



# REVERB TWENTYFOUR

High-Definition 19 Rack Unit with 24 Channels of Simultaneous Uncorrelated Reverb Supporting Extreme Surround Formats

Owner's Manual



# Table of Contents

<b>Important Safety Instructions</b> .....	<b>3</b>	<b>10. Using Reverb TwentyFour</b> .....	<b>29</b>
<b>Legal Disclaimer</b> .....	<b>3</b>	<b>11. Main page</b> .....	<b>32</b>
<b>Limited warranty</b> .....	<b>3</b>	11.1 Levels Section.....	32
<b>1. Introduction</b> .....	<b>4</b>	11.2 Pre Delay Section.....	32
<b>2. TC Icon software installation</b> .....	<b>5</b>	<b>12. Grid page</b> .....	<b>33</b>
2.1 Software Installation.....	5	<b>13. Setup page</b> .....	<b>34</b>
2.2 Installing the TC Icon software on a PC.....	5	13.1 Grid Setup section.....	34
2.3 Installing the TC Icon software on a Mac.....	6	13.2 Group 1 section.....	34
2.4 Running the TC Icon software .....	7	<b>14. Rev page</b> .....	<b>35</b>
2.5 Updating the Reverb TwentyFour firmware .....	8	14.1 Reverb Setup section .....	35
<b>3. Controls and Connectors</b> .....	<b>9</b>	14.2 Reverb Color section.....	35
<b>4. Overview</b> .....	<b>11</b>	<b>15. Trim page</b> .....	<b>36</b>
<b>5. Setting up</b> .....	<b>12</b>	<b>16. Factory presets</b> .....	<b>37</b>
5.1 Networking basics and troubleshooting .....	12	16.1 Scene Presets .....	37
<b>6. Quick Setup</b> .....	<b>14</b>	16.2 Routing Presets.....	38
<b>7. Basic operation with the TC Icon software</b> .....	<b>15</b>	16.3 Engine Presets.....	40
7.1 TC Icon interface .....	15	<b>17. System/ Remote</b> .....	<b>41</b>
7.2 System/ Status page .....	17	17.1 Remote – GPI 1 – Scene Recall section.....	41
7.3 System/ I/O.....	18	17.2 Remote – Calibration.....	42
7.4 System/ Setup/ Version.....	18	17.3 GPIO Technical specifications.....	43
7.5 System/ Setup/ Net .....	19	<b>18. Acoustics Enhancement</b> .....	<b>45</b>
7.6 System/ Setup/ Update .....	19	<b>19. Specifications</b> .....	<b>47</b>
7.7 System/ Remote .....	20		
7.8 E1-3 page.....	20		
<b>8. Using the Library</b> .....	<b>21</b>		
8.1 Library – Recall.....	21		
8.2 Library – Store.....	23		
8.3 Library – Delete.....	24		
8.4 Library – Bank page .....	25		
<b>9. TC Icon Setup</b> .....	<b>26</b>		
9.1 Info page .....	26		
9.2 Devices page .....	26		
9.3 Security page .....	27		
9.4 UI page .....	27		
9.5 Color page.....	28		

**EN Important Safety Instructions**

Terminals marked with this symbol carry electrical current of sufficient magnitude to constitute risk of electric shock.

Use only high-quality professional speaker cables with ¼" TS or twist-locking plugs pre-installed. All other installation or modification should be performed only by qualified personnel.



This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure - voltage that may be sufficient to constitute a risk of shock.



This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

**Caution**

To reduce the risk of electric shock, do not remove the top cover (or the rear section). No user serviceable parts inside. Refer servicing to qualified personnel.

**Caution**

To reduce the risk of fire or electric shock, do not expose this appliance to rain and moisture. The apparatus shall not be exposed to dripping or splashing liquids and no objects filled with liquids, such as vases, shall be placed on the apparatus.

**Caution**

These service instructions are for use by qualified service personnel only. To reduce the risk of electric shock do not perform any servicing other than that contained in the operation instructions. Repairs have to be performed by qualified service personnel.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11. Use only attachments/accessories specified by the manufacturer.



12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid

injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

15. The apparatus shall be connected to a MAINS socket outlet with a protective earthing connection.

16. Where the MAINS plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.



17. Correct disposal of this product: This symbol indicates that this product must not be disposed of with household waste, according to the WEEE Directive (2012/19/EU) and your national law. This product should be taken

to a collection center licensed for the recycling of waste electrical and electronic equipment (EEE). The mishandling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the efficient use of natural resources. For more information about where you can take your waste equipment for recycling, please contact your local city office, or your household waste collection service.

18. Do not install in a confined space, such as a book case or similar unit.

19. Do not place naked flame sources, such as lighted candles, on the apparatus.

20. Please keep the environmental aspects of battery disposal in mind. Batteries must be disposed of at a battery collection point.

21. Use this apparatus in tropical and/or moderate climates.

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# 1. Introduction

## About this manual

Read this manual to learn how to install and use your TC Electronic Reverb TwentyFour multichannel reverb unit.

This manual is only available in PDF format from the TC Electronic website.

To get the most from this manual, please read it from start to finish, or you may miss important information.

To download the most current version of this manual, visit the web page [tcelectronic.com/support/manuals/](http://tcelectronic.com/support/manuals/)

## Getting support

If you still have questions about your TC Electronic product after reading its manual, please get in touch with TC Support:

[tcelectronic.com/support/](http://tcelectronic.com/support/)

## 2. TC Icon software installation

### 2.1 Software Installation

The Reverb TwentyFour unit has no physical controls on the front or rear panel. It is controlled via the rear panel Ethernet connections either by a PC or Mac computer running the free TC Icon software available from our website, or by using the optional TC Icon remote control, available separately.

When you are working with a system involving one or multiple Reverb TwentyFour units, you are interacting with two types of software:

#### 2.1.1 TC Icon Software:

TC Icon is a software application that you install on the computer(s) which you are using to access, configure, operate and update the Reverb TwentyFour unit(s).

TC Icon software is available for Microsoft Windows and Mac OS X operating systems.

TC Icon software is free and can be installed on multiple computers.

Downloading and installing TC Icon software is described in this section of the manual.

#### 2.1.2 TC Reverb TwentyFour Firmware:

Reverb TwentyFour firmware is the software internally installed on the Reverb TwentyFour. Every unit comes pre-installed with the most current firmware version available at the time of production. You can download newer versions of firmware from the TC website. Firmware updates will contain bug fixes and/or new features.

Reverb TwentyFour firmware updates are free.

Use the TC Icon software installed on your computer (see above) to transfer firmware to your Reverb TwentyFour unit(s).

Downloading and installing the Reverb TwentyFour firmware updates is described in "System/Setup/Update" on page 19.

Please check our website often for any updates to the software and firmware. You should keep both the TC Icon software running on your computer and the Reverb TwentyFour firmware up to date. Using the latest software and firmware versions ensures that you benefit from any bug fixes and the latest features.

The following procedures show how to obtain and run the TC Icon software for PC or Mac computers.

### 2.2 Installing the TC Icon software on a PC

Please go to [www.tcelectronic.com](http://www.tcelectronic.com) and locate the Reverb TwentyFour section or TC Icon section (as it has the same software). Alternatively, you can visit the support/software section and locate the available software downloads for the Reverb TwentyFour or the TC Icon remote unit.

Please note, the screenshots that follow, are of the Reverb TwentyFour section of the website.

- Click on the button to select the Windows version of the software.

#### Firmware

[+ Show version history](#)



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#### TC Icon Software

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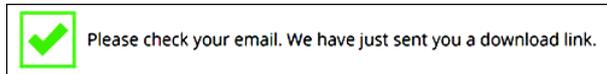
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- Enter your e-mail address, press "Submit" and a link to the download will be sent to you very shortly. If you wanted to be notified of updates and news, you can click on the small box below where you enter your address.

Please enter your email address to receive a download link for the software.

**Keep Me Informed with Updates and News**

- The website will confirm that an e-mail has been sent to your address.



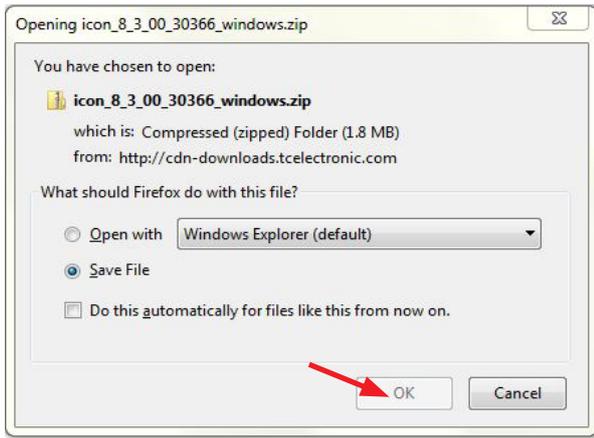
- Open your e-mail application and check for the new e-mail we sent you:



- Open the e-mail and click on the link provided. The download will begin.

EN

- Save the zipped file in a convenient location on your PC.



- Unzip the zipped file and save the Icon.exe executable file in a convenient location on your PC.

### 2.3 Installing the TC Icon software on a Mac

Please go to [www.tcelectronic.com](http://www.tcelectronic.com) and locate the Reverb TwentyFour section or TC Icon section (as it has the same software). Alternatively, you can visit the support/software section and locate the available software downloads for the Reverb TwentyFour.

Please note, the screenshots that follow, are of the Reverb TwentyFour section of the website.

- Click on the button to select the Mac version of the software.

#### Firmware

[+ Show version history](#)



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#### TC Icon Software

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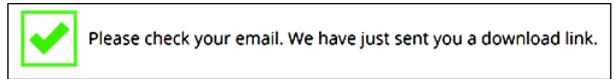
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- Enter your e-mail address, press "Submit" and a link to the download will be sent to you very shortly. If you wanted to be notified of updates and news, you can click on the small box below where you enter your address.

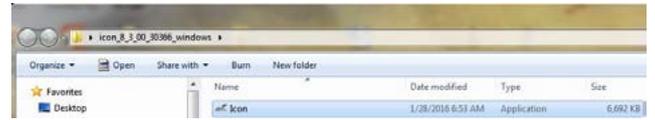
Please enter your email address to receive a download link for the software.

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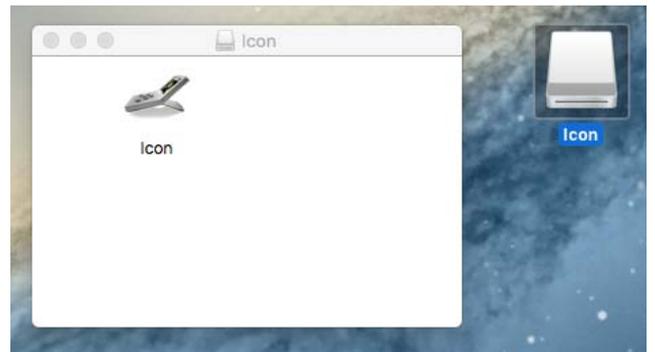
- Open your e-mail and check for the new e-mail we sent to you:



- Open the e-mail and click on the link provided.
- Save the mac.dmg file in a convenient location on your Mac.



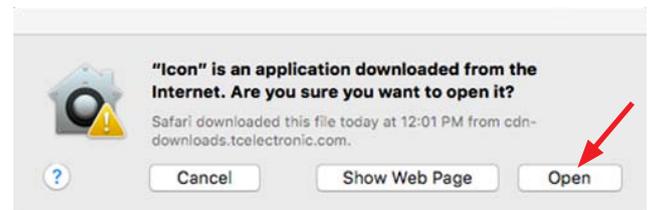
- Click on the file and the Icon folder and drive will appear.



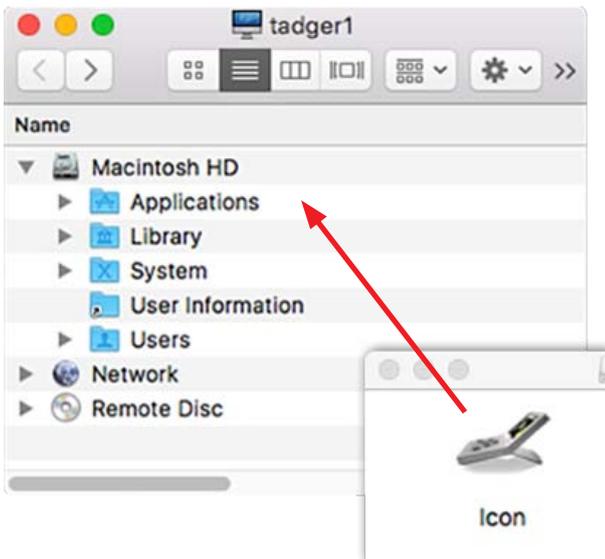
- Note, if you have trouble at this stage, for example, the following screen appears: "Icon can't be opened because it is from an unidentified developer," then check your system preferences.



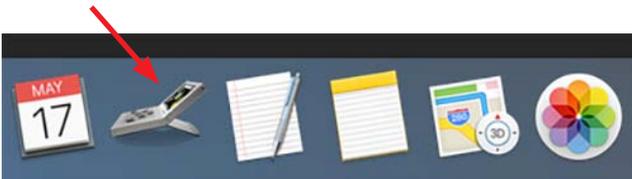
- Then select OPEN to accept and trust the file from tcelectronic.com.



- When this is successful, then drag the Icon into your Applications folder.



- You can then copy it from the applications folder onto your toolbar for easy access.



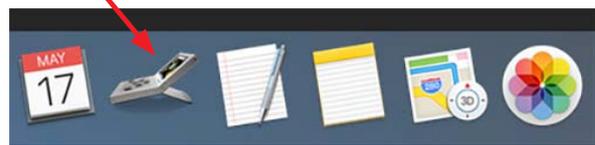
- If you experience technical problems during software download or installation, please ask a person with administrator privileges on your computer for assistance.
- To prevent the App from going to sleep and to ensure smoother operation in certain situations, right-click on the App and choose "prevent App Nap."

## 2.4 Running the TC Icon software

- Make the connections to the Reverb TwentyFour unit, including the Ethernet connection to the same Network as your computer. When all connections are made, apply AC power to the Reverb TwentyFour.
- On a PC, locate and double-click on the extracted Icon.exe file to run the executable file.



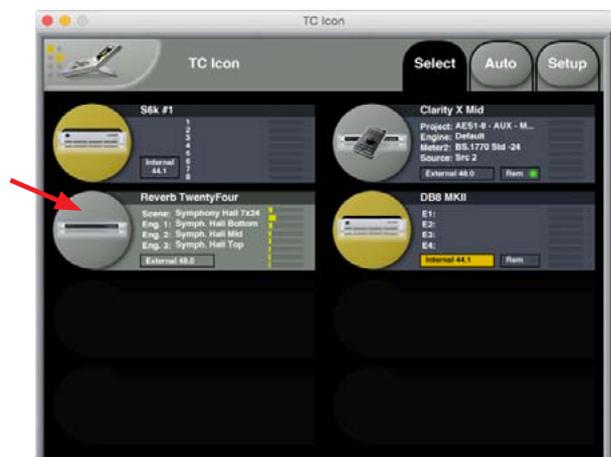
- On a Mac, click on the TC Icon.



