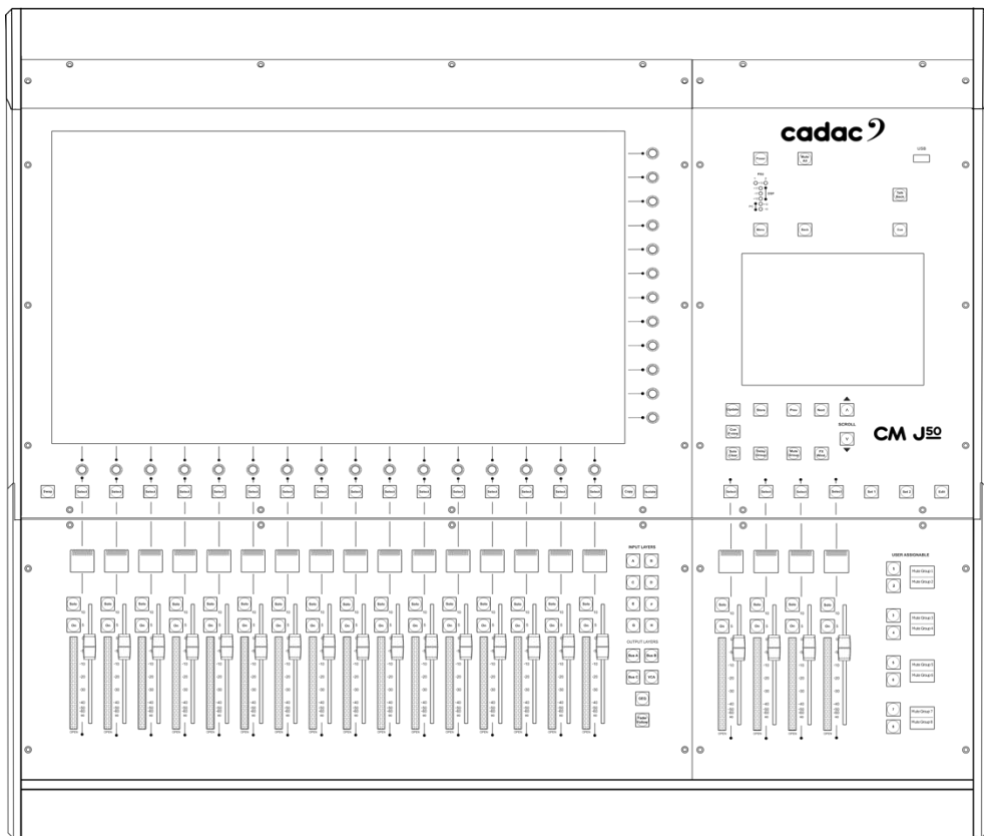




Cadac Digital Audio Mixing Console



CM-J50

Hardware Overview

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Important Safety Information

CAUTION: These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the User Manual unless you are qualified to do so. Refer all servicing to 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. Do not expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on this apparatus.
6. Clean only with a dry cloth.
7. Do not block any of the 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 that produce heat.
9. Only use attachments/accessories specified by the manufacturer.
10. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as the 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.
11. To completely disconnect mains power from this apparatus, the power supply cord must be unplugged.

For US and CANADA Only

Do not defeat the safety purpose of the grounding-type plug. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.



The lightning flash with arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of an uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



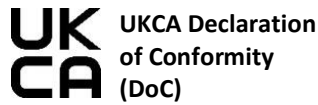
The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

General Precautions

- Do not place heavy objects on the control surface, expose it to sharp objects or handle the console in any way that may cause damage, e.g., rough handling and /or excessive vibration.
- Do not subject the equipment to dirt, dust, heat or vibration during operation or storage. Never expose the console to rain or moisture in any form. Should the console become wet, turn it off and disconnect it from the mains without further delay. The console should be given sufficient time to dry out before recommencing operation.
- When cleaning the console, never use chemicals, abrasive substances or solvents.
- The console control panel should be cleaned using a soft brush and a dry lint-free cloth. For persistent marks, use a soft cloth and isopropyl alcohol. Switches and potentiometers do NOT require cleaning or lubrication.
- Keep these instructions for future reference. Follow all warnings in this manual and those printed on the console.
- The console must be connected following the guidance in this manual. Never connect power amplifier outputs directly to the console. Connectors and plugs must never be used for any other purpose than that for which they are intended.
- The console mains input must always be connected to correctly rated mains power as referred to in this manual. The mains input must, at all times, be connected to the local mains power supply using the supplied power cord. In cases where the supplied plug does not fit, a qualified electrician must be consulted.
- The power cord must be routed in such a way that the risks of accidentally stepping on it, stretching it or it being pinched are minimized.
- **WARNING! THIS EQUIPMENT MUST BE EARTHED!**
- Ventilation slots must never be covered or obstructed in any way, otherwise airflow required for safe operation may be restricted. Where the console is to be operated in its flight-case, then this must be located in such a way that it allows for proper ventilation.
- Refer servicing to qualified technical personnel only.

Declaration of Conformity

The following pages show the individual declarations of conformity, for both the CE and UKCA marks, for the Cadac CM-J50 digital audio mixing console.



We, SCC Audio Limited, of 1 New Street, Luton, Bedfordshire, LU1 5DX declare under our sole responsibility that the **Cadac CM-J50** digital audio mixer, as detailed below complies with the provisions of the following UKCA Directives and is eligible to bear the UKCA mark:

CM-J Series

Product Type Number	Product Description	Serial number
Cadac CM-J50	Digital Audio Mixer	

Object of the declaration:



The Cadac CM-J50 is a self-powered live sound digital audio mixing console with 96 input channels and 56 busses. Based on Cadac’s “touch, turn and swipe” operating system with a 23.5” 16:9 touch screen, with encoders to the right and bottom of the screen, plus twenty 100mm motorised faders and a 6.5” control screen. Local I/O consists of 16 Cadac mic-amps and 8 analogue outputs plus 8 AES3 inputs and 8 AES3 outputs with remote stage options connected via Cadac’s MegaCOMMS network protocol on either coax cable or optical fibre.

Assurance of conformance of the described product with the provisions of the stated UK Regulation is given through compliance to the following standards:

- EMC Directive: **2014/30/EU**
- Low Voltage Directive: **2014/35/EU**

The following harmonised standards and technical specifications have been applied:

- Electrical Safety (LVD): **EN 62368-1:2014/AC:2015**
- Electromagnetic Compatibility: **EN55032:2015**
EN55013:2013+A1:2016
EN61000-3-2:2019
EN61000-3-3:2013 + A1. 2019
EN61000-4-2:2009
EN61000-6-2:2019
EN55035:2017/A11:2020


Our representative in the UK is SCC Audio Limited, located at 1 New Street, Luton, Bedfordshire, LU1 5DX.

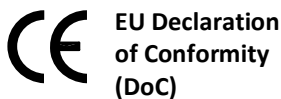
Note: The EMC performance of a system component will be affected by the final installation, compliance to the stated EMC standards and conformance to the EMC Directive must be confirmed after installation by the final equipment installer. For guidance with respect to test conditions please contact your local CADAC representative.

Signed for on behalf of:

Name of Authorised Signatory
 Signature of Authorised Signatory

 Position of Authorised Signatory
 Date
 Date when first CE marked
 Place where signed

Emily Watson

 Head of R&D Cadac
 21st October 2022
 21st September 2022
 Luton, UK



**EU Declaration
of Conformity
(DoC)**

We, SCC Audio Limited, of 1 New Street, Luton, Bedfordshire, LU1 5DX declare under our sole responsibility that the **Cadac CM-J50** digital audio mixer, as detailed below complies

CM-J Series

with the provisions of the following European Directives and is eligible to bear the CE mark:

Product Type Number	Product Description	Serial number
Cadac CM-J50	Digital Audio Mixer	

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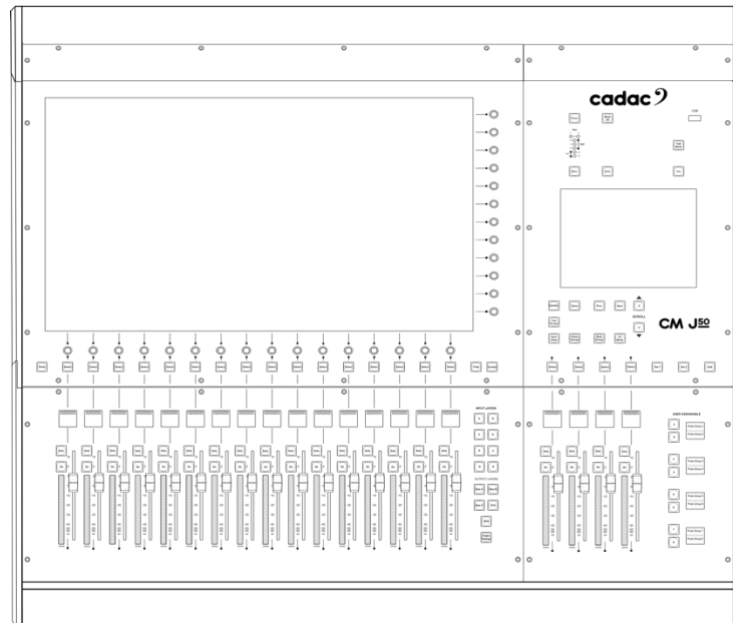
Emily Watson



Head of R&D Cadac
21st October 2022
21st September 2022
Luton, UK

Introduction

Thank you for purchasing the Cadac CM-J50 digital audio mixing console.



From its founding in 1968, Cadac's products have become the benchmark for audio mixing consoles. The CM Series continues this tradition with a live performance digital audio system benefiting from Cadac's innovative and acclaimed user interface, superlative audio quality and industry leading low latency infrastructure.

It expands the audio performance and features developed over a 50-year period of innovation within large-scale theatre and touring analogue desks and puts them within a compact, fixed-architecture digital system, featuring a "high-agility" user interface utilising a wide format touch screen. Professional sound engineers familiar with other digital consoles will find the transition to the Cadac workflow quick and intuitive.

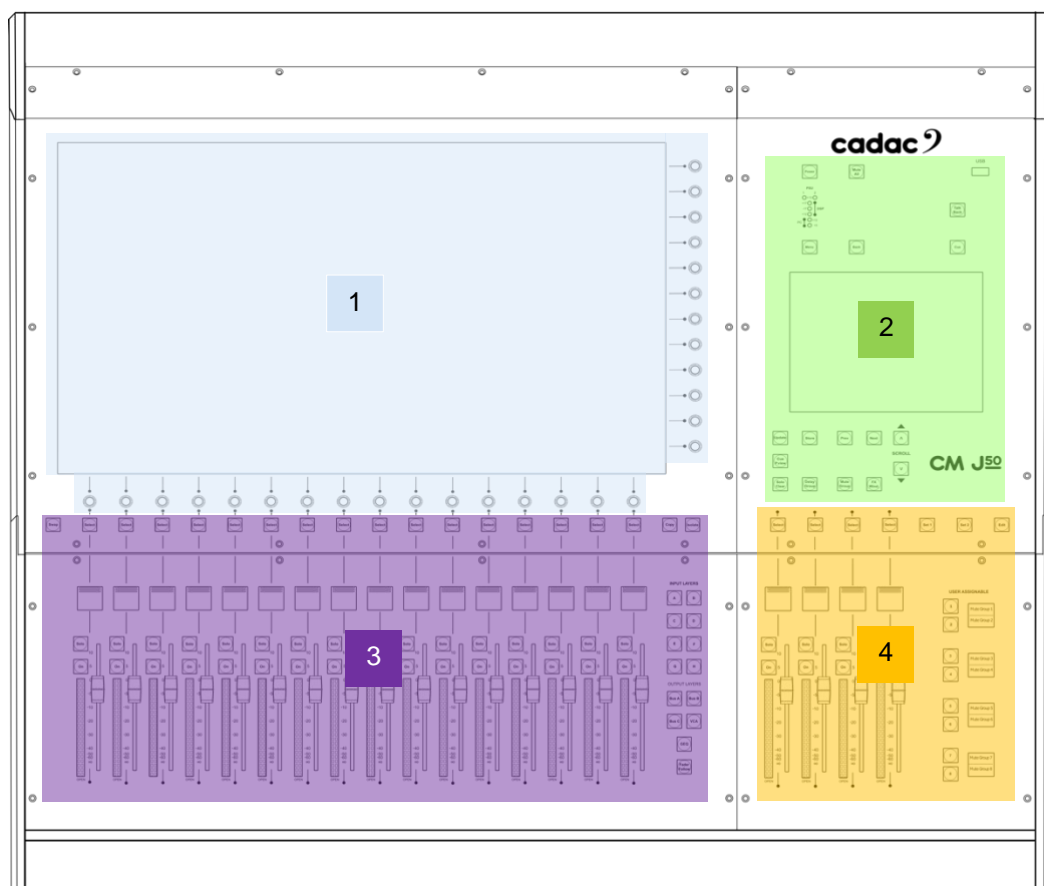
Cadac's attention to detail and high-quality audio circuitry remains at the core of Cadac's CM Series design philosophy.

Surface Overview

The CM-J50 can be used as a stand-alone unit and as part of a larger system comprising of multiple units: console and remote MegaCOMMS I/O device(s). The control surface provides local analogue and digital inputs and outputs, which can be expanded via a number of remote stage rack(es) options.

Control Surface

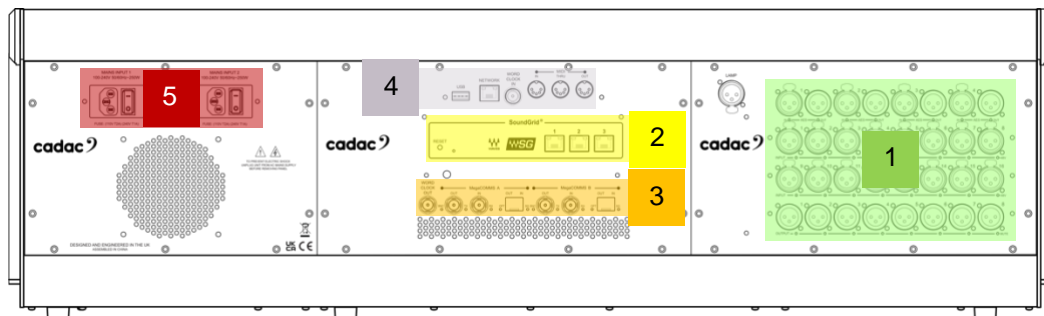
The control surface is divided in four operational areas:



1. **Channel Section:** Based around a 23.5", 16:9 (1920 x 1080 pixels) touchscreen display with two sets of rotary encoders mounted below and to the right of the screen.
2. **Master Section:** To the right of the Channel Section, with the CM-J50's 6.5" Control Screen, automation and other ancillary controls.
3. **Channel Fader Bay:** Below the Channel Section, with 16 x 100 mm motorised faders, OLED channel displays, stereo LED bar graph meters, layer select buttons and other controls.
4. **Master Fader Bay:** Below the Master Section, with four x 100mm motorised faders, OLED displays and a set of user-assignable keys.

Rear Panels

All connections to the surface (apart from headphones and three USB ports) are on the rear panel of the control surface: these include PSU connectors, MegaCOMMS ports, local analogue and digital audio I/O, Waves® SoundGrid® card, MIDI, Word Clock IN and Out, USB and Network ports.



1. Local I/O - analogue and AES3
2. Waves® SoundGrid® card
3. MegaCOMMS ports
4. MIDI, Word Clock In, Network and USB
5. PSU connectors

For further detailed explanation of the control surface please see sections: Console Hardware Overview: Surface and Console Hardware Overview: Rear

Shipping Details

As well as the control surface and remote I/O device(s) specified at the time of ordering, the CM-J50 is shipped in a cardboard box with the following additional items:

- Dust cover for the control surface
- Gooseneck console lamp
- IEC power cables

Remote MegaCOMMS I/O Devices

A number remote MegaCOMMS I/O units are available. Two can be connected directly to the console:

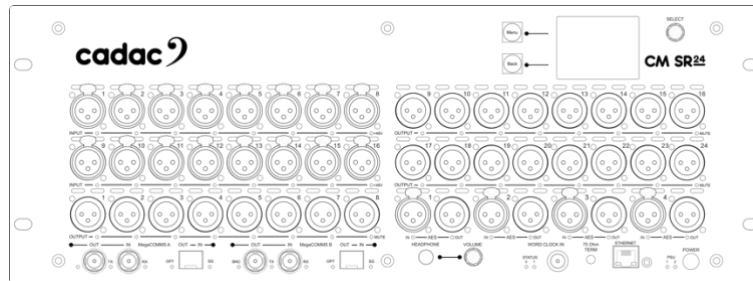
- CM-MD64: 64 bi-directional channels of MADI I/O, including SRC



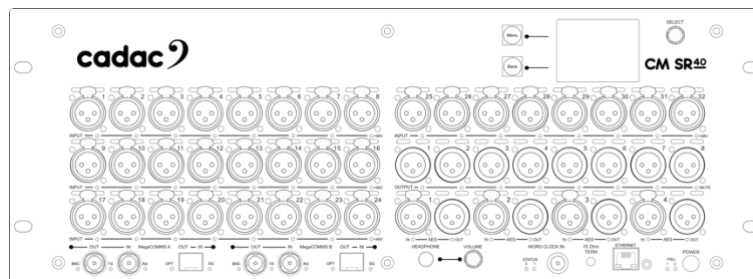
- CM-DT64: 64 bi-directional channels of Dante I/O, including SRC



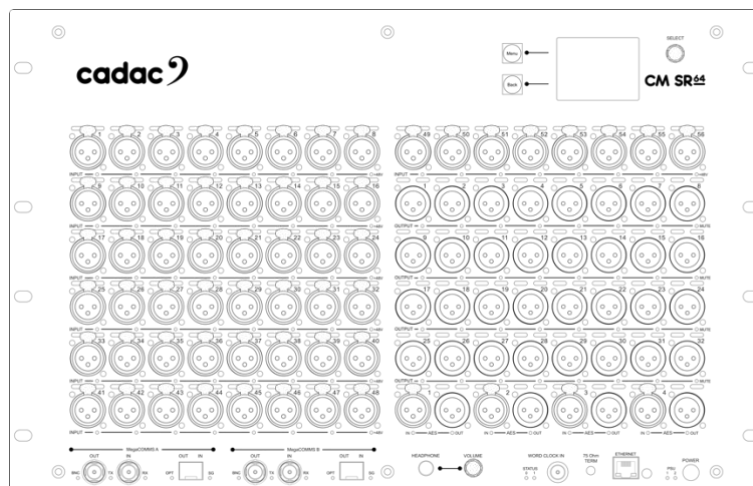
- CM-SR24: 16 mic / line inputs and 24 balanced line outputs plus 8 AES3 inputs / outputs



- CM-SR40: 32 mic / line inputs and 8 balanced line outputs plus 8 AES3 inputs / outputs

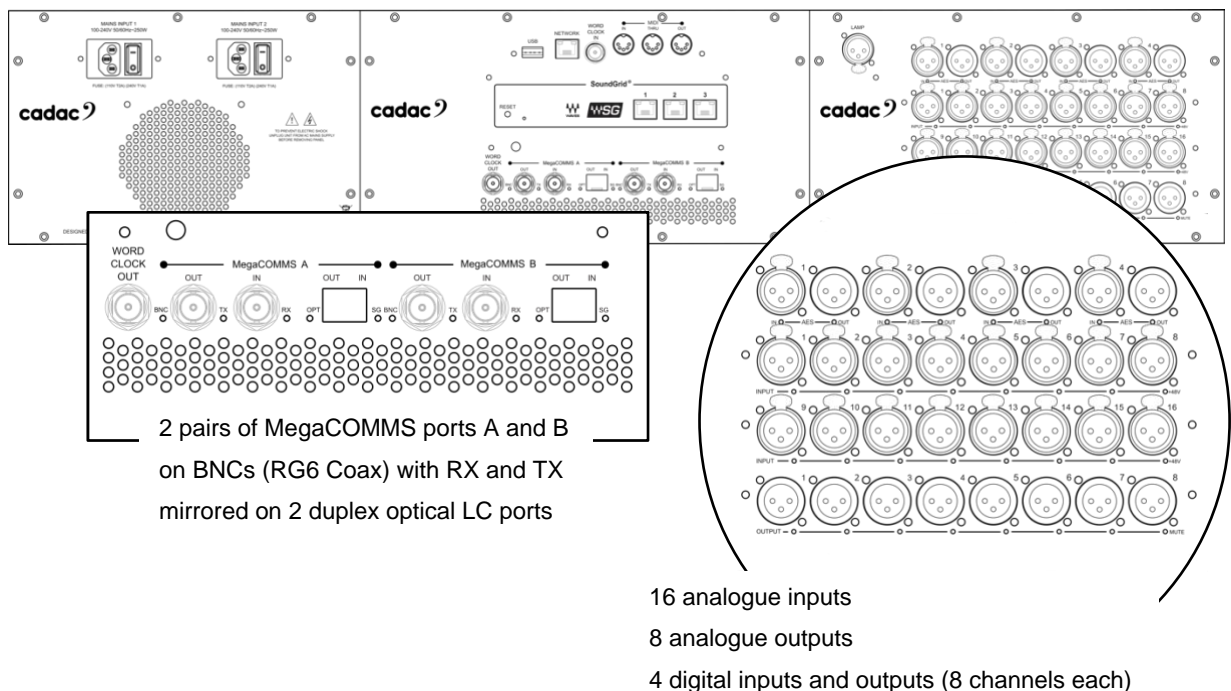


- CM-SR64: 56 mic / line inputs and 32 balanced line outputs plus 8 AES3 inputs / outputs



In addition to the I/O provided by the CM-SR Series of remote I/O devices, the control surface is configured with sixteen analogue mic/line inputs, eight analogue line outputs (all balanced), four balanced AES/EBU inputs and four balanced AES/EBU outputs. The routing of this local I/O may be configured via the CM-J50's software.

- CM-J50 Local I/O:



MegaCOMMS 19" units can be connected to the CM-J50 via two MegaCOMMS ports on the rear of the console. Connection can be made via MegaCOMMS port A or MegaCOMMS port B. These comprise of two pairs of BNC connectors (Rx and Tx) which are mirrored on two duplex optical LC ports. Each A or B port can only use either coaxial or optical, both coaxial and optical on a single port cannot be used simultaneously.

To use the duplex optical LC ports, it will require the purchase of compatible 1000BASE-LX/LH SFP 1310nm 10km DOM Duplex LC MMF/SMF transceiver modules from a third party.

For more information about connecting units to the rear of the console please refer to the section: [Remote Stage Rack Connection](#)

Console System Overview

The control surface contains all the system DSP, and apart from the local analogue I/O, all audio signal paths, and processing are in the digital domain.

The stage racks contain Cadac's high-quality analogue microphone preamplifiers with their gain and other parameters being remotely controlled, together with 96 kHz, 24-bit A/D and D/A conversion.

The CM-J50 employs the now-familiar concept of "layering" to reduce the size of the control surface, with 16 motorised faders able to control a maximum console configuration of 96 input channels mixing into 48 assignable mix busses, plus 4 faders for left, centre and right master busses, and three monitor busses (however, in Monitor mode LCR and Monitors become assignable busses making the console a 56 assignable mix bus console) are for PFL and AFL plus headphones.

The graphical interface on the 23.5" touchscreen screen has been designed to present as familiar a layout as possible, using large, intuitive controls with visual feedback. This is complemented by a further a 6.5" Control Screen LCD touchscreen, which by default, shows the Cue List, but it can also display the console configuration options, show file management and provides access to numerous other user features.

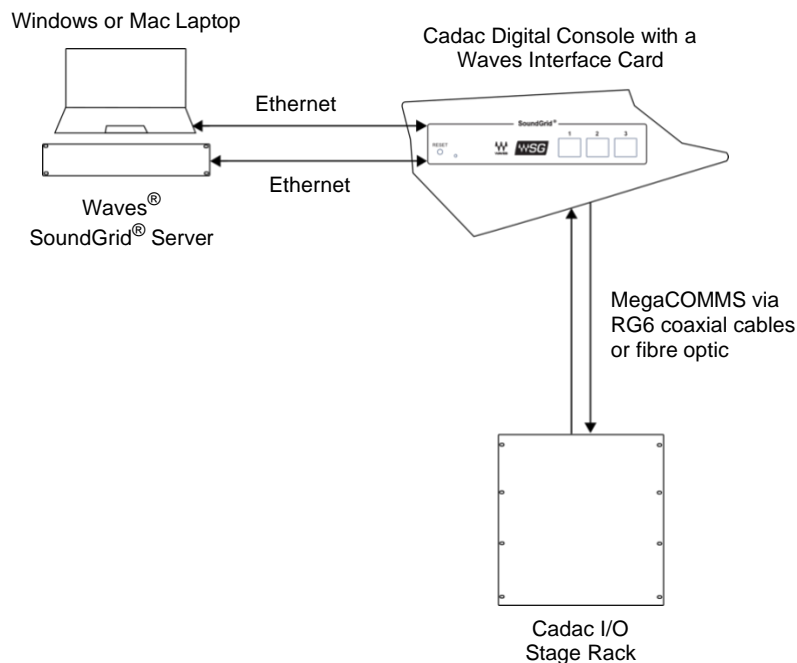
The rotary encoders at the edges of the screen map to the graphical interface on the screen and are used to make all parameter adjustments (levels, EQ parameters etc.).

An important feature of the CM-J50 is that there is very little distinction between input channels and output channels in terms of features and facilities. The 48 mix busses are freely assignable as groups, auxiliary sends, matrix sends or FX sends: all of these have fundamentally the same facilities as the input channels and are displayed and controlled in the same way.

Waves®

The CM-J50 control surface includes a Waves® SoundGrid® interface. This allows 64 channels in and out of the Waves® SoundGrid® eco-system, which allows both the use of Waves® studio grade plugins to run simultaneously alongside the console's native audio processing, as well the ability to use Waves® as a recording and playback interface for multi-channel audio. These require additional hardware and appropriate licenses, all available from Waves®.

An example of Waves® SoundGrid® Server and Cadac integration:



Audio is streamed from the console's integrated interface card to the SoundGrid® server, processed, and then streamed back to the console via Cat-5e.

The Waves processing is patched in the same way as the Cadac I/O racks and can be used as a send and return for effects processing, or alternatively it can be patched and used as inserts, giving great flexibility.

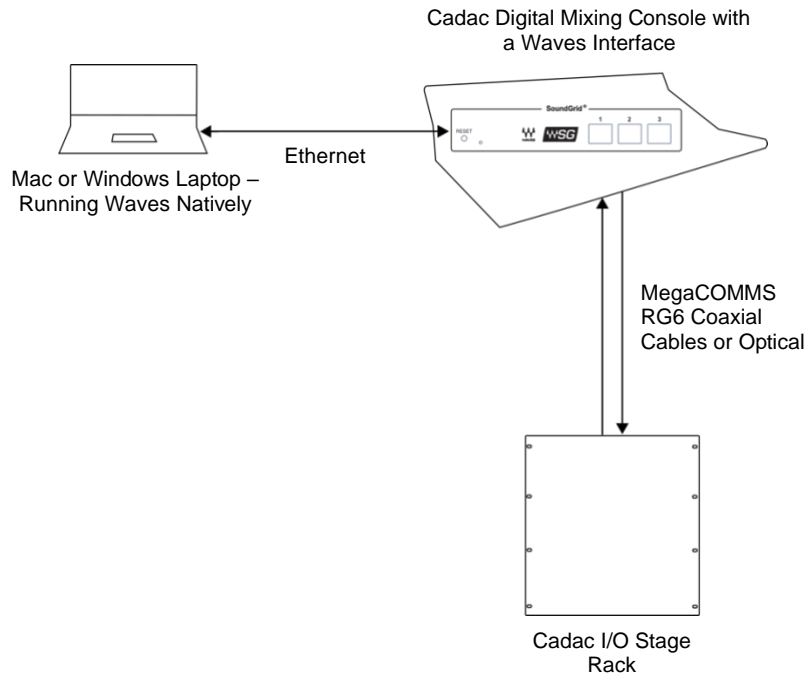
More information about using Waves® effects please refer to the [Waves® website](#).

See the section [Waves® SoundGrid® Interface](#) for details of the interface's connections.

See Section [CM-J50 Local I/O Mapping and Waves](#).

When the console's Waves® SoundGrid® interface is connected to a suitable Windows or Mac laptop or desktop computer with Waves® QRec installed, it can record and playback up to 64 tracks of 24-bit, 96 kHz audio.

Example of a Waves® integrated with a Cadac console:



For more information about using Waves® QRec please refer to the Waves® website.

MegaCOMMS Protocol

Communication between the remote MegaCOMMS I/O devices and the console is via a proprietary Cadac high speed protocol called MegaCOMMS, using high-speed 75 Ohm coaxial cable terminated in BNC connectors, or depending on the unit, via fibre optic cable using the duplex optical LC ports.

MegaCOMMS is a robust, TDM (time division multiplex) system. Control data is embedded within the data stream, so that no audio channels are sacrificed for this purpose. The high bandwidth available means that the current implementation of MegaCOMMS can carry 128 channels of 24-bit, 96 kHz audio, plus control data, plus clock, bi-directionally, up to 100 metres (328 ft) via a pair of RG-6 coaxial cables and up to 2km (1.24 miles) via single mode fibre on optical.

In addition to audio and control data, MegaCOMMS provides for accurate, phase-aligned clock distribution, by embedding timing markers in the data stream. This allows reliable, low-jitter synchronisation of all hardware elements within a network.

The simplest implementation of a MegaCOMMS network is the straightforward console-stage rack configuration. In this application, the console provides the clock, and the stage rack synchronises itself once the connections are made. Total through-system propagation delay for this system, including all console processing and A/D to D/A conversions is an astonishing 37 samples (@ 96 kHz), or just under 400us. This compares with the many millisecond propagation delays usually found in most other similar systems.

Two interconnection paths are provided, A and B, each of which requires a transmit and receive cable. The maximum capacity of each path is 128 audio channels in each direction.

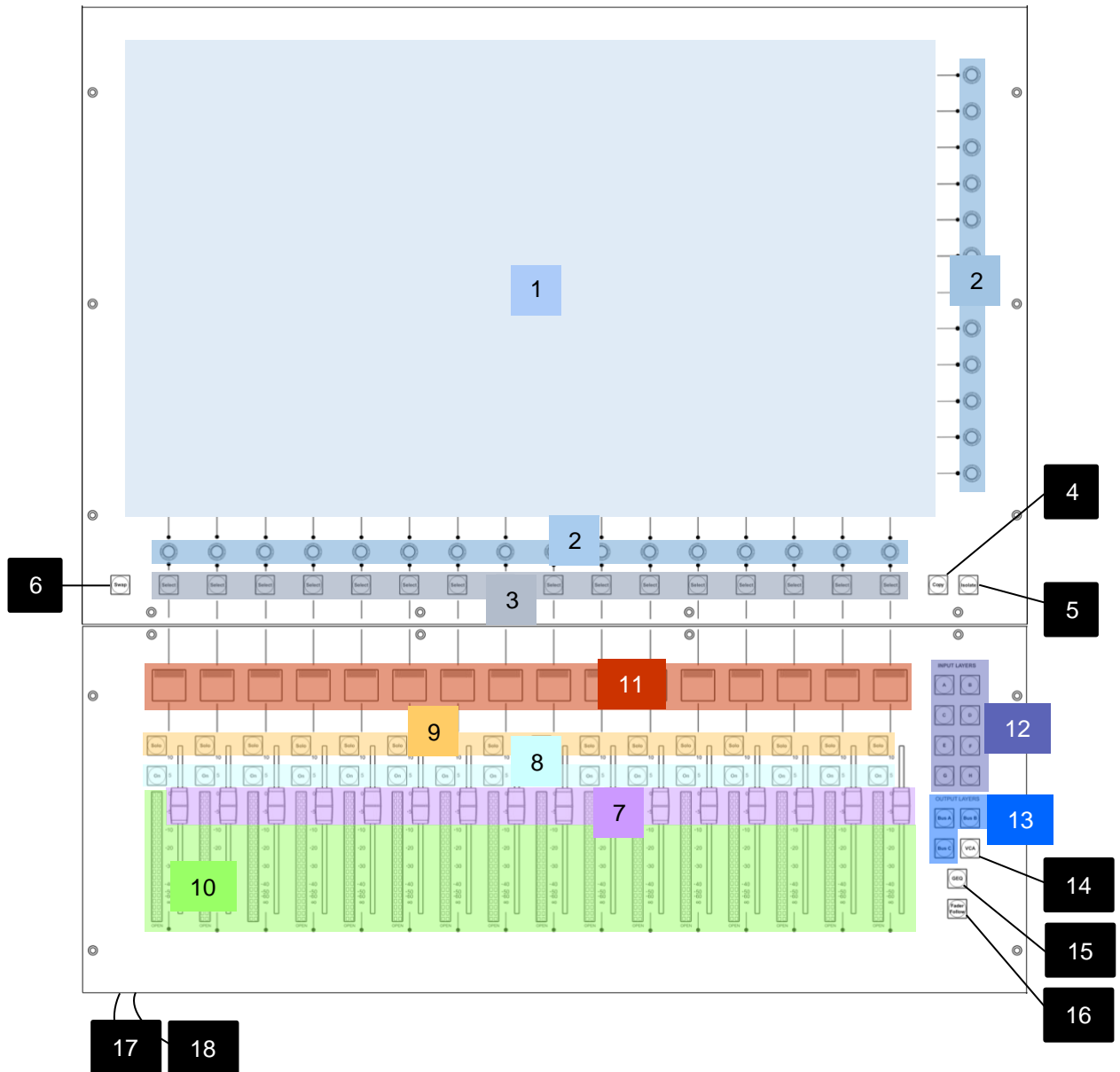
Console Features

- Up to 96 simultaneous channels in the mix
- 48 mix busses, freely assignable as groups, aux sends or matrix sends, plus LCR main busses and monitor LCR
- 16 local analogue and 8 local AES3 inputs
- 8 local analogue and 8 local AES3 outputs
- MegaCOMMS audio protocol available on 4 x BNC coax and 2 x duplex optical LC ports
- Waves® interface card providing 64ch. multitrack recording, or for connection to a Waves® SoundGrid® server to access the full range of Waves® plug-in processing. Note: Requires the relevant Waves® Licenses
- Unrestricted allocation of physical I/O to input channels and group/aux/matrix outputs
- 16 VCA groups
- 8 dual layer user assignable buttons, with OLED displays (e.g., Mute group masters), giving a total of 16 user assignable functions
- Input channels may be linked or paired for stereo operation, plus one talkback pair
- 20 x 100 mm motorised faders with OLED displays of current assignments
- All output types – groups, auxes or matrices – either as mono or stereo
- Channel sends to outputs may be pre-EQ, pre-fade or post-fade (switchable pre or post VCA) and post-Mute
- Default display of all primary channel parameters
- Two physical inputs per input channel
- 4-band fully parametric EQ on all inputs and outputs
- Cadac EQ
- One Dynamic EQ on each input and output
- Variable-frequency hi and lo-pass filters on all inputs and outputs
- 1/3-octave graphic equaliser available on all outputs
- Compressor / limiter with sidechain filter, plus gate on all input channels

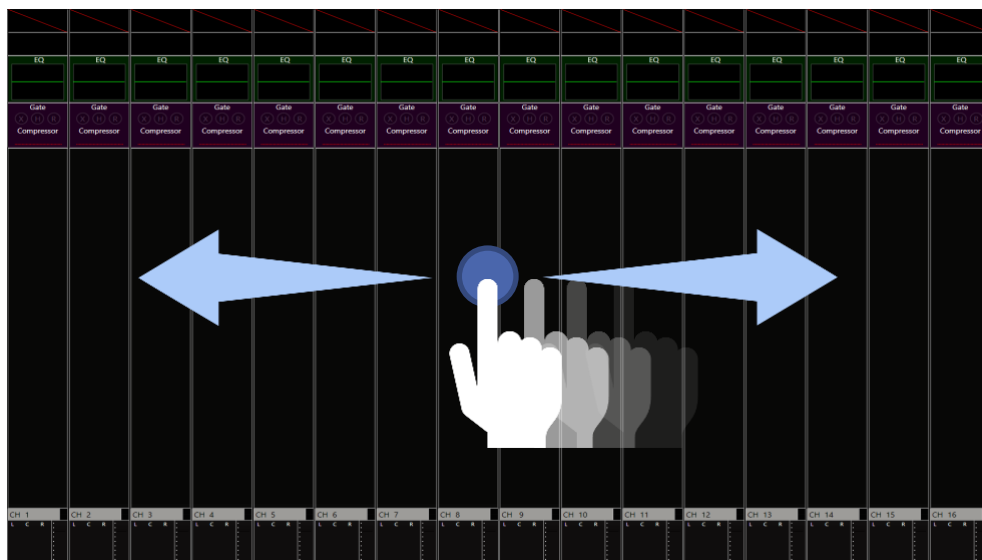
- Compressor / limiter with sidechain filter on all outputs
- Adjustable delay on all inputs and outputs
- 16 stereo (or 32 mono) FX processors – freely assignable
- Each FX processor provides reverb, delay and modulation, in any series/parallel combination
- Switchable inserts on all channels
- Switchable LR and LCR panning
- Channel copy and isolate functions
- Full Monitor, PFL and Talkback facilities
- 1 x 23.5" 16:9 touchscreen display
- 1 x 6.5" control touchscreen screen
- Scene automation with fast keypad access
- 96 kHz, 24-bit Delta-Sigma A/D and D/A converters
- Low-noise, wide dynamic-range analogue mic pre-amps with remote gain control
- All channel functions immediately accessible by single touch
- Stereo bar graph meters, integrated in fader bays
- Gooseneck console lamp XLR socket

CM-J50 Console Hardware Controls

Control Surface: 23.5" Screen and Main Fader Bank



1. **Main Screen:** A 23.5", 16:9 high-definition touchscreen. The default display shows a block of 16 consecutively numbered channels; alternative sets of channels may be displayed using the hardware layer buttons - Input Layers [12] or Output Layers [13], or by setting a Go To button using one of the 8 dual layer User Assign [Part 2: 29] buttons, or by "swiping" the screen horizontally. Touching any area in a channel strip opens a virtual panel with controls for parameter adjustment and enhanced displays. Switch functions are actioned by touching the virtual "button", rotary controls are mapped to the physical encoders to the bottom / right of the screen.



1: The Screen

2. **Rotary Encoders:** 28 encoders are provided, 12 on the right-hand side of the screen and 16 along the bottom (also referred in this manual as "vertical" and "horizontal"). The encoders also have press plus press and hold functions, along with turn, depending on the function used. By default, the lower set are the channel pan controls but may be changed to be mic gain/trim by the SWAP button [6]. The vertical set is inactive until an on-screen panel is opened; the function of each active encoder is then clearly indicated. The function of the lower set may also change when certain channel panels are opened. This is part of the functionality of the audio channel paths.
3. **Select Buttons:** Are used in conjunction with control panels that are displayed on the screen and in conjunction with the COPY [5] and ISO [4] buttons and CUE ripple.
4. **Isolate Button:** Used in conjunction with the Select [3] buttons when placing one or more sections of a channel strip into RECALL SAFE mode. A press and hold of the ISO button when used in conjunction with CUE recall will temporarily disable the SAFES on the CUES recalled.

