Hardware version Frontpanel</td></tr> </table> <p>Press <span style="border: 1px solid black; padding: 2px;">↩ Back</span> to exit the version display mode.</p> <p>Note: The version of the Dante module can be read out using the Dante Controller software.</p>	☀ <b>AD</b>	FPGA Firmware Major version	☀ <b>MO</b>	FPGA Firmware Minor version	☀ <b>MC</b>	Control Firmware Major version	☀ <b>MT</b>	Control Firmware Minor version	☀ <b>AE</b>	Hardware version Mainboard	☀ <b>DA</b>	Hardware version Frontpanel
☀ <b>AD</b>	FPGA Firmware Major version													
☀ <b>MO</b>	FPGA Firmware Minor version													
☀ <b>MC</b>	Control Firmware Major version													
☀ <b>MT</b>	Control Firmware Minor version													
☀ <b>AE</b>	Hardware version Mainboard													
☀ <b>DA</b>	Hardware version Frontpanel													

### 8.3. Multiverter Remote Control

All of the multiverter's functions can be remote controlled over multiple interfaces and controlling methods\*:

- USB port (serial port)
- Standard MIDI port
- Standard MIDI over MADI (embedded MIDI signal in MADI stream), RME compatible
- Ethernet (telnet)

All of the remoting methods can either be triggered by the multiverter's PC-based configuration tool\*, or by 3<sup>rd</sup> party software.

### 8.4. Headamp Remote Control

The multiverter is prepared\* to send and receive headamp remote control data (i.e. gain and phantom power) for the following models:

- Behringer and MIDAS stage boxes (e.g. S16) over AES50
- Yamaha AD8HR over RS485

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\* Not implemented in firmware package 1.0.0. Functionality will be supplied later via firmware update.

## 8.5. Firmware Upgrade

Firmware upgrade involves two independent operations to update all of the multiverter's subsystems:

- The MVR-64's core FPGA and Control firmware is updated via the PC (USB) port. Please follow the instructions supplied with the MVR-64 firmware updater software.
- Dante firmware update is done separately via the Dante Firmware Update Manager software. The required \*.dnt file will be supplied together with the MVR-64 firmware package.

