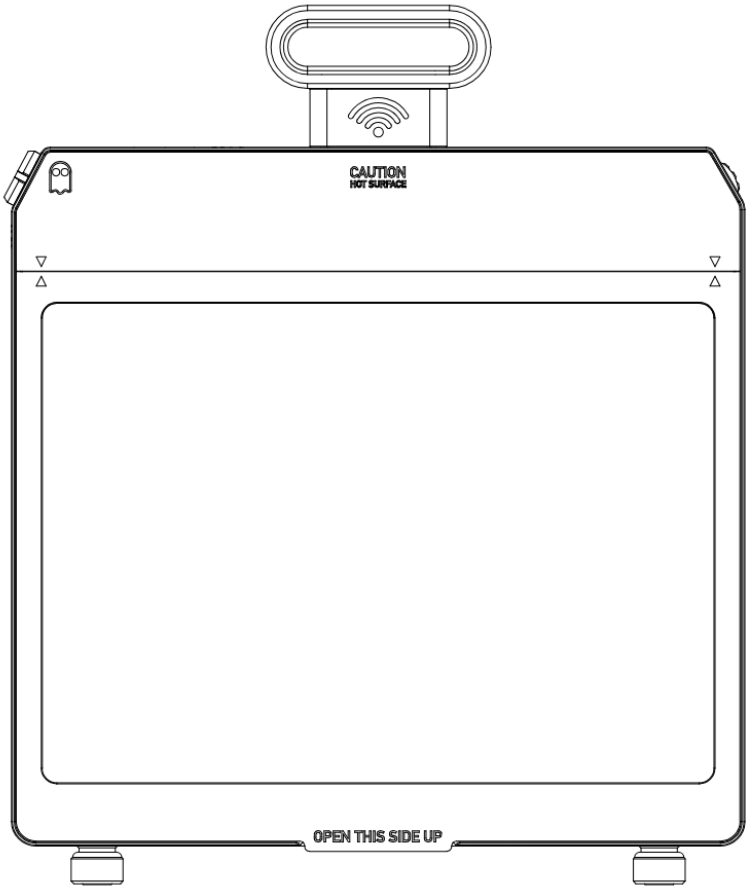
Ghost Lab

Echo Filter Tray



User Manual

Table of Contents:

⚠ WARNINGS & HANDLING

PLEASE READ CAREFULLY BEFORE USE

The Echo Filter is a precision electronic lighting accessory designed for professional use only. Improper handling, power input, or environmental exposure may result in reduced performance, overheating, or permanent damage.

USE REGULATED 12V DC ONLY

⚠ DO NOT POWER FROM UNREGULATED SOURCES SUCH AS D-TAP.

The Echo Filter must be powered using a nominal 12V DC or regulated D-Tap output. Using higher-voltage sources (e.g. 14.4V-15.8V from unregulated V-Lock D-Tap ports) can cause the LEDs to run significantly hotter and brighter than intended, resulting in thermal shutdowns, shortened LED lifespan, or permanent damage to internal components.

Power is delivered via a 2-pin LEMO connector (not included as standard). Always verify voltage output before connecting power.

⚠ HOT SURFACES

The Echo Filter contains 70 high-density LEDs in close proximity, generating significant heat during operation. The aluminium enclosure functions as a passive heat sink and can reach temperatures up to 50°C under sustained use.

- The top handle is thermally isolated and safe to touch at all times.
- Avoid contact with the metal housing during or immediately after high-output operation.
- Do not run all LEDs at 100% simultaneously for extended periods (e.g. via DMX full-on commands), unless you have confirmed sufficient ambient cooling and airflow.

OPERATING ENVIRONMENT

For dry environments only.

- The Echo Filter is not water- or dust-sealed, and has no official IP rating. If used outdoors, it must be protected from rain, moisture, and airborne debris.
- Operating temperature: 0°C to 40°C recommended. Use in high-heat environments may lead to derating, shutdowns, or failure.