- The TC Icon software will run, and it will then try to locate any TC devices that are connected to your Ethernet network. If a TC device is not found, then the following screen will appear:



- If TC devices are found on the network, then the TC Icon screen will be something similar to this example, where 4 different TC Electronic devices are found. Click on the Reverb TwentyFour area to select it for editing and controlling:



- Note that the TC Icon software runs on other TC units, not just the Reverb TwentyFour, so it may find other units in your system, and you can select which unit you would like to control at any given time.
- If a connection to the TC device cannot be established, please refer to “Networking basics and troubleshooting” on page 12.

#### 2.4.1 Updating TC Icon software (PC)

To update the TC Icon software on your computer when a newer version is released:

- Quit the TC Icon software if it is currently running on your PC.
- Download and extract the newer version as described previously and replace the currently installed version by copying the newer version over it.

#### 2.4.2 Updating TC Icon software (Mac)

To update the TC Icon software on your computer when a newer version is released,

- Quit the TC Icon software if it is currently running on your Mac.
- Download and extract the newer version as described previously and replace the currently installed version by copying the newer version over it.
- You can now unmount (eject) the disk image by right-clicking it and selecting “Eject” from the context menu.

## 2.5 Updating the Reverb TwentyFour firmware

The TC Icon software user interface on your computer includes an area where the Reverb TwentyFour firmware can be updated, and the various firmware and software version numbers can be displayed. This is described in “System/Setup/Update” on page 19.

- Regularly check the TC Electronics website for updates to the Reverb TwentyFour firmware, and download the updated files from the same web pages as described above for the TC Icon software downloads.
- If a newer version of the firmware is available, download it onto your computer (PC or Mac) from the website, by clicking the firmware button.

### Firmware

[+ Show version history](#)



**Reverb TwentyFour Firmware**  
Windows & Mac - Version 1\_0\_00\_3421 - 1.34 MB

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### TC Icon Software

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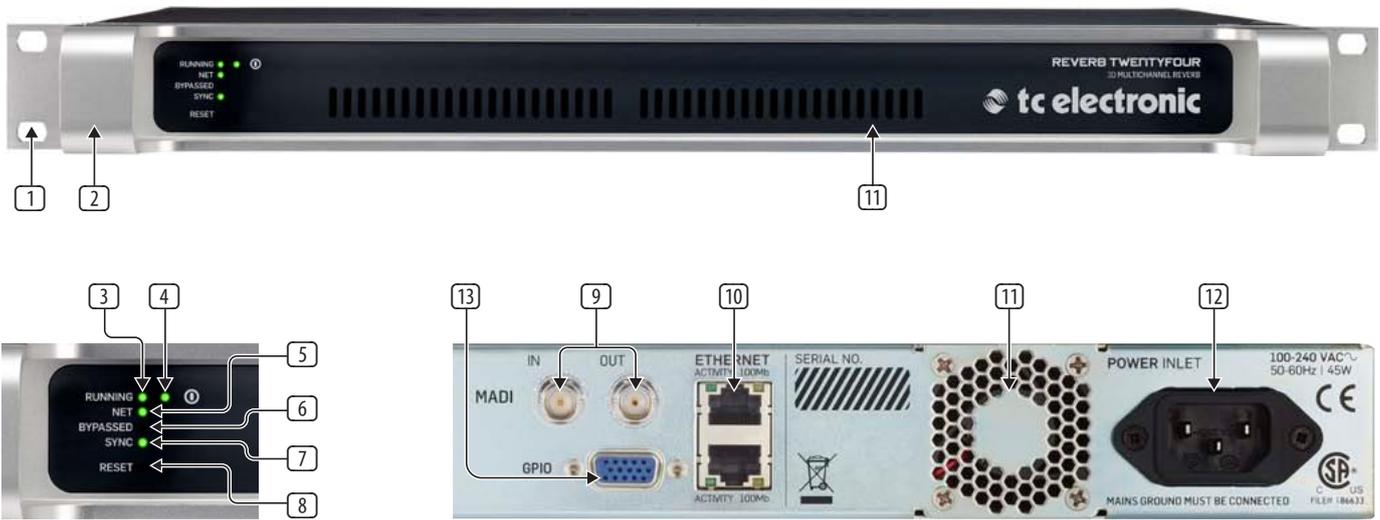
**Reverb TwentyFour TC Icon Software**  
Windows - Version 8\_4\_00\_30457 - 1.84 MB

Released: Tuesday May 29, 2017

**Reverb TwentyFour TC Icon Software**  
Mac - Version 8\_4\_00\_30457 - 5.9 MB

Released: Tuesday May 29, 2017

### 3. Controls and Connectors



- 1 RACK MOUNT EARS – allow the unit to be mounted into a standard 1U rack. Be kind and use washers and the correct rack screws to hold the unit securely in your rack.
- 2 HANDLES – these allow the unit to be carried and easily pulled in and out of the rack.
- 3 RUNNING LED – this LED indicates the status of the Reverb TwentyFour:

Running Led	Status	TC Icon message
Off	Startup until all processors are running	N/A
Green	Startup completed, and the unit is ready	Running OK
Red	System Error	Not running, system error

- 4 POWER LED – this is Green when AC power is applied to the unit.
- 5 NET LED – The Net LED indicates the status of the network connection to a computer running TC Icon software or a hardware TC Icon device.

Net Led	Status	TC Icon message
Off	No computer or TC icon device connected	N/A
Green	One or more TC Icons or computers connected	Net – This Icon(1), 2 Icons/ Apps(2) ... 8 Icons/Apps(8) Running OK
Off/ Green, Yellow, Red	Frame identification – see "Frame identification parameter" on page 17	Net LED will blink various colors as set by the TC Icon software, so you can easily identify the Reverb TwentyFour when operating multiple units

- 6 BYPASSED LED – this LED will turn on when the Reverb TwentyFour is in the BYPASS mode, as set by the TC Icon controller software on your computer (see page 20), or by using the hardware TC Icon remote device. No reverb will be added to any of the audio inputs when the unit is in Bypass mode.

- 7 SYNC LED – this LED indicates if synchronization to the signal source has been achieved.

Sync Led	Status	TC Icon message
Off	Startup until I/Os are up and running	N/A
Green	Sync OK + all inputs OK (No sample slips/repeats)	Inputs OK
Yellow	Slip/repeat observed	Input Slip
Red	No valid clock available	No Clock

- 8 RESET BUTTON – The Reset button on the front panel can be used to reset the IP address of a Reverb TwentyFour unit, or to reset Ethernet communication between the unit and a computer when a communication error has occurred.

#### Resetting the IP address

- On the rear panel, make a note of the unit's serial number and write it down here:
- Switch off the Reverb TwentyFour unit by disconnecting AC power to the unit.
- Gently insert a straightened paper clip or a similar object into the small "Reset" hole on the front panel, until it touches the button behind the panel, and then keep it holding down gently.
- Reconnect the AC power to the unit, while still holding the straightened paper clip onto the Reset button.
- The Reverb TwentyFour unit will then boot using its default IP address as follows: 192.168.1.[xx], where [xx] is the last two digits of the device's serial number as printed on the rear panel.

192.168.1.\_\_

## Resetting Ethernet communication

- To reset Ethernet communication between the Reverb TwentyFour and a computer during operation, proceed as follows:
- During operation, gently insert a straightened paper clip or a similar object into the "Reset" hole on the front panel until it touches the button behind the panel, and press the button down for approximately 5 seconds until the LEDs start blinking.
- This will reset Ethernet communication without interrupting audio streams.

## Rear Panel

- 9 MADI INPUT AND OUTPUT – the Reverb TwentyFour has one BNC MADI input that connects to the MADI output of your external equipment. Use a 75 Ohm impedance cable to make the connections. The Reverb TwentyFour accepts 28, 32, 56, or 64 channels of MADI input.
  - The BNC MADI output connects to the MADI input of your external MADI equipment. The Reverb TwentyFour processes and adds reverb to a maximum of 24 channels per unit, and the other inputs channels are bypassed.
  - See the specification table on page 47 for more details of the MADI input and outputs.
- 10 ETHERNET CONNECTORS – these two 32-bit Ethernet interfaces are fully compliant with the IEEE 802.3u standard, supporting 10 and 100 Mbit/s (100Base-TX ports).
  - Connect a computer running TC Icon software or a hardware TC Icon device to one of these ports using a "straight-through" cable with 8P8C modular connectors (RJ45). A "crossover" type cable is not required.
  - The Ethernet ports are used exclusively for connecting a controller (namely a computer running TC Icon software, or the hardware TC Icon device). No audio signals are transmitted for processing over these Ethernet ports.
- 11 FAN VENTILATION – do not block the ventilation slots at the front or rear, as this will reduce or block the airflow within the unit.
- 12 AC POWER INPUT – the unit is provided with one AC power input socket that accepts input voltages from 100 to 230 Volts AC at 50/60 Hz. Do not make connections to AC power until all connections to and from the Reverb TwentyFour have been made. The unit has no AC power switch and so it will be on whenever the AC power is applied to this AC input, and the Power LED (item 4) will be on.
- 13 GPIO PORT – this General Purpose Input/Output port can be used to connect a controller to remotely control various Reverb TwentyFour features.
  - For more information on GPIO, see "System/Remote" on page 41 and "GPIO Technical Specifications" on page 43.

## 4. Overview

Thank you for choosing a Reverb TwentyFour. This remarkable device has the following features:

- Pristine high-definition multichannel reverb in 19" rack format, that lets you create and manipulate reverb for up to 24 channels simultaneously, so you can deliver powerful content for even the most extreme surround formats.
- Process any mono or higher signal source to create content with as many output channels as you want.
- Flexible and seamless audio routing with 64 MADI channels of input and output on-board.
- Manipulate spaciousness for countless channels faster, better and over a wider range than ever before, letting you convey space more credibly than is possible with a microphone array in a real room.
- Fully downmix-compatible to let you render down from high channel formats gracefully, without introducing phasing artifacts or altering mix balance.
- Compatible with modern high-channel-count workflows, such as NHK Super Hi-vision, Dolby Atmos, Barco Auro and of custom installations where multichannel, high-performance audio is a key element.
- Power Correction maintains your direct-sound-to-reverb ratio while you do mix changes and experiment with decay time settings, saving significant re-trimming work.
- Truly make the most of extra discrete channels with reverb color to help you convey spaces imaginatively in multichannel format.
- New envelopment technique overthrows convention so that input signals already containing spatial information can be regarded as a perfect input source, enabling you to add significant reverb to them.
- Grid page provides quick and easy access to make and adjust spaces for many channels simultaneously.
- Main setup options let you manipulate channel groups to quickly offset balances and timing.
- As well as creating more credible envelopment from many loudspeaker channels than is achievable using a microphone array in a real room, the Reverb TwentyFour mixes-down perfectly and predictably, like other decorrelated signals.
- An important development goal of the Reverb TwentyFour has been not to waste loudspeakers – the more discrete channels there are, the better the envelopment will be.
- The inputs and outputs of the Reverb TwentyFour can be distributed quite flexibly.

### Solid foundations

TC's involvement with high quality digital audio dates back to the mid-eighties. Our commitment to digital excellence has continued over the years with equipment for the music, film and mastering industries.

Many years of experience with analog and digital audio production and the know-how of skilled engineers: this is the foundation on which this product was built. From the purist and quality-conscious hardware engineers to the software writers, some of whom were involved with designing the MPEG codecs: The team who have worked on the Reverb TwentyFour forms a competent, non-dogmatic design group ready to take film audio production to the next level.

We are confident you will value the result of their hard work.

### Basic concepts and operation

The Reverb TwentyFour is equipped with three so-called engines E1, E2, and E3, running the reverb algorithms.

As you can easily see, Reverb TwentyFour is a "headless system" – it has no front panel controls (with the exception of the Reset button).

Reverb TwentyFour is operated using the TC Icon software, which you can download from the TC Electronic website as described previously.

You can use the same version of the TC Icon software to operate our other products in film, audio and production, such as the System 6000.

Accordingly, a significant part of this manual covers operating Reverb TwentyFour using TC Icon software running on a standard computer, and the screen shots you will see are taken from the OS X or Windows versions of this software.

Reverb TwentyFour offers a variety of ways to engage or disengage audio processing. Processing may be invoked automatically, depending on format, level, physical inputs etc., while remote control can be achieved via Ethernet, and GPIO. When setting up the device, make sure to only engage the methods you wish to use. For example, if the GPI inputs are not used, make sure to disable the respective input.

Please invest some time in learning TC Icon's basic concepts – you will benefit from it when you are operating systems that may include many networked TC signal processors.

### Reverb TwentyFour and MADI

Reverb TwentyFour is available in just one hardware version: with MADI input and output.

There are up to 64 MADI inputs and outputs, and a maximum of 24 channels can be processed by the Reverb TwentyFour at any given time. The remaining channels of MADI input will pass right through.

We assume that you have a good working knowledge of MADI, including external audio equipment that outputs MADI into the Reverb TwentyFour, and equipment that inputs MADI from the Reverb TwentyFour. The MADI standard is not discussed in this manual, although the specification table on page 47 shows MADI technical details.

### Reverb TwentyFour presets

Reverb TwentyFour comes with ready-to-use presets based on international standards. More presets will be made available as part of software updates from the TC website. These presets are based on information from engineers around the world.

A good look at the available factory presets will help you see the flexibility offered by the Reverb TwentyFour, and what can be achieved. Please see section 16 on page 37 for more details of the factory presets. You can use the factory presets as a basis for creating your own user presets.

If you feel that an important preset is missing or that a given preset does not work as it should, please get in touch with TC Electronic technical support:

[tcelectronic.com/support/](http://tcelectronic.com/support/)

## 5. Setting up

Reverb TwentyFour can be used in a variety of configurations and setups. However, as up to 8 TC production and broadcast processors in your system can be controlled from a single computer running TC Icon software, even large and complex setups are basically operated in the same manner as the basic setup described in this chapter.

### 5.1 Networking basics and troubleshooting

You may setup and operate your Reverb TwentyFour in a simple networking environment – where you can connect a computer and one Reverb TwentyFour directly using a standard Ethernet cable –, or your system may be more complex, involving several Reverb TwentyFour units and other TC devices.

Either way, you are operating a system based on TCP/IP – the same protocol suite the Internet is built on. Accordingly, you need to follow basic networking procedures when setting up your system.

It is most likely that a standard computer running the TC Icon software will detect a Reverb TwentyFour “out of the box” without any problems. However, if it doesn't, there is most likely a subnet issue or an IP address conflict. In this case, please refer to the following sections.

#### Subnet mask and TCP/IP addresses

The subnet mask is a number that defines a “group” of computers (or other devices) connected to a network. All units in this group must have the same subnet mask.

The default subnet mask of each Reverb TwentyFour is 255.255.255.0.

The TCP/IP address of each device connected to a network has to be unique. An IP address consists of four decimal numbers (ranging from 0 to 255) separated by dots, e.g. 192.168.1.1.

The first three numbers (e.g. “192.168.1”) must be the same for each unit – but the remaining number has to be unique in the subnet, i.e., no two units in the subnet can have the same last number.

The default IP address of each Reverb TwentyFour is 192.168.1.[nn],

...where [nn] is identical to the last two digits in the Reverb TwentyFour's serial number (you will find the serial number of Reverb TwentyFour on a label on the rear side of the unit). This way, multiple Reverb TwentyFours can be setup directly out of the box without having to change their IP numbers.

If your computer is using the same IP address as a Reverb TwentyFour on the same network, there will be a conflict, and you have two options to take care of it:

- Change the last octet (last three numbers) of your computer's IP address or.
- Change the last octet of the Reverb TwentyFour's IP address.