5. **Copy Button:** Used in conjunction with the Select [3] buttons when copying channel settings from one channel to another.
6. **Swap Button:** By default, the input blocks of the channel strips are displayed at the top of the virtual channel strip and the pan blocks at the bottom. The lower encoders control pan by default, but pressing SWAP exchanges the on-screen positions of the input gain blocks and pan blocks and reassigns the lower encoders as the channel input gain/trim controls. SWAP also performs the same function on the outputs.
7. **Faders:** 16, 100 mm motorised faders. The fader information is displayed directly above the fader on the OLED [11] screen. The fader is affected by any screen swiping or scrolling actions, plus any functions related to the fader e.g., GEQ. As the channels displayed on-screen are changed, the faders reposition to follow the new channel set.
8. **On Buttons:** Each fader has an On button; when the button is unlit, the channel currently displayed on-screen above it is muted. All channels default to OFF on power-up. The On button allows both 'soft' and 'hard' muting.
 - a. **'Soft' Mute:** a short press mutes the channel's output electronically at the fader; any pre-fade sends in use will remain active. The On button is not illuminated.
 - b. **'Hard' Mute:** a long press mutes the channel and cannot be switched on via the automation. The On button flashes red in this state.
9. **Solo Buttons:** Perform either a PFL (pre-fade listen), AFL (after-fade listen) or SIP (solo-in-place) function, depending on settings made through the Solo menu page on the Menu screen. The default mode for input channels is 'Auto', if only one channel is solo'd it is PFL, and if multiple channels are solo'd it is AFL; Stereo channels under auto are always AFL; Output channels are AFL only. If the solo button illuminates pink it is in PFL, if it illuminates cyan it is in AFL. AFL is post the channel pan pot (if in circuit), so correctly reflects the stereo imaging of the channel being solo'd; if the pan pot is not in circuit, AFL is mono. SIP mode is also available, selected from the Solo Menu page. As well as the master modes, the CM-J50 also features 'momentary' and 'latching' solo operation:
 - a. **'Momentary' Solo:** Press and hold the Solo button; solo is active while the button is pressed and cancels when the button is released.
 - b. **'Latching' Solo:** A short press on a Solo button activates solo mode and the button may be released. Press again to cancel.

- c. **'Block Latching'**: Press and hold one Solo button and press another Solo button while still pressing the first. This will solo the block of channels between the two buttons. Note: Press and hold of any Solo when other solos are in place will cancel itself and all other solos when released

In use, the Solo button illuminates in a colour that is mode dependent.

- 10. **Metering**: A 20-segment LED dual bar graph meter is fitted adjacent to each of the 16 faders in the fader bay. The meters display a single LED ladder when the selected channel (input or output) is mono, and dual LED ladder if stereo. The lowest segment acts as a 'signal present' LED and illuminates at -80 dBFS. The LEDs are colour coded: the signal present segment is green, the five highest segments are red, with the top one corresponding to 20 dBFS. The remaining segments are yellow.

A Meters Options page on the Menu screen allows the user to select between pre and post fade meters for fader meters, screen meters and Fader Follow output meters. There is additionally a green Open LED at the bottom of the meter which illuminates as soon as the fader is moved, and the channel is on. Moving a fader while channel is off does not switch it on. So, if it is off because of a VCA mute group for example is open, the Open LED will be off.

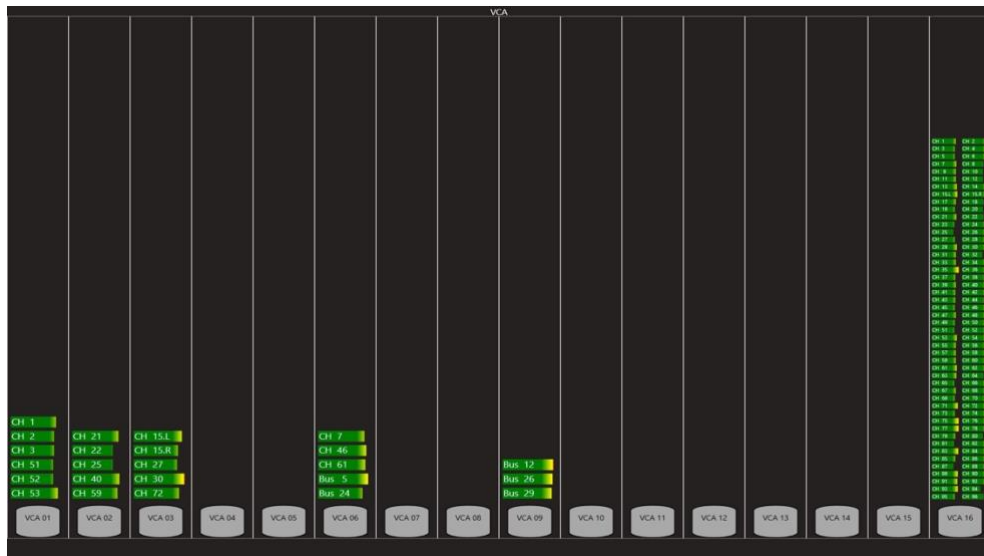
- 11. **OLED Alphanumeric Displays**: One per fader. The OLEDs - which auto dim over time if the console is left un-touched - display the name of the channel (input or output); this will either be the user-assigned name, or if the channel has not been renamed it will show the fader value if active, plus the default number e.g. Ch. 23. They are also colour-coded to match the channel type – stereo or mono, output bus assignment, etc. The fader value can also be shown if this option is selected via the User Settings menu.

- 12. **Input Layers**: 8 buttons, labelled A-H, select which input channels are displayed on-screen. By default it selects in sets of 16 (A 1-16, B 17-32, C 33-48, D 47-64, E 65-80, F 80-96, G 80-96, H 80-96) however they can be set to jump in sets of 12 (A 1-16, B 13-29, C 25-41, D 37-53, E 49-65, F 61-77, G 73-89, H 85-96) via the Console configuration page accessed through the Console Type menu (see [Console Configuration: Modes / Configuration](#)). The faders, OLED displays and the On, Solo and Select buttons always follow the on-screen channel strips selected by the Input Layers. If the screen is used to swipe the channels and the channels displayed fall in between 16 "complete" layers, then the Input Layers buttons immediately above and below will both light up. Once a "complete" layer of 16 is shown, then only the relevant Layer button will be illuminated.

- 13. **Output Layers**: 3 buttons, labelled Bus A to Bus C, select the Bus layers. The faders, OLED displays and the On, Solo and Select buttons always follow the on-screen channel strips

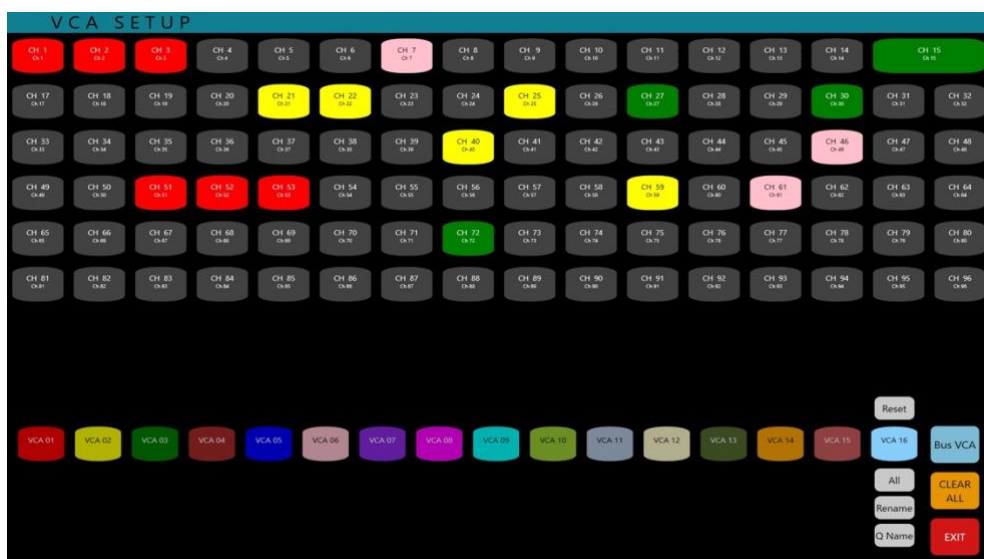
selected by the Output Layers. If the screen is used to swipe the channels and the channels displayed fall in between 16 “complete” layers, then the Output Layer buttons immediately above and below will both light up. Once a “complete” layer of 16 is shown, then only the relevant Layer button will be illuminated.

14. **VCA button:** Displays the VCA assignment page, and the faders become VCA masters.



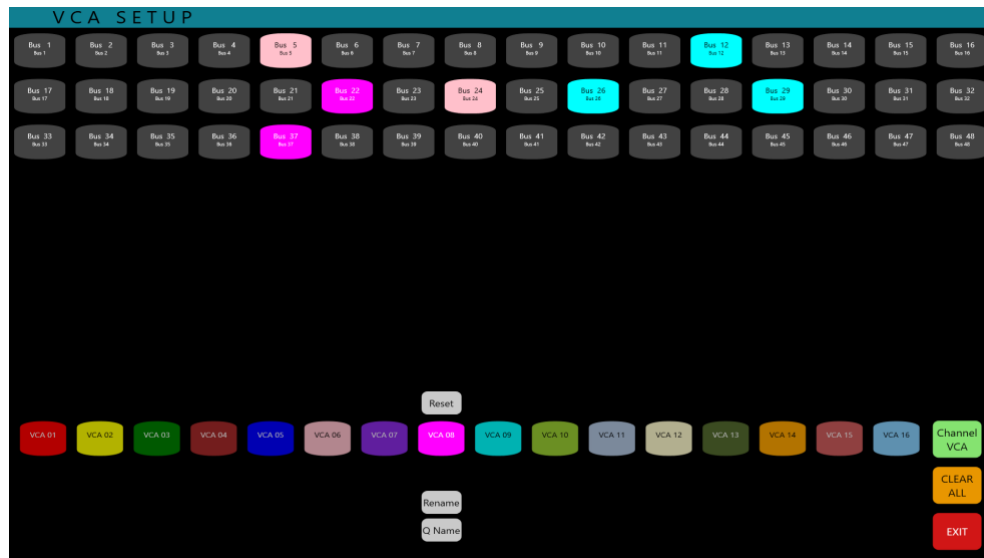
2: VCA Assignment screen. Assigned VCAs can be named and be a mixture of input channels and busses. Metering for each input and bus within a VCA is also displayed.

By pressing a blank VCA name it will bring up the **Input Channel VCA** setup page. Here channels can be assigned to a VCA and the VCAs named:



3: Input Channel VCA Setup screen

By pressing “BUS VCA” it will bring up the VCA setup page for the busses. Again, busses can be assigned to a VCA and the VCAs named:



4: Bus VCA Setup screen

15. **GEQ button:** Press this when an output bus is selected (with the Select [3] button illuminated) to access the CM-J50 's graphic equaliser function for that bus. A 32-band graphic equaliser may be inserted in any or all output channels, in addition to the channel's standard parametric EQ. When GEQ is in use, the OLEDs [11] display the centre frequencies of each band.



5: GEQ screen: The console faders control the levels of the EQ bands



6: GEQ screen. The GEQ can be by passed by pressing ByPass



7: GEQ screen. The GEQ can be stored and recalled from the Settings Library

16. **Fader Follow button:** When active, the Fader Follow Outputs function allows the operator to use the faders to control the bus send levels from the currently selected input channel. An input channel layer must be selected for Fader Follow Outputs to be available. The left-most channel in the visible set, and busses 1 to 16 will be selected by default: the Select [3] buttons select other channels, the left / right Scroll [26, 27] buttons allow navigation both up and down the busses. While Fader Follow Outputs is active, the screen display and rotary encoders continue to be active for input channels.

The **Fader Follow** button activates either Fader Follow or Monitor Follow depending on which has selected in the User Option settings.

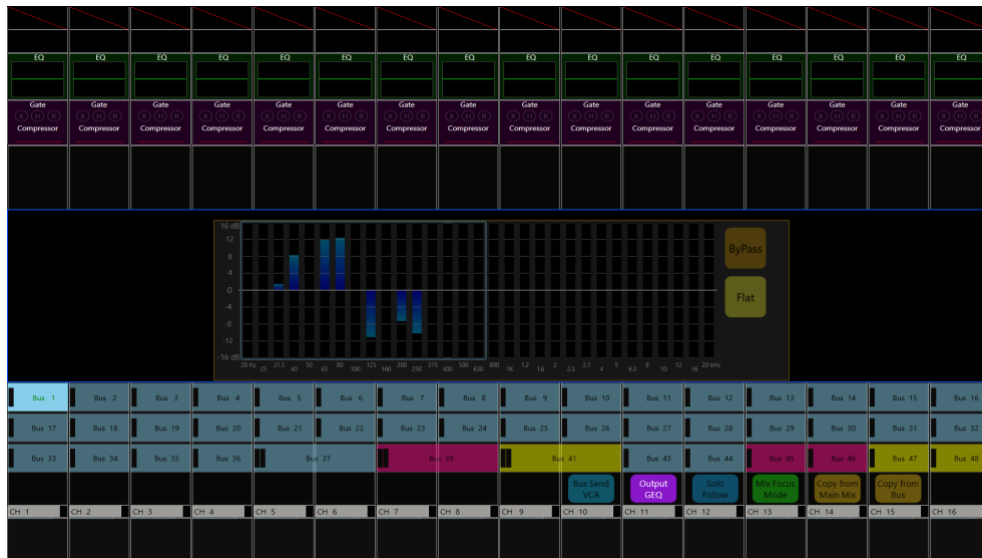
In Monitor Follow shortcuts to the busses appear on screen.



8: MONITOR FOLLOW Screen

Selecting one of the busses on screen allows you to control the send to it from every channel. The faders now become that particular bus send for each channel and the pan section on screen gives you access to any stereo bus pan.

The GEQ can be edited for the selected busses if the Output GEQ is onscreen. Pressing the GEQ [17] “flips” the console’s faders into GEQ mode. They will remain in this state until deselected.



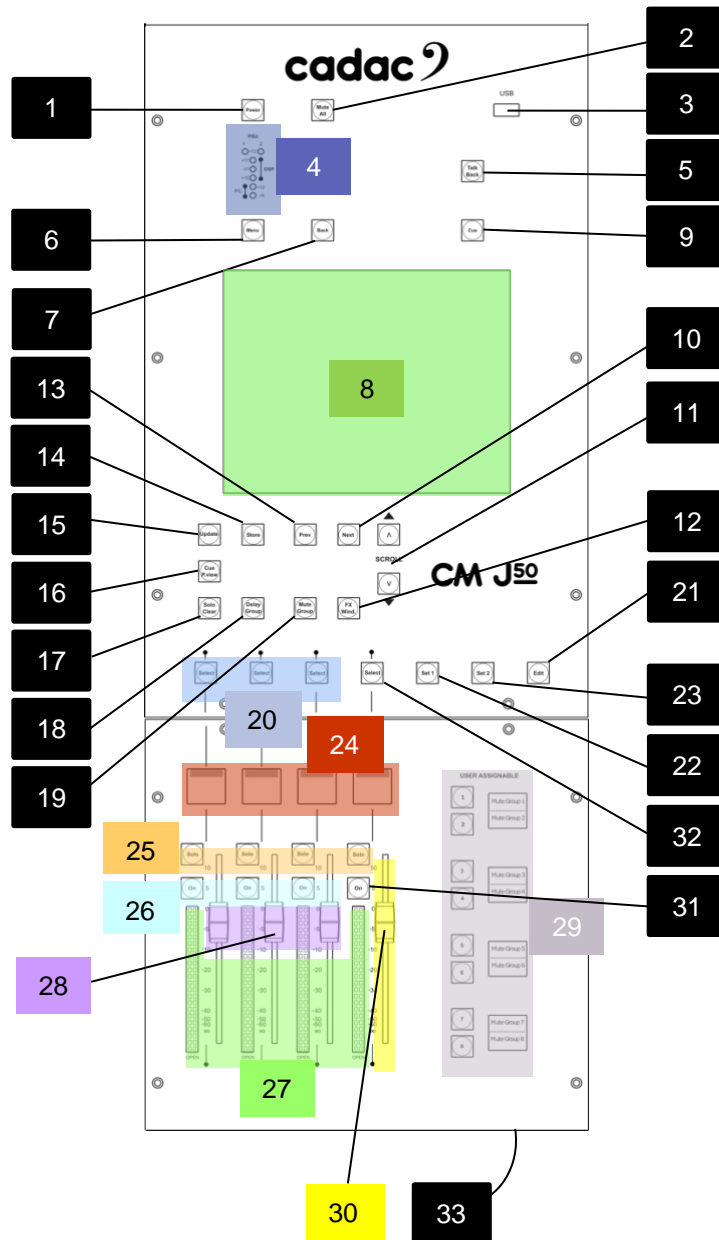
9: GEQ and MONITOR FOLLOW

Bus sends VCAs can also be accessed via this page. The members of each bus VCA remain the same as the normal VCA group membership, but the bus VCAs only attenuate the level of its members within the selected bus mix.

Solo Follow sends each bus mix, when selected, to your monitors / headphones.

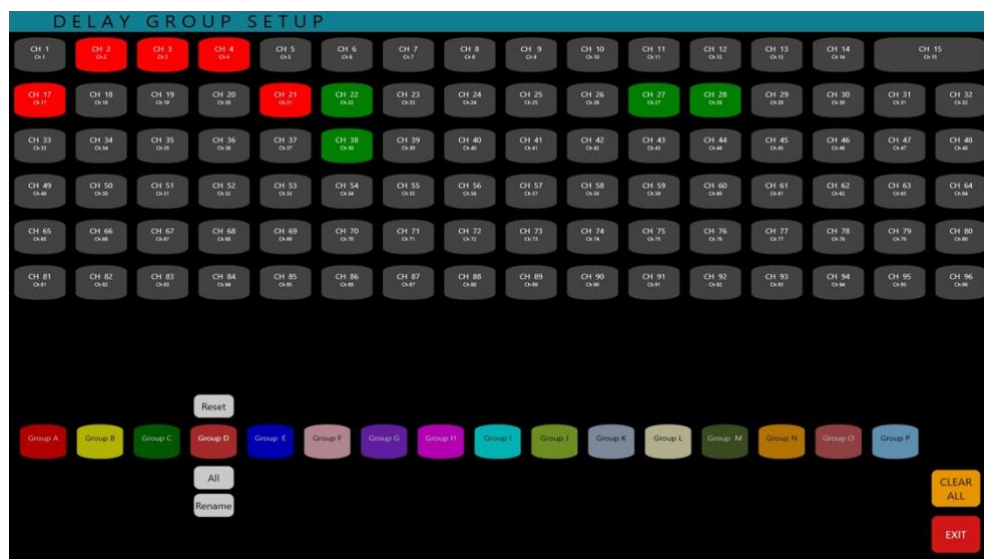
17. **Headphones:** One ¼” stereo jack is fitted under the front armrest for the console’s Phones output with a volume attenuator.
18. **USB Ports:** Two type ‘A’ USB sockets are fitted under the armrest for firmware upgrades, exporting / importing Projects / Shows or plugging in a keyboard / mouse. The screen can display a “virtual” QWERTY keyboard, but a hardware keyboard may be plugged in here and used, if preferred.

Control Surface: 6.5" Screen and Master Section



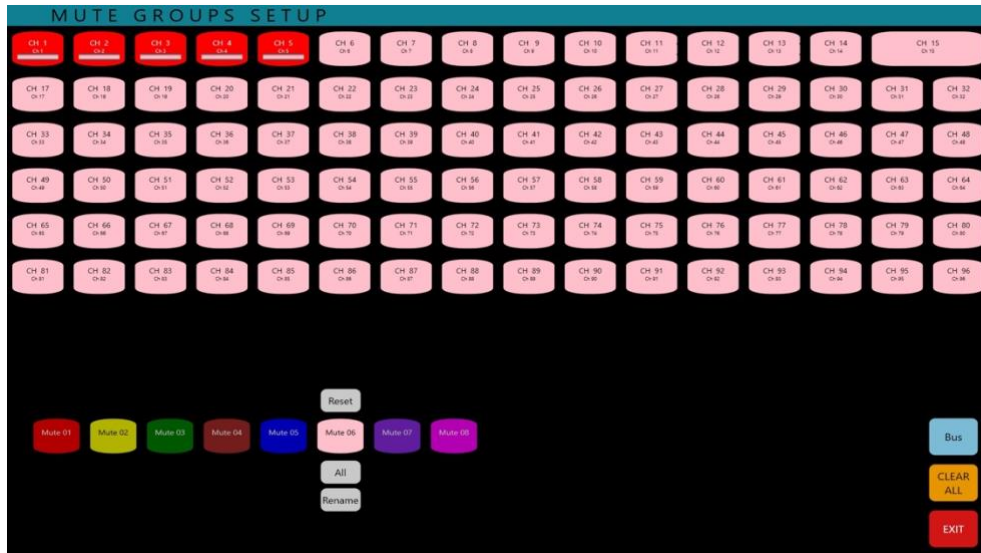
1. **Power button:** This is a multi-function “soft” button for starting and closing the console surface. There is also a physical power switches on the rear of the console that shuts power off to the PSUs in the console.
2. **Mute All button:** Pressing this button will apply a ‘hard’ mute to all analogue outputs from the console. The button is not illuminated during the console’s normal operation, and flashes red when active. Note that Mute All is automatically active when the surface powers up and must be released by pressing the button.
3. **USB port:** A single ‘A’ USB socket is fitted to the surface for firmware upgrades, exporting / importing Projects / Shows or plugging in a keyboard. Main screen displays feature a “virtual” QWERTY keyboard, but a hardware keyboard may be plugged in and used, if preferred.
4. **Power Rail Indicators:** LEDs confirm the status of each internal PSU and the power status within the console.
5. **Talkback button:** This button is not active until a Talkback channel has been assigned to the input channels. The CM-J50 has a very flexible talkback system, which is configured through setup options on the Menu screen. Any of the local (rear panel) I/O may be assigned as a Talkback output or a Return Talkback input.
6. **Menu button:** When navigating the system menus, use this button to return the Control Screen display to the home page.
7. **Back button:** Used in the system menu; navigates back one “level” within the Menu screen menu, if available, or returns to the default Cue list. A further press will close the Menu screen. Illuminates red when available.
8. **Control Screen:** A 6.5” LCD touchscreen which by default the screen shows the Cue List, but it can also display the console configuration options, Show file management and provides access to numerous other user features.
9. **Cue button:** Pressing this displays the currently loaded Cue list on the Control Screen.
10. **Next button:** Brings the next Cue.
11. **Scroll (up and down) buttons:** Allow scrolling up and down of the Cue list.

12. **FX button**.: Quick access to the FX window.
13. **Prev. button**: Brings up the previous Cue.
14. **Store button**: Stores a Cue.
15. **Update button**: Updates the currently selected Cue (in the Cue List).
16. **Cue P.view button**: Allows an offline preview of a Cue and permits changes to be made to the Cue.
17. **Solo Clear button**: Used to clear Solo selections, either single or multiple channels.
18. **Delay Group button**: This brings up the Delay Group Setup page on the 23.5" screen. This allows the set-up of up to 16 Delay Groups which can also be named.



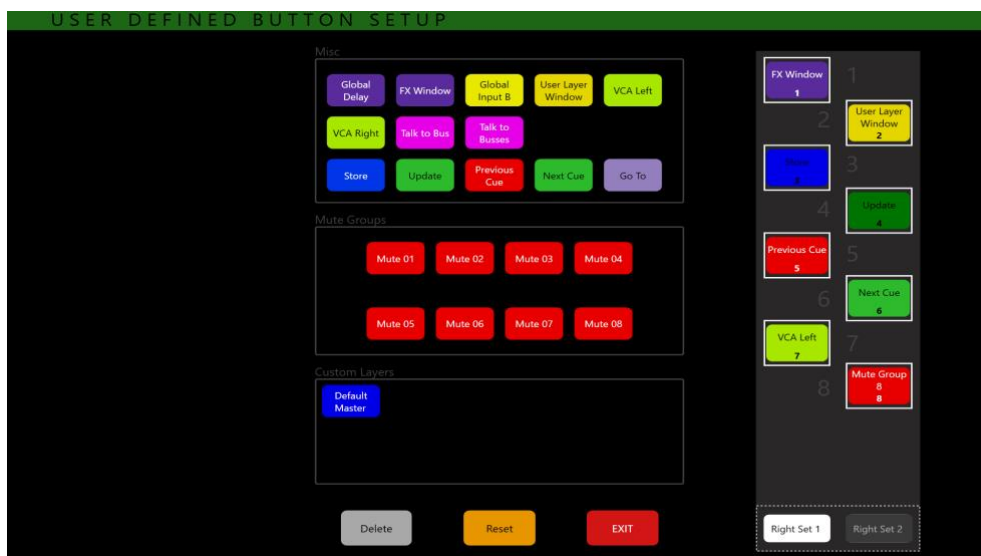
10: Delay Group setup screen

19. **Mute Group button:** Pressing this brings up the Mute Groups Setup page on the 23.5" screen. This allows the input channels to be assigned to any number of the eight Mute Groups. This is a toggle function, and a second press reverts to the previously display.



11: Mute Group setup screen. If a channel appears in more than one Mute group a colour bar representing the additional Mute Group appears under the channel number. Mute groups can also be re-named.

20. **Monitor outputs Select buttons:** these access the locations on the screen.
21. **Edit button:** Brings up the User Defined Button Setup screen. This screen allows functions to be assigned to one of the 16 available User Assign Buttons [29] that are located to the right of the master faders. There are two sets, or banks, of 8 buttons. Set 1 and Set 2 are defaulted to Mute Groups 1 to 8. Allocation of a function to a button is done by selecting the function, then the required Set, and then the button within each Set.



12: User Define Button Setup screen

22. **Set 1 button:** Brings up Set 1 of buttons defined by the user on the User Defined Button Setup screen to the hardware User Defined Button [29], with the function displayed on the OLED screen next to the button.
23. **Set 2 button:** Brings up Set 2 of buttons defined by the user on the User Defined Button Setup screen to the hardware User Defined Button [29], with the function displayed on the OLED screen next to the button.
24. **OLED displays:** These indicate the functions currently assigned to the four master faders – by default, these will be Phones, Monitor LR, Wedge and LCR. The OLEDs auto dim over time if the console is left un-touched.
25. **Solo buttons:** Perform an AFL (after-fade listen) function. SIP mode is also available, selected from the Solo Control page.
26. **Monitor outputs On buttons:** Master On buttons for each of the monitor outputs.
27. **Metering:** A 20-segment LED dual bar graph meter is fitted adjacent to each of the four faders in the fader bay. These have the same characteristics as the meters in the Channel section.
28. **Monitor faders:** Four 100 mm motorised faders by default control (but can be reassigned to any other fader function):
 - a. Headphone output
 - b. Left and right stereo monitor outputs
 - c. Mono wedge feed
29. **User Assign 1 to 8, 9 to 16 buttons:** These multi-function buttons are by default the masters for the CM-J50's Mute Groups. There are two sets / banks of 8 buttons - selected by Set 1 and Set 2.

The user defined functions also includes Global Delay for the effects section, fast access to the FX screen, Global Input, User Layer Window, Fast VCA Left Window, Talk to Bus or Busses, Store, Update, Previous Cue, Next Cue and Go To buttons. Custom Layers are also set to a button here.

The OLEDs auto dim over time if the console is left un-touched.

30. **LCR master fader:** A 100 mm fader controlling the main stereo or LCR output. This is a VCA master fader controlling all three master output channels; the levels of the individual L, C and R legs may be controlled by the Mix Left, Mix Centre and Mix Right faders of the master channels which are accessed by swiping the display to below Output Channel 1 or above Input Channel 64.

NOTE: The functions of the four faders [28] and [30] are re-assignable in software; the descriptions above are of the default assignments.

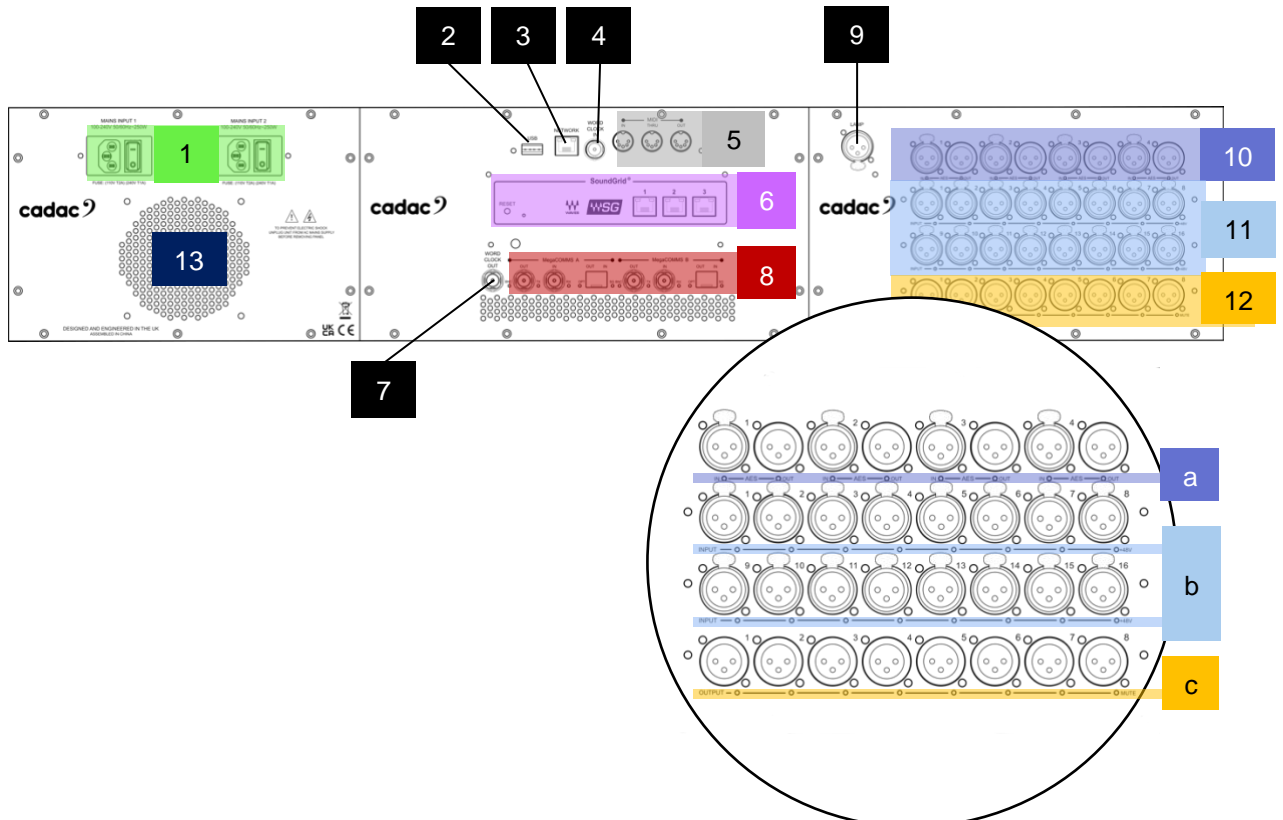
31. **LCR On button:** When this button is unlit, the main LCR output is muted.

32. **LCR Select button:** Pressing this button changes the Main Screen (and the faders, Select and ON buttons below the Main Screen) to Busses A Layer, but with the three channels of the master output (L, R and C) at the left, and Busses 1 to 13 to their right. This allows gain trim, EQ, dynamics and other functions to be applied to the individual channels of the master output, as well as providing access to the master faders.

33. **Headphones:** One ¼" stereo jack is fitted under the front armrest for the console's Phones output with a volume attenuator.

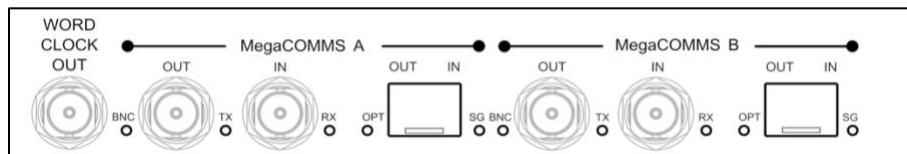
CM-J50 Console Rear Panel

Rear Panel Connectors



1. **Mains Inputs:** Two switched IEC sockets for the dual internal power supplies. The unit is designed to run off one PSU, however it is recommended that the unit is run on both PSUs to ensure optimum load and heat management and adds PSU redundancy.
2. **USB:** A type 'A' USB 2.0 ports.
3. **NETWORK:** RJ45 Ethernet ports for the connection of peripheral Ethernet accessories.
4. **WORD CLOCK IN:** a TTL level (0 to +5 V) clock signal applied here can be selected to synchronise the AES outputs.
5. **MIDI: IN, OUT and THRU.** The console can send MIDI data on a CUE basis to external MIDI-controlled devices for purposes of triggering a sound effect or changing a programme setting on an Effects device.

6. **SoundGrid®:** Waves® SoundGrid® interface – three RJ45 network connectors carrying 64 bi-directional channels of audio. The interface allows multitrack recording on an external computer or connected to a Waves® MultiGrid® server for the full range of external Waves® FX plug-ins (dependent upon your Waves® license) or for multitrack recording or playback. The RESET button resets the Waves® interface.
7. **WORD CLOCK OUT:** A 96 kHz clock signal is always available, at TTL level (0 to +5 V).
8. **MegaCOMMS:** 4 x BNC connectors - in 2 pairs – and two duplex optical LC ports carrying all audio and control data between the control surface and other MegaCOMMS devices such as stage racks and network bridges.



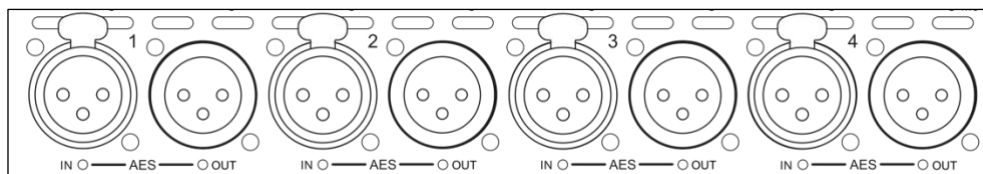
13: 2 x MegaCOMMS ports on BNC RG6 coaxial and LC optical transceiver SFP ports

Status LEDs: The LEDs provide indication of whether the BNC or optical connections are active, along with the TX and RX status.

9. **Lamp:** XLR socket for a 12 V DC gooseneck console light.
10. **AES IN 1 to 4 and OUT 1 to 4:** Four female XLR sockets providing eight AES3 format digital inputs to the mixer.

The inputs are fitted with Sample Rate Converters (SRCs) and will accept sample rates between 44.1 and 192 kHz. The mixer's internal clock frequency is 96 kHz.

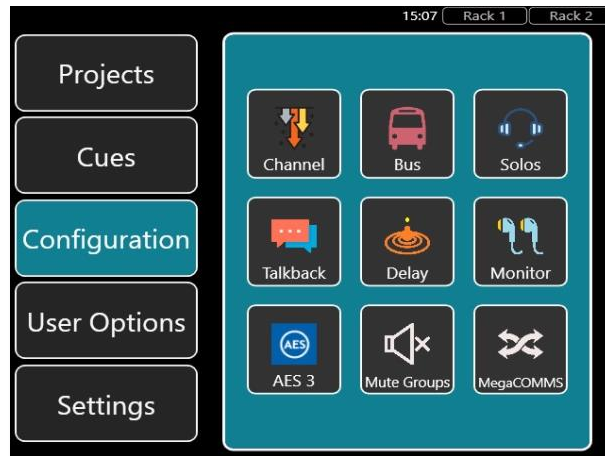
Four male XLR connectors providing eight AES3 format digital outputs from the mixer.



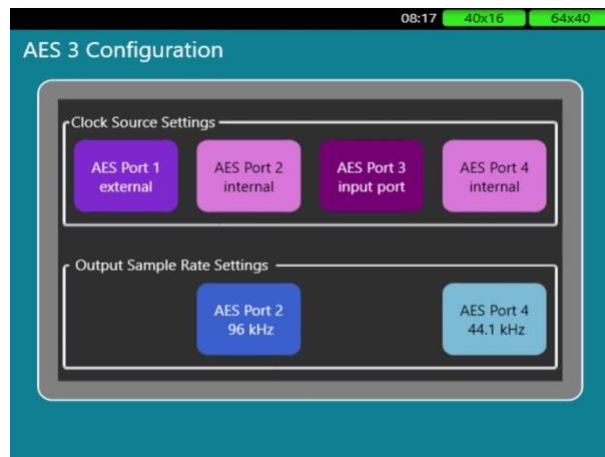
14: AES3 digital inputs and outputs on male and female XLRs

- a. **Status LEDs:** Eight RGB (multi-colour) LEDs are fitted to the card. On the inputs the =LED will illuminate Green ■ to confirm the presence of a valid AES3 input signal. If there is no valid clock it will turn Red ■. For the outputs, if there is a valid internal sample rate the output LED will illuminate Yellow ■ for 44.1 kHz, Magenta ■ for 48 kHz and Cyan ■ for 96 kHz. If there is an external clock the output LED will remain Off.

The default sample rate for the outputs is 48 kHz; this can be changed in the AES3 Configuration page on the Menu Screen to 44.1 kHz, 48 kHz and 96 kHz.

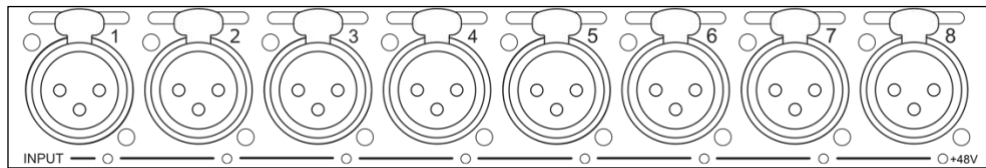


15: Access to the AES3 Configuration Screen



16: AES3 Configuration Screen

11. **Inputs:** 16 balanced “local” analogue audio inputs to the CM-J50, on XLR sockets.

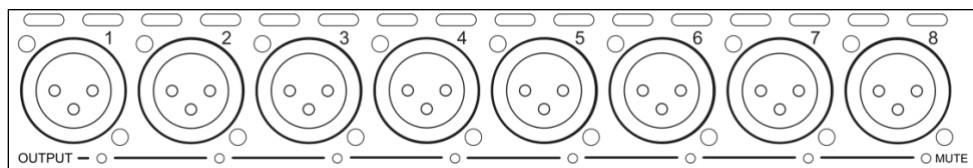


17: Analogue Inputs on male XLRs

48 V LEDs: 16 red LEDs; illuminate when 48 V phantom power is enabled at the associated input connector.

These may be the sources for any input channel or insert return in the same way as the remote stage rack inputs. They may be used for connection of FOH sound sources, FX processing, talkback mic, etc. Characteristics are identical to the inputs on the stage racks.

12. **Outputs:** Eight balanced “local” analogue audio outputs from the CM-J50, on XLR male connectors.



18: Analogue Outputs on male XLRs

MUTE LEDs: Each analogue output connector has an adjacent red LED. This illuminates when the physical output is ‘hard’ muted by the internal relay, either during power-up, when the MUTE ALL button is pressed, or if a ‘hard’ mute is applied to an output from a channel ON button.

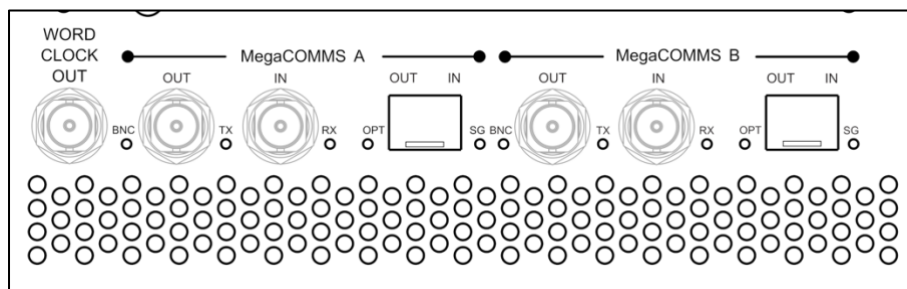
Any output channel, insert send or direct out may be routed to these, to enable the connection of FX processors, recorders, etc. The talkback/comms output from the CM-J50 may also be available here; this is configured in software via the MENU Screen. Characteristics are identical to the outputs on the stage racks.

