



MIXERBLOCKS

User's Manual

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FINEGEAR

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INTRODUCTION

Welcome to the MIXERBLOCKS User's Manual!

This document describes the MIXERBLOCKS modular mixing console system as follows:

- First, it describes the connections (power and audio) that can be made between the console and other audio gear and the power supply;
- Secondly, the general principles according to which a MIXERBLOCKS console is constructed are presented.

Please note that these are not the assembly instructions, which can be found in separate documents at <https://finegear.net/mixerblocks/#documentation>

- Finally, the basic blocks found in MIXERBLOCKS are described in detail. Since this is an evolving series, more blocks will be added so please expect updated versions of this document.

OPERATION

CONNECTIONS

POWER CONNECTION

MIXERBLOCKS can be powered either by the Total Audio Control power supply (sold separately by Finegear), or by an equivalent power supply fitted with the power connector of the Main Docking Block.

The power supply should be placed as far away as possible from the mixing console in order to avoid hum pick-up.

WARNING! The power supply sold by Finegear is universal: it can be set to work at 110 V or 220 V. Please check the switch on the back of the supply before plugging in!

Power connector pinout

1. +15 V
2. -15 V
3. Ground (electronics ground)
4. +48 V
5. Earth (chassis ground)

The main docking block has a POWER LED, if after turning on the power supply, the LED doesn't illuminate, turn off the supply, unplug it and check if any of the fuses are blown.

ATTENTION! There are two sets of fuses: the individual voltages fuses and the mains fuse.

AUDIO CONNECTIONS

Here are the wiring conventions for the different types of audio connectors that can be used with MIXERBLOCKS:

Balanced XLR input (female):

- Pin 1: Earth
- Pin 2: Hot phase
- Pin 3: Cold phase

Balanced 1/4" input/output jack:

- Sleeve: Earth
- Tip: Hot phase
- Ring: Cold phase

Stereo 1/4" input/output jack:

- Sleeve: Earth
- Tip: Right
- Ring: Left

Balanced(stereo) 1/4" jack insert:

- Sleeve: Earth
- Tip: Send
- Ring: Return

MODULAR CONCEPT

A MIXERBLOCKS console can be made up of different numbers of different types of channels which are interconnected¹ and whose signals are summed and routed by a “docking” station², which also supplies power for the channels. (see **FIGURE 1**)

Each basic channel has:

- Balanced input stage,
- Input utilities (pad, phase invert and 48 V phantom power)
- Transparent gain stage,
- 3 band equalizer with low cut,
- Mute and solo,
- Panning
- Fader gain stage,
- Routing to all the busses (knobs for effect sends and switches for master, submix, solo and mute.)

The busses and routing features of the basic channels and dock are:

- Stereo master bus, with insert,
- Stereo submix bus, with insert,
- 2 balanced effect sends,
- 2 balanced (mono) effect returns,
- Solo bus and phones output.

Connector pin-out:

- 1 Solo left bus
- 2 GND
- 3 FX B send bus
- 4 GND
- 5 FX A send bus
- 6 GND
- 7 Submix right bus
- 8 GND
- 9 Submix left bus
- 10 GND
- 11 Master right bus
- 12 GND
- 13 Master left bus

- 14 48 V GND
- 15 48 V
- 16 Common ground pin (for effect sends)
- 17 LED GND
- 18 LED -15 V
- 19 LED +15 V
- 20 EARTH (chassis ground)
- 21 -15 V
- 22 +15 V
- 23 Solo logic pin
- 24 GND
- 25 Solo right bus
- 26 GND



Output connector (right side of channel), as seen from the right side.



Input connector (left side of channel), as seen from the left side.