#### 5.1.1 Changing your computer's subnet mask and TCP/IP address (where required)

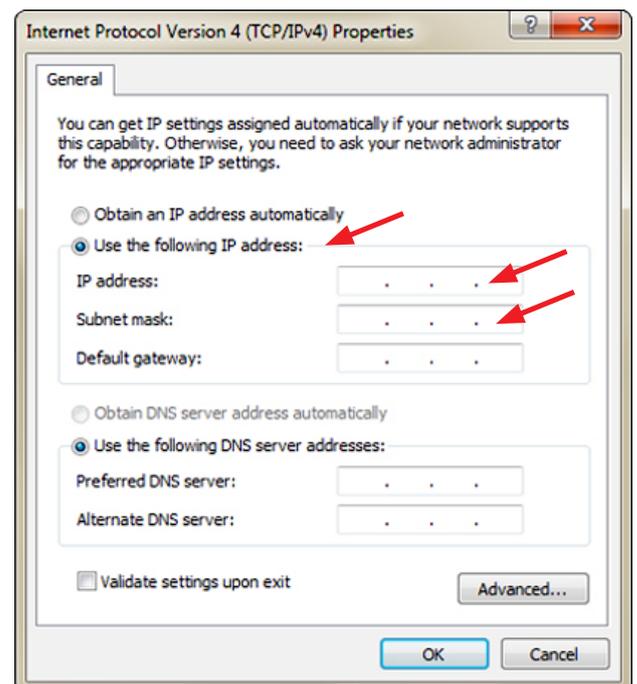
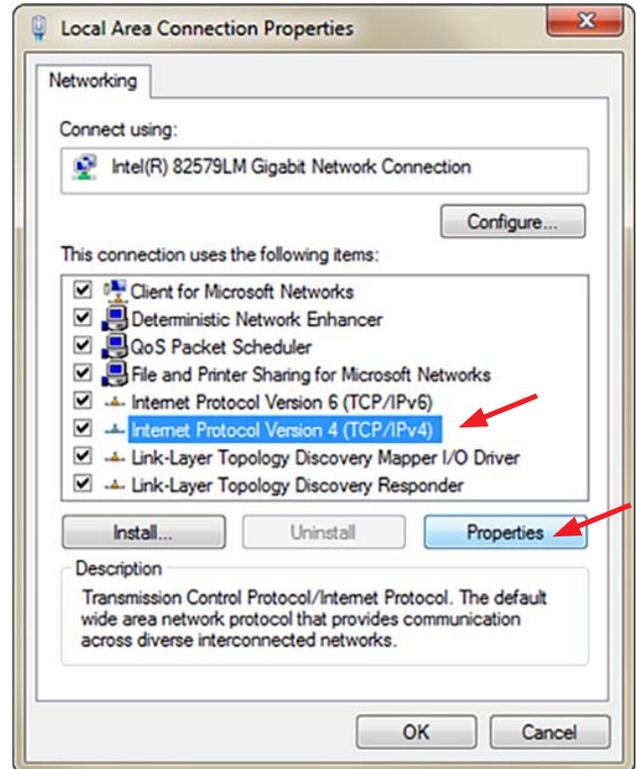
If and where you can change the subnet mask and IP address of your computer depends on:

- The operating system you are using and:
- Your account privileges.

If in doubt, please consult your company's network administrator for help and advice. Bring donuts.

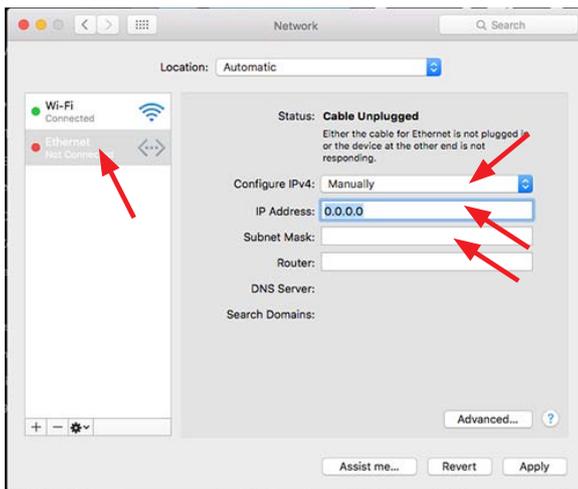
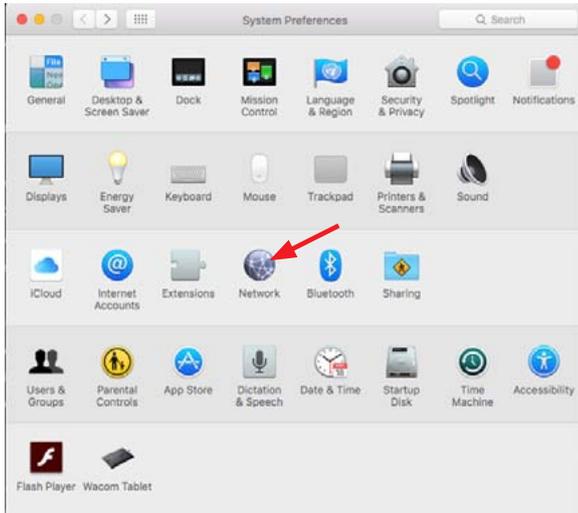
#### To find and change the TCP/IP address and the subnet mask on a computer running Windows:

- Go to Control Panel / Network Connections / Internet Protocol (TCP/IP).
- Set the TCP/IP address.
- Set the Subnet mask.



## To find and change the TCP/IP address and the subnet mask on a computer running OS X:

- Go to System Preferences/ Network.
- Select "Ethernet".
- Under "Configure IPv4", select "Manually".
- Set the TCP/IP address.
- Set the Subnet mask.



For further information, please refer to your operating system's integrated help system.

## 5.1.2 Changing the subnet mask and TCP/IP address of a Reverb TwentyFour (where required)

To change the subnet mask and TCP/IP address of a Reverb TwentyFour, you need to access it using a computer running the TC Icon software.

In case there is an IP address conflict that keeps you from accessing Reverb TwentyFour in the first place, you will need to change your computer's IP first as described in the previous section.

- Launch the TC Icon software on your computer.
- Select the particular Reverb TwentyFour you want to access.
- Click on the Frame tab.
- Select the System page.
- Select the Setup subpage.
- Select Net.



### To change the IP address of a Reverb TwentyFour:

- Select the IP address parameter on the Net page shown above.
- Enter the new IP address.
- Confirm by clicking Enter.

### To change the subnet mask:

- Select the IP Subnet Mask parameter on the Net page shown above.
- Enter the new subnet mask.
- Confirm by clicking Enter.

### Resetting the IP address

You may need to reset the IP address of the Reverb TwentyFour. This procedure is done using the front panel RESET button, as described in the section "Reset button" on page 9.

If the serial number of a particular Reverb TwentyFour ends with "00", the default IP address for this device will be 192.168.1.100, as "00" is not a valid IP number in all networks.

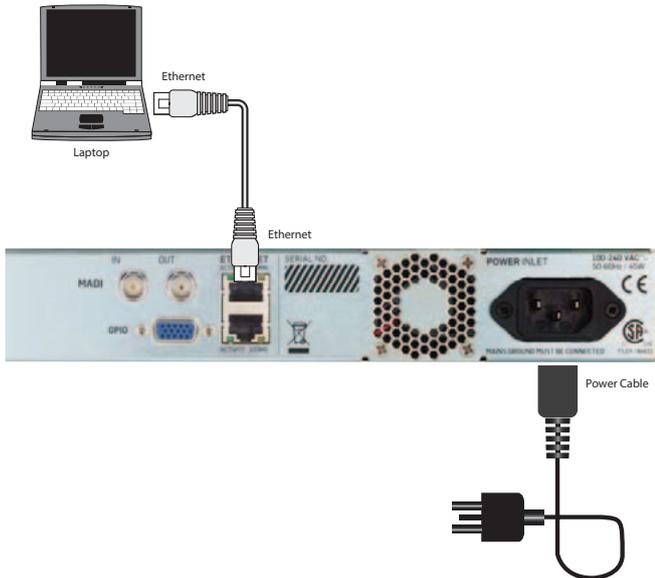
There is a small risk that two Reverb TwentyFours (or other TC signal processors) on a network have the same last two digits in the serial number and thus will result in a conflict after a reset. To resolve this issue, reset one Reverb TwentyFour first and change its IP address before connecting the second Reverb TwentyFour.

## EN 6. Quick Setup

This guide applies for a simple setup as illustrated below.

Requirements for this setup are:

- A Reverb TwentyFour.
- A CAT5 Ethernet cable.
- A computer equipped with an Ethernet adapter, running Microsoft Windows or Mac OS X and the latest version of TC Icon software.



### Procedure:

- Unpack the Reverb TwentyFour and install it in a stable, dry, and well-ventilated space.
- Connect the Reverb TwentyFour and your computer using an Ethernet cable.
- Power up your computer and the Reverb TwentyFour.
- If you have not already done so, download and install the latest version of the TC Icon software editor onto your computer. (See page 5 for details)
- Launch the TC Icon software on your computer.

The following screen will appear:



- Click "Assign". The network is scanned, and all connected and operational devices will be listed on the next screen:



- Select the device you wish to access.
- To have TC Icon detect more devices and assign them to one of up to eight slots, see "Assigning devices to the available slots" on page 26.
- If you cannot access the Reverb TwentyFour, please refer to "Networking basics and troubleshooting" on page 12.

### Operating multiple computers and/or TC Icon devices in one network

In a more complex setup with multiple TC Icon hardware remote controls and/or several networked computers running TC Icon software, each of these TC Icon units and computers can be used to connect to TC HD devices (System 6000 MKII, Reverb TwentyFour, Loudness Pilot, UpCon) on this network.

If your setup contains multiple TC HD devices, you should name these devices unambiguously so you don't accidentally edit the settings of the wrong device.

### Scanning / rescanning a network for devices

The scenario described above covers the first time you boot up your system or when no connected units are assigned.

You should scan the network again when you do any of the following:

- You make changes to your setup.
- When devices are powered up or down, or.
- If there are connection errors, these may not be detected immediately.

### To scan a network for devices:

- In the TC Icon software, go to Setup/ Devices.
- Click the Detect button.

For further information, see "Devices page" on page 26.

That's it – you are now ready to configure and operate your Reverb TwentyFour.

## 7. Basic operation with the TC Icon software

### Introduction

This section of the manual is a general introduction to operating the Reverb TwentyFour using the TC Icon software.

In the following chapters we assume that you have successfully connected the Reverb TwentyFour unit and your computer directly, or as part of a network as described in "Quick Setup" on the previous page.

Several Reverb TwentyFour and other TC signal processors (e.g. Clarity-X, DB4/DB8 MKII), and computers running the TC Icon software can be connected and operated at the same time as part of a standard Local Area Network (LAN). The TC Icon software is used to detect, configure and operate devices from your computer.

If you encounter communication errors or cannot detect or operate a device properly, please refer to "Networking basics and troubleshooting" on page 12.

The following sections of this manual assume that you are operating a basic system with only one Reverb TwentyFour connected.

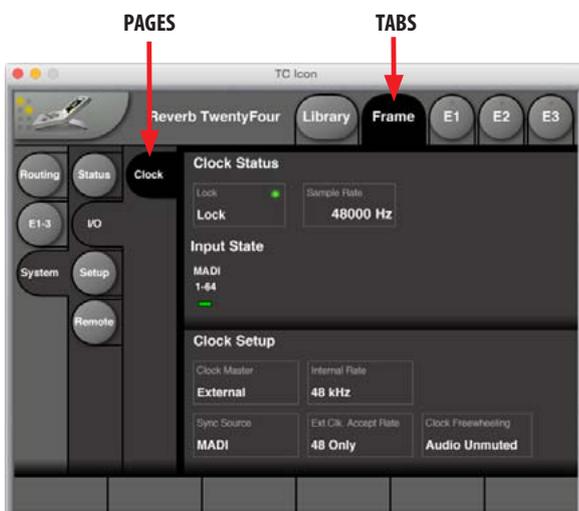
### 7.1 TC Icon interface

The TC Icon software interface has been optimized for use in real-time situations in film and post production environments (which usually are very different from standard desktop computing tasks and environments). Accordingly, the on-screen buttons are very prominent and clearly-labelled to ensure proper operation even in stressful situations. In addition, important parameters can be assigned to on-screen faders, allowing for precise control and immediate visual feedback.

The interface can be customized. Customizable parameters include the position of the faders and the user interface colors. For more information, please refer to the chapters "UI page" on page 27" and "Color page" on page 28 of this manual.

#### 7.1.1 Tabs versus pages

- Use the tab buttons on the upper edge of the TC Icon window to select a primary group of functions.
- Use the page buttons on the left edge of the TC Icon window to select specific pages within each tab.

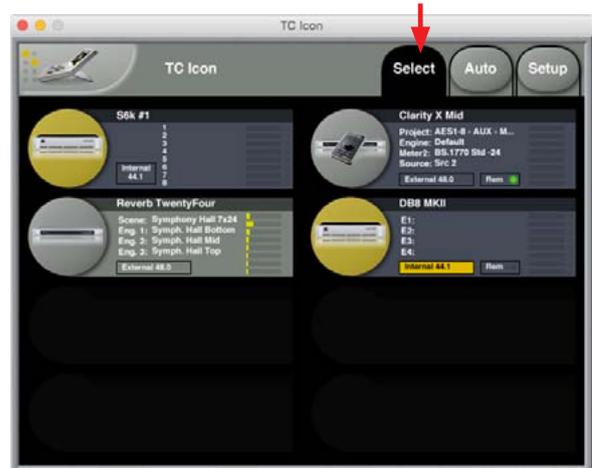


#### 7.1.2 TC Icon modes: Base and Device operation

The TC Icon software has two operation modes: **Base** and **Device** operation.

Use **Base** operation mode to select devices and configure the network and the TC Icon software itself.

- In Base mode, you will see the Select, Auto and Setup tabs on the upper edge of the initial TC Icon window that appears before you select a TC device. Most Base mode functions are described in the chapter "TC Icon Setup" on page 26.



Use **Device** operation mode to operate the currently selected device.

- In Device Mode, you will see the specific tabs for operating the currently selected TC device.



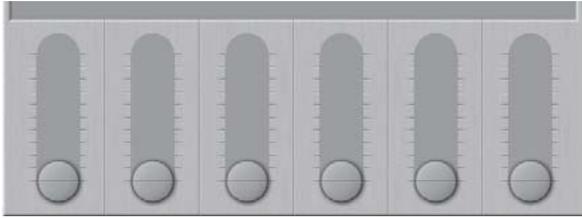
#### Switching between Base and Device operation modes:

To switch between Base and Device operation modes, click the TC Icon symbol in the upper left corner of the window.



### 7.1.3 Faders

The TC Icon software has six large on-screen faders along the bottom edge of the interface. They have several features that will help you operate your Reverb TwentyFour efficiently:



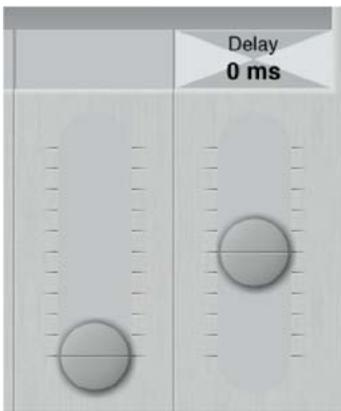
- There are six on-screen faders.
- You can change the position of the faders or hide them completely – see “UI page” on page 27.
- The name of the parameter that a fader is currently assigned to is displayed above the fader.
- When no label is shown above a fader, that fader is currently not assigned to a parameter.
- Fader assignments and values will always reflect the last Engine E1, E2, E3, that you have accessed.