13. **Fan:** For internal cooling; do not block. The fan speed is controlled automatically and will vary according to the internal ambient temperature.

Connecting the Hardware

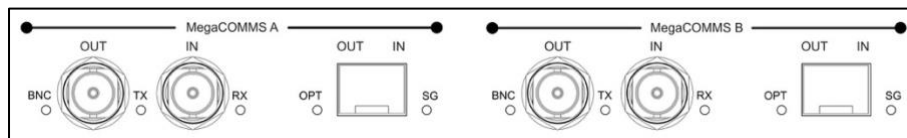
MegaCOMMS

Cadac's proprietary MegaCOMMS hi-speed data protocol is used to interconnect the console and stage rack(s). The control surface has four BNC sockets to provide the main system data interconnection, labelled IN (RX) A, OUT (TX) A and IN (RX) B, OUT (TX) B. The interconnections are also available on optical via 2 optical ports next to the BNC sockets.



19: CM-J50 - 2 pairs of MegaCOMMS ports on BNC connectors and 2 duplex optical LC ports*

The stage racks – CM-SR64, CM-SR40 and CM-SR24 – all have four BNC sockets and two duplex optical LC ports.



20: CM-SR64, CM-SR40 and CM-SR24 - 2 pairs of MegaCOMMS ports and 2 optical ports*

The two paths, A and B, carry identical and synchronous data, and can be used in various ways, depending on whether system redundancy is required. Providing a redundant path gives greater system robustness, as the CM-J50 will automatically switch its comms to Path B if communication is lost on Path A, such as might occur if a cable is damaged. Note that the CM-J50 system is fully functional in all respects if only one coax TX / RX or optical path is connected.

*To use the two duplex optical LC ports, it will require the purchase of compatible 1000BASE-LX/LH SFP 1310nm 10km DOM Duplex LC MMF/SMF transceiver modules or for very short distances Direct Attach Copper Cables.

System Connection Options

The console and stage racks should be connected using one of the system configurations shown over the next few pages. The diagrams depict systems with one or two stage racks, using optical fibre and / or coaxial cables, in either redundant or non-redundant configurations.

IMPORTANT: Best Practice when Designing a System

When using coaxial cable (3G HD-SDI), it is best practice **NOT** to tape power cables to the coaxial cable. This could lead to interference with the signal and result in unwanted audio artefacts, or in the worst case, total loss of audio. It is highly recommended that **all coaxial cables be connected** to the appropriate units **prior to powering** them on.

When designing a **non-redundant system**, it is extremely important to ensure that the **total cable runs do not exceed 100m for coaxial and 2km for fibre optic**.

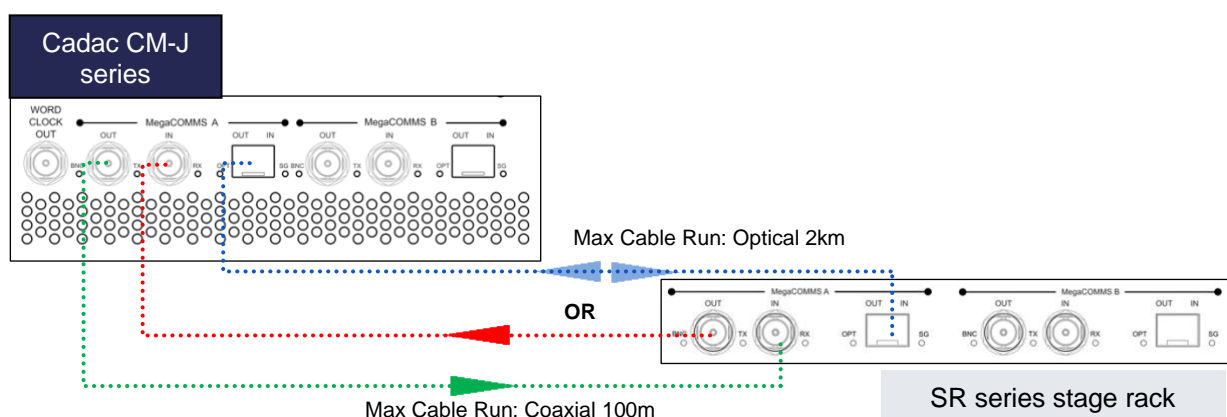
When using **redundancy for a single stage rack**, the cable runs (fibre optic or coaxial) from MegaCOMMS Port A and B must be of **similar lengths** - up to a maximum of 100m for coaxial or 2km for optical.

When using **redundancy for two stage racks**, the optical and coaxial runs from the console to the stage rack must not exceed 2km or 100m respectively - and must be of **similar lengths**. The coaxial link cables connecting the two stage racks must not exceed 100m.

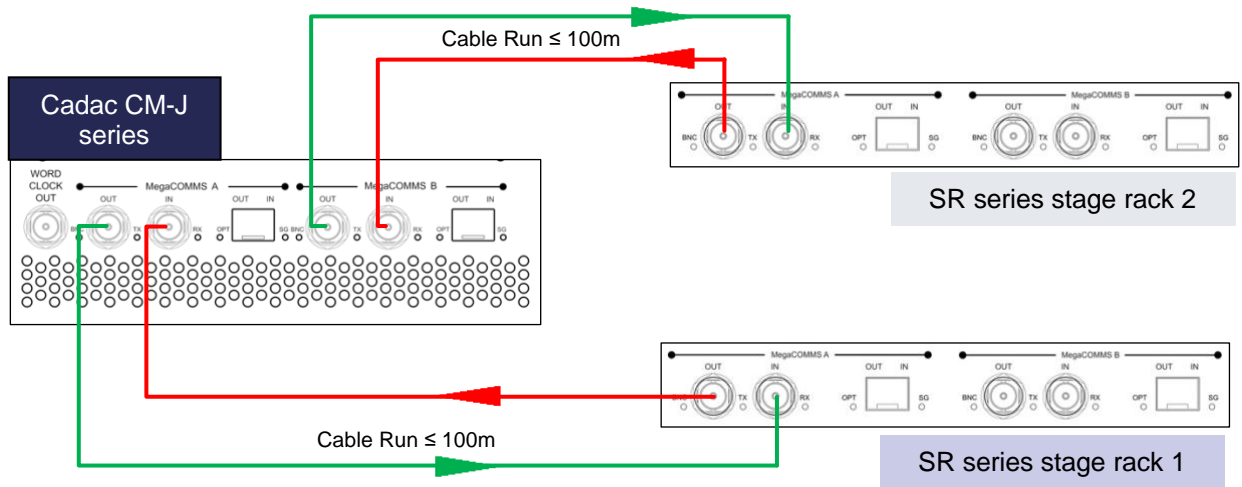
When designing a redundant MegaCOMMS port A or B from the console **MUST** be connected to **MegaCOMMS port A** - NOT port B - on both stage racks. Any link cables must use ports B on both units.

NOTE: You cannot use coaxial and fibre optic cables on the same MegaCOMMS port at the same time. One cable type must be selected for that port.

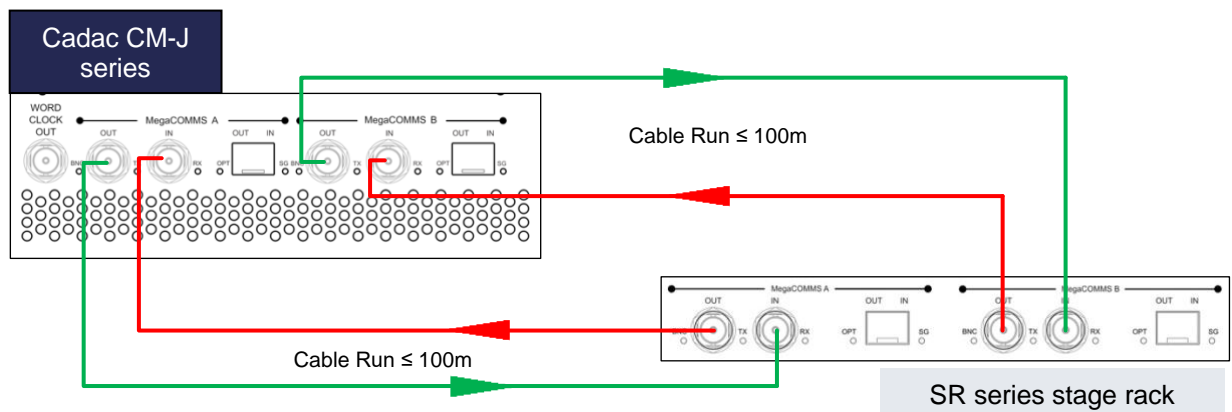
One stage rack: Non-Redundant System using coaxial cables (or fibre optic)



Two stage racks: Non-Redundant System using coaxial cables

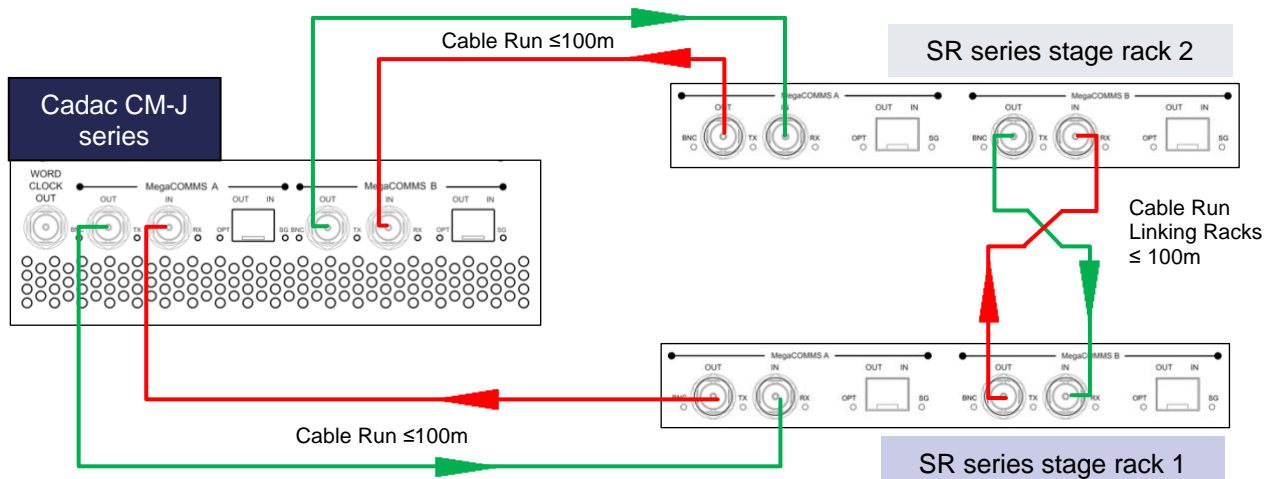


One stage rack: Redundant System using coaxial cables



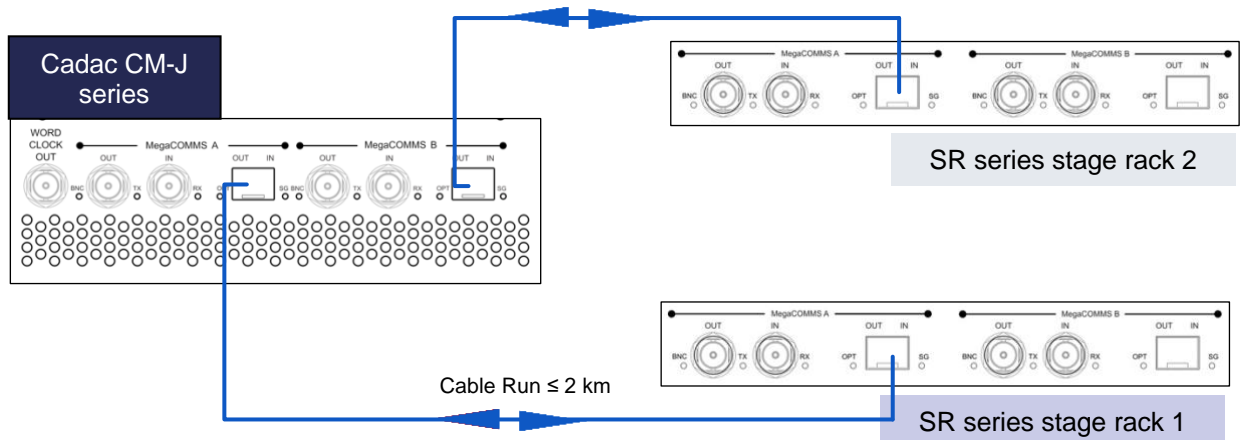
NOTE: The coaxial cables within the system must be of similar length.

Two stage racks: Redundant System using coaxial cables



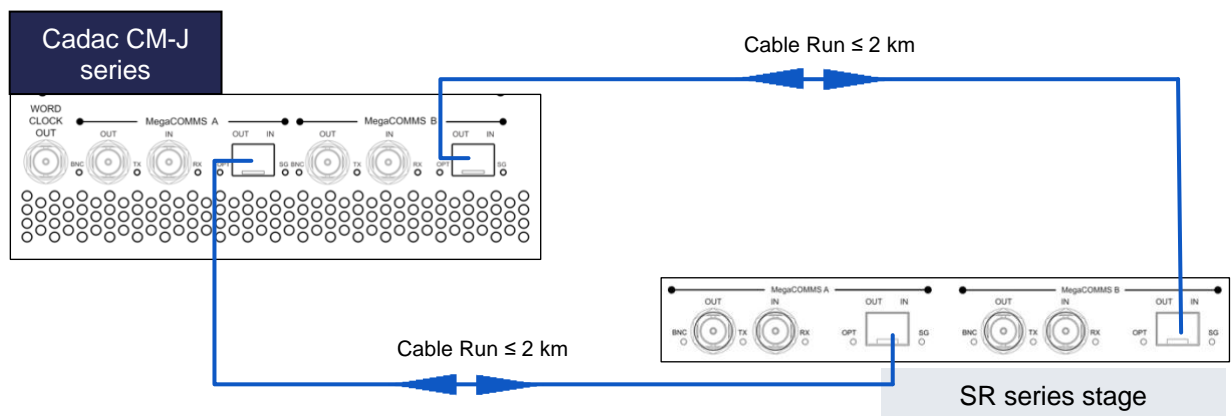
NOTE: With the system setup above MegaCOMMS *PORT A* on both stage racks **MUST** be connected to the console. The coaxial cables linking the console to the racks must be of similar length.

Console and two stage racks: Non-Redundant System using fibre optic cable



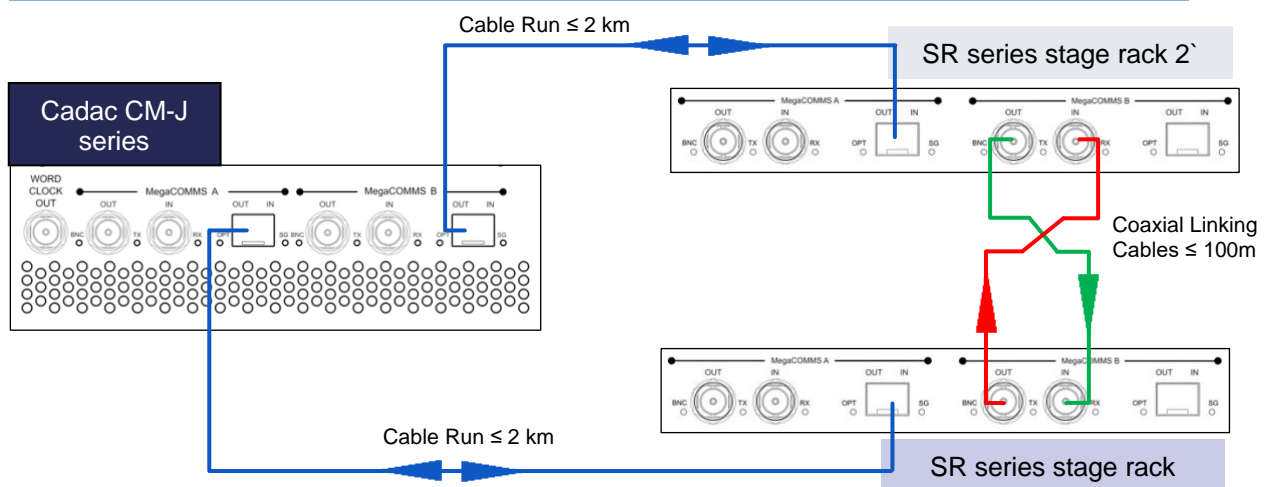
NOTE: With the system setup above MegaCOMMS PORT A on both stage racks MUST be connected to the console.

Console and one stage rack: Redundant System using fibre optic cables



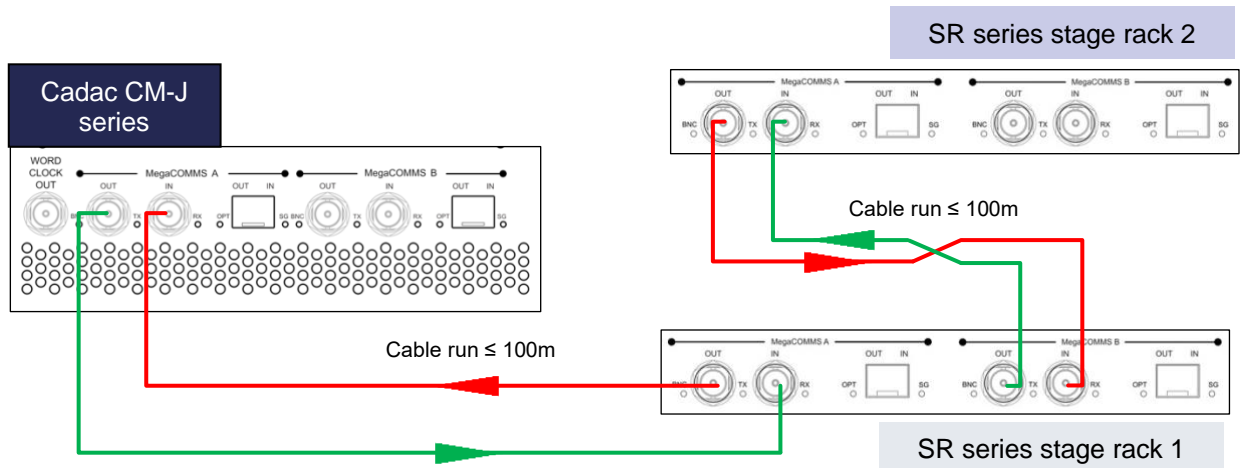
NOTE: The fibre optical cables within the system must be of similar length.

Console and two stage racks: Redundant System using fibre optic cables with coaxial linking



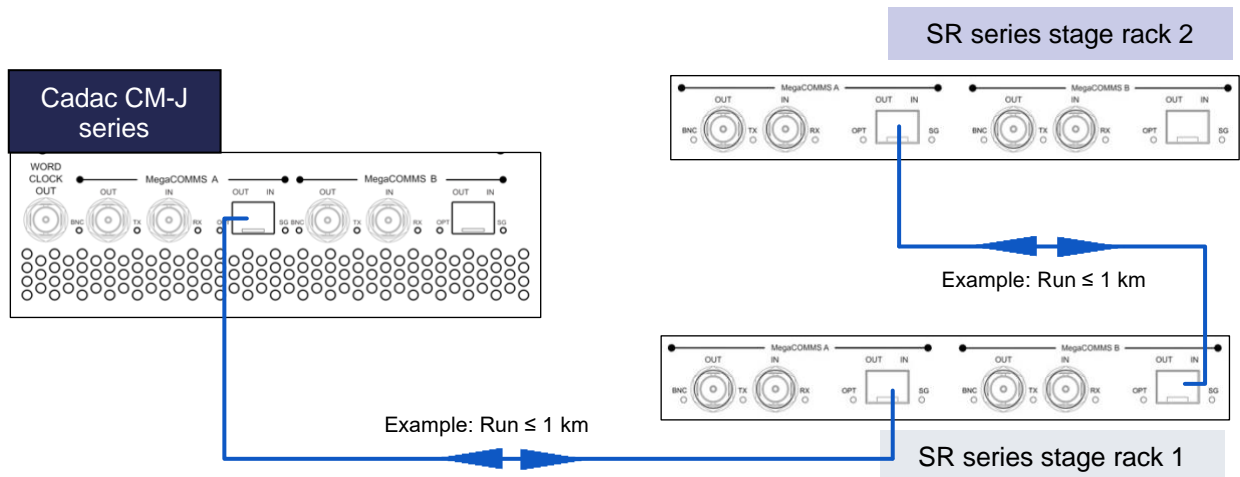
NOTE: With the system setup above MegaCOMMS PORT A on both stage racks MUST be connected to the console. The fibre optical cables within the system must be of similar length.

Console and daisy chaining two racks using coaxial cables



NOTE: With the system setup above MegaCOMMS *PORT A* on the first stage rack **MUST** be connected to the console.

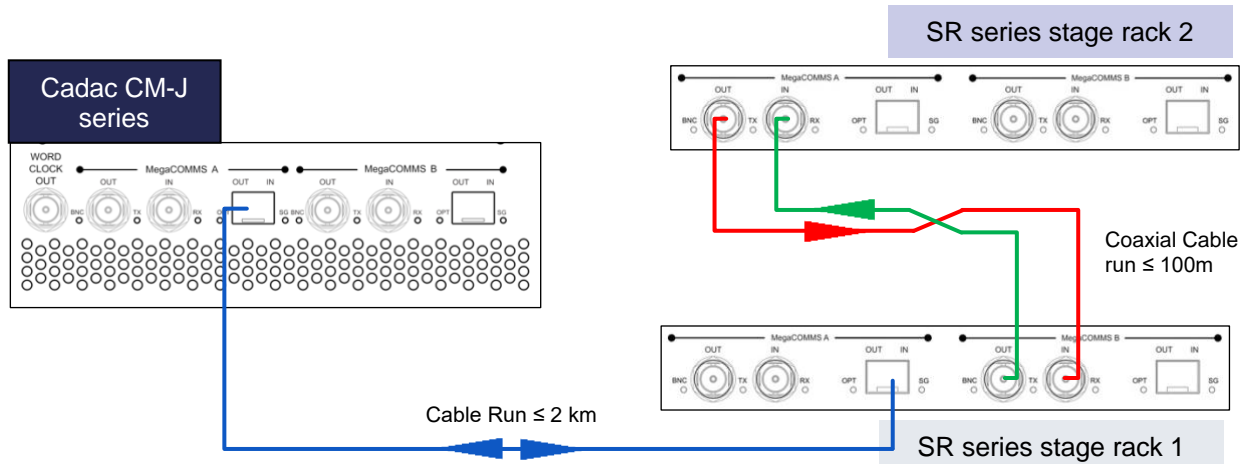
Console and daisy chaining two racks using fibre optic cables



Total cable run within the system must not exceed 2km

NOTE: With the system setup above MegaCOMMS *PORT A* on the first stage rack **MUST** be connected to the console.

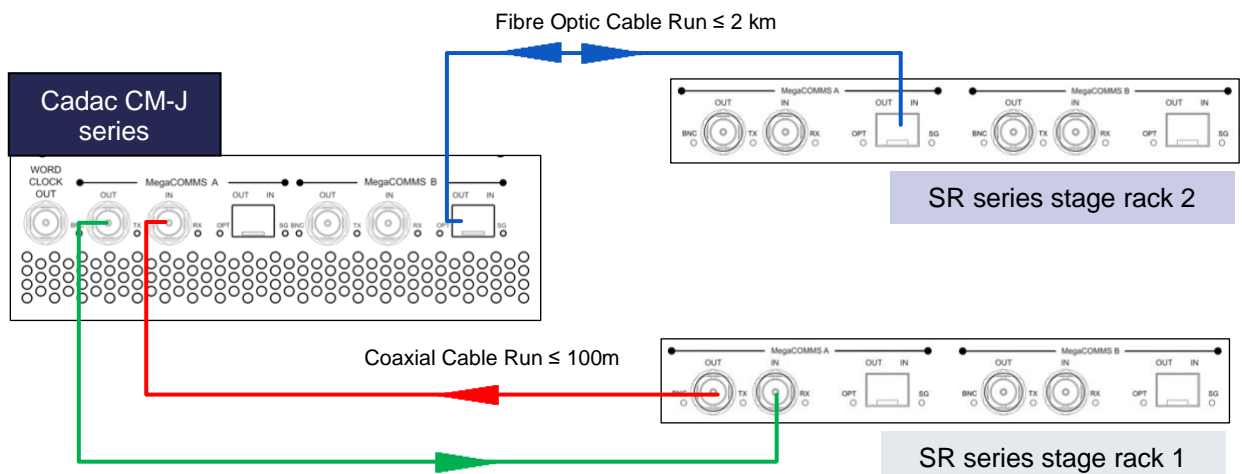
Console and daisy chaining two racks using fibre optic and coaxial cables



Total fibre optic cable run within the system must not exceed 2km, however the coaxial run can go up to 100m

NOTE: With the system setup above MegaCOMMS *PORT A* on the first stage rack **MUST** be connected to the console. In this instance the fibre optic cable **MUST** connect the console to first stage rack, and the coaxial cable used to link the first stage rack to the second rack. If this order is **NOT** followed, then the system could suffer from timing issues.

Console and two racks: Connecting one via fibre optic and the second via coaxial cables

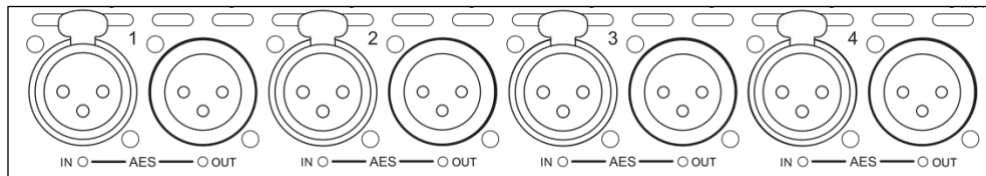


NOTE: With the system setup above MegaCOMMS *PORT A* on both stage racks **MUST** be connected to the console.

NOTE: Only RG6 video cable suitable for 3G HD-SDI (High-Definition Serial Digital Interface) should be used for the Cadac MegaCOMMS connections. The cables should be terminated in BNC connectors of the appropriate type, and total system cable run should not exceed 100m (surface-to-stage rack or stage rack to stage rack as a snake). A suitable cable: Kramer bulk Type BC-1X.

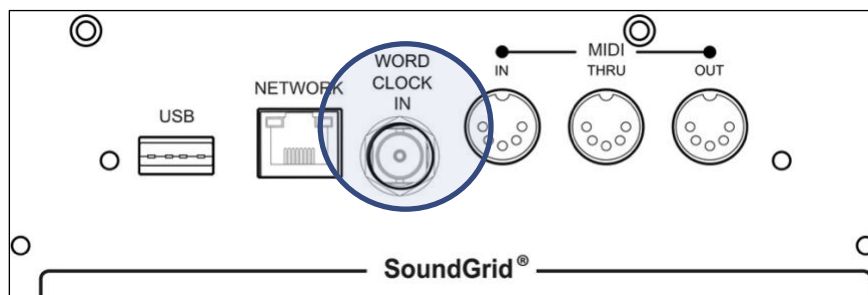
Word Clock

The CM-J50 caters for digital audio I/O in the form of eight AES3 inputs and eight AES3 outputs, accessible on the rear of the control surface.



21: AES3 digital inputs and outputs on male and female XLRs

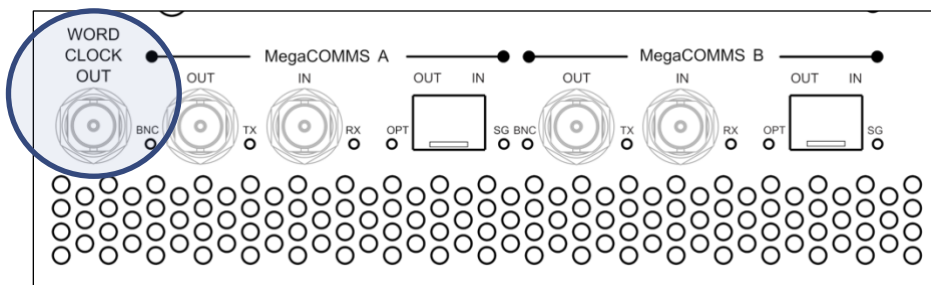
The AES3 outputs have Sample Rate Converters (SRCs) and can operate at any frequency required by applying an external clock source to the WORD CLOCK IN connector.



22: Word Clock In

The external clock must be selected on the AES3 Configuration Page in the “Control Screen Menus”.

The CM-J50’s internal word lock is fixed at 96 kHz, and a clock signal is always available at the rear of the console at the WORD CLOCK OUT connector.



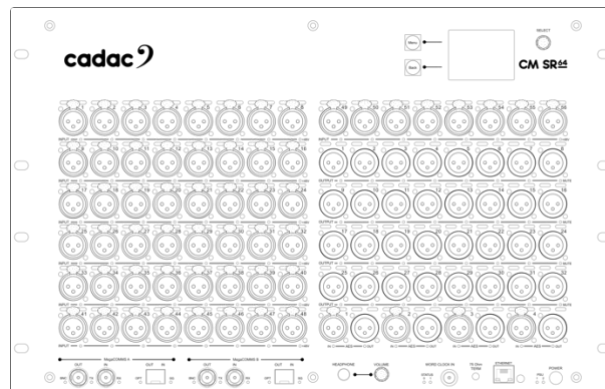
23: Word Clock Out

Remote Stage Rack Connections

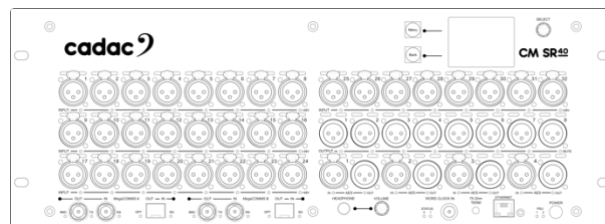
Audio Connections

The stage racks provide the (non-local) audio inputs and outputs for the system and are intended to be located remotely from the control surface, typically stage-side. Audio equipment to be used at the FOH position can be connected to the control surface’s local I/O (when fitted) on the rear panel.

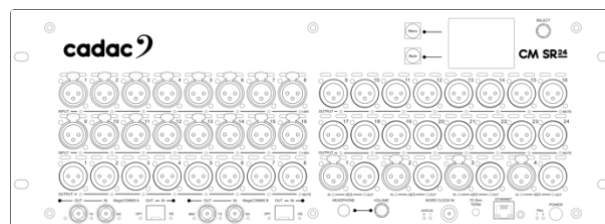
The CM-SR64 stage rack has a total of 64 inputs and 40 outputs, the CM-SR40 has 40 inputs and 16 outputs and the CM-SR24 stage rack has 24 inputs and 32 outputs. On all three units 8 of the inputs and 8 outputs are AES3 on 8 XLRs. The CM-J50 can support one or two stage racks of any type via direct connection; in these circumstances the maximum remote I/O connectivity the system can provide is 128 inputs and 80 outputs, using two CM-SR64 stage racks. These totals are increased further by the local I/O on the rear of the control surface (see “[Surface and Local I/O: Audio Connections](#)”).



24: CM-SR64 Stage rack



25: CM-SR40 Stage rack



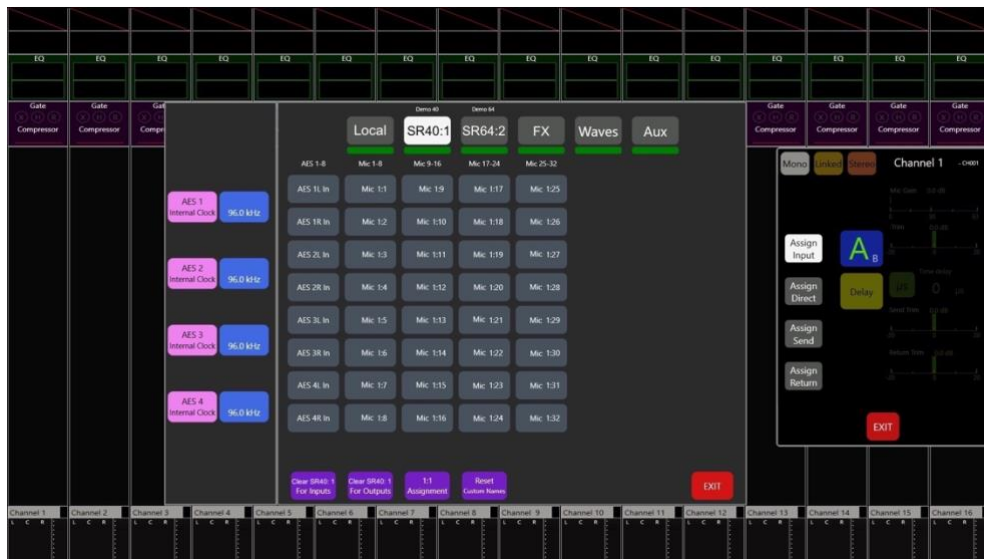
26: CM-SR24 Stage rack

Note that the number of any connector on a stage rack is unrelated to its function. Any input (or output) connector can be assigned in software to a system input (or output) of any type – channel input, aux send, channel insert, matrix output, etc. – anywhere in the console’s architecture. It should also be noted that the overall I/O physical connectivity provided by the system is unrelated to the CM-J50’s maximum processing capacity of 96 simultaneous input channels mixing onto 48 assignable output busses. Some additional connectors will be required in all installations for channel or bus insert sends and returns, and for ‘B’ inputs to input channels.

For further information regarding the stage racks please refer to the “*Cadac Audio Stage Racks: CM-SR64 CM-SR40 CM-SR24 Hardware Overview*” manual”

Routing

Routing is done using the on-screen Input and Output Assign functions.



27: CM-J50 Routing Screen

Connector Details

Analogue Inputs: 3-pin female XLR connectors. The inputs are electronically balanced and are suitable for connection of either microphones or line level sources. Input impedance is 1.2 kohms in Mic Mode, or 10 kohms in Line Mode, Mic or Line mode being selected from the assigned channel's Input Gain panel. The maximum input level is +40 dBu (with pad enabled). When an input connector is assigned as the input of a channel in Mic mode, 48 V phantom power is available, also switched from the channel's Input Gain panel. The connector should be wired as follows:

Pin	Connection
1	Screen
2	Signal 'hot' (phase)
3	Signal 'cold' (antiphase)

Analogue Outputs: 3-pin male XLR connectors. The outputs are electronically balanced with a source impedance of 50 ohms. The maximum output level is + 21 dBu. The connector should be wired as follows:

Pin	Connection
1	Screen
2	Signal 'hot' (phase)
3	Signal 'cold' (antiphase)

Surface and Local I/O: Audio Connections

Analogue inputs: The connector and characteristics of the local analogue inputs are identical to those on the remote stage racks:

Pin	Connection
1	Screen
2	Signal 'hot' (phase)
3	Signal 'cold' (antiphase)

Analogue outputs: The connector and characteristics of the local analogue outputs are identical to those on the remote stage racks:

Pin	Connection
1	Screen
2	Signal 'hot' (phase)
3	Signal 'cold' (antiphase)

AES3 digital inputs: Four AES3 digital audio inputs are available at the rear of the control surface on 3-pin XLR female connectors. The AES3 format carries two independent audio channels. In accordance with the AES3 spec, the inputs are balanced, with a characteristic impedance of 110 ohms. Connections to these inputs should always be made using cable specifically designed for digital audio.

The digital inputs are equipped with Sample Rate Converters (SRCs) and can accept sample rates between 44.1 kHz to 192 kHz.

Connector pinout is the same as XLRs for analogue audio:

Pin	Connection
1	Screen
2	Chs A & B 'hot' (phase)
3	Chs A & B 'cold' (antiphase)

AES3 digital outputs: Four AES3 digital audio outputs are available at the rear of the control surface on 3-pin XLR male connectors. The outputs are balanced, with a characteristic impedance of 110 ohms. Connections to these outputs should always be made using cable specifically designed for digital audio.

The digital outputs are equipped with Sample Rate Converters (SRCs), which may synchronise to other digital audio equipment using the WORD CLOCK IN connector.

Connector pinout is the same as XLRs for analogue audio:

Pin	Connection
1	Screen
2	Chs A & B 'hot' (phase)
3	Chs A & B 'cold' (antiphase)

Other Control Surface Audio I/O

Headphones

The stereo monitor signal is also available on two ¼" (6.35 mm) 3-pole (TRS) jack sockets for the connection to a pair of headphones. There are 2 sockets under the front armrest, on the left and right side, along with a volume attenuator for each headphone. The sockets are wired as follows:

Pin	Connection
Tip	Left monitor output
Ring	Right monitor output
Sleeve	Screen (common)

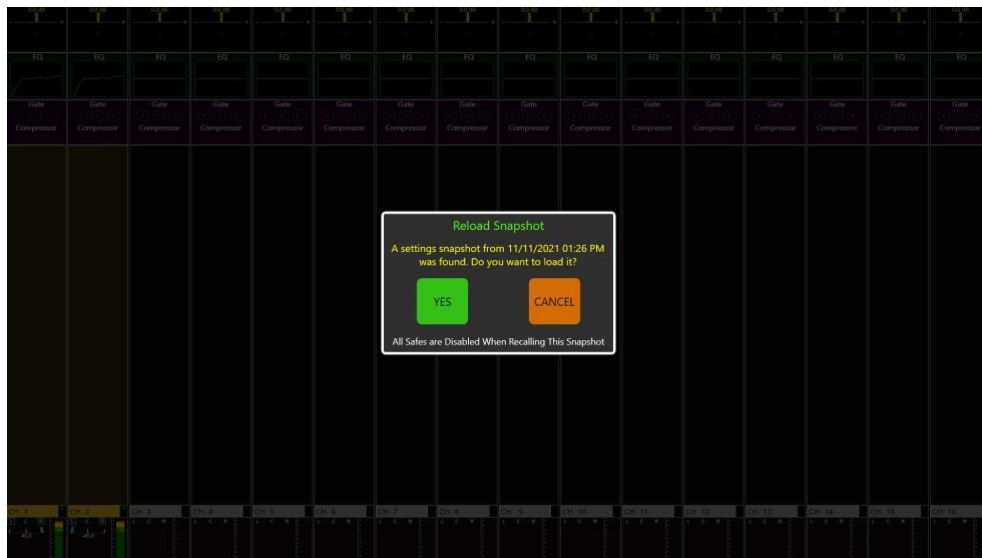
Waves® SoundGrid® interface

The CM-J50 is fitted with a Waves® SoundGrid® interface card. Access to this is via three RJ45 connectors on the rear panel. These may be used for multitrack recording on an external computer or connected to a Waves® SoundGrid® server.

Principles of Operation

Switching the CM-J50 ON

The Power button [1 in Control Surface Part 2] is a “soft” button for starting and powering-down the surface. When the surface is not operative, but connected to power and the rear switch is on, the button illuminates red. A short press initiates the console boot sequence, the internal computer runs standard BIOS and diagnostics routines, and power is applied to the internal audio DSP section. The Power button then illuminates green. At the end of the power-on sequence, a dialogue box appears on the screen as shown below:



28: Power ON Dialogue

Touching YES in answer to the question will reload the snapshot saved during the last power-down and reinstate the console to the last-known settings. Pressing YES also ignores all Safes to allow the console to start in its previous state. Touching CANCEL will result in the console operating in its ‘default’ state, without a scene loaded – i.e., no channel names, routing or processing will be active. If you press CANCEL and want to recall a Cue without safes, press-and-hold the ISO button [Button 4 shown in Control Surface: Part 1] until the cue has fully recalled ignoring safes.

A ‘long’ press on the Cue List button at any point after the initial boot-up will re-invoke the power-on snapshot window: this is useful if the CANCEL button has been pressed inadvertently.

For safety reasons, the CM-J50 boots up with the Mute All function active: all console outputs from both the stage rack(s) and the local analogue I/O are ‘hard’-muted (note: digital in / outs are not muted). Press the Mute All [24] button to cancel this mode and activate the outputs.