FIGURE 2

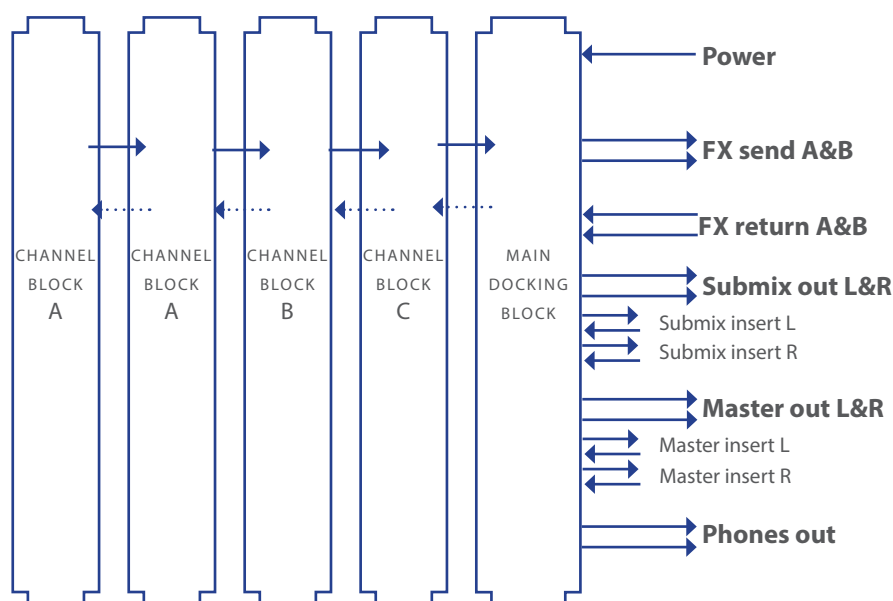


FIGURE 1

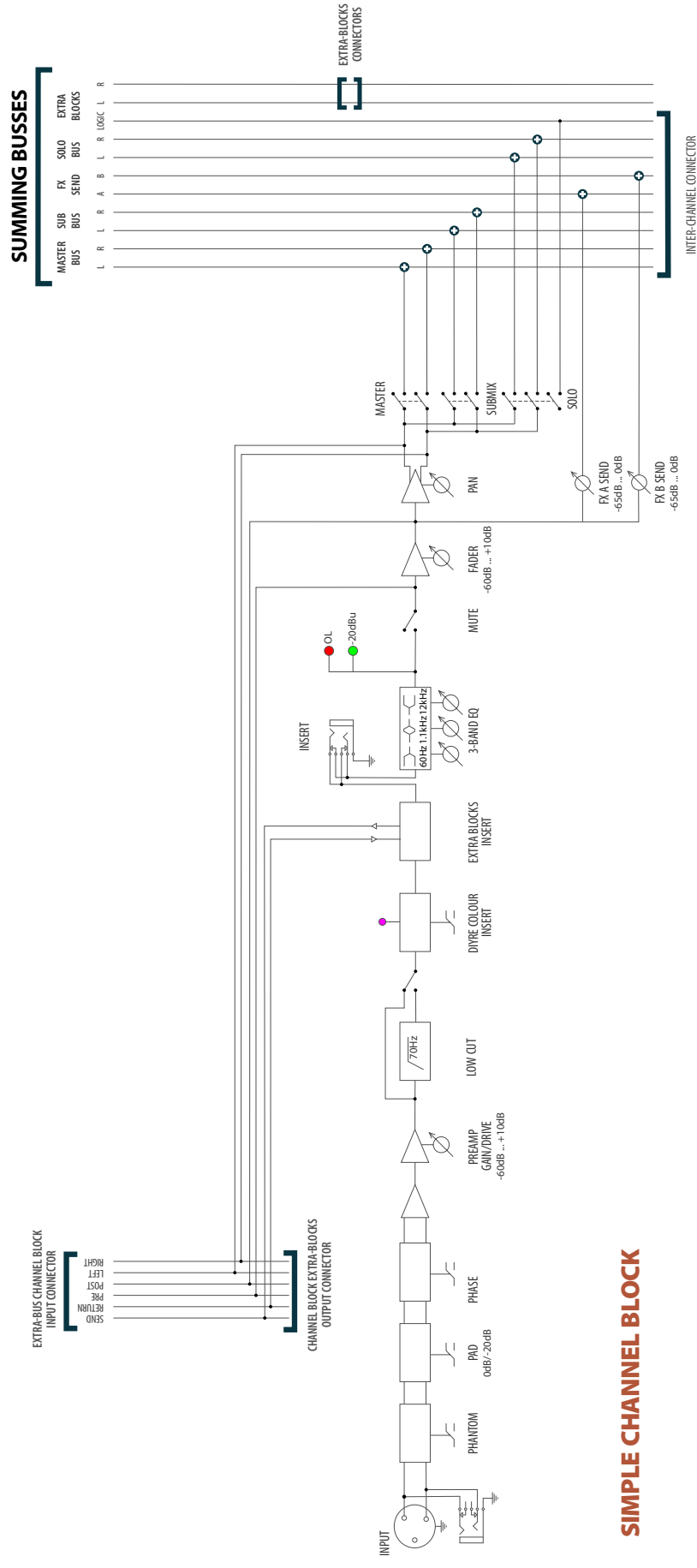
¹ Electronically, through 26 pins connectors and mechanically, through “puzzle” pieces for MDF enclosures and M3 screws for sheet metal ones.
² Also connected like above

CURRENT BLOCKS

SIMPLE CHANNEL BLOCK

Signal flow diagram

This is a simple but complete mono channel strip



SIMPLE CHANNEL BLOCK

Description

1 **Input XLR/jack combo:**

This is the channel's balanced input, connect an instrument or microphone here. It accepts both XLR and 1/4" jack connectors. Unbalanced jacks can also be connected.

2 **Channel insert jack:** The 1/4" jack allows the insertion of an external effect in the channel's signal path.

3 **Extra blocks connector:** This is a 16 pins female connector used to connect and send audio signals to "extra" blocks.

4 **-20dB pad switch:** When pressed, attenuates the signal by 20dB.

5 **Phase invert switch:** Inverts the signal's polarity when activated.

6 **Phantom power switch & LED:** Used for powering condenser microphones, this switch activates the 48V phantom power on the channel's input.

7 **DIYRE Colour bypass switch & LED:** If a DIYRE Colour module is installed in the channel, this switch bypasses the Colour insert. The RGB LED lights to the unique colour indicated by the Colour module's type.

ATTENTION: if no COLOUR module is installed, the switch should be set to ON (pressed).

8 **Gain/drive knob:** This input gain knob is used to trim/amplify the incoming signal. If a preamplifier board is installed, setting this knob above 0dB will drive the preamplifier.

9 **Effect sends knobs:** These knobs are used to send more or less of the channel's signal to one of the two effect send buses (called A and B) included by default in MIXERBLOCKS. The signal is taken after the fader (post-fader.)

10 **3-band equalizer:** This is the channel's equalizer. The circuit is very simple and transparent. The frequency ranges chosen for the three bands (60 Hz, 300 Hz -1.9 Hz, 12 K Hz) as well as the +/-10 dB

gain ranges give a very pleasant sounding EQ.

11 **Low cut switch:** This switch activates a 2 pole low cut filter with a cutoff frequency of 70 Hz. It can be used to reduce low frequency rumble.

12 **Pan knob:** The pan knob controls the channel's signal's panoramic (left/right) position. With the knob in the middle position the signal is sent to both the left and right channels equally, while all the way to the left (L), the signal is only sent to the left channel and all the way to the right (R), the signal is only sent to the right channel.