#### Using Faders for fine adjustments

When a parameter is assigned to a fader, you can choose between **Normal** and **Fine** adjustment mode.

- In **Normal Adjustment mode**, the fader range will cover the full parameter range – e.g. -18 dB to 18 dB for the Center Trim parameter.
- In **Fine Adjustment mode**, the fader range will be smaller, allowing you to fine-tune around the current value – e.g. in 0.1 dB steps for a level parameter.

To switch a fader from Normal Adjustment mode to Fine Adjustment mode or back, click the label above that fader. Fine Adjust mode will be indicated by two triangles in the label field.



#### Fader Groups

The Reverb TwentyFour uses many parameters on several pages. For efficient operation, the most important parameters can be assigned to the on-screen faders in Fader Groups. Fader Groups allow you to access the most important features immediately, no matter what particular page is currently being displayed.

You can access predefined Fader Groups that cover typical applications, and you can define a User Fader Group with your own assignment for each fader.

You can select and customize Fader Groups per Engine – meaning that you can use one group of fader assignments for Engine 1, and others for Engine 2 and 3.

#### To select a Fader Group

- Select the tab of an Engine E1, E2, or E3 (on the top edge of the TC Icon software window).
- Use the arrow buttons on the Fader Group selector (at the lower left) to select the desired Fader Group. The name of the currently selected Engine and Fader Group are displayed on the Fader Group selector. E.g., “E1 Group 1” means that you have selected the predefined Fader Group 1 for Engine 1.



#### To set up the User Fader Group

- Select the tab of an Engine as shown above.
- Use the arrow buttons on the Fader Group selector to select the “User” Fader Group.
- Click the circular “Fader Asgn” button (on the left edge of the TC Icon software window).
- Click the label of a fader that you want to assign to a parameter.
- Click the name of the parameter that you want to assign to the previously selected fader.
- Repeat the last two steps until you have made all desired assignments.
- Click the circular “Fader Asgn” button again.

#### Assigning Fader 6 on the fly

Even when using one of the pre-defined Fader Groups for an Engine, you can always assign the sixth Fader to whatever parameter you want to control in a given situation. Like all other Fader-related settings, this is an Engine-specific setting: You can assign Fader 6 to one parameter when Engine 1 is selected and to another parameter when Engine 2 is selected.

#### To assign a parameter to Fader 6:

- To assign a parameter to the fader 6, simply click on a parameter field. That parameter will immediately be assigned to the sixth fader. If that parameter is also assigned to one of the other faders, you can now use both faders to control that parameter.

## On-screen keyboard

Reverb TwentyFour allows you to store and rename presets, assign labels to inputs and outputs, and perform other functions where text input is required. When you access any of these functions, an on-screen keyboard will be displayed.



While the keyboard is being displayed, you can either click the letters shown on-screen or use your computer's keyboard for character input. When you are done, click the large Enter button or press your computer keyboard's Enter key.

## 7.2 System/ Status page

Please note that the LEDs on the Reverb TwentyFour front panel will display basic status information as long as the device is powered – see “Controls and Connectors” on page 9.

To display additional status information about the Reverb TwentyFour, go to Frame/System/Status in the TC Icon software.



This page will display the following status information:

### Clock section

- **SOURCE** indicator – Indicates the source of the clock signal that the Reverb TwentyFour is currently following.
- **LOCK** indicator – Indicates if synchronization has been achieved. If no synchronization has been achieved, a red LED will be shown in this field.
- **NOMINAL RATE** indicator – Shows the detected sample rate of the signal Reverb TwentyFour is synced to (48 KHz).

### Status section

The indicators in this section follow the same status as the front panel LEDs described on page 9. Please refer to that page as it shows tables of the various LED color codes and their meaning.

- **RUNNING** indicator – Displays the current state of the Reverb TwentyFour power supply. A power supply failure may be indicated as described under “Power LED” on page 9.
- **NET** indicator – Displays the number of TC Icons hardware devices or the number of computers running TC Icon software, that have been detected on the network.
- **MUTE** – Indicates if the Reverb TwentyFour is running in Bypassed mode or Normal mode.
- **SYNC** indicator – The LED indicates if synchronization to the signal source has been achieved.
- **FRAME IDENTIFICATION** – If you are operating multiple Reverb TwentyFour units, you may need to identify one specific unit quickly. To do so, select the Frame Identification parameter to have that Frame identify itself with a blinking front panel NET LED. The color/color combination is selected by moving the small slider at the right of the Frame Identification box: “Green/Off”, “Yellow/Off”, “Red/Off”, “Green/ Yellow”, “Green/Red”, “Yellow/Red” or “Off”.
- **Temperature** indicator – Shows the current internal temperature of the Reverb TwentyFour in degrees Celsius.

## 7.3 System/ I/O

Go to Frame/System/ I/O.

Use this page to:

- Display clock status.
- Display input state.
- View the clock settings.



### Clock Status

- **LOCK indicator** – The Lock status field shows the top-level lock status of an incoming MADI stream.
- When Reverb TwentyFour is locked to an acceptable MADI stream, “Lock” is shown.
- When no acceptable MADI stream is available, “No Lock” and a red LED will be shown in this field.
- **Sample Rate indicator** – When the Reverb TwentyFour is locking to an incoming MADI stream, the sample rate in Hz will be shown. If the Reverb TwentyFour is not locking, the indicator field will read “N/A”.

### Input State

- **MADI 1-64** – The LED below this text will indicate green when MADI input is present .

### Clock Setup

- **Clock Master** – The Reverb TwentyFour can only sync to the external MADI input.
- **Internal Rate** – If the MADI input is lost, it will revert to the internal clock at 48 KHz = “Freewheeling”.
- **Sync Source** – The Reverb TwentyFour can only sync to MADI.
- **Ext.Clk. Accept Rate** – The Reverb TwentyFour can only sync at 48 kHz.
- **Clock Freewheeling** – If the unit is freewheeling, then the audio output is unmuted.

## 7.4 System/ Setup/ Version

Go to Frame/System/Setup/Version.

Use this page to:

- Show the unit's unique factory serial number.
- Show the TC Icon software version number.
- Show the unit's SW version number (i.e. the firmware version).



This page also has 2 buttons in the lower section as follows:

- **Update Version Information** – press the circular button in the lower left, to update the information, if for example, you have updated the TC Icon software or the Reverb TwentyFour's firmware.
- **Reset to Defaults** – press the circular button in the lower right to reset the Reverb TwentyFour to its factory default settings. Any user presets will be saved and not lost.

## 7.5 System/ Setup/ Net

Go to Frame/System/Setup/Net

Use this page to:

- Show the network parameters and network name of the device.
- Reboot the device.



This page shows details of the various network parameters. These can be altered if required, by clicking on the numbers and entering new numbers.

- Network Identifier – this shows the device name, the Reverb TwentyFour.
- IP Address – The TCP/IP address of each device connected to a network has to be unique. An IP address consists of four decimal numbers (ranging from 0 to 255) separated by dots, e.g. 192.168.1.1 The first three numbers (e.g. "192.168.1") must be the same for each unit – but the remaining number has to be unique in the subnet, i.e., no two units in the subnet can have the same last number. The default IP address of each Reverb TwentyFour is 192.168.1.[nn], where [nn] is identical to the last two digits in the Reverb TwentyFour's serial number (shown on a label on the rear panel of the device, or in the system/setup/version page). This way, multiple Reverb TwentyFours can be setup directly out of the box without having to change their IP numbers.
- IP Subnet Mask – The subnet mask is a number that defines a "group" of computers (or other devices) connected to a network. All units in this group must have the same subnet mask. The default subnet mask of each Reverb TwentyFour is 255.255.255.0.
- IP Gateway – The default value is 0.0.0.0 and is not usually changed.
- Reboot Device – press this circular button to reboot the Reverb TwentyFour on the network. This should be done if you have made any changes to the settings above, or any physical changes to the external network or connections.

## 7.6 System/ Setup/ Update

Go to Frame/System/Setup/Update.

Use this page to:

- Enter the file location of the latest downloaded firmware file.
- Find the downloaded firmware file.
- Install the new firmware.



To update the firmware, please proceed as follows:

- Please go to [www.tcelectronic.com](http://www.tcelectronic.com) and locate the Reverb TwentyFour section. Alternatively, you can visit the support/software section and locate the available software downloads for the Reverb TwentyFour unit.
- Download the Reverb TwentyFour firmware if it is newer than the version shown in the System/Setup/Version page.

### Firmware

[+ Show version history](#)



Released: Tuesday May 29, 2017

[+ Show previous versions](#)

### TC Icon Software

[+ Show version history](#)



Released: Tuesday May 29, 2017



Released: Tuesday May 29, 2017

- If the file is zipped, please unzip it and make a note of its file location on your computer.
- In the "Common Software Update Folder" area of the System/Setup/Update page above, enter the folder where you stored the downloaded firmware file, and press enter. The available file should now appear in the area below.
- Check that the filename is correct, and then press the circular "Update SW" button at the right. Be careful, as there may be more than one firmware file shown, so make sure you get the latest version.
- The firmware should now be downloaded onto the Reverb TwentyFour, and a confirmation will be shown on-screen when this is completed.

## 7.7 System/ Remote

Go to Frame/System/Remote.

This Remote page allows you to access remote features of the Reverb TwentyFour through an external interface. For example, an external switch box can be made so that different scene presets can be chosen remotely. More details of this feature can be found on page 41.

Use this page to:

- GPI – setup, choose, and enable different scene presets for remote recall.



- Cal – calibrate the operation of the external equipment.



- GPO – setup operation of external LEDs.



## 7.8 E1-3 page

Go to Frame/E1-3.

Use this page to:

- View the User group parameters for all 3 Engines. Selecting User group parameters is done from the Engine Edit pages E1, E2, E3.
- Values can be altered from this page, as well as from the 3 individual Engine Edit pages.
- Press the parameter you wish to assign to the Fader located below.
- At the right of the screen is a general Wet level (Out Level) parameter that works on all 3 engines.



## Bypass Mode

- There is also an overall Mute button, which mutes the wet part only. The Reverb TwentyFour is then in Bypass mode, and the BYPASS LED will light on the front panel.

## 8. Using the Library

### Recalling, storing and deleting settings, scenes, routings, engines

To use the Reverb TwentyFour effectively, you should make all required settings as described in this manual and then store them, so they can later be recalled. You may also want to name the settings you store, and delete settings that are no longer required. All these features are described in this Library section.

You first need to understand the hierarchical structure of your Reverb TwentyFour of Scenes, Engines, and Routings:

#### Scenes

A Scene is the most extensive selection you can make when recalling, storing or deleting settings. A Scene includes:

- All settings for all 3 Engines.
- Signal routings to and from these Engines.
- Recalling a Scene is equivalent to a “total recall”.
- All the settings that make up a Scene are called a Scene preset.

Recalling (loading), storing (saving) and deleting Scene Presets is covered in this Library chapter.

#### Engines

Instead of recalling or storing a full Scene as described in the previous section, you may want to edit, store or recall the settings for one particular Engine.

All the settings for one particular Engine are called an Engine preset.

Recalling (loading), storing (saving) and deleting Engine Presets is covered in this Library chapter.

#### Routings

All the settings that define how signals are routed to and from the Engines are called a Routing preset.

Recalling (loading), storing (saving) and deleting Routing Presets is covered in this Library chapter.

### The Library concept

The Library gives you access to all settings of all parameters of the currently selected Reverb TwentyFour.

The highest organizational level of the Library is a Bank. A Bank will hold:

- Scene presets.
- Routing presets.
- Engine presets.

### Factory presets vs. user presets

When recalling presets, you will see that there are two categories of presets: Factory presets and User presets.

- Factory presets can only be recalled, but not overwritten or deleted. If you change a Factory preset and you want to keep it, you have to store it as a User preset.
- User presets can be recalled, edited and stored, thereby overwriting the previous version.

## 8.1 Library – Recall

Use the Library Recall page of the TC Icon software to recall (load) previously stored settings into the memory of the currently selected device.

All colored buttons and selected items on the Recall page are colored in green.

To access the Library Recall page:

- If it isn't already, select the device you want to control using the Select page – see “TC Icon modes: Base and Device operation” on page 15.
- Select the “Library” tab.
- Select the “Recall” page.
- Select the subpage for the setting type you want to access:
  - Scene – to recall a Scene preset.
  - Routing – to recall a Routing preset.
  - E(engine) 1, 2, or 3 – to recall an Engine preset and use it for the currently selected Engine.
- Select between Factory and User preset groups by clicking the Factory or User button.



There are up to 8 Factory and 8 User preset groups, with each group holding up to 8 presets.

- Select a preset you want to use.
- Click the large “Recall (Scene/ Route/ Engine) Preset” button in the upper right corner to recall (activate) the selected preset.
- The selected preset will be recalled.

### Preset information

For some presets, additional information is stored as part of the preset. When you select such a preset, an inverted “Info” tag will appear at the bottom of the large Preset Recall button. Keep an eye out for it.



- Click the Info tag to display additional information about this preset in a modal dialog.
- Click the OK button to close the dialog.

### Library/Recall/Scene Presets



### Library/Recall/E2 (Engine 2) Presets



### Library/Recall/Routing Presets



### Library/Recall/E3 (Engine 3) Presets



### Library/Recall/E1 (Engine 1) Presets



## 8.2 Library – Store

Use the Library Store page of the TC Icon software to store (save) settings to a memory bank. You can only store settings as User presets. Factory presets cannot be overwritten.

All colored buttons and selected items on the Store page are colored in red.

To access the Library Store page:

- Select the “Library” tab.
- Select the “Store” page.
- Select the subpage for the setting type you want to store:
  - Scene – to store all settings (including Routing and all algorithm settings) as a Scene.
  - Routing – to store the current Routing.
  - E(ngine) 1, 2 or 3 – to store the settings of either Engine 1, 2, or 3 as an Engine preset.
- Select a User preset group. There are 8 User preset groups, with each group holding up to 8 presets.
- Select a preset slot in the currently selected group that you want to use.
- Click the large “Store (Scene / Route / Engine) Preset” button to store (save) your settings as a preset.
- The selected data type will be stored as a preset. You can then recall this preset – see “Library – Recall page” on page 21.

### Naming Presets

All user preset types can be (re)named.

To rename a preset:

- On the Store page, select the preset that you want to rename.
- Click the circular “Name” button.
- An on-screen keyboard will be shown.
- Use the on-screen keys or the physical keyboard of your computer to edit the name.
- Click the large Enter button to confirm the new name.

**Please note** that the preset itself is not stored when you click the Enter button! To store the preset with its new name, click the large “Store (Scene/ Route/ Engine) Preset” button.

### Adding Preset Information

You can add information to presets you have created or modified. When recalling such a preset later, a small inverted “Info” tag will appear at the bottom of the large Preset Recall button, allowing you to access this additional information.

To add information to a preset:

- On the Store page, select the preset that you want to add information to.
- Click the “Info” button.
- An on-screen keyboard will be shown.
- Use the on-screen keys or the physical keyboard of your computer to enter the information.
- Click Enter to confirm.

**Please note** that the preset itself is not stored when you click the Enter button! To store the preset with the newly added information, click the large “Store (Scene/ Route/ Engine/) Preset” button.