Switching the CM-J50 OFF

To shut the surface down, 'short-press' the Power [1 in Control Surface Part 2] button again, and a dialogue box will be displayed asking if the console should be shut-down (YES), or restart (Warm Start) while continuing to process audio or CANCEL. Selecting YES initiates a power-down sequence, ensuring that the computer is shut down correctly. When the surface shuts down, a snapshot is taken of the current console status: this includes all input and output channel settings.



29: Power OFF screen

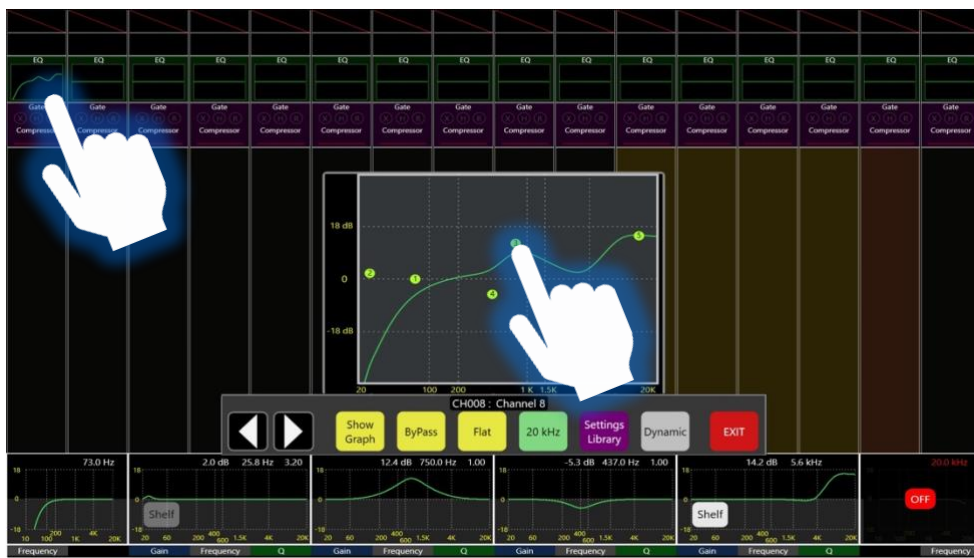
Alternatively, the surface can be powered down via the Menu screen using the Shutdown button in the Settings menu, which opens the same dialogue box.

The internal computer may be 'forced' to reboot by pressing the Power [1 in Control Surface Part 2] button for approx. 1 - 3 secs. This function may be useful in the unlikely event of a major computer crash; audio continues during the reboot, until the computer is fully rebooted, at which time the audio is muted until the power down snapshot is selected.

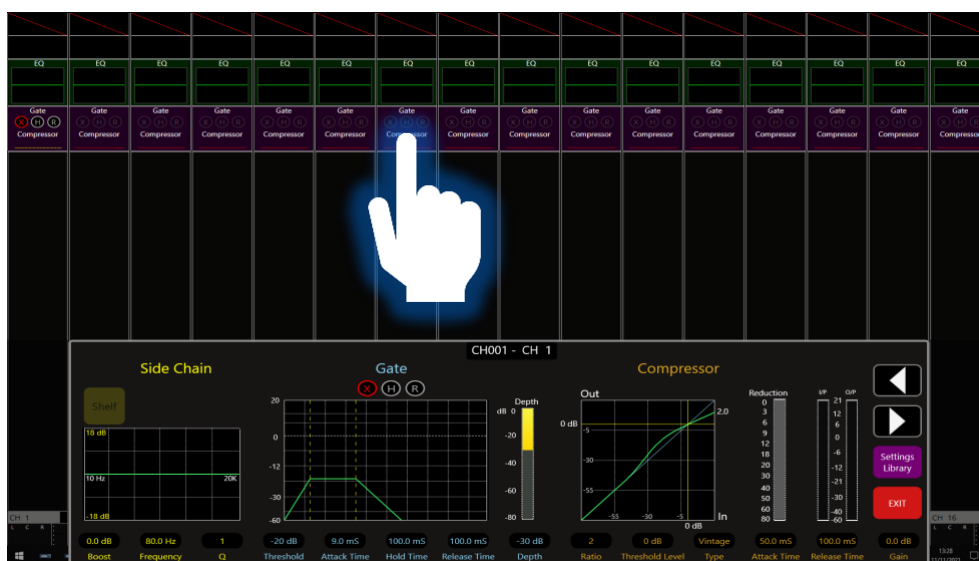
If the Power button is held pressed for at least 5 secs., a complete shutdown of all console functions is forced. {need to put in colour flashing sequence}

Touch Operation

This section of the manual describes the basic principles of screen navigation and parameter controls. All audio operations on the CM-J50 are performed using the touchscreen. The display shows sixteen consecutive virtual channel strips and includes the most important information about the channels' configuration and parameters. More detailed information and access to controls for any channel is obtained by a single touch on the appropriate area of the screen.



30: EQ controls populate the screen when the EQ on the “channel” strip is pressed. When using the GRAPH function the EQ points can be dragged to the required position



31: DYNAMIC interface populates the screen when the DYNAMICS on the “channel” strip is pressed

EXIT

The EXIT button will, as the name implies, exit the current function on the screen.

This will close the function - e.g. EQ or Dynamics – plus, it will remove all the mapping to the encoders for that function.



32: EXIT closes the function, or window, and removes any mapping to the encoders

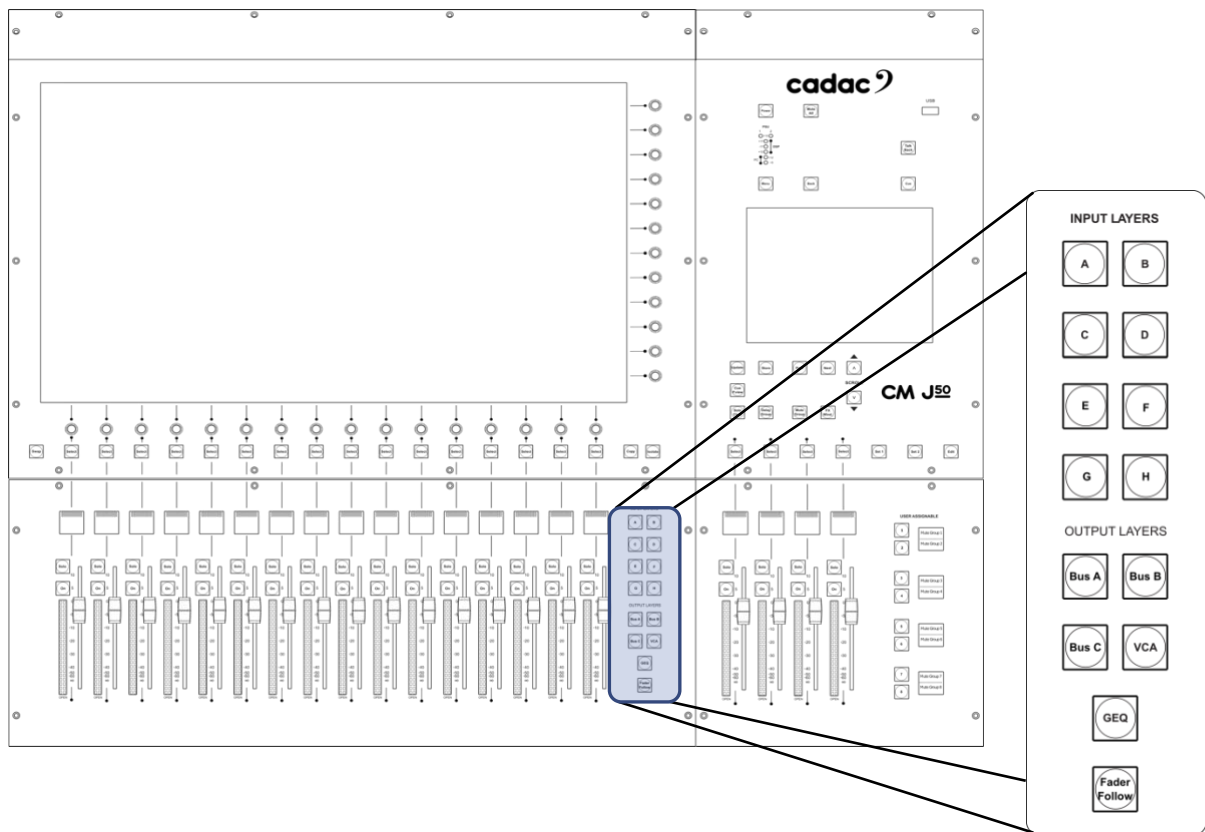
It is possible to have more than one function open on the screen, as some functions will map to the vertical encoders and others to the horizontal by default.

NOTE: The functions can also overlap, hiding portions of the GUI of the second function - including the EXIT button.

Layers

The CM-J50 provides three methods of changing “layers” or going to channels.

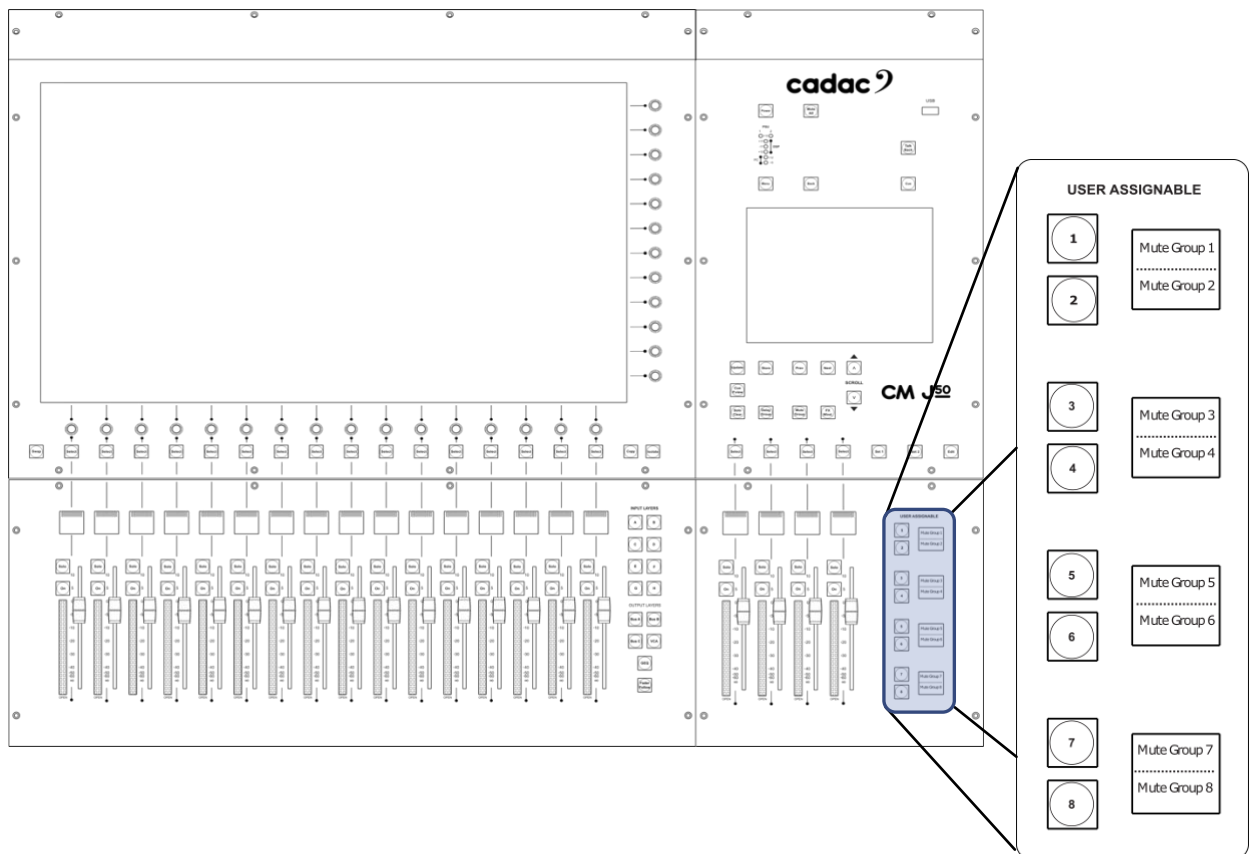
1. **Layer buttons:** There are 8 Input Layer (A to H) buttons plus 3 Output layer (Bus A to Bus C) buttons which can be used to bring up either Input Layers or Output Layers in blocks of 16. The faders, OLED displays and the On, Solo and Select buttons always follow the on-screen channel strips selected by either the Input or Output Layers.



33: LAYER buttons:
Inputs from A to H
and BUS A to BUS C

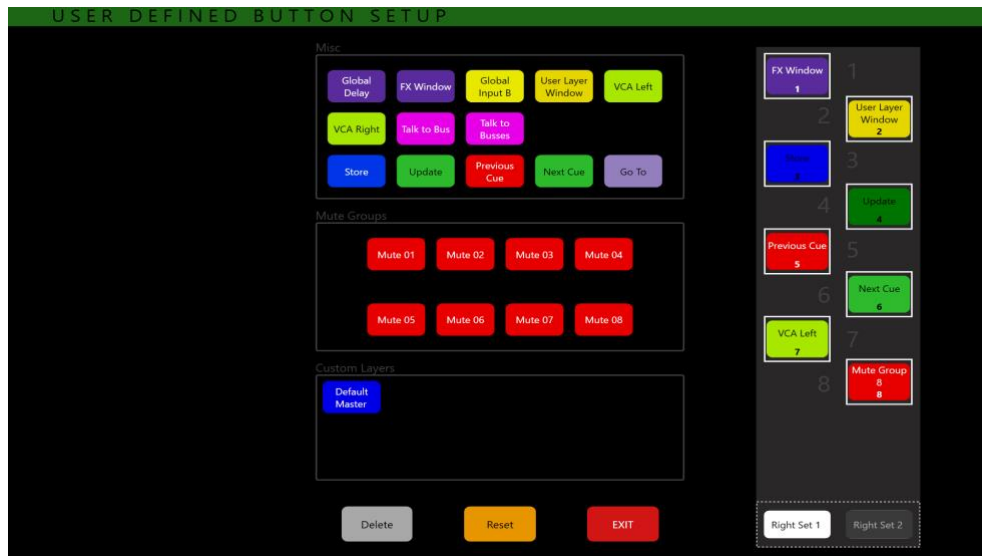
- User Assignable buttons: 1 to 8:** These multi-function buttons are by default the masters for the CM-J50's Mute Groups on 1 to 8. The User Assignable buttons can also be assigned to the Go To function. This gives quick access to any input or output channel. This will then bring up the selected channel followed by the 16 following channels. Go To can also be assigned to LCR function.

There are two sets, or banks, of 8 buttons - giving a total of 16 assignable buttons - selected by Set 1 or Set 2. All can be reassigned via the **User Defined Button Setup** screen to other functions.



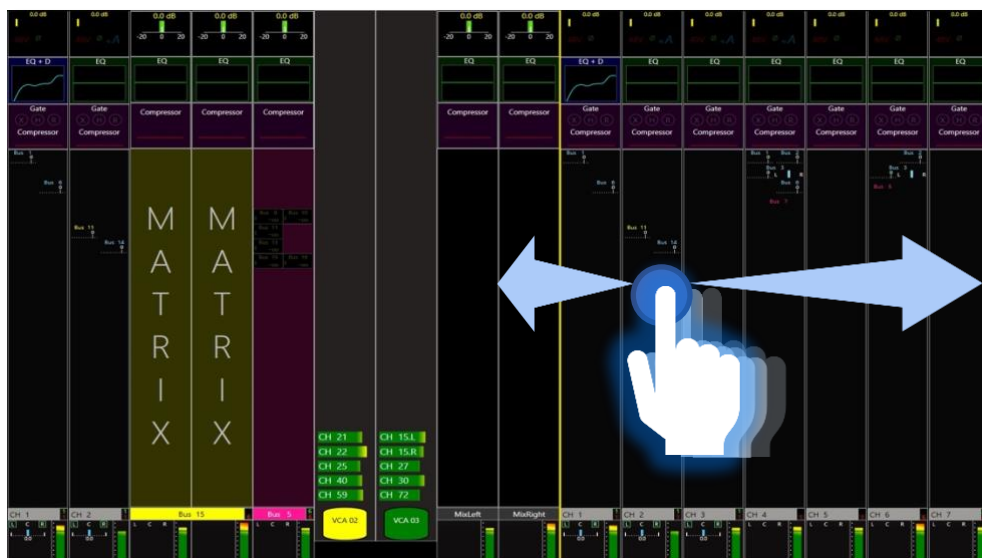
34: Default USER ASSIGN buttons

The User Assign buttons can be reassigned to other functions via the User Define Button Setup screen, accessed via the Edit button.



35: USER DEFINE BUTTON SETUP screen

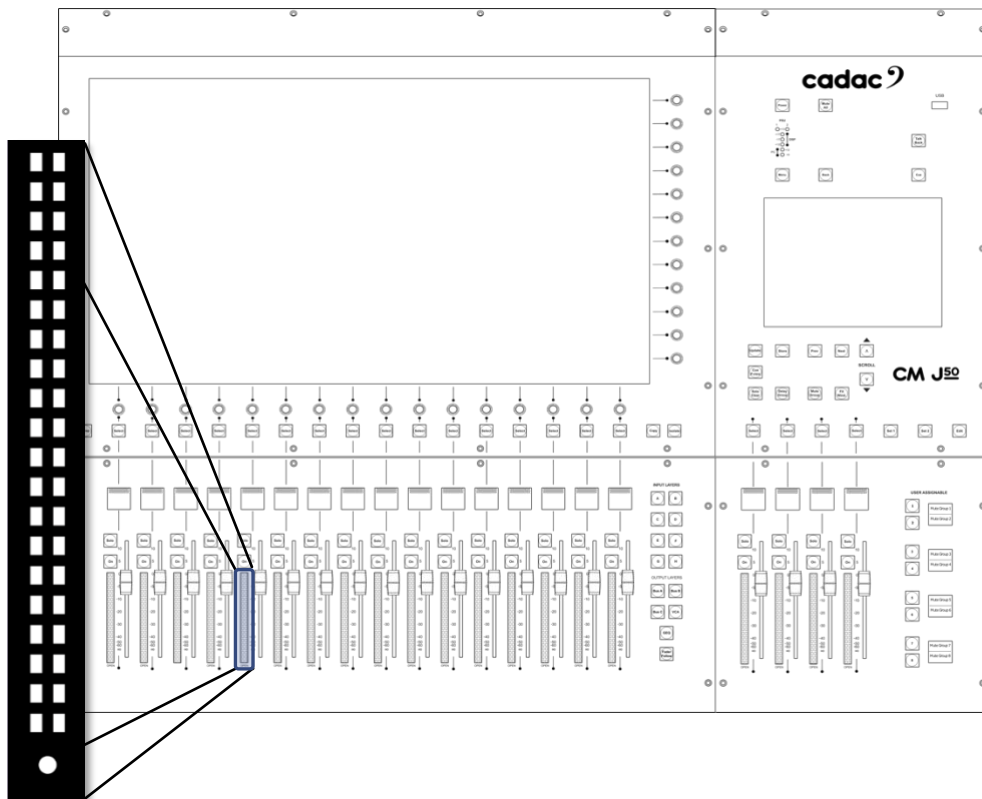
3. **Swiping:** A “swipe” action horizontally across the screen will shift the displayed set of channels by a number of channels proportional to the “length” of the swipe. This is a very powerful feature of the CM-J50 and allows very rapid access to channels not currently displayed.



36: Swiping Left or Right will move channels “up” or “down”. The inputs will scroll underneath the “fixed” VCAs, input channels and Busses without affecting the VCA, input and Bus faders in the above example

Channel Meters

The CM-J50 has 20 dual bar graph meters located in the fader bay and in the master section, one per fader. The source for each meter will always be the signal in its channel; the identity of this will be confirmed by the OLED immediately above. If an input layer is selected, the meters will display input levels; if an output layer is selected, they will show output levels.



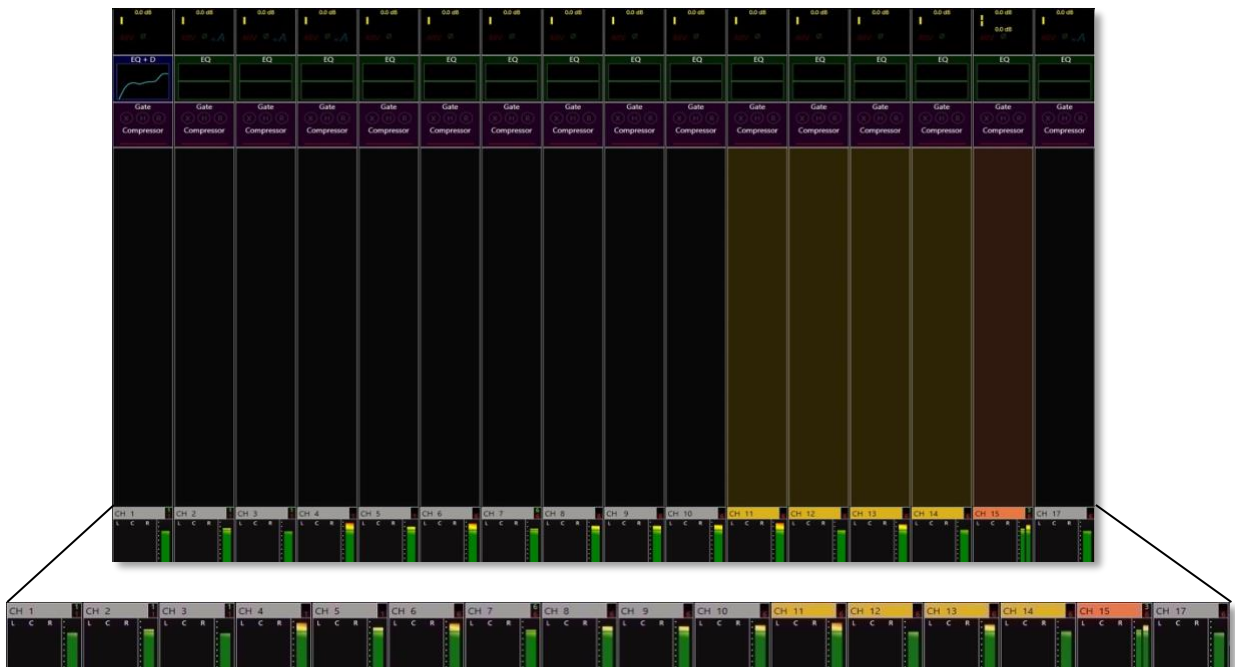
37: Bar Graph - 20 Segment

The bar graphs have 20 segments: the lowest segment illuminates green at a signal level of -80 dBFS and the top segment illuminates red at 10 dBFS, indicating digital clipping. The four segments below are also coloured red and the remainder yellow. An additional LED below the meter (OPEN) illuminates green when the fader is moved from its fully closed position.

If the channel is mono, only the left meter ladder is used. If the input channel has been defined as stereo, both meter ladders will be active and show the signal level in the left and right legs of the stereo channel. When outputs are set as stereo they remain as two channels, but only the left meter ladder indicates the levels for each channel of the stereo output.

The default source for the bar graph meters is Post Fader, but this may be changed to Pre-Fader on the Menu screen's Meter Options page. By default, the on-screen meters and the Bus Follow are both set to Pre-Fader.

In addition to the fader bay meters, each channel strip - input or output - on the screen includes a small virtual bar graph - dual on stereo channels - complete with a 0 dB reference point. The source for these may also be selected as Pre-Fader or Post Fader on the Meter Options page as described above, so the engineer can see both pre fade and post fade signal levels simultaneously. The meters are at the bottom of the channel strip, immediately above the lower encoders (unless Swap has been pressed and they will appear at the top of the screen).

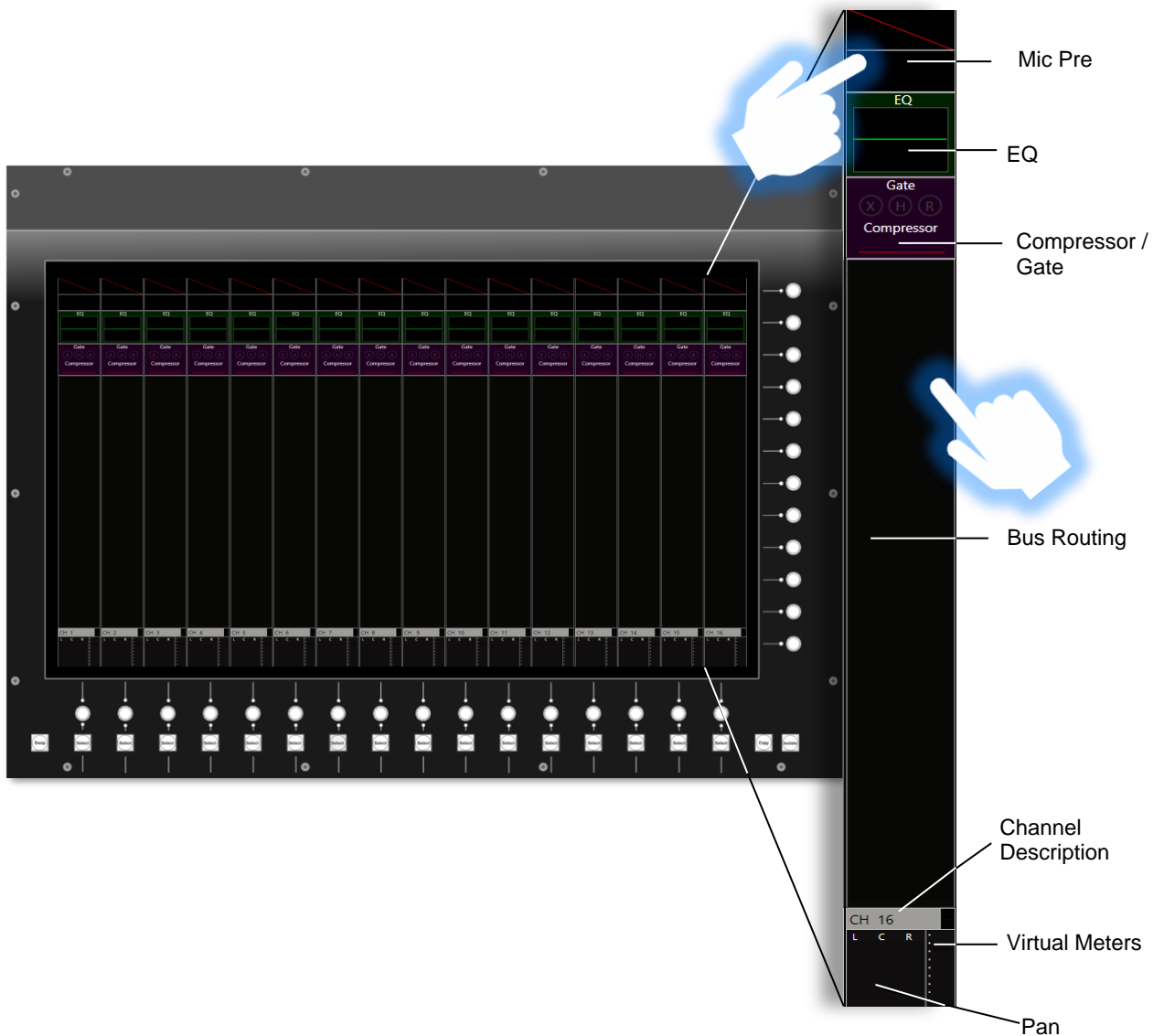


38: Virtual Meters show at the bottom of the Channel Strip. Stereo channels display meters with two ladders.

Channel Blocks

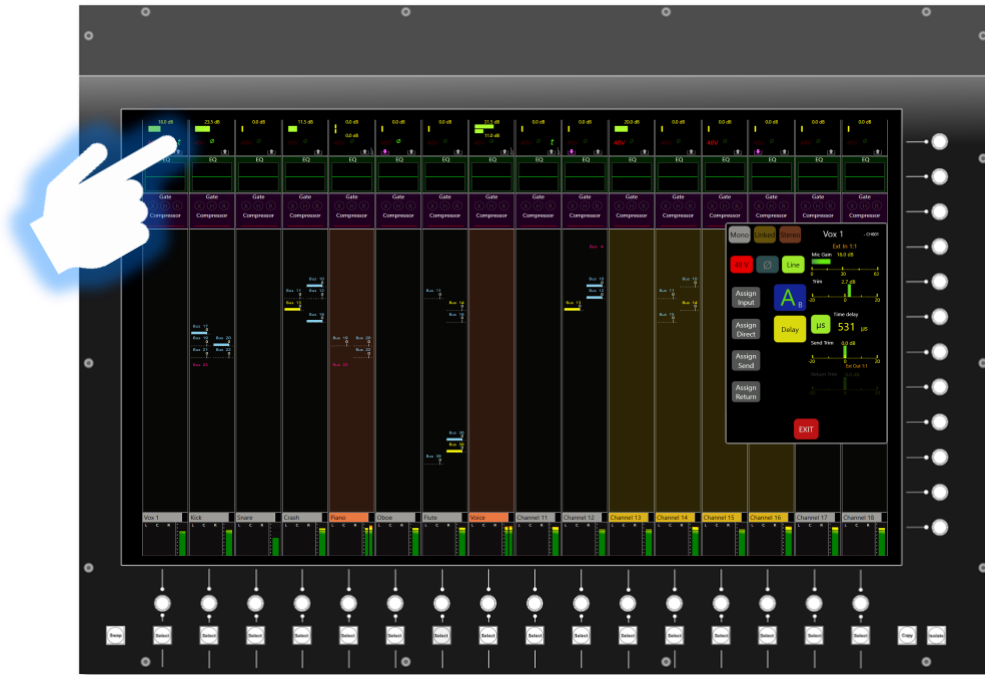
Touching a channel block opens a virtual panel, or window, with all controls relevant to the block.

Below are the channel blocks for the input channels. The same principle applies to the output channels.

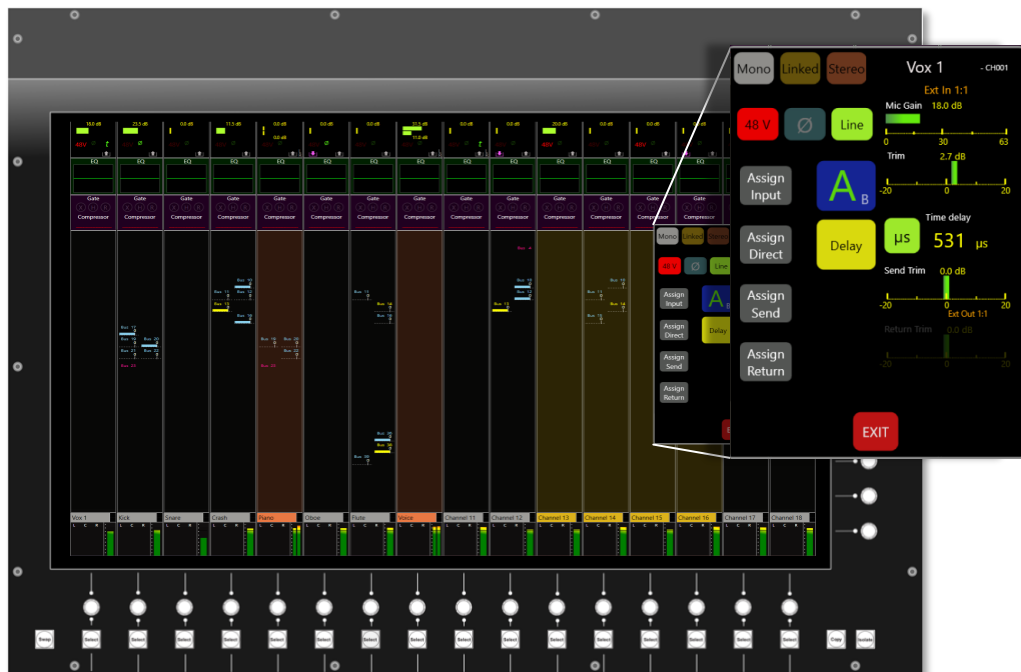


Using the Mic Pre Block

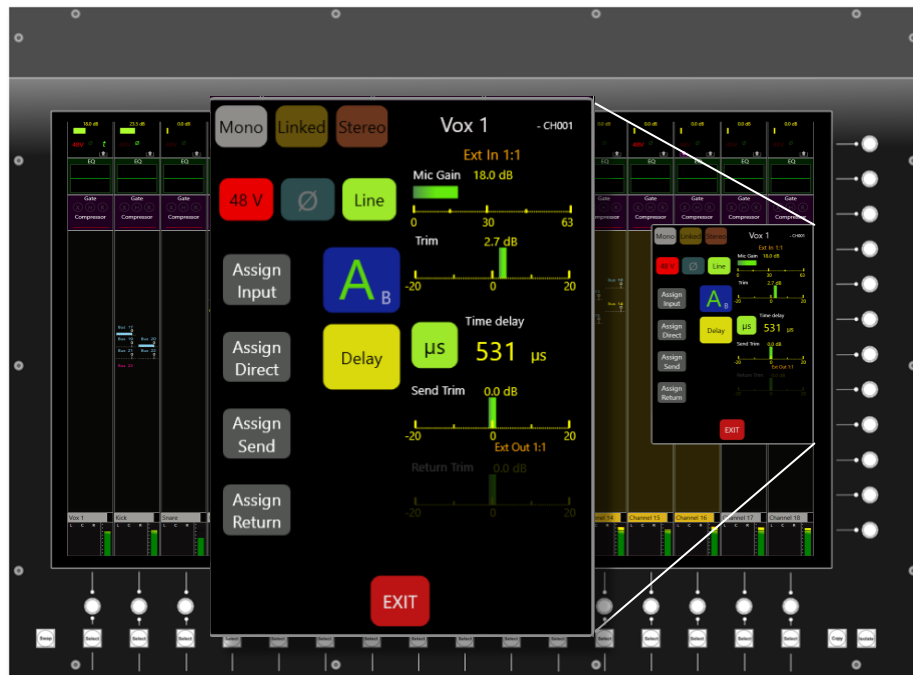
Touch the top of the input channel strip and the Input Gain Panel will open:



39: Touching the "Mic Pre block" opens the Input Gain panel



40: Input Gain Panel



41: Input Gain Panel explained

The Input Gain Panel provides access to:

- Channel Type:** Mono, Linked or Stereo
- Channel Behaviour:** Phantom Power (48V), Phase Reverse, Line (20 dB pad)
- Channel Source:** A or B input
- Channel Assignment:** Assign Input, Assign Direct, Assign Send or Assign Return
Assign Direct can be set Insert, Pre EQ, Pre Fader or Post Fader
Assign Send can be set Insert, Pre EQ, Pre Fader or Post Fader
- Assignment Parameters:** The Gain, Trim, Time Delay, Send Trim and Return Trim
These functions automatically map themselves to the encoders
- EXIT:** Shuts the panel / window



42: Routing Panel

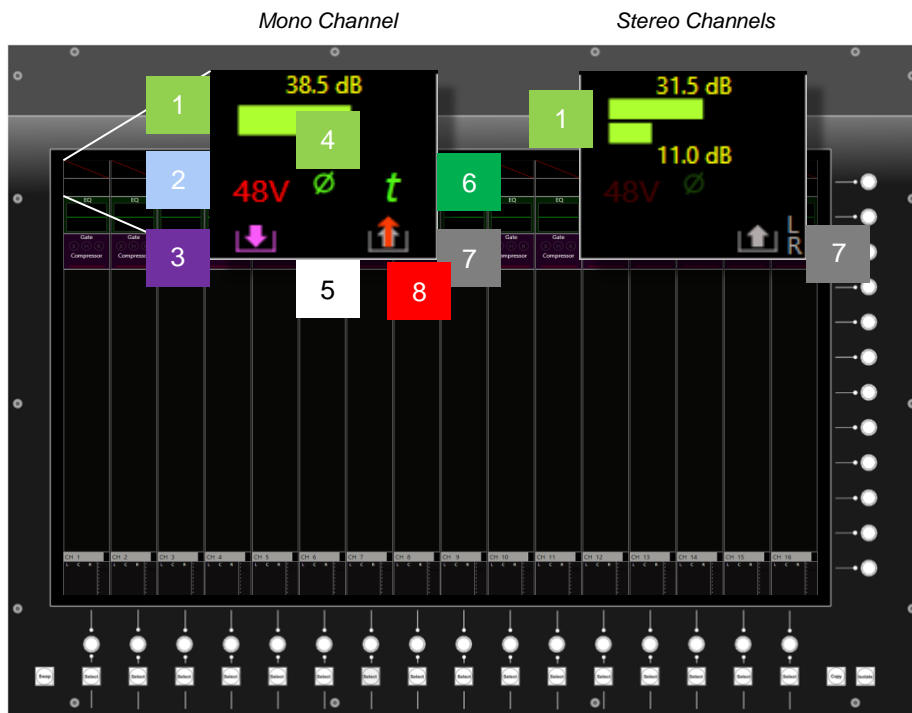
When a channel is Assigned the Routing panel appears.

This allows the selection of routing from:

- Local:** 16 analogue inputs and 4 stereo AES inputs
- Rack 1:** The number of channels available are depending on what unit is attached to MegaCOMMS port A.
(If the unit has a custom / “friendly” name it will appear above the unit type)
- Rack 2:** The number of channels available are depending on what unit is attached to MegaCOMMS port B.
(If the unit has a custom / “friendly” name it will appear above the unit type)
- FX:** 16 stereo FX units
- Waves:** 64 Waves channels
- AUX:** 100Hz oscillator, 1 kHz oscillator or Noise Generator
- EXIT:** Shuts the panel / window

If SR racks are connected, the clock for AES3 ports can be set on this page either at 96 kHz or 48 kHz. Options along the bottom of this panel also allow the unit to be cleared of all inputs or outputs routing or provide 1:1 routing.

