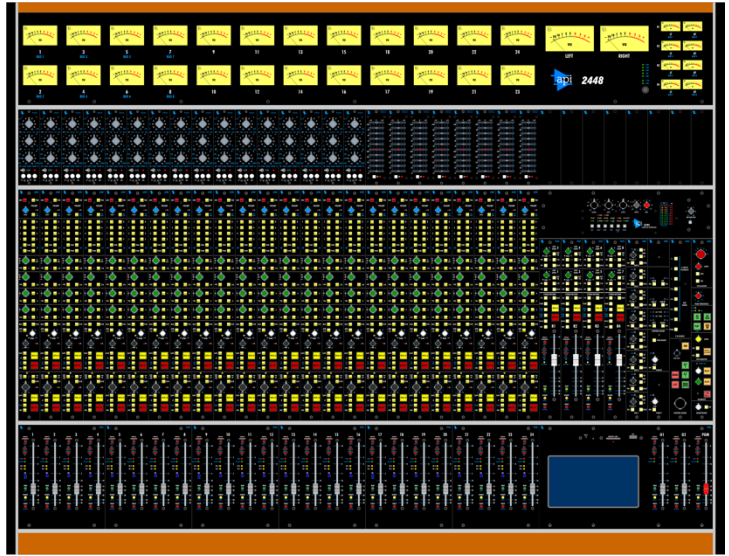
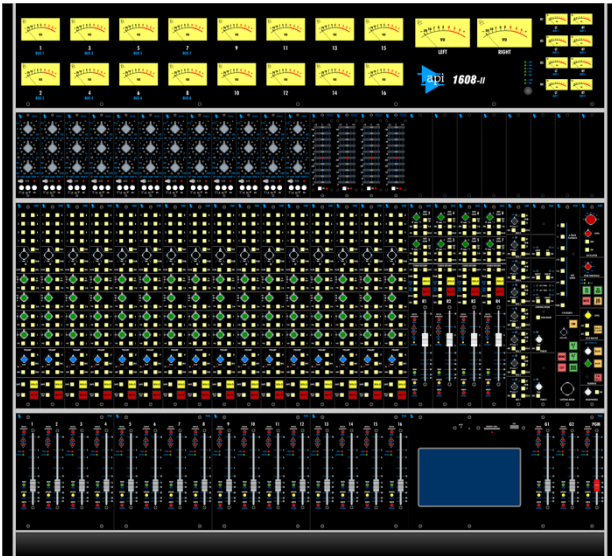


1608-II and 2448 Recording Console Operator's Manual



Automated Processes, Inc.



Written for Automated Processes, Incorporated
by Dan Pfeifer
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Automated Processes, Inc.

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About This Manual

This manual explains the operation and applications of the API 1608-II and 2448 recording consoles. Both consoles are an evolution of the original API 1608 console that was released in 2008 and are identical in regard to Program Bus, Summing Bus, and Auxiliary Bus architecture, Stereo Returns, Metering, and most Master Section function and features. The primary difference between the two consoles is the 2448 is an "in-line" console with "*dual audio path*" channels capable of simultaneously delivering audio sources to the multitrack recorder and mixing the multitrack returns. The 1608-II is a "*single audio path*" console with channels capable of recording or mixing, but not at the same time. More specifically the 1608-II is equipped with 16 "*single audio path*" channels and the 2448 is equipped with 24 "dual audio path" channels. The 2448 can also be equipped with an optional 529C Stereo Bus Compressor.

The specifics of the signal flow architecture and channel modules for each console is described in detail in separate sections. The remaining console functions and features are discussed in sections that are common to both consoles, with the few differences between console included.

The channel signal path in the 1608-II will be referred to as the "channel path." The two channel signal paths in the 2448 will be referred to as the "Large Fader path" and "Small Fader path" respectfully. This terminology uses the same conventions used on the API Legacy AXS console. It should be noted that the level control for the 2448 Small Fader path is a rotary potentiometer, not a fader, but it's signal path is referred to as the "Small Fader path."

Legend:

- **UPPER-CASE BOLD = SWITCHES, BUTTONS, POTS, & FADERS**
- **UPPER-CASE = REAR PANEL CONNECTIONS**

Manual Revision History: YYYY-MM-DD format

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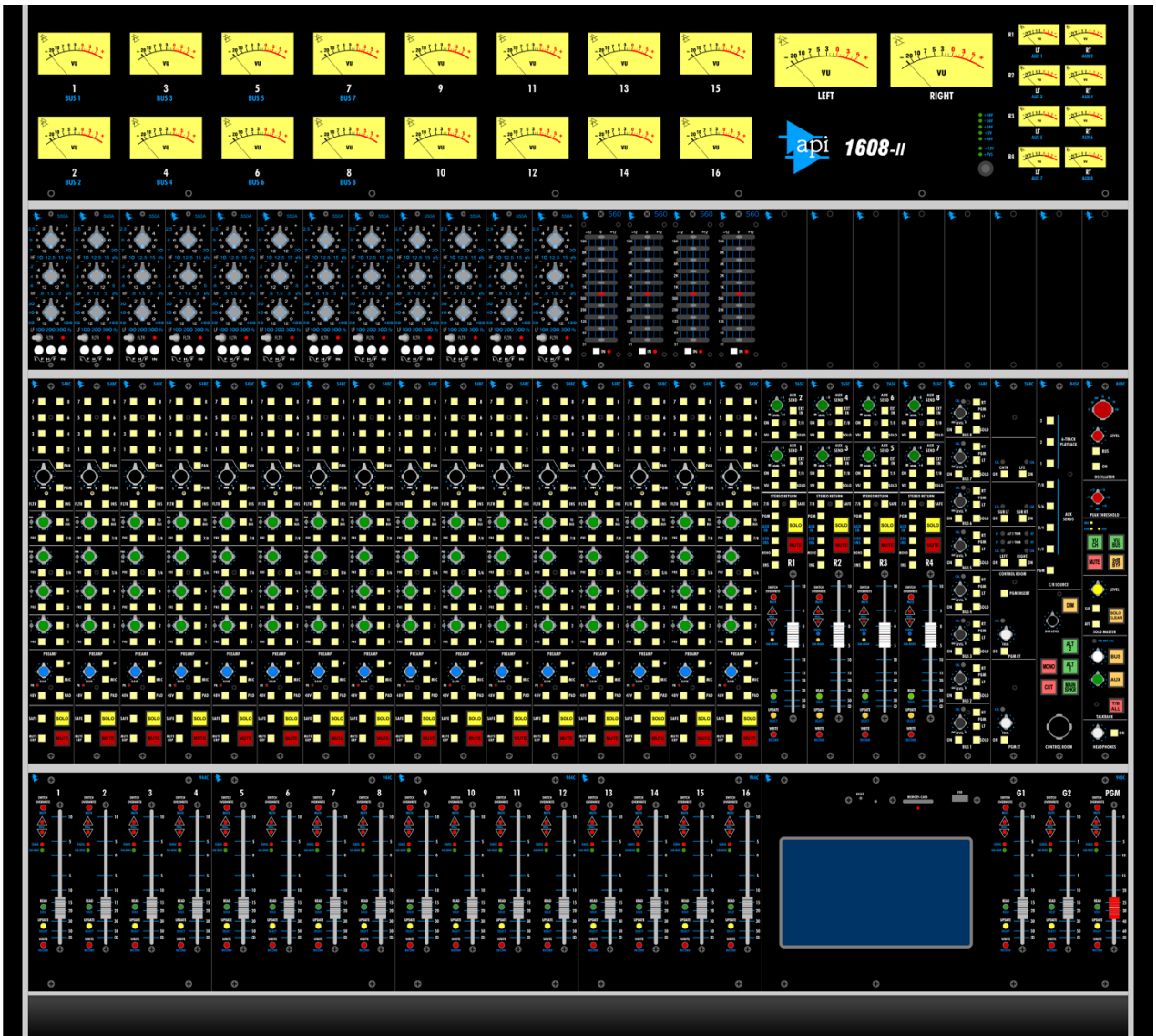
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1.0 Introduction

Building on API's rich heritage of extremely high-quality recording consoles, we introduce the new Model 1608-II, a full featured mid-format recording console based on the vintage API 1604 and modern 1608 consoles.

1.1 1608-II Overview

The 1608-II gives all of the advantages of the vintage 1604 and classic 1608 consoles while adding new, modern features valuable to today's engineers, producers and musicians. A major upgrade is the inclusion of four (4) automatable stereo returns instead of the 8 mono echo returns that were included in the classic 1608 console.



The 1608-II continues to be built to the same exacting API build standards as our Vision, Legacy AXS, 2448, and previous 1608 consoles.

1.1.1 1608-II Features

- 16 Input Channels each with Mic Pre and Equalizer
- Accepts up to eight VPR Alliance 500 Series signal processing modules
- 8 Summing Buses

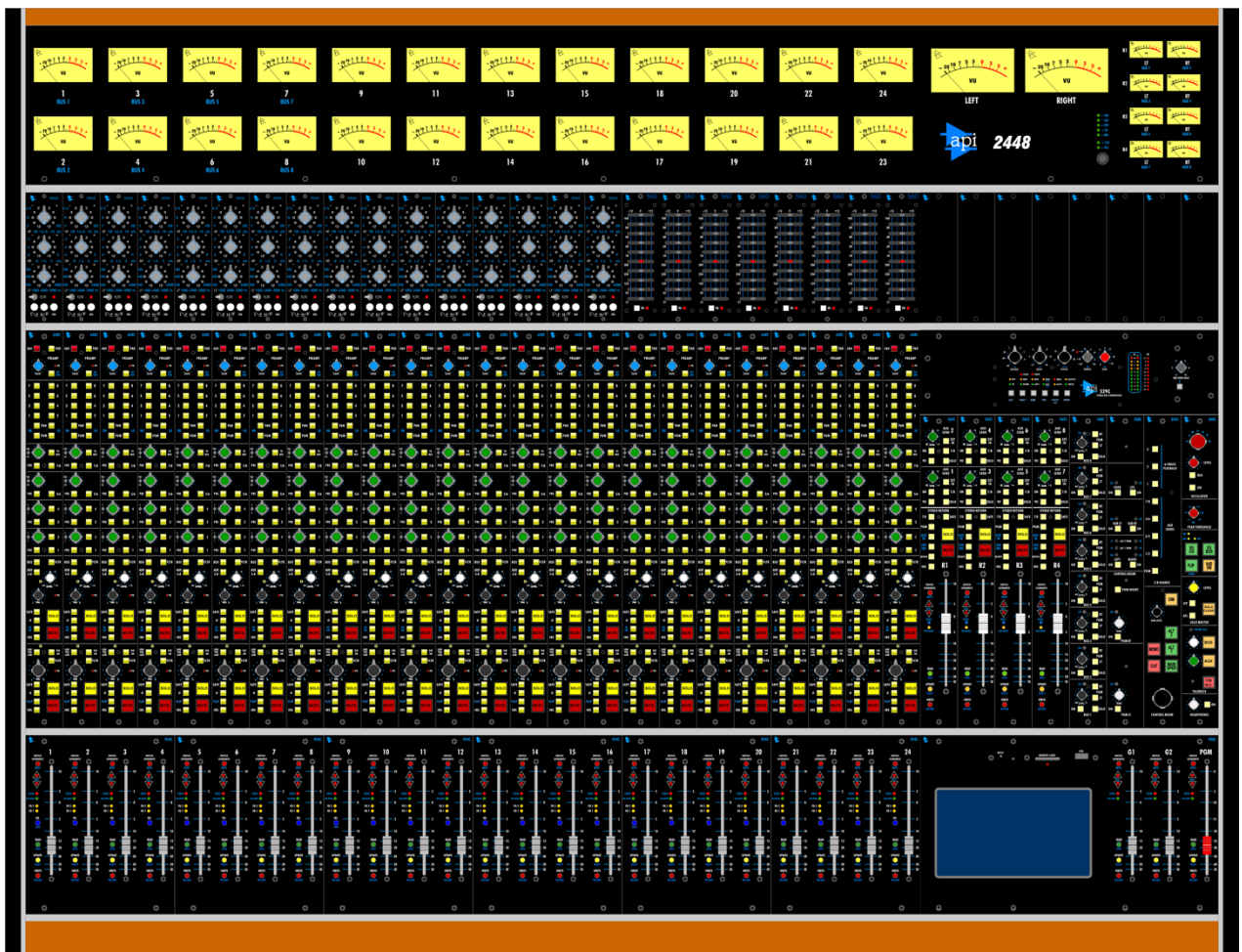
- 8 Auxiliary Buses
- 1 Stereo Bus
- 4 Stereo Returns
- Full Master Section
- Switchable Metering
- 5.1 External Input Monitoring
- Comprehensive Rear Patch Connections
- Optional *Final Touch™* Automation System, with 2 Automatable Control Group Masters

1.1.2 1608-II Standard Configuration

- 16 548C Single Signal-path Channel modules with Mic/Line and Direct Output
- 12 550A Equalizers
- 4 560 Equalizers
- 4 265C Stereo Returns
- 8 500 Series Slots (empty)
- 1 Complete Master Section
- 16 Channel Faders
- 1 Stereo Master Fader

1.2 2448 Overview

The 2448 is a new dual-signal path, inline recording console based on the vintage 1604 and classic 1608 consoles, but provides 24 channels of multitrack recording and 56 channels for mixing. The 2448 provides all of the advantages of large-format console in a smaller, more affordable package.



The 2448 is built to the same exacting API build standards as our Vision, Legacy AXS, 1608, and 1608-II consoles.

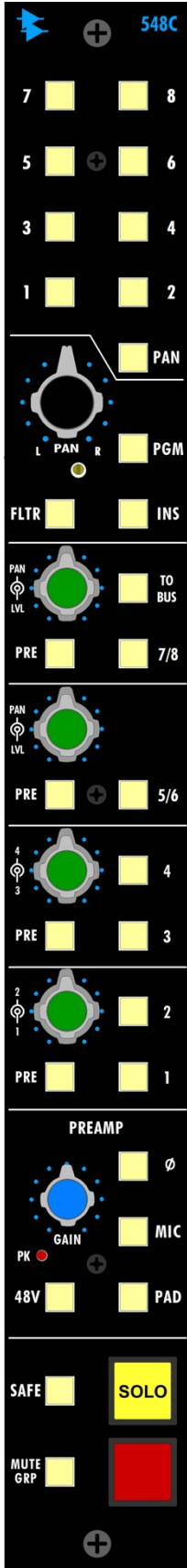
1.2.1 2448 Features

- Dual audio path architecture: Two complete audio paths in each channel
- 24 Input Channels each with Mic Pre and Equalizer
- Accepts up to eight VPR Alliance 500 Series signal processing modules
- 8 Summing Buses
- 8 Auxiliary Buses
- 1 Stereo Bus
- 529C Stereo Bus Compressor (optional)
- 4 Stereo Returns
- Full Master Section
- Switchable Metering
- 3 Peak Indicators Per Channel
- 5.1 External Input Monitoring
- Comprehensive Rear Patch Connections
- Optional *Final Touch*TM Automation System, with 2 Automatable Control Group Masters

1.2.2 2448 Standard Configuration

- 24 648C Dual Signal-path Channel modules with Mic/Line Inputs and Direct Output
- 16 550A Equalizers
- 8 560 Equalizers
- 1 529C Stereo Bus Compressor (optional)
- 4 Stereo Returns
- 8 500 Series Slots (empty)
- 1 Complete Master Section
- 24 Channel Faders
- 4 Stereo Return Faders
- 1 Stereo Master Fader

2.0 548C Channel Module (1608-II)



The 548C Channel module provides a single audio path for bringing signals into the console for mixing and/or routing to external destinations. Together with the 444C or 944C channel fader, it provides a comprehensive audio path for a variety of applications:

- Microphone/line preamplifier
- Equalizer
- High-pass filter (50Hz, 12dB/octave)
- Balanced insert
- Eight (8) auxiliary sends
- Fully featured mute and solo section
- Assignable mute group
- Assignable pan-pot
- Direct output
- Stereo program bus and summing bus assignments
- Peak indicator
- Globally assignable VU meter
- Solo with "safe" mode
- Channel mute

All eight auxiliary sends can be routed either pre or post-fader. Aux Sends 7/8 can be routed to feed the Summing Buses 1-4.

2.1 1608-II Signal Path Architecture

From top to bottom the following components make up a complete 1608-II channel strip:

- Channel VU Meter
- 500 Series Slot: Channel EQ
- 548C Channel Module
- 444C or 944C Fader Module

The 1608-II is a single audio path console, having only one audio path per channel. Each channel strip provides a single audio path for multitrack recording or mixing. The audio path can route microphones to a multitrack recorder or route multitrack returns and other sources to the Program Bus for mixing.

2.1.1 548C Channel Input Selection

There are two choices of input sources, LINE IN and Preamp output.

LINE IN: Main channel input for mixing and multitrack returns while recording.

- Typically connected to the output of the multitrack recorder
- Fed from LINE INPUT female XLR connector on the rear panel
- Balanced, low-impedance, line-level input
- -6dB LINE PAD can be engaged
- Default channel input

PREAMP: This is the output of the 548C channel microphone preamp.

- Pad, 48V Phantom Power, +55dB Gain

As noted above, the default channel input is LINE IN. The output of the microphone Preamp can be selected by engaging the **MIC** button. Only one input source can be selected at a time.

2.1.2 548C Channel Output Routing

The channel has access to three primary output assignment possibilities:

- Direct Output
- Summing Buses 1-8
- Stereo Program Bus

Direct Output: Primary channel output for recording.

- Feeds the DIRECT OUT D-sub connector on the rear panel
- Balanced, low-impedance, line-level output
- Continually fed from the channel audio path

Summing Buses (1-8): Eight (8) Summing Buses

- Routes the channel path to the selected Summing Bus(es)
- Summing Bus assignments are made by engaging the desired **1-8** buttons

Stereo Program Bus (PGM): Primary channel output for mixing.

- Feeds the channel output to the Left-Right stereo Program Bus
- Program Bus assignments are made by engaging the **PGM** button

Panning: Channel pan-pot

- Left-Right panning to the Program Bus
- Odd-Even panning to the Summing Buses (when engaged)
- Center = -3dB/side pan law with center detent
- The **PAN**-pot is always active when the channel is assigned to the Program Bus
- The **PAN**-pot must be engaged at the channel output to enable Odd-Even panning to a pair of Summing Buses
- The **PAN**-pot can be inserted before the Summing Buses by engaging the **PAN** button

2.1.3 Session Signal Flow

For those familiar with other single-path recording consoles, the channel can function as a “mic” or “channel” path to route microphones and DI’s to a multitrack recorder or function as a “monitor” or “mix” path, bringing multitrack and other sources to the Program Bus for stereo mixing. The choice of function depends on needed workflow and the operational controls and signal flow are well suited for either function.

The channel path can provide a different function during the various types of recording sessions. The signal routing of input and output of the channel audio path is handled by the 548C Channel module.

Multitrack Recording and Overdubs: In a typical multitrack recording session, the channel strip functions as follows:

- **Record Path (channel path, input path, mic path):** The channel path carries the signals from the microphone preamp, DI, or other input source to the multitrack recorder.
 - Routed via Direct Output or the 8 Summing Buses
 - Signal processing is often recorded to the multitrack so filters, EQ, and inserts are assigned to the record path as needed
- **Monitor Path (mix path, return path):** The stereo mix is accomplished in the DAW and returned to the Monitor section of the console.

Stereo Mixing: In a typical mixing session, the channel strip functions as follows:

- The channel is the main mix path from the multitrack returns to the Program Bus
- The four Stereo Returns can also be used to route additional returns from multitrack stems or other sources such as effect units to the mix
- Summing Bus Masters 1-8 have an external input (BUS MIX IN) and can be used to route stems and effects returns to the Program Bus
- In combination, a total of 32 inputs are available while mixing on a 16-channel console
- Signal processing is often applied to channels contributing to the mix, so the channel EQ, insert, and other processes are assigned to the audio path as needed while mixing
- The channels and Stereo Returns contributing to the mix are routed to the stereo Program Bus

Default 1608-II Signal Flow: With no routing buttons engaged, the default channel signal flow is as follows:

Channel Audio Path:

- Input: LINE IN (assignable output of the 548C Preamp)
- Signal Processing: Polarity Inverter, EQ, Insert, & High-pass Filter
- Output: Direct Output (assignable Summing Buses & Program Bus)
 - **PAN**-pot output is routed to the Program Bus by default
 - **PAN**-pot assignable to the Summing Buses

This default channel signal flow can be altered by changing the positions of the **MIC** button:

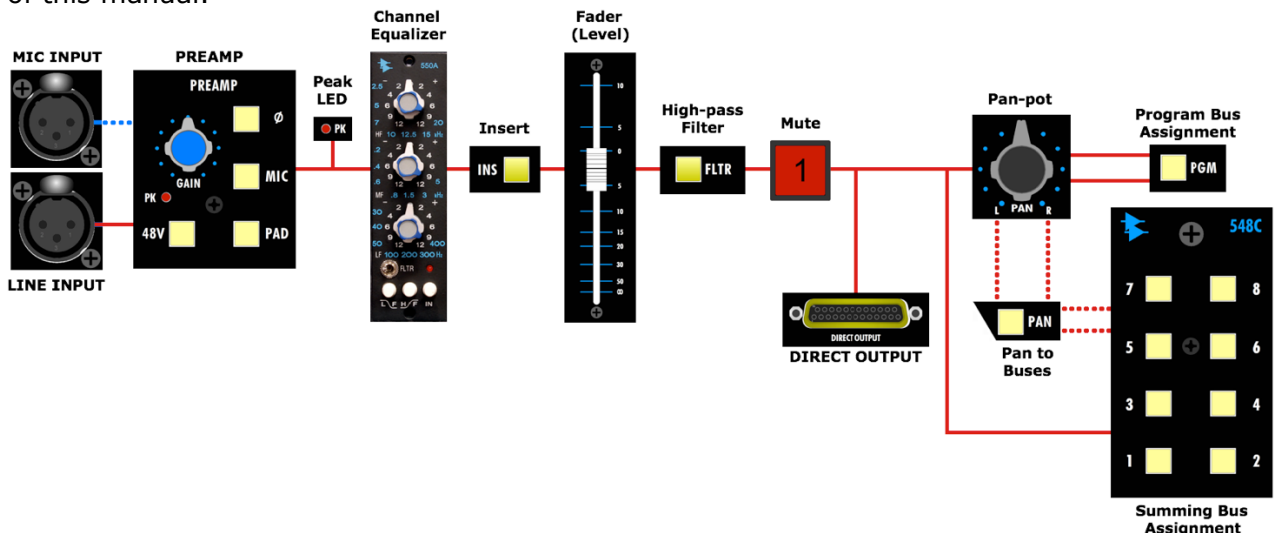


MIC (Microphone): Routes the output of the microphone Preamp to the channel audio path.

- Disengages LINE IN as the source for the channel audio path
- Illuminates when engaged

2.1.4 Simplified 1608-II Channel Signal Flow Diagram

The simplified block diagram below indicates the signal flow through the channel audio path. A more technical and detailed signal flow is available in the 1608-II Block Diagram in the appendix of this manual.



The features of the channel path are shown in the order in which they occur. The diagram assumes the following:

- Solid lines show the default signal flow
- Dotted lines show signal flow options
- A 550A Equalizer is installed in the 500 Series EQ slot
- The **MIC** button is in default positions (not engaged)
- Pan-pots are not routed to the Summing Buses
- Auxiliary Sends, 0dB Fader Bypass, solo sends, and VU meter are not included

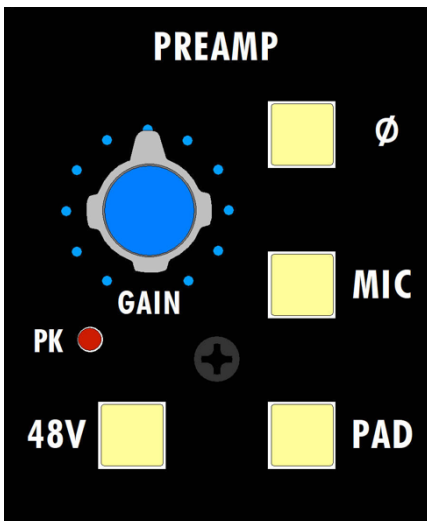
2.1.5 0dB Fader Bypass

The channel fader can be bypassed allowing the audio to pass at unity gain (0dB). This is helpful when the console is used with DAW automation and as a control surface (*Final Touch™* automation required).



The Fader Bypass is engaged globally by engaging the **0dB** (0dB Bypass) button in the 840C Multifunction module. This option is not available on individual channels and is not shown in the diagram on the previous page.

2.2 548C Preamp Section



The preamp section of the 548C provides two (2) audio input options:

- Line Input
- Microphone Input

Line Input: Accepts balanced, low-impedance, line-level signals from the LINE INPUT connector. The Line Input has the following features:

- Default channel input
- -6dB Pad
- Peak Indicator

Microphone Input: Accepts balanced, low-impedance, microphone-level signals from the MIC INPUT XLR connector on the rear panel. It's essentially a classic API 212L microphone preamplifier with the following features:

- +55dB of gain
- -20dB Pad
- Peak Indicator
- Polarity Inverter (phase reverse)
- 48v Phantom Power

*NOTE: The **MIC** button must be engaged to use the microphone input.*

2.2.1 548C Preamp Controls

The controls for the 548C Preamp function as follows:

No Buttons Engaged: Line Input selected.

MIC: Selects the microphone preamp as the input for the channel.

- Illuminates when engaged

GAIN: Provides up to +55dB of gain for the MIC input.

48V: Provides 48 Volt Phantom Power to the MIC INPUT XLR connector on the rear panel.

- Illuminates in red when engaged

PAD: Inserts a pad for the microphone and line inputs.

- Mic Preamp pad is -20dB
- Line Input pad is -6dB
- Illuminates when engaged

Ø: Applies a Polarity Inverter (Phase Reverse) to the microphone input.

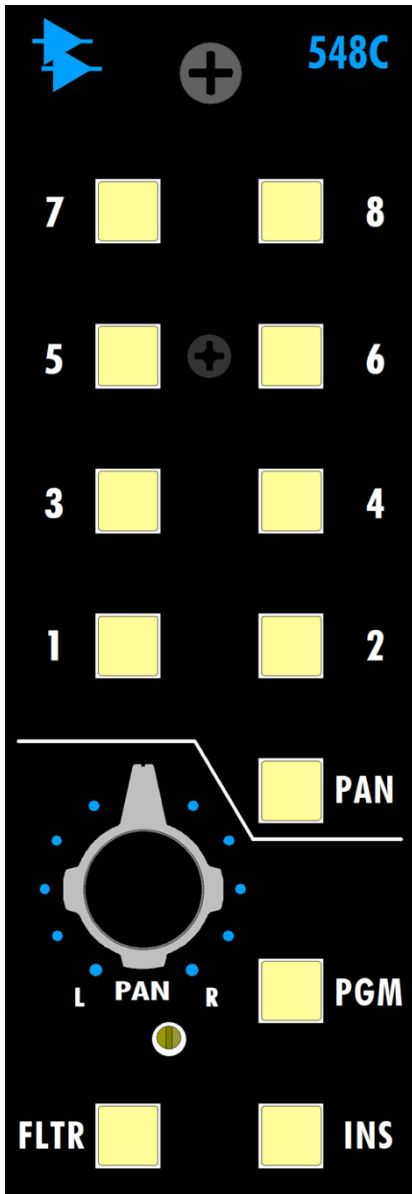
- Applies only to the mic preamp signal (does not apply to the Line Input)
- Illuminates when engaged

NOTE: The polarity inverter is part of the Microphone Preamp circuit and does not effect the Line Input signal.

PK (Peak): A LED Peak Indicator is located at the output of the preamp section.

- The PK indicator LED turns red when the peaks of the selected input signal crosses the threshold set on the 840C Multifunction module.

2.3 548C Routing and Output Section



The routing and output section of the 548C Channel module provides a comprehensive set of routing and output functions including:

- Insert
- High-pass filter
- Pan-pot
- Program bus assignment
- Summing bus assignment
- Direct Output

The output section provides three simultaneous audio output options:

- Direct Output: Direct balanced line output
- Summing Buses: Any of eight summing buses
- Program Bus: Left-Right stereo Program Bus (PGM)

Direct Output: The Direct Output feeds the channel output signal to the DIRECT OUTPUT connector on the rear panel. The Direct Output has the following features:

- The Direct Output is fed post-fader
- The Direct Output is always active except when the channel **MUTE** button is engaged
- Balanced, line-level output at the DIRECT OUTPUT 25-pin D-sub connector on the rear panel of each 8-channel section

Summing Buses: The channel output may be assigned to one or more of the eight Summing Buses. Some possible applications of the Summing Buses include:

- Multitrack channel assignments
- Multitrack summing
- 5.1 mixing
- Additional channel outputs
- Additional auxiliary sends
- Sub-grouping

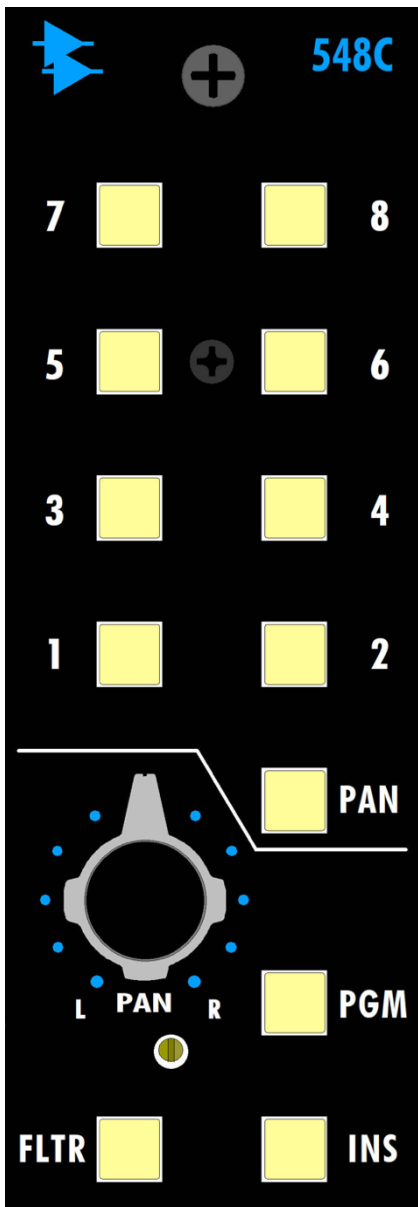
The summing buses include the following features:

- Individual Summing Bus assignments from the 548C Channel modules
- Switchable Odd-Even Summing Bus panning on the 548C Channel modules
- Routing from Auxiliary Sends 7 & 8 to Summing Buses 1-4 on the 548C Channel modules
- Individual ON/off, calibration, trim, solo, and Program Bus assignment controls on the 168C Summing Bus Master module
- Balanced, line-level outputs at the BUS OUTPUT 1-8 D-sub connector

Program Bus: The channel output can be routed to the Program Bus for stereo mixing and for the Left & Right channels of a 5.1 mix. The Program Bus includes the following features:

- Program Bus assignment from the 548C Channel modules
- Program Bus Insert via the 268C Program Master module and rear panel connections
- 440C or 940C Stereo Master Fader
- Individual Left & Right program channel ON/off, calibration, and trim controls on the 268C Program Bus Master module
- Balanced, line-level outputs via the LEFT & RIGHT PROGRAM OUTPUT XLR connectors

2.3.1 548C Routing and Output Controls



The controls for the 548C Routing and Output section function as follows:

Summing Bus Assignment 1-8: Assigns the channel output to one or more of the eight Summing Buses.

- Assignments to the Summing Buses can be made on an individual basis
- Summing Buses are fed post-fader or post the channel **PAN**-pot when engaged
- Summing Bus assignments are only active when engaged
- Switchable Odd-Even Summing Bus panning
- The Summing Buses 1-4 can be fed pre or post fader from Auxiliary Sends 7 & 8
- Illuminates when engaged

PAN (button): Enables Odd-Even panning between the assigned Summing Buses

- The **PAN** button must be engaged to enable summing bus panning
- The **PAN** button only applies to summing bus panning and does not affect Program Bus Left-Right panning
- Illuminates when engaged

PAN (pan-pot): Provides continuous panning control.

- Stereo panning between the Left & Right Program Buses
- Odd-Even panning between Summing Buses (when engaged)

PGM (Program): Assigns the channel output to the Program Bus.

- The Program Bus is fed post the channel **PAN**-pot
- Illuminates when engaged

FLTR (Filter): Activates the channel output high-pass Filter.

- -3dB at 50Hz
- 12dB/octave slope
- The channel output Filter is located post the Fader wiper and pre the Fader amplifier
- Illuminates when engaged

INS (Insert): Activates the channel Insert Return.

- The Insert Send is fed pre-fader from the output of the Equalizer
- The Insert Send is always active
- The Insert Send is a balanced, line-level signal routed to the INSERT SEND (EQUALIZER OUTPUT) ¼" tip-ring-sleeve jack on the rear panel
- The Insert Return accepts a balanced, line-level signal from the INSERT RETURN (FADER INPUT) ¼" tip-ring-sleeve jack on the rear panel
- The Insert Return is located post-EQ and pre-fader
- The Insert Return is active only when the **INS** button is engaged
- Illuminates when engaged

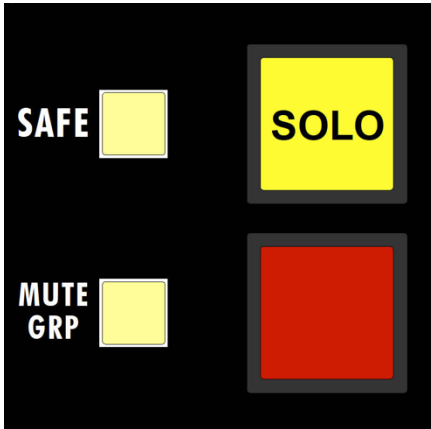
Trim-pot: The trim-pot below the channel **PAN**-pot calibrates the FADER IN to the Direct Output stage so the path is exactly at unity gain with the channel fader set to 0dB.

FADER (LEVEL): Level control for the channel path (not shown here) .

- 444C or 944C 4-channel Fader module
- 100mm audio-taper mono fader
- +10dB of gain
- $-\infty$ dB of attenuation
- Unity gain when set to 0dB
- Global 0dB Fader Bypass
- Optional automation (944C)

2.4 548C Mute & Solo Section

The 548C Channel module provides a comprehensive set of solo and mute controls.



SOLO: Activates the selected solo function.

- The following solo functions may be selected via the 845C Multifunction module:
 - Pre-fader Listen (PFL): Non-destructive, mono
 - After Fader Listen (AFL): Non-destructive, post-pan-pot (panned stereo)
 - Solo-In-Place (SIP): Destructive, panned, post-fader
- Illuminates in yellow when engaged

NOTE: PFL is the default solo mode.

SAFE: Activates the "Solo Safe" mode for that channel.

- The **SAFE** button protects that channel from being muted when the Solo-In-Place function is active and another channel or a Stereo Return is soloed
- Illuminates when engaged

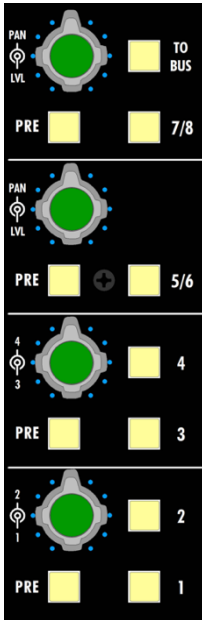
MUTE: Cuts the primary audio output.

- The **MUTE** button is the ON/off switch for the primary channel output and is located post-fader in the signal flow
- The **MUTE** button is the numbered button located just above each fader
- Illuminates in red when engaged

MUTE GRP (Mute Group): Assigns the channel to the master Mute Group.

- All channels assigned to the master Mute Group will mute when the **MUTE GROUP** button on the 840C Multifunction module is pressed
- There is only one master Mute Group
- Illuminates when engaged

2.5 548C Auxiliary Sends

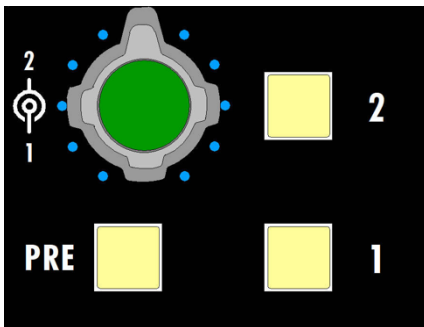


The 548C Channel module provides eight fully functional auxiliary sends, four mono sends (Sends 1-4) and two stereo sends (Sends 5/6 and 7/8). Accordingly, the 1608 is equipped with eight balanced Auxiliary Buses and outputs.

- Each mono Auxiliary Send (1-4) has an individual level control and an ON/off switch
- Each stereo Auxiliary Send (5/6 & 7/8) has a stereo level control, a pan-pot, and an ON/off switch
- Sends 7 and 8 can be routed to feed the Summing Buses 1-4 in addition to their Auxiliary Buses

2.5.1 548C Mono Auxiliary Sends

The controls for the 548C mono Auxiliary Sends 1-4 function as follows:



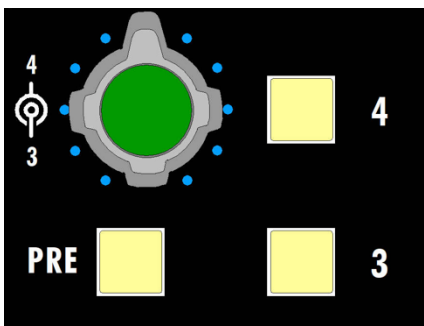
1 & 2 Level: Individual level controls for Sends 1 & 2.