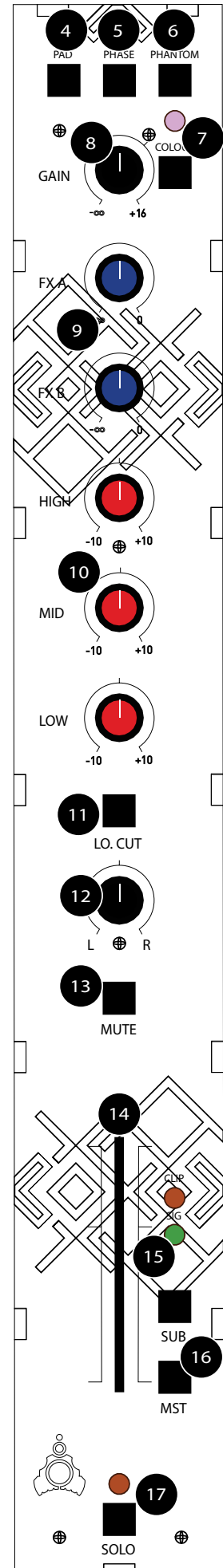
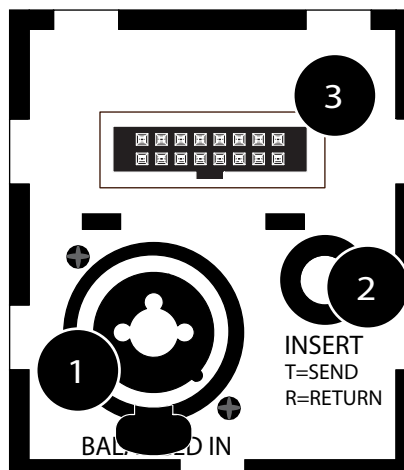
13 **Mute switch:** This mutes the signal before the fader (and implicitly the sends and submix buses are also muted).

14 **Channel fader:** This fader controls the level of the channel signal. It has a 10 dB gain range at the top and a 0 dB indicator.

15 **Signal present and clipping LEDs:** These LEDs allow you to monitor your signal: the green signal present LED lights if a signal above -20 dBu is present and the red clipping LED lights if the signal goes above 0 dB.

16 **Routing switches:** To route the panned left and right signals to either of the master or submix buses, use these switches.

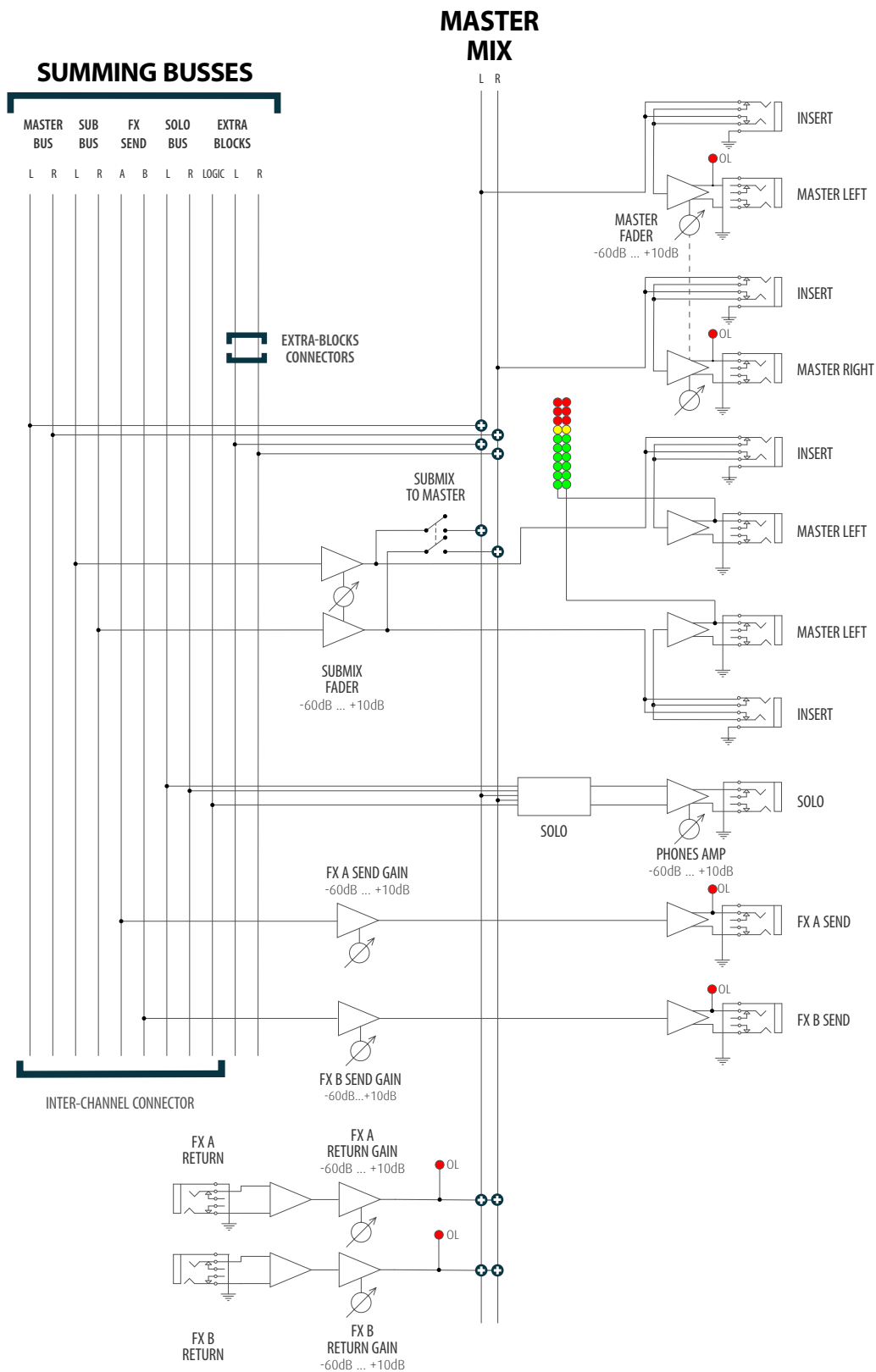
17 **Solo switch and LED:** This activates the solo mechanism on the headphones output.



MAIN DOCKING BLOCK

General signal flow
diagram

DOCKING BLOCK



Description

1 **Power LED:** Indicates that the unit is powered correctly.

ATTENTION! If the LED stops lighting even though the power supply is turned on and connected, immediately turn off the power supply and disconnect it. Afterwards, you can check the fuses or troubleshoot the supply.