## Operating the unit while renaming presets

Please note that even when renaming presets or adding information as described above, the faders for the previously accessed page are still available and operational.

### Library Store Scene



### Library Store Routing



### Library Store Engine E1



### 8.3 Library – Delete

Use the Library Delete page of the TC Icon software to delete user presets from a memory bank. You can only delete user presets. Factory presets cannot be deleted.

Please note that all colored buttons and selected items on the Delete page are colored in yellow.

To access the Library Delete page:

- Select the “Library” tab.
- Select the “Delete” page.
- Select the subpage for the setting type you want to delete:
  - Scene.
  - Routing.
  - E(engine) 1, 2, or 3.
- Select a User preset group. There are up to 8 User preset groups, with each group holding up to 8 presets.
- Select a preset in the currently selected group that you want to delete.
- Click the large “Delete (Scene/ Route/ Engine) Preset” button to delete the selected preset.
- You will be asked to confirm this operation before the preset is actually deleted.

#### Operating the unit while deleting presets

Please note that even when deleting presets, the faders for the previously accessed page are still available and operational.

#### Library Delete Scene



## 8.4 Library – Bank page

Use the Library Bank page of the TC Icon software to copy Scene / Routing / Engine / Presets from one location to another.

You can copy Presets to and from Banks and files.

Files can be transferred to other computers, allowing you to easily reuse presets.

To access the Library Bank page:

- If it isn't already selected, select the device you want to control using the Select page – see "TC Icon modes: Base and Device operation" on page 15.
- Select the "Library" tab.
- Select the "Bank" page.
- Select the subpage for the setting type you want to copy:
  - Scene.
  - Routing.
  - E(ngine) 1, 2 or 3.

To copy from a Bank to a file on disk.

- Select "From Bank" in the first column. The second column will switch to "To File" accordingly.
- Specify the folder where the file should be written in the "File Folder" field.
- If you want to overwrite an existing file, select it in the right column.
- If you select "New file" instead, you will be prompted to specify the file name.
- Click the "Copy Bank" button.

To copy from a file on disk to a Bank.

- Select "From File" in the first column. The second column will switch to "To Bank" accordingly.
- Specify the folder from where the file should be read in the "File Folder" field.
- Click the "Copy Bank" button.

### Library Bank Scene



### Library Bank Routing



### Library Bank Engine

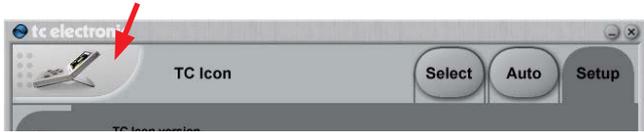


## EN 9. TC Icon Setup

This chapter covers screens and parameters of the TC Icon software not directly related to the day-to-day operation of your Reverb TwentyFour.

Accessing the Icon Setup pages.

- Switch the TC Icon software to Base mode by clicking the Icon symbol in the upper left corner of the window.



In Base Mode, you will see the Select, Auto and Setup tabs on the upper edge of the TC Icon window.

- Select the Setup tab.
- Select one of the pages described below : Info, Devices, Security, UI, and Color.

### 9.1 Info page

On this page, the version number of the currently installed TC Icon software is displayed. To update the TC Icon software, please refer to the "TC Icon software installation" on page 5 of this manual.



### 9.2 Devices page



Use this page to detect, control and assign the devices in your local network.

- Detect button – Click the "Detect" button to scan the network for connected devices. All detected devices will appear in the list.
- If you encounter problems when detecting connected devices, please refer to "Networking basics and troubleshooting" on page 12.

#### Assigning devices to the available slots

You need to assign a device to a slot of the TC Icon software to control it. Each instance of the TC Icon software can control up to eight different devices.

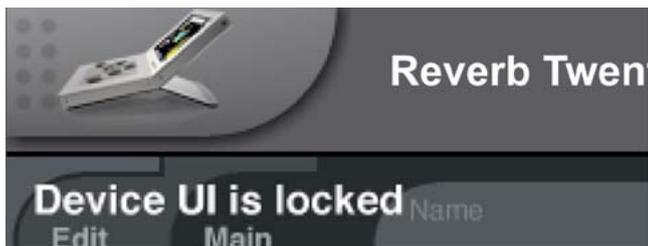
- Select a device from the list on the left side of the screen.
- Click one of the eight slots on the right side of the screen to assign the selected device to this slot.

## 9.3 Security page



On the security page, you can set several features regarding device readouts and operation.

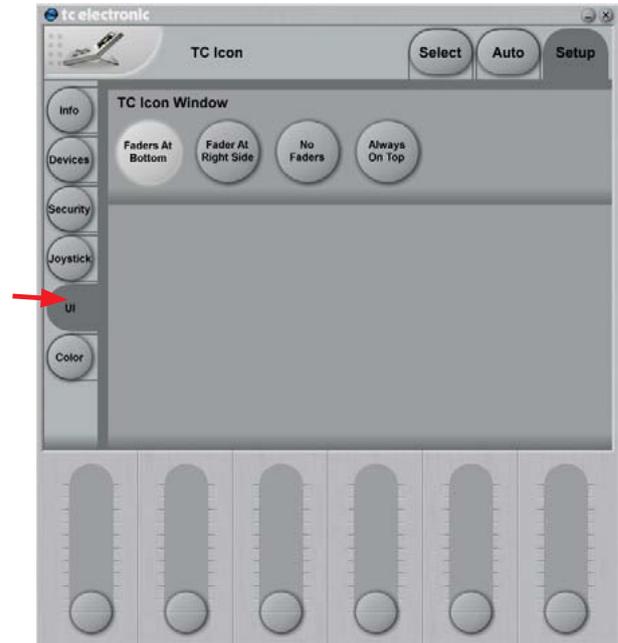
- **Sticky Clip button** – Click the Sticky Clip button to activate or deactivate the Sticky Clip feature.
  - When the Sticky Clip feature is activated (button highlighted) and clock errors or clippings are detected in a device, the red and yellow warning indicators will remain lit until the user presses “Reset Clip” button. This feature ensures that clock errors or clippings do not go unnoticed.
- **Lock Device UI button** – Click the Lock Device UI button to lock or unlock the user interfaces of the devices controlled by the TC Icon software.
  - When the Lock Device UI feature is activated (button highlighted), the user will be able to see the settings of the currently selected device, but he cannot change them. This will be indicated by a semi-transparent overlay and a “Device UI is locked” message on all device-related screens.



### Joystick page

- The MIDI Joystick setup page of the TC Icon software is not required for operating Reverb TwentyFour and is not described in this manual.

## 9.4 UI page



Use the 4 buttons to specify if and where the 6 faders should be shown. Changes on this page will take effect next time you open the TC Icon software.

- **Faders at bottom setting** – Faders will be positioned right below the main interface. This is the default setting.
- **Fader at right side setting** – One fader will be positioned to the right of the main interface.
- **No faders setting** – No faders will be shown on screen.
- **Always On Top** – the interface will always on top, and not hidden from view.

## 9.5 Color page



Use the Color page to define the TC Icon software's interface colors.

- **Color Scheme parameter** – Use the Color Scheme parameter to select a predefined color scheme. You can select a predefined color scheme from the list or define your own color scheme using one of the "User scheme" slots.
- **Color Element parameters** – Use the Color Element parameters to customize the colors of the currently selected User scheme. You can change the colors used for:
  - Background.
  - Icon Panel Front.
  - Icon Panel Back.
  - Device Panel Front.
  - Device Panel Back.
  - User Interface Text.

We suggest changing these colors under realistic/typical lighting conditions to make sure the interface is easy to read during day-to-day use.

### Changing User scheme colors

- To change the color, select a User Interface Scheme in the Color Scheme list and adjust each Color Element (e.g. Background) using the three R(ed), G(reen), and B(lue) faders that appear.
- To apply the new color scheme, click the "Apply User Scheme" button on the right.



# 10. Using Reverb TwentyFour

The Reverb TwentyFour comes pre-loaded with many factory presets for scenes, routings, and the Engines. These may be viewed using the Library/Recall page.

Details of the factory presets are shown on page 37. Here are a few example pages:

## Factory Scene Presets



## About the Scene Presets

Details of the Factory Scene Presets supplied with the Reverb TwentyFour are shown in section 16.1 on page 37.

## Flexible routing options

Of course, the input does not have to be a mono signal. Feeding stereo, 5.1, 6.1, 7.1 or x-to-x channel stems is easy using the Reverb TwentyFour's routing matrix.



## Factory Routing Presets

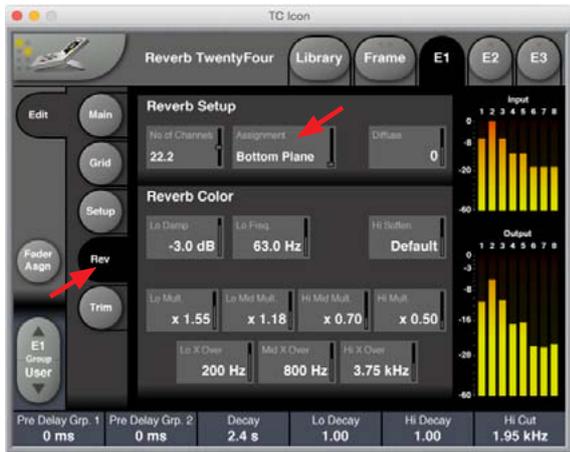


## Factory Engine Presets (E1 shown)



## Topologies: Surround, Rows, Columns

When connecting Reverb TwentyFour to the physical inputs and outputs on the Routing page, note that I/O numbers depend on the topology you have chosen. Use the "Assignment" parameter on the Rev page to set the topology.



The topologies to choose from include:

- Surround, Rows, Columns.
- Layers, Planes.

Each of these topologies uses the I/O numbers differently.

The currently selected topology is always shown on the Grid page.

Reverb TwentyFour and its factory presets are forgiving on speaker placement – but presets expect all channels to produce the same SPL for a certain signal. In case speakers are not aligned in level, offsets should be applied on the Trim page of the Reverb TwentyFour.

### 22.2 in/22.2 out Routing Preset

The 22.2 in/ 22.2 Routing preset settings and channel assignments are shown in detail on page 39.

## Using the Main and Grid pages

Load one of the factory presets into an Engine and go to its Main page. In this example, we have chosen Engine E1, and preset "Symph. Hall Bottom."



The most important pages for quick edits are Main and Grid.

- On the Main page, use Groups to quickly balance levels and adjust timing, or make A/B comparisons using the Mute and Zero functions. See "Main page" (page 32).
- On the Grid page, use the graphic display to weigh reverb parameters using an intuitive, visual approach – see "Using the Grid" below.

Please note that there are always two Groups of Channels. You assign Channels to these Groups on the Setup page – see "Setup page" on page 34.

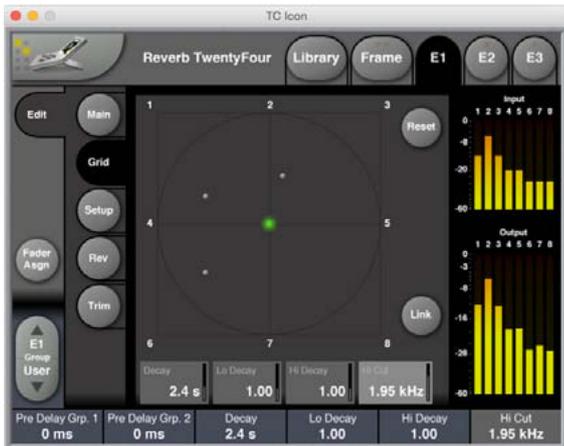
In all factory presets, channels 1 to 3 are assigned to Group 1, while all other channels are assigned to Group 2.

### Using the Grid

The Grid page provides a new approach to multichannel editing. The four parameters shown below the Grid can quickly be varied across the algorithm's channels by offsetting a dot from its center position.

- Select one of the four parameters shown below the Grid:
  - Decay.
  - Lo Decay.
  - Hi Decay.
  - Hi Cut.
- A green dot in the actual Grid will now represent the selected parameter's status.
- Set the selected parameter to a base value.
- Click the Reset button to center the dot and set the associated parameter to the same value on all channels, or:
- Move the dot to obtain the variation required.
- Reverb TwentyFour provides decorrelated outputs, whether the Grid parameters are set to the same setting or not.

In the Grid example below, the Grid has the Assignment parameter set to Surround, and the Hi Cut parameter has been selected and moved towards the center of the grid.



## Grid setup

What happens when the dot in the Grid is moved off-center is defined in the “Grid Setup” section of the Setup page. This Setup page example shows the typical Groups for Surround Mode and Grid Setup used on most factory presets.



## Decay Res. parameters

If you were to move the dot in the previous grid page towards the channel 8, then with the Decay Res. parameter on the Setup page set to the “Default” setting, the decay time of channel 8 would be much longer than the rest, channel 5 and 7 somewhat longer, and channel 3 and 6 a bit longer. For a more detailed explanation, see the following section.

A setting of 50 % for the Decay Res. parameter means that moving the dot from the center towards a channel will prolong the previously set Reverb Decay time by 50 %.

## Focus parameters

The Decay Focus, Lo Decay Focus, Hi Decay Focus, and Hi Cut Focus parameters on the Setup page determine how strongly neighboring channels are affected when the dot is moved toward one channel.

- **Narrow** : There is only a limited influence on the neighboring channel(s).
- **Default**: The neighbor channels are influenced, and a bit of influence is also applied to their next neighbor.
- **Wide**: Similar to Default, but the effect on the respective channels is more pronounced.

Focus may also be set to:

- “FB Only” (Front/Back only) or:
- “LR Only” (Left/Right only).

Those settings provide the same off-center adjustments to all channels in either the Front/ Back or the Left/Right plane.

Resolution and Focus settings may be changed before or after adjusting the Grid. For example, with the scenario shown above, if Decay Res. were changed to -75%, the decay in channels 8, 5 and 7 (direct neighbors), 6 and 3 (neighbors’ neighbors) would become much shorter than the remaining channels.

## 11. Main page

Go to E1/Main to reach the main page of Engine 1. The details of each area of the main page is described below:



### Name

- Use the Name field in the top area to edit the name of the currently selected Preset. It can then be saved as a user preset once you have set it up.

## 11.1 Levels Section

### In Level

- Range: Off, -115,5 to 0 dB.
- Use the In Level parameter to set and adjust the input level.

### Dry Level

- Range: Off, -115,5 to 0 dB.
- Use the Dry Level parameter to set the level of the dry, unprocessed signal that should be passed to the output channels.

### Power Correct

- Range: Off, 50 % and 100 %.
- As Reverb Decay times gets longer, the Power Correct feature can be used to lower the gain, thereby keeping the power of the Reverb constant. This feature is typically a big help when mixing because trimming of Decay is more forgiving (as the dry/wet balance doesn't change).

### Out Level Group 1 and Out Level Group 2

- Range: Off, -115,5 to 0 dB.
- Use the Out Level Group 1 and Out Level Group 2 parameters to set the output levels of the reverb channels assigned to Group 1 and Group 2. You assign Reverb Channels to the two Groups on the Setup page.

### Mute Group 1 and Mute Group 2 button

- Use the Mute Group 1 and Mute Group 2 buttons to temporarily mute all Reverb Channels assigned to Groups 1 and 2.