1 & 2 PRE: Routes the pre-fader signal to Sends 1 & 2.

- Sends 1 & 2 are fed post-fader when the **PRE** button is not engaged
- Illuminates when engaged

1 & 2 (buttons): Individual ON/off switches for Sends 1 & 2.

- Illuminate when engaged



3 & 4 Level: Individual level controls for Sends 3 & 4.

3 & 4 PRE: Routes the pre-fader signal to Sends 3 & 4.

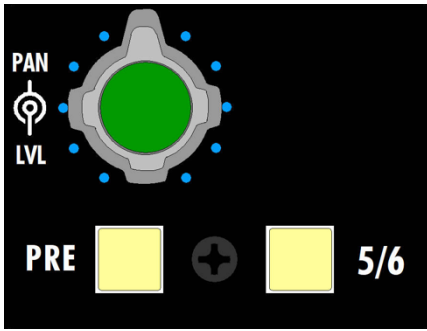
- Sends 3 & 4 are fed post-fader when the **PRE** button is not engaged
- Illuminates when engaged

3 & 4 (buttons): Individual ON/off switches for Sends 3 & 4

- Illuminate when engaged

2.5.2 548C Stereo Auxiliary Sends

The controls for the 548C stereo Auxiliary Sends 5-8 function as follows:



5/6 LVL: Stereo level control for Sends 5 & 6.

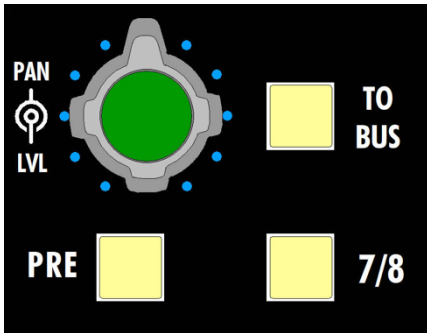
5/6 PAN: Pan-pot for Sends 5 & 6.

5/6 PRE: Routes the pre-fader signal to Sends 5 & 6.

- Sends 5 & 6 are fed post-fader when the **PRE** button is not engaged
- Illuminates when engaged

5/6 (button): ON/off switch for Sends 5 & 6.

- Illuminates when engaged



7/8 LVL: Stereo level control for Sends 7 & 8.

7/8 PAN: Pan-pot for Sends 7 & 8.

7/8 PRE: Routes the pre-fader signal to Sends 7 & 8.

- Sends 7 & 8 are fed post-fader when the **PRE** button is not engaged
- Illuminates when engaged

7/8 (button): ON/off switch for Sends 7 & 8

- Illuminates when engaged.

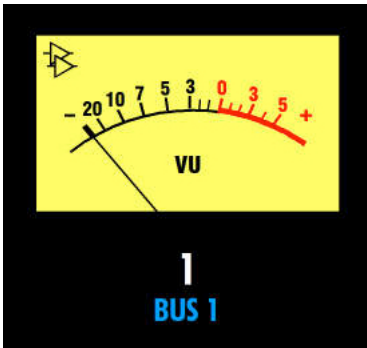
TO BUS: Routes the output of stereo Send 7 & 8 directly to the Summing Bus assignment section for assignment to Summing Buses 1-4. When TO BUS is engaged the send functions as follows:

- Summing Buses 1-4 can be assigned to be fed from Auxiliary Sends 7 & 8
- Auxiliary Bus Masters 7 & 8 are fed in addition to the assigned Summing Bus(es)
- Auxiliary Sends 7 & 8 cannot access the Program Bus from the channel module
- The Aux Send 7/8 ON/off switch is bypassed by the feed to Summing Buses
- The 7/8 ON/off switch will always control the feed to Auxiliary Buses 7 & 8
- The 7/8 **PRE** button may be used
- The 7/8 stereo level control and pan-pot are active
- Illuminates when engaged

IMPORTANT NOTE: When **TO BUS** is engaged, only Summing Buses 1-4 can be fed from the output of Auxiliary Sends 7 & 8. Auxiliary Sends 7 & 8 cannot feed Summing Buses 5-8.

2.6 1608-II Channel VU Meters

A VU Meter is provided for each channel, along with a LED Peak Indicator after the channel input.



VU (Volume Unit): Channel level indicator.

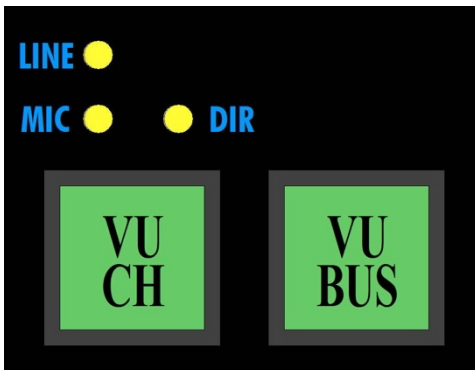
The channel VU Meter can be fed from the following points:

- Direct Output (post fader/mute)
- Microphone Preamp (post input, pre-EQ & insert)
- Line Input (post input, pre-EQ & insert)
- Associated Summing Bus Output (1-8)

The channel Direct Output is the default source for the channel VU meter. The feed to the channel VU Meter is determined by the selection made using the VU routing controls on the 840C Multifunction module. These selections are global and apply to all channel VU Meters.

2.6.1 840C Channel VU Meter Controls

The channel VU meter routing controls are found on the 840C Multifunction module and operate as follows:



LINE: Line Input VU meter routing LED.

- Illuminates when the channel meters are fed from the Line Inputs

MIC (Microphone): Mic Preamp VU meter routing LED.

- Illuminates when the channel meters are fed from the outputs of the microphone preamps

DIR (Direct Output): Direct Output VU meter routing LED.

- Illuminates when the channel meters are fed from the Direct Outputs

VU CH (VU Channel): Globally selects the input source for the channel VU meter.

- Line Input, Mic Preamp output, & Direct Output selections
- Each push will cycle to the next selection
- Direct Output is the default selection
- Illuminates when engaged
- **VU Bus** will override the **VU CH** selection

VU BUS (Summing Bus 1-8): Routes the outputs of Summing Buses (1-8) to channel VU meters 1-8.

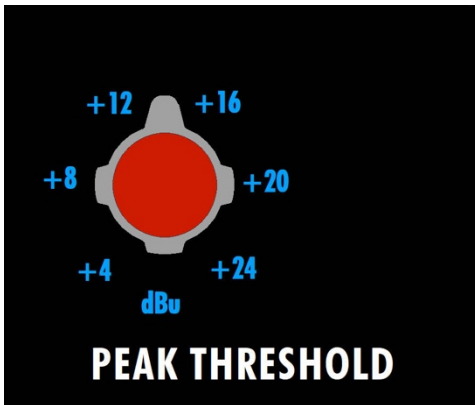
- Defeats the meter feed from the channel and replaces it with the associated Summing Bus output
- Illuminates when engaged

2.7 548C Channel Peak Indicator



Each 548C Channel module is equipped with one LED peak indicator:

- **PK (Peak)**: Illuminates when the channel input reaches the reference PEAK THRESHOLD set on the 840C Multifunction module.

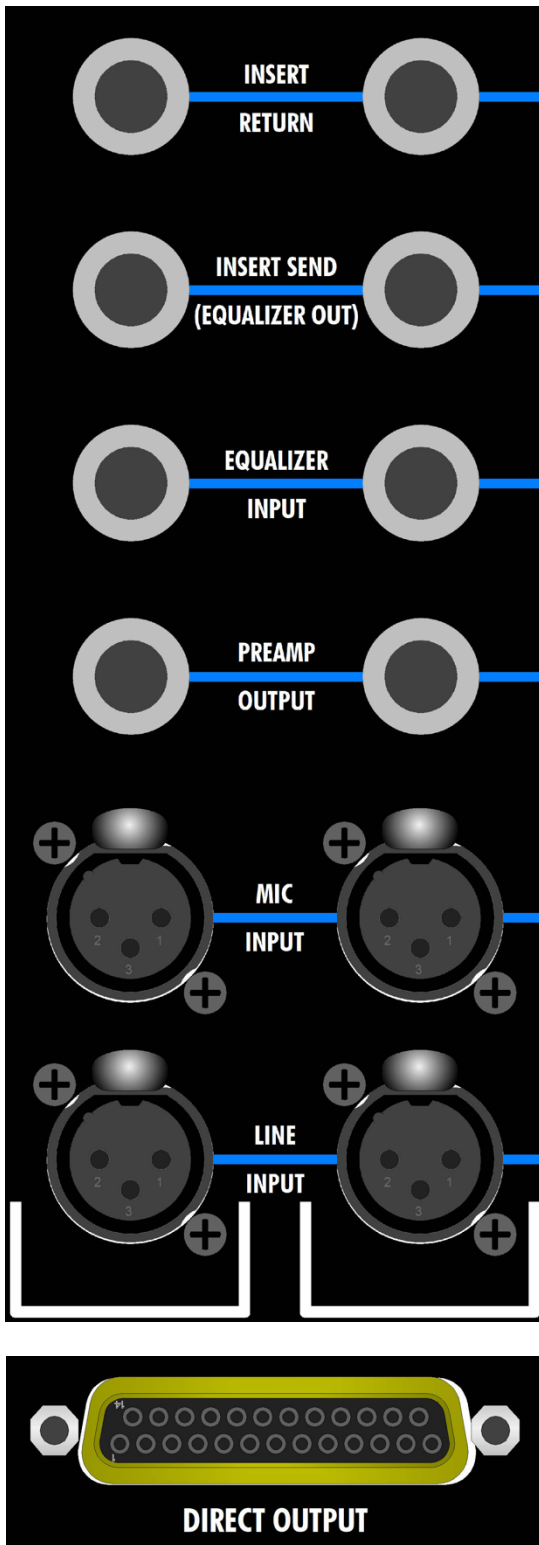


PEAK THRESHOLD: Sets the peak reference level for the channel LED **PK** indicators console-wide.

- +4dBu to +24dBu range
- Located on the 840C Multifunction module

2.8 548C Channel Module Rear Panel Connections

A comprehensive set of 548C Channel module connections are provided on the rear panel of the 1608-II console. Each channel has the following connections (shown in pairs) and a 25-pin D-sub connector provides the Direct Output for each section of eight channels.



INSERT RETURN:

- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- Replaces the EQ Out signal when a jack is inserted and the **INS** button is engaged

INSERT SEND (EQUALIZER OUT):

- Balanced, Line-level
- ¼" tip-ring-sleeve
- Insert Sends are always active

EQUALIZER INPUT:

- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- The Preamp Output signal is replaced with this signal when a jack is inserted

PREAMP OUTPUT:

- Balanced, Line-level
- ¼" tip-ring-sleeve jack
- Preamp Outputs are always active

MIC INPUT:

- Balanced, Low-impedance
- Microphone-level
- Female XLR connector

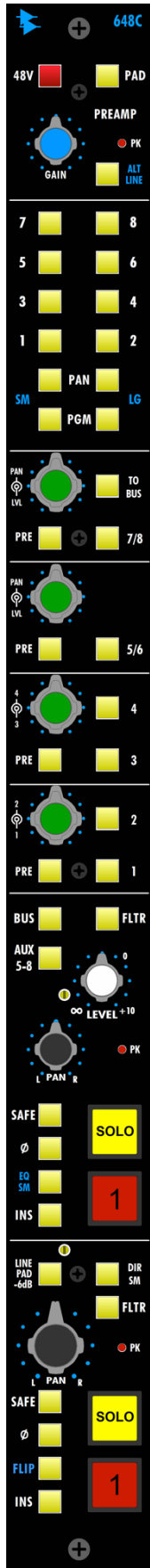
LINE INPUT:

- Balanced, Low-impedance
- Line-level
- Female XLR connector

DIRECT OUTPUT: Channels 1-8 and 9-16

- Balanced, low-impedance
- Line-level
- Female 25-pin D-sub connector
- Standard 8-channel pin-out

3.0 648C Channel Module (2448)



The 648C Channel module provides two (2) independent audio paths. In combination, these paths yield twenty-four (24) simultaneous microphone and monitor return audio paths for twenty-four (24) channels of multitrack recording. The dual-channel architecture of the 648C Channel module provides forty-eight (48) channels of returns to the stereo Program Bus when mixing. Together with a 444C or 944C channel fader, it provides a comprehensive audio path for a variety of applications:

- Dual audio path architecture: Two complete audio paths in each channel
- Input source “flip”
- Microphone Preamplifier
- Auxiliary Line Input
- Equalizer (assignable to either path)
- High-pass filter in each path
- Balanced insert in each path
- Eight (8) auxiliary sends
 - Aux Sends 1-8 can be fed from Large Fader path
 - Aux Sends 5-8 can be switched to be fed from Small Fader path
- Fully featured mute and solo section for each path
- Assignable pan-pot in each path
- Direct output (assignable to either path)
- Stereo program bus assignment from both paths
- Summing bus assignments (assignable to either path)
- Peak indicator in both paths and preamp
 - Large, Small, Direct Out, Summing Bus Out

All eight auxiliary sends can be routed either pre or post-fader. Auxiliary Sends 7/8 can be routed to feed the Summing Buses.

3.1 2448 Signal Path Architecture

From top to bottom the following components described above make up a complete 2448 channel strip:

- Channel VU Meter
- 500 Series Slot: Channel EQ
- 648C Channel Module
- 444C or 944C Fader Module

The 2448 is a “dual-channel” or “in-line” console. Each channel strip provides two independent, discrete audio paths for multitrack recording and mixing. When recording one path routes microphones to a multitrack recorder and the other path is for mixing the multitrack return. After recording, both audio paths can be routed to the Program Bus to provide additional inputs during mix-down. On the 2448 these audio paths are referred to as the Small Fader path and the Large Fader path.

3.1.1 Channel Input Selection

There are two primary choices of input sources, LINE IN and Preamp output, and one ALTERNATE LINE INPUT.

LINE IN: Main channel input for mixing and multitrack returns while recording.

- Typically connected to the output of the multitrack recorder
- Fed from LINE INPUT female XLR connector on the rear panel
- Balanced, low-impedance, line-level input
- -6dB LINE PAD can be engaged
- Feeds the Large Fader Path by default

PREAMP: This is the output of the 648C channel microphone preamp.

- Boosts microphones and DI's to line level
- Fed from MIC INPUT female XLR connector on the rear panel
- Balanced, low-impedance, mic-level input
- -20dB Pad, 48V Phantom Power, +55dB Gain
- Feeds the Small Fader Path by default

ALT LINE IN: Alternate line input for the Small Fader path.

- Provides 24 additional line-level inputs during mixing
- Fed from ALT LINE IN D-sub connector on the rear panel
- Balanced low-impedance, line-level input
- Engaged using the **ALT LINE** button
- Replaces the Preamp output as the source for the Small Fader path when engaged

As noted above, the default input for the Large Fader path is LINE IN and the default input for the Small Fader path is the output of the Preamp. The input sources cannot feed both paths simultaneously, so the Preamp, LINE IN, or ALT LINE IN can only feed one path at a time.

NOTE: The output of the Preamp and ALT LINE IN cannot be selected simultaneously.

Engaging the **FLIP** button will swap the input sources between the Large and Small fader paths, so the Preamp will feed the Large Fader path and LINE IN will feed the Small Fader path. Engaging the **ALT LINE** button will replace the Preamp output with the ALT LINE IN as the input to the Small Fader for recording or mixing additional line level sources. If **ALT LINE** and **FLIP** are both engaged, the ALT LINE IN will feed the Large Fader path.



The **FLIP** button in the 840C Multifunction module will toggle the inputs between the Small and Large Fader paths on a global basis. Holding the master **FLIP** button will **CLEAR** the input selections made on individual channels and return both paths on all channels to the default inputs.

*IMPORTANT NOTE: Engaging the **SAFE** button on a channel will protect that channel from the global **FLIP** functions.*

3.1.2 648C Channel Output Routing

The Small Fader and Large Fader paths have access to three primary output assignment possibilities:

- Direct Output
- Summing Buses 1-8
- Stereo Program Bus

Direct Output: Primary channel output for recording.

- Feeds the DIRECT OUT D-sub connector on the rear panel
- Balanced, low-impedance, line-level output
- Continually fed from the assigned channel path
- Only one path can be assigned to feed the Direct Output at a time
- The Large Fader is the default source for the Direct Output
- The Small Fader will feed the Direct Output when **DIR SM** is engaged
- Engaging **DIR SM** will defeat the Large Fader signal to the Direct Output and replace it with the Small Fader signal

Summing Buses (1-8): Eight (8) Summing Buses

- Feeds the assigned fader path to the selected Summing Bus(es)
- Summing Bus assignments are made by engaging the desired **1-8** buttons
- Only one audio path, Small Fader or Large Fader, can be assigned to the Summing Buses at a time
- The Large Fader is the default source for the Summing Buses
- The Small Fader will feed the Summing Buses by pressing **BUS**
- Engaging **BUS** will defeat the Large Fader signal to the Summing Buses and replace it with the Small Fader signal

Stereo Program Bus (PGM): Primary channel output for mixing.

- Feeds the assigned fader path to the Left-Right stereo Program Bus
- Program Bus assignments are made independently for each fader path by engaging the **PGM LG** or **SM PGM** buttons
- Both paths, Small Fader and Large Fader, can be assigned to the Program Bus simultaneously

Panning: Both fader paths have **PAN**-pots

- Left-Right panning to the Program Bus
- Odd-Even panning to the Summing Buses (when engaged)
- Center = -3dB/side pan law with center detent
- Both **PAN**-pots are always active when either fader path is assigned to the Program Bus
- The **PAN**-pots must be engaged at the output of either fader path to enable Odd-Even panning to the Summing Buses
- **PAN**-pots can be independently engaged in either fader path by engaging the **PAN LG** or **SM PAN** button on the 648C Channel module

3.1.3 Session Signal Flow

For those familiar with other in-line recording consoles, one fader path functions as a “mic” or “channel” path and the other fader path functions as a “monitor” or “mix” path. The fader used for each function depends on the selected signal functions. The operational controls allow for both paths to be used for either function.

Each path can provide a different function during the various types of recording sessions. The signal routing of input and output of each path is handled by the 648C Channel module.

Multitrack Recording and Overdubs: In a typical multitrack recording session, the channel strips function as follows:

- **Record Path (channel path, input path, mic path):** One fader path carries the signals from the microphone preamp, DI, or other input source to the multitrack recorder.
 - Routed via Direct Outputs or the 8 Summing Buses
 - Signal processing is often recorded to the multitrack so filters, EQ, and inserts are assigned to the record path as needed
 - The fader used for this function (Small or Large) is determined by the user

- **Monitor Path (mix path, return path):** The other fader path is used to mix signals from the multitrack recorder to the stereo Program Buses for monitoring.
 - The fader used for this function (Small or Large) is determined by the user
 - Alternately a monitor mix could be created in the DAW and returned to the Monitor section of the console

Stereo Mixing: In a typical mixing session, the channel strip functions as follows:

- The Large Fader path is the main mix path from the multitrack to the Program Bus
- The Small Fader path and four Stereo Returns can also be used to route additional returns from multitrack recorders or other sources such as stems, virtual instruments, and effect units to the mix
- Summing Bus Masters 1-8 have an external input (BUS MIX IN) and can be used to route stems and effects returns to the Program Bus
- In combination, a total of 64 inputs are available while mixing on a 24-channel console
- Signal processing is often applied to channels contributing to the mix, so the channel EQ, inserts, and other processes are assigned to the Large or Small Fader paths as needed while mixing
- The channel fader paths and Stereo Returns contributing to the mix are routed to the stereo Program Bus
- The optional 529C Stereo Bus Compressor and/or stereo insert can be applied to the stereo Program Bus

Default 2448 Signal Flow: With no routing buttons engaged, the default channel signal flow is as follows:

Small Fader path:

- Input: Output of the 648C Preamp (assignable ALT LINE IN via **ALT LINE** or LINE IN via **FLIP**)
- Signal Processing: (assignable EQ), Insert, Polarity Inverter, & High-pass Filter
- Output: None (assignable Direct Output, Summing Buses, & Program Bus)
 - **PAN**-pot to Program Bus by default
 - **PAN**-pot assignable to Summing Buses

Large Fader path:

- Input: LINE INPUT (assignable Preamp output or ALT LINE IN via **FLIP**)
- Signal Processing: EQ, Insert, Polarity Inverter, & High-pass Filter
- Output: Direct Out (assignable Summing Buses & Program Bus)

This default channel signal flow can be altered by changing the positions of the channel routing buttons: **ALT LINE**, **FLIP**, **EQ SM**, **DIR SM**, and **BUS**.



ALT LINE: Switches the Small Fader path input source to the Alternate Line Input (ALT LINE IN) when engaged.

- Replaces the Preamp output with the Alt Line In as the Small Fader path source
- Illuminates when engaged



FLIP: Swaps the Large and Small fader path input sources when engaged.

- Large Fader source: Preamp output (or ALT LINE IN)
- Small Fader source: Line Input
- Illuminates when engaged



EQ SM (Equalizer Small): Moves the 500 Series EQ to the Small Fader path.

- Illuminates when engaged



DIR SM (Direct Small): Routes the Small Fader to the Direct Output.

- Disengages the Large Fader path from the Direct Output
- Illuminates when engaged



BUS: Routes the Small Fader to the Summing Buses.

- Disengages the Large Fader path from the Summing Buses
- Illuminates when engaged

While either configuration is appropriate, most engineers will choose to use the Small Fader path as the “Record Path” to route microphones and other sources to the multitrack recorder and use the Large Fader path the “Mix Path” to monitor the multitrack return via the Program Buses. Using this method, the console will be in a basic mixing configuration when tracking is completed. Many engineers also prefer to have the multitrack sends on the small faders and use the large faders to mix the multitrack returns.

Small Fader to Multitrack

To use the Small Fader path as the “Record Path,” an output to the multitrack recorder must be assigned. The Direct Outputs provide the most direct audio output path and are typically normalled to the multitrack recorder inputs, so the Direct Output is often used when recording single source to a single track. Engaging the **DIR SM** button will route the Small Fader path to the Direct Output post the **MUTE** button. The signal processing desired to be recorded should be applied to the Small Fader path.

If two or more sources are to be summed together before being sent to the multitrack recorder, the Small Fader path must be routed to one or more of the eight Summing Buses. The Summing Buses are fed from the Large Fader path by default, so engage the **BUS** button to reroute the Small Fader to feed the Summing Buses, followed by the desired bus assignment(s). If Odd-Even stereo panning is to be employed to a pair of Summing Buses, the **SM PAN** button must be engaged.

In this configuration, the Large Fader path will be used to mix the returns from the multitrack recorder and must be assigned to the stereo Program Bus for monitoring. Assign the Large Fader path to the stereo Program Bus by engaging **PGM LG**.

Large Fader to Multitrack

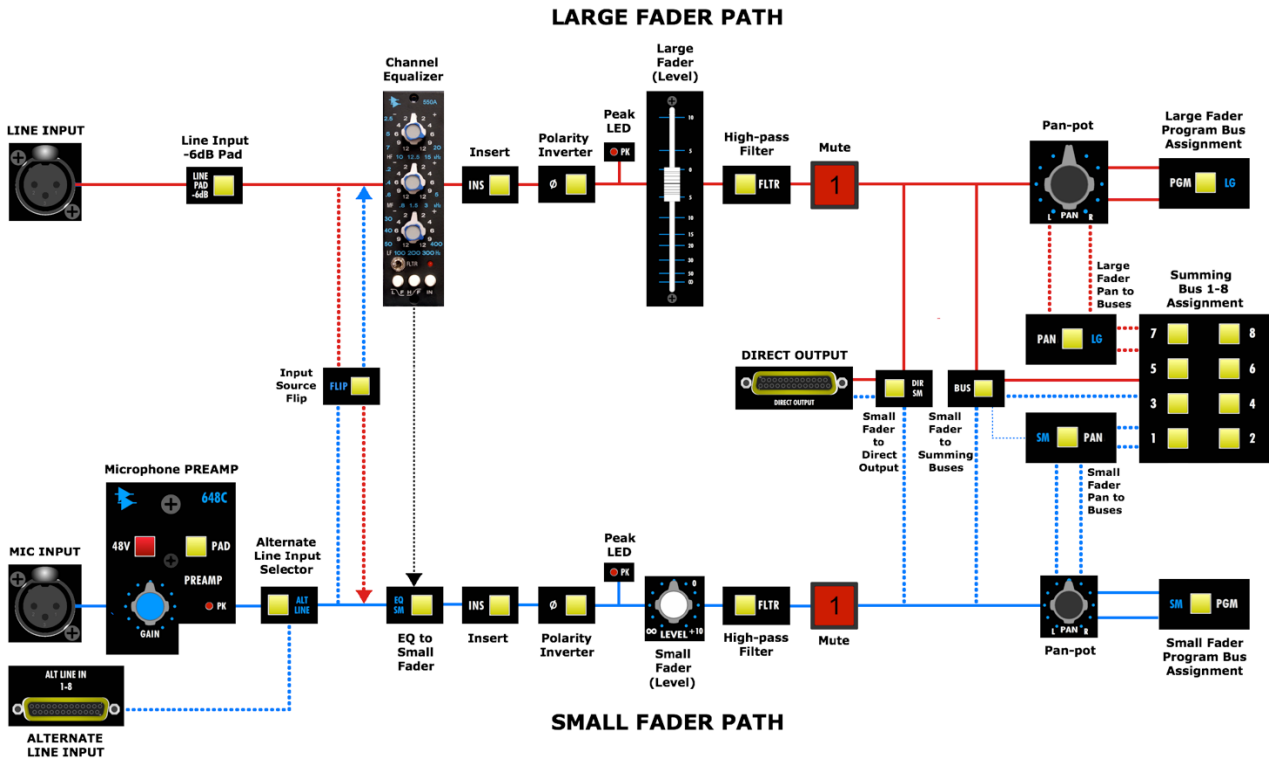
If it is preferable to use the Large Fader path as the “Record Path” to route sources to the multitrack recorder, engage the **FLIP** button to route the output of the Preamp to the Large Fader path input. The Direct Output and Summing Bus assignments are fed from the Large Fader by default, so only the desired multitrack bus/pan-pot assignments need to be made. The Large Fader path will feed the Direct Output post the **MUTE** button. The signal processing desired to be recorded should be applied to the Large Fader path.

If two or more sources are to be summed together before being sent to the multitrack recorder, the Large Fader path must be assigned to one or more of the eight Summing Buses. The Summing Buses are fed from the Large Fader path by default, so only the desired bus assignment(s) need to be made. If Odd-Even stereo panning is to be employed to a pair of Summing Buses, the **PAN LG** button must be engaged.

In this configuration, the Small Fader path will be used to mix the returns from the multitrack recorder. The **FLIP** button routed the LINE INPUTS to the Small Fader path, so assign the Small Fader to the stereo Program Bus for monitoring. Assign the Small Fader path to the stereo Program Bus by engaging **SM PGM**.

3.1.4 Simplified 2448 Signal Flow Diagram

The simplified block diagram below indicates the signal flow through the Small and Large Fader signal paths. A more technical and detailed signal flow is available in the 2448 Block Diagram in the appendix of this manual.



The features of each path are shown in the order in which they occur. The diagram assumes the following:

- Solid lines show the default signal flow
- Dotted lines show signal flow options
- A 550A Equalizer is installed in the 500 Series EQ slot
- **ALT LINE**, **FLIP**, **EQ SM**, **DIR SM**, and **BUS** are in default positions (not engaged)
- Pan-pots are not routed to the Summing Buses.
- Auxiliary Sends, 0dB Small Fader Bypass, solo sends, and VU meter are not included

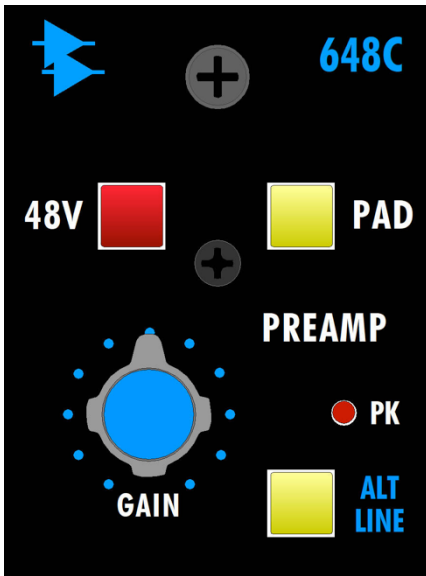
3.1.5 0dB Small Fader Bypass

The Small Fader rotary **LEVEL** pot can be bypassed allowing the audio to pass at unity gain (0dB). This is helpful when the console is used with DAW automation.



The Fader Bypass for the Small Fader is engaged globally by engaging the **0dB SM** (0dB Small Fader) button on the 840C Multifunction module. This option is not available on individual channels and is not shown in the diagram above.

3.2 648C Preamp Section



The preamp section of the 648C provides the Microphone Input to the Small Fader audio path.

Microphone Input: Primary Small Fader path input.

- Microphone preamplifier input.
- Accepts balanced, low-impedance, microphone-level signals from the MIC INPUT connector.
- Essentially a classic API 212L microphone preamplifier the following features:
 - +55dB of gain
 - -20dB Pad
 - Peak Indicator
 - 48v Phantom Power

Alternate Line Input: Secondary Small Fader path input.

- Accepts balanced, low-impedance, line-level signals from the ALT INPUT connector.
- Provides a line-level input to the Small Fader path for mixing.

3.2.1 648C Preamp Controls

The controls for the 648C Preamp function as follows:

48V: Provides 48 Volt Phantom Power to the MIC INPUT XLR connector on the rear panel

- Illuminates when in red engaged

PAD: Inserts a -20dB Pad for the microphone

- Illuminates when engaged

GAIN: Provides up to +55dB of gain for the MIC inputs

PK (Peak): A LED Peak Indicator is located at the output of the preamp section.

- Fixed at +18dBu
- Preamp only (does not apply to Alt Line In)

ALT LINE (Alternate Line Input): Selects the Alternate Line Input as the source for the Small Fader path:

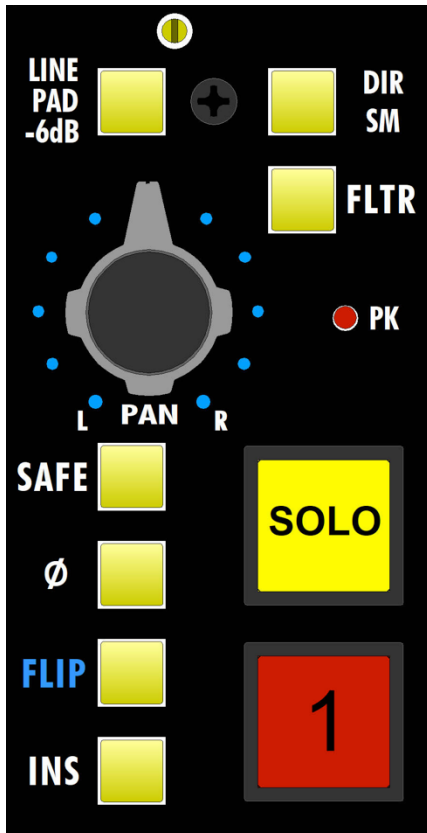
- Replaces the output of the Mic Preamp with the Alternate Line Input as the Small Fader input
- Illuminates when engaged

3.3 648C Large Fader Controls

The 648C Channel module provides a comprehensive set of Large Fader signal processing, routing, solo and mute controls. The primary input to the Large Fader audio path is the LINE INPUT XLR on the rear panel.

Line Input: Primary input to the Large Fader path.

- Accepts balanced, low-impedance, line-level signals from the LINE INPUT connector.
- Default channel input
- -6dB Pad
- Peak Indicator
- Polarity Inverter (phase reverse)



The Large Fader section of the 648C Channel module provides a comprehensive set of routing and output functions including:

- Mute
- Solo
- Safe (Solo-In-Place and global **FLIP**)
- Insert
- Line input pad
- Pan-pot
- High-pass filter
- Polarity inverter (phase reverse)
- Peak indicator
- Direct Output routing
- Input source "flip"

3.3.1 648C Large Fader Controls

The controls for the 648C Large Fader function as follows:

LINE PAD -6dB: Inserts a -6dB pad immediately after the Line input.

- Illuminates when engaged

DIR SM (Direct Output Small): Routes the output of the Small Fader to the Direct Output.

- Defeats the Large Fader feed to the Direct Output
- Illuminates when engaged

FLTR (Filter): Activates the Large Fader high-pass Filter.

- -3dB at 50Hz
- 12dB/octave slope
- Illuminates when engaged
- The Large Fader Filter is located post the Fader wiper and pre the Fader amplifier

PAN (pan-pot): Continuous Large Fader panning control.

- Stereo panning between the Left & Right Program Buses
- Odd-Even panning between Summing Buses (when engaged)

SOLO: Activates the selected solo function for the Large Fader path.

- The following solo functions may be selected via the 840C Multifunction module:
 - Pre-fader Listen (PFL): Non-destructive, mono
 - After Fader Listen (AFL): Non-destructive, post pan-pot (panned stereo)
 - Solo-In-Place (SIP): Destructive, panned, post-fader
- Illuminates in yellow when engaged

NOTE: PFL is the default solo mode.

SAFE: Activates the "Safe" mode for the Large Fader path.

- The **SAFE** button protects the fader path from being muted when the Solo-In-Place function is active and another channel or Stereo Return is soloed
- The **SAFE** button protects that channel from the global **FLIP** functions
- Illuminates when engaged

∅: Applies a Polarity Inverter (Phase Reverse) to the Large Fader path signal.

- Illuminates when engaged

FLIP: Swaps the default input sources for the Large & Small Fader paths.

- The output of the Mic Preamp will be routed to the Large Fader input
- The Line Input will be routed to the Small Fader input
- Illuminates when engaged

MUTE: Cuts the Large Fader audio output.

- The **MUTE** button is the ON/off switch is located post-fader in the signal flow
- The **MUTE** button is the numbered button located just above each fader
- Illuminates in red when engaged

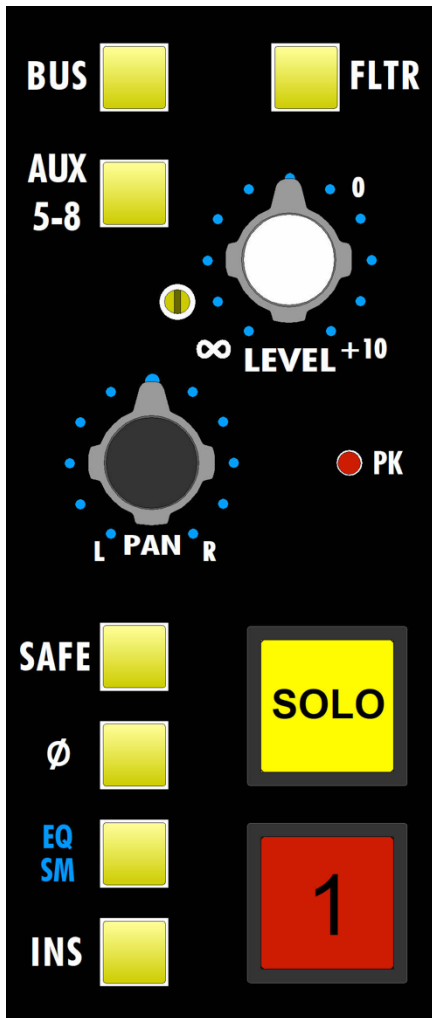
INS (Insert): Activates the Large Fader Insert Return.

- The Insert Send is normally fed pre-fader from the output of the Equalizer
- The Insert Send is always active
- The Insert Send is a balanced, line-level signal routed to the INSERT SEND ¼" tip-ring-sleeve jack on the rear panel
- The Insert Return accepts a balanced, line-level signal from the INSERT RETURN ¼" tip-ring-sleeve jack on the rear panel
- The Insert Return is located post-EQ and pre-fader
- The Insert Return is active only when the **INS** button is engaged
- Illuminates when engaged

FADER (Large Fader Level): Level control for the Large Fader path.

- 444C or 944C 4-channel Fader module
- 100mm audio-taper mono fader
- +10dB of gain
- -∞dB of attenuation
- Unity gain when set to 0dB
- Global 0dB Fader Bypass (via automation)
- Optional automation (944C)
- (not shown here)

3.4 648C Small Fader Controls



The 648C Channel module provides a comprehensive set of Small Fader signal processing, routing, solo and mute controls. The default input to the Small Fader audio path is the output of the microphone Preamp. The MIC INPUT XLR connector is available on the rear panel.

An Alternate Line Input is available as a secondary input. The ALT LIN IN D-sub connector on the rear panel supports this function.

The Small Fader section of the 648C Channel module provides a comprehensive set of routing and output functions including:

- Rotary level control
- Mute
- Solo
- Safe (Solo-In-Place and global **FLIP**)
- Insert
- Pan-pot
- High-pass filter
- Polarity inverter (phase reverse)
- Peak indicator
- EQ routing
- Routing to Summing Buses
- Routing to Auxiliary Sends 5-8

3.4.1 648C Small Fader Controls

The controls for the 648C Small Fader function as follows:

BUS: Routes the output of the Small Fader path to the Summing Bus assignment section.