MODIFICATION & REPAIR

The Echo Filter is a sealed unit and must not be opened, modified, or repaired by the user or by any third party. Any attempt to do so will void all warranty coverage, and any subsequent repair costs will be the responsibility of the owner.

If service or updates are required, please contact Ghost Lab directly or an authorised service partner.

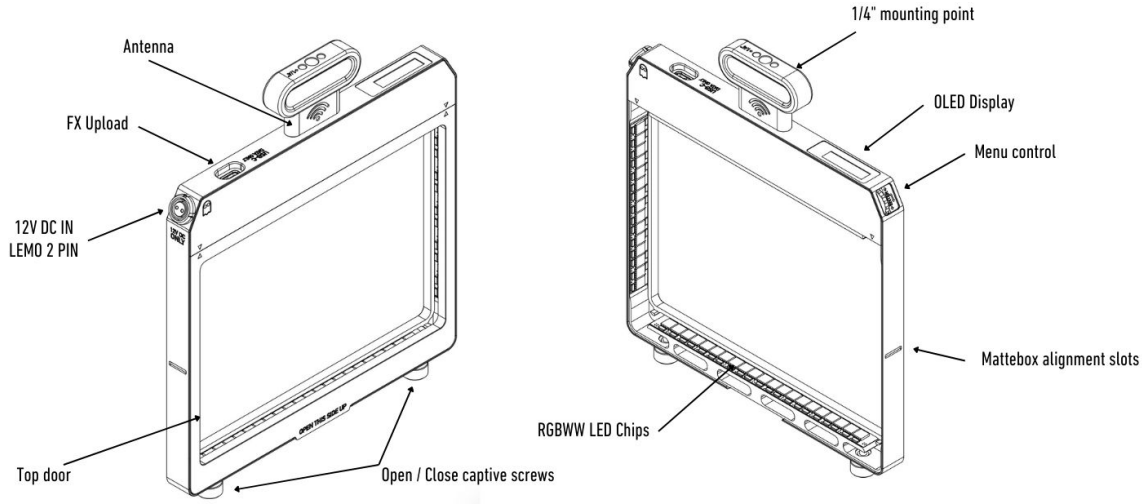
LIABILITY & DISCLAIMER

Ghost Lab Ltd is not liable for any damage, injury, or data loss resulting from:

- Improper power usage (including over-voltage)
- Overheating due to environmental conditions or misuse
- Modification or unauthorised repair
- Failure to follow usage guidelines outlined in this manual

This includes, but is not limited to, damage to matte boxes, cameras, lenses, filters, or other camera accessories used in conjunction with the Echo Filter Tray.
All use is at the user's own risk.