## 11.2 Pre Delay Section

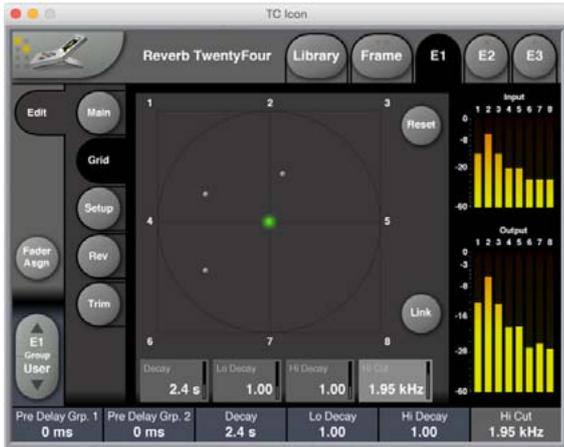
### Pre Delay Group 1 and Pre Delay Group 2

- Range: 0 to 150 ms.
- Use the Pre Delay Group 1 and Pre Delay Group 2 parameters to apply a pre-delay to the Reverb Channels assigned to Groups 1 and 2.
- Please note that in addition to these Pre Delay Group parameters, each Reverb Channel can be delayed individually using the eight Ch. parameters in the Delay Trim section of the Trim page.

### Zero Group 1 and Zero Group 2 buttons

- Use the Zero Group 1 and Zero Group 2 buttons to temporarily remove the delay from the Reverb Channels assigned to Groups 1 and 2.

## 12. Grid page



For a description of how to use the Grid, please see the previous section “Using the Grid” (page 30).

### Reset button

- To reset the position of the green selector dot for the currently selected parameter to Zero (center of grid), click the Reset button.

### Decay

- Range: 0.1 to 20 s.
- Use the Decay parameter to define the basic decay time of the Reverb TwentyFour. This is defined as the time it takes the Reverb to decay 60 dB. The Decay times for all eight Reverb channels, as defined by the position of the green dot on the Grid page, refer to the setting of this parameter. This means that when the Decay parameter is selected and the green dot is centered in the Grid, the Reverb Decay time for all eight Channels will be the value shown for this parameter.

### Lo Decay

- Range: 0.5 to 2.0.
- Use the Lo Decay parameter to define the decay time for the lower frequencies of the reverb. This parameter acts as a multiplier to the Lo Mult. and Lo Mid Mult. parameters in the Reverb Color section on the Rev page.
- Example:
  - Let us assume the Decay parameter on the Grid page is set to 2.0 seconds – this is the “base” decay time.
  - On the Rev page, you have set the Low Mult. parameter to 1.5. This means that the decay time for the low frequency band (as defined by the Lo X Over parameter) is  $(2 \times 1.5 \Rightarrow) 3.0$  seconds.
  - You have also set Lo Mid Mult. on the Rev page to 2.5. Accordingly, the decay time for the low mid frequency band is now  $(2 \times 2.5 \Rightarrow) 5.0$  seconds.
  - Now if you set Lo Decay on the Grid page to 2 and move the green dot all the way towards one channel in the grid, this will have the following effect for this particular channel:
    - Decay for the low frequency band:  $(2 \times 1.5 \times 2 \Rightarrow) 6$  seconds.
    - Decay for the low-mids frequency band:  $(2 \times 2.5 \times 2 \Rightarrow) 10$  seconds.

Put more simply: The parameters on the Rev page set the basic character of the reverb, allowing you to use the Grid as a wider “paint brush” for customizing/weighing the base settings as required.

### Hi Decay

- Range: 0.5 to 2.0.
- Use the Hi Decay parameter to define the decay time for the higher frequencies of the reverb. This parameter acts as a multiplier to the Hi Mid Mult. and Hi Mult. parameters in the Reverb Color section on the Rev page.

The interaction between the four involved parameters (Decay and Hi Decay on the Grid page, Hi Mid Mult. and Hi Mult. on the Rev page) is the same as for the low and low mid frequency bands described in the example for the Lo Decay parameter above.

Tip: When you are creating new Reverb TwentyFour presets, be sure to start by setting the Lo Decay and Hi Decay parameters to “1” first. This way, you enjoy the greatest flexibility when you edit and “play” your Reverb Preset later using the Grid.

### Hi Cut

- Range: 20 Hz to 20 kHz.
- Use the Hi cut parameter to define the cutoff frequency for the high-cut filter applied to the reverb. The filter frequencies applied to all eight Reverb channels as defined by the position of the green dot on the Grid page refer to the setting of this parameter.

## 13. Setup page



### 13.1 Grid Setup section

#### Decay Res.

- Settings: -75 / -50 / -25 / 0 / 25 / 50 / 100 %.
- Use the Decay Res. parameter to define how moving the green dot towards one of the eight Grid Markers affects the overall Reverb decay for the respective Reverb channel and its neighbors on the Grid.
- Negative values will shorten the Reverb decay, a neutral setting means that Reverb decay is not affected, and positive values will increase the Decay time by up to 100 % when the green dot is moved toward a Grid Marker.

#### Decay Focus

- Settings: Narrow / Default / Wide / LR Only / FB Only.
- Use the Decay Focus parameter to specify to what degree moving the green dot in the Grid affects the Decay times for neighboring channels. See "Grid setup – Focus parameters" (page 31).

#### Lo Decay Res.

- Settings: -75 / -50 / -25 / 0 / 25 / 50 / 100 %.
- Use the Lo Decay Res. parameter to define how moving the green dot towards one of the eight Grid Markers affects the decay of the Reverb's low frequency component for the respective Reverb channel and its neighbors on the Grid. Negative values will shorten the decay time, positive values will increase it.

#### Lo Decay Focus

- Settings: Narrow / Default / Wide / LR Only / FB Only.
- Use the Lo Decay Focus parameter to specify to what degree moving the green dot in the Grid affects the Lo Decay times for neighboring channels. See "Grid setup – Focus parameters" (page 31).

#### Hi Decay Res.

- Settings: -75 / -50 / -25 / 0 / 25 / 50 / 100 %.
- Use the Hi Decay Res. parameter to define how moving the green dot towards one of the eight Grid Markers affects the decay of the Reverb's high frequency component for the respective Reverb channel and its neighbors on the Grid. Negative values will shorten the decay time, positive values will increase it.

#### Hi Decay Focus

- Settings: Narrow / Default / Wide / LR Only / FB Only.
- Use the Hi Decay Focus parameter to specify to what degree moving the green dot in the Grid affects the Hi Decay times for neighboring channels. See "Grid setup – Focus parameters" (page 31).

#### Hi Cut Res.

- Settings: -75 / -50 / -25 / 0 / 25 / 50 / 100 %.
- Use the Hi Cut Res. parameter to define how moving the green dot towards one of the eight Grid Markers affects the high frequency filter applied to the reverb for the respective Reverb channel and its neighbors on the Grid.

#### Hi Cut Focus

- Settings: Narrow / Default / Wide / LR Only / FB Only.
- Use the Hi Cut Focus parameter to specify to what degree moving the green dot in the Grid affects the high-cut filter applied to the neighboring channels. See "Grid setup – Focus parameters" (page 31).

### 13.2 Group 1 section

- Use the Group 1 section of the Setup page to specify the Reverb channels that should belong to Reverb Channel Group 1 by clicking the respective buttons.
- All Reverb channels that are not assigned to Reverb Channel Group 1 automatically become part of Reverb Channel Group 2.
- Use the two Reverb Channel Groups to control complex Reverbs more effectively.

## 14. Rev page



The Rev page is used for basic setup and color adjustment of the reverb. When producing more output channels than 8, be sure to have Assignment set correctly, i.e. to different Planes (ITU 22.2) or to different Layers (all other formats).

It is fine to combine a Layer 1 Surround in one Engine with a Layer 2 Column in another Engine but different instances of Reverb TwentyFour should always be set to different Layers.

### 14.1 Reverb Setup section

#### No of Channels

Settings: 5-16, 22.2, 16-24.

Use the "No of Channels" parameter to define the total number of Reverb channels you will create:

- With the No of Channels parameter set to 5-16, you can use the Assignment parameter (right next to it) to assign each Engine E1, E2, or E3 to Layer 1 or 2 of a particular topology (Surround, Row or Column) – see "Topologies: Surround, Rows, Columns" (page 30).
- With the No of Channels parameter set to 22.2, you can use the Assignment parameter to assign each Engine E1, E2, or E3, to one of the three planes (Bottom/Mid/Top) – see "Description of the 22.2 in/22.2 out Routing Preset" on page 39.
- With the No of Channels parameter set to 16-24, you can use the Assignment parameter to assign each Engine E1, E2, or E3 to Layer 1, 2 or 3 of a particular topology (Row or Column).

#### Assignment

- Range: Depending on setting of No. of Channels parameter.
- Use the Assignment parameter to assign every instance to a particular Layer or Plane. Make sure that you do not set multiple instances to the same Layer.

The available settings are:

- With the No of Channels parameter set to 5-16: Layer 1 Surround, Layer 2 Surround, Layer 1 Row, Layer 2 Row, Layer 1 Column, Layer 2 Column.
- With the No of Channels parameter set to 22.2: Bottom Plane, Mid Plane, Top Plane.
- With the No of Channels parameter set to 16-24: Layer 1 Row, Layer 2 Row, Layer 3 Row, Layer 1 Column, Layer 2 Column, Layer 3 Column.

#### Diffuse

- Range: -16 to 16.
- Use the Diffuse parameter to apply more or less diffusion to the reverb than the algorithm designer intended for the given Decay time. For optimum performance, the diffusion is automatically adjusted "behind the scenes" whenever you change decay time. This parameter gives you added control to vary the diffusion around this automatic setting.

### 14.2 Reverb Color section

#### Lo Damp

- Range: -18 to 0 dB.
- Reverb TwentyFour is equipped with an adjustable low-cut filter that allows you to remove low frequencies from the Reverb. Use the Lo Damp parameter to set the amount of cut.

#### Lo Freq

- Range: 20 to 200 Hz.
- Use the Lo Freq parameter to set the filter frequency for Reverb TwentyFour's low-cut filter.

#### Hi Soften

- Range: -50 to 50.
- Hi Soften is a special filter used to "soften" the high frequencies of Reverb TwentyFour. This is not a simple high-cut filter, but a complex set of filters working together to remove those frequencies that make a reverb sound "brittle" or harsh.

#### Lo Mult.

- Range: 0.01 to 2.5.
- Use the Lo Mult. parameter to define a multiplier for the frequencies below the Lo X Over frequency.
- For example: If the main Decay parameter on the Grid page is set to 2 seconds, and the Lo Mult. parameter is set to 1.5, frequencies below the Lo X Over frequency will decay for 3 seconds.

#### Lo Mid Mult.

- Range: 0.01 to 2.5.
- Use the Lo Mid Mult. parameter to define a multiplier for the frequencies below the Mid X Over frequency.

#### Hi Mid Mult.

- Range: 0.01 to 2.5.
- Use the Hi Mid Mult. parameter to define a multiplier for the frequencies below the Mid X Over frequency.

#### Hi Mult.

- Range: 0.01 to 2.5.
- Use the Hi Mid Mult. parameter to define a multiplier for the frequencies above the Mid X Over frequency.

**Lo X Over**

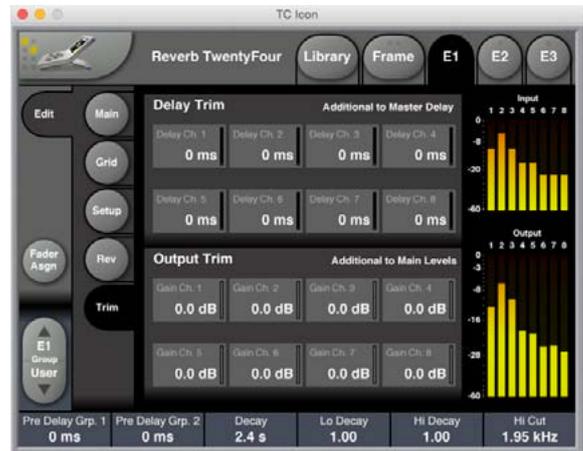
- Range: 20 to 500 Hz.
- Use the Lo X Over parameter to define the crossover frequency from the Low Frequency band to the Low Mid Frequency band.

**Mid X Over**

- Range: 200 Hz to 2 kHz.
- Use the Mid X Over parameter to define the crossover frequency from the Low Mid Frequency band to the High Mid Frequency band.

**Hi X Over**

- Range: 689 Hz to 20 kHz.
- Use the Hi X Over parameter to define the crossover frequency from the High Mid Frequency band to the High Frequency band.

**15. Trim page**

Level trims and Delay offsets per output are available on the Trim page. All parameters are additive to Level and Pre Delay settings on the Main page.

**15.2.1 Delay Trim section****Delay Ch. 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8**

- Range: 0 to 120 ms.
- Use the Delay Ch. 1 to Delay Ch. 8 parameters in the Delay Trim section to delay each Reverb Channel by up to 120 milliseconds.
- These delay values are applied **in addition to** the Pre Delay Group 1 and 2 values set on the Main page – see “Pre Delay section” (page 32).

**15.2.2 Output Trim section****Gain Ch. 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8**

- Range: Off, -115,5 to 0 dB.
- Use the Gain Ch. 1 to Gain Ch. 8 parameters in the Output Trim section to attenuate each Reverb Channel.
- The Level reduction for each Channel as defined on this page is added to the Out Level Group 1 and Out Level Group 2 values set on the Main page – see “Levels section” (page 32).

# 16. Factory presets

## 16.1 Scene Presets

There are five scene preset groups F1 to F5, each with a number of presets.

To review the available factory scene presets, go to Library/Recall/Scene and select the "factory" button.



Group	Presets	Notes
<b>F1: Unwrap 24 channels</b>	<p>Presets intended for going to 24 channels from mono, stereo, 5.1 or 7.1 channel inputs</p> <p>“Symphony Hall” preset with routing 1 to 24, 2 to 24, 5 to 24 and 7 to 24</p> <p>“Old Theatre” preset with same routing as “Symphony Hall” : 1 to 24, 2 to 24, 5 to 24 and 7 to 24</p>	<p>The 3 layers are tuned individually for best experience of the 24 speakers.</p> <p>The routing follows 3 times 7.1 SMPTE input channel order L-R-C-(LFE)-Lss-Rss-Lsr-Rsr</p> <p>The LFE input channel is not used</p> <p>Output channel order is 3 times: L - R - C - BC (back center) -Lss-Rss-Lsr-Rsr</p> <p>The rear center channel in each layer is fed by either rear L or R input channel</p> <p>With stereo input L and R is feeding the reverb in a "random" pattern so the 24 channels reverb is using less of the original stereo information. Use as an example - other input routing may fit the input material better</p> <p>Input routing is included as an example and works well with some 5.1 stems. Optimum routing depends on type of input. In some situations a stem downmix to stereo or to LtRt can give a more satisfactory result</p>

Group	Presets	Notes
<b>F2: Unwrap 16 channels</b>	Same as Unwrap to 24, but only the Mid and Top layer settings are used	
<b>F3: Film 24 Ch. In/Out</b>	Specific tunings for typical film use. 24 channel in/out presets	<p>The Film scene presets are based on the "Film" Engine presets</p> <p>3 presets are "stacked" with adjusted settings and different speaker assignments ensuring a 24 fully decorrelated channels experience</p> <p>The routing follows 3 times 7.1 SMPTE input channel order L-R-C-(LFE)-Lss-Rss-Lsr-Rsr</p> <p>Output channel order is 3 times: L - R - C - BC (back center) -Lss-Rss-Lsr-Rsr</p> <p>On the input the LFE channel is not used</p> <p>Use e.g. Dedicated 22.2 routing presets to make the preset compatible with ITU 22.2 setups</p>
<b>F4: Film 3 x Surround</b>	Different Film production examples with 3 x surround presets for both 5.1 and 7.1 with different channel order standards	<p>Channel order: SMPTE and FILM, 5.1 and 7.1</p> <p>7.1 SMPTE channel order L-R-C-(LFE)-Lss-Rss-Lsr-Rsr</p> <p>5.1 SMPTE channel order L-R-C-(LFE)-Lsr-Rsr</p> <p>7.1 FILM channel order L-C-R-Lss-Rss-Lsr-Rsr-(LFE)</p> <p>5.1 FILM channel order L-C-R-Lsr-Rsr-(LFE)</p>
<b>F5: Acoustics, RT60</b>	This Presets Group supports acoustics enhancement. The group contains 6 presets for different decay times: 0.6, 0.8, 1.2, 1.8, 2.2 and 2.7 sec. RT60 is the time it takes for the sound to decay by 60 dB after the sound source stops.	<p>Acoustics 0.6 sec 2x24, Side columns, ceiling rows 1-4</p> <p>Acoustics 0.8 sec 2x24, Side columns, ceiling rows 1-4</p> <p>Acoustics 1.2 sec 2x24, Side columns, ceiling rows 1-4</p> <p>Acoustics 1.8 sec 2x24, Side columns, ceiling rows 1-4</p> <p>Acoustics 2.2 sec 2x24, Side columns, ceiling rows 1-4</p> <p>Acoustics 2.7 sec 2x24, Side columns, ceiling rows 1-4</p>

## 16.2 Routing Presets

There are three routing preset groups F1, F2, F3, each with a number of presets to select.