- Defeats the feed of the Large Fader to the Summing Bus assignment section
- Illuminates when engaged

AUX 5-8: Routes the output of the Small Fader to Auxiliary Sends 5-8.

- Defeats the Large Fader feed to Auxiliary Sends 5-8
- Illuminates when engaged

FLTR (Filter): Activates the Small Fader high-pass Filter.

- -3 dB at 50Hz
- 12dB/octave slope
- Illuminates when engaged
- The Small Fader Filter is located post the Fader wiper and pre the Fader amplifier

LEVEL (Small Fader): Level control for the Small Fader path

- Rotary audio-taper level potentiometer
- +10dB of gain
- -∞dB of attenuation
- Unity gain when set to 0dB
- Global 0dB Fader Bypass (in Master Section)
- Not automatable

*NOTE: A 0dB Small Fader bypass can be applied to all channels by engaging the **0dB SM** button in the 840C Multifunction module. This feature provides is useful when an additional Small Fader gain stage is not needed or when using DAW automation.*

*NOTE: The Small Fader **LEVEL** potentiometer is generically referred to as the "Small Fader" in some places in this manual.*

PAN (pan-pot): Continuous Small Fader panning control.

- Stereo panning between the Left & Right Program Buses
- Odd-Even panning between Summing Buses (when engaged)

SOLO: Activates the selected solo function for the Small Fader path.

- The following solo functions may be selected via the 840C Multifunction module:
 - Pre-fader Listen (PFL): Non-destructive, mono
 - After Fader Listen (AFL): Non-destructive, post-pan-pot (panned stereo)
 - Solo-In-Place (SIP): Destructive, panned, post-fader
- Illuminates in yellow when engaged

NOTE: PFL is the default solo mode.

SAFE: Activates the "Safe" mode for the Small Fader path.

- The **SAFE** button protects the fader path from being muted when the Solo-In-Place function is active and another channel or Stereo Return is soloed
- The **SAFE** button protects that channel from the global **FLIP** functions
- Illuminates when engaged

∅: Applies a Polarity Inverter (Phase Reverse) to the Small Fader path signal.

- Illuminates when engaged

MUTE: Cuts the Small Fader audio output.

- The **MUTE** button is the ON/off switch and is located post-fader in the signal flow
- The **MUTE** button is the numbered button
- Illuminates in red when engaged

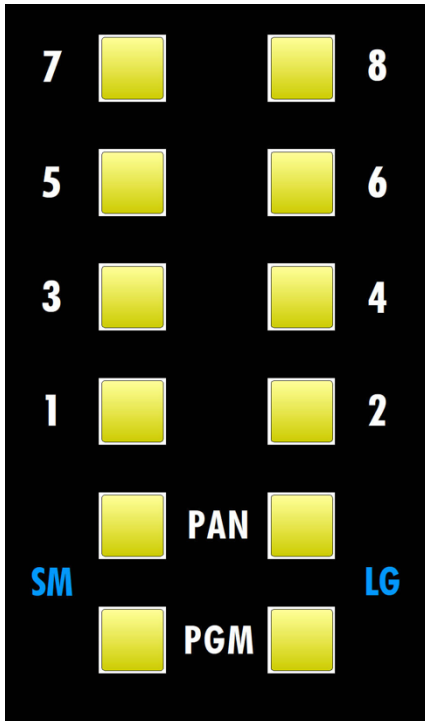
EQ SM (EQ Small Fader): Routes the channel EQ to the Small Fader path.

- EQ will be post-input
- EQ will be pre-insert
- Removes the channel EQ from the Large Fader path

INS (Insert): Activates the Small Fader Insert Return.

- The Insert Send is normally fed pre-fader from the output of the mic preamp
- The Insert Send is always active
- The Insert Send is a balanced, line-level signal routed to the INSERT SEND ¼" tip-ring-sleeve jack on the rear panel
- The Insert Return accepts a balanced, line-level signal from the INSERT RETURN ¼" tip-ring-sleeve jack on the rear panel
- The Insert Return is located post-preamp and pre-fader
- The Insert Return is active only when the **INS** button is engaged
- Illuminates when engaged

3.5 648C Routing and Output Section



The routing and output section of the 648C Channel module provides a comprehensive set of routing and output functions including:

- Stereo Program Bus assignment
- Summing Bus assignment
- Pan-pot assignment

The output section provides three simultaneous audio output options:

- Direct Output: Direct balanced line output
- Summing Buses: Any of eight summing buses
- Program Bus: Left-Right stereo Program Bus (PGM)

Direct Output: The Direct Output feeds the channel output signal to the DIRECT OUTPUT connector on the rear panel. The Direct Output has the following features:

- Fed from the Large Fader by default
- Engaging the **DIR SM** button will feed the Direct Output from the Small Fader instead of the Large Fader
- Fed post-fader
- The Direct Output is always active except when the **MUTE** button for the active path is engaged
- Balanced, line-level output at the DIRECT OUTPUT 25-pin D-sub connector on the rear panel of each 8-channel section

Summing Buses: The channel output may be assigned to one or more of the eight Summing Buses. Some possible applications of the Summing Buses include:

- Multitrack channel assignments
- Multitrack summing
- Additional channel outputs
- Additional auxiliary sends
- Audio sub-grouping

The summing buses include the following features:

- Individual Summing Bus assignments from the 648C Channel modules
- Switchable Odd-Even Summing Bus panning on the 648C Channel modules
- Routing from Auxiliary Sends 7 & 8 to Summing Buses 1-4 on the 648C Channel modules
- Individual ON/off, calibration, trim, solo, and Program Bus assignment controls on the 168C Summing Bus Master module
- Balanced, line-level outputs at the BUS OUTPUT 1-8 D-sub connector

Stereo Program Bus: The channel output can be routed to the Program Bus for stereo mixing and for the Left & Right channels of a 5.1 mix. The Program Bus includes the following features:

- Program Bus assignment from the 648C Channel modules
- Program Bus Insert via the 268C Program Bus Master module & rear panel connections
- 440C or 940C Stereo Master Fader
- Individual Left & Right program channel ON/off, calibration, and trim controls
- Balanced, line-level outputs via the LEFT & RIGHT PROGRAM OUTPUT XLR connectors

Channel Pan-Pots

The pan-pots in both fader paths are always routed to the stereo Program Bus. Whenever either fader path is assigned to the Program Bus, its pan-pot is active. However, neither pan-pot is engaged or routed to the Summing Buses unless the **PAN** button for that path is engaged. Without the **PAN** button engaged, all multitrack assignments are mono. At the bottom of the output section of the 648C Channel module are two **PAN** buttons, one for each fader path (**SM** or **LG**). The **PAN** button must be engaged for each path for the pan-pot to feed Summing Bus assignments. When the pan-pot is engaged, signal levels at the extremes of the pan control will be at the same level as they would be if the pan control was not active.

According to the pan law applied to both channel pan-pots, signals are attenuated by 3dB when the pan-pot is centered. This value will provide a consistent level when signals are panned from side-to-side and will avoid center channel build-up of signals panned to the middle.

Depending on routing and assignments either pan-pot may be used for Left-Right panning to stereo Program Bus or Odd-Even panning to Summing Buses.

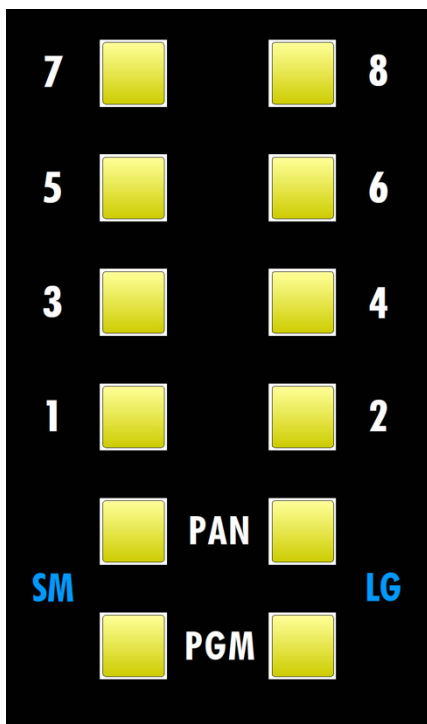
Panning across Odd-Even pairs of Summing Buses can be useful when it is desired to mix several sources together to a stereo pair of tracks on the multitrack recorder (DAW). For example, you may wish to record five tom mics to two tracks of the recorder and maintain the stereo position of each tom.

To pan across Odd-Even Summing Buses from the Small Fader path:

- Press **BUS** on the mic channels to feed the Small Fader to the Summing Buses
- Assign the Small Faders to a pair of Odd-Even Summing Buses (5 & 6 for example)
- Engage the **PAN** button in the "**SM**" column of the 648C Bus Assignment section
- The Small Fader pan-pot can be used to "place" tracks in the stereo image on tracks 5 & 6

3.5.1 648C Routing and Output Controls

The controls for the 648C Routing and Output section function as follows:



Summing Bus Assignment 1-8: Assigns the Large & Small Fader path outputs to one or more of the eight (8) Summing Buses.

- Assignments to the Summing Buses can be made on an individual basis
- Summing Buses are fed post-fader or post the channel pan-pot when engaged
- Summing Bus assignments are only active when engaged
- Switchable Odd-Even Summing Bus panning
- The Summing Buses 1-4 can be fed pre or post fader from Auxiliary Sends 7 & 8
- Illuminates when engaged

PAN SM (Small): Engages the Small Fader pan-pot.

- Enables Odd-Even panning to the Summing Buses
- Illuminates when engaged

PAN LG (Large): Engages the Large Fader pan-pot.

- Enables Odd-Even panning to the Summing Buses
- Illuminates when engaged

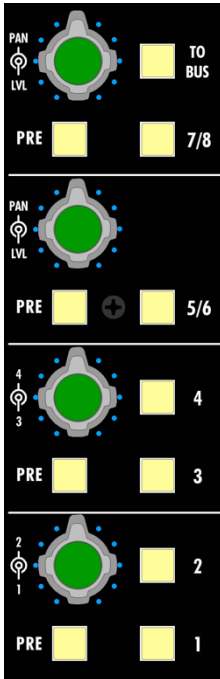
PGM SM (Program Small): Assigns the Small Fader output to the Program Bus.

- The Program Bus is fed post the Small Fader pan-pot
- Illuminates when engaged

PGM LG (Program Large): Assigns the Large Fader output to the Program Bus.

- The Program Bus is fed post the Large Fader pan-pot
- Illuminates when engaged

3.6 648C Auxiliary Sends

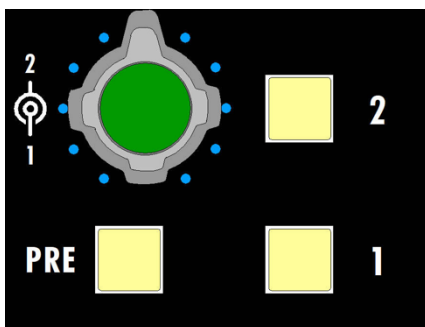


The 648C Channel module provides eight fully functional auxiliary sends, four mono sends (Sends 1-4) and two stereo sends (Sends 5/6 and 7/8). Accordingly, the 2448 is equipped with eight balanced Auxiliary Buses, Aux Masters, and outputs.

- Each mono Auxiliary Send (1-4) has an individual level control and an ON/off switch
- Each stereo Auxiliary Send (5/6 & 7/8) has a stereo level control, a pan-pot, and an ON/off switch
- Sends 7 & 8 can be routed to feed the Summing Buses 1-4 in addition to their Auxiliary Buses
- Auxiliary Sends 1-8 are fed from the Large Fader path by default
- Auxiliary Sends 5-8 can be routed from the Small Fader path

3.6.1 648C Mono Auxiliary Sends

The controls for the 648C mono Auxiliary Sends 1-4 function as follows:



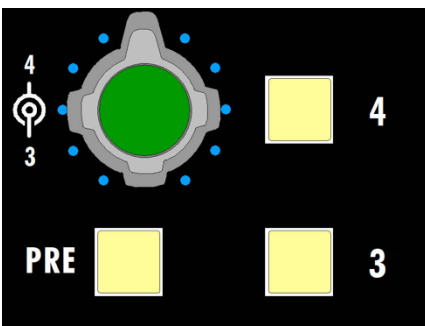
1 & 2 Level: Individual level controls for Sends 1 & 2.

1/2 PRE: Routes the pre-fader signal to Sends 1 & 2.

- Sends 1 & 2 are fed post-fader when the **PRE** button is not engaged
- Illuminates when engaged

1 & 2 (buttons): Individual ON/off switches for Sends 1 & 2.

- Illuminate when engaged



3 & 4 Level: Individual level controls for Sends 3 & 4.

3/4 PRE: Routes the pre-fader signal to Sends 3 & 4.

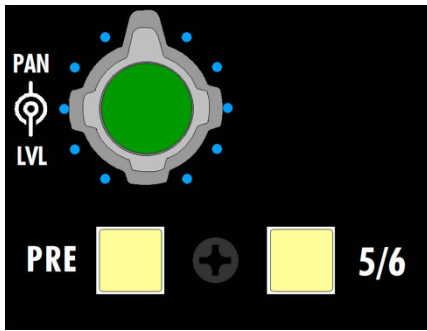
- Sends 3 & 4 are fed post-fader when the **PRE** button is not engaged
- Illuminates when engaged

3 & 4 (buttons): Individual ON/off switches for Sends 3 & 4.

- Illuminate when engaged

3.6.2 648C Stereo Auxiliary Sends

The controls for the 648C stereo Auxiliary Sends 5-8 function as follows:



5/6 LVL: Stereo level control for Sends 5 & 6.

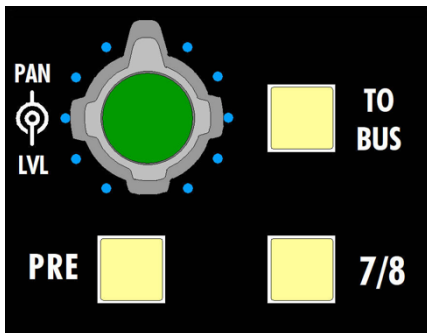
5/6 PAN: Pan-pot for Sends 5 & 6.

5/6 PRE: Routes the pre-fader signal to Sends 5 & 6.

- Sends 5 & 6 are fed post-fader when the **PRE** button is not engaged
- Illuminates when engaged

5/6 (button): ON/off switch for Sends 5 & 6.

- Illuminates when engaged



7/8 LVL: Stereo level control for Sends 7 & 8.

7/8 PAN: Pan-pot for Sends 7 & 8.

7/8 PRE: Routes the pre-fader signal to Sends 7 & 8.

- Sends 7 & 8 are fed post-fader when the **PRE** button is not engaged
- Illuminates when engaged

7/8 (button): ON/off switch for Sends 7 & 8.

- Illuminates when engaged

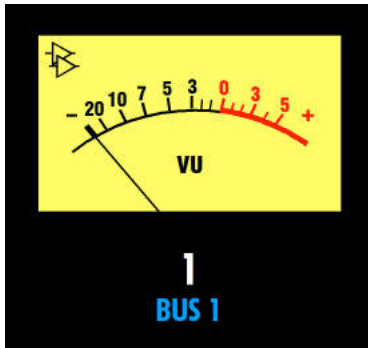
TO BUS: Routes the output of stereo Send 7 & 8 directly to the Summing Bus assignment section for assignment to Summing Buses 1-4. When TO BUS is engaged the send functions as follows:

- Summing Buses 1-4 can be assigned to be fed from Auxiliary Sends 7 & 8
- Auxiliary Bus Masters 7 & 8 are fed in addition to the assigned Summing Bus(es)
- Auxiliary Sends 7 & 8 cannot access the Program Bus from the channel module
- The Aux Send 7/8 ON/off switch is bypassed by the Summing Bus feed
- The 7/8 ON/off switch will always control the feed to Auxiliary Buses 7 & 8
- The 7/8 **PRE** button may be used
- The 7/8 stereo level control and pan-pot are active
- Illuminates when engaged

IMPORTANT NOTE: When **TO BUS** is engaged, only Summing Buses 1-4 can be fed from the output of Auxiliary Sends 7 & 8. Auxiliary Sends 7 & 8 cannot feed Summing Buses 5-8.

3.7 2448 Channel VU Meters

A VU Meter is provided for each channel, along with three (3) LED Peak Indicators for the mic preamp and each audio path (Small Fader and Large Fader).



VU (Volume Unit): Channel level indicator.

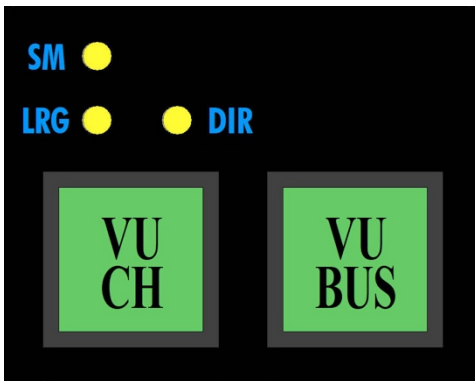
The channel VU Meter can be fed from the following points:

- Direct Output (post fader/mute)
- Large Fader Input (post input, pre-EQ & insert)
- Small Fader Input (post input, pre-EQ & insert)
- Associated Summing Bus Output (1-8)

The channel Direct Output is the default source for the channel VU meter. The feed to the channel VU Meter is determined by the selection made using the VU routing controls on the 840C Multifunction module. These selections are global and apply to all channel VU Meters.

3.7.1 840C Channel VU Meter Controls

The channel VU meter routing controls are found on the 840C Multifunction module and operate as follows:



SM (Small Fader): Small Fader VU meter routing LED.

- Illuminates when the channel meters are fed from the Small Fader inputs

LRG (Large Fader): Large Fader VU meter routing LED.

- Illuminates when the channel meters are fed from the Large Fader inputs

DIR (Direct Output): Direct Output VU meter routing LED.

- Illuminates when the channel meters are fed from the Direct Output

VU CH (VU Channel): Globally selects the input source for the channel VU meter.

- Large Fader Input, Small Fader Input, & Direct Output selections
- Each push will cycle to the next selection
- Direct Output is the default selection
- Illuminates when engaged
- **VU Bus** will override the **VU CH** selection

VU BUS (Summing Bus 1-8): Routes the outputs of Summing Buses (1-8) to channel VU meters 1-8.

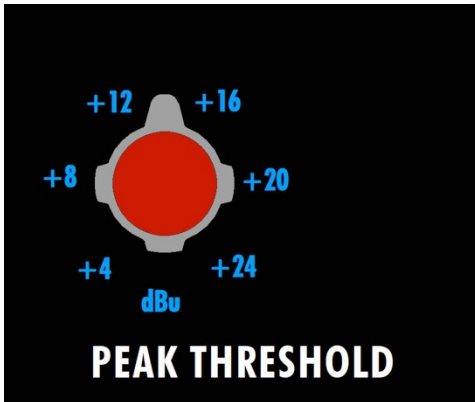
- Defeats the meter feed from the channel and replaces it with the associated Summing Bus output
- Illuminates when engaged

3.8 648C Channel Peak Indicators



Each 648C Channel module is equipped with LED peak indicators:

- **Mic Preamp:** Illuminates when the preamp output reaches a fixed threshold at +18dBu
- **Large Fader Path:** Illuminates when the Large Fader path reaches the reference PEAK THRESHOLD set on the 840C Multifunction module
- **Small Fader Path:** Illuminates when the Small Fader path reaches the reference PEAK THRESHOLD set on the 840C Multifunction module

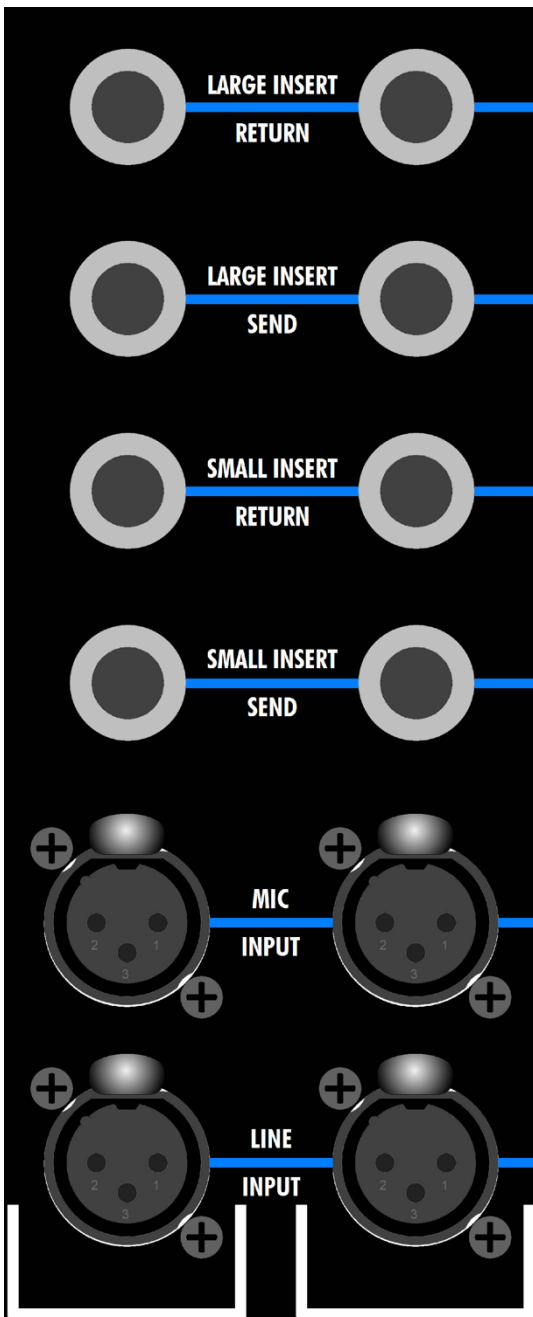


PEAK THRESHOLD: Sets the peak reference level for the Large & Small fader LED **PK** indicators console-wide.

- +4dBu to +24dBu range
- Located on the 840C Multifunction module

3.9 648C Channel Module Rear Panel Connections

A comprehensive set of 648C Channel module connections are provided on the rear panel of the 2448 console. Each channel has the following connections (shown in pairs) and 25-pin D-sub connectors provides the ALT LINE IN and DIRECT OUTPUT connections for each section of eight channels.



LARGE INSERT RETURN:

- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- Replaces the EQ Out signal when a jack is inserted and the **INS** button is engaged

LARGE INSERT SEND:

- Balanced, Line-level
- ¼" tip-ring-sleeve
- Insert Sends are always active

SMALL INSERT RETURN:

- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- Replaces the EQ Out signal when a jack is inserted and the **INS** button is engaged

SMALL INSERT SEND:

- Balanced, Line-level
- ¼" tip-ring-sleeve
- Insert Sends are always active

MIC INPUT:

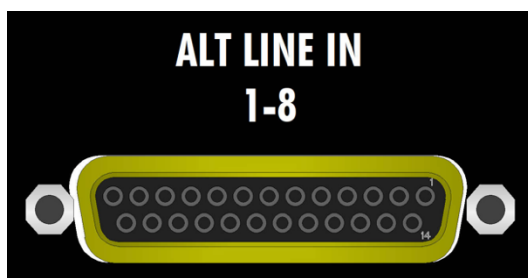
- Balanced, Low-impedance
- Microphone-level
- Female XLR connector

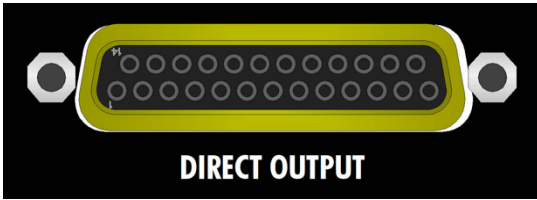
LINE INPUT:

- Balanced, Low-impedance
- Line-level
- Female XLR connector

ALT LINE IN (Alternate Line Input): Channels 1-8, 9-16, and 17-24

- Balanced, low-impedance
- Line-level
- Female 25-pin D-sub connector
- Standard 8-channel pin-out





DIRECT OUTPUT: Channels 1-8, 9-16, and 17-24

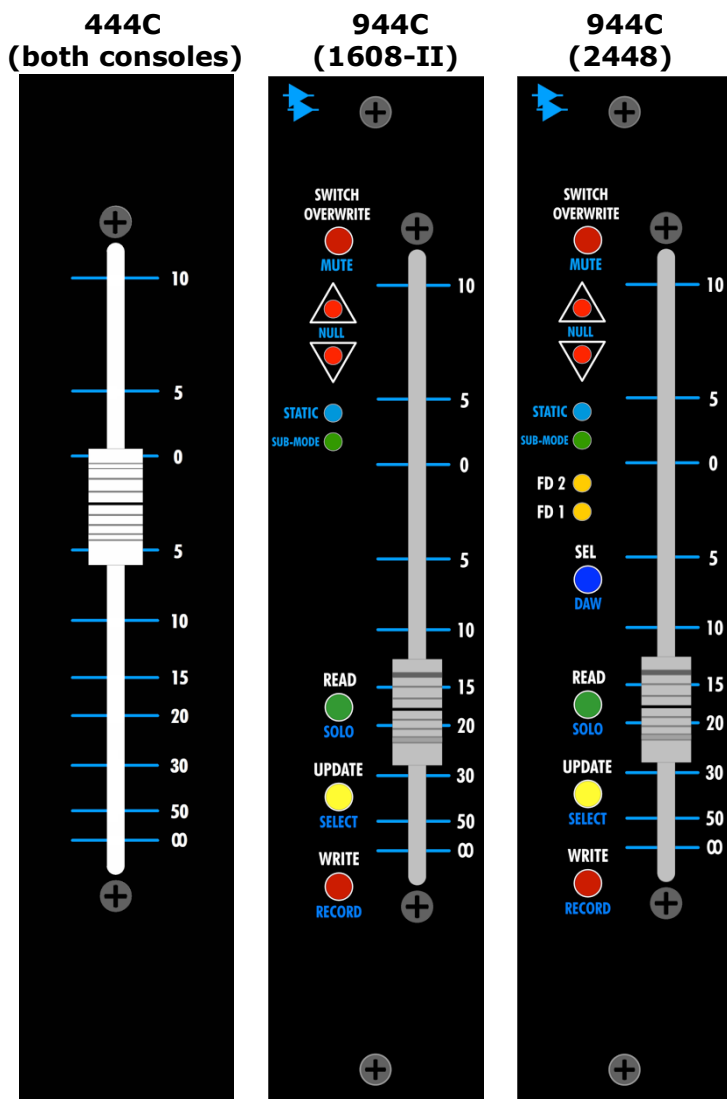
- Balanced, low-impedance
- Line-level
- Female 25-pin D-sub connector
- Standard 8-channel pin-out

4.0 444C & 944C Channel Fader Modules

The 1608-II and 2448 consoles ship with or without the optional *Final Touch™* automation system. Both consoles can be retro-fitted with automation after initial delivery. Consoles without automation are equipped with the 444C non-automated 4-channel mono Fader modules and automated consoles are fitted with the appropriate 944C automated 4-channel mono Fader modules.

The 4-channel 444C manual channel Fader module provides the standard channel faders for the 1608-II and the standard Large Faders for the 2448.

Because of the differences in channel architecture, there are two versions of the optional *Final Touch™* 4-channel 944C automated channel Fader module. Both versions support automation and DAW control functions, but the 2448 also supports channel section (fader path) selection with the addition of the **SEL** button and LEDs to indicate the selected fader paths.



The 444C and 944C mono faders are the primary output level control for the channel. The channel Fader controls the output to the:

- Direct Output
- Summing Buses
- Program Bus
- Post-fader Auxiliary Sends
- When the Fader is set to 0dB, the level is at unity gain

Each fader module contains four (4) faders and are interfaced with the four channel modules mounted directly above it.

Channel/Large FADER:

- Primary level control for the channel
- 100mm long-throw stereo fader
- $-\infty$ dB to +10dB range
- 0dB = unity gain
- Optional automation

5.0 Channel Equalizers

Both the 1608-II and 2448 come equipped with legendary API equalizers in the channel strips. Because the channel strip is equipped with a 500 Series slot, any VPR Alliance 500 Series signal processing module can be fitted.

Standard configurations for channel EQs are as follows:

- 1608-II: Twelve 550A EQs and four 560 EQs
- 2448: Sixteen 550A EQs and eight 560 EQs

5.1 550A Discrete 3-Band Equalizer

The legendary API 550A Equalizer is installed on channels 1-12 in the standard 1608-II configuration and channels 1-16 in the standard 2448 configuration.



Features:

- 3 bands of classic API equalization
- Each band offers 7 API selected frequency centers
- Reciprocal and repeatable filtering
- Maximum 12dB of boost/cut per band
- EQ band 1 and 3 offer shelf/peak switching
- "Proportional Q" narrows filter Q at extremes
- Traditional API fully discrete circuit design

Few equalizers enjoy the respect and admiration of the coveted API 550A. Designed by the now-legendary Saul Walker in the late '60s, the discrete 550A was first used as a modular OEM equalizer. As the industry rapidly embraced the sonic quality of the 550A, it quickly found its way into many custom console designs by Frank DeMidio and other leading engineers. Many of these consoles are still in use today.

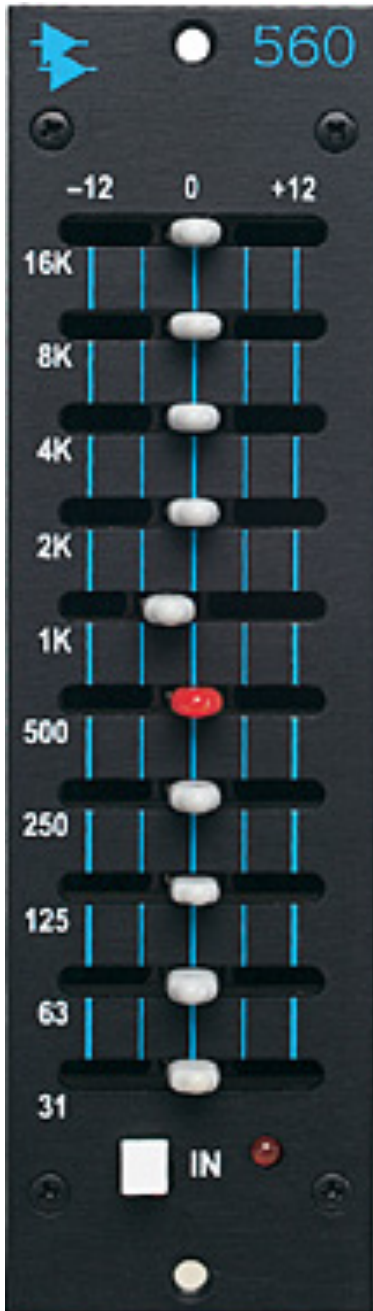
Nearly 50 years later, the 550A remains the standard against which other EQs are measured, and it has played a major role in the recording industry for decades. Still copied, but never duplicated, the 550A became API's standard channel module EQ when the company began manufacturing consoles in 1971. With virtually all existing units spoken for, popular demand for the EQ resulted in API finally resuming production in 2004.

The 550A provides reciprocal equalization at 15 points in 5 steps of boost to a maximum of 12dB of gain at each point. The fifteen equalization points are divided into three overlapping ranges. The high and low frequency ranges are individually selectable as either peaking or shelving, and a band-pass filter may be inserted independently of all other selected equalization settings. Frequency ranges and boost/cut are selected by three dual-concentric switches, and a pushbutton "IN" switch allows the EQ to be silently introduced to the signal path. A small toggle switch is used to insert the band-pass filter into the 550A.

The combination of Walker's incomparable 2520 op amp, and his "Proportional Q" circuitry gives the 550A user an uncomplicated way to generate acoustically superior equalization. With the long-awaited reissue of this unit, an EQ that has had such a part in the history of recording is continuing to make history in today's music.

5.2 560 Discrete 10-Band Graphic Equalizer

The classic API 560 Equalizer is installed on channels 13-16 in the standard 1608-II configuration and channels 17-24 in the standard 2448 configuration.



Features:

- 10 bands of API proprietary equalization
- Familiar graphics operation on one octave centers
- 12dB of boost/cut per band
- "Proportional Q" narrows filter Q at extremes
- Additional resolution within the ± 4 dB region
- Center detent for reliable reset
- Traditional API fully discrete circuit design
- Silent bypass button
- Re-issue of the 1969 API 560 EQ

Originally conceived for use in API Consoles of the 60's and 70's, the API 560 re-issue is a unique device designed to accomplish tasks that no other EQ can. Extremely fast to set and reset using accurate zero detents, the curve shaping potential of the 560 is unmatched. With a wide range of 500 mounting options, from racks to consoles, the 560 proves to be an invaluable asset to all critical performance applications. Based on API's original 560 EQ, the current production of 560 has improved resolution in the ± 4 dB area and possesses our exclusive circuitry and proprietary components, including the API 2520 op amp.

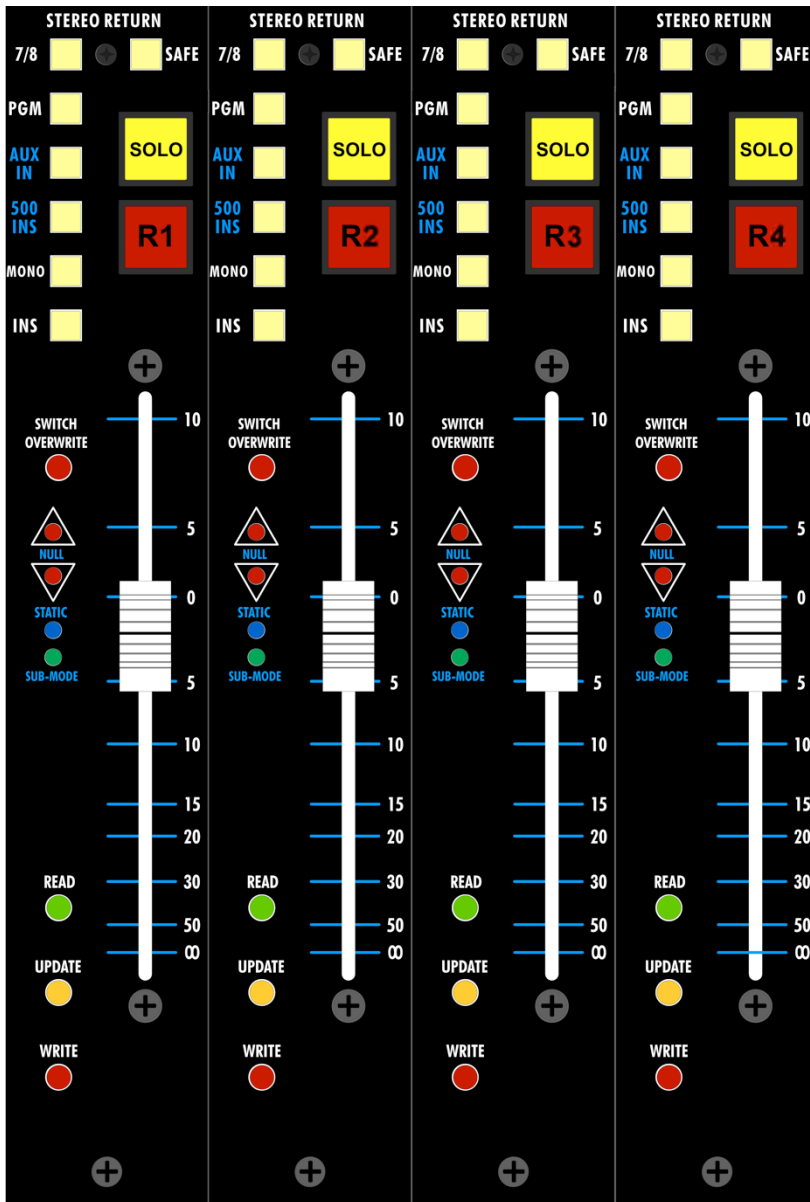
The extraordinary headroom made possible with the 2520 offers consistent analog performance even when using radical EQ curves. Of course, the 2520's ability to drive low impedance loads is key when paired with API's custom built transformers. The results are quite audible with better low end frequency production and tighter imaging, which gives you that legendary API 'punch in the gut' sound.

The 10 precision EQ bands makes the 560 ideal for signal sweetening and room tuning. A great companion to a parametric EQ, the 560 utilizes API's unique "Proportional Q" design introduced in the '60s. The design intuitively widens the filter bandwidth at lower boost/cut levels and narrows at higher settings. Additionally, boost and cut characteristics are identical, allowing previous actions to be undone if desired.

Reliable, durable, and uniform, the API 560 EQ delivers the "one-of-a-kind API sound" with precision easy set filtering and high headroom in a compact package. If you want the sounds of classic American music in an easy-to-set graphic EQ package, you want the API 560.

6.0 265C Stereo Returns & 500 Series Slots

The 1608-II and 2448 consoles are equipped with four (4) automatable Stereo Returns. A pair of 500 Series module slots (Odd-Even) is associated with each Stereo Return. The Stereo Returns are located on the 265C module in the master section of the consoles and the eight (8) 500 Series slots are located immediately above the returns.