Features



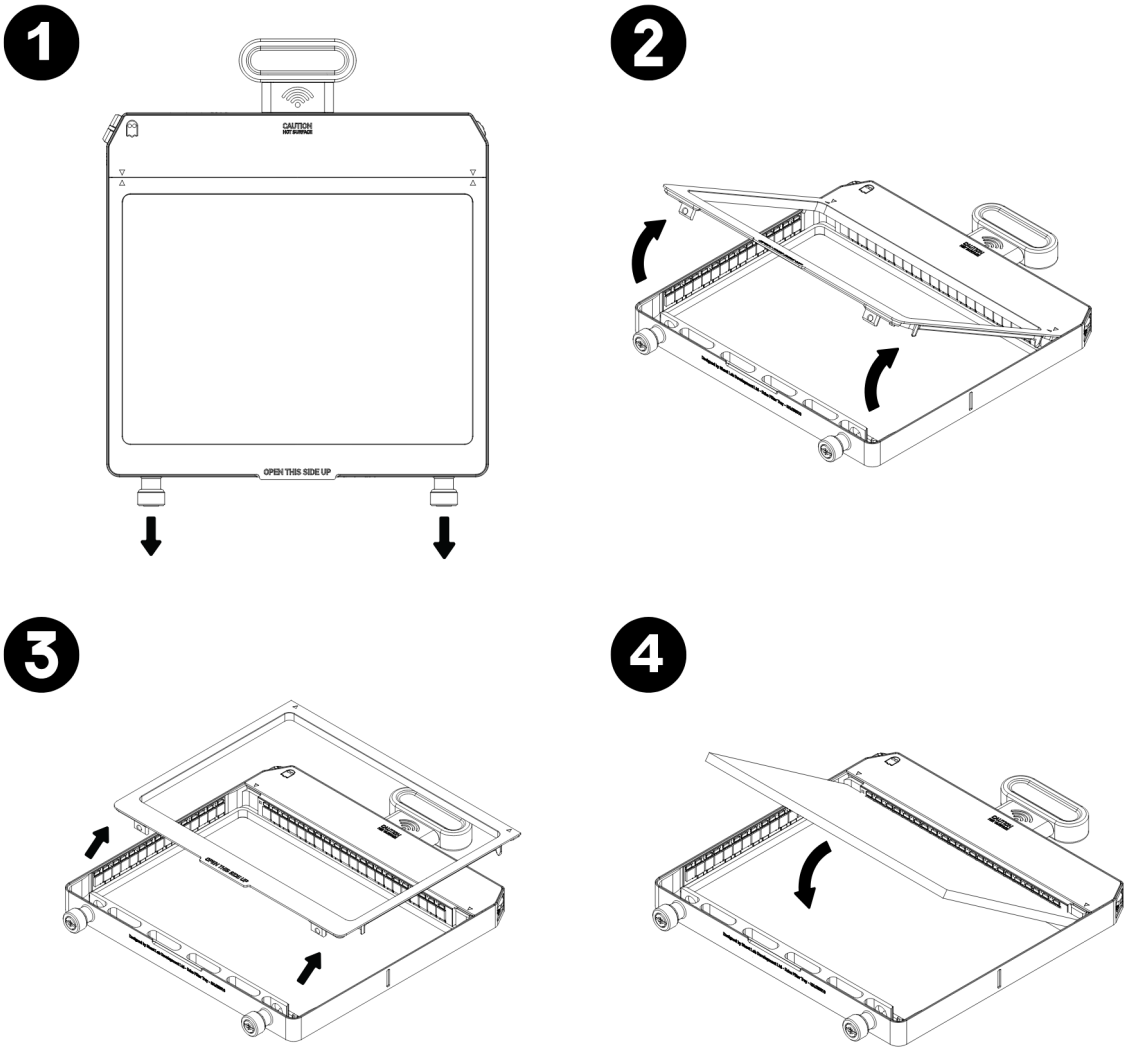
Data Sheet:

Power in:	12VDC Lemo 2 pin
Current:	2.7A MAX Over 12V DC
PWM Frequency:	20kHz
Number of LEDs:	70 Emitters
LED Colours:	Red, Green, Blue, Warm White (2700K), Cool White (6500K)
Colour Rendering Index:	CRI Average > 95 TLCI Average > 80
Temperature working range:	-10°C - +55°C
Operating temperature:	35°C - 60°C
On-Board Control: Local UI:	0.84” OLED Graphical Display - 96px x 16px
Protocol:	DMX512-A (ANSI E1.11) over Lumenradio CRMX RX Only
Antenna:	Build-in
Housing:	6061 Aluminium - Hard Anodised
Weight:	176g (not including filter)
Dimensions:	150 x 180 x 12.6 (W x H x D)

Changing Filters

When inserting or changing a filter make sure the Echo Filter Tray is switched off.

Follow the steps below.