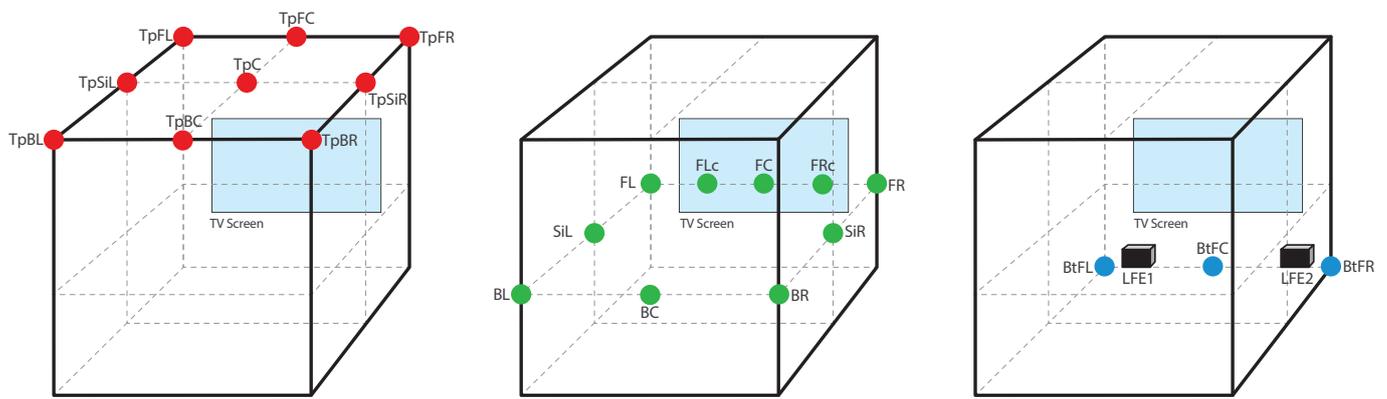
To review the available factory routing presets, go to Library/Recall/Routing and select the “factory” button.



Group	Presets	Notes
<b>F1: Mono, Stereo, 24</b>	1 in, 24 out, SMPTE 7.1	Unwrap from mono input to 24 channel output
	2 in, 24 out, SMPTE 7.1	Unwrap from stereo input to 24 channel output
	24 in, 24 out, SMPTE 7.1	Use with full 24 channel mix stems. Routing is 3 x 7.1 SMPTE channel order
	22.2 in, 22.2 out, ITU-R BS.2159	Use with full 22.2 channel mix stems. Routing is ITU-R BS.2159 channel order. Please see page 39 of this manual for more details.
	Empty Routing	Removes all input and output routing
<b>F2: 5.1 Surround</b>	E1-E3 3x5.1	Setup for 5.1 for all 3 engines. SMPTE, FILM, DTS channel order available
	Unwrap 5x24	Going from 5.1 input to 24 channel output. SMPTE, FILM, DTS input channel order available
	E1 5.1	Route 5.1 to/from E1. SMPTE and FILM channel order available
<b>F3: 7.1 Surround</b>	E1-E3 3x7.1	Setup for 7.1 for all 3 engines. SMPTE, FILM channel order available
	Unwrap 7x24	Going from 7.1 input to 24 channel output. SMPTE, FILM input channel order available
	E1 7.1	Route 7.1 to/from E1. SMPTE and FILM channel order available

16.2.1 Description of the 22.2 in/22.2 out Routing Preset

22.2 standard channel layout ITU ITU-R BS.2159				Reverb Twenty Four			
Channel number	Label	Name	Layer	Engine	Engine Channel	MADI channel	Notes
1	FL	Front Left	Mid	E2	4	1	
2	FR	Front Right	Mid	E2	5	2	
3	FC	Front Centre	Mid	E2	2	3	
4	LFE1	LFE-1	Bottom	E1	4	4	Input not routed = output muted, can be fed carefully to LFE channel
5	BL	Back Left	Mid	E1	6	5	
6	BR	Back Right	Mid	E1	8	6	
7	FLc	Front Left Centre	Mid	E2	1	7	
8	FRc	Front Right Centre	Mid	E2	3	8	
9	BC	Back Centre	Mid	E1	7	9	
10	LFE2	LFE-2	Bottom	E1	5	10	Input not routed = output muted, can be fed carefully to LFE channel
11	SiL	Side Left	Mid	E2	6	11	
12	SiR	Side Right	Mid	E2	8	12	
13	TpFL	Top Front Left	Top	E3	1	13	
14	TpFR	Top Front Right	Top	E3	3	14	
15	TpFC </td <td>Top Front Centre</td> <td>Top</td> <td>E3</td> <td>2</td> <td>15</td> <td></td>	Top Front Centre	Top	E3	2	15	
16	TpC	Top Centre	Top	E2	7	16	
17	TpBL	Top Back Left	Top	E3	6	17	
18	TpBR	Top Back Right	Top	E3	8	18	
19	TpSiL	Top Side Left	Top	E3	4	19	
20	TpSiR	Top Side Right	Top	E3	5	20	
21	TpBC	Top Back Centre	Top	E3	7	21	
22	BtFC	Bottom Front Centre	Bottom	E1	2	22	
23	BtFL	Bottom Front Left	Bottom	E1	1	23	
24	BtFR	Bottom Front Right	Bottom	E1	3	24	



## 16.3 Engine Presets

There are five factory preset groups F1, F2, F3, F4, F5, for each Engine, E1, E2, and E3. Each Factory preset group has 8 presets to select.

To review the available factory routing presets, go to Library/Recall/E1, E2, or E3 and select the "Factory" button.



Group	Presets	Notes
<b>F1: System 6000</b>	8 presets	Factory presets from System 6000, Reverb 8 algorithm
<b>F2: FX</b>	8 presets	Different and funny FX presets with rather extreme settings
<b>F3: Halls</b>	8 presets	A variety of surround Halls for both music and film
<b>F4: Plates &amp; Rooms</b>	8 presets	A variety of surround plates and rooms for both music and film
<b>F5: Film</b>	8 presets	Specific tunings for typical film use

All engine presets are suitable for all surround formats but verified specifically in 5.1, 7.1 and 22.2.

### An example of how to make reverb settings for more than 8 channels:

- Use an existing 8 channel engine preset or make your own in a 7.1 setup.
- Copy the 8 channel preset into the engines needed for the output format e.g. 3 engines for the 22.2 format. Now you have identical sound in all 24 channels but we need to make them uncorrelated.
- Use a suitable routing preset for the setup e.g. "22.2 in, 22.2 out".
- Adjust Engine 1 and 3, leaving Engine 2 as the reference.
- Set the No of Channels and Assignment on the Rev page differently in all 3 engines E.g. No of Channels = 22.2 and Assignment = Top, Mid and Bottom Plane respectively.
- Now the 24 output channels are completely de-correlated.
- Make adjustments in Engine 1 and 2 to precisely exploit the 22.2 speaker setup. For example, use slightly different Decay, Pre Delay, Hi Cut and Output Level settings in the 3 engines. More drastic adjustments may be used for your specific needs or your sound ideas.

## 17. System/ Remote

Go to Frame/System/Remote.

Remote features of the Reverb TwentyFour can be accessed through an external user-supplied interface connected to the rear panel GPIO port (see page 43 for details of the GPIO interface).

The Remote page of the TC Icon software has 3 main sections as follows:

- **GPI** – setup, choose, and enable different scene presets for remote recall. This may be used for quickly changing of the acoustics by changing the decay time in a venue. An external switch box can be made so the venue technicians have 3 buttons – one for each of 3 user scene presets that have different decay times. In this way you can select a decay time for the venue that fits the evening's concert type.
- **Cal** – calibrate the operation of the external equipment.
- **GPO** – this can be used if required, to setup operation of external LEDs.

### 17.1 Remote – GPI 1 – Scene Recall section

- GPI input 1 can be used for User Scene preset recall (see "Library – Recall page" on page 21). Please note that the Icon user interface is locked when GPI is used for control.



#### Enable button

- Use this button to enable the GPI 1 input for User Scene Recall.

#### Current Scene Status field

- The Current Scene status field shows the name of the currently active Scene preset. The currently active Scene will be shown here whether it has been selected via GPI or not. The name shown here is identical to that shown on the Library – Recall – Scene page as "Current" and on top of the Frame – Routing page. When GPI is disabled, "-" is shown.

#### Function parameter

- Use the Function parameter to define the scope of the GPI recall feature. The available GPI recall modes that you can set using the Preset Recall Function parameter are:
  - Off setting – No Preset Recall using GPI.
  - 2 Presets – Select one of two Presets using GPI1. Select the Preset Bank using the Scene Bank parameter.
  - 3 Presets – Select one of three Presets using GPI1. Select the Preset Bank using the Scene Bank parameter. For a description of the "Idle" state, see "Idle state" below.

- 4 Presets – Select one of four Presets using GPI1. Select the Preset Bank using the Scene Bank parameter.
- 7 Presets – Select one of seven Presets using GPI1. Select the Preset Bank using the Scene Bank parameter.
- 8 Presets – Select one of eight Presets using GPI1. Select the Preset Bank using the Scene Bank parameter.
- 3 Presets DUAL – Select one of three Presets using GPI1 and GPI2. This mode uses simple binary inputs on GPI1 and GPI2 – i.e. 00, 01, 10 and 11. Select the Preset Bank using the Scene Bank parameter.
- 4 Presets DUAL – Select one of four Presets using GPI1 and GPI2. This mode uses simple binary inputs on GPI1 and GPI2 – i.e. 00, 01, 10 and 11. Select the Preset Bank using the Scene Bank parameter.
- 15 Presets DUAL – Select one of fifteen Presets using GPI1 and GPI2. This mode uses 8-state on GPI1 and binary on GPI2. In this mode, the Scene Presets are always recalled from two consecutive banks – e.g. Bank 1 and Bank 2. Select the Preset Bank pairs (1+2, 3+4 etc.) using the Scene Bank parameter.
- 16 Presets DUAL – Select one of sixteen Presets using GPI1 and GPI2. This mode uses 8-state on GPI1 and binary on GPI2. In this mode, the Scene Presets are always recalled from two consecutive banks – e.g. Bank 1 and Bank 2. Select the Preset Bank pairs (1+2, 3+4 etc.) using the Scene Bank parameter.

#### Idle state

"Idle" denotes GPI control being presently not active – i.e. the unit can still be controlled as normal, adjusting parameters and recalling presets via the TC Icon. However, once a non-idle GPI state is chosen, the selected Scene preset is recalled, and normal functionality is blocked (which is also the case when GPI is engaged in general).

#### Scene Bank parameter

If you have set the previously-described Function parameter to any value other than "Off", you can select the Bank (or Banks) that Presets should be chosen from using the Scene Bank parameter. See the recall modes for a more thorough explanation.

#### Status field

- The status field is intended for diagnostics during the setup of GPI control.
  - "-" – GPI 1 is not enabled, or the incoming voltage is outside of valid windows. Check the device's GPI calibration, the incoming voltage and the general external GPI setup.
  - "Idle" – GPI is not controlling. The incoming GPI voltage may be at maximum or not connected while the current setting for the Scene Bank parameter in the same section includes the "idle" option.
  - "1 (N/A)" – No valid User preset is stored in that specific library location, and therefore GPI is not controlling. The behavior of the device is identical to Idle state.
  - "1, 2, 3, 4, 5, 6, 7, or 8" – Incoming GPI voltage is within the valid window, and GPI is controlling Scene Recall. The TC Icon UI is locked. Details regarding GPI signals: GPI 1 is receiving fixed-state, latching signals. A validation process is performed when receiving a new GPI voltage. The incoming voltage needs to be within the specific valid window for 500 ms before the preset change is initiated. The time required for performing a change depends on the scope of that change – e.g., whether it only involves parameters changes or the routing and algorithm change as well.
  - For information on voltage windows and GPI circuits, please see page 43.

## 17.2 Remote – Calibration

To calibrate GPI, go to the Frame / System / Remote / Cal page.



Each GPI may be used to switch between up to 8 states. GPI calibration should be performed when switching between more than two states (as it is required for preset recall).

### Current section

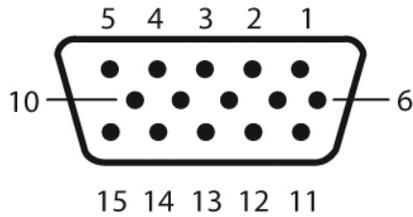
- The Current section of the GPI Calibration page provides live status information for the GP inputs. Here, “Vs” denotes positive terminal on the respective GP connector, typically 3.3 V.

### Limits section

- The Limits section of the GPI Calibration page shows the lower (“GPI Lo Threshold”) and upper (“GPI Hi Threshold”) limits of the voltage windows for the four GP inputs.
- To calibrate a GPI input, click the respective Calibrate button and follow the on-screen instructions.

## 17.3 GPIO Technical specifications

The General Purpose Input/Output (GPIO) connector on the Reverb TwentyFour rear panel is configured as follows:



Pin No	Function
1	GPO 1, contact 1
2	GPO 2, contact 1
3	GPI 2
4	GPI 4
5	3V3 output, 100 mA max
6	GPO 1, contact 2
7	GPO 2, contact 2
8	GPI 1
9	GPI 3
10	3V3 output, 100 mA max
11	Ground
12	Reserved
13	Ground
14	Ground
15	Reserved

The 3V3 output (presented on 2 pins) can be used for an external GPIO network as described below. It is current-limited to 100 mA.

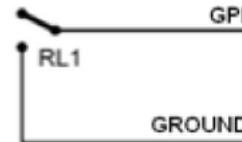
Each of the two GPOs consist of a floating internal relay than can either be set open (this is the default setting) or closed. Each relay can handle 200 mA / 24 V AC/DC max. The relays can be used to turn on or off external LEDs, with the assignment selection coming from the TC Icon software menu Frame/System/Remote/GPO.