The four Stereo Returns and eight 500 Series slots are designed to provide extra capacity and flexibility during mixing and support techniques such as returning additional tracks, stereo stems, virtual instruments, parallel compression, effects returns, and other applications. Each Stereo Return can be assigned to the stereo Program Bus and Summing Buses 7/8.

A comprehensive set of internal normals and rear panel connections allow the 500 Series slots to be used in pairs in conjunction with the associated Stereo Returns or independently as eight separate, patchable 500 Series signal processors.

Each of the four 265C Stereo Returns have the following features:

- Stereo balanced, low-impedance, line-level, rear-panel inputs
- Alternate input from the associated pair of Aux Masters
- Balanced stereo insert (automatable)
- 500 slot insert (pairs)
- Mono input summing
- 100mm long-throw resistive fader:
 - $-\infty$ dB to +10dB range
- Mute (automatable)
- Solo with "Solo Safe"
- Optional automation

6.1 500 Series Module Slots

Both consoles are equipped with eight (8) 500 Series module slots. These 500 slots are built to power and interface any certified VPR Alliance 500 Series signal processor modules other than microphone preamps.

The 500 slots are associated with Stereo Return 1-4 in Odd-Even pairs. Odd-Even pairs of 500 slots are internally normalled to an associated Stereo Returns as follows:

<u>500 Series Slot</u>	<u>=</u>	<u>Stereo Return</u>
1-2	=	1
3-4	=	2
5-6	=	3
7-8	=	4

The features of the 500 Slots are as follows:

- All eight 500 Slots are empty in the standard 1608-II and 2448 configurations
- The input to Odd-Even pairs of 500 slots have their normal fed from STEREO RETURNS INPUT connector
- If the **500 INS** button is engaged, the module in a slot will process the audio before the signal arrives at the Stereo Return input, assuming nothing is patched to the RETURN 500 SLOTS INPUTs
- The modules loaded into the 500 slots can be used independently of the Stereo Returns by patching to/from the RETURN 500 SLOTS INPUTs and OUTPUTs

The modules in the Stereo Return 500 Slots may be used elsewhere by using the RETURN 500 SLOT INPUT and OUTPUT patch points on the rear panel. Inserting a plug into the RETURN 500 SLOT INPUT jack will defeat the signal from the Stereo Return Input connector, but the output of the slot is still sent to the Stereo Return module.

The range of available API 500 Series modules as of this writing include:

- 505 Direct Input
- 525 Compressor
- 527 Compressor
- 529 Stereo Compressor (2 slots)
- 550A 3-Band EQ
- 550b 4-Band EQ
- 560 Graphic EQ
- 565 Filter Bank

Third-party modules that have been approved by API as part of the VPR Alliance can be fitted into the slots. Additional information about approved 500 series modules and the VPR Alliance is available at: http://apiaudio.com/vpr_alliance.html

IMPORTANT NOTE: Installation of any module that's not approved by the API VPR Alliance will VOID the console warranty!

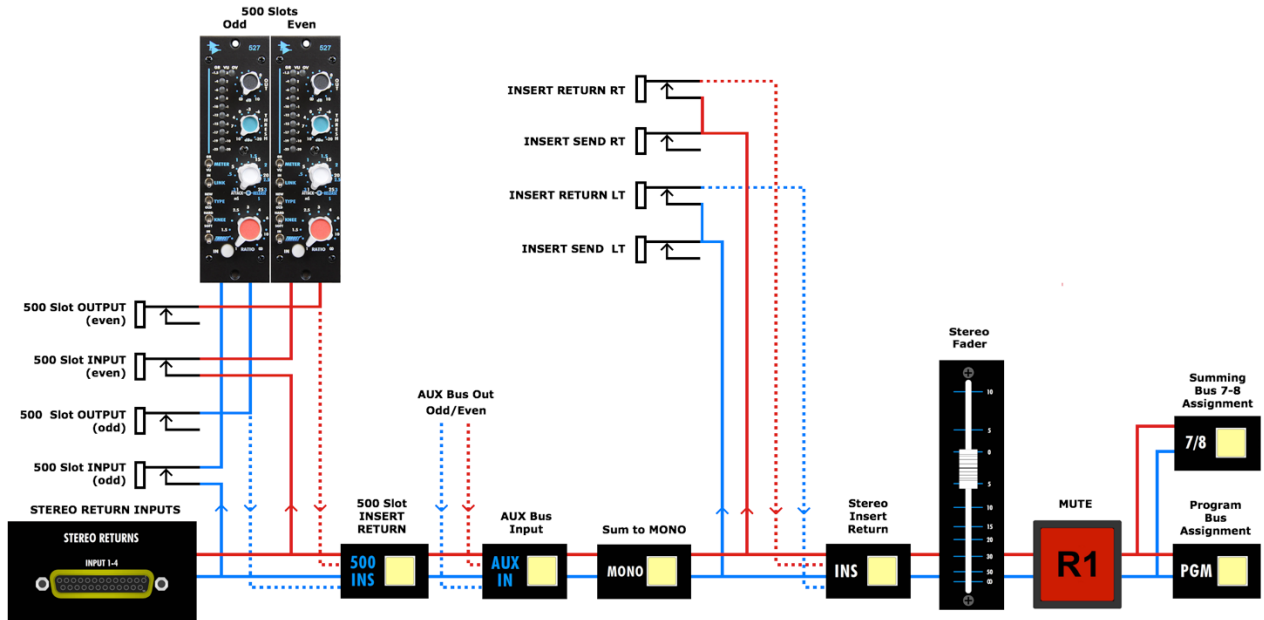
Some possible applications of the 500 Slots include:

- Extra signal processing for the Stereo Return inputs
- Patchable signal processing for use in the channel Inserts
- Patchable signal processing for use in the Program Bus Inserts
- Patchable signal processing for use anywhere else (internally, externally, etc.)

As indicated by these examples, the 500 Slots can be custom configured to add versatility and maximize performance.

6.2 Stereo Return Signal Flow

The simplified block diagram below indicates the basic signal flow through the Stereo Return from input selection to output assignment. In interest of space, routing for only 1 of the 4 Stereo Returns are shown. A more technical and detailed signal flow is available in the 1608-II and 2448 Block Diagrams in the appendix of this manual.



The features of the Stereo Return audio path are shown in the order in which they occur. The diagram assumes the following:

- Solid lines show the default signal flow
- Dotted lines show signal flow options
- Nothing is patched into the 500 SLOT INPUTS
- A pair of 527 compressors are installed in the Odd-Even 500 Series slots
- **500 INS**, **AUX IN**, **MONO**, and **INS** are in default positions (not engaged)

The Stereo Returns have three primary input options:

- **Line-Level:** STEREO RETURNS INPUT 1-4 D-sub connector on the rear panel
- **500 Slot:** The output of the associated pair of 500 Series slots
- **Auxiliary Bus:** Output of the associated pair of Auxiliary Bus Masters

The default line inputs to the Stereo Returns are the STEREO RETURNS INPUT 1-4 D-sub connector on the rear panel. These inputs feed both the main Stereo Return audio path and the inputs to the associated 500 Series slots. If a male TRS ¼" plug is inserted in the 500 SLOT INPUT jack, that signal will replace the STEREO RETURN INPUT as the source for the associated 500 Series slot.

The outputs of the associated 500 Series slots can be returned to the Stereo Return signal path by engaging the **500 INS** button. This will replace the STEREO RETURN INPUT signal with the 500 slot signal.

*IMPORTANT NOTE: Because the 500 SLOT INPUT jacks are switching jacks, the modules in the 500 Series slots can be used independently from the Stereo Return as patchable signal processors. When male TRS ¼" plug is inserted in the 500 SLOT INPUT jack, that signal will replace the STEREO RETURN INPUT as the source for the associated 500 module, but the STEREO RETURN INPUT signal will continue to feed the main Stereo Return audio path. For 500 slots to function independently, inputs and outputs of the 500 slot must be patched and the **500 INS** button cannot be engaged.*

If desired, the output of the associated pair Auxiliary Bus Masters can be routed to the Stereo Return inputs by engaging the **AUX IN** button. This will replace the STEREO RETURN INPUTS or the 500 Slot outputs as the inputs to the Stereo Return with outputs of the associated Aux Send Masters.

The associated Auxiliary Send Masters are as follows:

Aux Send Masters		Stereo Return
1-2	=	1
3-4	=	2
5-6	=	3
7-8	=	4

The Left & Right inputs to the Stereo Returns can be summed to mono by engaging the **MONO** button. This mono summing happens before the Stereo Return INSERT SENDS.

A balanced stereo insert with an in/out switch is provided for each Stereo Return. Engage the **INS** button to route the INSERT RETURN to the Stereo Return signal path. The Stereo Return insert sends and returns are available via rear panel connections.

The Stereo Returns have two primary output options:

- **Program Bus:**
- **Summing Bus 7 & 8:**

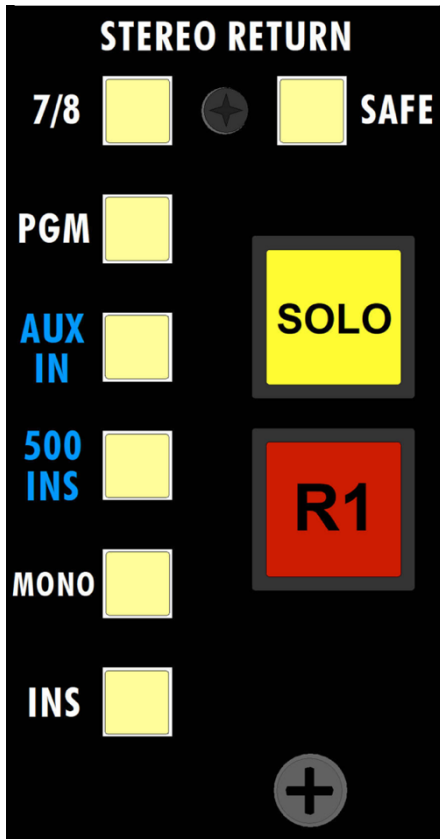
Stereo Program Bus (PGM): Primary channel output for mixing.

- Feeds the Stereo Return outputs to the Left-Right stereo Program Bus
- Program Bus assignment is made by engaging the **PGM** button

SUMMING BUSES (7/8): Summing Buses 7 & 8

- Feeds the Stereo Return outputs to Summing Buses 7 & 8
- Summing Bus assignments are made by engaging the **7/8** button

6.3 265C Stereo Return Controls



The controls for the 265C Stereo Returns function as follows:

7/8: Routes the Stereo Return outputs to Summing Buses 7 & 8.

- Illuminates when engaged

SAFE: Activates the “Solo Safe” mode for the Stereo Return.

- The **SAFE** button protects the Stereo Return from being muted when the Solo-In-Place function is active and another return or channel is soloed
- Illuminates when engaged

PGM (Program): Routes the Stereo Return outputs to the Stereo Program Bus.

- Illuminates when engaged

AUX IN: (Auxiliary Input): Routes the outputs of the associated pair of Aux Send Masters to the input of the Stereo Return.

- Replaces the STEREO RETURN INPUT connector and 500 slot as the Stereo Return input source
- Illuminates when engaged

500 INS (500 slot Insert): Engages the 500 slot output in the Stereo Return signal path.

- Replaces the STEREO RETURN INPUT connector with 500 slot output (in pairs) as the Stereo Return input source
- An input signal for the pair of 500 slots is needed
- Illuminates when engaged

MONO: Sums the inputs of the Stereo Return to mono.

- Sums pre-insert
- Illuminates when engaged

INS (Insert): Engages the Insert Return in the Stereo Return signal path.

- Insert Send is fed post-input:
 - Post STEREO RETURN INPUT connector
 - Post Aux Master input
 - Post 500 slot Insert Return
- Insert Send is always active
- Insert Return is located pre-fader
- The Insert Return is active only when the **INS** button is engaged
- Automatable
- Illuminates when engaged

SOLO: Activates the selected solo function for the Stereo Return. The following solo functions may be selected via the Master Section:

- The following solo functions may be selected via the 840C Multifunction module:
 - Pre-fader Listen (PFL): Non-destructive, stereo
 - After Fader Listen (AFL): Non-destructive, stereo
 - Solo-In-Place (SIP): Destructive, panned, post-fader
 - Illuminates in yellow when engaged

NOTE: PFL is the default solo mode.

MUTE (R 1-4): Cuts the Stereo Return output signal.

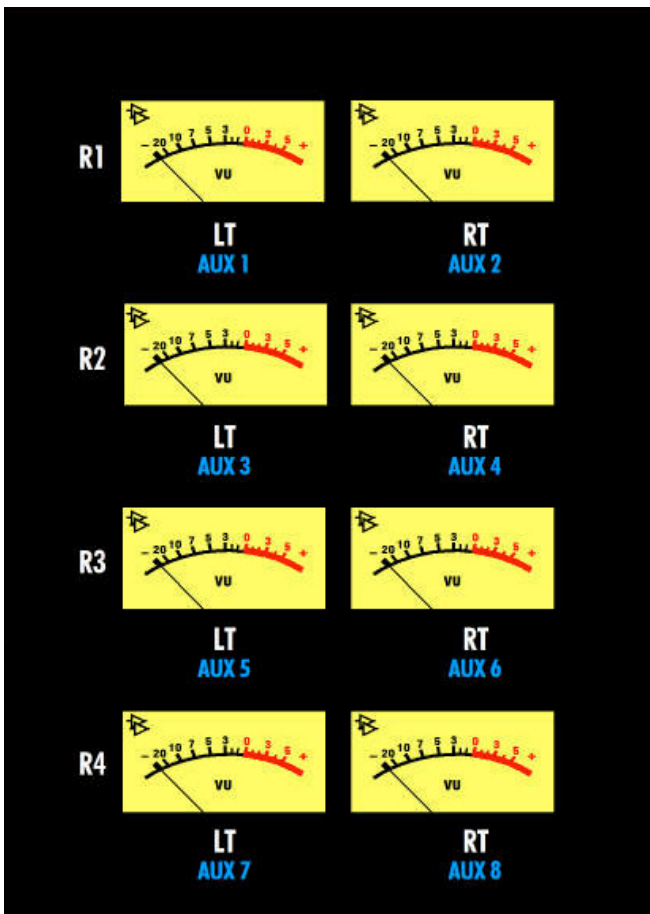
- The **MUTE** button is the ON/off switch for the Stereo Return
- Can be engaged by Solo-In-Place solos
- Illuminates in red when engaged

Stereo Fader (not shown): Controls the output level of the Stereo Return output.

- Full-size 100mm resistive fader
- +10dB of gain
- -∞dB of attenuation
- Unity gain when set to 0dB
- Optional automation

6.4 Stereo Return VU Meters

The meter bridge contains eight (8) dual-function VU meters that support both the Stereo Returns and Auxiliary Bus Masters. Used in pairs, these VU meters display the outputs of Stereo Returns 1-4 by default.

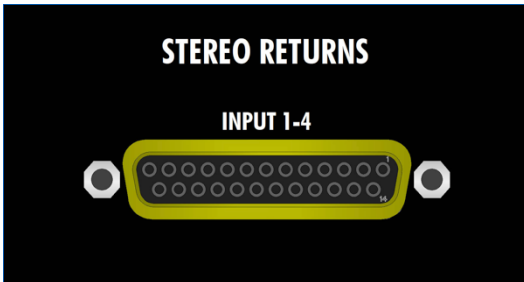


Engaging the **VU** button on a 265C Auxiliary Master will replace the associated Stereo Return signal with the output of that Auxiliary Master.

White labels are used to indicate the VU meters for each Stereo Return and **Blue** labels indicate the Auxiliary Master function.

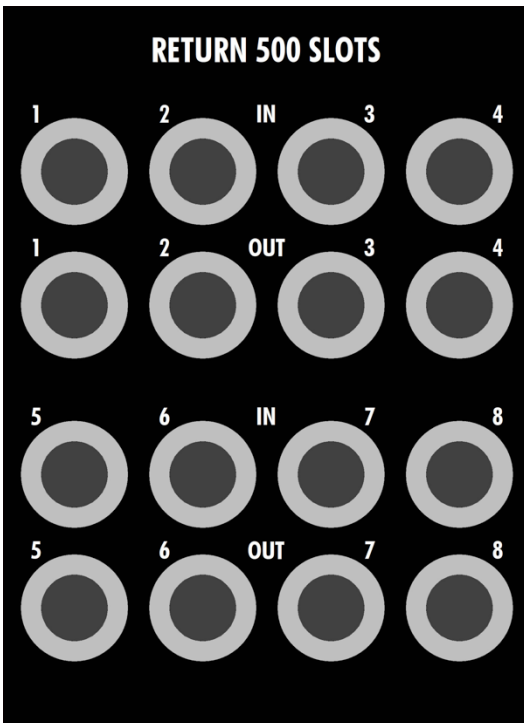
6.5 265C Stereo Return-500 Slot Rear Panel Connections

A comprehensive set of 265C Stereo Return and 500 Series module slot connections are provided on the rear panel of the 1608-II & 2448 consoles. Each Stereo Return and associate pair of 500 Series module slots has the following connections:



STEREO RETURNS INPUT 1-4:

- Left & Right inputs to the Stereo Returns & 500 slots
- Balanced, Line-level
- Female 25-pin D-sub connector
- Standard 8-channel pin-out

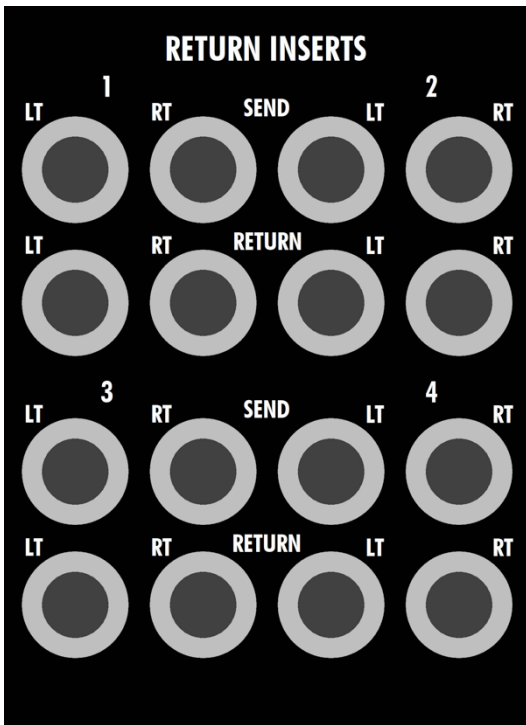


RETURNS 500 SLOTS IN 1-8:

- 500 slot inputs
- Balanced, Line-level
- 1/4" tip-ring-sleeve switching jack
- When a jack is inserted, the signal replaces the STEREO RETURNS INPUT as the source for the 500 slot

RETURNS 500 SLOTS OUT 1-8:

- 500 slot outputs
- Balanced, Line-level
- 1/4" tip-ring-sleeve jack
- Also normalled to the **500 INS** button



RETURN INSERTS SEND 1-4, LT & RT:

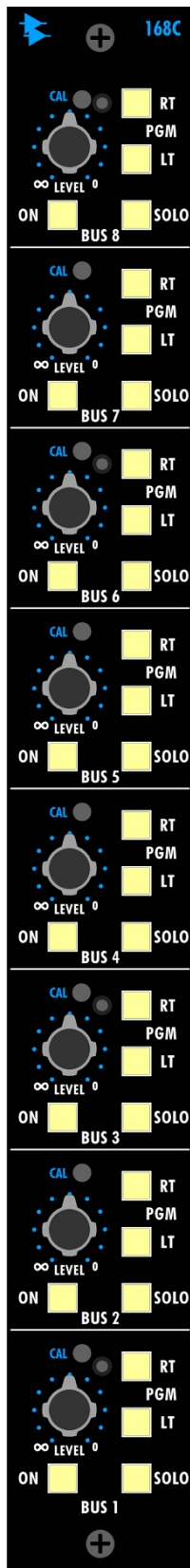
- Left & Right Stereo Return Insert Sends
- Balanced, Line-level
- ¼" tip-ring-sleeve jack
- Insert Sends are always active

RETURNS INSERTS RETURNS 1-4, LT & RT:

- Left & Right Stereo Return Insert Sends
- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- Also normalled to the **INS** button

7.0 168C Summing Bus Master Module

The 168C Summing Bus Master module provides control and routing for the eight (8) Summing Buses, including Program Bus assignments and an external input to the Program Bus.

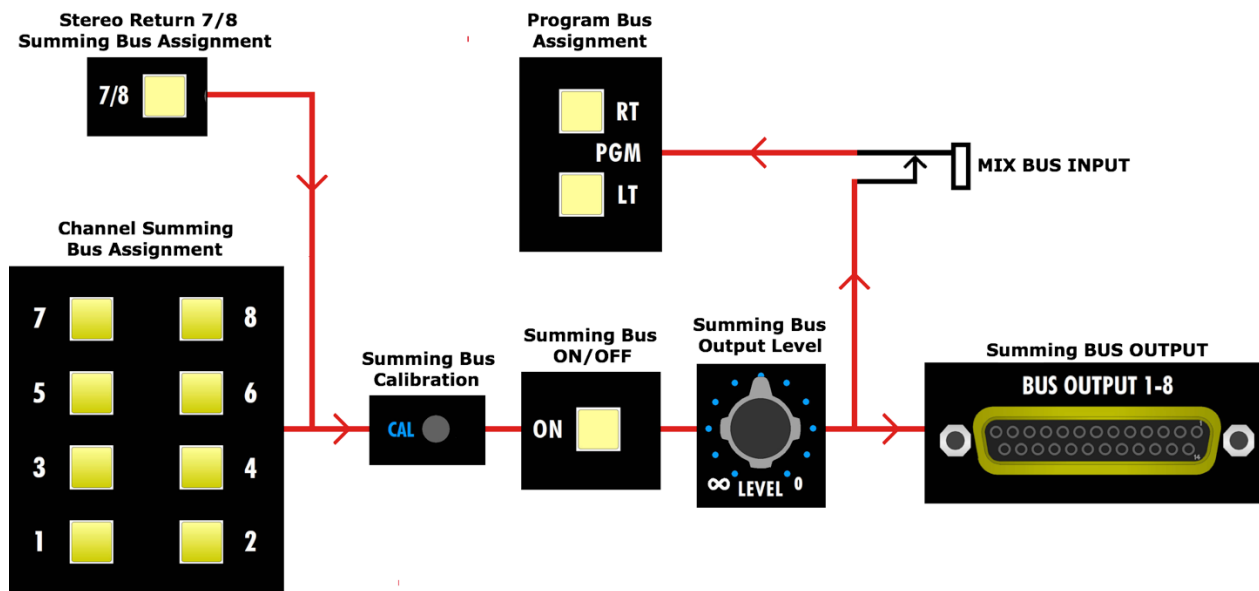


The following is provided for each Summing Bus Master:

- ON/off switch
- Solo
- Trim control (level)
- Summing bus calibration
- Individual Left & Right Program Bus assignments
- External input for Program Bus assignment (MIX BUS INPUT)
- Balanced, line-level output

7.1 168C Summing Bus Signal Flow

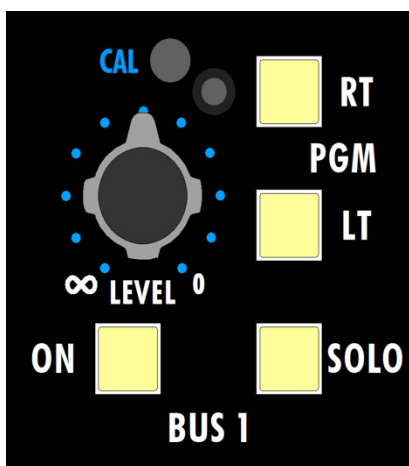
The simplified block diagram below indicates the basic Summing Bus signal flow from the channels & Stereo Returns to the output connectors. A more technical and detailed Summing Bus signal flow is available in the 1608-II and 2448 Block Diagrams in the appendix of this manual.



The Summing Bus Masters (labeled BUS 1-8) are the final stage before the Summing Bus outputs are fed to the BUS OUTPUT 1-8 D-sub connector on the rear panel. The Summing Bus Masters are fed from the Summing Bus assignments made on the channels and Stereo Returns. The output of the Summing Bus Masters (BUS 1-8) can also be routed to the Program Bus via individual Left & Right assignment buttons (**PGM LT & RT**).

7.2 168C Summing Bus Master Controls

The controls for each 168C Summing Bus Master (BUS 1-8) function as follows:



ON: ON/off switch for the Summing Bus Master (BUS 1-8).
 • Illuminates when engaged

LEVEL: Controls the output level of the Summing Bus.
 • $-\infty$ dB to +0dB range
 • 0dB = unity gain (attenuation only)

CAL (Calibrate trim-pot): Trim-pot calibrates the BUS OUT signal to 0dB when the **LEVEL** pot is set to 0dB.

LT - RT PGM (Left-Right Program Bus Assignment): Individual assignment of the Summing Bus output to the Left & Right Program Buses.

- Routes the Summing Bus output to the Left-Right Program Bus(es) when engaged
- If a plug is inserted in the BUS MIX INPUT jacks on the rear panel, that signal will replace the Summing Bus output as the feed to the **LT - RT PGM** assignment buttons
- These jacks are normalled to the output of the Summing Buses, but break that connection when a jack is inserted
- The normal or inserted signal present at the BUS MIX INPUT jack feeds the **LT - RT PGM** Program Bus assignment buttons
- Illuminates when engaged

*NOTE: Summing Bus Masters that are assigned to the Program Bus DO NOT mute when Solo-In-Place is the active solo function and a **SOLO** button is engaged on a channel or Stereo Return.*

SOLO: Activates the PFL or AFL Solo function.

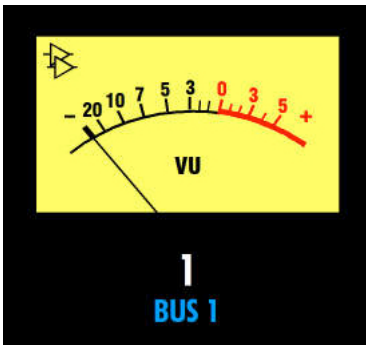
- The following solo functions may be selected via the 840C Multifunction module:
 - Pre-fader Listen (PFL): Non-destructive, mono (Summing Bus output)
 - After Fader Listen (AFL): Non-destructive, mono (BUS MIX INPUT)
 - Solo-In-Place (SIP): Destructive, mono (must be assigned to the Program Bus)
- Illuminates when engaged

NOTE: PFL is the default solo mode.

NOTE: To help facilitate comprehensive monitoring, when the console solo function is PFL and Summing Bus is soloed, the Summing Bus output will be routed to the Solo Bus. When the console solo function is AFL, the signal from the BUS MIX INPUT connector will be routed to the Solo Bus.

7.3 Summing Bus VU Meters

The VU meters for the first eight channels also provide the meter functions for Summing Buses 1-8.



The channel Direct Output is the default source for the channel VU meter. The feed to the channel VU Meter is determined by the selection made using the VU routing controls on the 840C Multifunction module. These selections are global and apply to all channel VU Meters.

To display the output levels of the Summing Buses 1-8 on the first eight channel VU meters, engage the **VU BUS** button on the 840C module.

White labels are used to indicate the VU meters for each channel and **Blue** labels indicate the Summing Bus Master function.

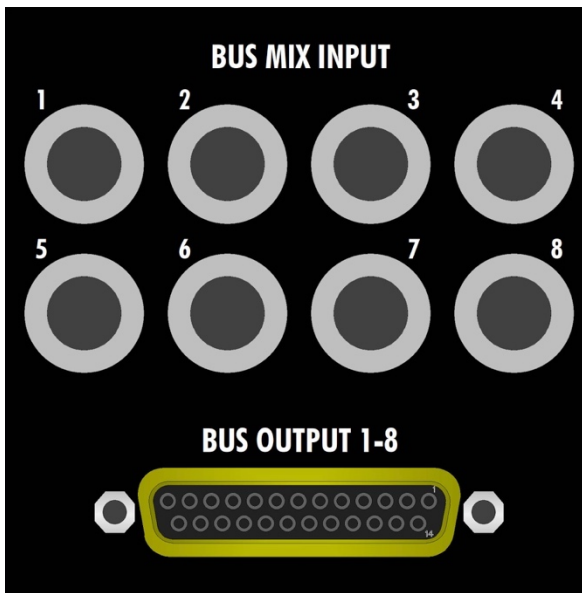


VU BUS (Summing Bus 1-8): Routes the outputs of Summing Buses (1-8) to channel VU meters 1-8.

- Defeats the meter feed from the channel and replaces it with the associated Summing Bus output
- Illuminates when engaged

7.4 168C Summing Bus Connections

A complete set of Program Bus connections are provided on the rear panel of the 1608-II and 2448 consoles. The rear panel connections for the 168C Summing Bus Master module are as follows:



BUS MIX INPUT 1-8:

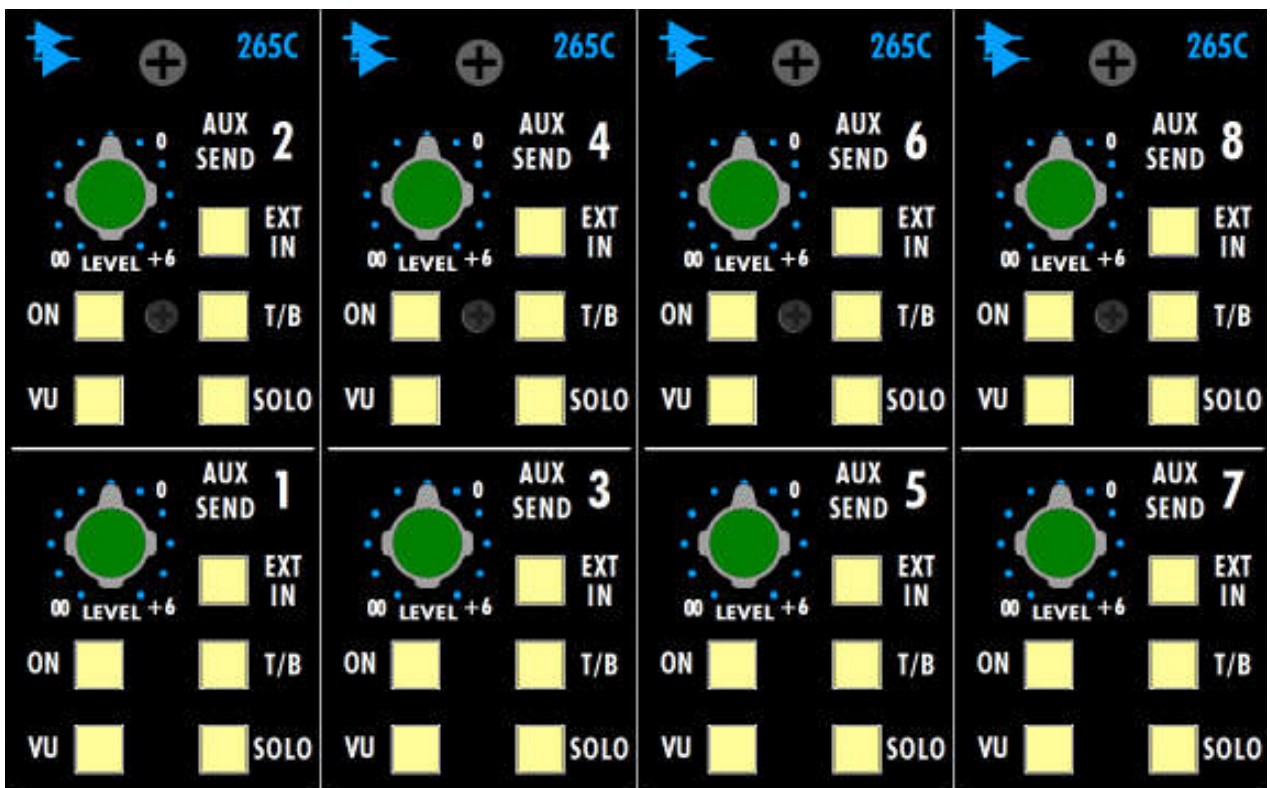
- Balanced, Line-level
- ¼" tip-ring-sleeve switching jacks
- Replaces the Summing Bus Output feed to the **LT-RT PGM** bus assignment switches when a jack is inserted

BUS OUTPUT 1-8:

- Balanced, Line-level
- Female 25-pin D-sub connector
- Standard 8-channel pin-out

8.0 265C Auxiliary Bus Masters

The eight (8) Auxiliary Bus Masters (AUX SEND 1-8) are situated in pairs on the 265C modules, above their associated Stereo Returns. The Auxiliary Bus Masters provides control and routing for the eight (8) Auxiliary Bus outputs.



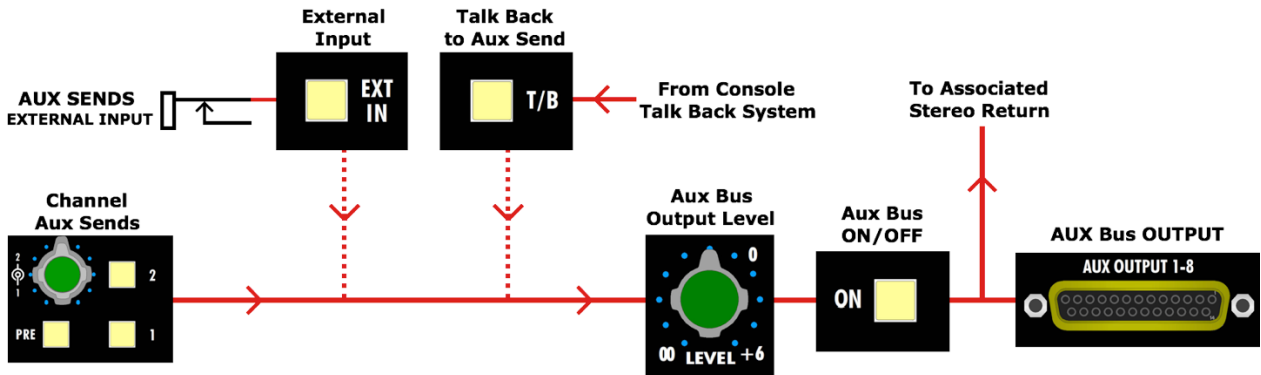
The 265C AUX SENDS 1-8 function primarily as Auxiliary Bus Masters for effects sends and headphone feeds, but can function as output masters for any sub-mix.

The Aux Send Masters have the following features:

- External Input (sums with Aux Bus input)
- ON/off switch
- Level control
- Solo (AFL only)
- Talkback insertion for cue/foldback sends (headphone sends)
- Routing to the associated Stereo Return
- VU Meter routing
- Balanced, line-level output at the AUX SENDS OUTPUT 1-8 D-sub connector

8.1 265C Auxiliary Bus Signal Flow

The simplified block diagram below indicates the basic Auxiliary Bus signal flow from the channels Aux Sends to the output connectors. A more technical and detailed Auxiliary Bus signal flow is available in the 1608-II and 2448 Block Diagrams in the appendix of this manual.



The Auxiliary Send Masters (labeled AUX SEND 1-8) are the final stage before the Auxiliary Bus outputs are fed to the AUX OUTPUT 1-8 D-sub connector on the rear panel. The Auxiliary Bus Masters are fed from the channel Aux Sends.

In addition to the normal feed from its corresponding Auxiliary Bus, the Aux Send Master can accept a balanced, line-level input from the corresponding AUX SEND EXTERNAL INPUT ¼" tip-ring-sleeve jack on the rear panel. This signal is added to the Aux Send Master output when the **EXT IN** button is engaged.

The output of the console Talk Back system will be routed to the Aux Send Master when the **T/B** button is engaged. This will help facilitate communication when headphone sends are created from Aux Sends while recording.

The output of the Aux Send Master is fed to the AUX OUTPUT 1-8 D-sub connector on the rear panel for connection to effects devices, cue/foldback systems, and other equipment. This output is active whenever the corresponding Aux Send is turned ON.

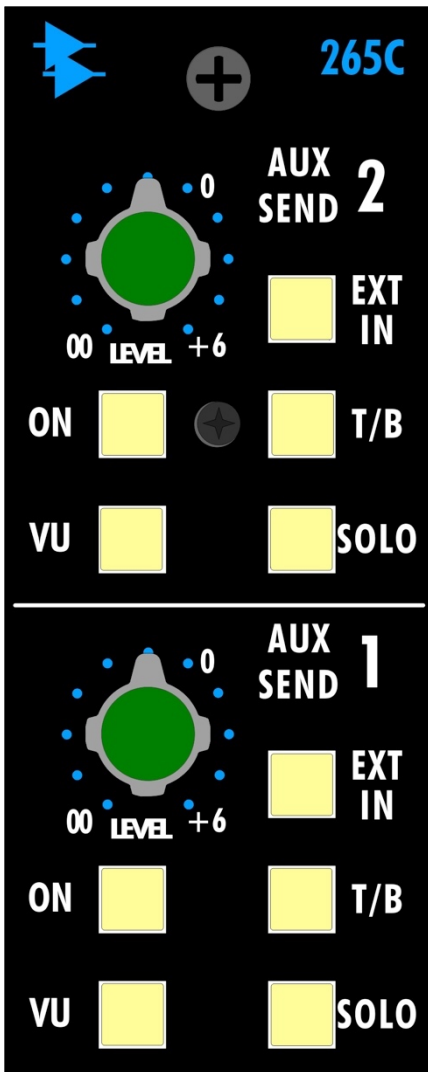
The output of a pair of Aux Send Masters can be selected as the input to its associated Stereo Return by engaging the **AUX IN** button on the Stereo Return. This will replace the STEREO RETURN INPUTs or the 500 Slot outputs as the inputs to the Stereo Return with outputs of the associated Aux Send Masters.