1. Undo the two screws at the bottom of the Echo Filter Tray. These are captive, so won't fall out. Make sure the Echo Filter Tray is in the right orientation before doing so**.
2. Lift the top flap from the bottom.
3. Remove the top flap completely and set this to the side
4. Drop in your 5.65x4" filter of choice

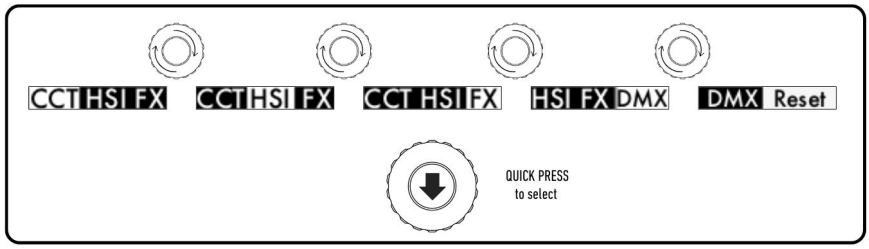
   Work the above steps in reverse to close the device.

**Always ensure the unit is held flat and horizontal, with the "Open This Side Up" label correctly oriented, before opening the filter mechanism. Ghost Lab Development Ltd accepts no responsibility for any damage caused by incorrect handling or orientation, including filters falling out or sustaining impact damage. All handling is at the user's own risk.

Main Menu Navigation:

The main menu is divided up in 5 modes/settings with its subsequent sub-settings. We have 3 main modes, DMX settings and a reset.

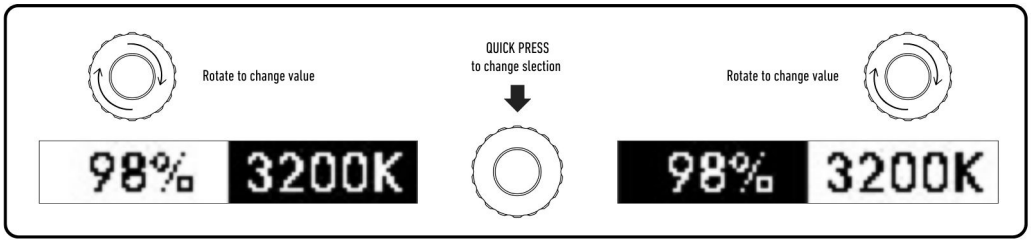
Rotate: Switch between the different modes/settings. The one selected is highlighted in white.
Press: Select mode/setting.



CCT MODE

In this mode the Echo filter tray will create white light. Use the encoder wheel on the side to select and change the desired attribute.

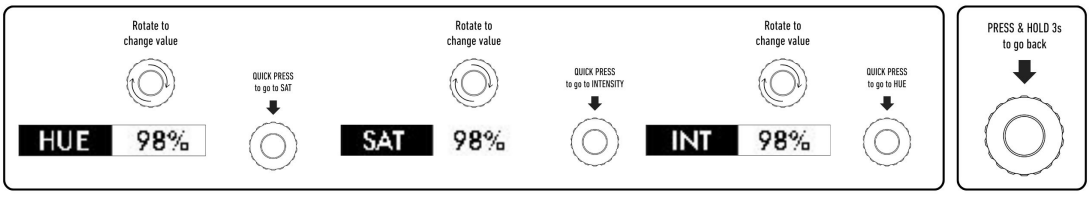
Rotate: Change the highlighted value in increments of 1% or 100 Kelvin.
Press: Switch in between the attributes
Press & Hold: Go back to the main menu. This also acts as a ‘save values’ function. The Echo Filter Tray’s internal memory will remember your setting in case power is lost.



HSI MODE

In this mode you can create custom colours using HSI (Hue, Saturation & Intensity). Use the encoder wheel on the side to select and change the desired attribute.

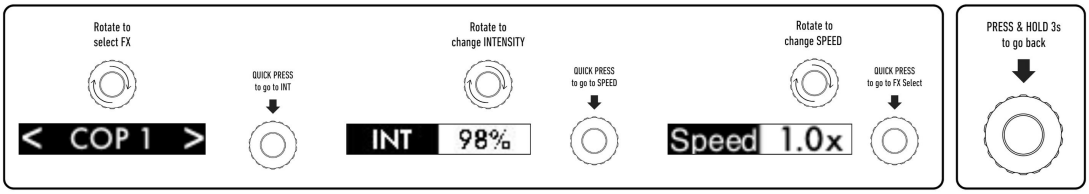
Rotate: Change the highlighted value in increments of 1%.
Press: Switch in between the attributes. These are looped.
Press & Hold: Go back to the main menu. This also acts as a ‘save values’ function. The Echo Filter Tray’s internal memory will remember your setting in case power is lost.