2 **Effects send gain knobs :** These knobs control the effect send buses' gains from off to 0 dB.

3 **Effect sends clipping LEDs:** If one of the signals sent to the effect send outputs is clipping, the respective LED will light (in this case, lower either the general effect send gain (2) or one of the individual channel send levels).

4 **Effect return gain knobs:** These knobs control the gain for external effects' return signals connected to the docking block, before being routed to the master bus.

5 **Effect return clipping LEDs:** If one of the effect return signals is clipping before being mixed to the master bus, the respective LED will light up (in this case, lower the general effect return gain (4) or alter the effect's settings so as to avoid clipping).

6 **Phones output gain knob:** Controls the headphones amplifier's gain.

7 **Solo LED:** This LED lights up whenever any of the channels is soloed.

8 **Submix clipping LEDs:** Clipping LEDs for the submix left and right buses.

9 **10 LEDs stereo vuMeter:** This is a 3 dB/LED 10 segment peak meter for the master left and right buses. The meter is calibrated to display a 9 dB clipping headroom.

10 **Master and submix faders:** Faders to control the master and submix buses' levels.

11 **Submix to master routing switch:** This switch allows routing the submix left and right buses to the master left and right buses.

Inputs, outputs & inserts

12 **Power connector :** The external power supply is connected here to power the console.

13 **Effect sends balanced outputs:** Effect sends A and B buses are output through these balanced jacks. These outputs should be connected to some external effects' inputs.

14 **Effect returns balanced mono inputs:** The output signal from the external effects from above is returned into the console through these balanced input jacks.

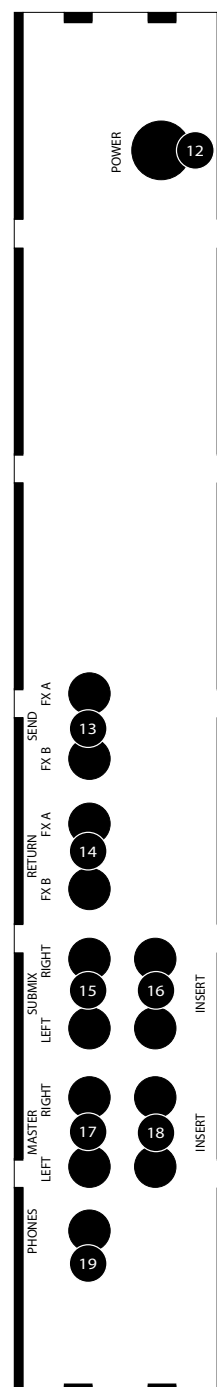
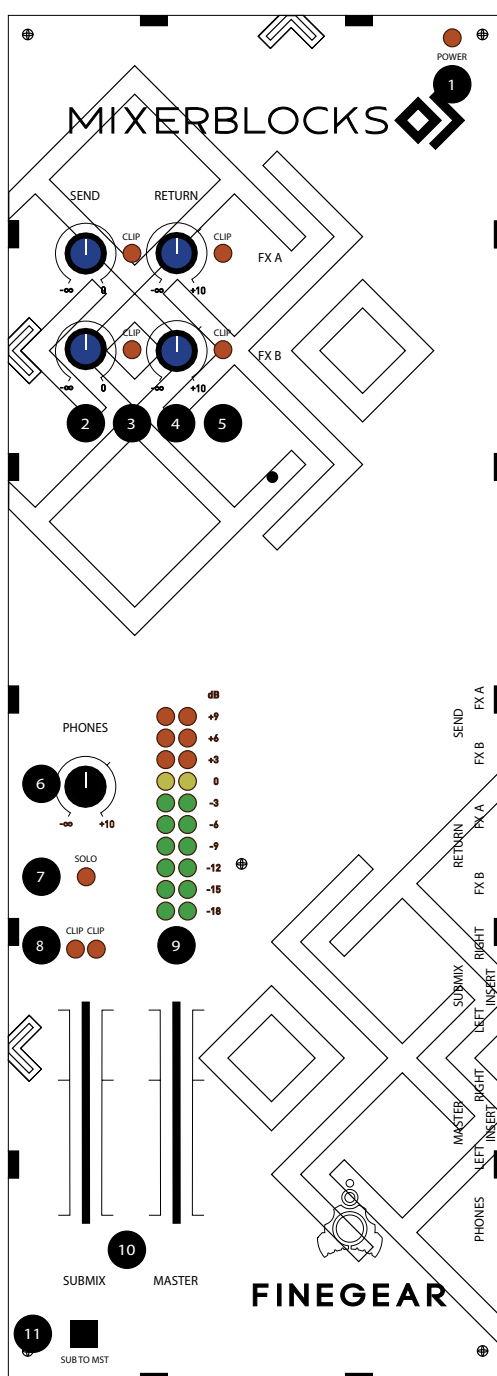
15 **Submix stereo balanced outputs:** These are individual (left and right) balanced outputs for the submix buses.

16 **Submix stereo inserts:** Insert points for the left and right submix buses.

17 **Master stereo balanced outputs:** These are individual (left and right) balanced outputs for the master buses.

18 **Master stereo inserts:** Insert points for the left and right master buses.