The associated Auxiliary Bus Masters are as follows:

<u>Aux Send Masters</u>		<u>Stereo Return</u>
1-2	=	1
3-4	=	2
5-6	=	3
7-8	=	4

8.2 265C Auxiliary Bus Master Controls

The controls for 265C AUX SENDs function as follows:



LEVEL: Controls the output level of the Auxiliary Bus.

- $-\infty$ dB to +6dB range
- 0dB = unity gain

ON: ON/off switch for the Auxiliary Send Master.

- Illuminates when engaged

VU: Routes the output of the Aux Send to the Aux Send/Stereo Return VU meter.

- Replaces the output of the associated Stereo Return as the feed to the VU meter
- Illuminates when engaged

EXT IN (External Input): Sums the AUX SEND EXTERNAL INPUT signal from the rear panel with the corresponding Auxiliary Bus at the input of the Aux Send Master.

- Illuminates when engaged

*NOTE: When the **EXT IN** button is engaged, the external input is combined with the output from the corresponding auxiliary bus and is fed to the input of the Aux Send Master.*

T/B (Talk Back): Routes the output of the console Talkback system to feed the Aux Send Master when the Talkback microphone is activated and assigned to AUX.

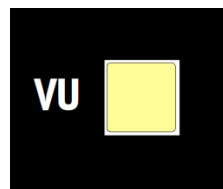
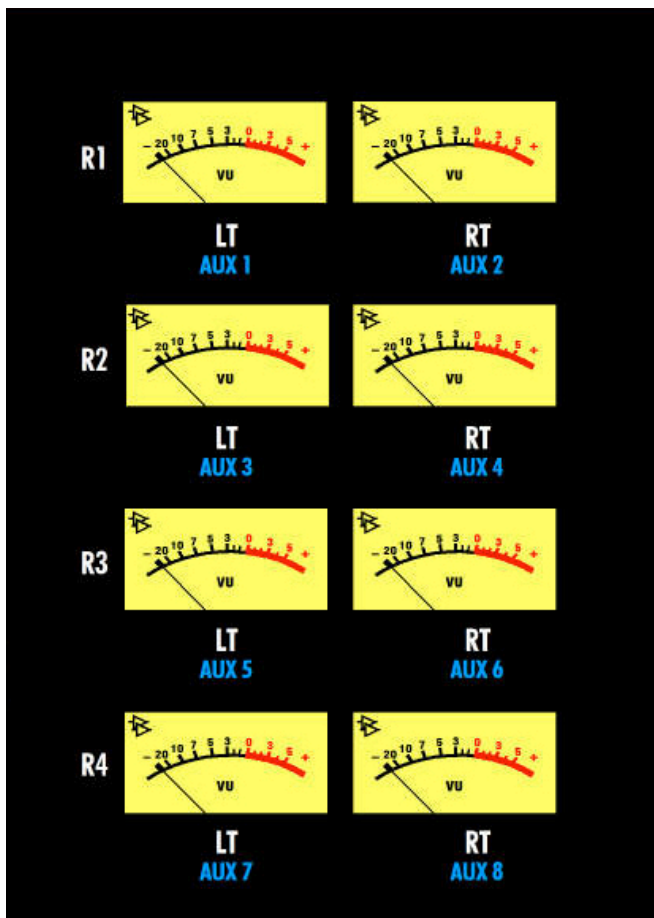
- Illuminates when engaged

SOLO: Activates the AFL solo for the Aux Send Master.

- AFL solo only (post Master output regardless of solo mode)
- Illuminates when engaged

8.3 Auxiliary Send VU Meters

The meter bridge contains eight (8) dual-function VU meters that support both the Stereo Returns and Auxiliary Bus Masters. Used in pairs, these VU meters display the outputs of Stereo Returns 1-4 by default.

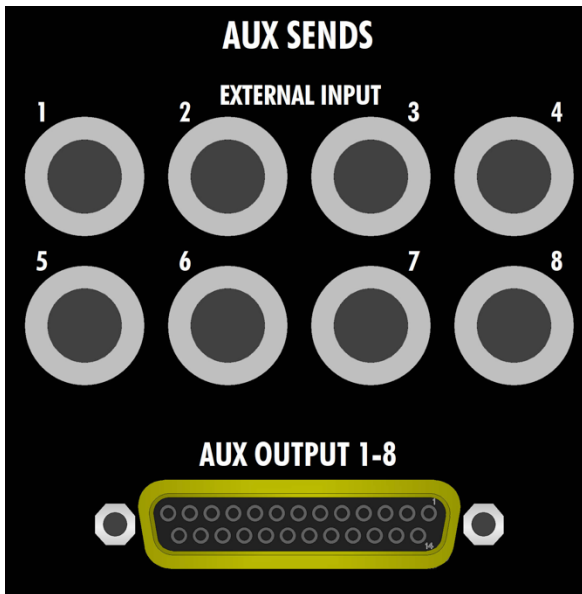


Engaging the **VU** button on an 265C Aux Send will replace the associated Stereo Return signal with the output of that Auxiliary Master.

White labels are used to indicate the VU meters for each Stereo Return and **Blue** labels indicate the Auxiliary Master function.

8.4 265C Auxiliary Send Rear Panel Connections

A complete set of Auxiliary Send connections are provided on the rear panel of the 1608-II & 2448 consoles. Each Aux Send has the following connections:



EXTERNAL INPUT 1-8:

- Balanced, Line-level
- ¼" tip-ring-sleeve jacks
- Sums with the Auxiliary Bus when the **EXT IN** button is engaged

AUX OUTPUT 1-8:

- Balanced, Line-level
- Female 25-pin D-sub connector
- Standard 8-channel pin-out

9.0 Program Bus Masters

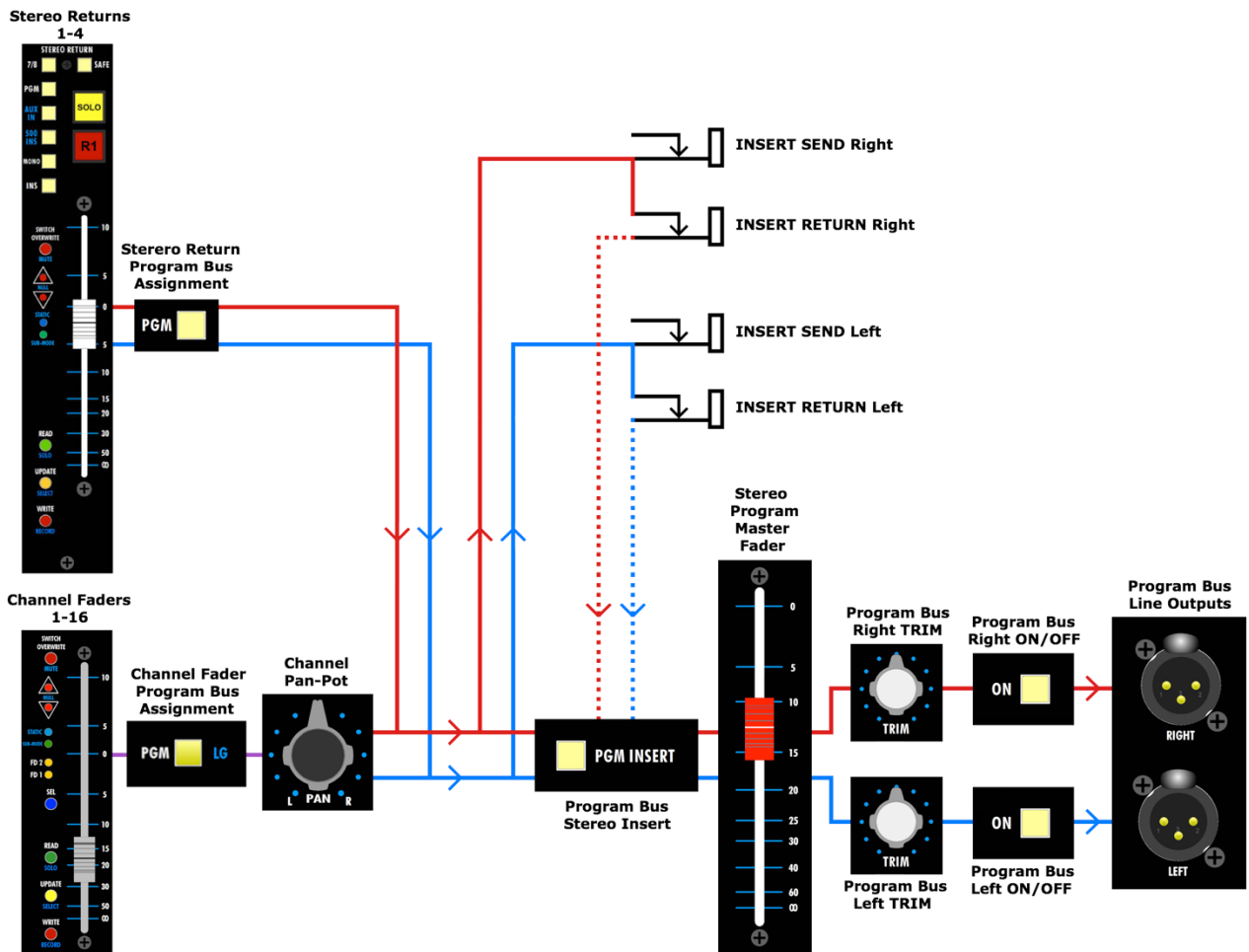
The complete stereo Program Bus signal flow for the 1608-II and 2448 consoles offers a suite of functions and is composed of the following components:

- Dedicated stereo (Left-Right) summing bus with calibration
- Balanced, line-level, stereo inserts with in/out switch (optional automation)
- Optional 529C Stereo Bus Compressor (2448 only)
- Stereo Program Master Fader (optional automation).
- Left & Right Program Bus Masters with **TRIM** and ON/off switch
- Balanced, line-level, stereo Program Bus outputs

Because the 1608-II and 2448 have slightly different architectures the Program Bus signal flow is slightly different for each console. Accordingly, the Program Bus signal flow for each console is outlined in the separate sections that follow.

9.1 1608-II Program Bus Signal Flow

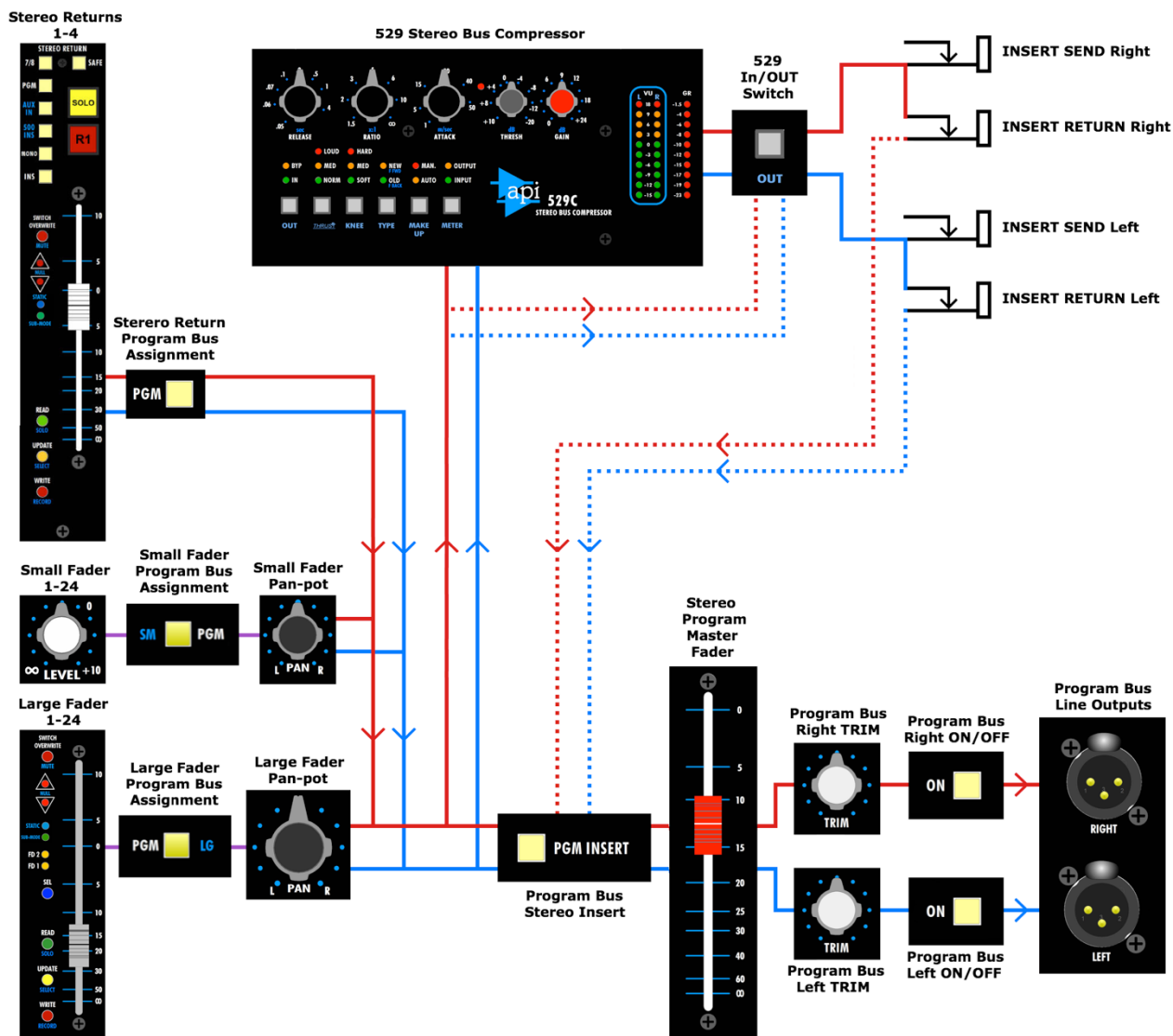
The simplified block diagram below indicates the basic stereo Program Bus signal flow from the channels & Stereo Returns to the output connectors. A more technical and detailed Program Bus signal flow is available in the 1608-II Block Diagram in the appendix of this manual.



The output of the channel pan-pots and Stereo Returns feed the stereo Program Bus INSERT SENDS as well as the **PGM INSERT** button. If the **PGM INSERT** button is engaged, the Program Bus INSERT RETURNS will feed the stereo Master Fader, trims, **ON/off** switches, and rear panel outputs.

9.2 2448 Program Bus Signal Flow

The simplified block diagram below indicates the basic stereo Program Bus signal flow from the channel Large & Small Fader paths and Stereo Returns to the output connectors. A more technical and detailed Program Bus signal flow is available in the 2448 Block Diagram in the appendix of this manual.



The output of the channel Large & Small Fader pan-pots and Stereo Returns feed the stereo optional 529C Stereo Bus Compressor as well as the **PGM INSERT** button. If so equipped, the 529C compressor can be bypassed by engaging the **OUT** button. The output of the optional 529C compressor feeds the stereo Program Bus INSERT SENDS. The INSERT SEND jacks are half-normalled to the INSERT RETURN jacks. If the **PGM INSERT** button is engaged, the Program Bus INSERT RETURNS will feed the stereo Master Fader, trims, ON/off switches, and rear panel outputs.

*NOTE: The optional 529C Stereo Bus Compressor and Program Bus Insert are normalled together in a common signal path. To apply the 529C compressor to the stereo Program Bus, the **PGM INSERT** button must be engaged.*

NOTE: The optional 529C Stereo Bus Compressor is not independently available via rear panel connections. Only the audio assigned to the Program Bus can be processed by the 529C compressor.

*NOTE: Inserting a plug in the PROGRAM BUS INSERT RETURN jack will defeat the optional 529C Stereo Bus Compressor output and replace it with that signal. The signal plugged into the PROGRAM BUS INSERT RETURN jacks will feed the **PGM INSERT** button.*

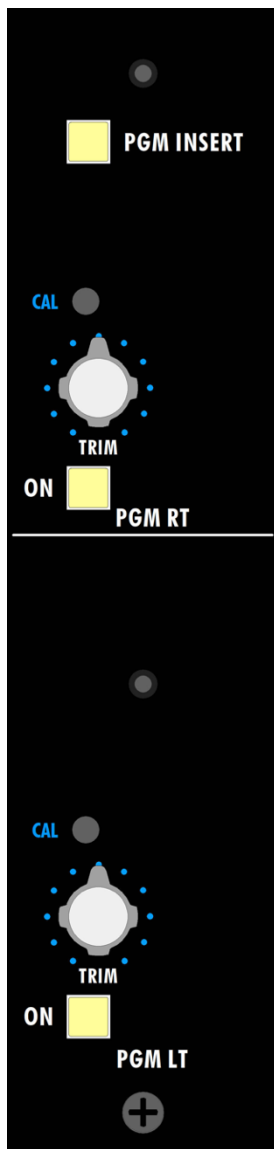
9.3 268C Stereo Program Bus Master

Together with the Stereo Master Fader, the Program Bus Output Master section of the 268C provides full control over the stereo Program Bus. Controls include:

- Switchable balanced insert (optional automation)
- Stereo Program Master Fader (optional automation)
- Output trim control
- ON/off switch
- Output calibration

The Left & Right Program Bus Masters (labeled PGM LT and PGM RT) are the final stage before the Program Bus outputs are fed to the PROGRAM BUS OUTPUT jacks on the rear panel.

9.3.1 268C Stereo Program Bus Master Controls



The controls for the 268C stereo Program Bus Masters and Stereo Master Fader function as follows:

PGM INSERT (Program Insert): Routes the LT & RT Program Bus INSERT RETURNS to the stereo Master Fader.

- The Program INSERT SEND is fed pre-fader from the output of the Program Bus (post-529C in the 2448, if so equipped)
- The Program INSERT SEND is always active
- The Program INSERT RETURN is located pre Master Fader
- The Program INSERT RETURN is active only when the **INS** button is engaged
- Illuminates when engaged

CAL (Calibration trim-pot): The trim-pot calibrates the level of the signal feeding the PROGRAM BUS LT & RT OUTPUTS.

TRIM: Controls the post Master Fader output level of the Program Bus.

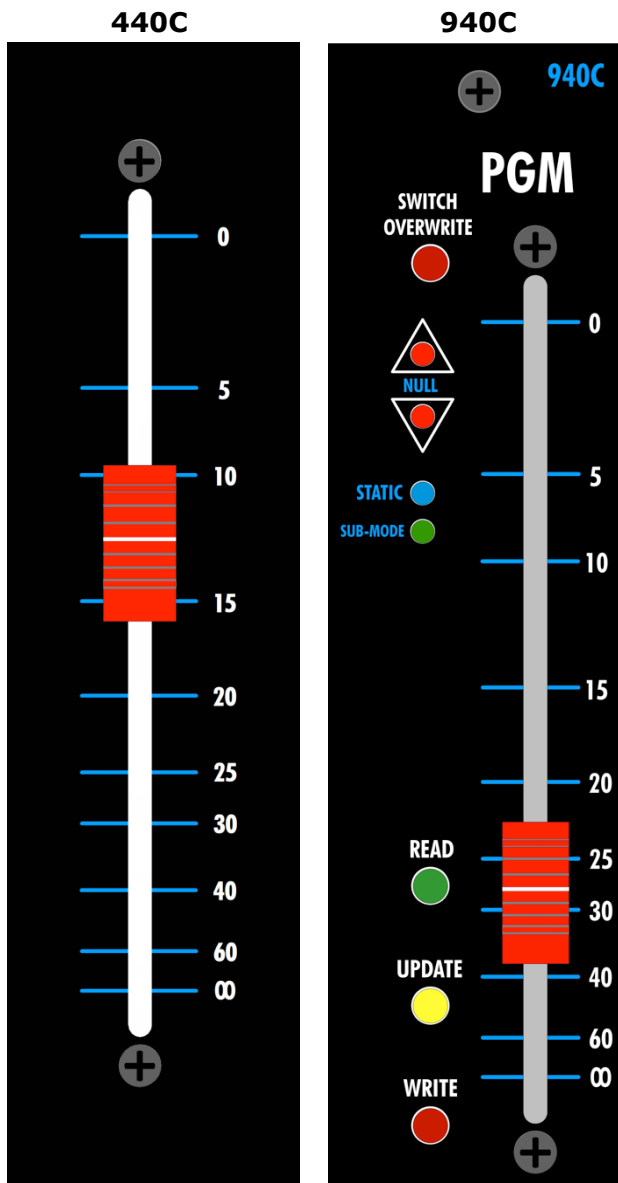
- -4bBU to +6dB

ON: ON/off switch for the Program Bus Master.

- Illuminates when engaged

9.4 Stereo Program Master Faders

The 1608-II and 2448 consoles ship with or without the optional *Final Touch™* automation system. Both consoles can be retro-fitted with automation after initial delivery. Consoles without automation are equipped with the 440C non-automated stereo Program Master Fader. Automated consoles are fitted with 940C Automation Control Module (ACM) that contains an automated stereo Program Master Fader.



The 440C and 940C stereo Program Master Faders are the primary mix output level control for the console.

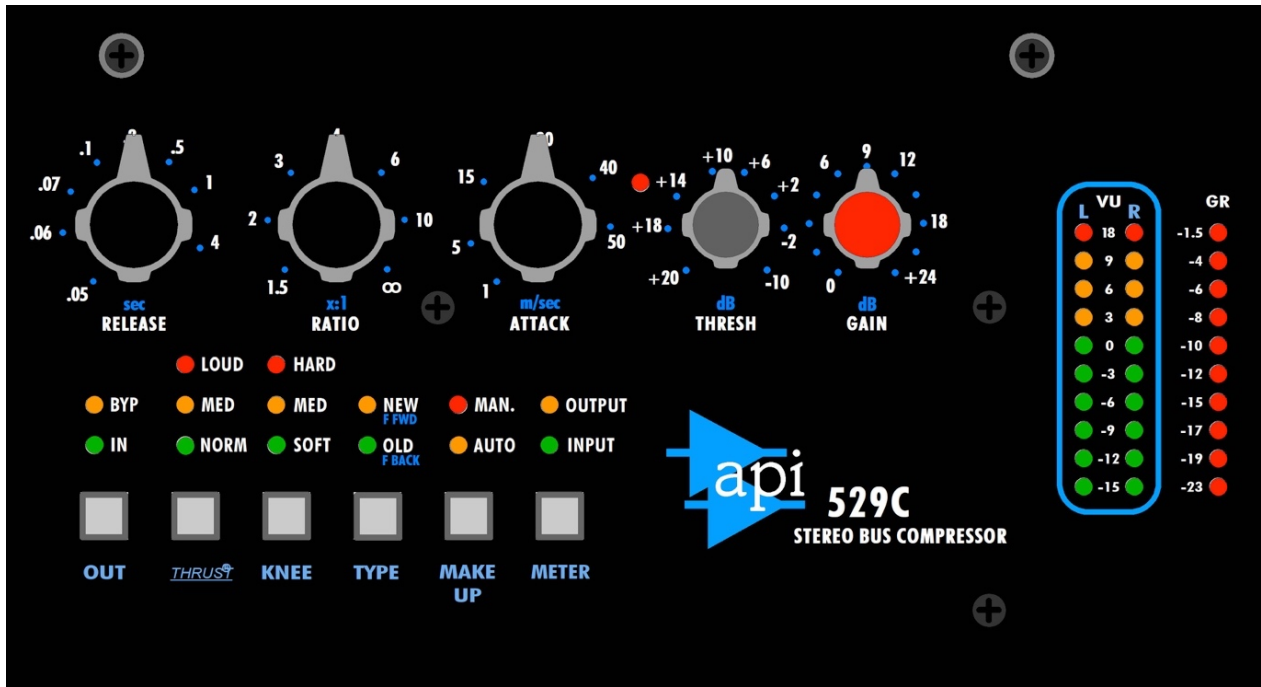
PGM FADER (Program Master Fader): Stereo Program Master Fader:

- Primary level control for the Program Bus
- 100mm long-throw stereo fader
- $-\infty$ dB to +0dB range
- 0dB = unity gain (attenuation only)
- Optional automation

9.5 Optional 529C Stereo Bus Compressor (2448 Only)

The 2448 can be equipped with an optional 529C Stereo Bus Compressor. Only the audio assigned to the Program Bus can be processed by the 529C compressor, if so equipped. The optional 529C compressor is not independently available via rear panel connections.

The 1608-II cannot be equipped with the optional 529C Stereo Bus Compressor.



The optional 529C Stereo Compressor combines the unmistakable sound of API's compression technology with the convenience and popularity of the API 500 Series format.

Carefully designed to deliver a wide range of compression options, the optional 529C delivers warmth, clarity and punch, whether used for subtle adjustments or heavy compression effects.

Based on the unprecedented success of the 2500, the optional 529C takes many of the features and controls from API's famous stereo bus compressor and puts them into the Program Bus audio path in the 2448 console. Using API's discrete op-amps and transformer technology, the 529C delivers the legendary analog sound of API.

The optional 529C is a two-channel, stereo-linked dynamic processor designed for stereo program bus compression and compression of any stereo audio source. The audio input signals from both channels are combined in a true-RMS power summing fashion to create the compression control signal for the detection path. Then, the resulting compression signal is applied evenly to both channels for proper balance. All front panel settings control both channels simultaneously.

This stereo compressor features API's patented **THRUST**[®] circuitry for a punchy low end, along with an OLD/NEW switch that lets you choose between classic and modern compression characteristics: OLD for vintage-style feedback compression and NEW for today's more common feed-forward compression. The 3-position KNEE switch adjusts the shape of the curve at the onset of compression for an "over-easy" type compression resulting in a very natural, uncompressed sound or a typical sharp knee type that lends itself to a much more severe limiting effect.

The Auto MAKE UP gain function lets you adjust ratio and threshold controls without affecting the output level. Alternately MAKE UP gain can be set manually.

529C Features:

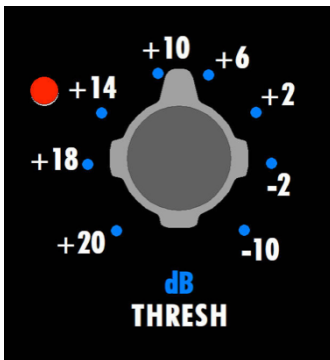
- Continuously variable 31-position detented controls for Gain, Threshold, Ratio, Attack & Release
- Patented **THRUST**® filter for frequency dependent side chain control
- 3 selectable compressor curve KNEE settings
- Selectable NEW or OLD switch for feed-forward or feed-back operation
- Selectable automatic or manually variable compressor make-up gain
- Stereo 10-segment LED VU meters show selectable input or output levels
- 10-segment LED Gain Reduction meter
- "Over Threshold" LED illuminates when input audio cross the set THRESHold
- Full hard-wired relay bypass
- Audio circuit uses 2510 and 2520 discrete op amps with transformer output

9.5.1 529C Stereo Bus Compressor Controls

The optional 529C Stereo Bus Compressor provides a comprehensive suite of controls:

- **THRESHold**: The level at which compression begins (+20dB to -10dB)
- **Threshold LED**: Indicates when the input audio crosses the selected THRESHold level
- **RATIO**: The amount of compression applied after threshold (1.5:1 to ∞:1)
- **ATTACK**: The time it takes for the compressor to respond (1 to 50 m/sec)
- **RELEASE**: The time it takes the compressor to return to unity gain (.05 to 4 seconds)
- **METER**: Selects OUTPUT or INPUT as the source for the stereo VU meter
- **VU (Stereo VU Meter)**: Stereo 10-segment LED VU meter (selectable OUTPUT or INPUT)
- **GR (Gain Reduction) Meter**: 10-segment LED gain reduction meter
- **MAKE UP**: Selects AUTOmatic or MANUAL MAKE UP gain
- **GAIN**: Manual MAKE Up gain control (0dB to +24dB of output gain when in MANUAL)
- **TYPE**: NEW (feed-forward) or OLD (feedback) detection path topology
- **KNEE**: The characteristic of the response curve at the onset of compression.
- **THRUST**®: Patented circuit that inserts a filter before the RMS detector
- **OUT**: Toggles to switch gain reduction in or out or engages hard bypass

The controls for the optional 529C Stereo Bus Compressor function as follows:

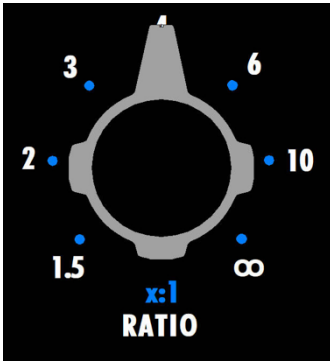


THRESHold: Sets the level at which compression begins.

- Continuously variable range between +20dB and -10dB
- Detented rotary pot for easy recall

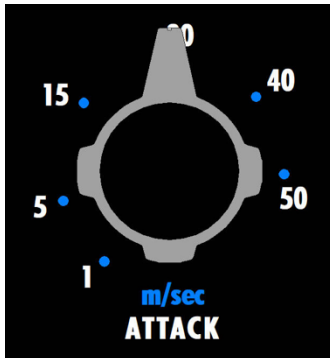
Threshold LED: Illuminates when the input audio crosses the level set by the THRESH control.

- Illuminates in red when active



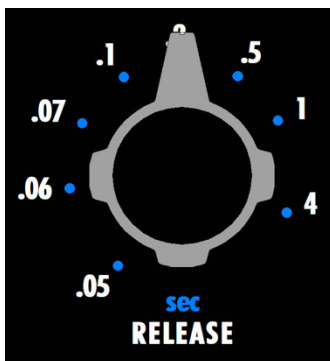
RATIO: Sets the ratio of input vs. output levels for signals that fall above the set THRESHold.

- Continuously variable between 1.5:1 and ∞:1 (x:1)
- Detented rotary pot for easy recall
- Compression with RATIOs of 10:1 or greater is generally considered to be limiting



ATTACK: Sets the time it takes the compressor to react when the level exceeds the set THRESHold.

- Continuously variable between 1 and 50 milliseconds (m/sec)
- Detented rotary pot for easy recall



RELEASE: Sets the time it takes the compressor to recover to unity gain after the level falls below the set THRESHold.

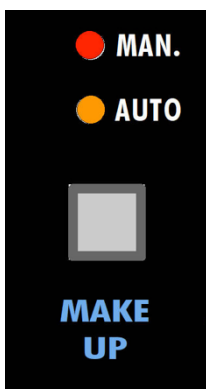
- Continuously variable between .05 and 4 seconds (sec)
- Detented rotary pot for easy recall

Make Up Gain

The optional 529C Stereo Bus Compressor has two (2) make up gain functions:

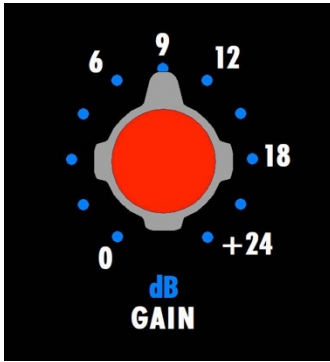
- **Auto:** The output gain of the compressor is adjusted automatically based on the input signal and the compressor settings
- **Manual:** The output gain of the compressor is adjusted manually using the GAIN control

The make-up gain function is determined by the **MAKE UP** button.



MAKE UP (gain): Toggle to select the make-up gain function.

- **MAN. (Manual):** Engages the manual make up gain function & GAIN control (red LED)
- **AUTO:** Engages the automatic make up gain function (yellow LED)



GAIN: Manual make up gain (output level).

- Post compression gain
- Continuously variable between 0dB and +24dB
- Active only when the MAKE UP function is set to MANUAL
- Detented rotary pot for easy recall

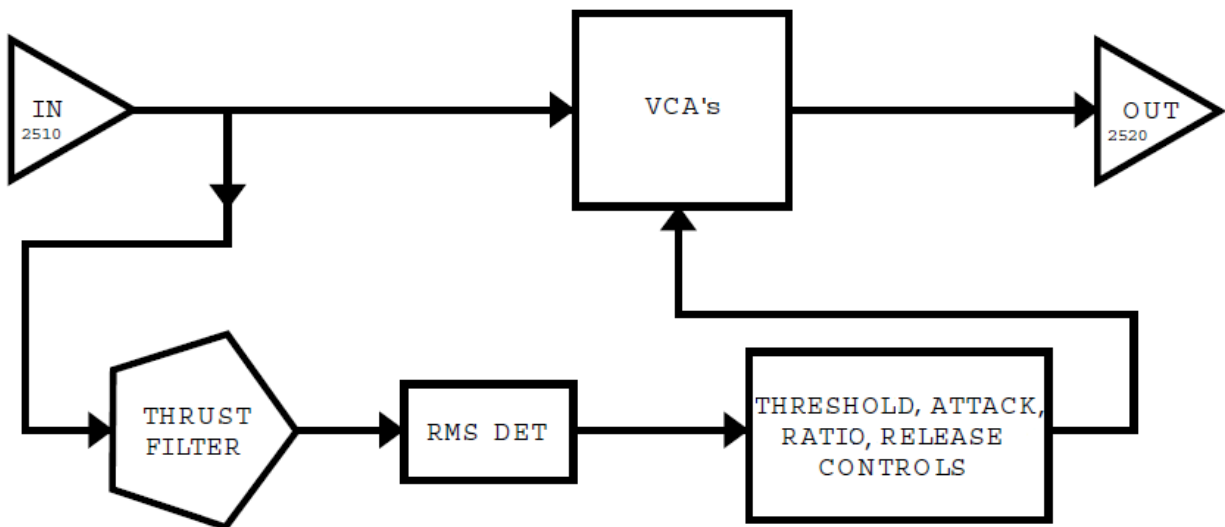
9.5.2 529C Compressor TYPE

The optional 529C compressor can be set to operate in two circuit topologies or “types” that determine where the signal that feeds the RMS detector comes from:

- **OLD:** Feed-Back topology: The RMS detector receives the signal from after the VCA
- **NEW:** Feed-Forward topology: The RMS detector receives the signal from before the VCA

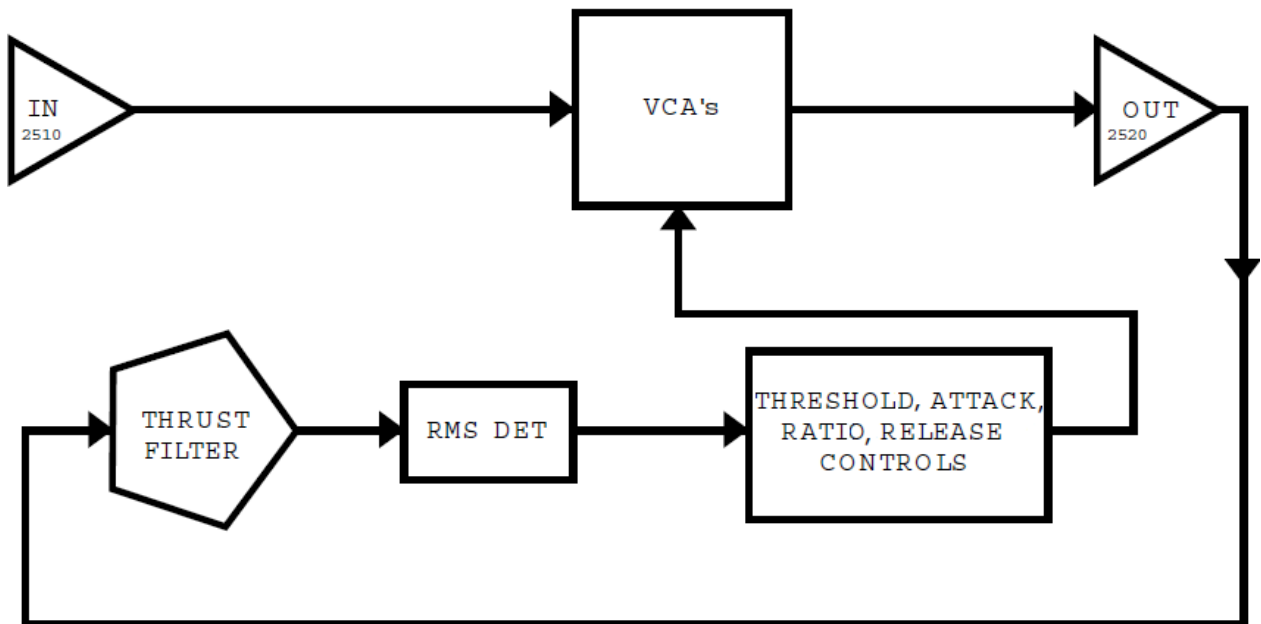
NEW (Feed-Forward)

In a feed-forward compressor, the RMS detector normally gets its signal from a split of the input signal. With this method, the RMS detector sends a signal to the VCA that is an exact ratio of the desired compression set by the RATIO control. This is how many new VCA based compressors work. This can yield more aggressive compression and a harder, more affected sound.



OLD (Feed-back)

In a feed-back compressor, the RMS detector gets its signal from the output of the gain reduction device (VCA). This is how older API 525, 1176 type, and 660 type compressors work. This yields a smoother, softer, more transparent sound.



The compressor circuit topology is selected using the TYPE switch.



TYPE: Toggle to select the compressor circuit topology.