## 9. SPECIFICATIONS

Parameter	Value																																																																	
Dimensions	482x45x230mm (BxHxD)																																																																	
Weight	2.25 kg																																																																	
Operating temperature	0..+70°C, non-condensing																																																																	
Storage temperature	-40..+85°C, non-condensing																																																																	
Power consumption	8W typ., 30W max. Each AC input: 85..264VAC, 50-60Hz, 0.75A@115VAC/0.5A@230VAC DC input: 9-18VDC (up to 30V tolerant), 2.5A peak																																																																	
Channel count	Up to 64 per interface in x1 modes Up to 32 per interface in x2 modes Up to 16 per interface in x4 modes  Multiple conversions (i.e. Dante<->MADI and ADAT<->AES50) with each using the full channel count can run simultaneously.																																																																	
Sample rates	32 / 44.1 / 48 / 64 / 88.2 / 96 / 128 / 176.4 / 192 kHz +/-100ppm Varispeed operation is not supported																																																																	
Latency	<p>The table below shows the overall latency (receive+convert+transmit) between the various interfaces in <b>number of samples</b>. For x1 modes (32/44.1/48kHz), n is 1 For x2 modes (64/88.2/96kHz), n is 2. For x4 modes (128/176.4/192kHz), n is 4. The Dante latency "d" depends on the setting in the Dante controller which should be chosen according to the network topology, and can range from 150µs to 5ms.</p> <table border="1"> <thead> <tr> <th colspan="2" rowspan="2"></th> <th colspan="7">Output</th> </tr> <tr> <th>ADAT</th> <th>MO</th> <th>MC</th> <th>MT</th> <th>AE</th> <th>DA</th> <th>EX</th> </tr> </thead> <tbody> <tr> <th rowspan="6">Input</th> <th>ADAT</th> <td>4*n</td> <td>4*n</td> <td>4*n</td> <td>4*n</td> <td>5*n</td> <td>4*n+d</td> <td>4*n</td> </tr> <tr> <th>MO</th> <td>3*n</td> <td>3*n</td> <td>3*n</td> <td>3*n</td> <td>4*n</td> <td>3*n+d</td> <td>3*n</td> </tr> <tr> <th>MC</th> <td>3*n</td> <td>3*n</td> <td>3*n</td> <td>3*n</td> <td>4*n</td> <td>3*n+d</td> <td>3*n</td> </tr> <tr> <th>MT</th> <td>3*n</td> <td>3*n</td> <td>3*n</td> <td>3*n</td> <td>4*n</td> <td>3*n+d</td> <td>3*n</td> </tr> <tr> <th>AE</th> <td>4*n</td> <td>4*n</td> <td>4*n</td> <td>4*n</td> <td>5*n</td> <td>4*n+d</td> <td>4*n</td> </tr> <tr> <th>DA</th> <td>4*n+d</td> <td>4*n+d</td> <td>4*n+d</td> <td>4*n+d</td> <td>5*n+d</td> <td>-</td> <td>4*n+d</td> </tr> </tbody> </table>			Output							ADAT	MO	MC	MT	AE	DA	EX	Input	ADAT	4*n	4*n	4*n	4*n	5*n	4*n+d	4*n	MO	3*n	3*n	3*n	3*n	4*n	3*n+d	3*n	MC	3*n	3*n	3*n	3*n	4*n	3*n+d	3*n	MT	3*n	3*n	3*n	3*n	4*n	3*n+d	3*n	AE	4*n	4*n	4*n	4*n	5*n	4*n+d	4*n	DA	4*n+d	4*n+d	4*n+d	4*n+d	5*n+d	-	4*n+d
				Output																																																														
		ADAT	MO	MC	MT	AE	DA	EX																																																										
Input	ADAT	4*n	4*n	4*n	4*n	5*n	4*n+d	4*n																																																										
	MO	3*n	3*n	3*n	3*n	4*n	3*n+d	3*n																																																										
	MC	3*n	3*n	3*n	3*n	4*n	3*n+d	3*n																																																										
	MT	3*n	3*n	3*n	3*n	4*n	3*n+d	3*n																																																										
	AE	4*n	4*n	4*n	4*n	5*n	4*n+d	4*n																																																										
	DA	4*n+d	4*n+d	4*n+d	4*n+d	5*n+d	-	4*n+d																																																										
ADAT ports	8 input+8 output ports, 64ch@44.1/48kHz, 32ch@88.2/96kHz																																																																	

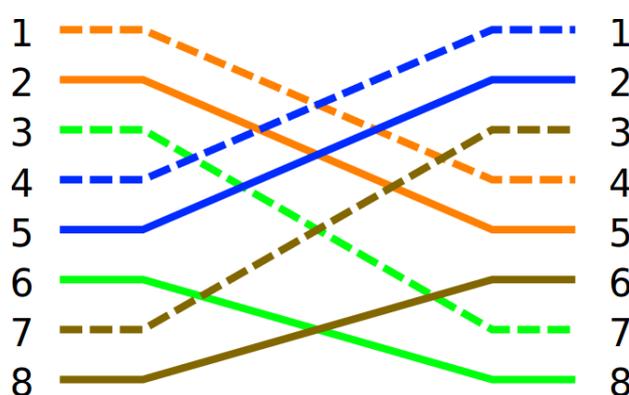
Parameter	Value
PC port	USB 2.0 (FTDI 2232). Remote control and firmware update, no audio connection
RS485 port	Male D-Sub 9pin, Yamaha AD8HR compatible Pinout: 2=RX-, 3=TX-, 4=TX+, 5=GND, 6=RX+
Extension port	HDMI connector type (not HDMI compatible). 64ch @ 32/44.1/48kHz, 32ch @ 64/88.2/96kHz, 16ch @ 128/176.4/192kHz
MADI optical port	SC connector, 50/125 µm or 62.5/125 µm multi-mode fibre (MM fibre), 1300nm, up to 2km total length.  Transceiver can be changed to Single mode (9/125µm) at the factory on request.  64ch @ 32/44.1/48kHz, 32ch @ 64/88.2/96kHz, 16ch @ 128/176.4/192kHz
MADI BNC port	Standard AES10 coaxial port. Use with up to 100meters of 75 ohm coaxial cable 64ch @ 32/44.1/48kHz, 32ch @ 64/88.2/96kHz, 16ch @ 128/176.4/192kHz
MADI TP port	AES-X 213 (upcoming MADI specification) compatible. 64ch @ 32/44.1kHz, 56ch @ 48kHz, 32ch @ 64/88.2, 28ch @ 96kHz, 16ch @ 128/176.4kHz, 14ch @ 192kHz Pinout: MADI-TP on 4/5, 7/8 Alternative use: Second AES50 port, Pinout: Data on 4/5, 7/8; Sync on 1/2, 3/6 (adapter cable required)
AES50 port	AES50 3.1 compatible 48ch @ 44.1/48kHz, 24ch @ 88.2/96kHz Pinout: Data on 1/2, 3/6; Sync on 4/5, 7/8 Alternative use: Second MADI-TP with Pinout: 1/2, 3/6 (adapter cable required)
Wordclock port	Output: 5.0Vpp nominal, able to drive two parallel 75 Ohm terminations Input: 2.0Vpp...5.0Vpp
Dante/AES67 port	2x Gigabit Ethernet, configurable either as "Switch" or as "Redundant connection" in the Dante controller. Device prefix: "MVR64" 64ch @ 32/44.1/48kHz, 32ch @ 64/88.2/96kHz, 16ch @ 128/176.4/192kHz
MIDI port	Standard isolated input, standard MIDI output
Headphones	2x125mW into 32Ohm (@0.01% THD+N) Bandwidth: 22Hz to 22kHz
ESD protection	all ports: +/- 15kV (Human Body Model)