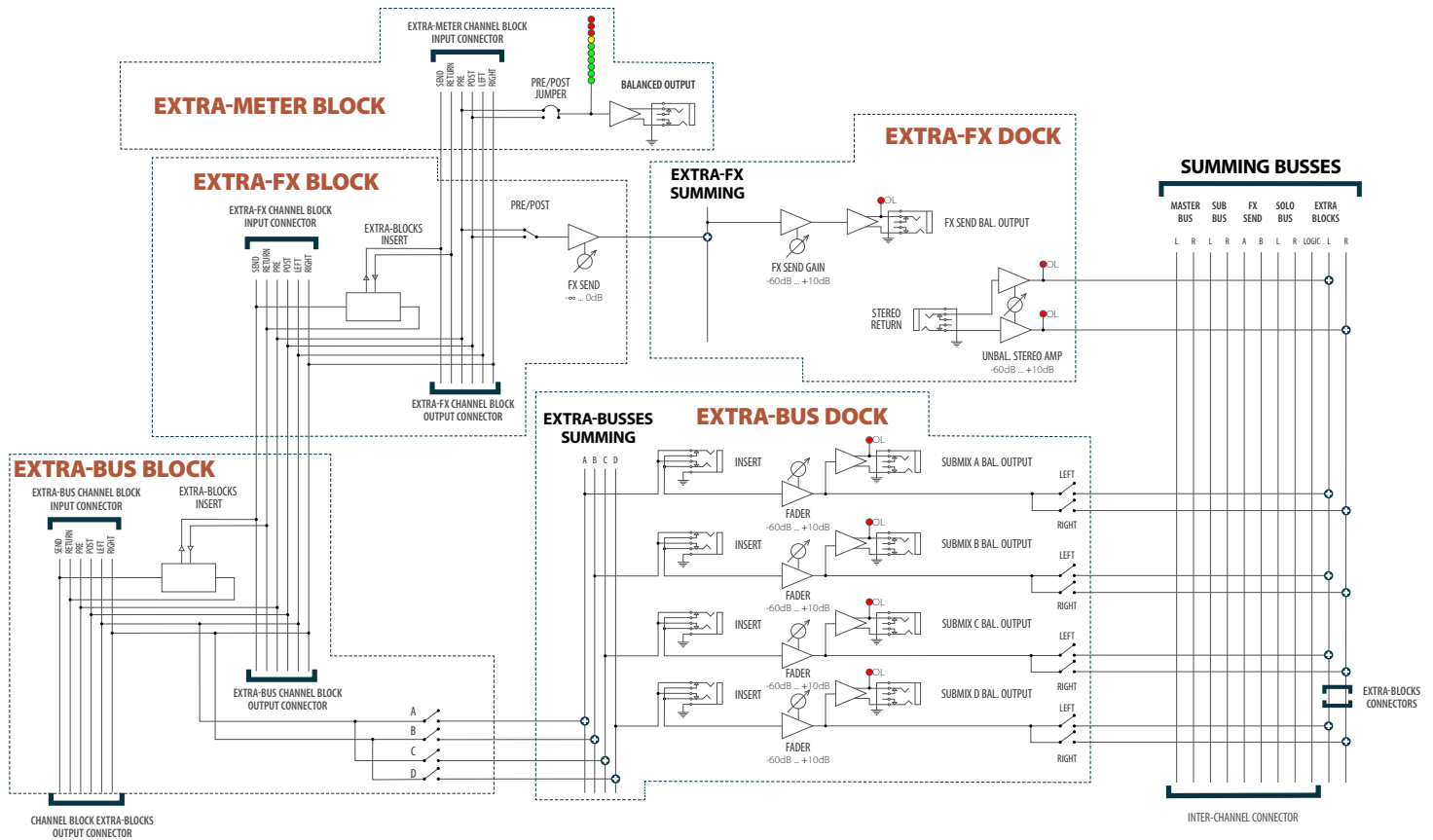
19 **Phones output:** Headphone amplifier output jack.



EXTRA BLOCKS

Signal flow diagram

The extra blocks connect to a channel (and their own dock) and between themselves, if more rows are used, as seen in the drawing.



General description

The extra blocks are modules that can be connected to the channels or to the dock or to each other in order to add routing, processing or visualizing features to the mixing console. The blocks are connected to the channel block through a connector that carries audio signals and power.

Each block can use any or all of the following signals picked from the channel:

- Pre-insert jack insert signals (send/return)
- Pre-fader signal
- Post fader signal
- Left channel
- Right channel

The electronic insert mechanism included in the channel and in each extra block, allows to break the signal path in order to “insert” a processing module in the channel’s signal chain if this is desired. You could, for example, insert a compressor effect to modify the sound.

The signals passing through the extra-block connectors are:

- | | |
|-----------------------|---------------------------|
| 1 Reserved | 9 Reserved |
| 2 Insert point send | 10 Post fader signal |
| 3 +15 V | 11 LED +15 V |
| 4 Insert point return | 12 Left signal |
| 5 -15 V | 13 LED -15 V |
| 6 Pre-fader signal | 14 Right signal |
| 7 GND | 15 LED GND |
| 8 Reserved | 16 EARTH (chassis ground) |

EXTRA BUSES BLOCKS

Signal flow diagram

The extra buses (XBUS) blocks add extra submix buses by groups of four. A channel with one or more X-BUS blocks can have its left or right channels routed to one of the four submix buses. Each of these buses has a volume fader, a clipping LED, routing switches to the left and right master channels as well as a balanced output and an insert jack.