All the changes that have been done on this panel are then reflected on the top of the channel strip:

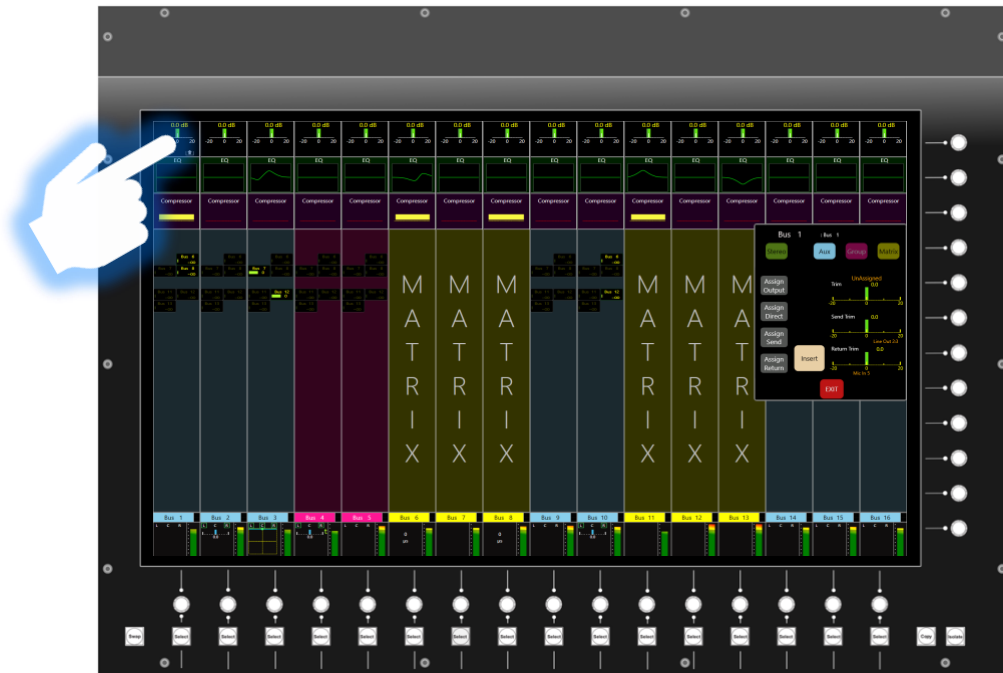


43: Information shown on Input Gain Panel

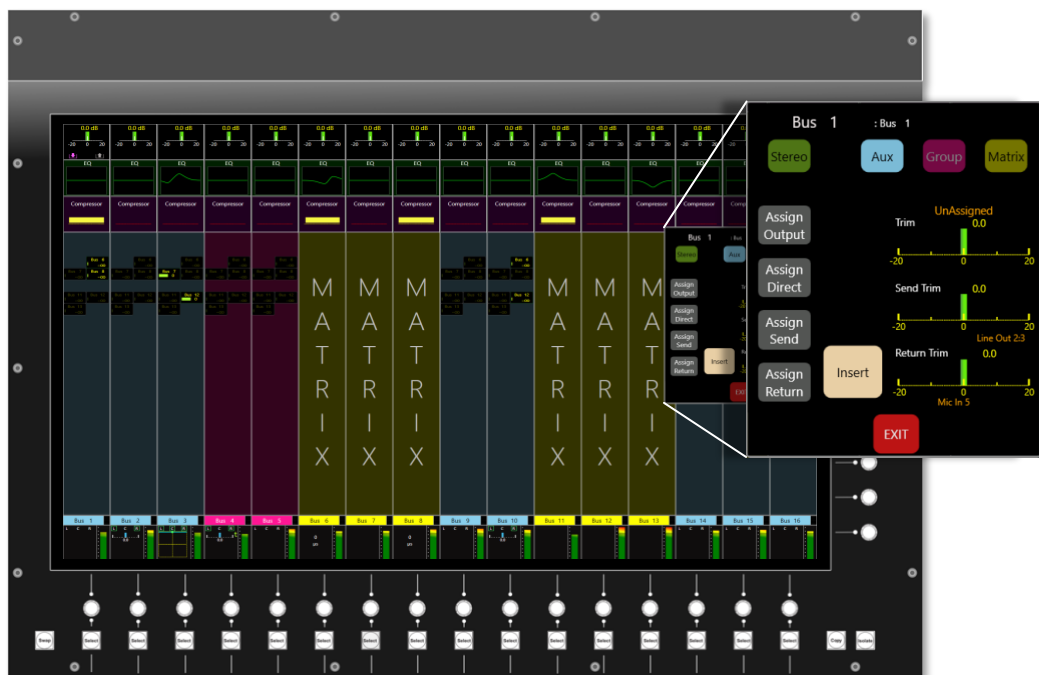
1. **Input Gain:** (in Stereo both Input Gains will be displayed)
2. **Phantom Power:** ON (in Stereo L/R will indicate the settings made to each path)
3. **Insert Return:** Assigned and active (in Stereo L/R will indicate the settings made to each path)
4. **Phase Return:** ON (in Stereo L/R will indicate the settings made to each path)
5. **Input B:** B is selected
6. **Delay:** Active (in Stereo L/R will indicate the settings made to each path)
7. **Insert Send:** assigned and active (in Stereo L/R will indicate the settings made to each path)
8. **Direct Out:** Indicated by the red arrow

Using the Output Assign Block

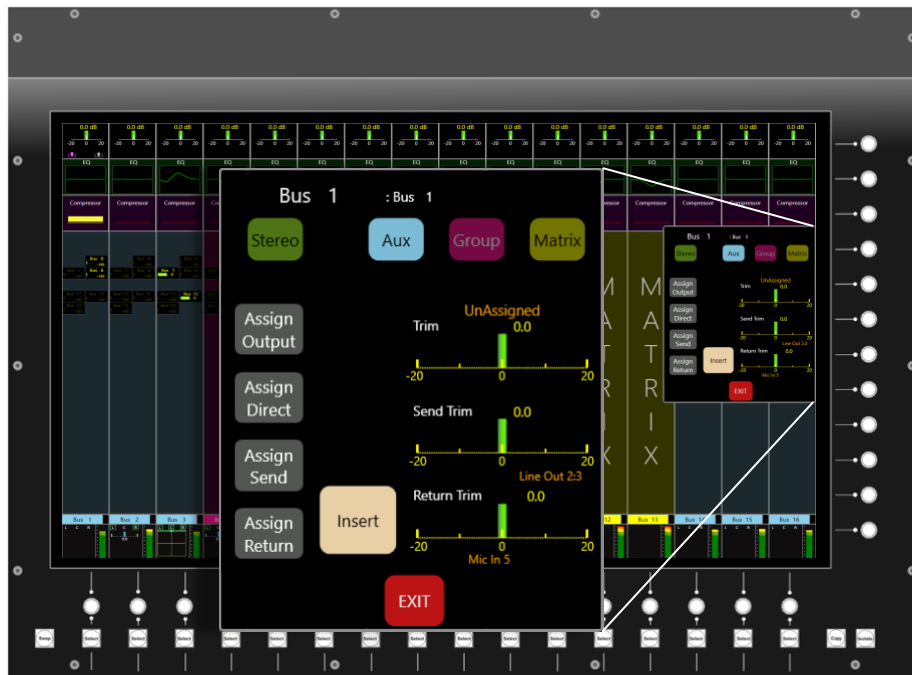
Touch the top of the output channel strip and the Output Assign Panel will open:



44: Touching the "Output Assign Block" opens the Output Assign panel



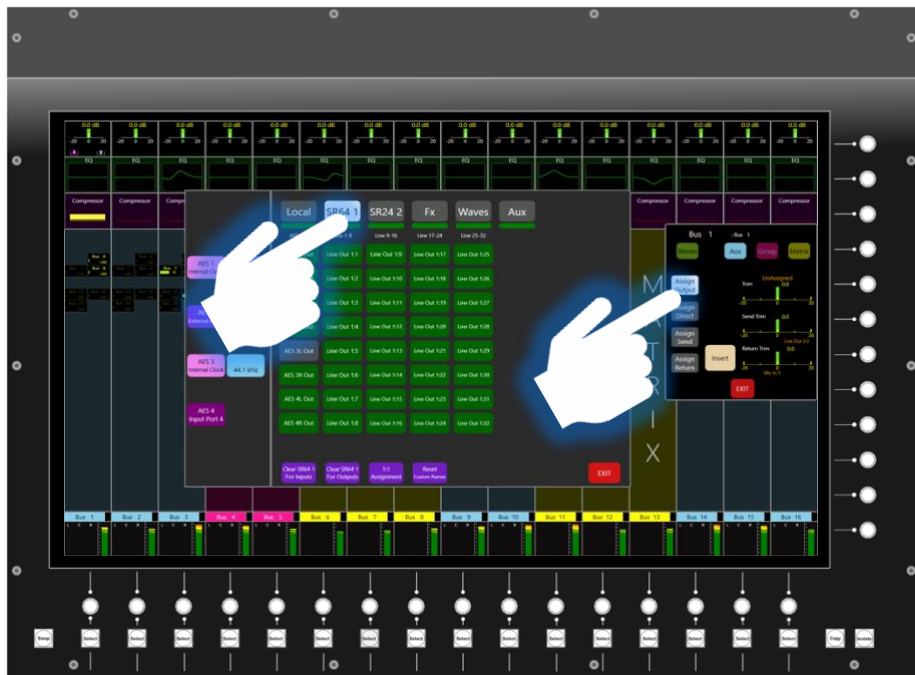
45: Output Assign Panel



46: Output Assign Panel explained

This provides access to:

- Channel Type:** Stereo, AUX, Group, Matrix
- Channel Assignment:** Assign Input, Assign Direct, Assign Send or Assign Return
Assign Direct can be set Insert, Pre EQ, Pre Fader or Post Fader
Assign Send can be set Insert, Pre EQ, Pre Fader or Post Fader
- Assignment Parameters:** Trim, Send Trim and Return Trim
These functions automatically map themselves to the encoders
- EXIT:** Shuts the panel / window



47: Routing Panel

When a channel is Assigned the Routing panel appears.

This allows the selection of routing from:

- Local:** 16 analogue inputs and 4 stereo AES inputs
- Rack 1:** The number of channels available are depending on what unit is attached to MegaCOMMS port A.
(If the unit has a custom / “friendly” name it will appear above the unit type)
- Rack 2:** The number of channels available are depending on what unit is attached to MegaCOMMS port B.
(If the unit has a custom / “friendly” name it will appear above the unit type)
- FX:** 16 stereo FX units
- Waves:** 64 Waves channels
- AUX:** 100Hz oscillator, 1 kHz oscillator or Noise Generator
- EXIT:** Shuts the panel / window

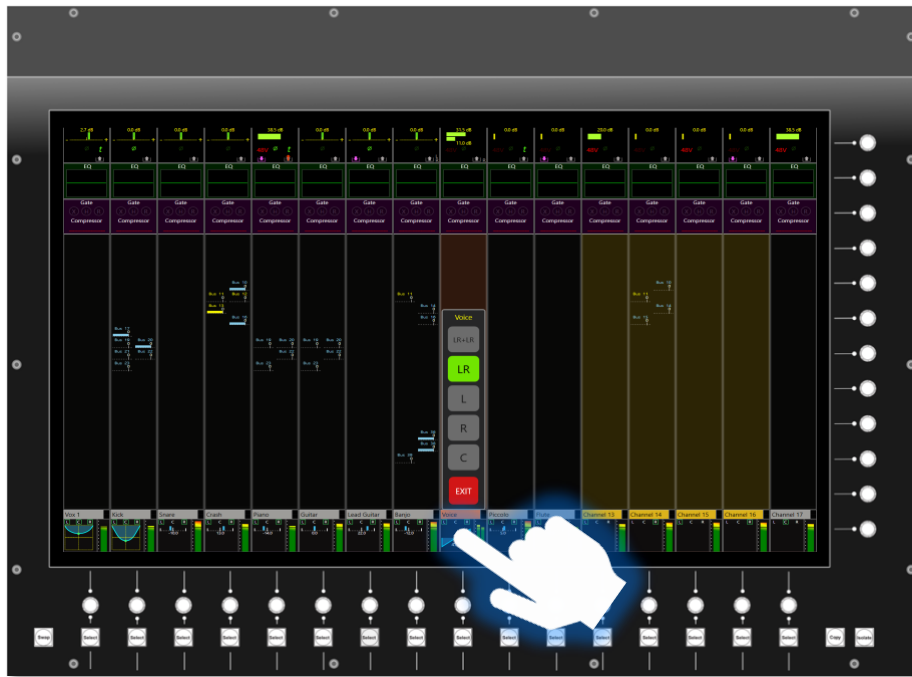
If SR racks are connected, the clock for AES3 ports can be set on this page either at 96 kHz or 48 kHz.

Options along the bottom of this panel also allow the unit to be cleared of all inputs or outputs routing or provide 1:1 routing.

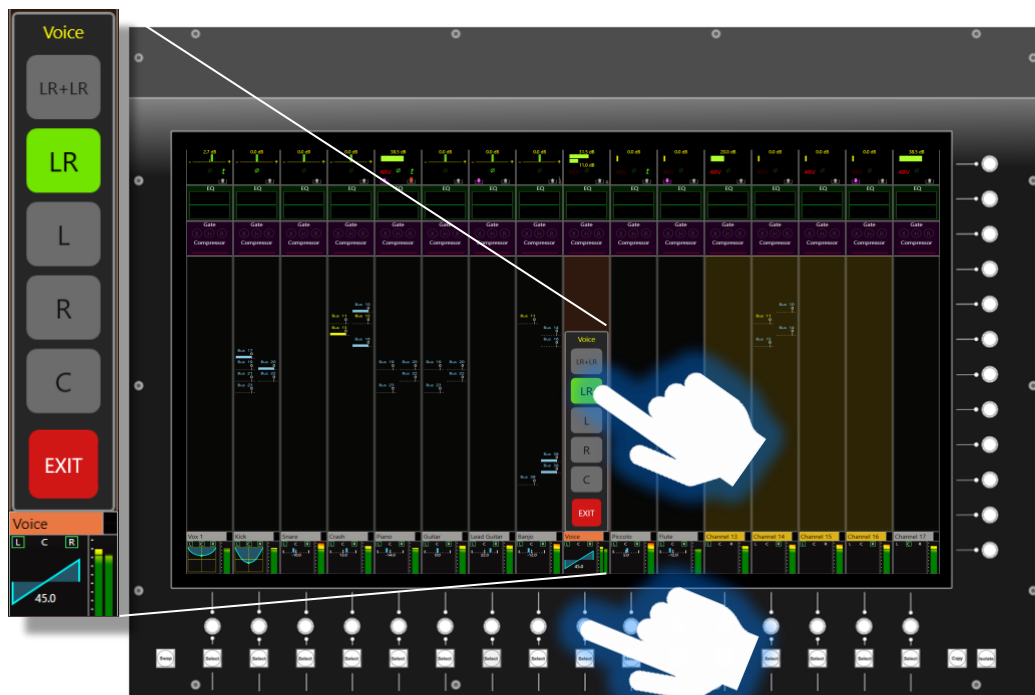
All the changes that have been done on this panel are then reflected in the top of the channel strip.

Using the Pan Block

Touch the bottom of the Input channel strip and the Pan Panel will open:



48: Touching the Pan Block will open the Panning options



49: The Pan Panel will appear showing LCR, LR, L, R and C. The panning is done by the encoder below the panel

For a MONO channel the Pan Panel provides access to LCR routing:

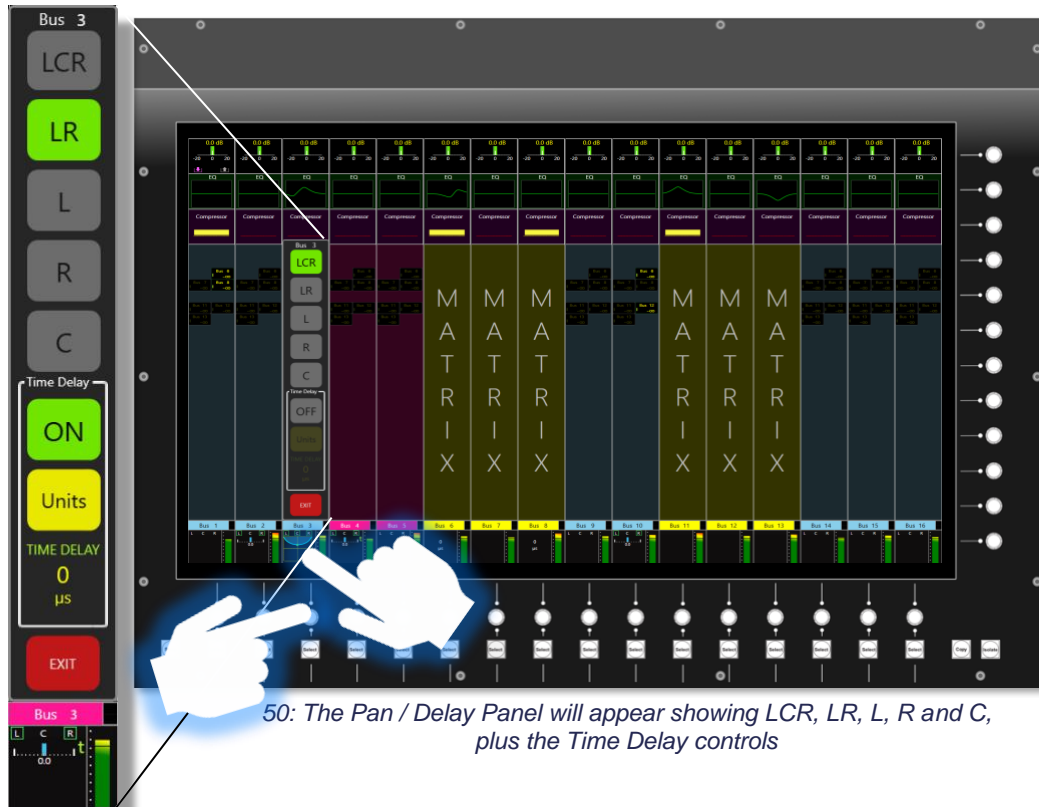
- LCR:** When centrally panned the signal is routed to the C bus. A press and turn of the encoder allows the pan depth to be adjusted.
- LR:** Routes the channel signal to the master output via the pan control, allowing stereo panning between the L and R busses
- L:** Routes the channel signal to the L bus of the master output
- R:** Routes the channel signal to the R bus of the master output
- C:** Routes the channel signal to the C bus of the master output
- Meters:** Show the pre-fade signal level in the channel.

It is possible to select L, R and C routings simultaneously in any combination where the channel signal is sent to all selected busses at equal level. It is also possible to select both LR and C routings; this combination enables the pan control to pan between the L and R busses but routes the full level signal to C regardless of the pan pot position.

For STEREO channels the LCR option is replaced with LR + LR. The options operate as follows:

- LR + LR:** Individual pan controls for both Left and Right channels can be control individually or simultaneously by using the encoder (clicking encoder will allow the selection of either channel)
- LR:** L and R of the stereo channel are routed to the L and R busses of the master output. The encoder acts as a stereo balance control.
- L:** Routes a (L + R) mono sum of the stereo channel signal to the L bus of the master output
- R:** Routes a (L + R) mono sum of the stereo channel signal to the R bus of the master output
- C:** Routes a (L + R) mono sum of the stereo channel signal to the C bus of the master output
- Meters:** In stereo it shows the separate left and right signal levels.

Touch the bottom of the Bus strip and the Pan / Delay panel will open - two types of Pan / Delay Panel, depending on output type.:



Pan / Delay Panel: It is possible to route to the LCR master bus from both Aux and Group output channels, but not from Matrix outputs, nor from the three legs of the Master output itself.

All Output channels include variable time delay up, up to 500 ms.

Aux / Group Outputs: The routing options to the Master output are the same as those available on Input channels.

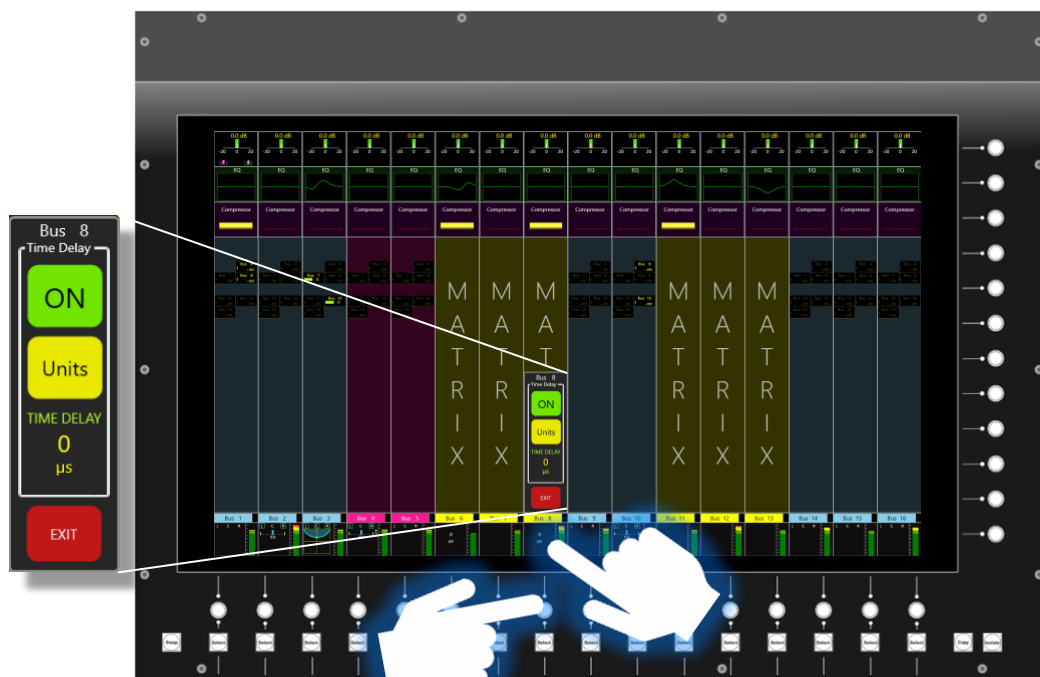
The stereo Aux and Group busses retain separate L and R output channels, so each path of a stereo output has full master bus routing and panning.

Time Delay: Sample-accurate time delay into the Aux, Group, Matrix or Master outputs can be inserted.

Touching the OFF / ON button enables the delay, assigning the time control to the encoder. When the Pan Panel is closed, the encoder reverts to its Pan function.

The delay value can be entered in distance (metres or feet) micro/milliseconds (μS / mSec) as well as the default Samples setting, with a maximum delay of 499.9 ms. A green 't' symbol appears when time delay is enabled.

Matrix / Masters: Have no routing options.



51: The Delay Panel for Matrix and Masters

Time Delay may be inserted and operates in an identical manner to that of the Aux and Group outputs.

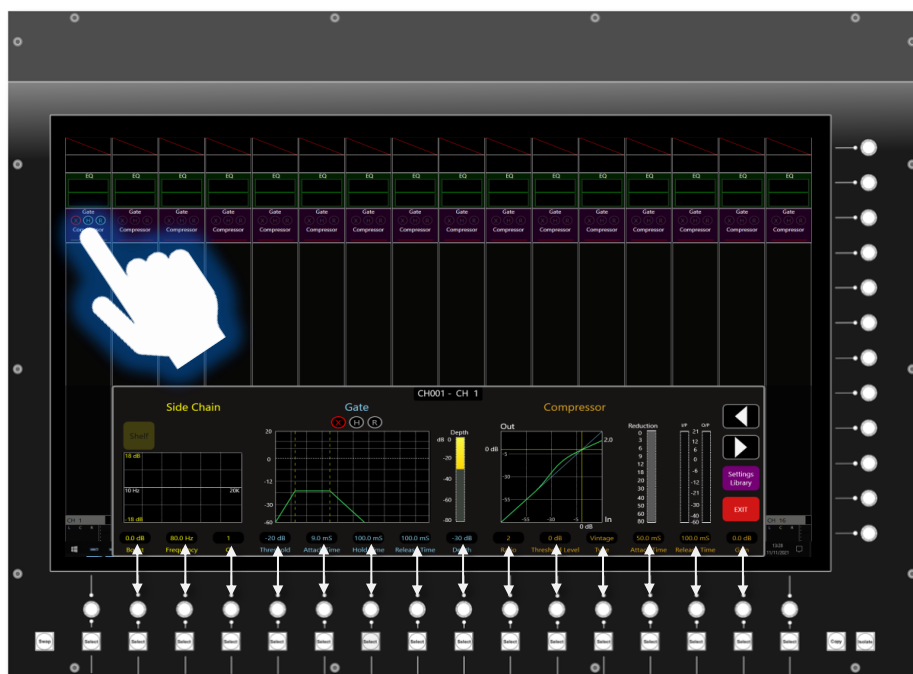
Virtual meters: A dual metering is displayed for stereo channels.

The meter's source may be the channel's pre-fade or post-fade signal, as selected on the Meter Options page of the Master screen.

Using the Encoders

The main screen has 28 rotary encoders around its perimeter – 16 horizontally below the screen and 12 vertically to the right of the screen. The encoders also have a push and push / hold function for certain operations.

The encoders will map to the relevant functions of the GUI - EQ, Dynamics etc - allowing the parameters to be changed via turning. By pressing and holding the encoder it will zero any trim or return values back to the default position.



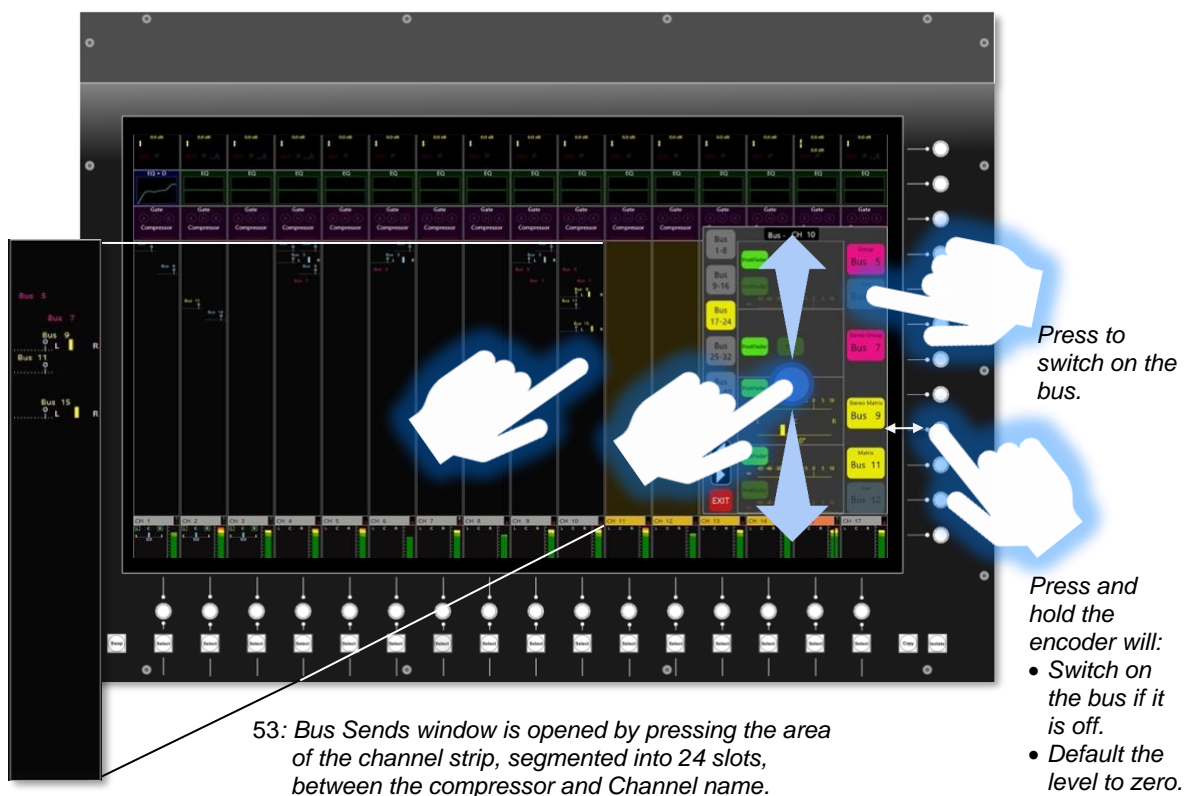
The white arrows in the following images indicate the mapping of the GUI to the encoders

52: Dynamics - The Dynamics GUI has the functions mapped to the bottom 16 encoders.

BUS Sends

The CM-J50 is equipped with 48 assignable busses, which can be configured as Aux Sends, Audio Groups or Matrices, all of which can be configured individually and can be operated in mono or linked in stereo. Individual channels can be routed to any bus type directly, and both Aux and Groups can then be routed to either the Master L&R or a Matrix, and the Master L&R can also be routed to any Matrix Bus.

It is worth noting that Cadac employs a comprehensive latency management system, meaning that routing through the console will not alter the phase alignment of the outputs. An example would be to route an Input Direct to a Matrix output, as well as routing the same Input to Group, then routing the Group to the Master L&R and then route the Master L&R to the same Matrix. The result would still be phase coherent down to sample level.



54: Bus sends will only populate the screen once routed. The horizon bar graph indicates the level of the input going to the bus. The vertical line shows the amount of pan: L to R. The balance control shows the balance of a stereo send to a stereo bus. The Bus sends are also colour coded:

Cyan ■ = Aux, Pink ■ = Group, Yellow ■ = Matrix, Green ■ = Stereo

Turning the encoder will change the level.

Keyboard

The CM-J50 allows the naming of a number of functions e.g., Inputs, Busses, VCAs and User Layers. This can be done via accessing the required Settings screen (or for a bus or channel by double tapping the digital write-on strip and for a VCA by tapping a VCA). Once in the Settings screen select the Input / Output / VCA etc for renaming and then press Rename and this will bring up the virtual QWERTY keyboard on the screen. The input and output settings screen can also be accessed by 'double tapping' the channel or buss name on screen.

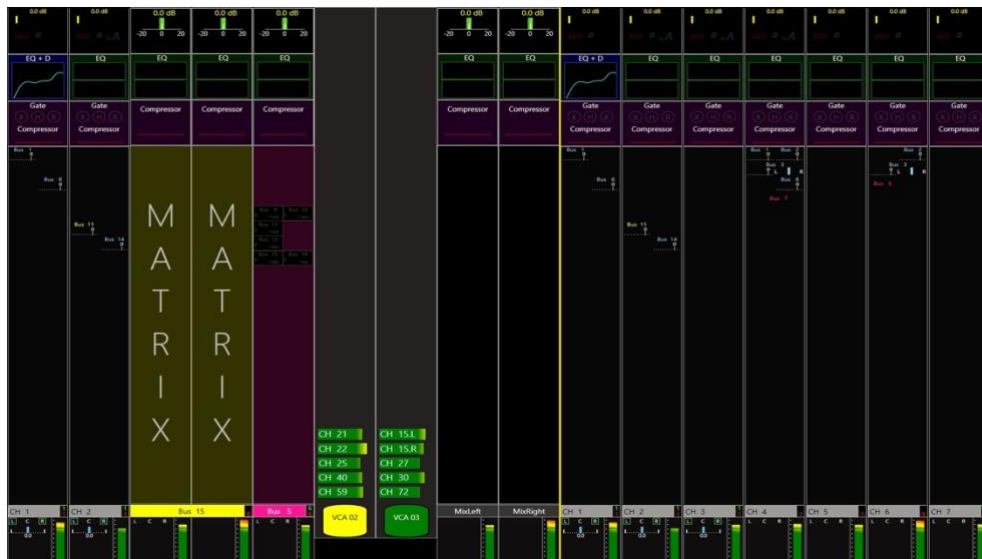


55: QWERTY keyboard

An external USB keyboard can also be used via one of four USB ports on the console - one is located to the top, right hand side of the 6.5" control screen, a pair under the arm rest, next to the Headphone connectors, plus the fourth on the rear panel.

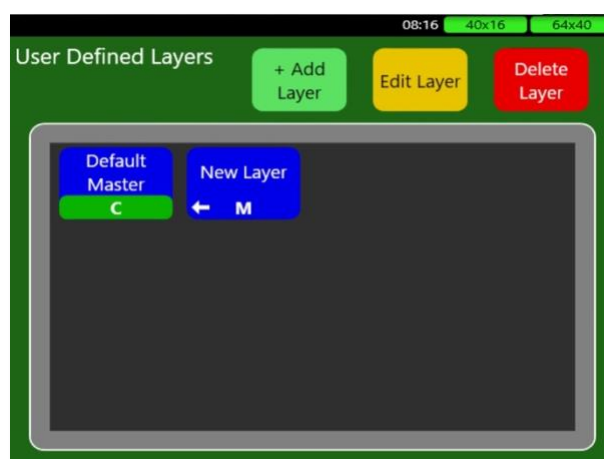
User Layers

The CM-J50 also allows input channels, busses and VCAs to be pinned / stuck to the screen in any combination in a User Layer or custom layer. These will remain on the screen - with the associated fader (s) also pinned in the fader tray - whilst the remainder of the channels can be navigated as normal (unless all 16 channels are used).



56: Custom Layers: 2 x input channels with 2 x VCAs, 2 x Busses, Mix left and right pinned to the screen

User Layers can be accessed through the Control Screen menu via User Options menu and Layers.

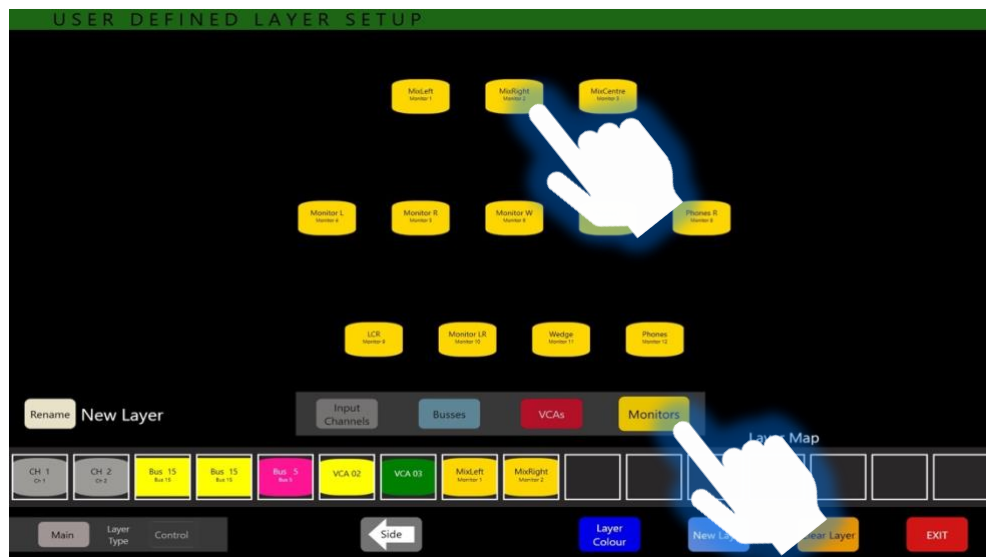


57: User Defined Layers screen

Any combination of Inputs, Busses, VCAs and Monitor functions can be allocated to a layer. The User Layer can be saved, named, coloured coded and pinned to either side - left or right - of the screen and be allocated to a User Assign button.



58: User Define Layer Setup: Select Input Channels, then select the input to be added to the customer layer

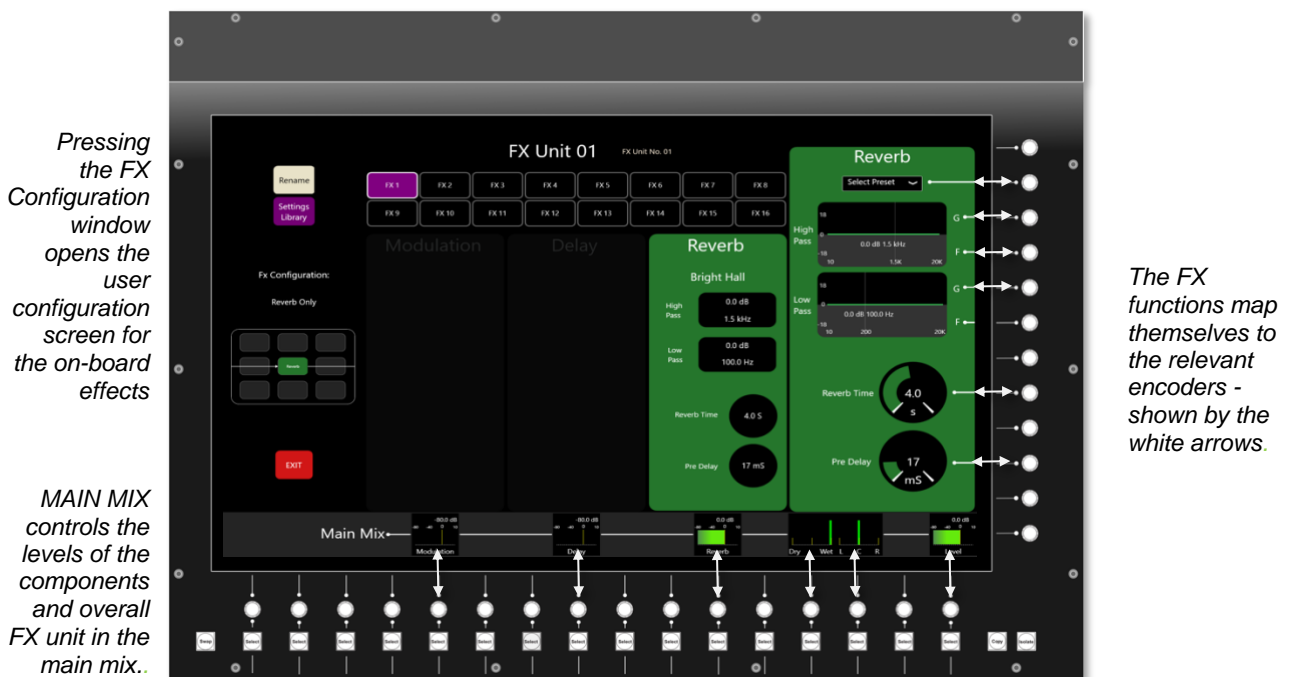


59: User Define Layer Setup: Select Monitors, then select the Monitor to be added to the custom layer

Effects

There are 16-stereo or mono on-board effects units including various types of reverbs, delay and modulation effects.

The 16-stereo effect “slots”, each with reverb, modulation, and delay elements, can be used simultaneously and freely configured by the user.



Pressing the FX Configuration window opens the user configuration screen for the on-board effects

MAIN MIX controls the levels of the components and overall FX unit in the main mix..

The FX functions map themselves to the relevant encoders - shown by the white arrows.

60: FX units page - functions map to the encoders

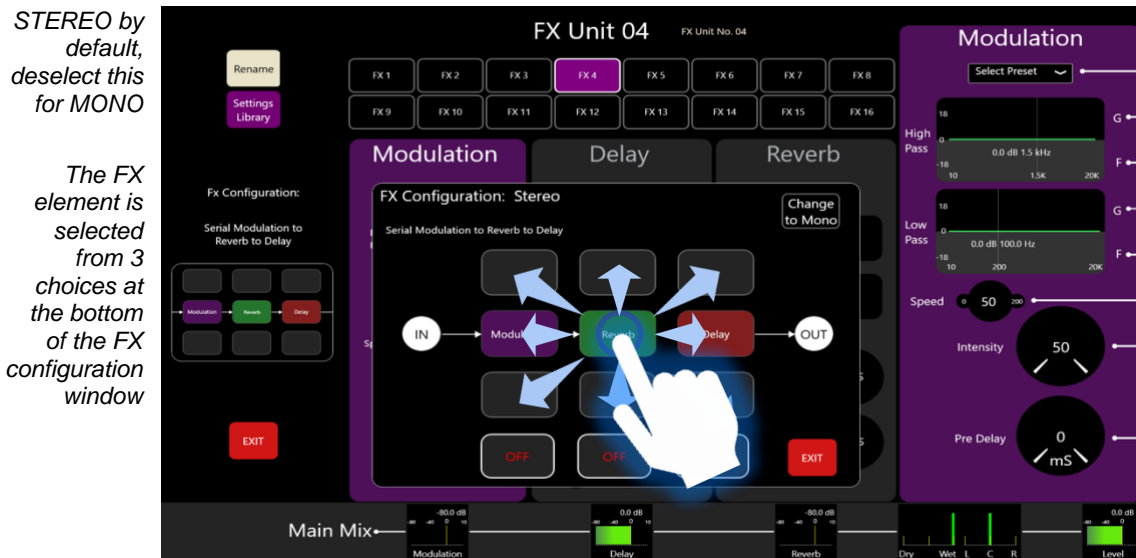
The 3 elements within each effect slot can be arranged in either series or parallel, and in any order, using a simple ‘drag and drop’ method. Effects can be patched as inserts on any channel or bus, or in-line on an aux send/return basis.

All the controls will map themselves to the relevant horizontal and vertical encoder. Turning the encoder will increase or decrease the value. Press and hold the encoder will reset the values to default levels.

Pressing the FX Configurations screen at the top left will bring up the screen to “build” the FX.

The MAIN MIX panel provides control over the level of each individual FX with the unit, how wet or dry the Mix is, the panning and the overall level of the FX unit within the main mix.

In the screen below the 3 elements within each effect slot can be arranged in either series or parallel, and in any order, by simply 'dragging and dropping' the required component. By default, the effects are stereo units, however by pressing Change to Mono deselects the stereo mode and reconfigures the effects to dual mono, allowing the Left and Right to be used as separate units.