The four GPI inputs are DC-coupled 0 to +3V3 inputs. Inside the Reverb TwentyFour, there are 100 kOhm resistors that connect the GPI inputs to the +3V3 power supply. When nothing is connected to the GPI input, the input voltage is +3V3V. A resistor network can be used to pull down the voltage as suggested in the 3 figures below:

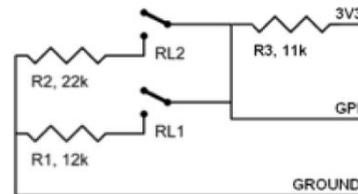
## GPI installation

Selection between up to 8 presets is achieved by feeding a DC voltage to the GPIO D-SUB connector. The input voltage is compared against voltage windows that correspond to certain presets. Between the valid voltage windows, invalid windows have been inserted to protect against erratic operation. The processor constantly monitors the GPI input, and only if several consecutive measurements point to the same, valid voltage window, a recall is performed. The voltage windows are chosen to enable easy "binary relay encoding" as shown in the 3 small schematics below. If long cable runs are required, you may need HF decoupling using a ceramic capacitor across the D-SUB GPI and GROUND pins. For maximum detection precision and maximum tolerance against cable induced noise/hum please use the calibration tool in the TC Icon application to set the "HI" and "LO" thresholds of the GPI voltage range.

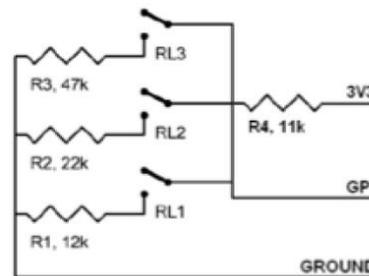
- Setup "1 of 2"



- Setup "1 of 4" (use 1% resistors)



- Setup "1 of 8" (use 1% resistors)



## GPI Voltage Windows

In the table below, voltages outside the limits mentioned are to be considered invalid. No action is taken if invalid measurements are made. GPI recall action resumes when a stable, valid measurement is detected again.

Mode	User Preset No	Scaled Target / Vs	Min typ / V	Target typ / V	Max typ / V	RL3	RL2	RL1
1 of 2	1	1.000 (idle)	2.67	3.30	3.30			open
	2	0.000	0.00	0.00	0.51			closed
1 of 4	1	1.000 (idle)	3.20	3.30	3.30		open	open
	2	0.689	2.18	2.28	2.38		closed	open
	3	0.548	1.71	1.81	1.91		open	closed
	4	0.439	0.00	1.45	1.55		closed	closed
1 of 8	1	1.000 (idle)	3.20	3.30	3.30	open	open	open
	2	0.826	2.63	2.73	2.83	closed	open	open
	3	0.689	2.18	2.28	2.38	open	closed	open
	4	0.602	1.93	1.99	2.05	closed	closed	open
	5	0.548	1.75	1.81	1.87	open	open	closed
	6	0.491	1.56	1.62	1.68	closed	open	closed
	7	0.439	1.40	1.45	1.50	open	closed	closed
	8	0.402	0.00	1.33	1.38	closed	closed	closed

### Notes:

- "Idle" refers to the state when no input is connected, or when the input is left floating.
- Rather than absolute voltage measurements, the windows are defined as a fraction of the supply voltage. This voltage can be measured with a high impedance DMM on the D-SUB pin 5 or 10.
- The table shows values as a fraction of the supply voltage, and, as a guideline, typical voltages when the supply is 3.30 V. (If the supply voltage is for example 3.315 V, the table should be corrected by multiplying these values by 3.315/3.3).

## 18. Acoustics Enhancement

The Reverb TwentyFour features a high degree of de-correlation between the reverb channels, in addition to the amazing sonic detail and flexibility of its first-class algorithm. This makes the Reverb TwentyFour an excellent choice for changing the acoustics in a multi-purpose venue.

Here are some typical venues where you might use the Reverb TwentyFour to electrically change the acoustics to suit the performance type:

**House of Worship** – Here the acoustics can be changed to suit various aspects of church life and services, such as concerts of various genres, singing, choir music, in addition to the spoken word and readings. Wooden churches and small chapels can benefit by sounding more like classical stone churches and for concerts, performances and speech.

**Concert Halls** – Those that are intended for a wide variety of uses, such as rock, theatre, jazz, opera, and classical music.

**Outdoor Concerts** – Here you may want to add the sound of a concert hall for example, or other acoustical enhancements in an outdoor environment.

**Museums** – Here you can add all sorts of sound changes to the exhibit environment, and enhance the museum experience for visitors.

**Cruise Ships** – Here the acoustics can be changed to suit a wide range of indoor and on-deck entertainment including song, dance, concerts, lectures, children's shows, and musicals.

### Acoustics Enhancement Presets

The Reverb TwentyFour supports acoustics enhancement with a Presets group called "F5: Acoustics, RT60." This group contains 6 presets for different decay times: 0.6, 0.8, 1.2, 1.8, 2.2 and 2.7 sec RT60. (RT60 is the time it takes for the sound to decay by 60 dB after the sound source stops).

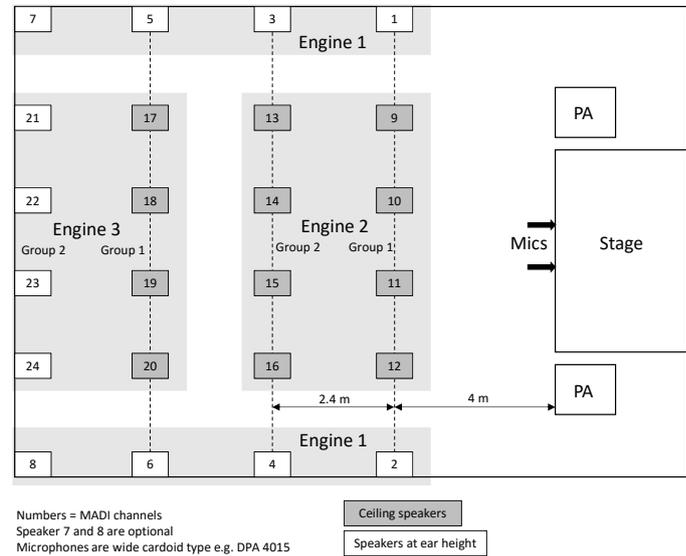


As an example, using the Reverb TwentyFour, you may be able to extend the decay time (RT60) of a venue by a factor of 2 from its original time.

The reverb field made by the Reverb TwentyFour and received at the audience seats, is extremely even and it is difficult to point out the individual speakers. The lack of any comb-filtering and phasing issues between the reverberating speakers also results in maximum headroom before there is any acoustical feedback to the stage microphones. This gives the opportunity to use less-directive microphones over the stage.

### A Typical Acoustics Enhancement System

- The audience receives the direct sound from the performance either acoustically or through a PA system.
- The audience receives the reverb field from reverb speakers mounted above, behind, and to the sides of the audience, as shown in the diagram below.



- An acoustics enhancement system used in a multi-purpose venue, often consists of the following:
  - Microphones picking up the sound signals over the stage. (For example, a wide cardioid type such as the 4015 manufactured by DPA Microphones).
  - Good-quality microphone preamplifiers.
  - The use of soft multi-band compression can give great results when added to the chain.
  - MADi equipment to convert to and from MADi.
  - The signals are sent via MADi to the Reverb TwentyFour and from there, MADi out to the multi-channel amplification system and the individual speakers – one per reverb channel.
  - By using two Reverb TwentyFour units, up to 48 fully de-correlated channels are possible.

### Assumptions for an Acoustics Enhancement System

- All reverb speakers are calibrated to play identical levels.
- The speakers should be able to reproduce signals well down to 100 Hz.
- The input to the system is stereo. Different input routing in the Reverb TwentyFour can accommodate input formats such as 5.1 and 7.1.
- All reverb speakers are playing the reverb 100% wet.
- The speakers are mounted in the venue ceiling and at the sides and rear of the venue at ear height. The distance between the speakers is often between 3 to 6 meters, but it depends on the distance from the audience to the speakers.

## The Reverb Preset Settings:

- Reverb level is important and it should be adjusted individually for each installation. There is a fine balance between “hearing” the reverb and making it “fit” the venue and music genre.
- Engine 1 (E1) handles the side speakers, E2 handles the 2 rows of ceiling speakers closest to the stage, and E3 handles the rear 2 rows (see the speaker layout diagram on page 45).
- Using the Frame - E1-3 page, the Output Level parameter can be used for fast adjustment of the audience speaker level. Use the Mute button to switch the reverb off for comparison (it turns off the Wet signals only).



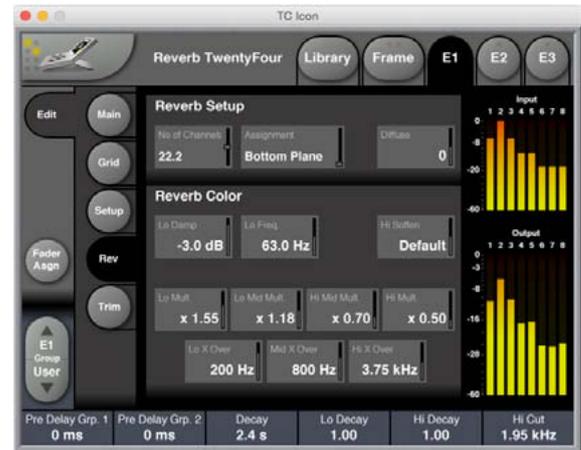
- The Frame - E1-3 page shows a fast overview of each engine. The parameters shown here are chosen in each engine so you have fast access to the most commonly used parameters in an acoustics controlling installation.
- Trim delays are adjusted for all speakers to compensate for the physical distance from PA front to the 4 speaker rows.



- Pre-delay is not included in the factory presets, but may be added to include the Haas effect, for example 20 ms. This could enhance the details coming directly from the stage and give the ability to increase the overall reverb level without muddying the sound image.
- Ceiling speakers are reduced by 4 dB to help prevent a “reverb raining effect.”
- Row 3 and 4 (including the side speakers) are adjusted for slightly shorter Hi-frequency decay time and lower Hi-Cut, to create a slightly darker-sounding rear venue.
- The overall reverb sound and coloring is carefully tuned in existing venue installations where different decay time for classical music (typically 2.2s), opera and piano (typically 1.8s), bigband and jazz (typically 1.2s), 0.8 and

2.7s are included. The sound of the venue itself, the microphones picking up the sound over the stage, plus the speakers themselves, makes a difference to the combined sound of the system. Therefore, individual system and reverb adjustments may be needed to make the reverb “fit” the venue.

- In order to ensure maximum de-correlation of the audience speakers, use the E1, E2, and E3 - REV pages and adjust the No of Channels and Assignment parameters so they are set differently in all 3 engines.



- **Note:** the E1, E2, and E3 engines have “Bottom,” “Mid,” and “Top” settings respectively, in order to have the de-correlation set to “max”. This may not fully reflect the physical setup, as this will vary between venues, and so other settings for the “No of Channels” may be better in some cases.
- This means that the reverb field at the audience seats is extremely even and it’s difficult to point out the individual speakers. As mentioned before, the lack of any comb filtering and phasing issues between the reverberating speakers also results in maximum headroom before acoustical feedback to the stage microphones, which also gives the ability to use less directive microphones over the stage.
- The stereo inputs are randomly but statically routed across the 24 reverb channel inputs. This is done to ensure there is an even reverb field, with very little Left/Right-specific information at the audience seats. Different input routing in the Reverb TwentyFour can also accommodate input formats such as 5.1 and 7.1.
- A venue might not always be full at every show. Therefore it may be a good idea to make more presets for a full venue, and a 2/3-full venue etc. The rear speakers could be turned down or off with a 2/3-full venue, and the decay time could also be set shorter, and the coloring set a bit darker in this case.

## General Notes About Changing Acoustics

- As a rule of thumb, you may be able to extend/prolong the decay time of a venue by a factor of 2 from its original time using the Reverb TwentyFour.
- An A-B microphone setup using wide cardioid microphones like the DPA 4015 is a good solution for picking up stage sound.
- Often you may need to introduce a multiband compressor with soft settings prior to the reverb channels, to catch fast transients from the stage that may sound slightly artificial by the time they reach the audience.

## GPI Control

- The GPI input of the Reverb TwentyFour may be used to select the preset so it does not take a highly-educated engineer to set up the suitable decay time for a specific show. A custom made push-button GPI box may be made for the specific installation to easily change the presets.

## 19. Specifications

### General

Frame Configuration	MADI I/O
Front Indicators/Control	Status LED: Runnig, Net, Bypassed and Sync. IP address reset button
Finish	Black anodized aluminum face plate Plated steel chassis
Dimensions	19 x 1.75 x 13.2 inches (483 x 44 x 334 mm), 1 RU
Weight	8.4 lbs. (3.8 kg)
Mains Voltage	100 to 240 VAC, 50 to 60 Hz auto-select
Fan	High quality fan
Power Consumption	7 W typ
Warranty, Parts and Labor	3 Years

### EMC

Complies with	EN 55103-1 and EN 55103-2, FCC part 15 class B, CISPR 22 class B
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### Safety

Certified to	IEC 60065, EN 60065, UL 6500 and CSA E65
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### Environment

Operating Temperature	32° F to 122° F (0° C to 50° C)
Storage Temperature	-22° F to 167° F (-30° C to 70° C)
Humidity	Max. 90 % non-condensing

### Control interface

Ethernet and TC Icon Rmt Control	2 ports, RJ45, 10/100 Mbps/s, Base-T, SNMP-enabled
GPI, control inputs (D-SUB)	Multi-state for preset recall. 0 V to 3.3 V DC sensing
GPO, output voltage (D-SUB)	3.3 V DC, 100 mA current limited

### General Processing

Input Audio Format	From one channel to 24 channels
Output Audio Format	From one channel to 24 channels, as long as the number of output channels is greater than the number of input channels (Reverb TwentyFour can not downmix)
Number of Reverb Engines	3
Number Audio Channels Processed	24
Unused Output Channels	Bypassed from respective input channels
Audio Processing Delay	41 samples, 2.08 ms @ 48 kHz (digital in to digital out)
Frequency Response DIO	DC to 23.9 kHz +/- 0.01 dB
Audio Processing Resolution	40 bit precision, bit transparent
Internal Clock Precision	+/- 30 PPM
External Sample Rates	48 kHz +/-1.5 %
Interface Function	Synchronous, bit transparent
Digital IO Engine	TC developed DICE™ core

### MADI

Connectors	1 BNC In, 1 BNC Out. 75 Ohm
Function	Audio input and MADI through/output
Number of channels	28, 32, 56, 64 in
Sample Rate	48 kHz
Complies with Standards	AES10-2008 r2014
Digital Output Phase	< 2 % of sample period
Input Signal Tolerance	Complies to AES10-2008 r2014
Output Signal Level	Complies to AES10-2008 r2014

### Legal Disclaimer

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## FEDERAL COMMUNICATIONS COMMISSION COMPLIANCE INFORMATION



Responsible Party Name: **Music Group Services NV Inc.**

Address: **5270 Procyon Street  
Las Vegas, NV 89118  
USA**

Phone Number: **+1 702 800 8290**

### REVERB TWENTYFOUR

EMC/EMI This equipment has been tested and found to comply with the limits for a Class B Digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in residential installations.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

For customers in Canada This Class B digital apparatus complies with Canadian CAN ICES-3B.