XBUS channel

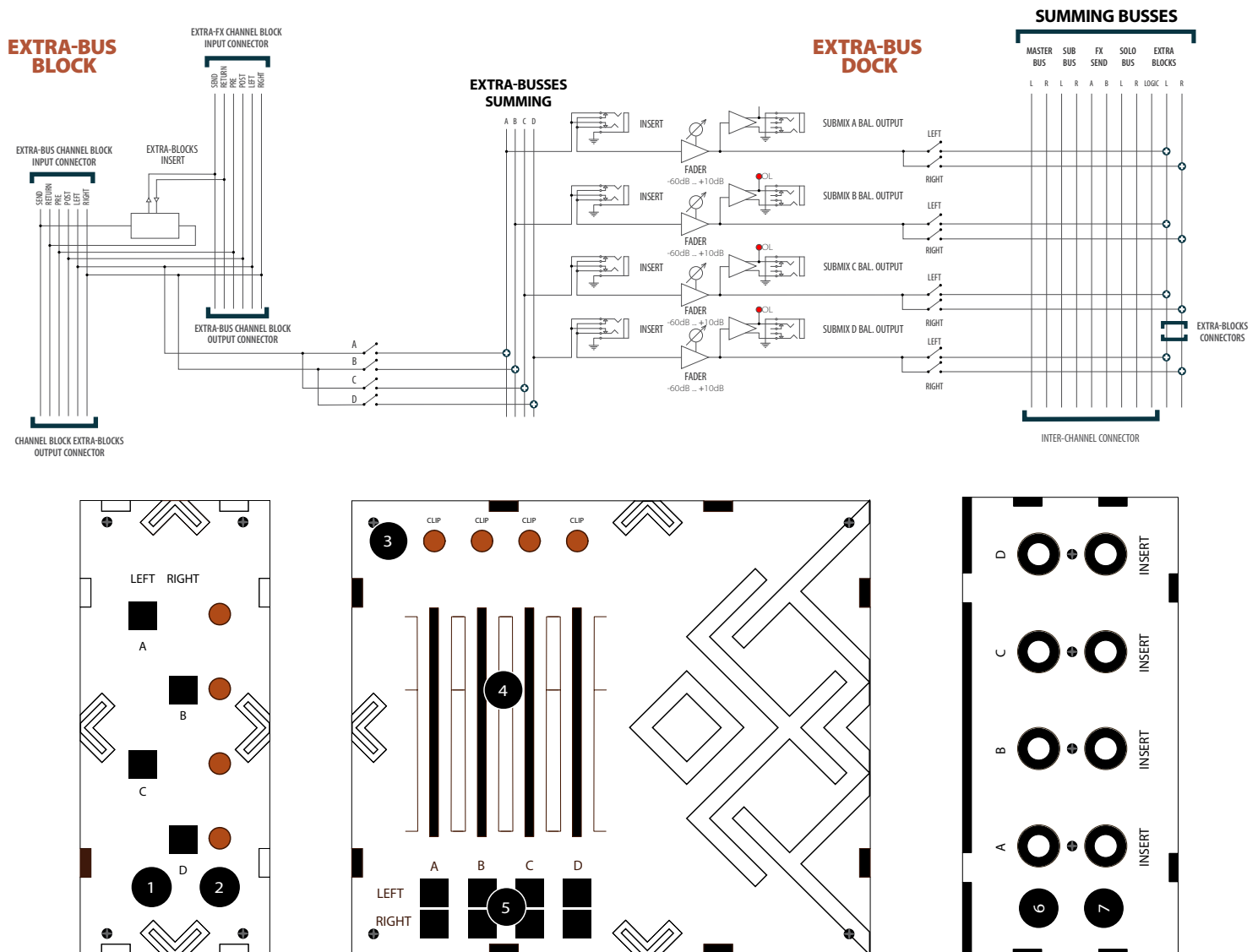
- Buses routing switches:** These switches are used to route either the left channel to submix busses A or C or the right channel to submix buses B or D.
- Buses routing LEDs :** Visually indicates which routing is activated.

XBUS dock

- Buses clipping LEDs:** Clipping LEDs for each of the four extra busses (A, B, C and D).
- Buses volume faders:** Volume fader for each of the extra buses.
- Buses to master mix routing switches :** Switches to route each of the submixes to left and/or right of the master bus.

Outputs and inserts

- Buses balanced individual output jacks:** These are individual balanced outputs for each of the submix buses.
- Buses insert jacks:** Insert points for each of the submix buses.



EXTRA SEND/RETURN BLOCKS

Signal flow diagram

The extra effects send/return (XFX) adds a supplementary effect send/return to the console. Thus, a channel's pre-fader or post-fader signal (selected with the PRE/POST switch) is routed to a balanced audio output to be connected to an effect's input, while the effect's output can be returned to the console through two (left and right) unbalanced jacks.

XFX channel

- 1 Effect send knob:** Sets how much of the channel's signal is sent to the effect send bus.
- 2 Pre/post fader routing switch:** Selects between the pre-fader or post-fader signal to be sent to the effect.

XFX dock

- 3 Effect send mix gain knob:** This knob controls the effect send busses' gain from off to 0 dB.
- 4 Effect send clipping LED:** If the signal sent to the effect send output is clipping, this LED will light (in this case, either lower the general effect send gain (3) or one of the individual channel send levels).
- 5 Effect return gain knob:** This knob controls the gain for external effects' stereo return signal before being routed to the master bus.
- 6 Effect return clipping LED:** If the effect return signal is clipping before being mixed to the master bus, this LED will light up.

(In this case, lower the general effect return gain (4) or alter the effect's settings so as to avoid clipping.)