STEREO by default, deselect this for MONO

The FX element is selected from 3 choices at the bottom of the FX configuration window

61: FX build screen - select the element (a choice of reverb, delay and modulation) and drag and drop into it one of the possible 9 "slots"

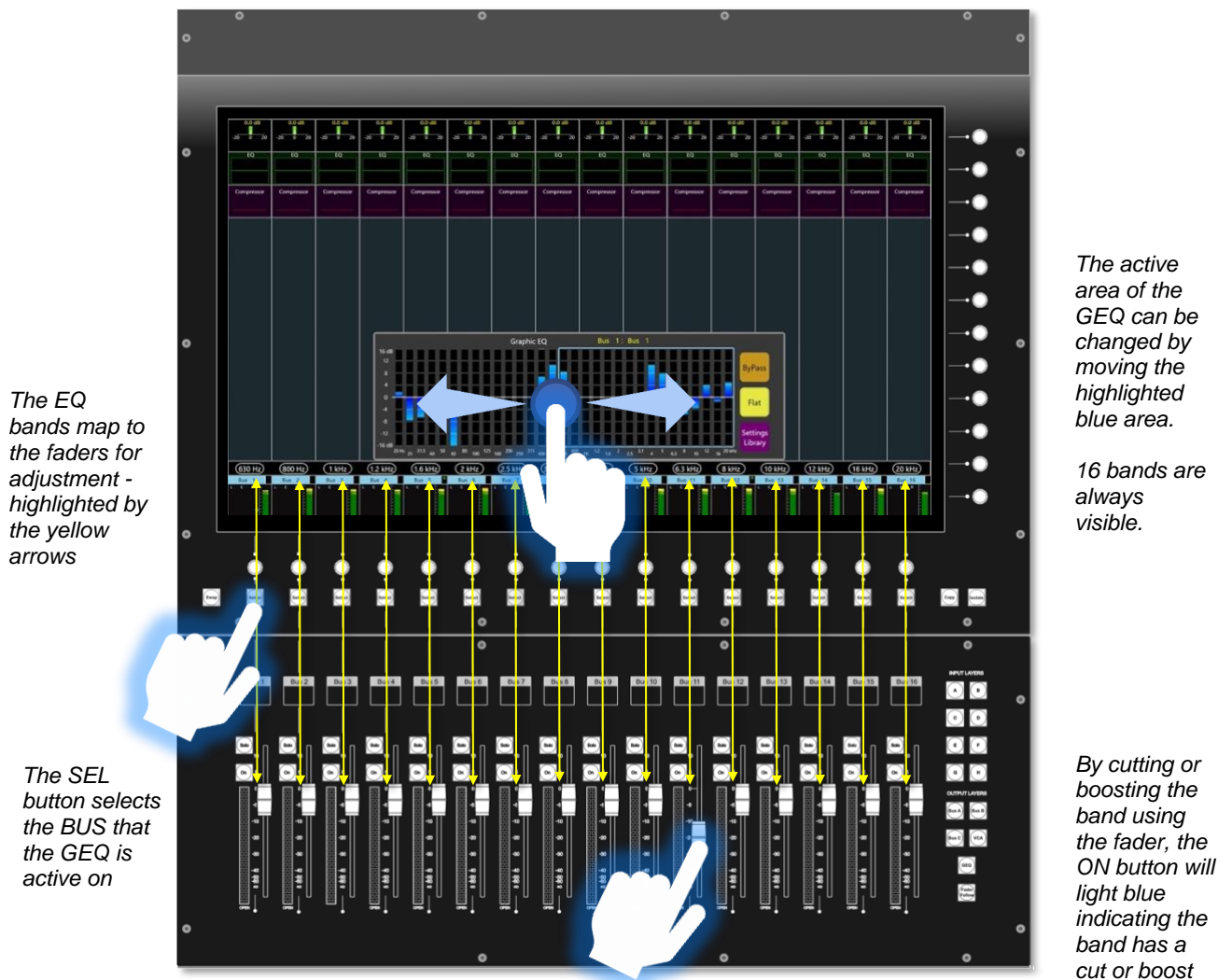
A Waves® interface card is also fitted as standard which provides direct, low latency connectivity to the Waves® MultiRack® server, allowing additional effects to be used in conjunction with the console's own DSP effect options.

GEQ

All output busses feature 4-band fully parametric EQ, variable HPF and LPF plus a 1/3 octave GEQ.

By pressing the GEQ [15: Control Surface Part 1] button - to the left of the screen - when the busses are selected, the GEQ screen will open. This shows 31 bands in BYPASS mode (press BYPASS to take it out of bypass) on the screen.

The GEQ is split into active bands highlighted by the blue box which can be cut or boosted by the faders. The bands outside the blue box are inactive. The faders are now mapped to the active bands (16 bands will be active) with the frequencies shown both on the screen and the OLEDs above the faders. Pressing the Select button under the BUS will activate the GEQ for that individual BUS. Once a fader is moved, the ON light will illuminate blue and the applied boost or cut will displayed on the GEQ screen. By pressing the ON button, the boost or cut will toggle between zero for that GEQ band and the amount the cut or boost that is applied.



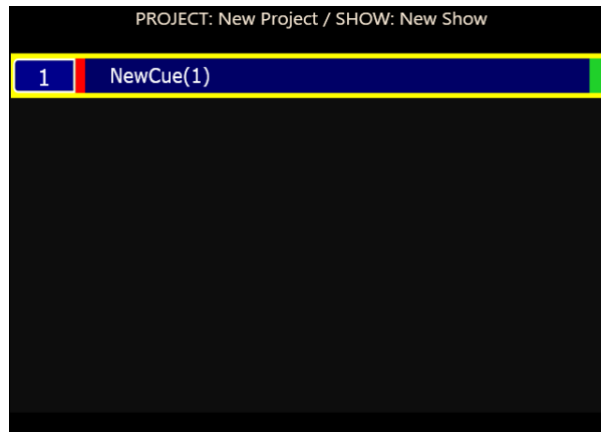
62: With the GEQ open on the outputs, the faders will be mapped to the relevant frequency

All parametric and graphic EQ's can be used simultaneously, without any concern about available processing power or tonality compromise.

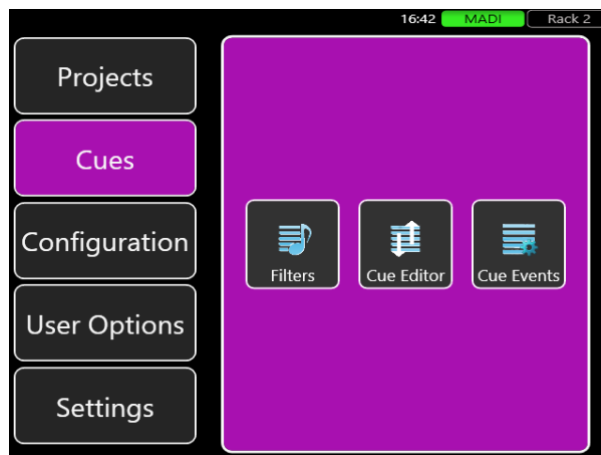
Additional features include GEQ in / out, an "instant flat" switch plus a bypass function for individual GEQ filters.

Control Screen Menus

During a performance, the **Control Screen Menu** will normally be used to display the Cue list. Pressing the Cue List [9 Control Screen Part 2] button, will bring up the Cue list.



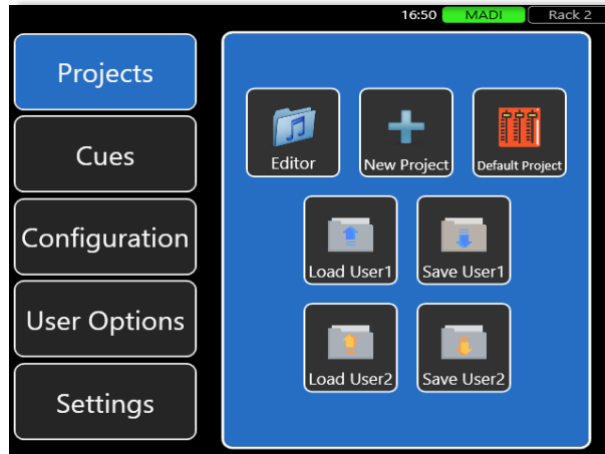
63: Control Screen displaying the Cue list



64: Menu Screen displaying the Cue options displayed by double taping a Cue or pressing the Store button

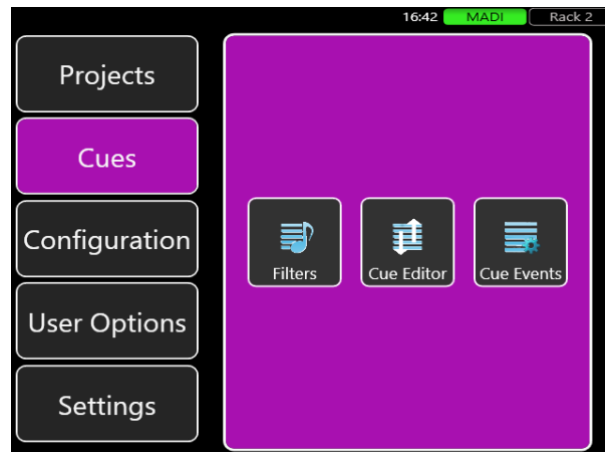
The **Menu Screen Home** page provides five menus – **Projects**, **Cues**, **Configuration**, **User Options** and **Settings**. Touching any of the tabs opens a further menu at the side.

Projects menu is effectively part of the CM-J50’s automation system: it enables file creation and management functions and is used when starting a new project or loading a previously stored one.



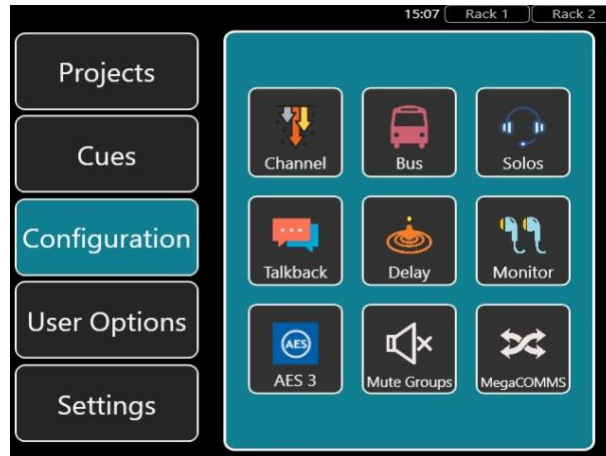
65: Menu Screen displaying the Projects menu

Cues menu gives access to Filters, Cue Editor and Cue Events.



66: Menu Screen displaying the Cues menu

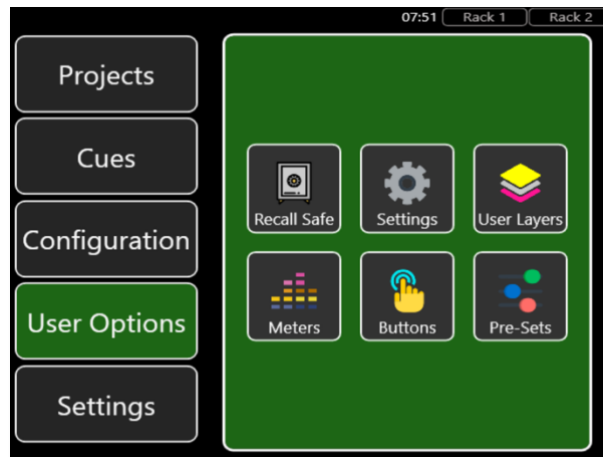
Configuration menu is used to configure the basic architecture of the console.



67: Menu Screen displaying the Configuration menu

- **Channel Settings page** opens on the screen and is used to define Input Channels as Mono, Stereo, or Linked, and to name or move the channels.
- **Bus Settings page** opens on the screen and is used to set up the basic bus structure of the console; busses may be defined as Groups, Auxiliary Sends or Matrix Sends, as Mono or Stereo, and named. Global channel send types can also be set.
- **Solos page** opens a Menu page allowing adjustment and settings to be made to the console's Solo system.
- **Talkback** configuration.
- **Delay** allows the configuration of 16 delay groups.
- **Monitor** allows the configuration of channels for the CM-Monitor iPad App.
- **AES3 menu** allows the output sample rate to be changed from the default 48 kHz to 44.1 kHz or 96 kHz.
- **Mute Groups** opens to the MUTE set-up page to define the groups.
- **MegaCOMMS page** provides the option of running over either coax or optical MegaCOMMS

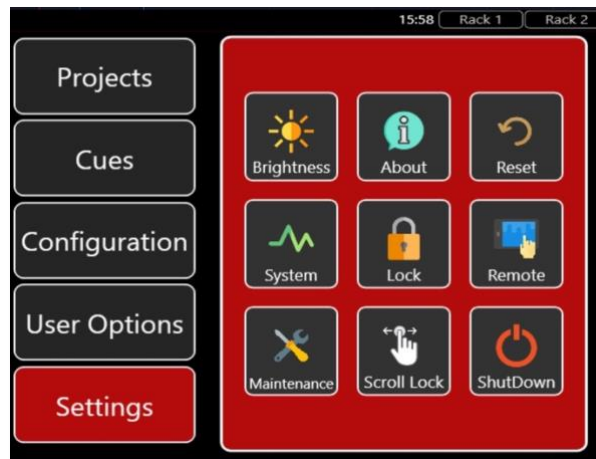
User Options menu provides access to Recall Safes, User Layers set up screen, the User Assign button setup screen and Metering configuration.



68: Menu Screen displaying the User Options menu

- **Recall Safes menu** provides the options of taking the I/O Patching, Channels Modes, Channel Head Amp, I/O Patching Outputs, Bus Modes, Outputs, Brightness, VCA Fader and VCA Mutes globally out of the automation.
- **Settings menu** provides access to options to customise the console. There are options for showing fader values, VCA colours, Assign VCA Auto On / Off, Bus Focus, Auto Save, Monitor Follow and Solo Select plus Global Input B.
- **User Layers page** allows the end user to define the contents of a user defined layer. This allows input channels, busses and VCAs to be pinned / stuck to the screen in any combination.
- **Meters page** allows the default source for the bar graph meters to be switched from Post Fader to Pre-Fader.
- **Buttons page** allows the user configuration of 16 user definable buttons (2 banks of 8 buttons). These buttons can set as Global Delay, FX Window, Global Input B, User Layer Window, VCA Left, VCA Right, Talk to Bus, Talk to Busses, Store, Update, Previous Cue, Next Cue, Go To, Mute 1 TO 8 and Default Master.
- **Pre-Sets page** gives access to a selection of pre-set options for fast set-up of the console. This includes: 48V all On or all Off, INPUTS either all A or B, FADERS all at 0dBs or infinity, CHANNELS all On or Off and ROUTING all LR or No Routing.

Settings menu allows access to a number of parameters of the console including controls for the brightness of the screen and LEDs, plus this is where the screen and console can be locked. It also provides access to the information regarding the console - serial number, software version along with System that monitors the power status of the console.



69: MENU SCREEN displaying the SETTINGS menu

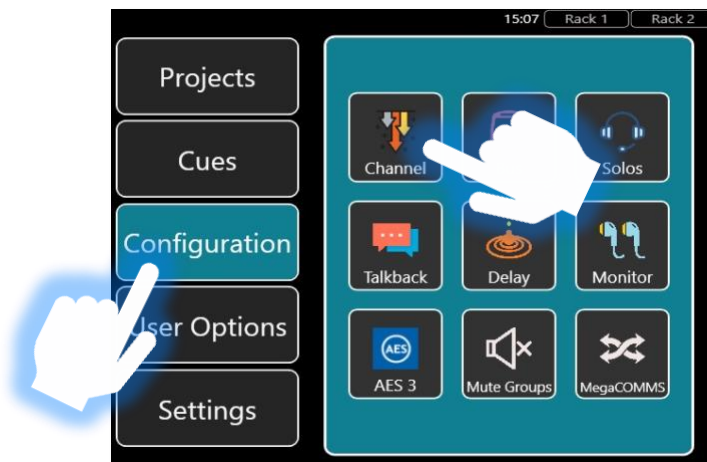
- **About** shows an overview of the internal configuration: software, firmware versions etc.
- **Remote** provides access to the Remote Client Access, Network Port and Remote Connector Control. Network Port allows the selection of which port a Router, or network, is attached to the console. This should always be an external port. Remote allows an iPad to control the console. Remote Connector Control allows the disconnection of remote clients.
NOTE: The Remote Connector must on start-up be set to run for these services to work.
- **System Maintenance page** gives options of Emailing Console Logs, Clear Logs plus access to both the Surface Data and Stage Rack Data and the Keyboard.
- **Reset** shows the options of resetting User, Safe Settings and a Factory Reset.
- **Lock** locks the touch screen to prevent any unwanted interaction with console from unauthorised users.
- **Scroll Lock** prevents the scrolling of the 23.5" screen.

Press Menu again closes the Menu screen; the Menu button illuminates green when it is available. Press the Back button to go back up the menu "tree" one level only. The Back button illuminates red when it is available.

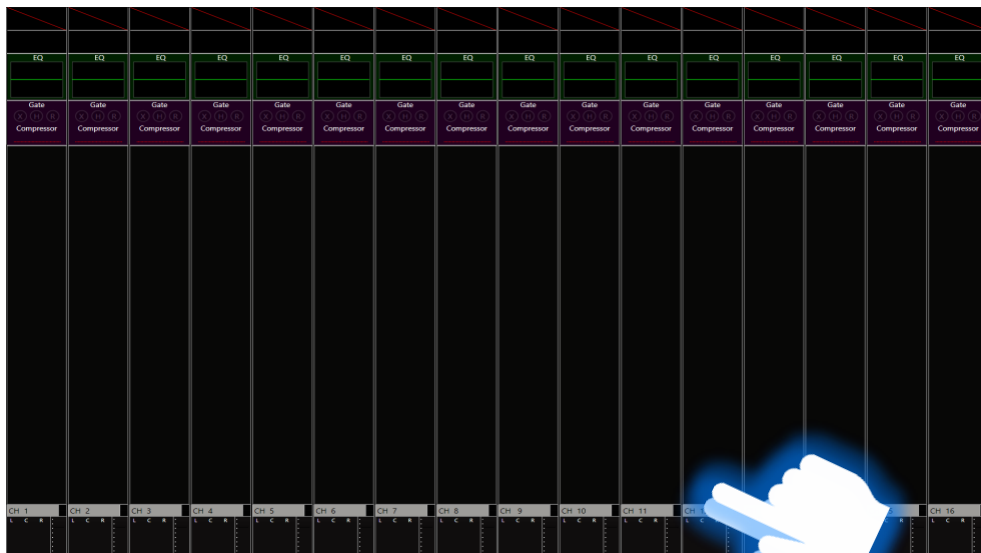
Talkback Setup

The Talkback button on the front panel (Page 31, No. 5) is not active until a Talkback channels have been assigned to the input channels via the Channel Settings page.

The Channel Settings page can be accessed either via the Configuration Menu and selecting Channel via the Menu on the 6.5" Control Screen, or double tapping the channel name at the bottom of the input channel.

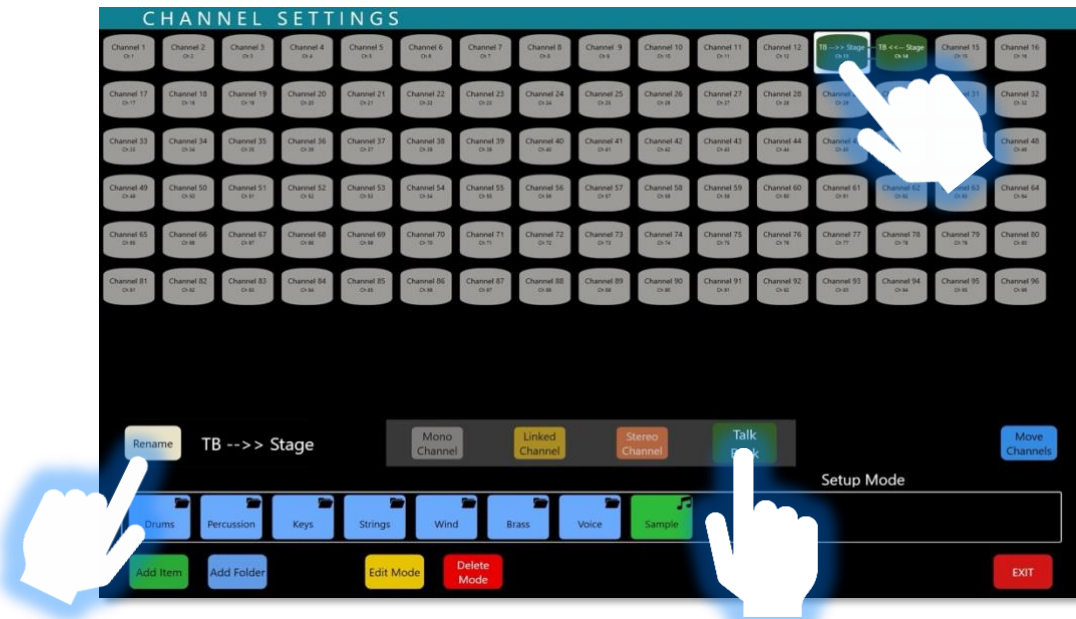


70: Selection via the Menu on the Control Screen



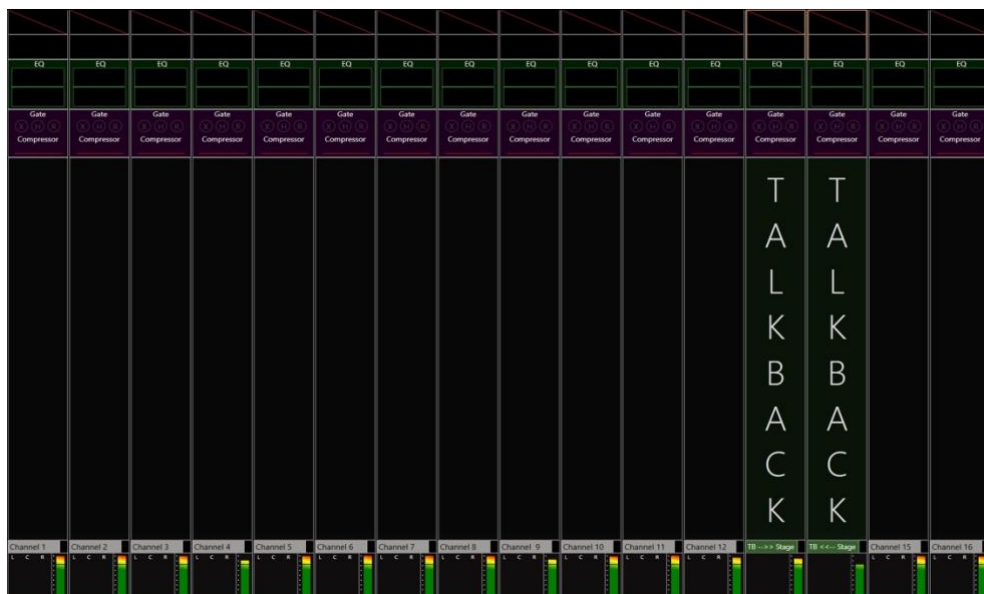
71: Selection via a double tap on the Input Channel name

On the Channel Settings page select the channel for Talkback - any of the local (rear panel) I/O may be assigned as a Talkback output or a Return Talkback input. When the Talkback button is pressed the odd channel number will be assigned as Talk to Stage (TB-->>Stage) and the even number channel above this will automatically be assigned as Talk from Stage (TB<<--Stage). To renamed these, press Rename and use the on-screen keyboard.



72: Channel Settings Page and selecting Talk Back

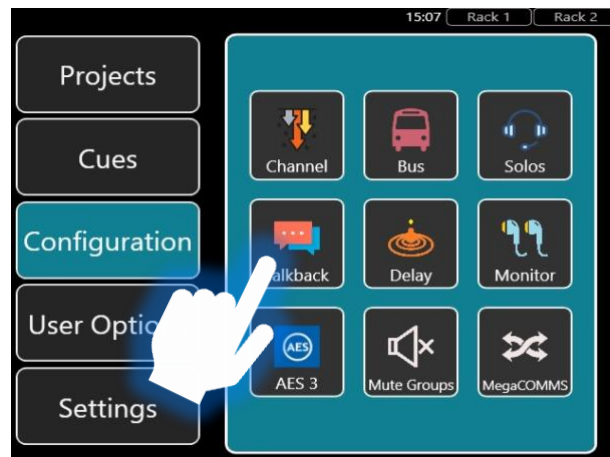
The channels selected as Talkback will now be appear on the input page:



73: Talkback

The CM-J50 has a very flexible Talkback system which is configured through setup options on the Control screen.

Configuration menu: allows access to the Talkback configuration



74: Talkback setup accessed via the Configuration menu

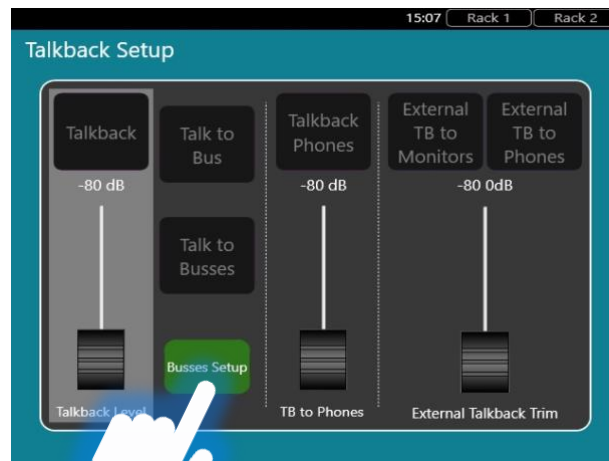
Talkback Set-up:



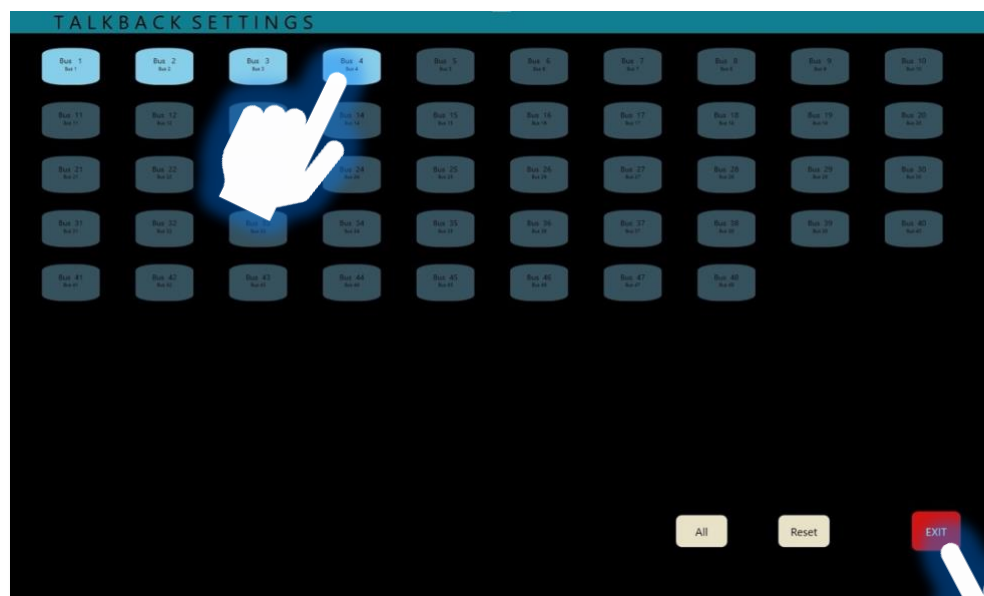
75. Talkback Set-up

- **Talkback**
 - Talk out of console Mic to a Bus with level control. Selected through Talk to Bus with solo or Talk to Busses with selection.
 - **Note:** Does not work without Talk to Bus and / or Talk to Busses being selected.
 - The Talkback button on this screen is also the ON button on TB-->>Stage and is the hard button on the console's front panel (Page 31, No. 5).

- **Talk to Bus.** Activated on Bus Solo being pressed. Talkback must be enabled.
- **Talk to Busses.** When activated, talks to all Busses set-up via the Busses Setup / Talkback Settings. Talkback must be enabled. Solo is not required to activate.



76. Busses Setup



77. Select Busses required and EXIT

- **Talkback Phones.** Listen to TB to Stage in Headphones with level control
- **External TB to Monitors.** Listen to TB from Stage on Monitors with level control
- **External TB to Phones.** Listen to TB from Stage in Headphones with level control

System Functions

Waves® SoundGrid® Interface

Waves® SoundGrid® is a proprietary high-speed digital audio transport protocol with a capacity of 64 bi-directional channels at 96 kHz. The CM-J50 is fitted with a SoundGrid® interface card, accessible on the rear panel via three RJ45 network connectors. Any one of these may be connected to an external computer (with the appropriate Waves® drivers loaded) to perform multitrack recording (with Waves® SoundGrid® Studio installed on the external computer and appropriate Waves® license) and playback.



78: Waves® SoundGrid® Interface

A range of optional Waves® servers are also available from Waves® which can be used to host the full range of Waves® plug-in signal processing.

See the Waves® website www.waves.com for further information regarding Waves®, SoundGrid®, Waves® Tracks Live®, servers and installation.

CM-J50 Local I/O Mapping and Waves®

There are only 64 channels of internal I/O so the Waves and local I / O share the audio paths.

Input:

AES 1 - 4	=	Waves 33 - 40
Local In 1 - 8	=	Waves 41 - 48
Local In 9 - 16	=	Waves 49 - 56

Output:

AES 1 - 4	=	Waves 41 - 48
Local Out 1 - 8	=	Waves 49 - 56
Headphones LR	=	Waves 63 - 64

In the Input / Output tables, shown over the page, all the “slots” in blue are shared.

Only one item out of each pair can be selected at a time. Once an item is selected the alternative option will be blacked out, with a red line, in the assignment window.

Note: There are no Waves® outputs on slots 63 and 64, these slots are dedicated to the headphone output by default - however these can be re-allocated to Waves®.

Input			Output		
<u>Waves</u>	<u>Local IO</u>		<u>Waves</u>	<u>Local IO</u>	
1	Waves 1	-	1	Waves 1	-
2	Waves 2	-	2	Waves 2	-
3	Waves 3	-	3	Waves 3	-
4	Waves 4	-	4	Waves 4	-
5	Waves 5	-	5	Waves 5	-
6	Waves 6	-	6	Waves 6	-
7	Waves 7	-	7	Waves 7	-
8	Waves 8	-	8	Waves 8	-
9	Waves 9	-	9	Waves 9	-
10	Waves 10	-	10	Waves 10	-
11	Waves 11	-	11	Waves 11	-
12	Waves 12	-	12	Waves 12	-
13	Waves 13	-	13	Waves 13	-
14	Waves 14	-	14	Waves 14	-
15	Waves 15	-	15	Waves 15	-
16	Waves 16	-	16	Waves 16	-
17	Waves 17	-	17	Waves 17	-
18	Waves 18	-	18	Waves 18	-
19	Waves 19	-	19	Waves 19	-
20	Waves 20	-	20	Waves 20	-
21	Waves 21	-	21	Waves 21	-
22	Waves 22	-	22	Waves 22	-
23	Waves 23	-	23	Waves 23	-
24	Waves 24	-	24	Waves 24	-
25	Waves 25	-	25	Waves 25	-
26	Waves 26	-	26	Waves 26	-
27	Waves 27	-	27	Waves 27	-
28	Waves 28	-	28	Waves 28	-
29	Waves 29	-	29	Waves 29	-
30	Waves 30	-	30	Waves 30	-
31	Waves 31	-	31	Waves 31	-
32	Waves 32	-	32	Waves 32	-
33	Waves 33	AES in 1L	33	Waves 33	-
34	Waves 34	AES In 1R	34	Waves 34	-
35	Waves 35	AES In 2L	35	Waves 35	-
36	Waves 36	AES In 2R	36	Waves 36	-
37	Waves 37	AES In 3L	37	Waves 37	-
38	Waves 38	AES In 3R	38	Waves 38	-
39	Waves 39	AES In 4L	39	Waves 39	-
40	Waves 40	AES In 4R	40	Waves 40	-
41	Waves 41	Mic In 1	41	Waves 41	AES Out 1L
42	Waves 42	Mic In 2	42	Waves 42	AES Out 1R
43	Waves 43	Mic In 3	43	Waves 43	AES Out 2L
44	Waves 44	Mic In 4	44	Waves 44	AES Out 2R
45	Waves 45	Mic In 5	45	Waves 45	AES Out 3L
46	Waves 46	Mic In 6	46	Waves 46	AES Out 3R
47	Waves 47	Mic In 7	47	Waves 47	AES Out 4L
48	Waves 48	Mic In 8	48	Waves 48	AES Out 4R
49	Waves 49	Mic In 9	49	Waves 49	Line Output 1
50	Waves 50	Mic In 10	50	Waves 50	Line Output 2
51	Waves 51	Mic In 11	51	Waves 51	Line Output 3
52	Waves 52	Mic In 12	52	Waves 52	Line Output 4
53	Waves 53	Mic In 13	53	Waves 53	Line Output 5
54	Waves 54	Mic In 14	54	Waves 54	Line Output 6
55	Waves 55	Mic In 15	55	Waves 55	Line Output 7
56	Waves 56	Mic In 16	56	Waves 56	Line Output 8
57	Waves 57	-	57	Waves 57	-
58	Waves 58	-	58	Waves 58	-
59	Waves 59	-	59	Waves 59	-
60	Waves 60	-	60	Waves 60	-
61	Waves 61	-	61	Waves 61	-
62	Waves 62	-	62	Waves 62	-
63	Waves 63	-	63	-	Headphones L
64	Waves 64	-	64	-	Headphones R

USB Ports

The CM-J50 is equipped with four Type 'A' USB 2.0 ports. These are located as follows: one socket top right above the 6.5" screen, two sets of sockets under the armrest on both the left and right side and one socket on the rear panel.

The USB ports are intended for the connection of an external memory device (USB stick or similar), on which Show files can be saved or backed-up, and for performing software upgrades. They also allow the connection of a standard USB QWERTY keyboard and / or mouse.

Ethernet Ports

The CM-J50 is equipped with two RJ45 Ethernet Ports. These are standard PC network Gigabit Ethernet ports for purposes of adding a wireless network router when using the iPad. It can also be used to connect to an internet connection for emailing the console's logs back to Cadac.

Cat-6 cable suitable for 1000base-T use is recommended for network connections.

MIDI I/O

Used for sending MIDI data for control of external hardware.

Lamp

A 3-pin female XLR connector providing 12 V DC for a gooseneck console light.

Pin	Connection
1	0 V
2	+12 V DC
3	0 V

iPad App – CM-Remote

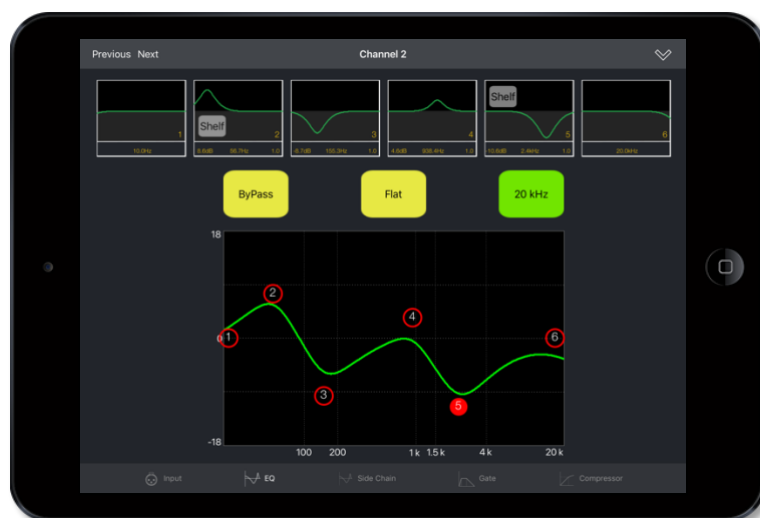
Cadac's iPad App – CM-Remote – provides the perfect solution for controlling wirelessly the key functions of the CM-J series of audio mixing consoles via an iPad or iPads. The App can be found on the Apple App Store, search for **CM-Remote**.

Once a wireless router is connected to the desk and the iPad linked to the network, the App automatically detects the active console types allowing the user to select the appropriate console.

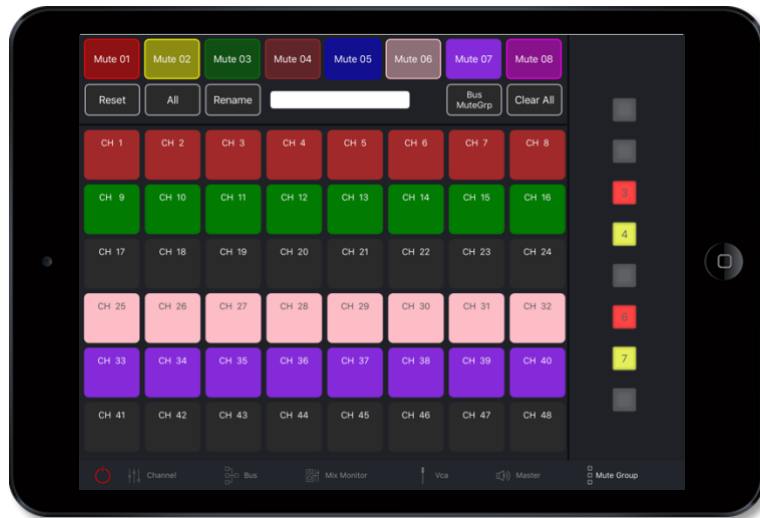
CM-Remote allows you to monitor in real time both the input and output metering, as well as providing the freedom to remotely EQ the PA whilst controlling the major features of the console.