FX Mode

This is our FX mode, here you can upload our open source FX and adjust them to your liking. Use the encoder wheel on the side to select and change the desired attribute.

Rotate: Change the highlighted value
Press: Switch in between the attributes. These are looped.
Press & Hold: Go back to the main menu. This also acts like a ‘save values’ function. The Echo Filter Tray’s internal memory will remember your setting in case power is lost.



FX Upload

The Echo Filter Tray lets you upload your own custom lighting FX patterns — ideal for situations where no lighting console or DMX programmer is available, but you still want a specific animated effect.

You can create, download, and upload these FX using a USB-C connection.

Step 1: Connect via USB-C

On the top of the Echo Filter Tray, you’ll find a USB-C port. Before connecting the USB-C cable make sure the Echo Filter Tray is switched on.

To upload FX:

1. Use a high-quality USB-C cable
2. Connect the tray directly to your computer or mobile phone (if your phone supports USB drive access).
3. The Echo Filter will appear as a USB storage device on your system

NOTE: While the USB-C cable is connected:
• Any running FX will stop
• The encoder wheel will be disabled

FX playback and encoder control will resume automatically once the Echo Filter Tray is safely ejected and the cable is unplugged.

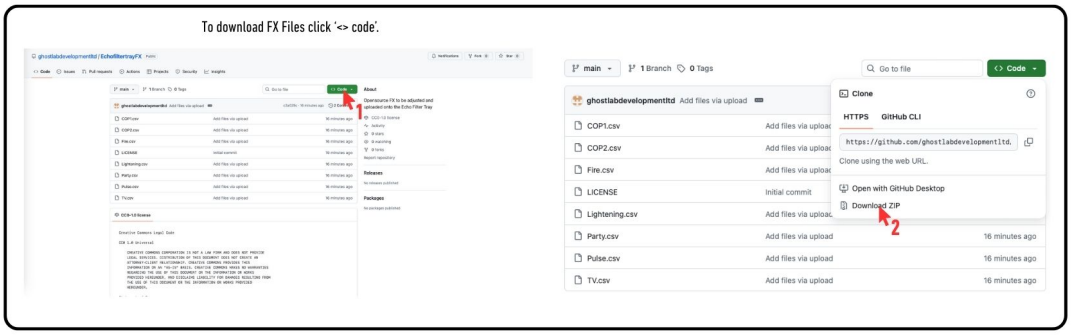
Step 2: Create the FX Folder (First-Time Use)

If your Echo Filter Tray is brand new or has never had FX installed:

1. Open the Echo Filter Tray’s USB drive on your computer.
2. Manually create a folder named ‘FX’ (all caps, no spaces).
3. This folder is where all your custom effects must be stored.

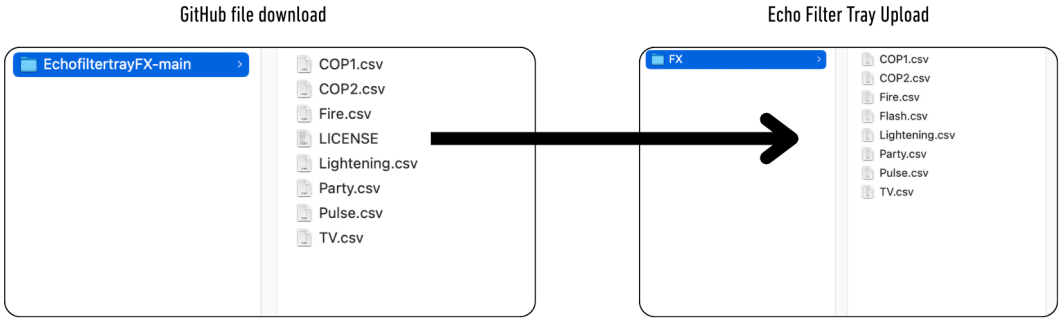
⚠ If the FX folder is missing or empty, the device will display: NO FILE. This means no playable FX were found or the FX Folder is missing.