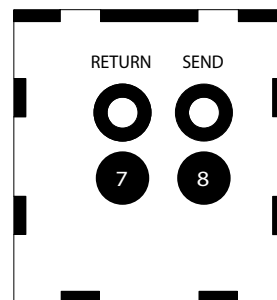
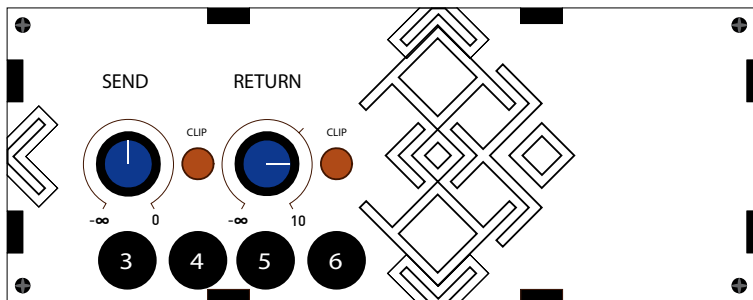
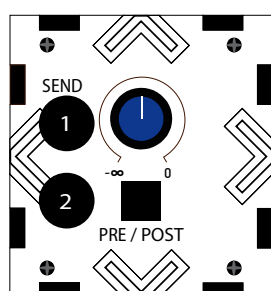
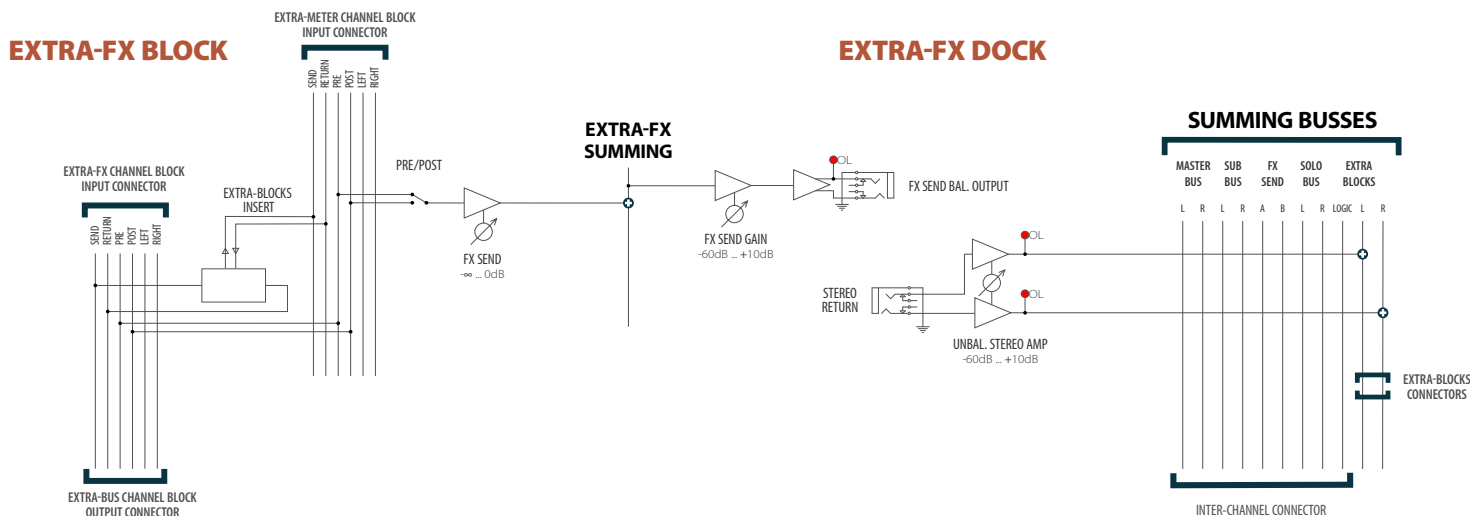
Inputs and outputs

7 Effect send balanced output

The signals sent from the channels are mixed and output through this balanced jack. This output should be connected to some external effects' input.

8 Effect return unbalanced stereo inputs

The output signal from the external effects from above is returned into the console through these balanced input jacks.



EXTRA METER & OUTPUT BLOCK

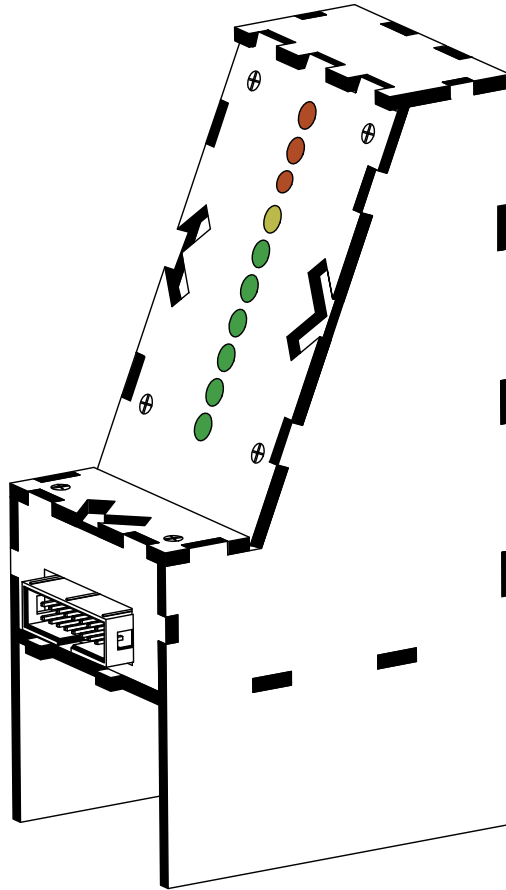
The extra meter and output block (XMETER) contains

- 10 LED peak meter
- balanced output jack
- insert jack.

This block is a special extra block because there can be only one of these blocks per channel and it always has to be the last one connected to the channel's row of extra blocks.

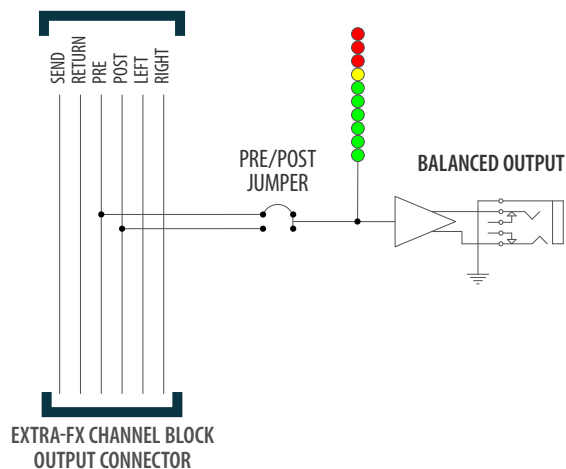
This is because there is no need for more than one peak meter per channel and usually there's no need for multiple outputs per channel either.

Another reason is a mechanical one: in order to be easily seen, the meter is mounted at an angle, giving this enclosure an slanted shape which would obscure any other block connected behind it.