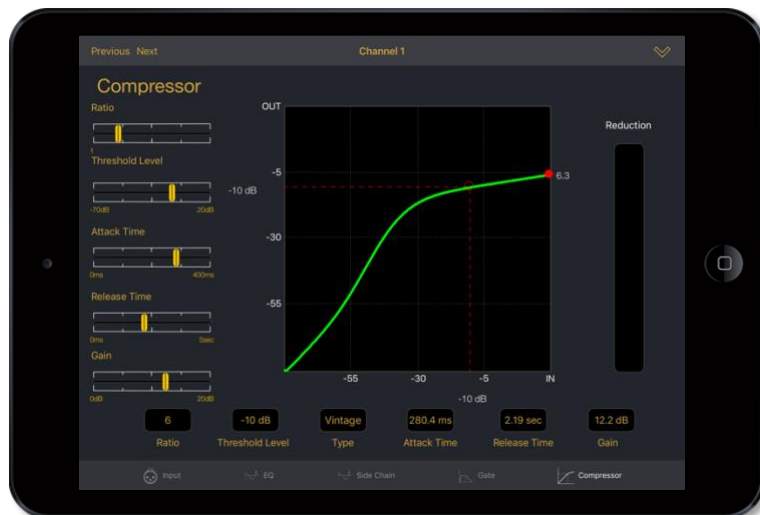
79: CM-Remote iPad: Input Faders



80: CM-Remote iPad: EQ



81: CM-Remote iPad: MUTE Groups



82: CM-Remote iPad: Compressor

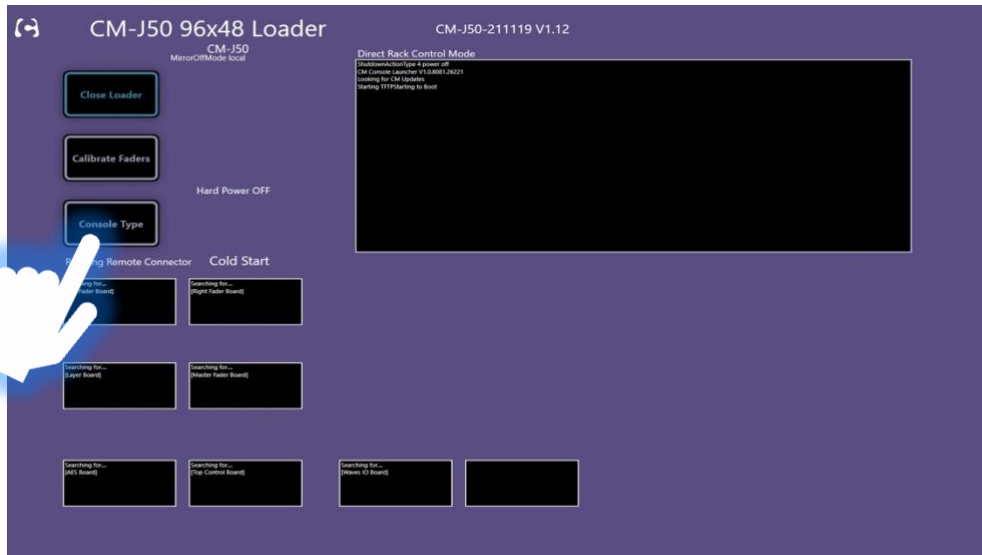


83: CM-Remote iPad: GEQ

Connecting a Wi-Fi Router

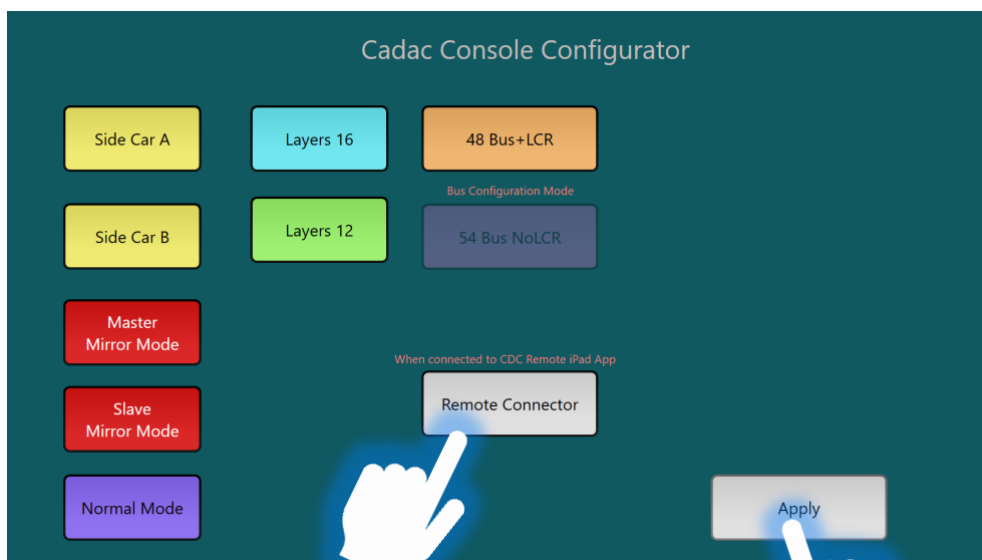
To connect the console to the iPad the console needs to run Remote Connector upon start-up.

The Remote Connector must be selected on the “Cadac Console Configurator” screen during console start-up. When the **Loader** screen appears press “Console Type”:



84: Loader Screen

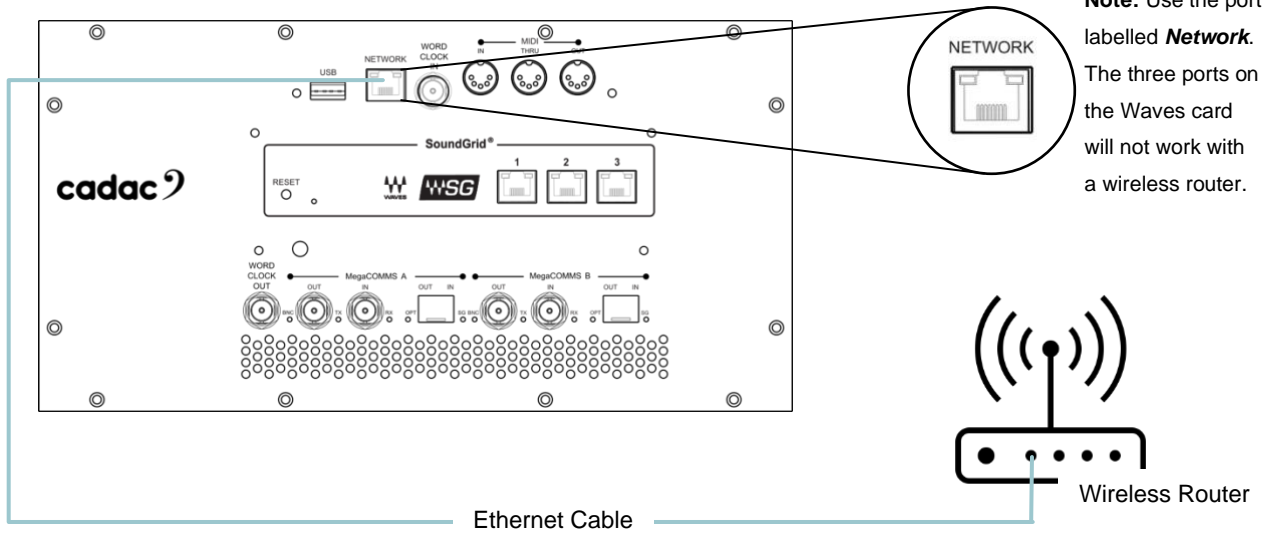
This will bring up the Console Configurator screen. Select “Remote Connector” and then “Apply”.



85: Loader Screen

The console will then continue to boot up. The console can now be connected to a wireless router.

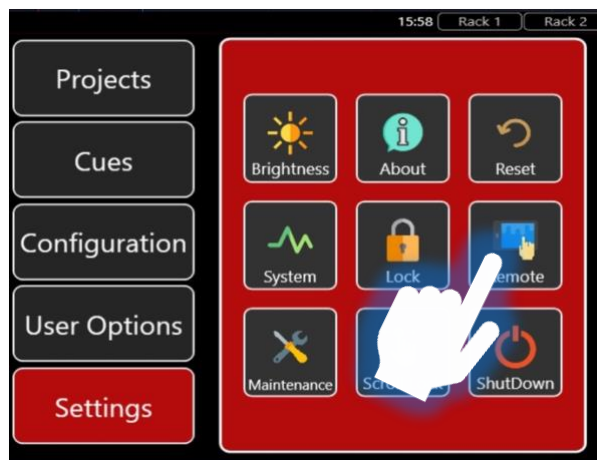
Console connection to a Wi-Fi router



Network Selection

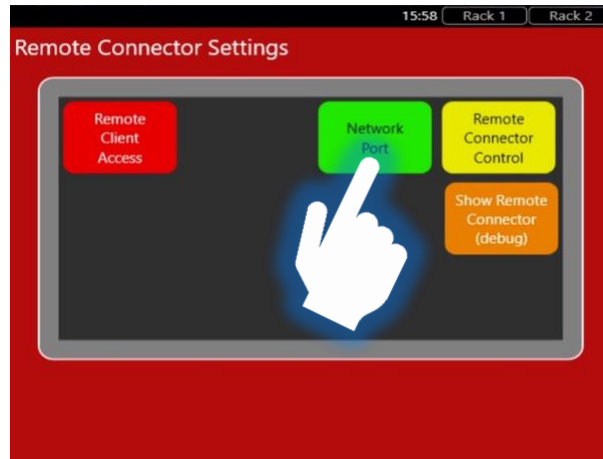
The console now needs to be configured to use the Network Ethernet port that is now connected to the wireless router. This is done via the “Settings Menu” screen on the 6.5” screen.

On the Settings Menu select “Remote”:



86: Settings Menu

This will bring up the “Remote Settings” page, select “Network Port”:



87: Remote Connector Settings Page

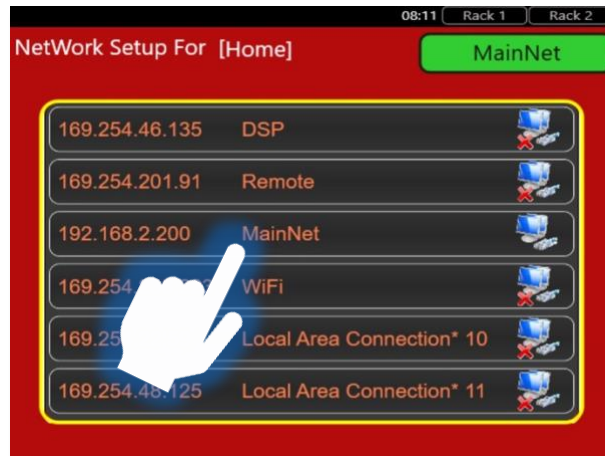
This will bring up the “Network Setup” screen:



88: Network Setup Menu

This screen displays a list of all Ethernet network adapters on the console, this will vary depending on the console’s configuration.

Select the correct adapter; if the selected adapter has the “UP” status and is available to use, it will appear in the top right-hand corner with a green background, as shown above. If the adapter does not have the “UP” status, it will be displayed with a red background.



89: Network Setup Menu

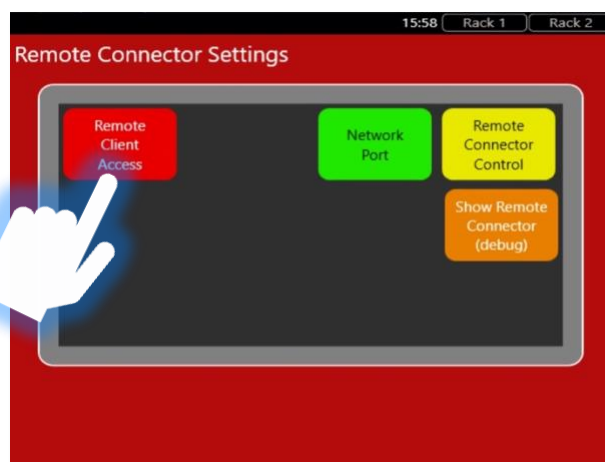
The console will now have access to the Ethernet Port with the wireless router attached.

Remote Connector Settings

For security reasons, the console must be able to control access of any iPads that are attempting to connect to it. When a non-authenticated iPad tries to connect to the console the word “Remote”, with a red background, will flash at the top of the 6.5” screen.

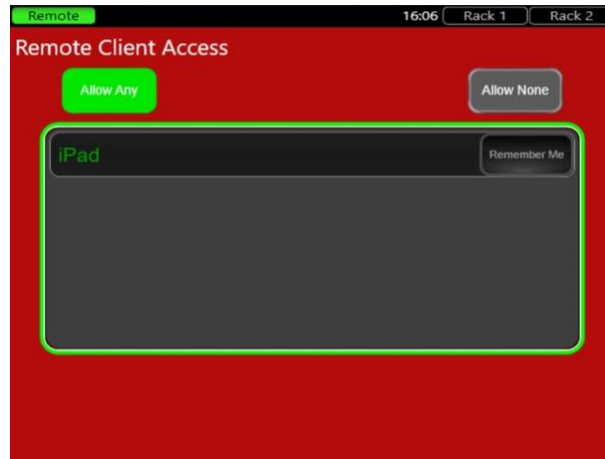
The console can then configure the access the iPad has by using the “Remote Client Access” screen, this is done via the “Settings” menu and the selecting “Bridge”, as described above.

This brings up the “Remote Connector Control” page. Select “Remote Client Access”:



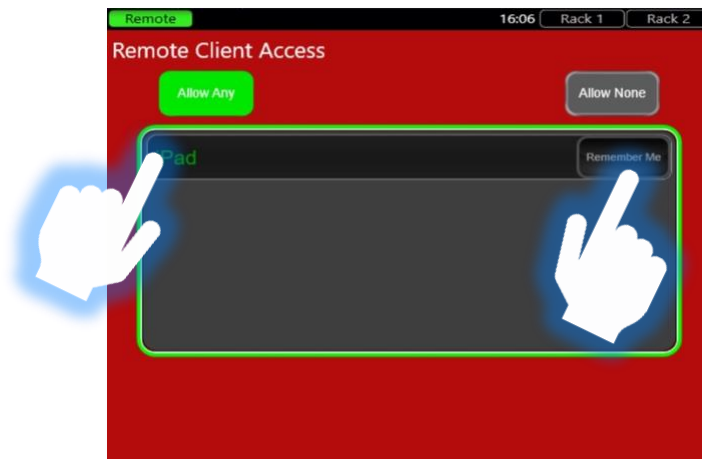
90: Remote Connector Settings Page

This will bring up the “Remote Client Access” page:



91: Remote Client Access Screen

When the “Remote” is flashing red, select the iPad trying to connect and press “Remember Me”.



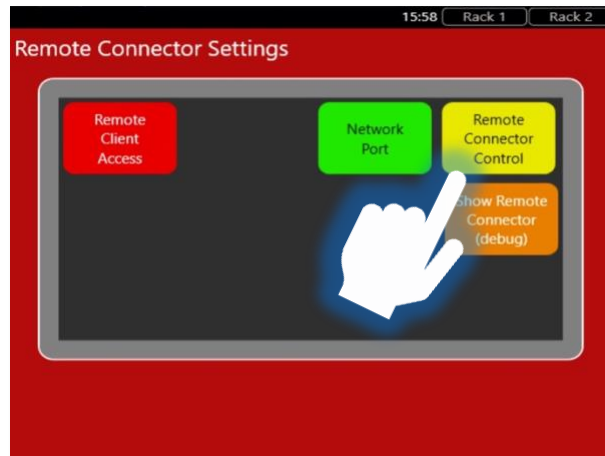
92: Remote Client Access Screen

The “Remote Client Access” screen also allows the console to remember an individual iPad and allow it to connect in the future without having to repeat the authentication process. Identification of an iPad is based on its Apple Unique ID (UDID), which is unique for every single iPad.

There are options to “Allow Any” or “Allow None” which will allow, or lock out, any iPads trying to connect to the console.

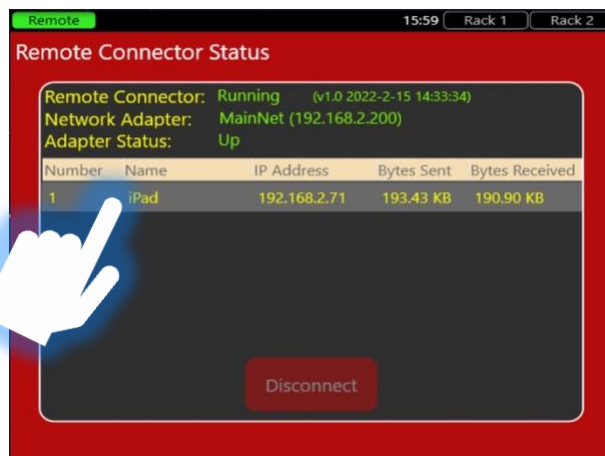
Remote Connector Status

The Remote Connector Status screen is accessed via the central menu on “Remote Connector Settings” page.



93: Remote Client Access Screen

This screen indicates the status of the Remote Connector, the status of the network adapter and the list of connected clients with details.



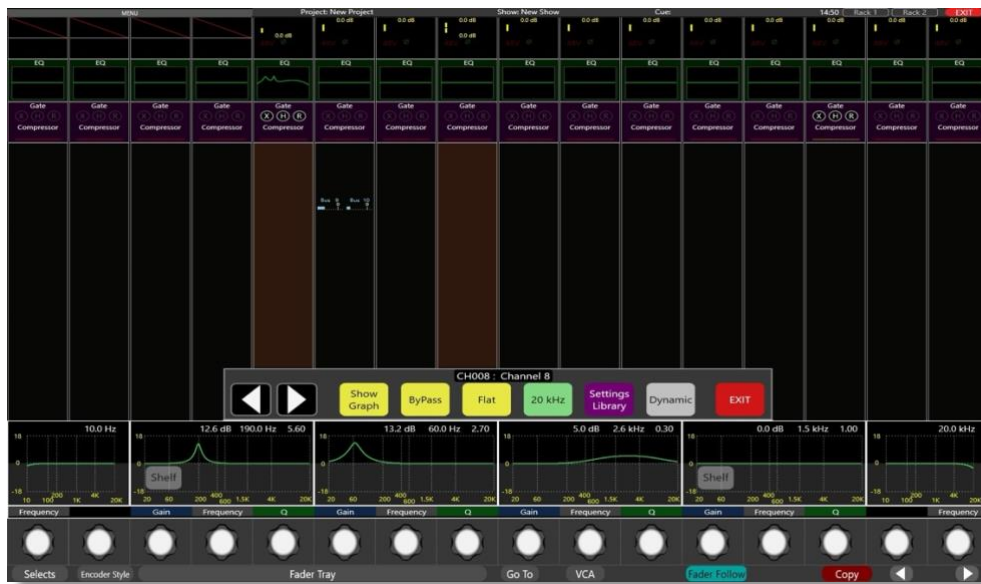
94: Remote Client Access Screen

Selecting a connected client and pressing “Disconnect” will send a disconnect message to that client.

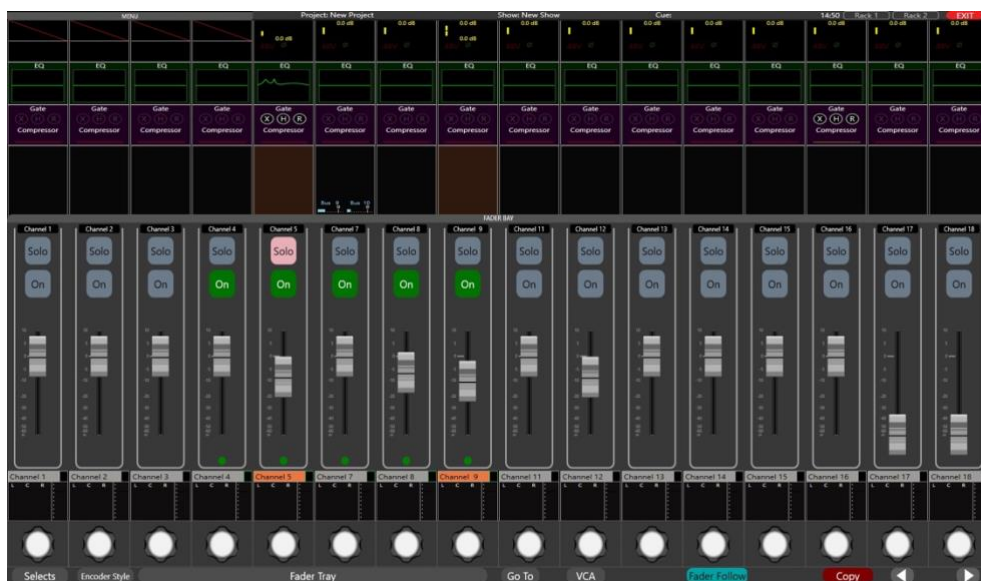
Offline Editor

The Cadac CM-Editor allows console Show files to be created and edited remotely on a Windows PC, and then saved and loaded on to the console via a USB drive. The latest version of the CM-Editor can be downloaded from the Cadac website <http://www.cadac-panels.com/>.

Once the software is installed on to a PC and opened, the PC will display the graphical user interface of the console along with, when required, virtual faders and encoders.



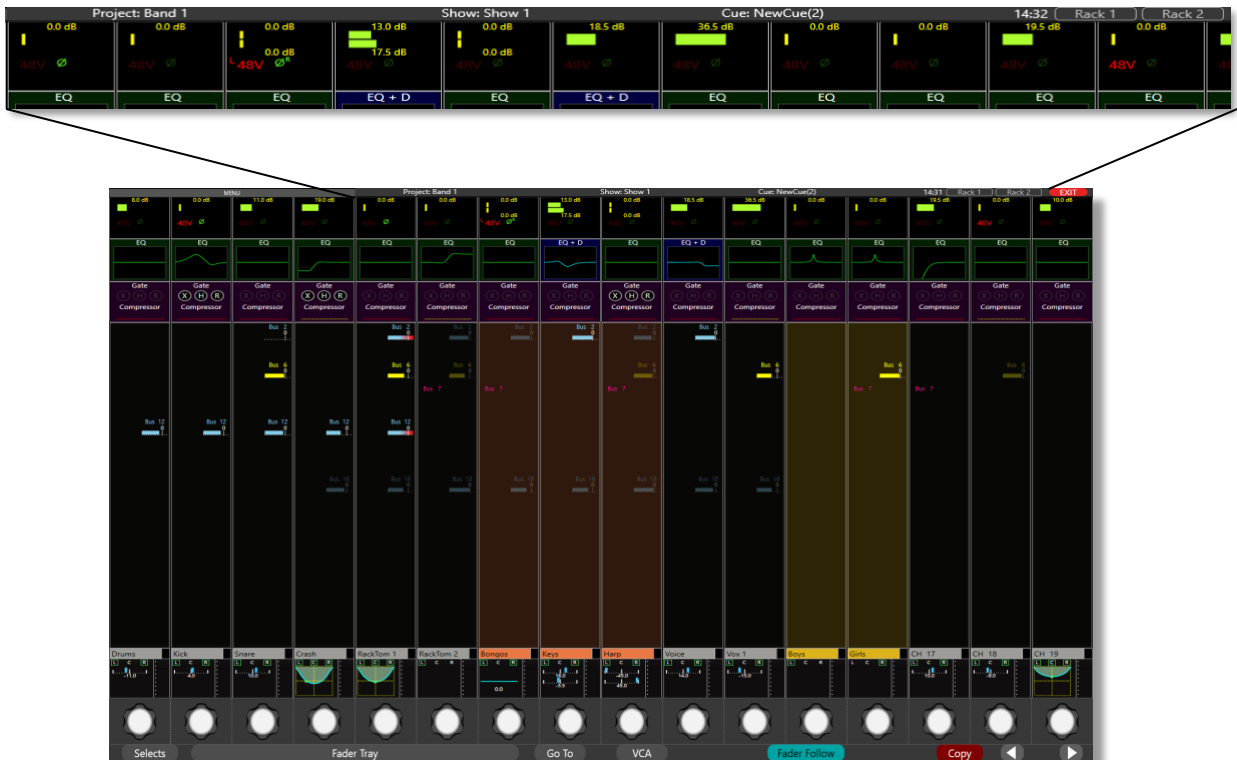
95: CM-Editor: The PC displays the same GUI as the console, but with virtual encoders. Quick access buttons to the Go To, VCA, Fader Follow, Selects, Copy functions plus virtual Faders are available at the bottom of the screen.



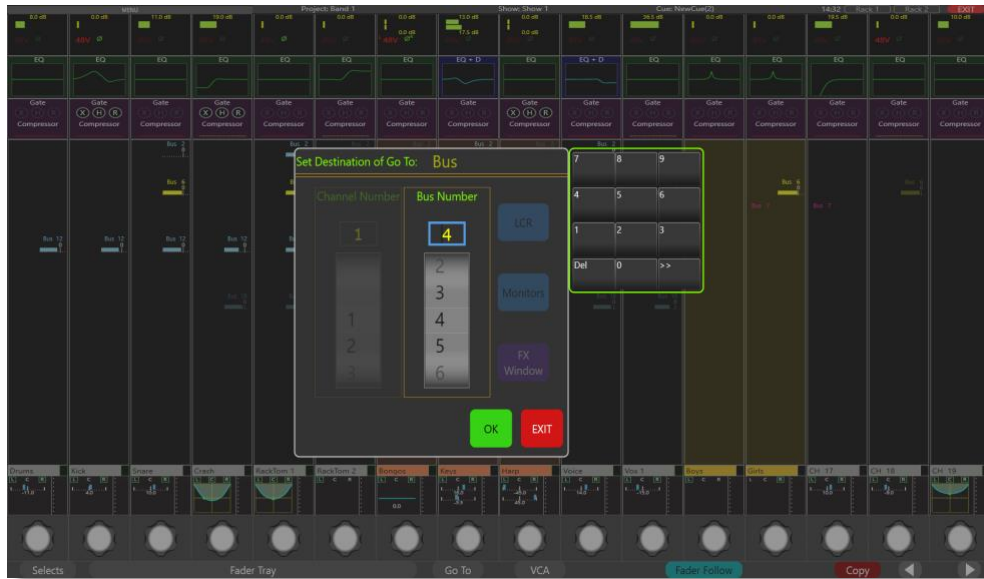
96: CM-Editor: Display shows the Virtual Faders. Screen Scroll function is found on the bottom right.



97: CM-Editor: The Control Screen window is accessed by selecting the Menu button at the top left of the displayed. This gives access to the menu structure that is found on the console's 6.5" physical displayed, along with the Back and Cue buttons.



98: CM-Editor: At the top of the screen Project, Show and Cue information is displayed, along with the Time and the stage rack information – Rack 1 and Rack 2.



99: CM-Editor: This displays the Go To function

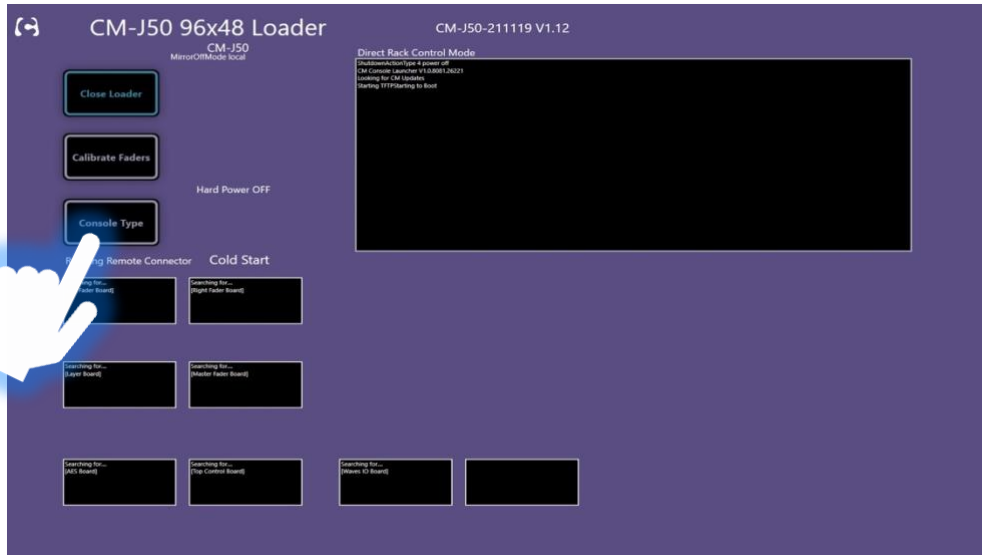
A show can be created and saved in the same way as it would be on the console. The Show file can then be exported to a USB drive and imported on to the console via one of its four USB ports. Show files can also be exported from the consoles, edited on the CM-Editor, and imported to the console, or created on the CM-Editor and imported on to the console.



100: CM-Editor: Project and Show Manager menu allows the import and export of a Show to a USB key

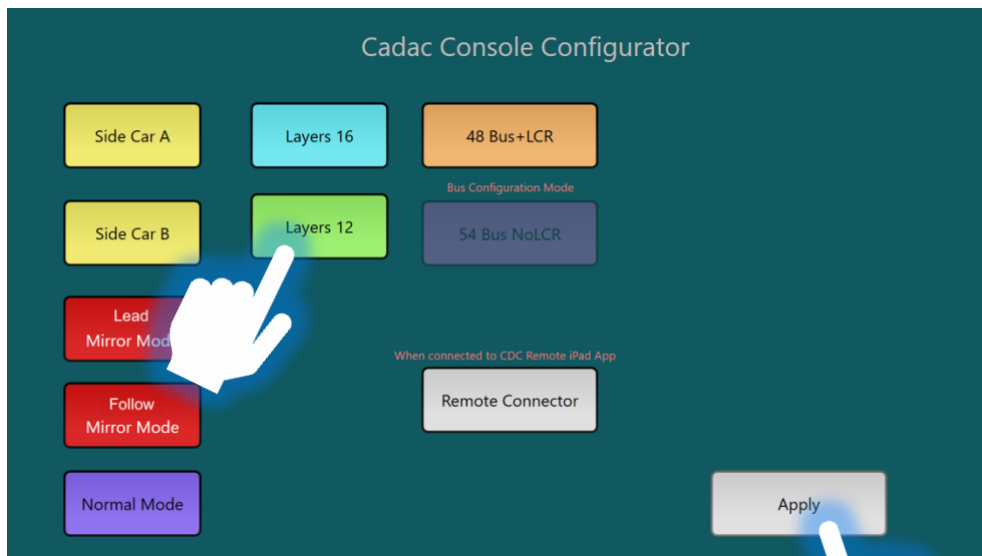
Console Configuration: Modes / Configuration

To change the console's mode / configuration it can be done through the "Cadac Console Configurator" screen which is accessed via the **Loader** screen during console start-up. When the **Loader** screen appears press "Console Type":



101: Loader Screen

This will bring up the Console Configurator screen. From here you can select the configuration / mode you would like the console to operate in. E.g., Layers to jump in groups of 12 rather than default 16:

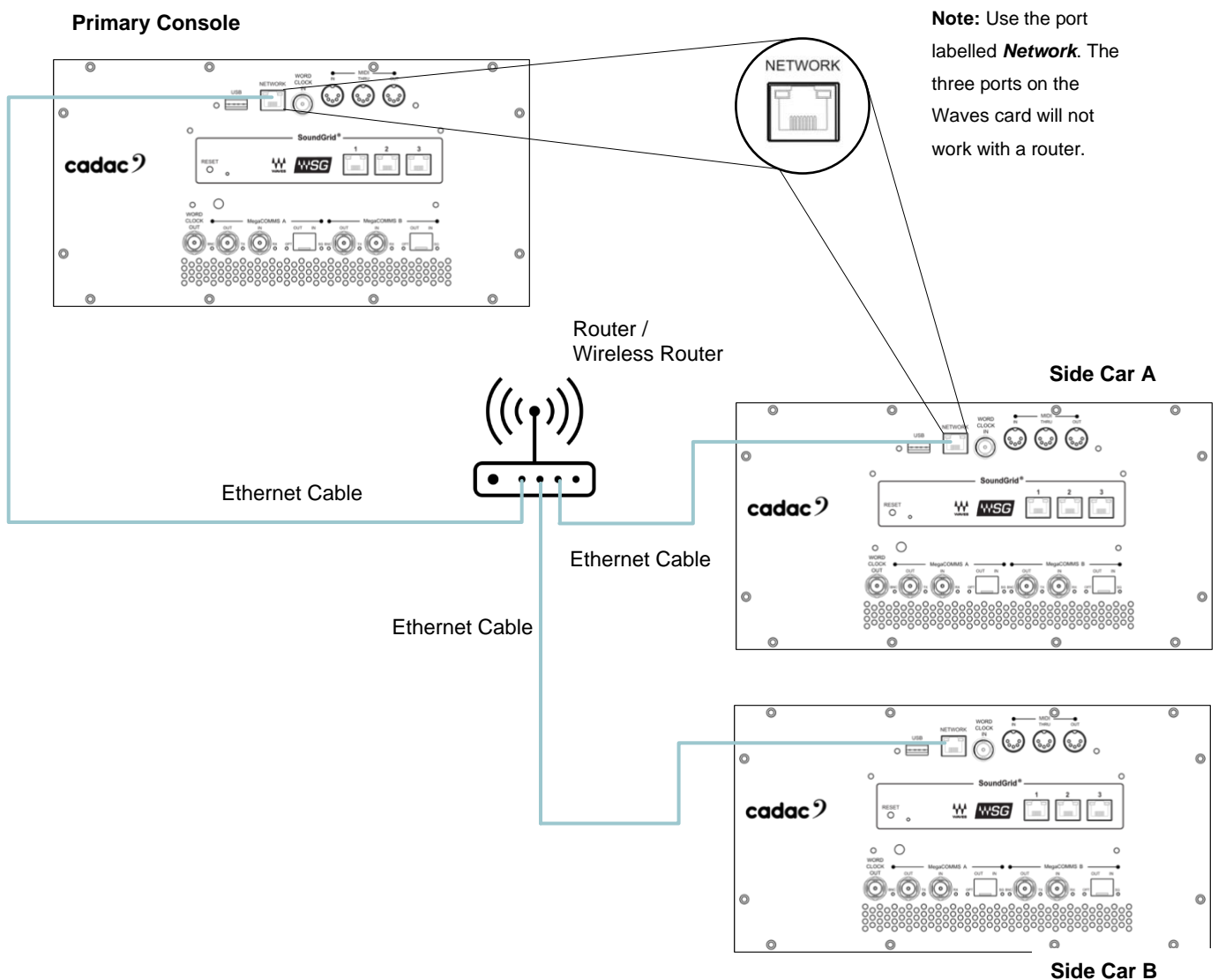


102: Console Configurator

Side Car

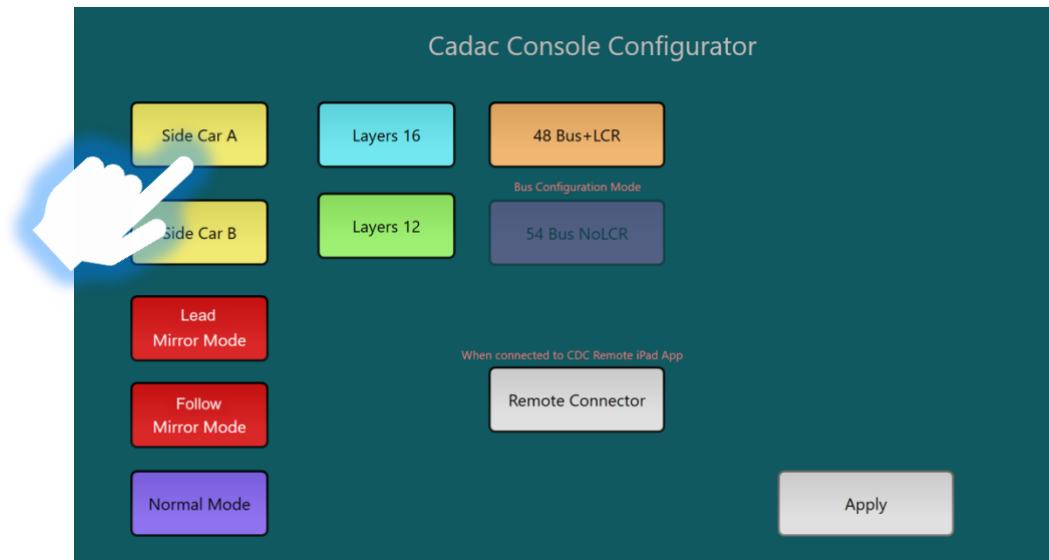
Side Car configuration allows up to two consoles to be attached to the primary console and act as side cars to extend the work surface controls of the primary console. This does NOT increase channel count, just the control surface. The MegaCOMMS connection to stage racks is made via the primary console as this has the active mix engine.

For Side Car A (for a single side car), or Side Car B (for two side cars) to work, the Primary console and the “Side Car” consoles need to be connected via an Ethernet Router, as shown by the diagram below:



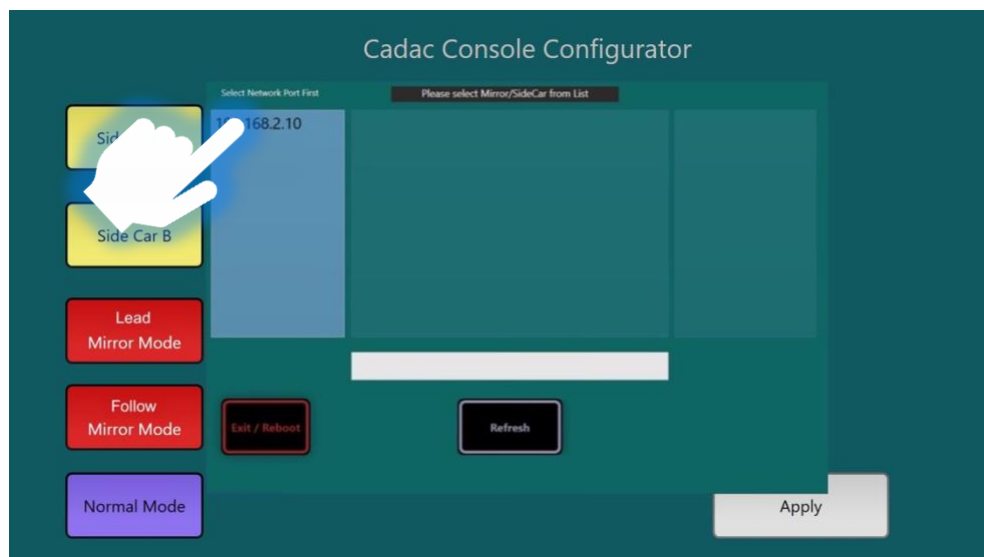
Once the network is setup, power up the consoles one at a time (primary first, then side car consoles) and follow the instructions on the following pages.

When the Loader screen (purple screen) appears on the Side Car Console (s) on start-up, press “Side Car A” (and “Side Car B” on the second side car console) to bring up the Console Configurator window.



103: Side Car A

This will then bring up the Select Network Port List window. Select the IP address of the console that is going to be the Side Car A (or Side Car B). If the remote port is not visible it can be set up using the process in [Network Selection](#):



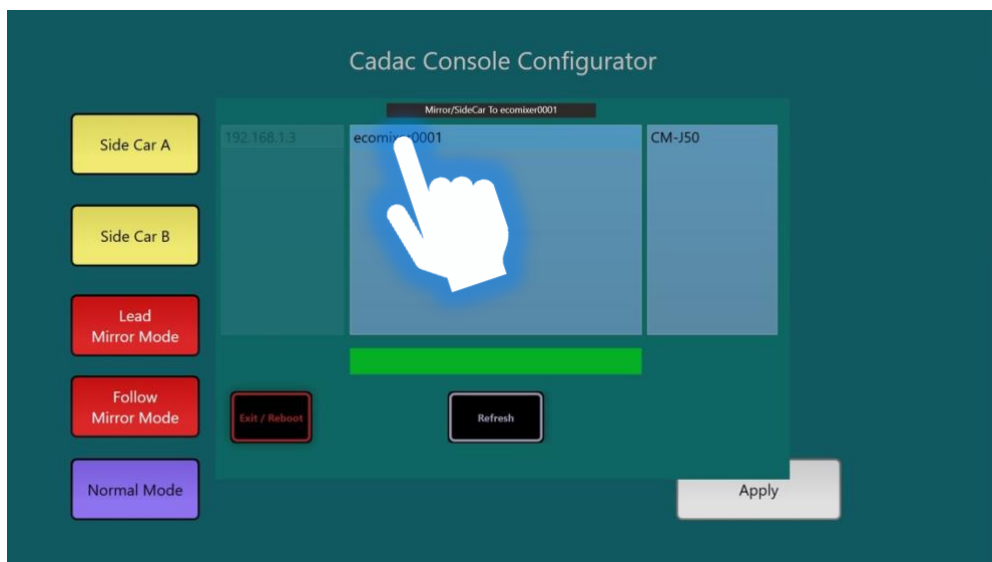
104: Network Selection Window

This will then bring up the **CM Console / Ecomixer ID** window. Enter the console's Ecomixer ID (the 4-digit Ecomixer code can be found on a label on the rear of the console, alternatively it can be found in the About section on the console) of the proposed Side Car (A / B). Then "Exit" this window:



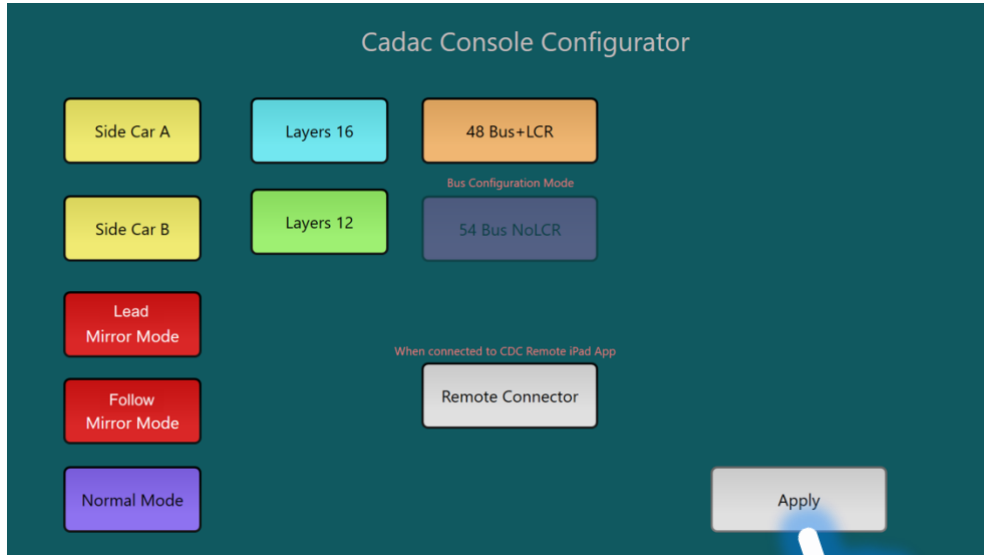
105: Ecomixer ID window

All available consoles will be show in the list below. Select the Ecomixer that will act as the **Side Car (A / B)** console:



106: Mirror / Side Car availability

Now press "Apply":



107: Apply

Completely power down all consoles, and then restart all consoles.