Step 3: Download & Add FX Files



1. Download official FX presets from:
   github.com/ghostlabdevelopmentltd/EchofiltertrayFX
   (No GitHub account required or email us at info@ghostlab.uk to get them directly.)
2. Unzip the downloaded file.
3. Inside the extracted folder, locate the .csv FX files.
4. Drag and drop your desired .csv files into the FX folder on the Echo Filter Tray.

⚠ FX files must be in .CSV format in order for the playback to work. Do not copy the 'LICENCE' File over. This is just a Creative Commons licence.



Step 4: Eject & Reboot

Once your FX files are copied:

1. Safely eject the Echo Filter Tray from your device.
2. Disconnect the USB-C cable.
3. The Echo Filter Tray will automatically reboot and display the ghost animation.
4. Navigate to FX Mode — your custom FX will now be available.

Creating your own FX:

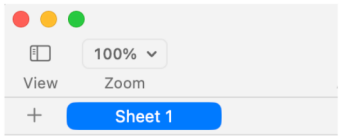
You can create your own custom effects from scratch or modify existing ones. You can also request bespoke FX from us at info@ghostlab.uk.

Getting Started:

1. Download one of the existing FX .csv files from our GitHub repository: github.com/ghostlabdevelopmentltd/EchofiltertrayFX
2. Open the .csv file using Microsoft Excel or Apple Numbers.

We recommend starting with an existing FX file (like COP 1) as a template.

Understanding the FX Structure



Here's what you need to know:

- The file consists of multiple columns, each representing a lighting channel (e.g. Red, Green, Blue, Warm White, Cool White).
- Editable cells are marked in GREEN in the picture to the right.
- The columns must remain in the same order — changing this will cause the FX to fail or not appear.

⚠ Do not delete, rename, or rearrange columns.

COP1

Frame No.	R	G	B	WW	CW
1	0	0	100	0	0
2	0	0	100	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	0	100	0	0
6	0	0	100	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0	0	0	0
12	0	0	0	0	0
13	0	0	0	0	0
14	0	0	0	0	0
15	0	0	0	0	0
16	0	0	100	0	0
17	0	0	100	0	0
18	0	0	0	0	0
19	0	0	0	0	0
20	0	0	100	0	0
21	0	0	100	0	0
22	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
25	0	0	0	0	0
26	0	0	0	0	0
27	0	0	0	0	0
28	0	0	0	0	0
29	0	0	0	0	0
30	0	0	0	0	0

Timing & Playback

- FX are structured as frame-based sequences. Each row represents one frame step.
- The Echo Filter Tray plays back these steps at a variable speed using the built-in encoder knob.

Designing With Timing in Mind

Use row spacing to shape the rhythm of your effect. For example:

- 100 on Blue at row 1-2
- 0 on Blue from row 3-4
- 100 again at row 5-6
- 0 on Blue from row 7-15 to end the cycle