- **NEW (F FWD):** Engages the feed-forward topology (yellow LED)
- **OLD (F BACK):** Engages feed-back topology (green LED)

9.5.3 529C Compression KNEE

The KNEE function determines the shape of the 529C Stereo Bus Compressor's response curve at the onset of compression.

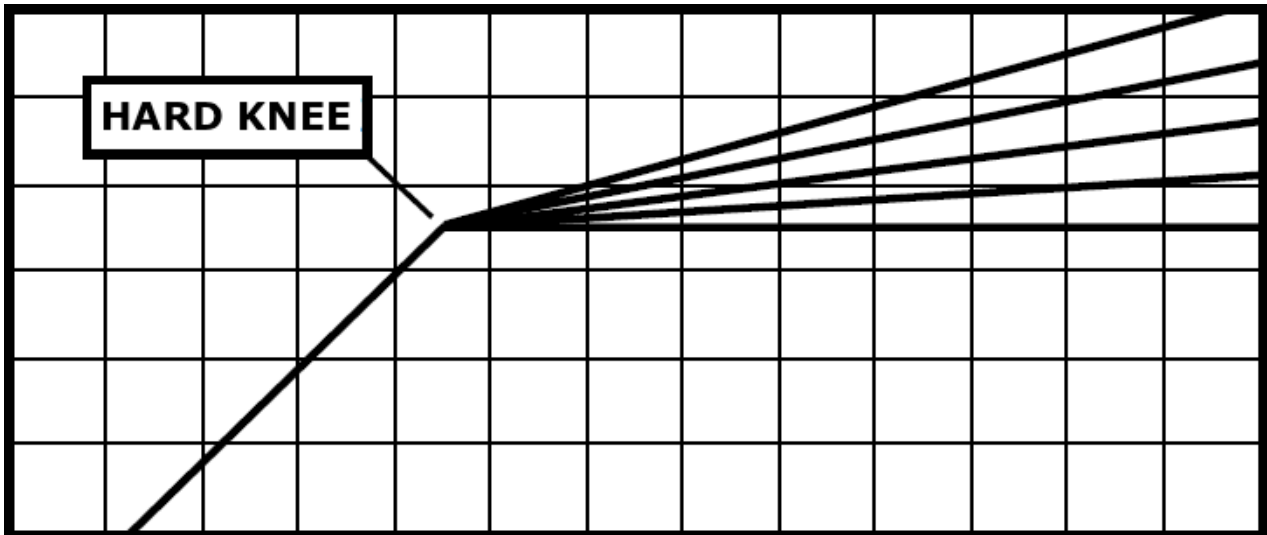
The optional 529C compressor has three (3) KNEE settings that control how the compressor transitions into compression:

- **HARD:** Sharp response curve
- **MEDium:** Slightly rounded response curve
- **SOFT:** Rounded response curve

HARD KNEE Compression

HARD: Sharp response curve.

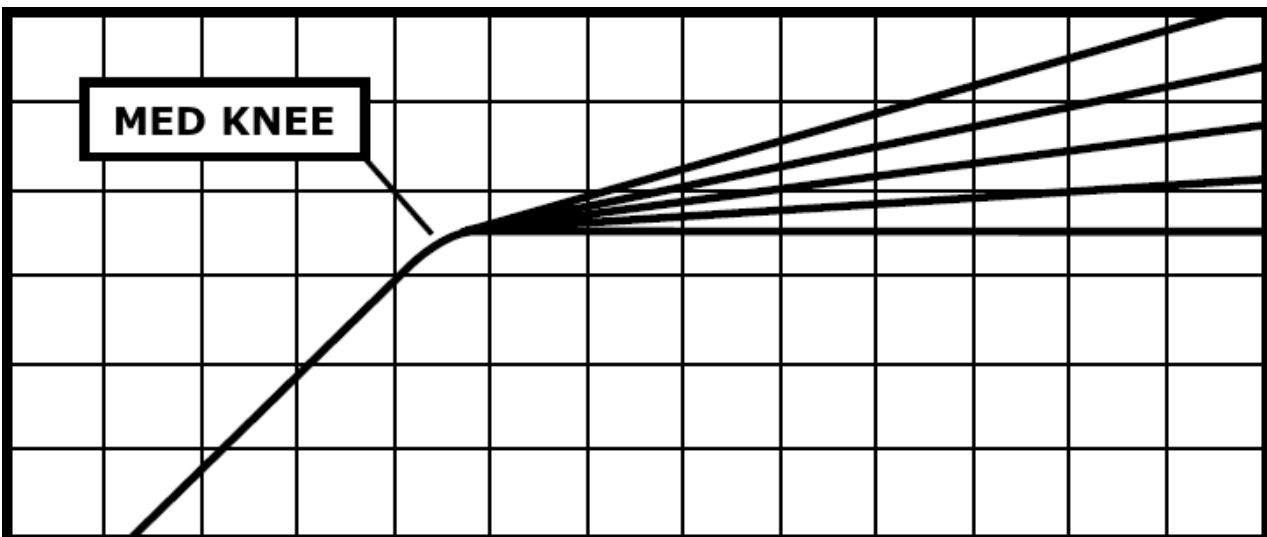
- Immediate onset of compression (sudden transition to set ratio)
- More aggressive and noticeable
- Red LED



MEDIUM KNEE Compression

MEDium: Slightly rounded response curve.

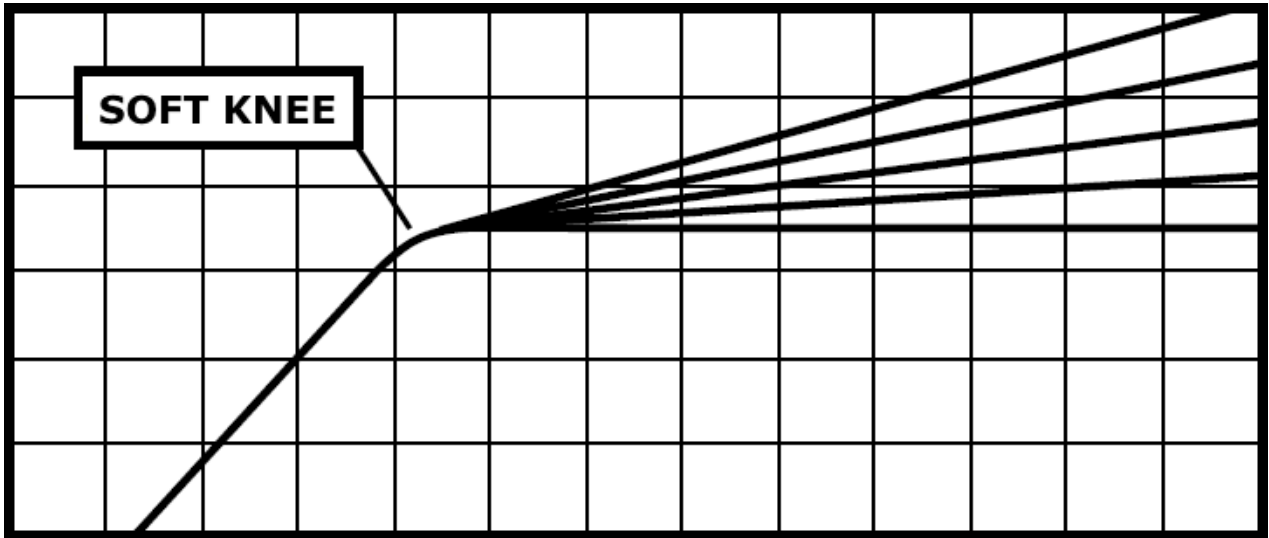
- Moderate onset of compression (firm, but less sudden transition to set ratio)
- Less aggressive and but still noticeable
- Yellow LED



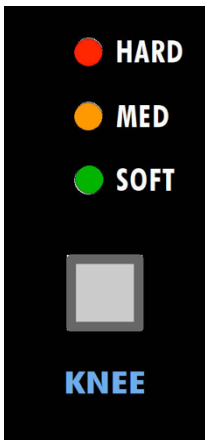
SOFT KNEE Compression

SOFT: Rounded response curve.

- Gradual onset of compression (fade-in up to the set ratio)
- Similar to an “over-easy” type knee
- More transparent
- Green LED



The knee of the compressor is selected using the KNEE switch.



KNEE: Cycle to select the response curve at the onset of compression.

- **HARD:** Sharp response curve (red LED)
- **MEDium:** Slightly rounded response curve (yellow LED)
- **SOFT:** Rounded response curve (green LED)

9.5.4 529C *THRUST*[®]

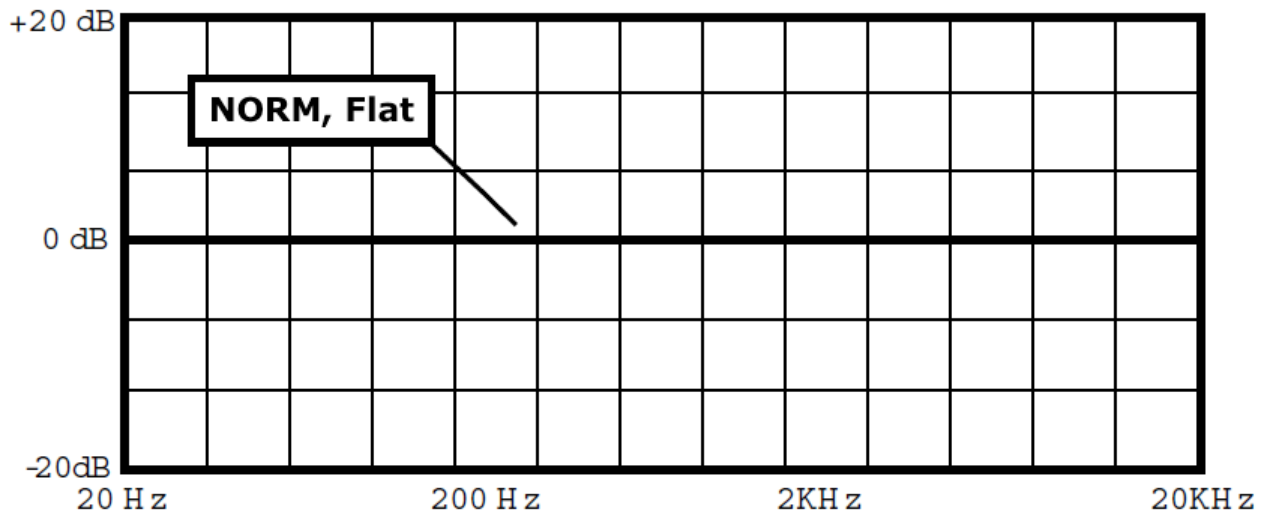
The optional 529C Stereo Bus Compressor includes API’s patented **THRUST**[®] circuit that can be switched in or out as needed. This places the **THRUST**[®] filter before the RMS detector that decreases the compressor’s reaction to low frequency content. The result is a noticeable increase of punch and low frequencies, but a uniformly compressed signal. It’s the “little more punch” switch!

The patented **THRUST**[®] circuit has been used for many years in the famed API 2500 Stereo Compressor, ATI Paragon and Paragon II consoles, as well as the Pro6 Input Strip. This circuit places a filter in front of the RMS detector with a slope of 10dB per decade (-3dB/8va), which is the inverse of the pink noise energy curve. In acoustics, the pink noise curve is used to equalize energy vs. frequency over the audio spectrum, as sound requires more low frequency energy than high frequency energy to sound correct to your ear. In Hi-fi equipment, a “LOUDNESS” contour is used to equalize the music at lower levels so it sounds correct. Even

with this curve, there is still a substantial amount of low frequency information compared to high frequency information in the audio signal path. When that signal is fed into the RMS detector, the detector will process the signal into a DC control voltage based upon those louder low frequencies, resulting in a control voltage that favors the low frequencies of the signal, causing pumping and a loss of punch. Sometimes, this is not desirable. By engaging the **THRUST®** switch, this inverse filter is placed in front of the RMS detector, evening out the energy by lowering the energy in the low frequencies and increasing the energy in the high frequencies, so each octave has the same energy instead of each octave having half the energy as the one lower. This creates a unique compression effect that still reduces the overall gain, but the sound is much more punchy and the signal actually sounds less compressed.

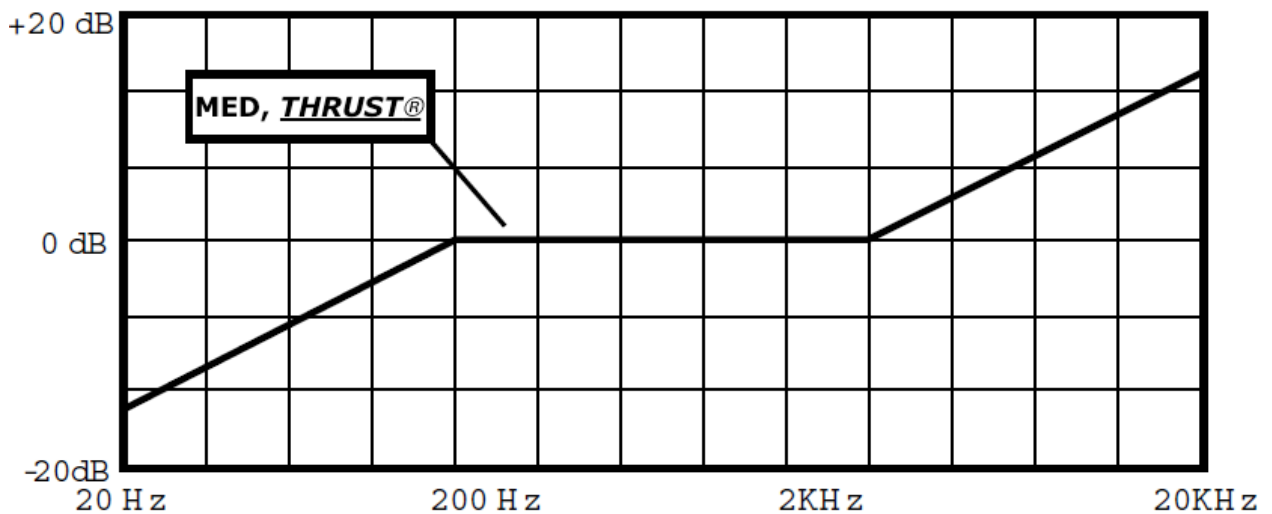
THRUST® NORMAL

NORMAL: Flat: There is no filter in the path to the RMS detector and the 529C compresses like most units on the market today.



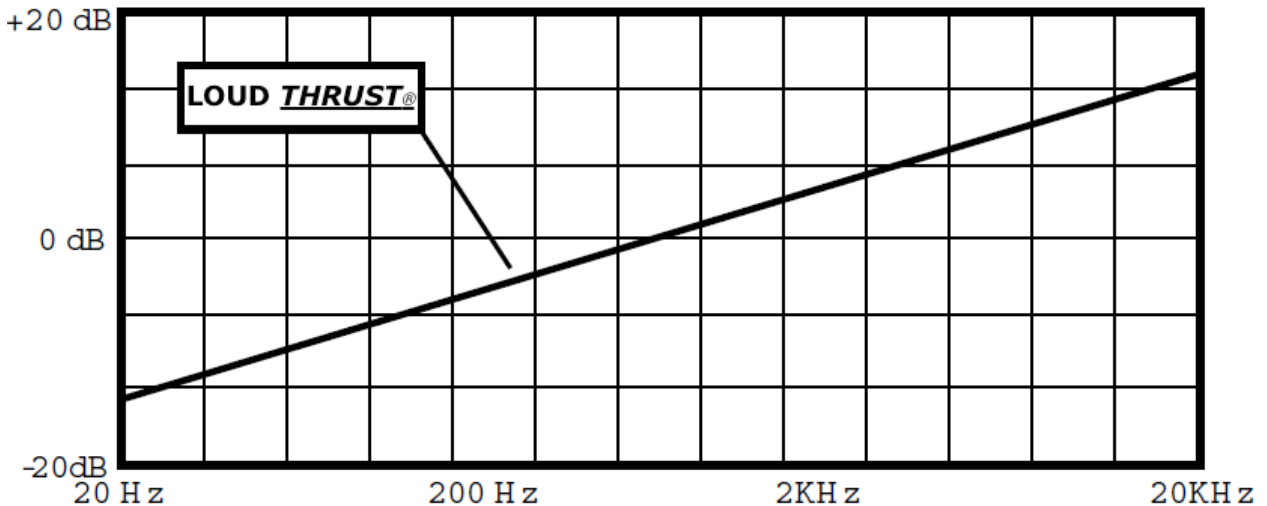
THRUST® MEDIUM

MEDIUM: A slight attenuation of the low frequencies and a slight boost in the high frequencies, with a flat mid-range are applied to the signal feeding the RMS detector. This reduces the low frequencies from pumping the compressor as much and increases the sensitivity of the RMS detector to the higher frequencies, affecting the higher frequency peaks of the signal.

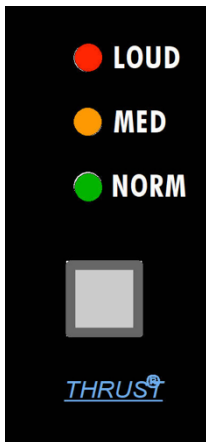


THRUST® LOUD

LOUD: A gradual, linear filter, down 15dB at 20Hz and up 15dB at 20kHz is applied to the signal feeding the RMS detector, equalizing the energy going into the RMS detector. This decreases the way the higher frequencies are compressed. The overall difference is a noticeable increase of punch and low frequencies, but a uniformly compressed signal. It is the “little more punch” function.



The **THRUST®** circuit can be engaged using the **THRUST®** switch.



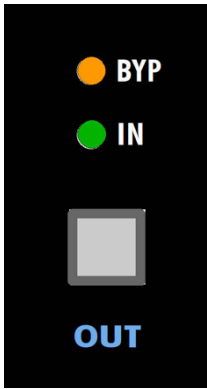
THRUST®: Cycle to select the **THRUST®** function.

- **LOUD:** Inserts the LOUD **THRUST®** filter before the RMS detector (red LED)
- **MEDIUM:** Inserts the MEDIUM **THRUST®** filter before the RMS detector (yellow LED)
- **NORMAL:** No filter before the RMS detector (green LED)

9.5.5 529C Bypass (OUT)

The optional 529C Stereo Bus Compressor is equipped with a relay-based, hard-wired bypass. Press-and-hold the **OUT** switch to toggle the BYPass control. When the compressor is in BYPass (yellow BYPass LED illuminated), the hard-wired bypass is engaged. In this state, the input audio signals are routed directly to the audio output connectors and do not pass through the 529C electronics.

A momentary press of the **OUT** button toggles the IN function. When the compressor is IN (green IN LED illuminated), the compressor is active and behaves normally. When IN is disengaged (green IN LED not illuminated), the control voltage signal is disengaged and the output signal is held at 0dB. Audio continues to pass through the 529C electronics.



OUT (Compressor Bypass): Press & hold to engage bypass (engages hard-wired bypass).

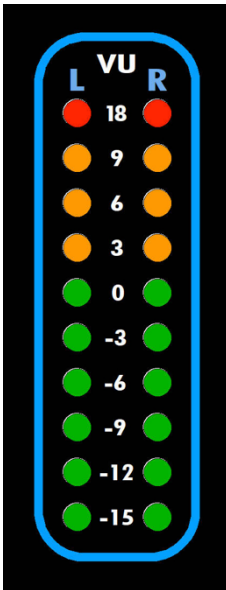
- **BYP** (Bypass): Engages the relay-based hard bypass (yellow LED)
- **IN**: Engages the compressor signal path (green LED)

9.5.6 529C LED Meters

The optional 529C Stereo Bus Compressor is equipped with a 10-segment LED stereo VU meter and a 10-segment LED gain reduction meter.

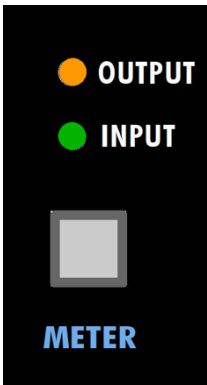
Stereo VU Meter

The 10-segment LED stereo VU meter can be fed from the compressor inputs or outputs.



The 10-segment LEFT & RIGHT LED VU meters have the following values:

- +18dBu
- +9dBu
- +6dBu
- +3dBu
- 0dBu
- -3dBu
- -6dBu
- -9dBu
- -12dBu
- -15dBu



METER: Toggle to select OUTPUT or INPUT as the source for the stereo VU meter.

- **OUTPUT**: Routes the compressor output to the stereo VU meters (yellow LED)
- **INPUT**: Routes the compressor input to the stereo VU meters (green LED)

GR (Gain Reduction) Meter



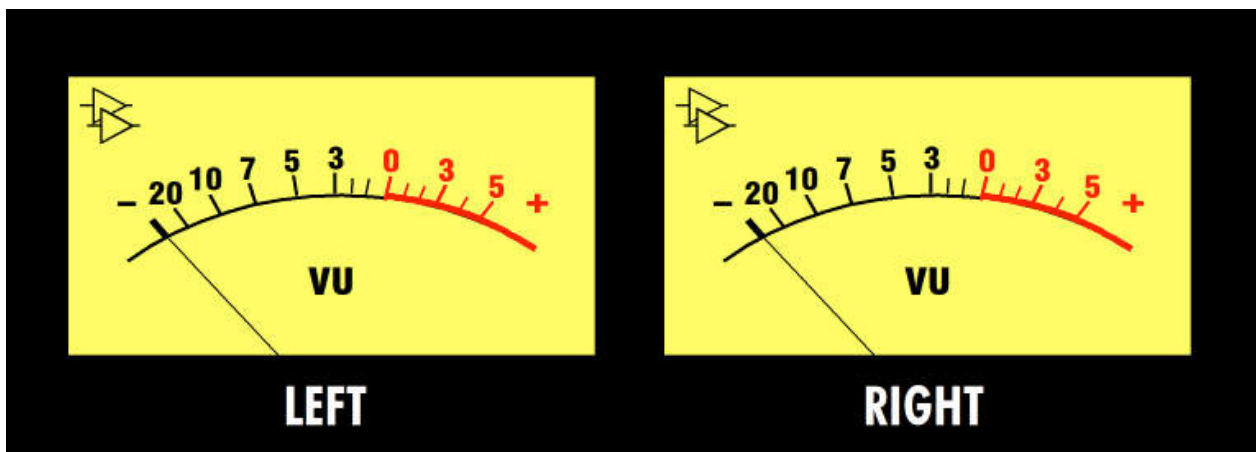
A 10-segment LED gain reduction (GR) meter is provided to indicate the amount of compression being applied. When no gain reduction is being applied, none of the LED's are lit on the Gain Reduction meter (GR). When compression occurs, the corresponding LED's illuminate to indicate the amount of gain reduction.

The following gain reduction increments are provided:

- -1.5dB
- -4dB
- -6dB
- -8dB
- -10dB
- -12dB
- -15 dB
- -17dB
- -19dB
- -23dB

9.6 Main Stereo VU Meters

A pair of large, high-quality VU meters are installed in the top bay of the master section for indicating the stereo Program Bus, external playback (Left & Right), and Solo levels.



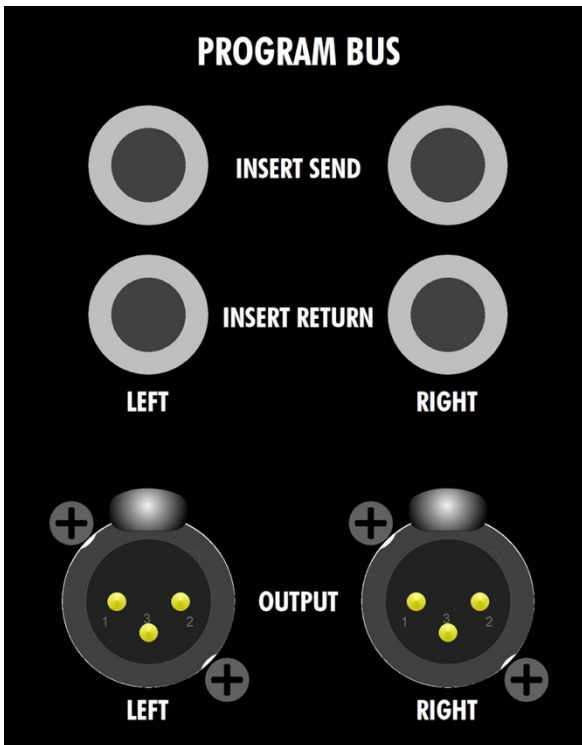
The source for the Main Stereo Meters is selected using the Control Room Monitor source selectors (**C/R SOURCE**) on the 845C Monitor Control module. Accordingly, the Main Meters can be fed from the following sources:

- **Stereo Program Masters:** PGM
- **Auxiliary Sends:** 1/2, 3/4, 5/6 or 7/8
- **6-Track Playback:** 1-3 (Left and Right only)

While recording and mixing the Main Meters will typically display the level of the stereo Program Master that's being used for mixing and monitoring. When a PFL or AFL **SOLO** is engaged, the control room Monitor Source is replaced with the output of the Solo Bus and the Solo Bus is displayed on the LEFT & RIGHT Main Meters.

9.7 Stereo Program Bus Rear Panel Connections

A complete set of Program Bus connections are provided on the rear panel of the 1608-II and 2448 consoles.



PROGRAM BUS INSERT SEND:

- Balanced, Line-level
- 1/4" tip-ring-sleeve jack
- Half-normalled to Program Insert Return
- Insert Sends are always active

PROGRAM BUS INSERT RETURN:

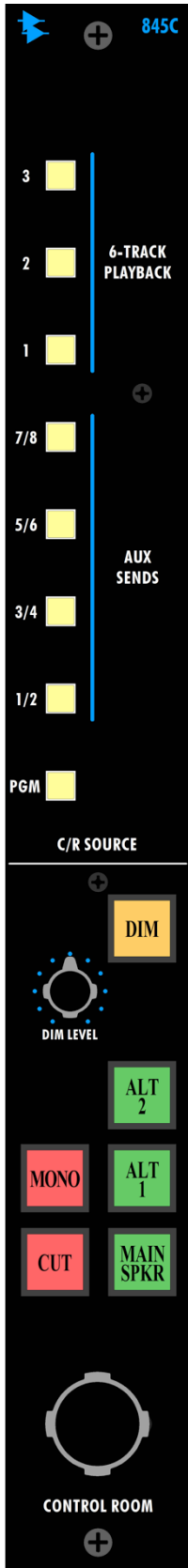
- Balanced, Line-level
- 1/4" tip-ring-sleeve switching jack
- Replaces the Program Insert Send signal when a jack is inserted and the **PRG INS** button is engaged

PROGRAM BUS OUTPUT LEFT & RIGHT: Main mix output.

- Balanced, Line-level
- Male XLR

10.0 Control Room Monitoring

The 845C Monitor Control module and 268C Monitor Output Masters support one set of main 5.1 monitors and two sets of stereo monitors.

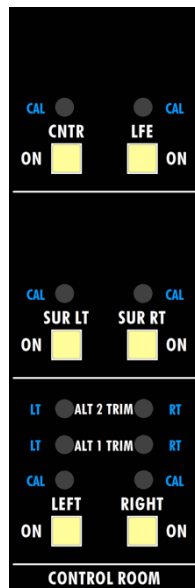


The 845C Control Room Monitor Control module provides three primary functions:

- Selection of the Control Room Monitor system
- Selection of the Control Room Monitor source
- Monitor level and muting control

Accordingly, the 845C Monitor Control section provides a comprehensive set of controls:

- Monitor volume control
- Monitor cut
- Control Room monitor dim with level control
- Monitor system selectors
- Switchable mono summing

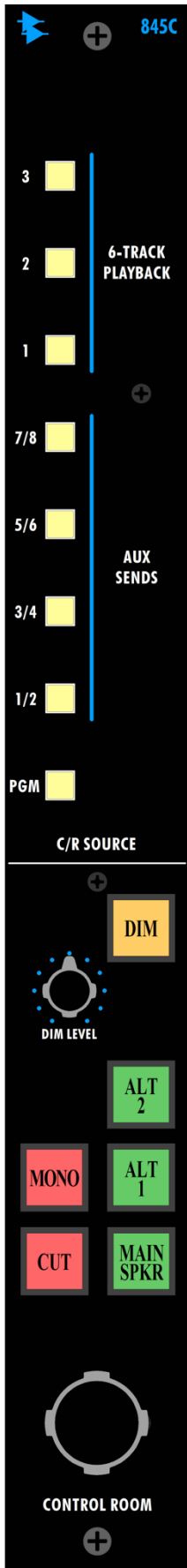


The 268C Monitor Output controls provide ON/off switching and calibration for three (3) control room monitor systems:

- **MAIN**: Stereo (Left-Right) or 5.1 (Left, Right, Center, Left Surround, Right Surround, and LFE) main monitor system
- **ALT 1** (Alternate 1): Stereo nearfield monitor system 1
- **ALT 2** (Alternate 2): Stereo nearfield monitor system 1

NOTE: The MAIN Left & Right Monitor Outputs are typically used to feed the primary monitoring system for stereo monitoring as well as 5.1 surround monitoring regardless of whether or not the rest of a 5.1 surround system is installed.

10.1 845C Monitor Control Module



The 845C Monitor Control module provides three primary functions:

- Selection of the Control Room Monitor system
- Selection of the Control Room Monitor source
- Monitor level and muting control

The 845C C/R SOURCE (control room monitor source) selectors provide a choice of eight (8) different sources to feed the Control Room monitors. Only one source can be selected at a time. The selections are divided into three categories:

- Program Bus (PGM)
- Auxiliary Send Outputs in pairs (AUX SENDS)
- Three (3) external 6-channel playback sources (6-TRACK PLAYBACK)

10.1.1 845C Control Room Source Selectors:

The 845C monitor source (C/R SOURCE) sectors function as follows:

6-TRACK PLAYBACK (1, 2, 3): Routes the signal from the selected 6-track playback source to the Control Room monitor output controls.

- The input from the selected external 6-TRACK PLAYBACK source connector on the rear panel is fed to the Monitor Control section
- The selected 6-TRACK PLAYBACK button illuminates when engaged

NOTE: The 5.1 surround channel order for the 6-TRACK PLAYBACK is Left, Right, Left Surround, Right Surround, Center, and LFE.

NOTE: Stereo playback devices may be interfaced to the Left & Right channels only for stereo playback. 6-TRACK 1 also has stereo XLR connectors that paralleled to Left & Right channels on the corresponding D-sub connector.

AUX SENDS (1/2, 3/4, 5/6, 7/8): Routes the outputs of the selected pair of Auxiliary Sends to the Control Room monitor output controls.

- The selected pair of AUX SEND outputs is fed to the Monitor Control section
- The selected AUX SEND button illuminates when engaged

PGM (Program Bus): Routes the output of the Program Bus Masters to the Control Room monitor output controls.

- The output from the Program Bus Masters are fed to the Monitor Control section
- Illuminates when engaged

10.1.2 845C Control Room Monitor Controls:

The 845C Control Room monitor output controls function as follows:

CONTROL ROOM (Monitor Level): Controls the output level for the selected monitor system.

- Volume control for the selected monitor system
- The largest and most dangerous knob on the console...please use it wisely!

CUT (Cut): Cuts the feed to the selected monitor system.

- ON/off switch for the Control Room monitor outputs
- Illuminates when engaged

MONO: Sums the Left & Right feed to the selected Control Room monitors to mono.

- The **MONO** button works with all monitor selections
- Illuminates when engaged

MAIN: Routes the selected Control Room Source (C/R SOURCE) to the MAIN monitor outputs.

- Supports one stereo or 5.1 monitor systems
- Left & Right support both stereo and surround monitoring
- Illuminates when engaged

ALT 1 - ALT 2 (Alternate 1 & 2): Routes the selected Control Room Source (C/R SOURCE) to the selected **ALT 1** or **ALT 2** monitor systems.

- Supports two stereo monitor systems
- **ALT 1** routes the selected Control Room Source to the ALT 1 monitor outputs when engaged
- **ALT 2** routes the selected Control Room Source to the ALT 2 monitor outputs when engaged
- Illuminates when active

DIM LEVEL (pot): Sets the amount of attenuation applied to the active Control Room monitor outputs when the **DIM** button is engaged.

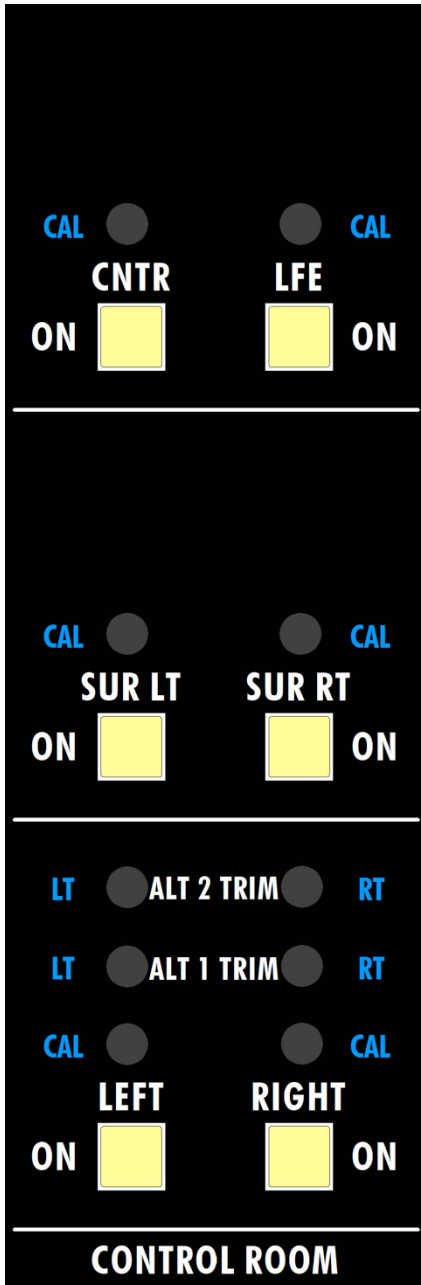
- Only active when the **DIM** button is engaged

DIM (button): Attenuates the output of the selected control room monitors by routing the selected monitor source through the **DIM LEVEL** attenuation pot.

- The dim level is set by the **DIM LEVEL** pot
- **DIM** is automatically engaged when:
 - The **BUS** button is engaged on the Oscillator
 - Any of the Talk Back buttons are engaged (**T/B ALL**, **BUS**, or **AUX**)
- Illuminates when engaged

10.2 268C Monitor Output Masters

The 268C Control Room Monitor Output Masters are the final stage before the selected monitor output is fed to the CONTROL ROOM OUTPUT connectors on the rear panel.



There are a set of controls for each of the six individual CONTROL ROOM Monitor Outputs that support the 5.1 and stereo monitor systems:

- **LEFT**: Left (stereo & surround)
- **RIGHT**: Right (stereo & surround)
- **SUR LT** (Surround Left): Left Surround
- **SUR RT** (Surround Right): Right Surround
- **CNTR** (Center): Center
- **LFE** (Low Frequency Effects): LFE (subwoofer)

10.2.1 268C Control Room Monitor Masters:

The 268C CONTROL ROOM Monitor Outputs Masters function as follows:

ON: ON/off switch for the corresponding MAIN CONTROL ROOM OUTPUT on the rear panel.

- Illuminates when engaged

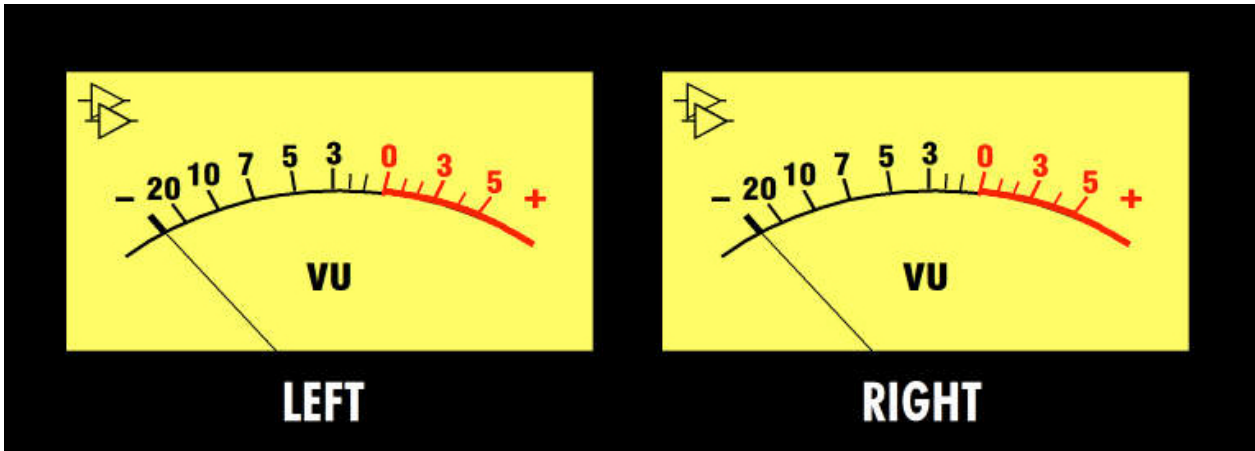
CAL (Calibration trim-pots): Calibrates the output of the corresponding MAIN CONTROL ROOM OUTPUTs on the rear panel.

ALT 1 TRIM (**LT-RT** trim-pots): The trim-pot sets the relative level for the ALT 1 LEFT & RIGHT CONTROL ROOM OUTPUTs on the rear panel.