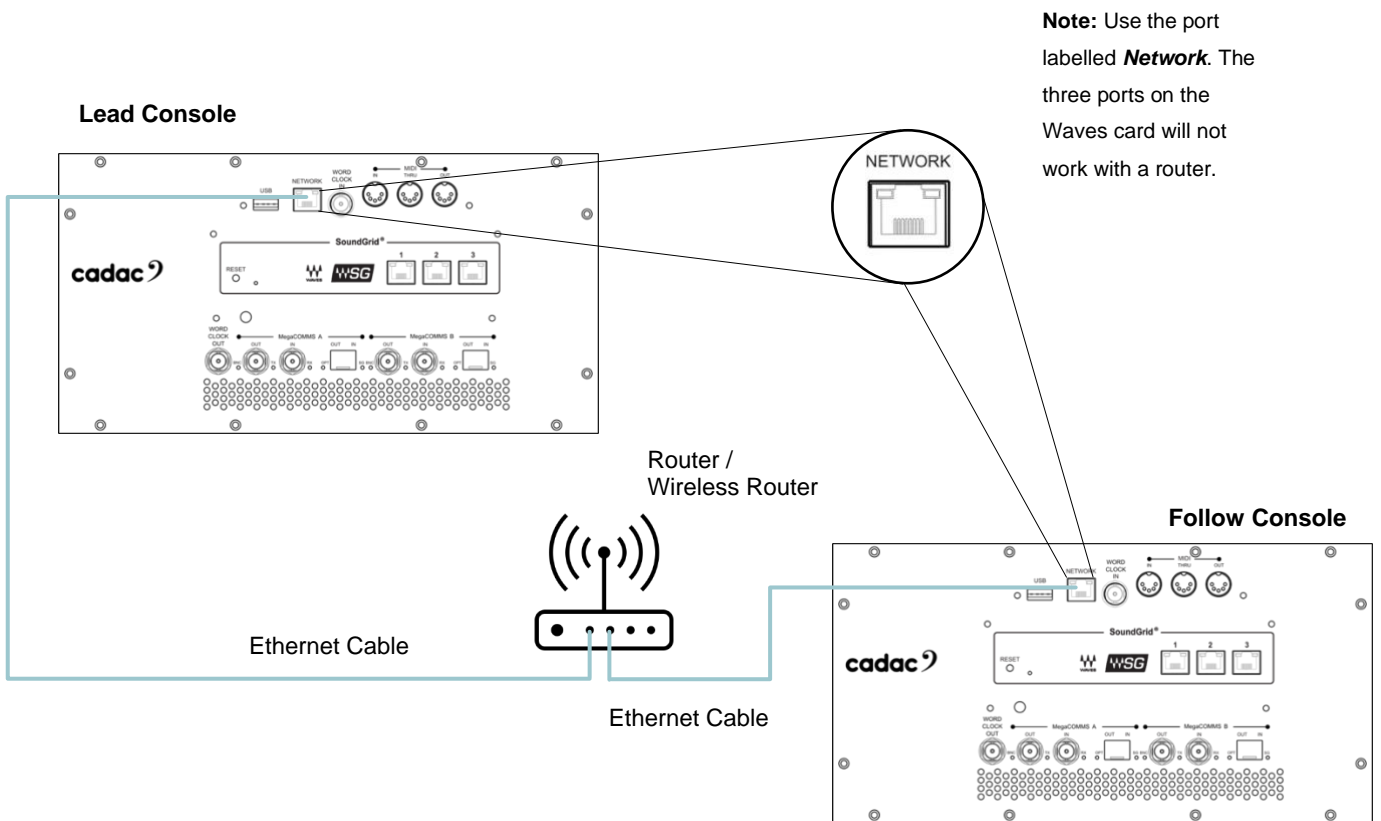
The consoles are now set-up for console side car configuration.

Mirroring

In Console Mirroring configuration, it allows a second (**Follow**) console to mirror, in real time, the status of the primary (**Lead**) console allowing for total console redundancy.

NOTE: If the primary / **Lead** console was to ever fail, the MegaCOMMS connectors would have to be manually disconnected from the primary / **Lead** console and connected to the secondary / **Follow** console for the audio to continue.

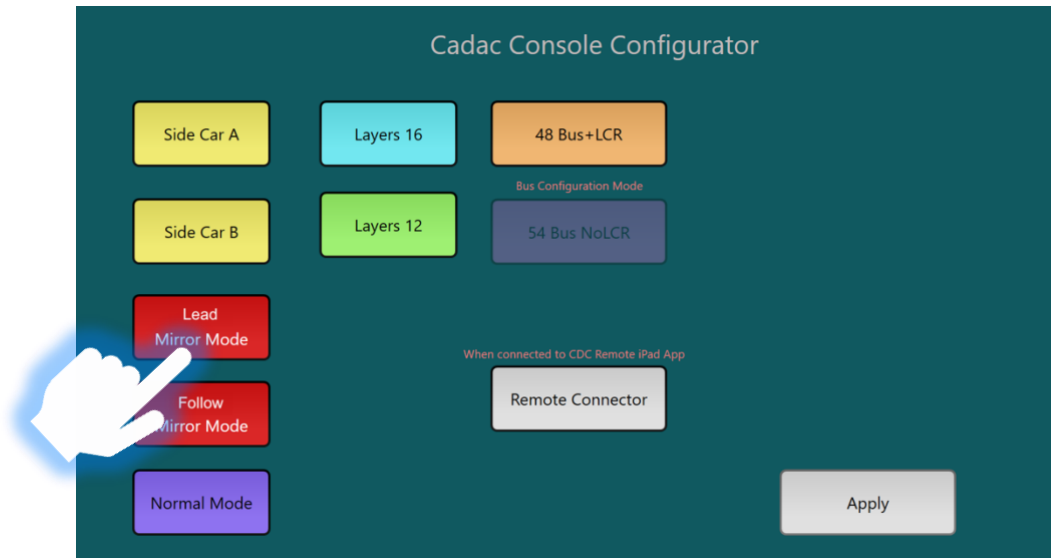
For Console Mirroring to work, both the **Lead** and **Follow** console need to be connect to each other via an Ethernet Router, as shown by the diagram below:



Once the network is setup, power up the consoles and follow the instructions on the following pages.

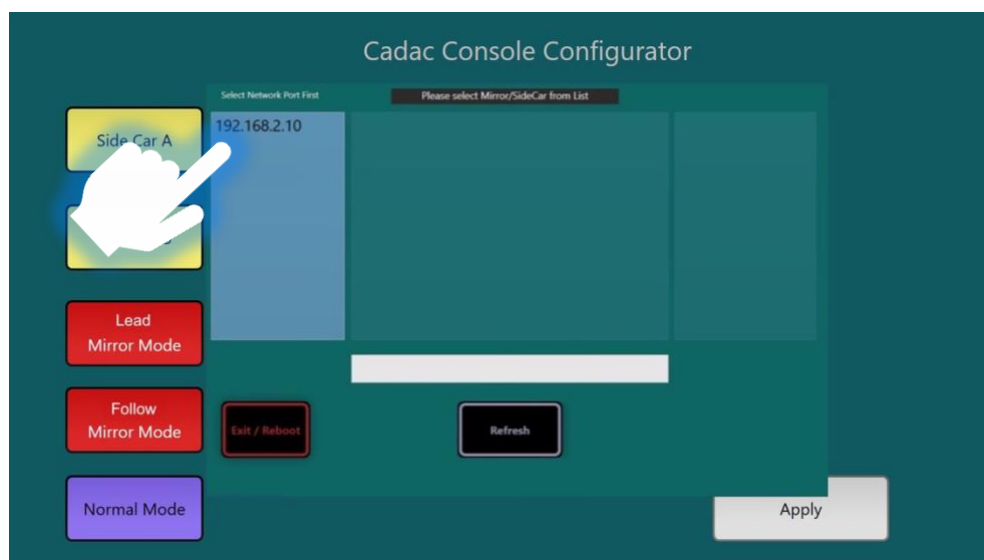
Lead Console

Power down and reboot the **Lead** console. When the Loader screen (purple screen) appears on the **Lead** console (primary console) on start-up, press “Console Type” to bring up the Console Configurator window. Then press “Lead Mirror Mode”:



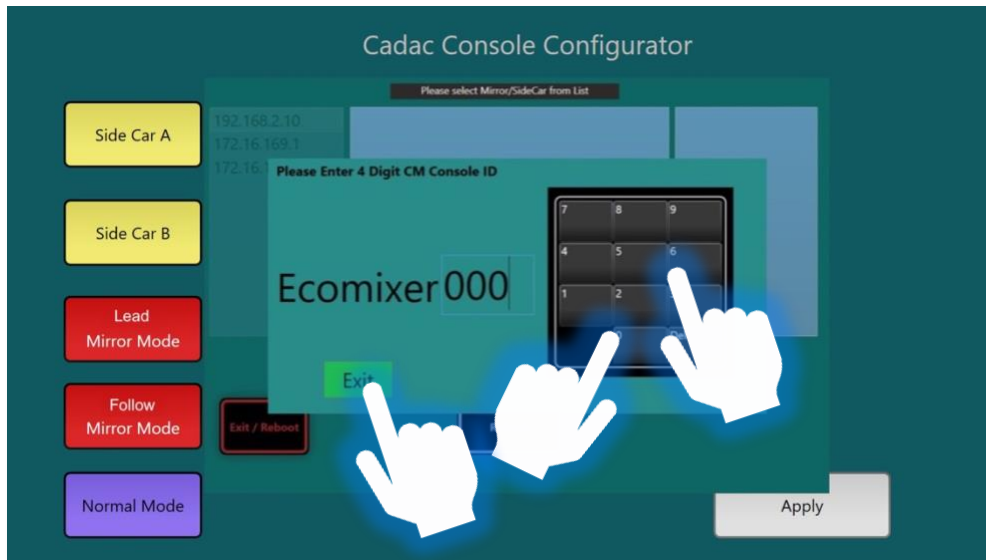
108: Lead Mirror Mode

This will then bring up the Select Network Port List window. Select the remote port of the **Lead** console. If the remote port is not visible it can be set up using the process in [Network Selection](#):



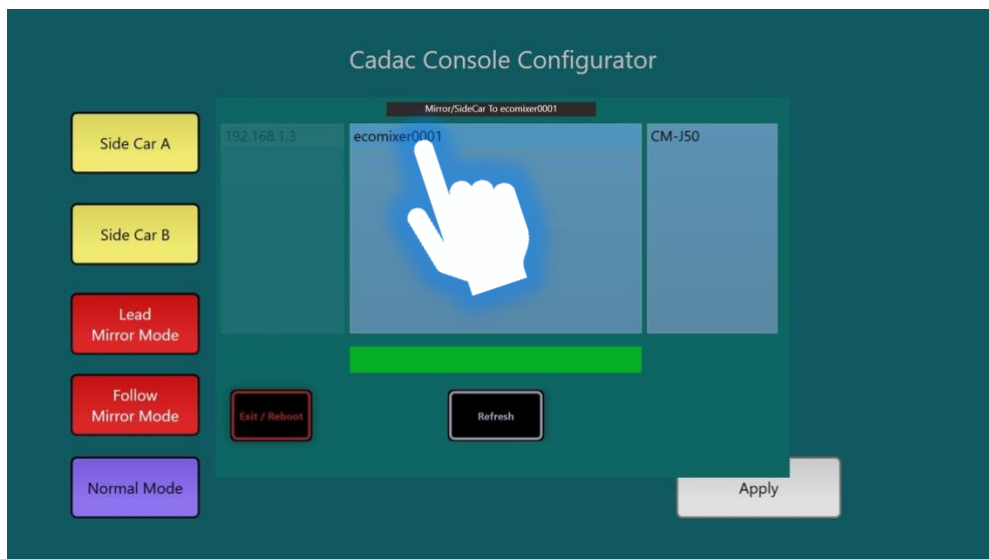
109: Network Selection Window

This will then bring up the **Ecomixer ID** window. Enter the **Follow** console's Ecomixer ID (the 4-digit Ecomixer code can be found on a label on the rear of the console, alternatively it can be found in the About section on the console). Then "Exit" this window:



110: Ecomixer ID window

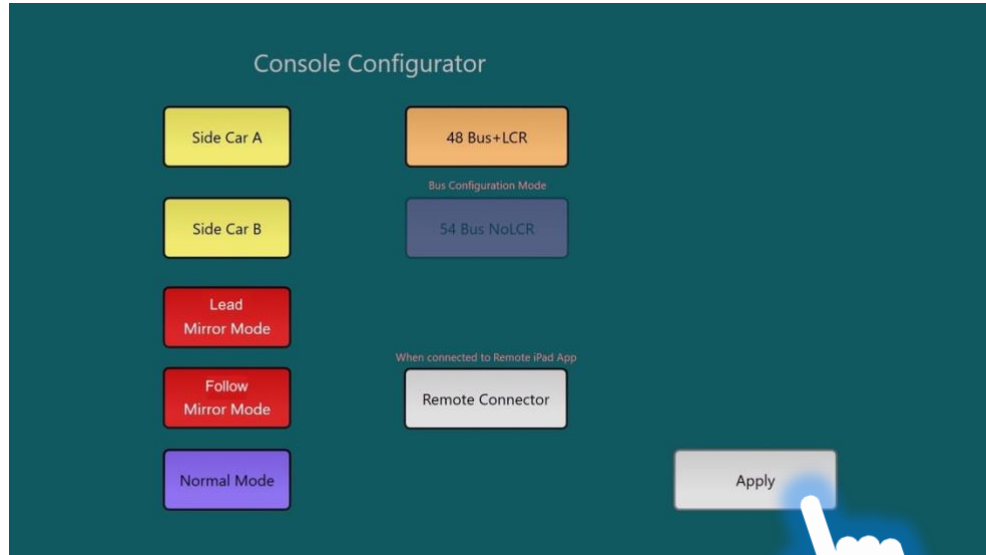
All available consoles will be show in the list below. Select the Ecomixer that will act as the **Follow** console:



111: Mirror / Side Car availability

Note: The **Follow** console needs to be entered here so the **Lead** console knows what console to lead.

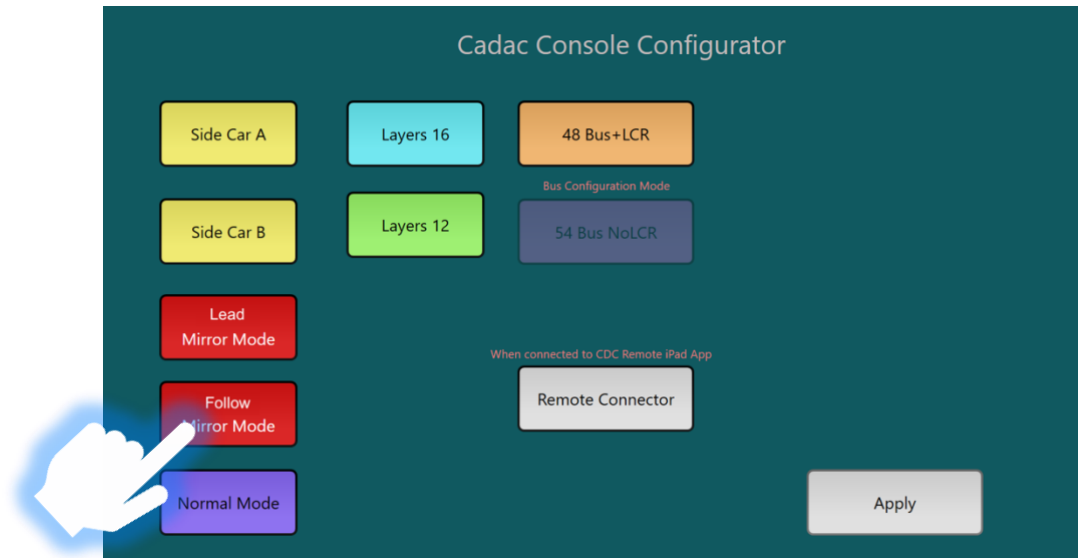
Now press "Apply":



112: Apply

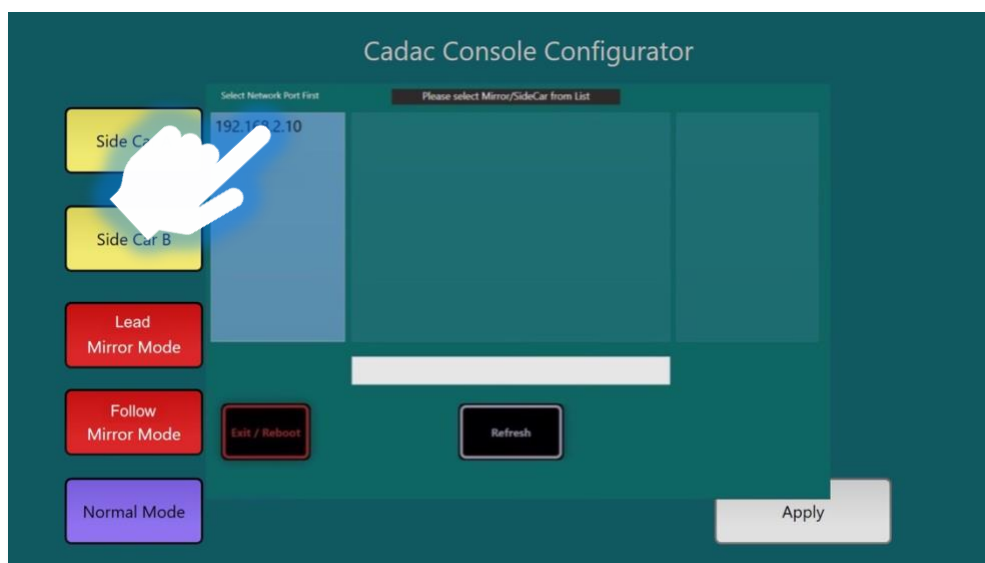
Follow Console

Power down and reboot **Follow** console. When the Loader screen (purple screen) appears on the **Follow** console (secondary console) on start-up, press “Console Type” to bring up the Console Configurator window. Then press “Follow Mirror Mode”:



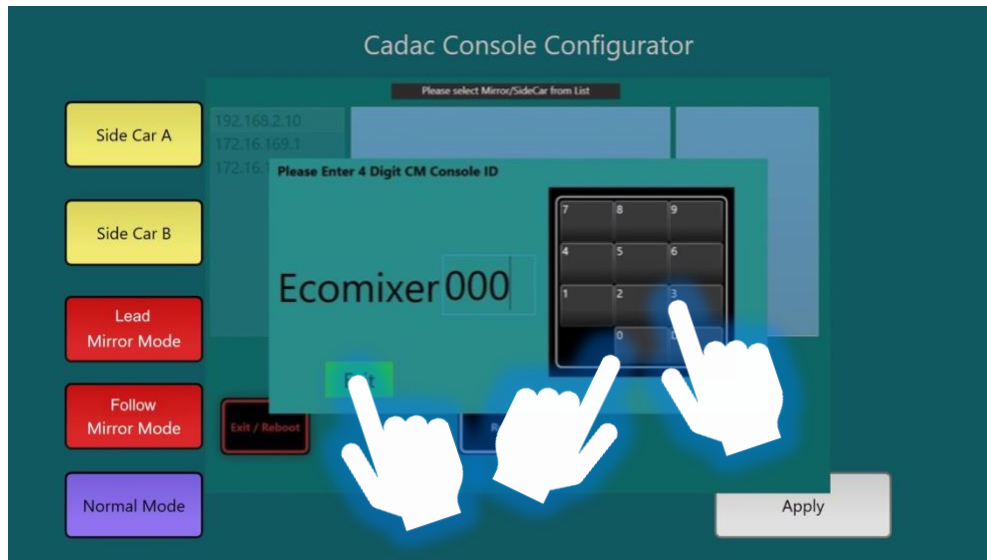
113: Follow Mirror Mode

This will then bring up the Select Network Port List window. Select the remote port of the **Follow** console. If the remote port is not visible it can be set up using the process in [Network Selection](#):



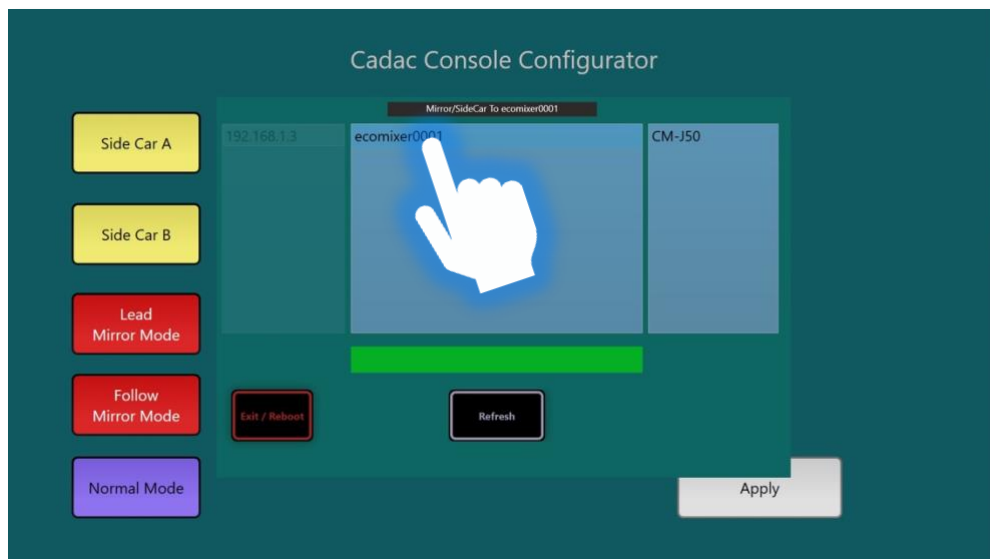
114: Network Selection Window

This will then bring up the **CM Console / Ecomixer ID** window. Enter the **Lead** console's Ecomixer ID (the 4-digit Ecomixer code can be found on a label on the rear of the console, alternatively it can be found in the About section on the console). Then "Exit" this window:



115: Ecomixer ID window

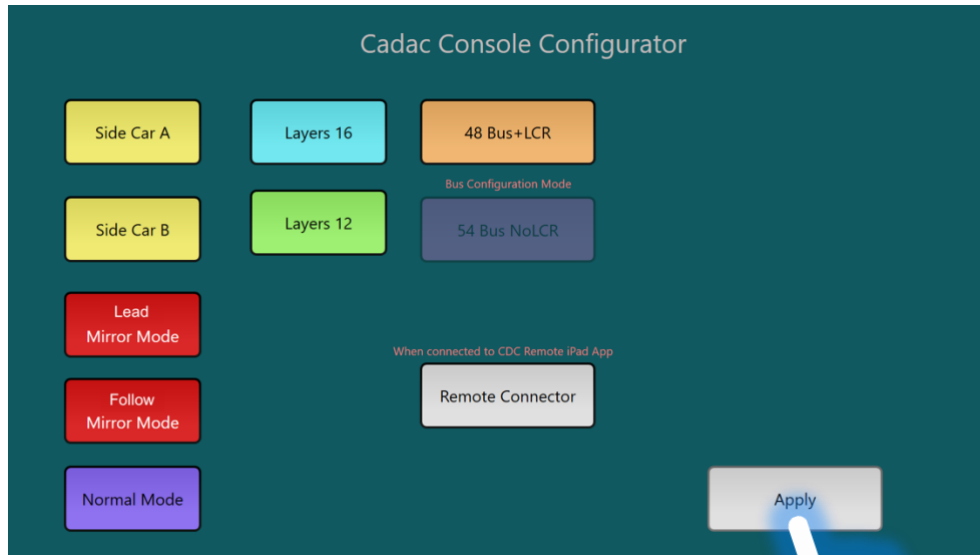
All available consoles will now be show in the list below. Select the Ecomixer that will act as the **Lead** console:



116: Mirror / Side Car availability

Note: The **Lead** console needs to be entered here so the **Follow** console knows what console to follow.

Now press "Apply":



117: Apply

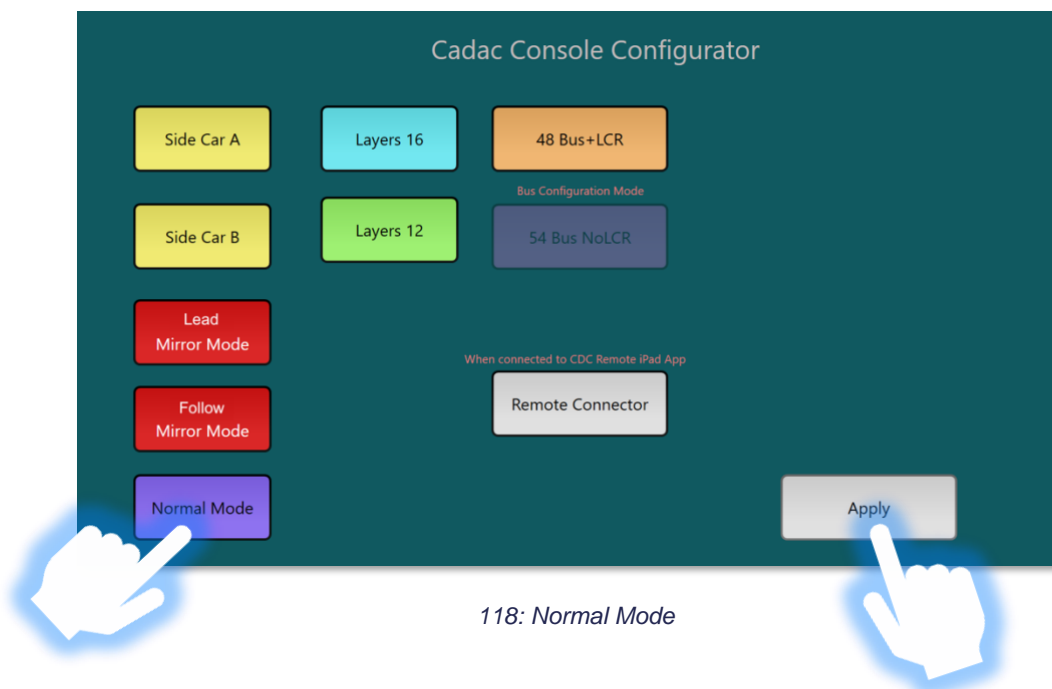
Now completely power down all consoles, and then restart all consoles.

The consoles are now set-up for console mirroring.

Normal

If the console has had its configuration / mode changed - e.g. set-up for Side Car or Console Mirroring - it will need to be reset to standard / normal Mode.

When the Loader screen (purple screen) appears during start up, press “Console Type” to bring up the Console Configurator window. Then press “Normal Mode”, then press “Apply”:



Completely power down the console, and then restart the console.

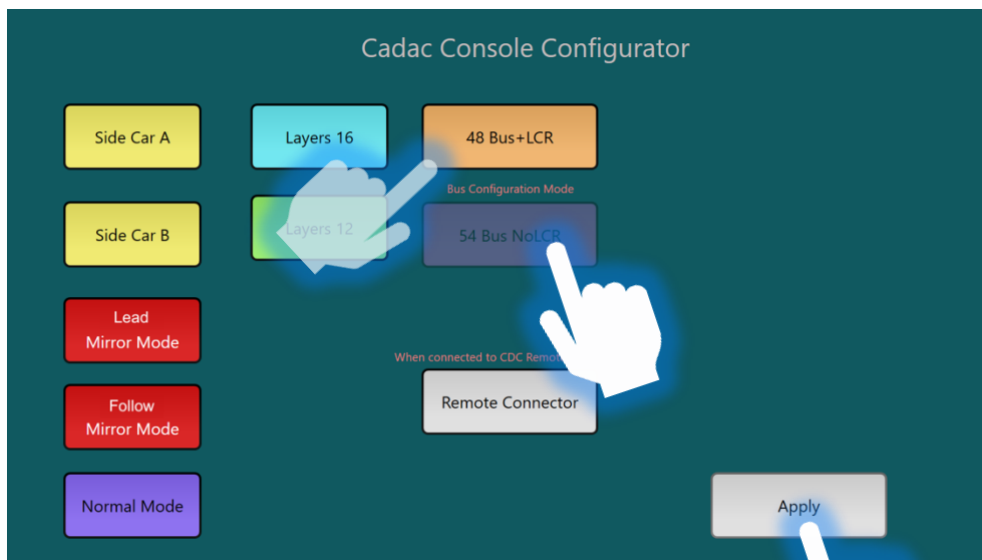
The console is now in Normal Mode.

Bus Configuration

The console can run in two bus configurations; **Front of House** mode with 48 configurable busses plus LCR (a total of 56 busses), or in **Monitor Mode** which allows 54 configurable busses – the LCR busses have been added to the configurable bus capability – (a total of 56 busses).

NOTE: The console by default runs in Front of House mode. However, if the console has been set to Monitor configuration and powered off, it will remain in this mode until it has been put back into Front of House mode.

When the Loader screen (purple screen) appears during start up, press “Console Type” to bring up the Console Configurator window. Then press “48 Bus+LCR” for Front of House mode, or “54 Bus NoLCR” for Monitor Mode, then press “Apply”:



119: Bus Mode

Completely power down the console, and then restart the console.

The console is now in your chosen Bus Mode.

Remote Connector

To connect the console to the iPad the console needs to run in Remote Connector mode.

See section [“iPad App – CM-Remote”](#) for further information and how to set-up the console to run with an iPad.

Command Centre

The CM-J50's Command Centre provides access to functions that are not used in the day-to-day use of the console. These functions are primarily aimed at the maintenance of the console such as software and firmware updates, factory reset etc.

To access this page a USB key containing a version of the console software (it does not need to be a copy of the latest console software – unless you are of course updating the software!) needs to be inserted in to one of the console's USB ports. The USB key should be plugged in when the console is fully booted up.

When the key is inserted the Command Centre window will appear:



120: Command Centre - Novice Setup Screen

1. The status information window. This displays information relevant to the function that has been selected.

Note: There is an Expert View of this page – but this should only be accessed by approved Cadac service personnel. The “Novice” setup screen will allow for the majority of the maintenance tasks to be performed.

There are a number of options available from the Command Centre:

Update Software: This will update the console's software but will keep all the console's show files and settings intact (see section [Updating Software](#) for more information).

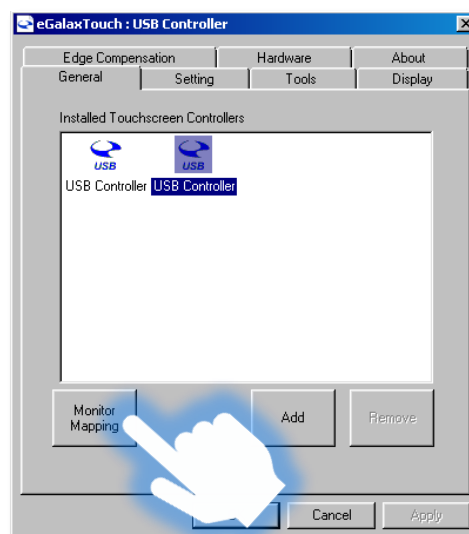
Update Software Launcher: The launcher programme is a programme that loads the console software. This will very occasionally require an update; however, the console will say whether this is required.

Factory Reset and Update: Removes all show files and settings stored on the console before the software is updated. Before pressing this make sure all required show files are stored on a USB key.

Update Firmware: This will extract the firmware from the software USB key and then updates the console's firmware. This requires the console to be powered off and restarted for the firmware update to start.

Clear Caches: Removes all the caches and temporary files stored by the console. This can help with speeding up the console if the console is slow to respond.

Touch Screen Calibration: Allows the touch screens to be recalibrated should the screen's touch become inaccurate. This brings up Window's Touch Controller window and access to the "Monitor Mapping" button.



121: Monitor Mapping

When “Monitor Mapping” is pressed follow the on screen “Touch Me” prompts.

Note: When using “Monitor Mapping” make sure you touch all the screens.

The “Touch Me” pop-up may not be visible on the small screen.

- If after pressing 'Monitor Mapping' and no “Touch Me” pop-up appears, press the small screen first.
- If the pop-up has already appeared on the large screen and now you can't see the “Touch Me” pop-up, press the small screen.

Power Down: Powers down the console – but the mains power is still going to the console. For some updates it may require the power to be physically switched off at the rear of the console.

EXIT: Closes the Command Centre window. The software USB key can then be removed. To open the window again simply reinsert the USB key containing a copy of the console software.

Updating Software

The CM-J50's operating system undergoes a programme of continuous development. The console may be updated by loading new versions of software as they become available.

This can be done by inserting a USB key containing the latest software. Download the latest version from <http://www.cadac-consoles.com> (software is on the Support / Software Download page), then unzip the software on the root of a clean / empty USB key. Then insert the key into one of the four USB ports on the console and then follow the on-screen instructions.

CM-J50 Console Software Upgrade Procedure

1. **Important: Backup all show files** that are on the console
2. Download the Console Software file from www.cadac-consoles.com
3. Then unzip this file, and copy into an **empty** USB stick
4. Plug the USB stick into a USB port on the console
5. The **Simple Command Centre Screen** will appear on the main screen



122: Novice Setup Screen

6. Press **Update Software** then wait till done
7. **Update software launcher** if required (button will be highlighted green)
8. Press **Clear Caches** then wait till done
9. Press **Power Down** and remove USB
10. Make sure the console is completely off then **Power Up** the console

Appendix

Technical Specifications

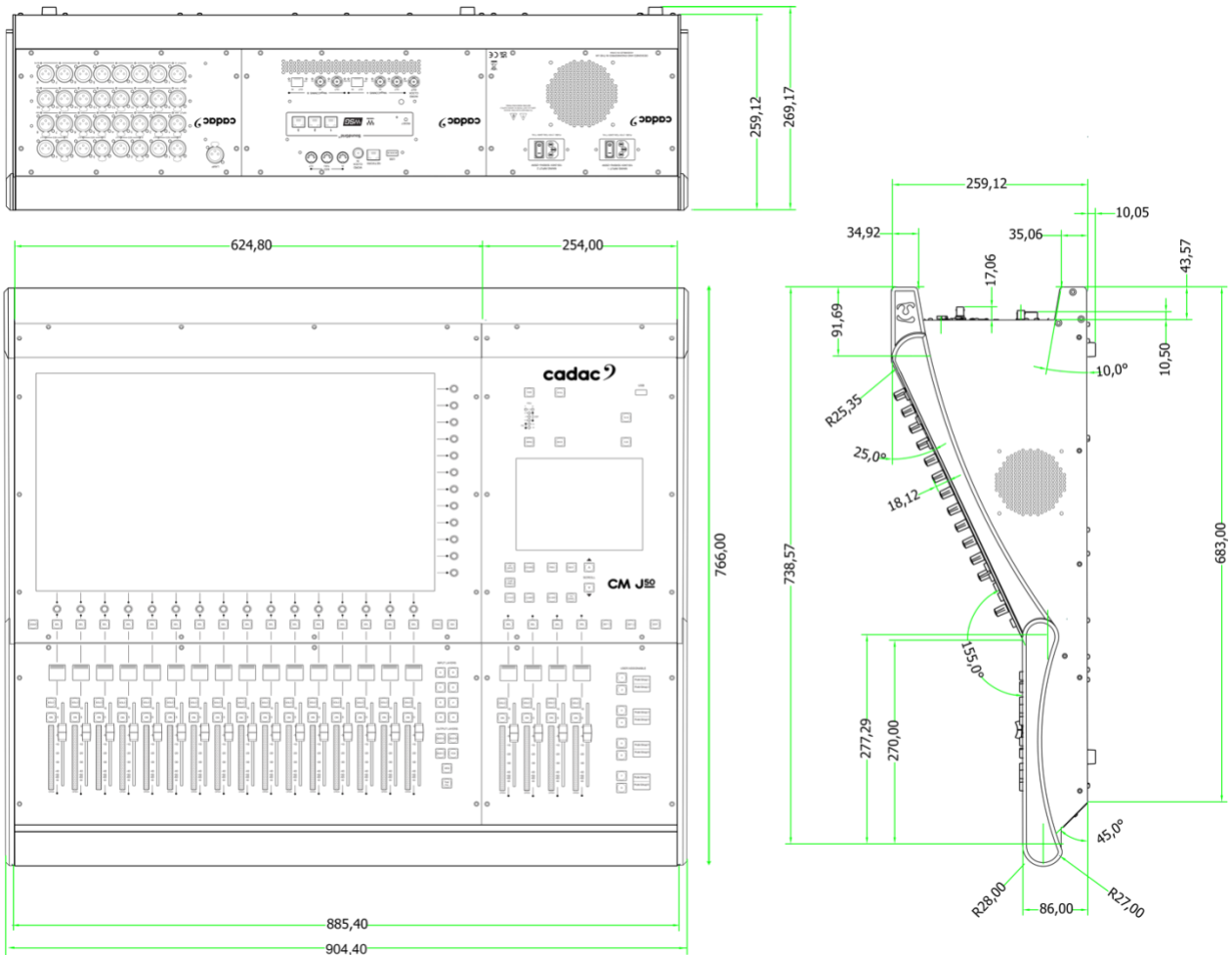
General Specifications

Faders	20 x 100mm motorised faders
Screens	1 x 23.5" 16:9 HD / 1 x 6.5"
PSU	2 x internal PSUs
Inputs	Up to 192 (inc local I/O)
Channels	96 with full processing
Busses	48 configurable in pairs as group / aux/ st aux plus dedicated LCR, monitor LR, headphones LR and talkback
Matrix	Up to 67 x 48 with full processing
Outputs	Up to 192 (inc. local I/O)
Graphic EQ	32 band +/-16 dB on all 55 outputs
Internal FX	16 high-resolution 96 kHz stereo effects processors
Local IO	16 x XLR Mic Inputs (inc 48 V, PAD and 1 dB gain steps), 8 x XLR Balanced outputs, 4 x XLR AES/EBU inputs and 4 x XLR AES/EBU outputs
Comms	2 x Cadac MegaCOMMS on: <ul style="list-style-type: none"> ○ 4 x BNC ○ 2 x Duplex optical LC ports

Audio Specification

Sample Rate	96 kHz
Processing Delay	Sub 0.4 millisecond latency through complete signal chain
Internal Processing	40-bit floating point
ADC/DAC	24-bit
Frequency Response	10 Hz to 44 kHz + 0.5 / - 0.5 dB
THD+N	better than 0.005% @unity gain, 10 dB input at 1 kHz
Channel Separation	better than 95 dB
Residual Output Noise	< -95 dBu (10 Hz – 44 kHz)
MIC EIN	< -127 dB with 200 Ohm source impedance
Maximum Output	21 dBu

Dimensions



Net Weight

39.5 kgs / 87.08 lbs *

*Approx. weight out of flight case

Notes:

Cadac Consoles

One New Street

Luton

Bedfordshire

England

LU1 5DX

www.cadac-consoles.com

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