## 10. ACCESSORIES

### 10.1. AES50/MADI-TP Pin swap adapter cable

The AES50 and MADI-TP ports have different pinouts as required by the respective standards. AES50 uses Pins 1/2 and 3/6 for the signal, 4/5 and 7/8 for sync, while a MADI-TP port uses 4/5 and 7/8 for the signal (with pins 1/2 and 3/6 reserved – this is where the AES50 sync signal is connected to in the multiverter).

To use the alternate function of such a port, an adapter cable with the pinout shown below is required:



### 10.2. Asynchronous Sample Rate Converter (ASRC) module

Add-on module which supports Asynchronous Sample Rate Conversion on one interface will be available in the future.

When this module is installed, one of the interfaces can be selected as “asynchronous” interface, meaning that its clock does not need to be derived from the same source as the multiverter's system clock.

### 10.3. Break-out boxes

Various break-out boxes for connection to the “Extension” port will be available in the future. These boxes are designed to add support for non-built-in interfaces (e.g. AVB), and to add additional ports (e.g. MADI) to the system.

## 11. APPENDIX

### 11.1. Warranty

We offer a full two (2) year warranty from the date of purchase. Within this period, we repair or exchange your device free o/f charge in case of any defect\*. If you experience any problems, please contact us first. We try hard to solve your problem as soon as possible, even after the warranty period.

\* Not covered by the warranty are any damages resulting out of improper use, willful damage, normal wear-out (especially of the connectors) or connection with incompatible devices.

### 11.2. Manufacturer contact

Appsys ProAudio  
Rolf Eichenseher  
Bullingerstr. 63 / BK241  
CH-8004 Zürich  
Switzerland

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Phone: +41 22 550 05 42  
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### 11.3. Recycling



According to EU directive 2002/96/EU, electronic devices with a crossed-out dustbin may not be disposed into normal domestic waste.

Please return the products back for environment-friendly recycling, we'll refund you the shipping fees.

### 11.4. Document Revision History

- 3: Added description of firmware 1.3 features
- 2: Corrected latency table
- 1: Initial release

### 11.5. About this document

All trademarks mentioned in this document are property of the respective owners. All information provided here is subject to change without prior notice.

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## Declaration of Conformity

The manufacturer:

**Appsys ProAudio  
Rolf Eichenseher  
Bullingerstr. 63 BK 241  
CH-8004 Zürich  
Switzerland**

declares under sole responsibility that the products mentioned below:

**Multiverter MVR-64**

meet the requirements of the following standards:

**EN 55024:2010  
EN 55032:2015 Class B  
EN 61000-3-2:2006/A1/A2:2009  
EN 61000-3-3:2009  
EN 61000-6-3:2007/A1:2011**

Therefore the product fulfills the demand of the following EC directives:

**73/23/EWG**

(Directive related to electrical equipment designed for use within certain voltage limits)

**89/336/EWG**

(Directive related to electromagnetic compatibility)

The devices are marked accordingly.

Zürich, 05.05.2016



Rolf Eichenseher (CEO)