ALT 2 TRIM (**LT-RT** trim-pots): The trim-pot sets the relative level for the ALT 2 LEFT & RIGHT CONTROL ROOM OUTPUTs on the rear panel.

10.3 Main Stereo VU Meters

A pair of large, high-quality VU meters are installed in the top bay of the master section for indicating the stereo Program Bus, external playback (Left & Right), and Solo levels.



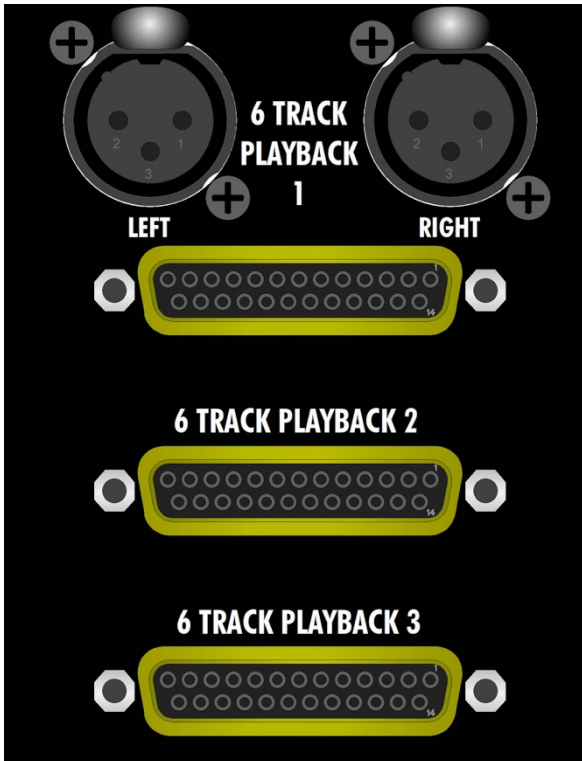
The source for the Main Stereo Meters is selected using the Control Room Monitor source selectors (**C/R SOURCE**) on the 845C Monitor Control module. Accordingly, the Main Meters can be fed from the following sources:

- **Stereo Program Masters:** PGM
- **Auxiliary Sends:** 1/2, 3/4, 5/6 or 7/8
- **6-Track Playback:** 1-3 (Left & Right only)

While recording and mixing the Main Meters will typically display the level of the stereo Program Master that's being used for mixing and monitoring. When a PFL or AFL **SOLO** is engaged, the control room Monitor Source is replaced with the output of the Solo Bus and the Solo Bus is displayed on the LEFT & RIGHT Main Meters.

10.4 845C External Source Rear Panel Connections

A complete set of External Source input connections are provided on the rear panel of the 1608-II & 2448 consoles. Labeled as 6-TRACK PLAYBACK 1-3 these connections are as follows:



6 TRACK PLAYBACK 1 (LEFT & RIGHT XLRs):

- LEFT & RIGHT Inputs
- Balanced, Line-level
- Female XLR connectors
- LEFT & RIGHT XLR connectors are paralleled with the Left & Right inputs on the 6 TRACK PLAYBACK 1 D-sub connector

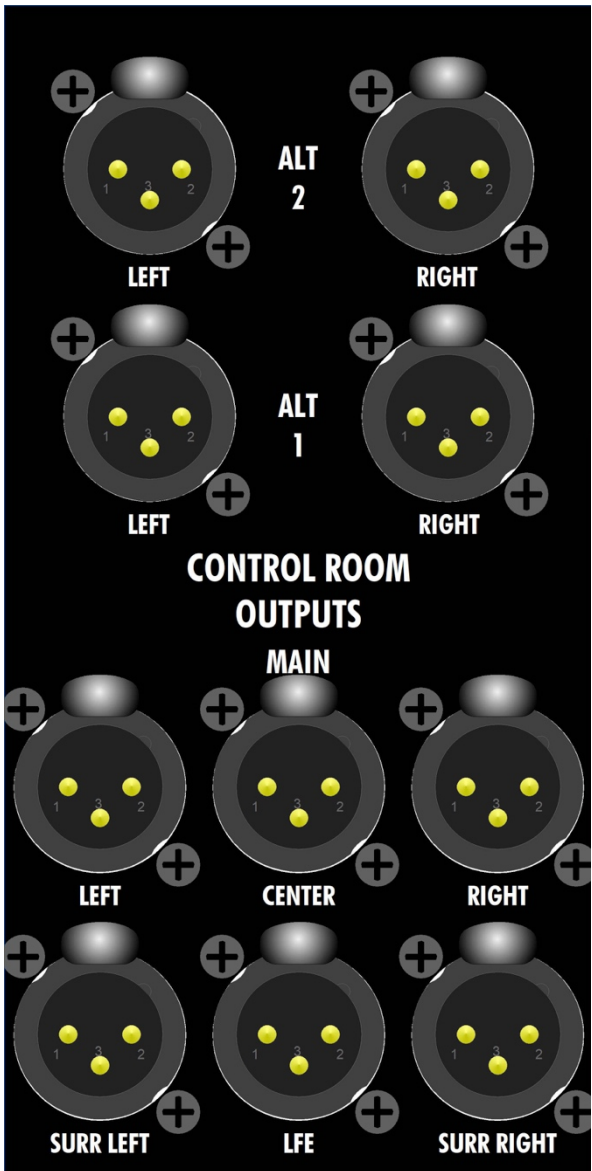
6 TRACK PLAYBACK INPUTS 1, 2, and 3:

- LEFT, RIGHT, LEFT SURROUND, RIGHT SURROUND, CENTER, LFE
- Balanced, Line-level
- Female 25-pin D-sub connector
- 6 Track Playback 1 is paralleled with the LEFT & RIGHT XLR connectors

NOTE: External stereo devices may be interfaced to the Left & Right channels only for stereo playback.

10.5 268C Monitor Output Rear Panel Connections

The rear panel connections for the 268C Control Room Monitor Output Masters are as follows:



ALT 2 CONTROL ROOM OUTPUTS:

- LEFT & RIGHT
- Balanced, Line-level
- Male XLR

ALT 1 CONTROL ROOM OUTPUTS:

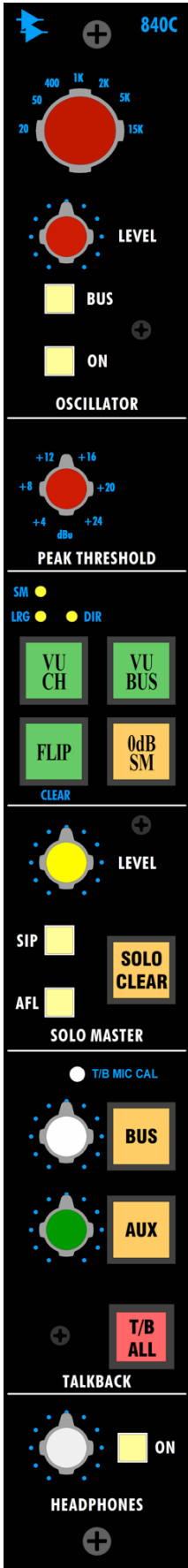
- LEFT & RIGHT
- Balanced, Line-level
- Male XLR

MAIN CONTROL ROOM OUTPUTS:

- LEFT, CENTER, RIGHT
- SURR LEFT, LFE, SURR RIGHT
- Balanced, Line-level
- Male XLR

NOTE: The 5.1 surround playback channel order is Left, Right, Left Surround, Right Surround, Center, and LFE.

11.0 840C Multifunction Module



The 840C Multifunction module provides several ancillary features that support console, workflow, and maintenance operations. The 840C module includes the following features:

- Headphone amplifier
- Talkback controls
- Master Solo controls
- Global channel controls
- Mute Group Master (1608-II only)
- Peak indicator threshold control
- Oscillator

IMPORTANT NOTE: The 840C module is slightly different for the 1608-II and 2448 consoles. This is due to the differences in signal flow architecture and features. The differences include controls for global signal flow changes, fader bypass, and channel VU meter routing. The specific controls for each console are describe in the subsequent sections of this chapter.

(840C from the 2448 is shown.)

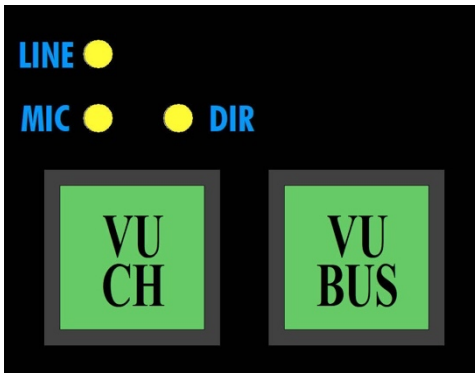
11.1 1608-II Global Channel Controls

The global channel controls on the 840C Multifunction module fitted in the 1608-II console supports the following functions:

- Channel VU Meter Routing with LED indicators
- Mute Group Master
- 0dB Fader Bypass

11.1.1 Channel VU Meter Routing Controls

The channel VU meter routing controls are found on the 840C Multifunction module and operate as follows:



LINE: Line Input VU meter routing LED.

- Illuminates when the channel meters are fed from the Line Inputs

MIC (Microphone): Mic Preamp VU meter routing LED.

- Illuminates when the channel meters are fed from the outputs of the microphone preamps

DIR (Direct Output): Direct Output VU meter routing LED.

- Illuminates when the channel meters are fed from the Direct Outputs

VU CH (VU Channel): Globally selects the input source for the channel VU meter.

- Line Input, Mic Preamp output, & Direct Output selections
- Each push will cycle to the next selection
- Direct Output is the default selection
- Illuminates when engaged
- **VU Bus** will override the **VU CH** selection

VU BUS (Summing Bus 1-8): Routes the outputs of Summing Buses (1-8) to channel VU meters 1-8.

- Defeats the meter feed from the channel and replaces it with the associated Summing Bus output
- Illuminates when engaged

11.1.2 1608-II Mute Group

The 1608-II is equipped with one Mute Group that consists of Mute Group assignment buttons on the channels and master **MUTE GROUP** button on the 840C Multifunction module. Individual channels assigned to the Mute Group will mute when the **MUTE GROUP** button on the 840C module is engaged. The 1608-II Mute Group controls functions as follows:



MUTE GRP (Mute Group): 548C channel Mute Group assignment button.

- Assigns the channel to the global mute group when engaged
- Illuminates when engaged



MUTE GROUP: 840C Mute Group Master

- Mutes all channels assigned to the global Mute Group
- Channels will be muted when the master **MUTE GROUP** button is engaged
- Channels may be assigned to the global Mute Group on an individual basis by engaging the **MUTE GRP** button on the desired channel
- Assigned channels may be muted independently of the Mute Group Master
- Assigned channels may not be independently unmuted when the master **MUTE GROUP** button is engaged
- Illuminates when engaged

11.1.3 0dB Fader Bypass

The channel faders can be bypassed on a global basis allowing the audio to pass at unity gain (0dB). This is helpful when the console is used with DAW automation and as a control surface (optional automation required). The Fader Bypass is engaged globally by engaging the **0dB** (0dB Bypass) button On the 840C Multifunction module. Fader bypass is not available on individual channels.



0dB (0dB Bypass): Engages a 0dB fader bypass globally.

- Illuminates when engaged

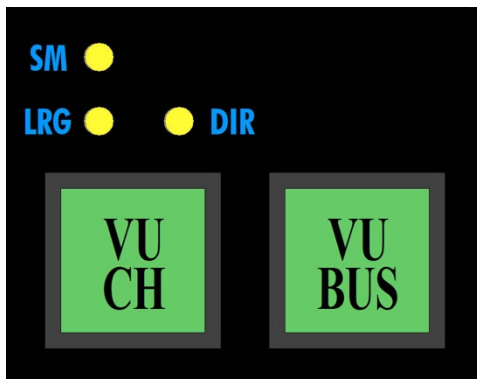
11.2 2448 Global Channel Controls

The global channel controls on the 840C Multifunction module fitted in the 2448 console supports the following functions:

- Channel VU Meter Routing with LED indicators
- Global channel input source "Flip"
- Small Fader 0dB Bypass

11.2.1 Channel VU Meter Routing Controls

The channel VU meter routing controls are found on the 840C Multifunction module and operate as follows:



SM (Small Fader): Small Fader VU meter routing LED.

- Illuminates when the channel meters are fed from the Small Fader inputs

LRG (Large Fader): Large Fader VU meter routing LED.

- Illuminates when the channel meters are fed from the Large Fader inputs

DIR (Direct Output): Direct Output VU meter routing LED.

- Illuminates when the channel meters are fed from the Direct Output

VU CH (VU Channel): Globally selects the input source for the channel VU meter.

- Large Fader Input, Small Fader Input, & Direct Output selections
- Each push will cycle to the next selection
- Direct Output is the default selection
- Illuminates when engaged
- **VU Bus** will override the **VU CH** selection

VU BUS (Summing Bus 1-8): Routes the outputs of Summing Buses (1-8) to channel VU meters 1-8.

- Defeats the meter feed from the channel and replaces it with the associated Summing Bus output
- Illuminates when engaged

11.2.2 Global Channel Input Source Flip

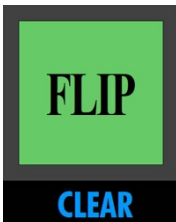
Engaging the **FLIP** button on a 648C Channel module will swap the input sources between fader paths, so the Preamp will feed the Large Fader path and LINE IN will feed the Small Fader path. Engaging the **ALT LINE** button on the channel will replace the Preamp output with the ALT LINE IN as the input to the Small Fader for recording or mixing additional line level sources. If **ALT LINE** and **FLIP** are both engaged, the ALT LINE IN will feed the Large Fader path.

The **FLIP** button in the 840C Multifunction module will toggle the inputs between the Small and Large Fader paths on a global basis. Holding the master **FLIP** button will **CLEAR** the input selections made on individual channels and return both paths on all channels to the default inputs.



FLIP: Swaps the Large and Small fader path input sources when engaged.

- Large Fader source: Preamp output (or ALT LINE IN if engaged)
- Small Fader source: Line Input
- Illuminates when engaged



FLIP: Swaps the input sources between Large and Small Fader paths globally.

- The Preamp Output will be routed to the Large Fader path
- The Line Input will be routed to the Small Fader path
- Hold down for a few seconds to return all channels to their default inputs
- Input sources on individual channels can be reset by engaging the **FLIP** button on the 648C Channel modules
- Illuminates when engaged to acknowledge activation, but then goes out

*IMPORTANT NOTE: Engaging the **SAFE** button on a channel will protect that channel from the global **FLIP** functions.*

11.2.3 0dB Fader Bypass

The faders in both signal paths can be bypassed allowing the audio to pass at unity gain (0dB) when the console is used with DAW automation and as a control surface. The Fader Bypass for the Large Fader path is handled via the *Final Touch™* automation system. The Fader Bypass for the Small Fader is engaged globally by engaging the **0dB SM** (0dB Small Fader) button in the master section. This option is not available on individual channels.




0dB SM (0dB Small Fader): Engages a 0dB bypass on all Small Faders.

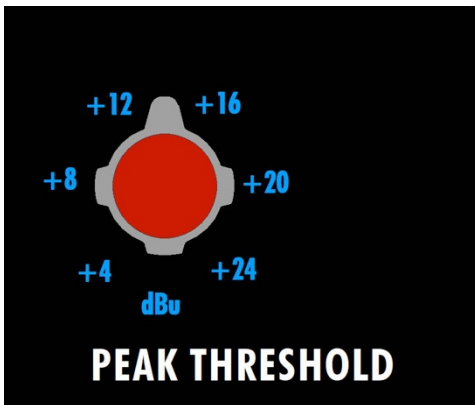
- Illuminates when engaged

11.3 Peak Threshold

Both the 1608-II and 2448 consoles are equipped with LED peak indicators built into their channel modules. Due to the differences in signal flow architecture, peak indication is handled slightly differently on each console.

11.3.1 548C Channel Peak Indicators


-  Each 548C Channel module is equipped with one LED peak indicator:
- **PK (Peak)**: Illuminates when the channel input reaches the reference PEAK THRESHOLD set on the 840C Multifunction module.

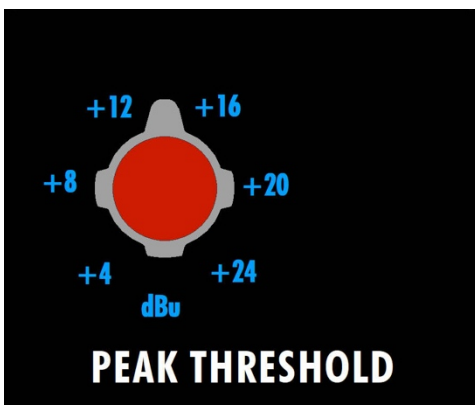


PEAK THRESHOLD: Sets the peak reference level for the channel LED **PK** indicators console-wide.

- +4dBu to +24dBu range
- Located on the 840C Multifunction module

11.3.2 648C Channel Peak Indicators

-  Each 648C Channel module is equipped with three (3) LED peak indicators:
- **Mic Preamp**: Illuminates when the preamp output reaches a fixed threshold at +18dBu
 - **Large Fader Path**: Illuminates when the preamp output reaches the reference PEAK THRESHOLD set on the 840C Multifunction module
 - **Small Fader Path**: Illuminates when the preamp output reaches the reference PEAK THRESHOLD set on the 840C Multifunction module



PEAK THRESHOLD: Sets the peak reference level for the Large & Small fader LED **PK** indicators console-wide.

- +4dBu to +24dBu range
- Located on the 840C Multifunction module

11.4 Solo Modes and Solo Master

The 1608-II and 2448 consoles are equipped with a stereo Solo Bus and three (3) solo modes:

- After-Fader Listen (AFL)
- Pre-Fader Listen (PFL)
- Solo-In-Place (SIP)

In addition, the 2448 is equipped with a Mix-Over-Solo function.

Pre-Fader Listen (PFL) is the default Solo mode on both consoles (no buttons engaged).

A Solo Mode is selected using the SOLO MASTER controls on the 840C Multifunction module on a global basis. Mix-Over-Solo controls on 2448 consoles are located on the same panel as the optional C Stereo Bus Compressor.

The selected solo mode is activated when a channel or Stereo Return **SOLO** button is engaged.

The following solo modes are provided:

Pre-fader Listen (PFL):

- The Solo Bus is fed pre-fader from the channel or Stereo Return.
- Soloed channels & Stereo Returns are monitored via the Solo Bus
- Non-destructive
- Mono (stereo on Stereo on Stereo Returns)
- Solo Level Control

After-fader Listen (AFL):

- The Solo Bus is fed post-fader from the channel or Stereo Return.
- Soloed channels & Stereo Returns are monitored via the Solo Bus
- Non-destructive
- Stereo (after pan-pot)
- Solo Level Control

Solo-In-Place (SIP):

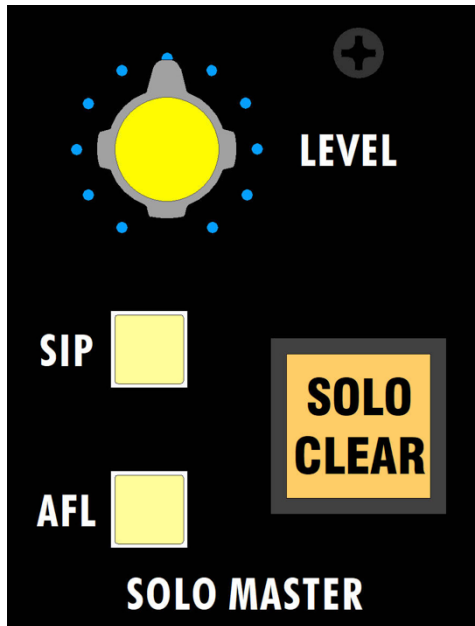
- Destructive (all other channels/returns will mute when the **SOLO** button is engaged in this mode)
- Soloed channels & Stereo Returns are monitored via the Program Bus
- Panned
- Post-fader

NOTE: PFL is the default solo mode.

*NOTE: Summing Bus Masters that are assigned to the Program Bus DO NOT mute when Solo-In-Place is the active solo function and a **SOLO** button is engaged on a channel or Stereo Return.*

11.4.1 840C Solo Master Controls

The 840C Solo Master controls function as follows:



No Buttons Engaged: PLF (Pre-Fader Listen) is the default solo mode.

LEVEL: Volume control for the PFL & AFL solo bus

SIP (Solo-In-Place): Selects the Solo-In-Place solo function.

- Illuminates when engaged

AFL (After-Fader Listen): Selects the After-Fader Listen solo function.

- Illuminates when engaged

SOLO CLEAR: Disengages all engaged channel and Stereo Return **SOLO** buttons.

- Provides a quick and easy method to turn off any active solo
- Momentary button
- Flashing indicates a **SOLO** button is engaged somewhere on the console

11.4.2 Mix-Over-Solo Controls (2448 Only)

The 2448 is equipped with a "Mix-Over-Solo" function. This function mixes the Solo Bus with the active control room monitor source in the control room monitors. This source is typically the Program Bus. The LEVEL control adjusts the balance between the Solo Bus and the control room monitor source. Mix-over-Solo only functions when the console is in AFL or PFL Solo mode (it does not work in Solo-In-Place). A channel or Stereo Return **SOLO** button must be engaged to activate Mix-Over-Solo.



MIX OVER SOLO (pot): Level control for the Mix-Over-Solo function.

- Adjusts the balance between the Solo Bus and the control room monitor source when the Mix-Over-Solo function is activated

MIX OVER SOLO (button): Activates the Mix-Over-Solo function.

- Enables mixing of the Solo Bus and the selected control room monitor source
- Illuminates when engaged

11.5 Talkback

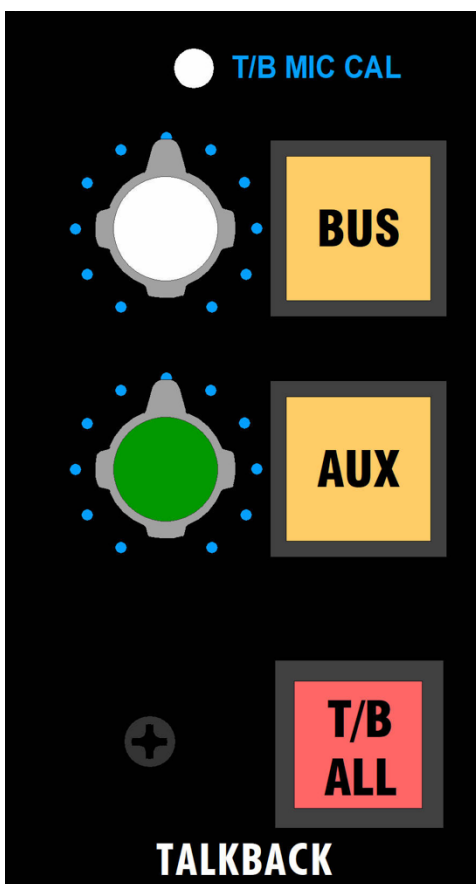
The Talkback section of the 840C Multifunction module provides a complete set of Talkback routing options and controls. It has the following features:

- Talkback to ALL
- Talkback to assigned Aux Send Masters only (with level)
- Talkback to Program and Summing Buses (with level)
- Talkback microphone in Meter Bridge
- Talkback remote control port on rear panel

Talkback can be engaged externally from the console by connecting a remote (not supplied) to the TALKBACK REMOTE port on the rear panel.

11.5.1 The 840C Talkback Controls

The 840C Talkback controls function as follows:



T/B MIC CAL (Talkback Mic Calibration): Talkback mic preamp level.

BUS (button): Routes Talkback to the Program and Summing Buses.

- Independent level control
- Momentary button
- Automatically engages the DIM function when pressed
- Illuminates when engaged

BUS (pot): Volume control for Talkback to the Program and Summing Buses.

AUX (button): Routes Talkback to the assigned Aux Send Masters.

- The **T/B** button must be engaged on the Aux Send Master to enable Talkback to feed the Aux Send output
- Independent Level Control
- Momentary button
- Automatically engages the DIM function when pressed
- Illuminates when engaged

AUX (pot): Volume control for Talkback to the Aux Send Masters.

T/B ALL (Talkback All button): Routes Talkback to the Program and Summing Buses and all Aux Send Masters.

- The **T/B** button must be engaged on Aux Send Masters to enable Talkback to feed the Aux Send output
- Momentary button
- Automatically engages the DIM function when pressed
- Illuminates when engaged

Talkback can be activated remotely via momentary switch closures (typically push-button) that short the desired signal to ground.

11.6 Stereo Headphone Amplifier

The 840C Stereo Headphone Amplifier is designed for use by the engineer or others in the control room. It has the following features:

- ON/off switch
- Stereo volume pot
- ¼" stereo headphone jack (located under the armrest)
- Fed from the output of the 845C Monitor Control module.
 - C/R SOURCE selected for control room monitoring is the source for the headphone amp
 - Volume follows the control room monitor LEVEL control.
 - Mono summing is available
 - DIM is available
- Not affected by the control room CUT or monitor output selectors.

11.6.1 840C Stereo Headphone Amplifier Controls



The 840C Stereo Headphone Amplifier Controls functions as follows:

LEVEL (pot): Level control for the stereo headphone amplifier.

ON: ON/off switch for the stereo headphone amplifier.

- Illuminates when engaged

STEREO HEADPHONE JACK: (under armrest)

- Headphone amplifier output
- ¼" tip-ring-sleeve jack

NOTE: This connector is not shown here.

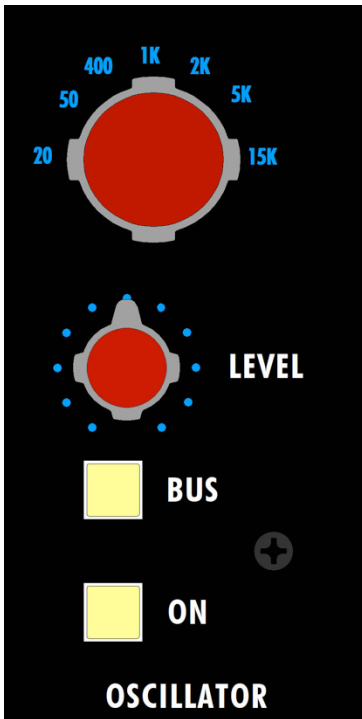
11.7 Oscillator

The 840C Oscillator section provides a full-range sine wave oscillator with the following features:

- Seven (7) frequency selections from 20Hz to 15kHz
- ON/off switch
- Level control
- Assignment to the Program and Summing Buses
- Balanced, Line-level rear panel output

11.7.1 840C Oscillator Controls

The 840C Oscillator controls function as follows:



Frequency Selector: Selects the Oscillator frequency from the following seven choices:

- 20Hz
- 50Hz
- 400Hz
- 1kHz
- 2kHz
- 5kHz
- 15kHz

LEVEL: Controls the Oscillator output level.

BUS: Routes the Oscillator output to the Program and Summing Buses.

- The **ON** button must be engaged to route the Oscillator to the buses
- Automatically engages the DIM function when engaged
- Illuminates when engaged

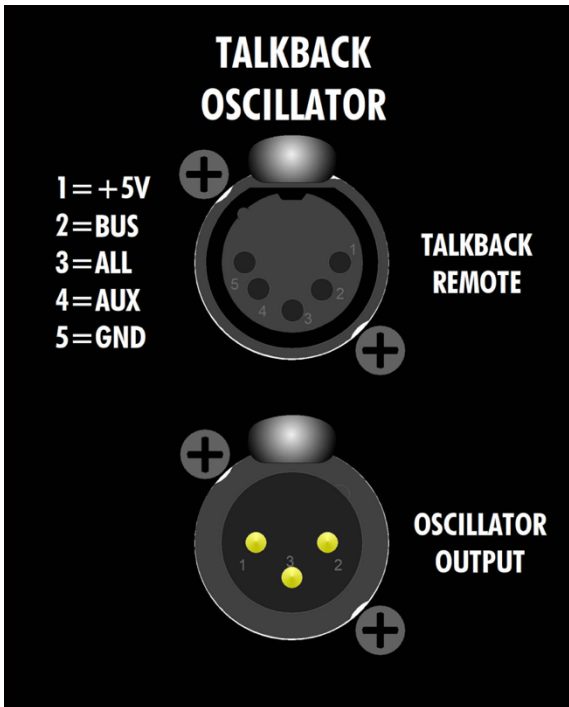
ON: ON/off switch for the Oscillator output.

- The **ON** button must be engaged to enable the Oscillator output
- When **ON** is engaged the Oscillator signal will be available at the OSCILLATOR output connector on the rear panel
- Engage the **ON** and **BUS** buttons to route the Oscillator output to the Program and Summing Buses
- Illuminates when engaged

NOTE: Talkback can be activated via remote switch closures (typically momentary push-button). See section 11.8 or 14.9 840C Talkback & Oscillator Rear Panel Connections for details.

11.8 840C Talkback & Oscillator Rear Panel Connections

The rear panel connections for the 840C Multifunction module are as follows:



Talkback can be activated remotely using momentary switch closures (typically push-button) that short the desired signal to ground. For example, to Talkback to ALL, the remote's momentary switch should short Pin 3 (TB All) to Pin 5 (Ground).

TALKBACK REMOTE: Talkback Remote Port

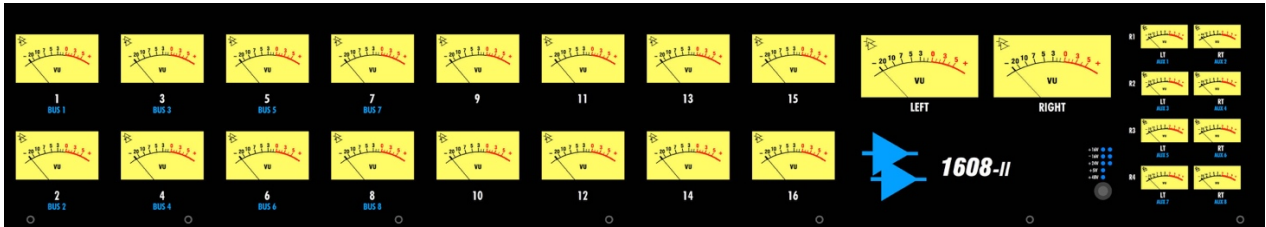
- Pin 1 = +5 volts (fused)
- Pin 2 = T/B BUS
- Pin 3 = T/B ALL
- Pin 4 = T/B AUX
- Pin 5 = Ground
- 5-Pin Female XLR connector
- Remote & cable not supplied

OSCILLATOR OUTPUT: Oscillator Output

- Active when the Oscillator **ON** button is engaged.
- Balanced, Line-level
- Male XLR connector

12.0 Meter Bridge

The 1608-II and 2448 consoles are equipped with a full Meter Bridge with illuminated VU meters for level indication for a comprehensive set of sources. (1608-II Meter Bridge shown below.)



The Meter Bridge provides VU level indication for the following sources:

- 548C Channel modules 1-16:
 - Mic Preamp Output
 - Line Input
 - Channel Direct Output
- 648C Channel modules 1-24:
 - Small Fader Input
 - Large Fader Input
 - Channel Direct Output
- Stereo Returns 1-4:
 - Left & Right
- Stereo Control Room Monitor Source:
 - Left & Right Program Bus Master Outputs
 - Aux Send Master Outputs 1-8 (in pairs)
 - 6-TRACK PLAYBACK 1-3 (Left & Right only)
- Summing Bus Masters 1-8
- Auxiliary Send Masters 1-8

The Meter Bridge has five (5) sections:

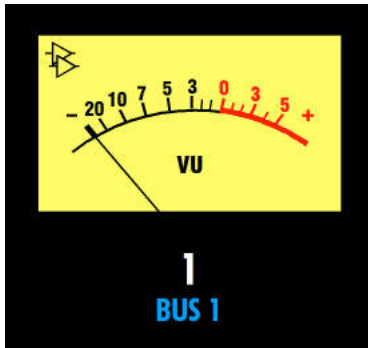
- Channel/Summing Bus VU Meters
- Main Stereo VU Meters
- Stereo Return/Aux Send VU Meters
- Talkback Microphone
- Power Supply Indicators

12.1 Channel VU Meters

A VU meter is provided for each channel, with the meters stacked in pairs with 1 over 2, 3 over 4, and so on. Each VU meter can indicate the level at three (locations within the channel) as selected on the 840C Multifunction module.

The first eight (8) channel VU meters can also display the output levels of the Summing Bus Masters 1-8.

12.1.1 1608-II Channel VU Meters



VU (Volume Unit): Channel level indicator.

The 1608-II channel VU Meter can be fed from the following points:

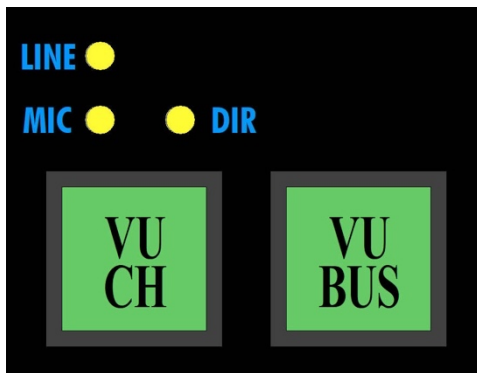
- Direct Output (post fader/mute)
- Microphone Preamp (post input, pre-EQ & insert)
- Line Input (post input, pre-EQ & insert)
- Associated Summing Bus Output (1-8)

White labels are used to indicate channel VU meter numbers and **Blue** labels indicate the Summing Bus Master function.

The channel Direct Output is the default source for the channel VU meter. The feed to the channel VU Meter is determined by the selection made using the VU routing controls on the 840C Multifunction module. These selections are global and apply to all channel VU Meters.

12.1.2 1608-II Channel VU Meter Controls

The channel VU meter routing controls are found on the 840C Multifunction module and operate as follows:



LINE: Line Input VU meter routing LED.

- Illuminates when the channel meters are fed from the Line Inputs

MIC (Microphone): Mic Preamp VU meter routing LED.

- Illuminates when the channel meters are fed from the outputs of the microphone preamps

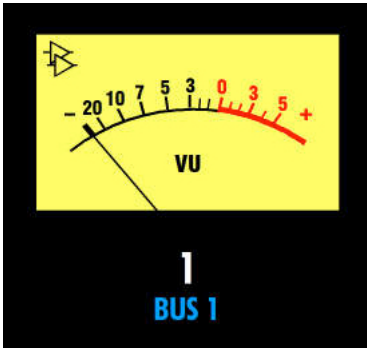
DIR (Direct Output): Direct Output VU meter routing LED.

- Illuminates when the channel meters are fed from the Direct Outputs

VU CH (VU Channel): Globally selects the input source for the channel VU meter.

- Line Input, Mic Preamp output, & Direct Output selections
- Each push will cycle to the next selection
- Direct Output is the default selection
- Illuminates when engaged
- **VU Bus** will override the **VU CH** selection

12.1.3 2448 Channel VU Meters



VU (Volume Unit): Channel level indicator.

The channel VU Meter can be fed from the following points:

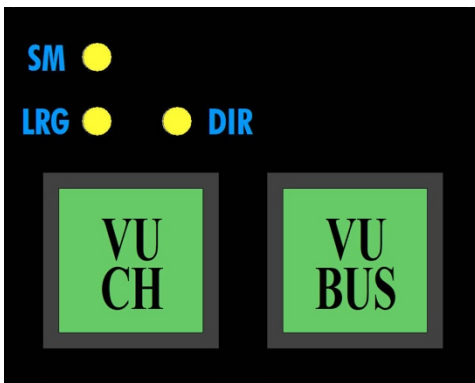
- Direct Output (post fader/mute)
- Large Fader Input (post input, pre-EQ & insert)
- Small Fader Input (post input, pre-EQ & insert)
- Associated Summing Bus Output (1-8)

White labels are used to indicate channel VU meter numbers and **Blue** labels indicate the Summing Bus Master function.

The channel Direct Output is the default source for the channel VU meter. The feed to the channel VU Meter is determined by the selection made using the VU routing controls on the 840C Multifunction module. These selections are global and apply to all channel VU Meters.

12.1.4 2448 Channel VU Meter Controls

The channel VU meter routing controls are found on the 840C Multifunction module and operate as follows:



SM (Small Fader): Small Fader VU meter routing LED.

- Illuminates when the channel meters are fed from the Small Fader inputs

LRG (Large Fader): Large Fader VU meter routing LED.

- Illuminates when the channel meters are fed from the Large Fader inputs

DIR (Direct Output): Direct Output VU meter routing LED.

- Illuminates when the channel meters are fed from the Direct Output

VU CH (VU Channel): Globally selects the input source for the channel VU meter.

- Small Fader Input, Large Fader Input, & Direct Output selections
- Each push will cycle to the next selection
- Direct Output is the default selection
- Illuminates when engaged
- **VU Bus** will override the **VU CH** selection

12.1.5 Summing Bus VU Meters

The first eight (8) channel VU meters can display the output levels of the Summing Bus Masters 1-8 by engaging the **VU BUS** button on the 840C Multifunction module.