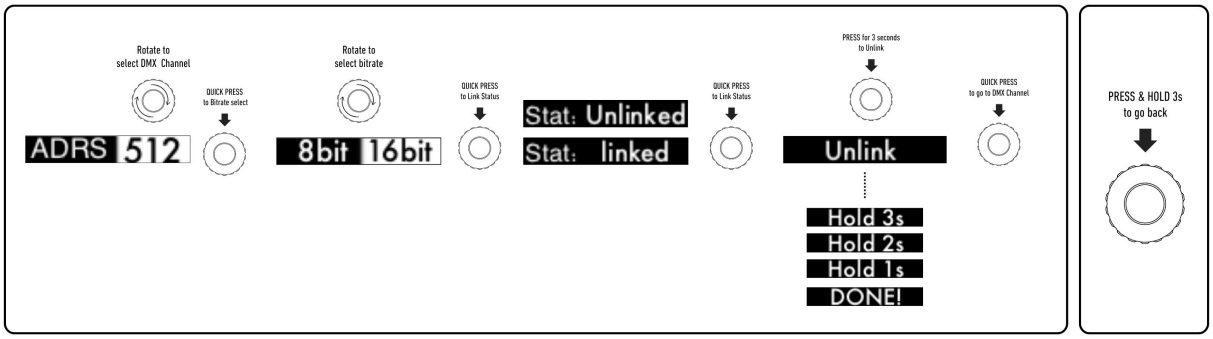
This creates a double flash with a gap of 2 steps, followed by a 7-step pause which plays faster or slower depending on your live speed setting.

You can adjust FX speed live on set without needing to re-edit the CSV This makes it easy to dial in the perfect timing for different scenes or moods.

After finishing the effect, make sure to export/save this new effect as a .csv file and upload onto the Echo filter as described above.

DMX Mode

The Echo Filter Tray has a built in Lumenradio CRMX receiver. Any transmitter that supports the CRMX protocol will be able to connect.



LINKING
Make sure the status is set to ‘Unlinked'. If the status is showing ‘Linked’. Check below for the unlinking process.

When this is all done, press link on the transmitter to start the linking process. The Echo Filter Tray display will show ‘STAT: LINKED’ straight away but make sure the transmitter is all done with it’s linking process and any status LEDs have stopped blinking on your transmitter before trying to take control over CRMX.

UNLINKING
Rotate the encoder wheel to the Unlink attribute of the menu. Once there, press and hold for 3 seconds. You will also see a count down and a ‘Done!’ message once the unlinking process is completed.

NOTE: You cannot return to the main menu from within the ‘Unlink’ attribute. Use the encoder wheel to go any other attribute before press and hold to go back to the main menu.

DMX CHANNEL MAP:

8 bit (factory default)
Ch1 - Red
Ch2 - Green
Ch3 - Blue
Ch4 - Warm white
Ch5 - Cool white

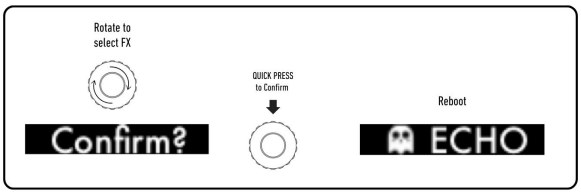
16bit
Ch1 - Red
Ch2 - Red (fine)
Ch3 - Green
Ch4 - Green (fine)
Ch5 - Blue
Ch6 - Blue (fine)
Ch7 - Warm white
Ch8 - Warm white (fine)
Ch9 - Cool white
Ch10 - Cool white (fine)

Reset

Resetting the Echo Filter Tray will set all the values in all the modes back to 0.

Select ‘Reset’ in the main menu and press the encoder wheel once quickly.

It will ask you to confirm, press again and the Echo Filter Tray will reboot.



Note: This reset will not affect your uploaded FX files or the LumenRadio connection. In order to get rid of those you will have to delete them manually via your computer or phone over the USB-C connection.

HARD RESET:

A hard reset can be performed if you want to reset the Echo Filter Tray to it’s factory settings. This option will wipe any FX you have saved, all settings and unlink the CRMX.

A hard reset is performed the following way:
1. Make sure the Echo Filter Tray is not plugged in.
2. Press and hold the encoder wheel.
3. Plug in the power using the 2-pin LEMO connector
4. Keep pressing for 10 seconds, the display will show ‘Reset?’
5. After 10 seconds the display will show ‘Hard Reset’
6. Release the encoder wheel and the Echo Filter Tray will reboot to full factory base settings.

Appendix 1

TYPICAL SPECTRAL DISTRIBUTION GRAPHS