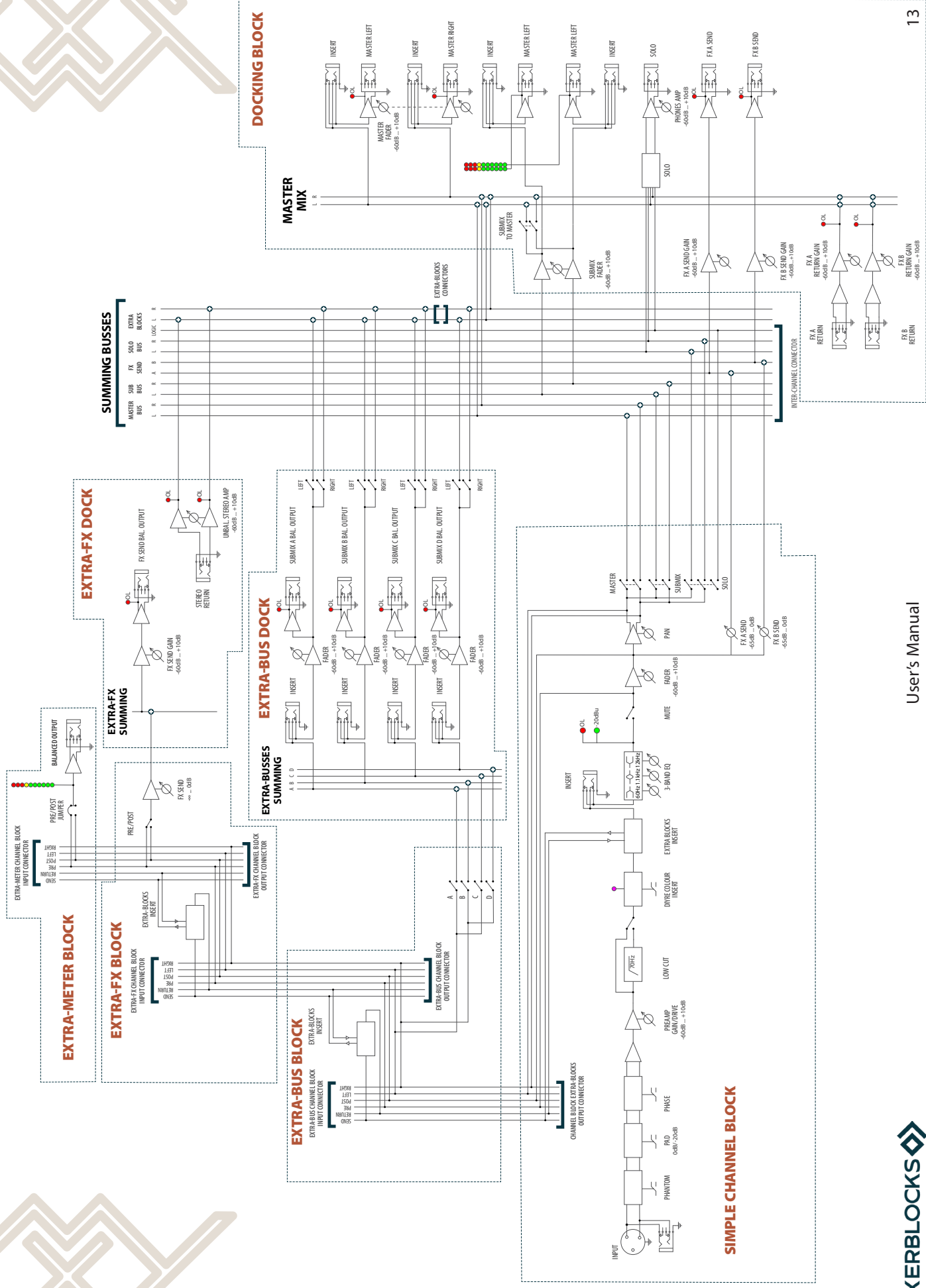


EXTRA-METER BLOCK

EXTRA-METER CHANNEL BLOCK
INPUT CONNECTOR



GENERAL SIGNAL FLOW



TECHNICAL SPECIFICATIONS

BASIC CHANNEL BLOCK

Current draw: max 120 mA

Input impedance:

- 11 k Ω unbalanced
- 22 k Ω balanced

SNR: -93 dB

Crosstalk (at 1 kHz):

- channel mute: -70 dB
- channel down: -70 dB

Pad: 0 dB/-20 dB

Input amp gain: -60 dB ... 40 dB

Fx send gains: -65 dB ... 0 dB

EQ:

- gain high: ± 10.5 dB @ 60 Hz
- gain mid: ± 10.5 dB @ 300 Hz – 1.9k Hz
- gain low: ± 10.5 dB @ 12 kHz

LoCut frequency: 70 Hz

Fader amp gain: -60 dB ... +10 dB

Frequency response:

- Input to main: 20-20 kHz, +0/-0.5 dB
- Input to submix: 20-20 kHz, +0/-0.5 dB
- Input to effect sends: 20-20 kHz, +0/-0.5 dB

Dimensions (W x H x D, mm):

53 x 63 x 400

Weight: 450 g

DOCKING BLOCK

Current draw: max 0.35 A

SNR: -93 dB

Input impedance:

- FX return: 32k Ω unbalanced, 64 k Ω balanced

Output impedance:

- Main mix putput: 70 Ω unbalanced, 140 Ω balanced,
- Submix output: 70 Ω unbalanced, 140 Ω balanced,
- Effect send outputs: 70 Ω unbalanced, 140 Ω balanced,
- Phones output: 30 Ω

Crosstalk (at 1 kHz):

- Master down: -70 dB

Frequency response:

- Input to main: 20-20 kHz, +0/-0.5 dB
- Input to submix: 20-20 kHz, +0/-0.5 dB
- Input to effect sends: 20-20 kHz, +0/-0.5 dB

Master fader amp gain: -60 dB ... +10 dB

Submix fader amp gain: -60 dB ... +10 dB

Phones amp gain: -60 dB ... +10 dB

FX return amps gain: -60 dB..+10 dB

LED vuMeter: 3dB/LED pair

Dimensions (WxHxD, mm): 145 x 63 x 400

Weight: 970g

POWER SUPPLY (TOTAL AUDIO CONTROL VERSION)

Supply: 2.5 or 3.8 A

Voltage input: 110 V/ 220 V

Voltage output:

- +15 V
- -15 V
- +48 V

Max current draw: 3800 mA

Dimensions (W x D x H, mm): 260 x 380 x 70

Weight: 4.5 kg



MIXERBLOCKS USER'S MANUAL

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(c) April 2018