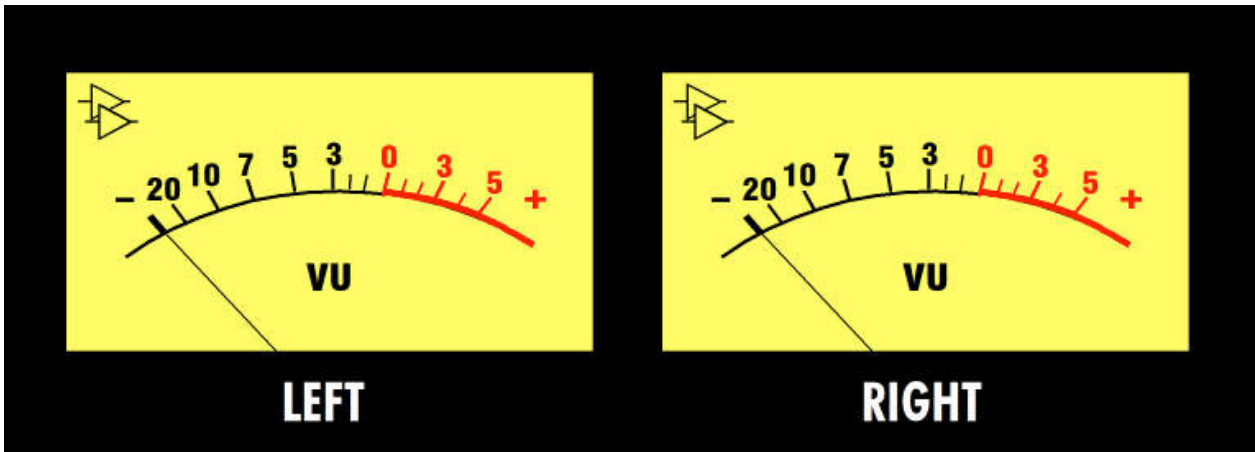


VU BUS (Summing Bus 1-8): Routes the outputs of Summing Buses (1-8) to channel VU meters 1-8.

- Defeats the meter feed from the channel and replaces it with the associated Summing Bus output
- Illuminates when engaged

12.2 Main Stereo VU Meters

A pair of large, high-quality VU meters are installed in the top bay over the master section for indicating the stereo Program Bus, external playback (Left & Right), and Solo levels.



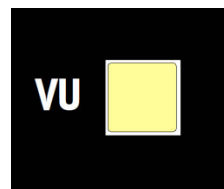
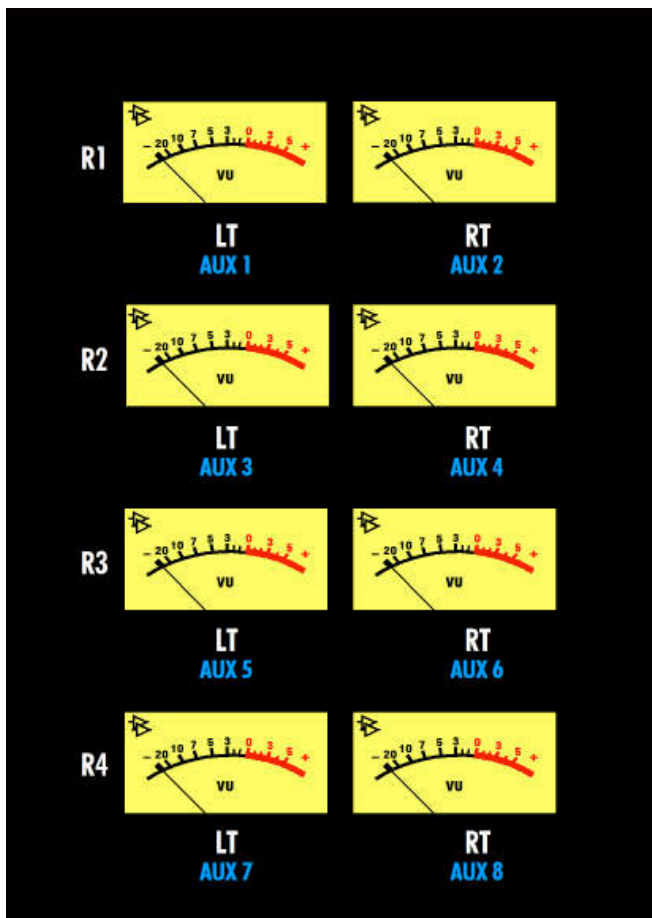
The source for the Main Stereo Meters is selected using the Control Room Monitor source selectors (**C/R SOURCE**) on the 845C Monitor Control module. Accordingly, the Main Stereo Meters can be fed from the following sources:

- **Stereo Program Masters:** PGM
- **Auxiliary Sends:** 1/2, 3/4, 5/6 or 7/8
- **6-Track Playback:** 1-3 (Left & Right only)

While recording and mixing the Main Meters will typically display the level of the stereo Program Master that's being used for mixing and monitoring. When a PFL or AFL **SOLO** is engaged, the control room Monitor Source is replaced with the output of the Solo Bus and the Solo Bus is displayed on the LEFT & RIGHT Main Meters.

12.3 Stereo Return/Aux Send Master VU Meters

The meter bridge contains eight (8) dual-function VU meters that support both the Stereo Returns 1-4 (Left & Right) and Auxiliary Send Masters 1-8. Used in pairs, these VU meters display the outputs of Stereo Returns 1-4 by default.



Engaging the **VU** button on an 265C Auxiliary Master will replace the associated Stereo Return signal with the output of that Auxiliary Master.

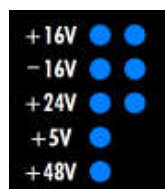
White labels are used to indicate the VU meters for each Stereo Return and **Blue** labels indicate the Auxiliary Master function.

12.4 Talkback Microphone



The built-in Talkback Microphone is located below the Power Supply Voltage Indicators.

12.5 Power Supply Voltage Indicators



Blue LED indicators are provided for the five power supply voltages:

- +16V
- -16V
- +24V
- +5V
- +48V

The Power Supply Voltage Indicators are located below the Right Main VU Meter.

13.0 Optional *Final Touch™* Automation

The 1608-II and 2448 console can be equipped with an optional API *Final Touch™* moving-fader and switch automation system. *Final Touch™* automation can be specified when the console is ordered or added at a later date.

The *Final Touch™* automation package provides the following features:

- Automated moving faders for all channels, Stereo Returns, and the Program Bus Master
- Mute automation for all channels and Stereo Returns
- Insert automation for all channels, Stereo Returns, and the Program Bus Master
- Two (2) automated Control Group Masters
- SMPTE timecode and MIDI timecode synchronization
- Expandable up to 48 channels

NOTE: While an overview of the automation system is provided here, operation of the automation package is covered in a separate manual.

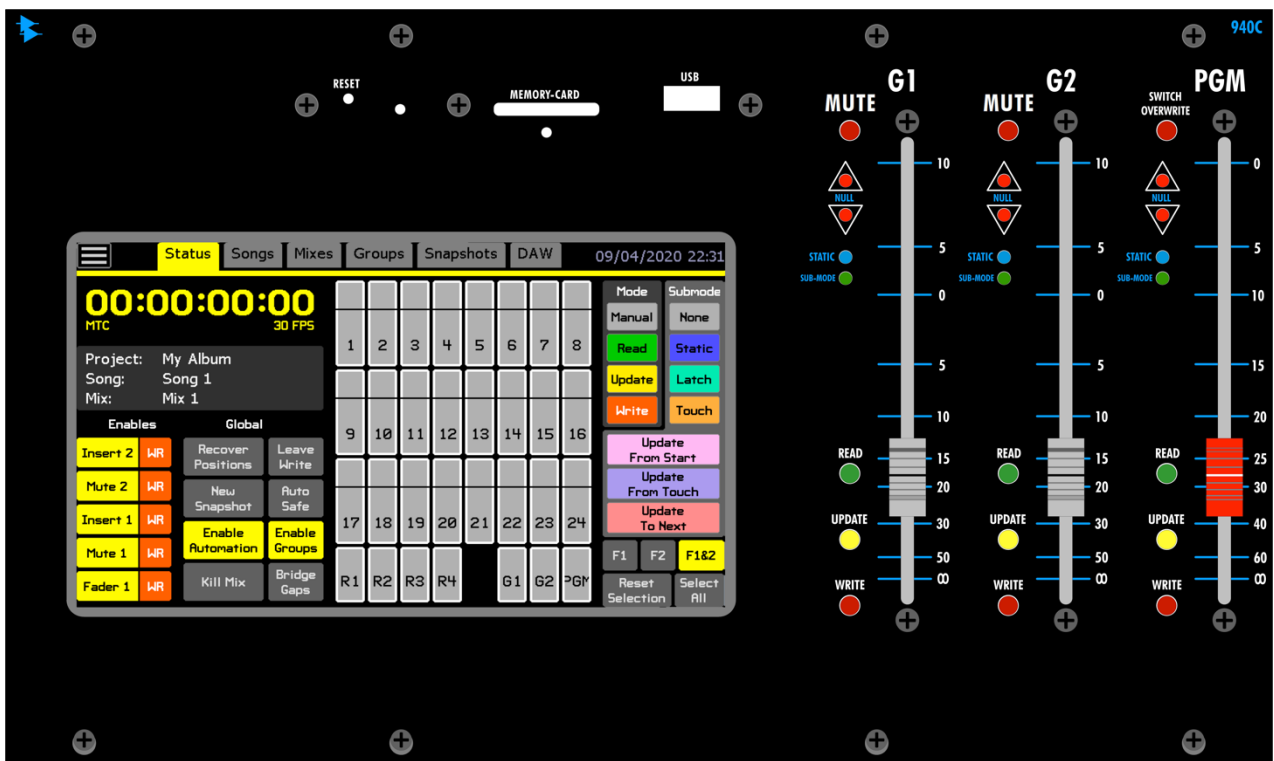
13.1 *Final Touch™* Automation System Components

The automation system includes the following components:

- 940C Automation Control Module (ACM) with touch screen, automated stereo Program Master Fader and two automated Control Group Masters
- 944C automated channel Fader modules
- Automated 265C Stereo Return modules
- Automation Rear Panel interface

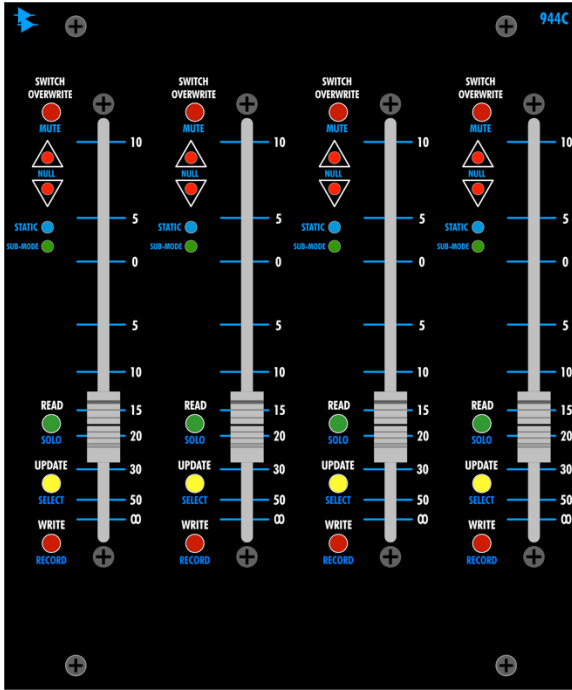
NOTE: An external computer is NOT required for operation of the Final Touch™ automation system.

940C Automation Control Module (ACM)

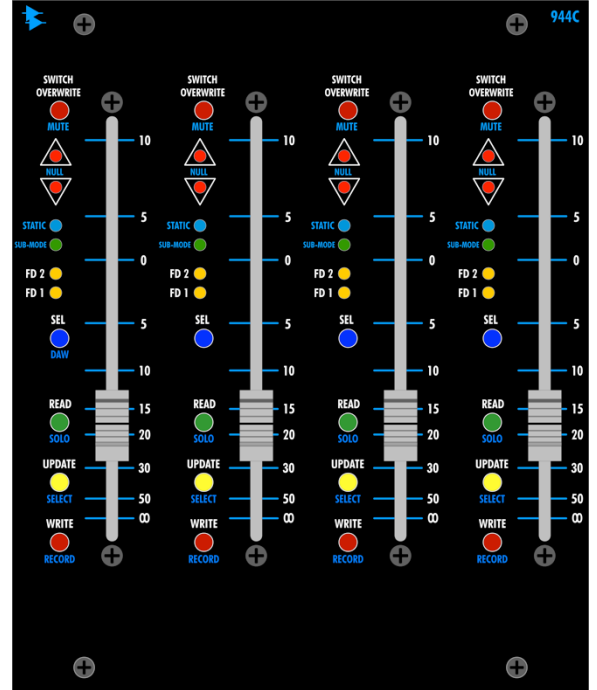


944C Automated Fader Modules

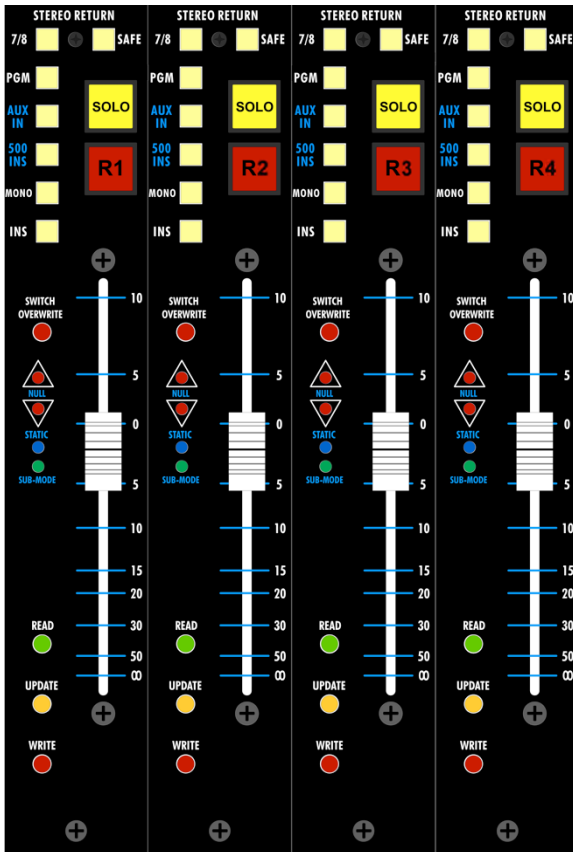
1608-II 944C



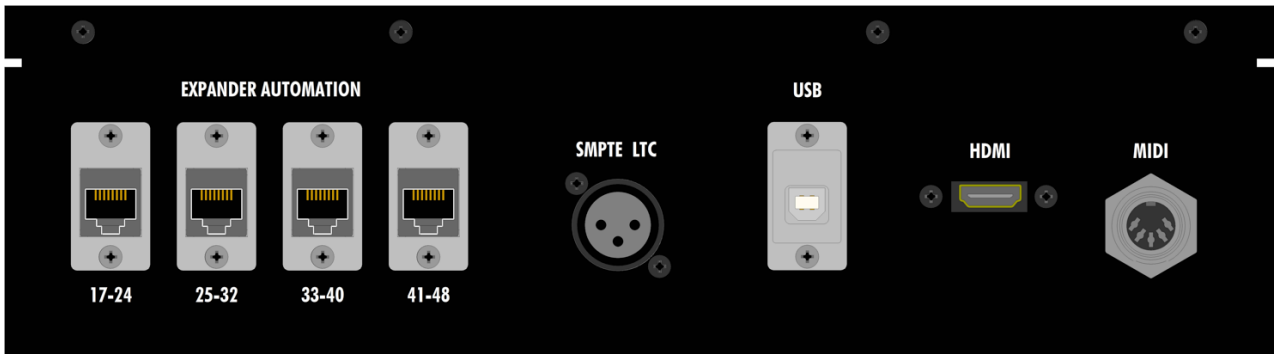
2448 944C



Automated 265C Stereo Returns



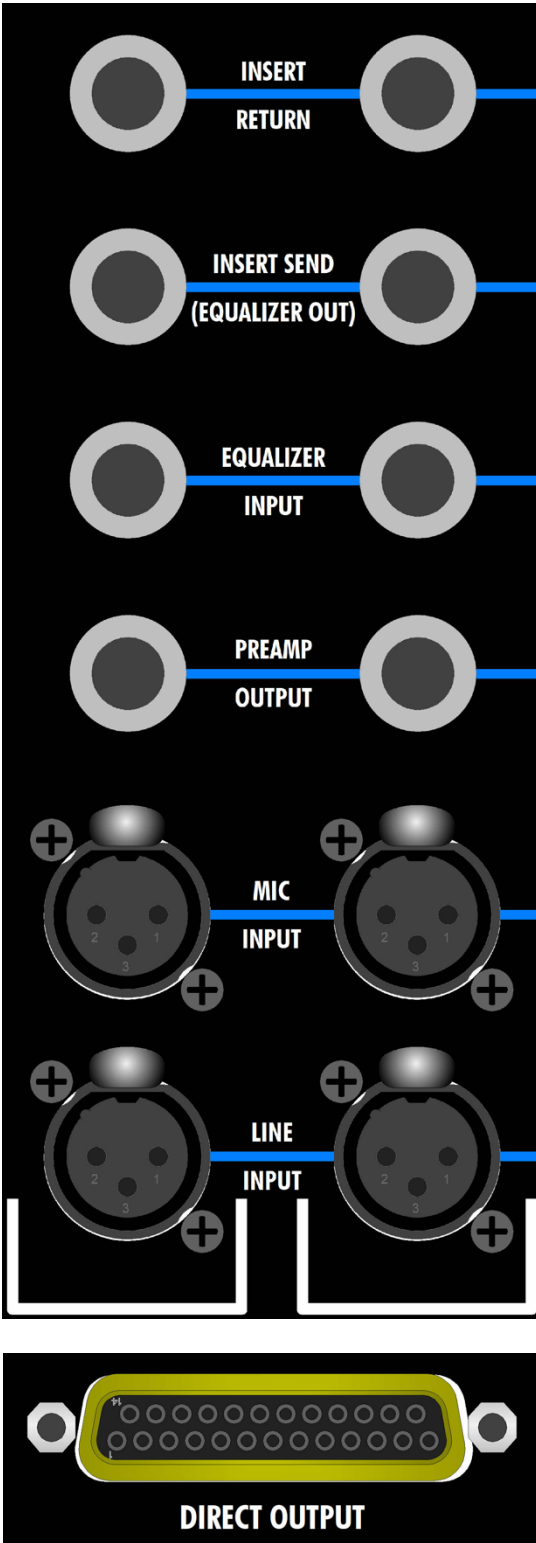
Final Touch™ Automation Rear Panel



14.0 Rear Panel

14.1 1608-II Channel Module Rear Panel Connections

A comprehensive set of 548C Channel module connections are provided on the rear panel of the 1608-II console. Each channel has the following connections (shown in pairs) and a 25-pin D-sub connector provides the DIRECT OUTPUT for each section of eight channels.



INSERT RETURN:

- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- Replaces the EQ Out signal when a jack is inserted and the **INS** button is engaged

INSERT SEND (EQUALIZER OUT):

- Balanced, Line-level
- ¼" tip-ring-sleeve jack
- Insert Sends are always active

EQUALIZER INPUT:

- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- The Preamp Output signal is replaced with this signal when a jack is inserted

PREAMP OUTPUT:

- Balanced, Line-level
- ¼" tip-ring-sleeve jack
- Preamp Outputs are always active

MIC INPUT:

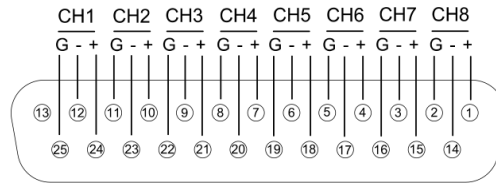
- Balanced, Low-impedance
- Microphone-level
- Female XLR connector

LINE INPUT:

- Balanced, Low-impedance
- Line-level
- Female XLR connector

DIRECT OUTPUT: Channels 1-8 and 9-16

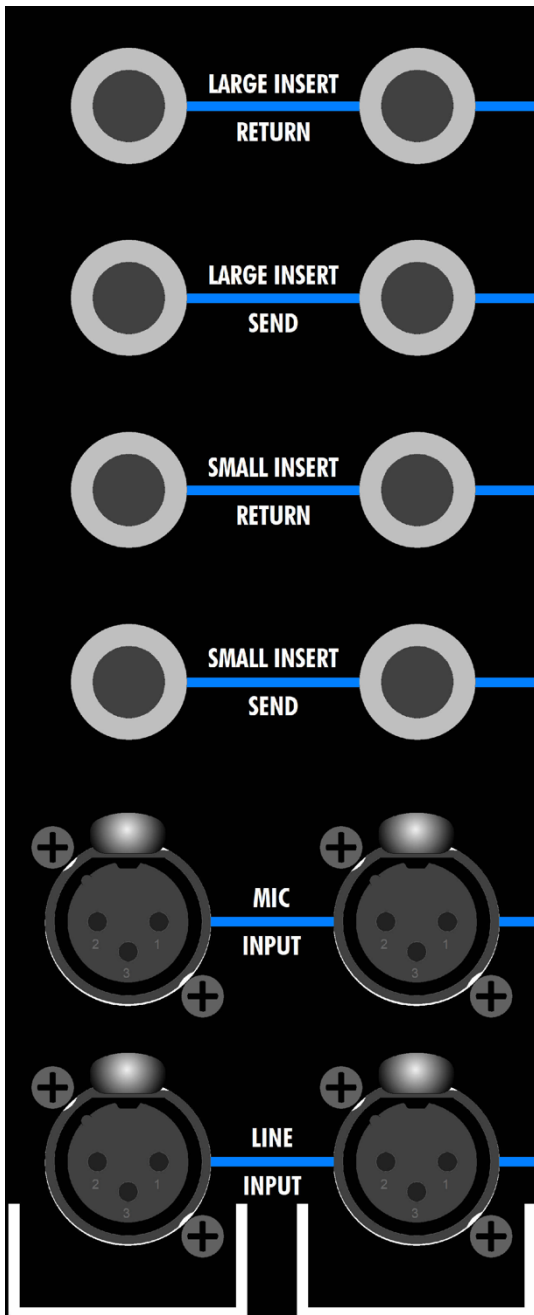
- Balanced, low-impedance
- Line-level
- Female 25-pin D-sub connector
- Standard 8-channel pinout



Standard 8-Channel D-Sub Pinout

14.2 2448 Channel Module Rear Panel Connections

A comprehensive set of 648C Channel module connections are provided on the rear panel of the 2448 console. Each channel has the following connections (shown in pairs) and 25-pin D-sub connectors provides the ALT LINE IN and DIRECT OUTPUT connections for each section of eight channels.



LARGE INSERT RETURN:

- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- Replaces the EQ Out signal when a jack is inserted and the **INS** button is engaged

LARGE INSERT SEND:

- Balanced, Line-level
- ¼" tip-ring-sleeve jack
- Insert Sends are always active

SMALL INSERT RETURN:

- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- Replaces the EQ Out signal when a jack is inserted and the **INS** button is engaged

SMALL INSERT SEND:

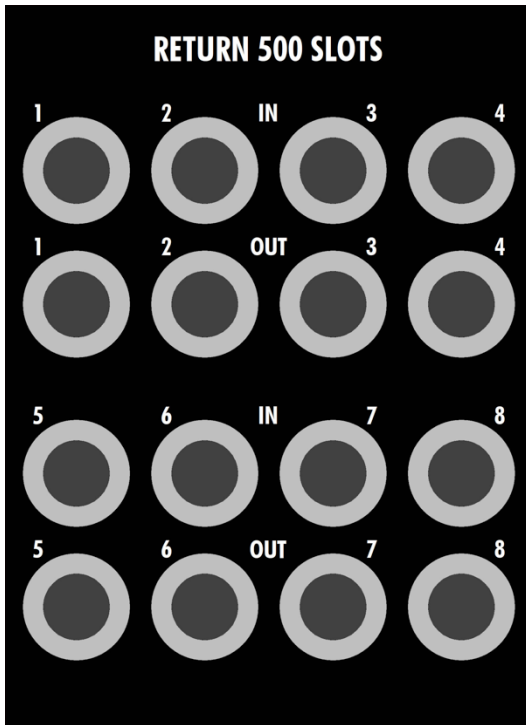
- Balanced, Line-level
- ¼" tip-ring-sleeve jack
- Insert Sends are always active

MIC INPUT:

- Balanced, Low-impedance
- Microphone-level
- Female XLR connector

LINE INPUT:

- Balanced, Low-impedance
- Line-level
- Female XLR connector

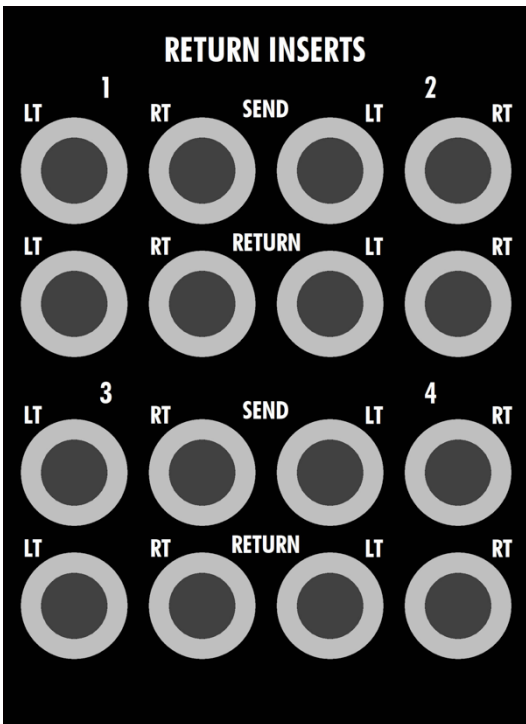


RETURNS 500 SLOTS IN 1-8:

- 500 slot inputs
- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- When a jack is inserted, the signal replaces the STEREO RETURNS INPUT as the source for the 500 slot

RETURNS 500 SLOTS OUT 1-8:

- 500 slot outputs
- Balanced, Line-level
- ¼" tip-ring-sleeve jack
- Also normalled to the **500 INS** button
- 500 slot outputs are always active



RETURN INSERTS SEND 1-4, LT & RT:

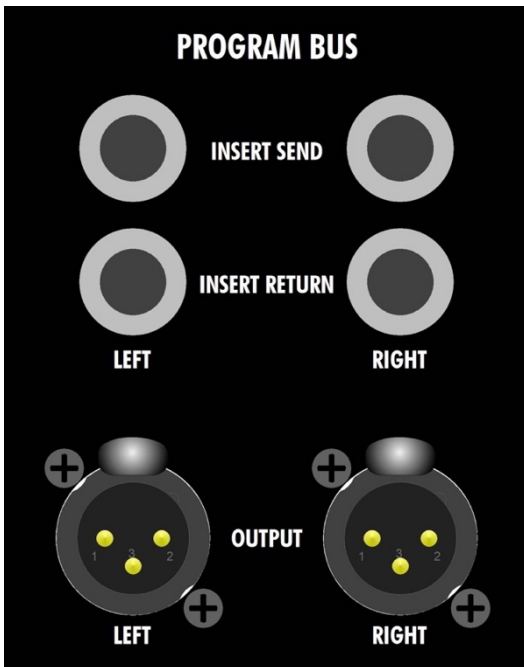
- Left & Right Stereo Return Insert Sends
- Balanced, Line-level.
- ¼" tip-ring-sleeve jack
- Insert Sends are always active

RETURNS INSERTS RETURNS 1-4, LT & RT:

- Left & Right Stereo Return Insert Sends
- Balanced, Line-level
- ¼" tip-ring-sleeve switching jack
- Also normalled to the **INS** button
- Insert Sends are always active

14.4 Stereo Program Bus Rear Panel Connections

A complete set of Program Bus connections are provided on the rear panel of the 1608-II and 2448 consoles.



PROGRAM BUS INSERT SEND:

- Balanced, Line-level
- 1/4" tip-ring-sleeve jack
- Half-normalled to Program Insert Return
- Insert Sends are always active

PROGRAM BUS INSERT RETURN:

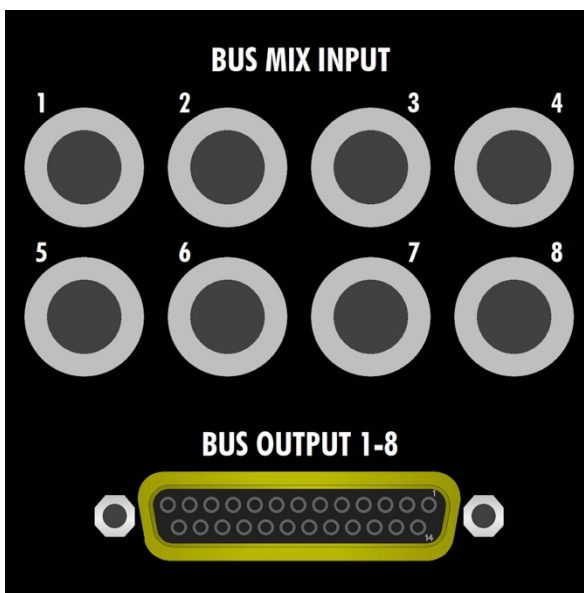
- Balanced, Line-level
- 1/4" tip-ring-sleeve switching jack
- Replaces the Program Insert Send signal when a jack is inserted and the **PRG INS** button is engaged

PROGRAM BUS OUTPUT LEFT & RIGHT: Main mix output.

- Balanced, Line-level
- Male XLR

14.5 168C Summing Bus Rear Panel Connections

A complete set of Program Bus connections are provided on the rear panel of the 1608-II and 2448 consoles. The rear panel connections for the 168C Summing Bus Master module are as follows:

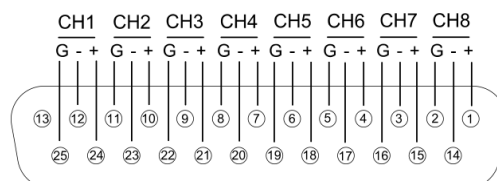


BUS MIX INPUT 1-8:

- Balanced, Line-level
- 1/4" tip-ring-sleeve switching jacks
- Replaces the Summing Bus Output feed to the **LT-RT PGM** bus assignment buttons when a jack is inserted.

BUS OUTPUT 1-8:

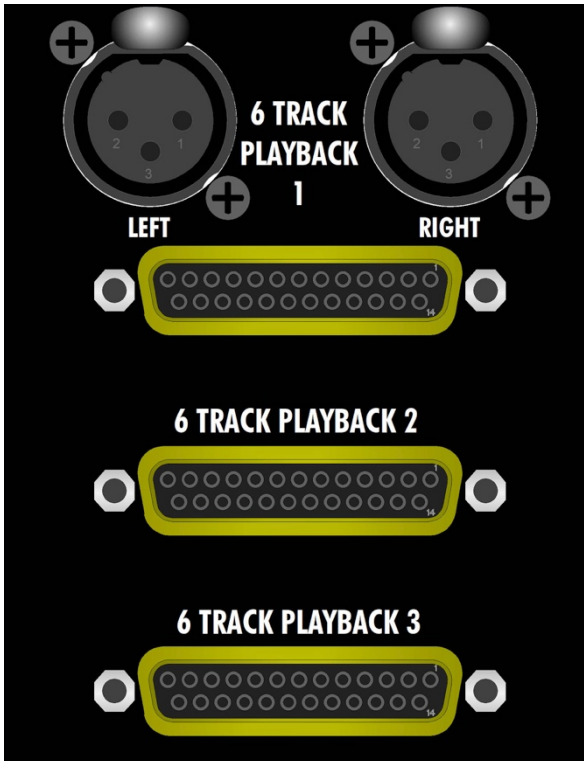
- Balanced, Line-level
- Female 25-pin D-sub connector
- Standard 8-channel pinout



Standard 8-Channel D-Sub Pinout

14.7 845C External Source Rear Panel Connections

A complete set of External Source input connections are provided on the rear panel of the 1608-II & 2448 consoles. Labeled as 6-TRACK PLAYBACK 1-3 these connections are as follows:



6 TRACK PLAYBACK 1 (LEFT & RIGHT XLRs):

- LEFT & RIGHT Inputs
- Balanced, Line-level
- Female XLR connectors
- LEFT & RIGHT XLR connectors are paralleled with the Left & Right inputs on the 6 TRACK PLAYBACK 1 D-sub connector

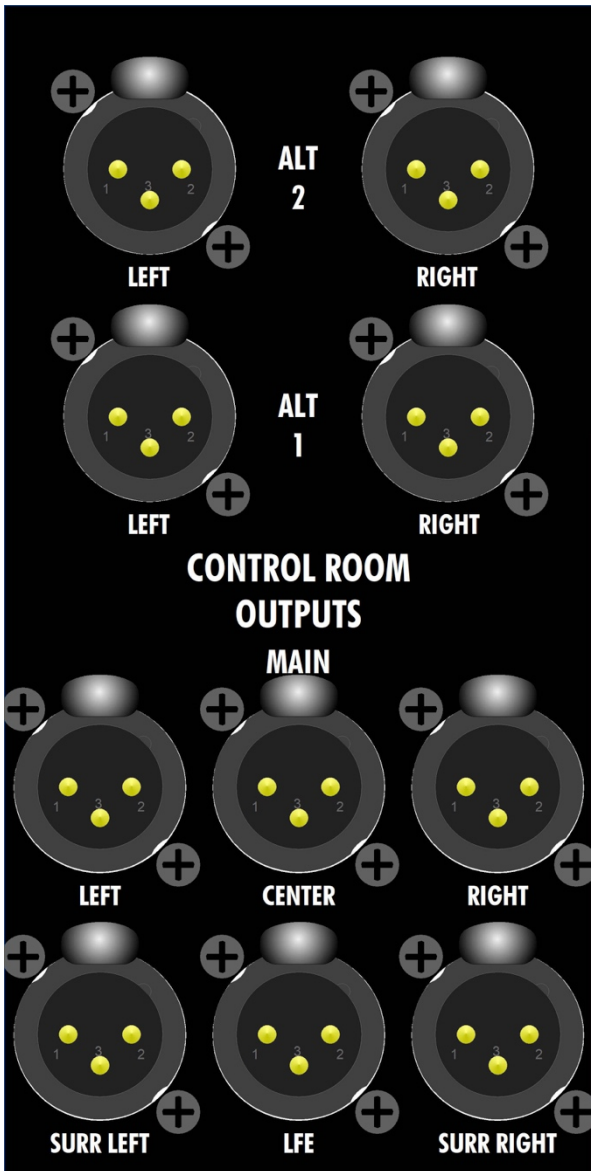
6 TRACK PLAYBACK INPUTS 1, 2, and 3:

- Left, Right, Left Surround, Right Surround, Center, LFE
- Balanced, Line-level
- Female 25-pin D-sub connector
- 6 Track Playback 1 is paralleled with the LEFT & RIGHT XLR connectors

NOTE: External stereo devices may be interfaced to the Left & Right channels only for stereo playback.

14.8 268C Monitor Output Rear Panel Connections

The rear panel connections for the 268C Control Room Monitor Output Masters are as follows:



ALT 2 CONTROL ROOM OUTPUTS:

- LEFT & RIGHT
- Balanced, Line-level
- Male XLR

ALT 1 CONTROL ROOM OUTPUTS:

- LEFT & RIGHT
- Balanced, Line-level
- Male XLR

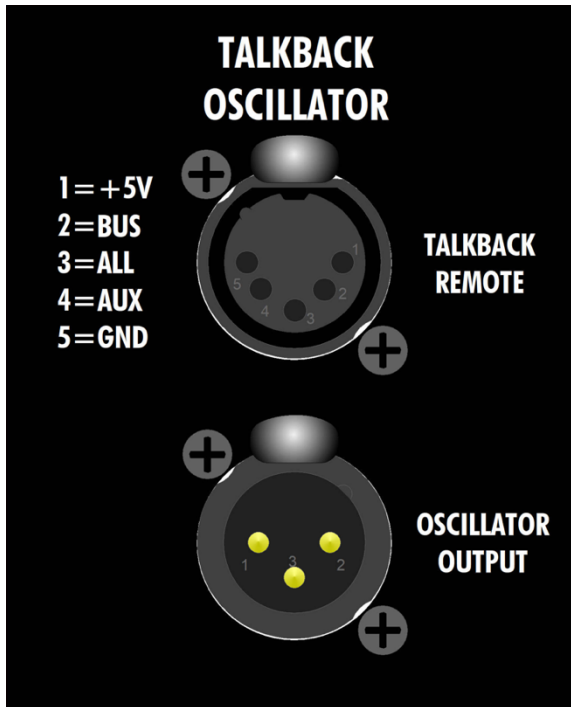
MAIN CONTROL ROOM OUTPUTS:

- LEFT, CENTER, RIGHT
- SURR LEFT, LFE, SURR RIGHT
- Balanced, Line-level
- Male XLR

NOTE: The 5.1 surround playback channel order is Left, Right, Left Surround, Right Surround, Center, and LFE.

14.9 840C Talkback & Oscillator Rear Panel Connections

The rear panel connections for the 840C Multifunction module are as follows:



Talkback can be activated remotely using momentary switch closures (typically push-button) that short the desired signal to ground. For example, to Talkback to ALL, the remote's momentary switch should short Pin 3 (TB All) to Pin 5 (Ground).

TALKBACK REMOTE: Talkback Remote Port

- Pin 1 = +5 volts (fused)
- Pin 2 = T/B BUS
- Pin 3 = T/B ALL
- Pin 4 = T/B AUX
- Pin 5 = Ground
- 5-Pin Female XLR connector
- Remote & cable not supplied

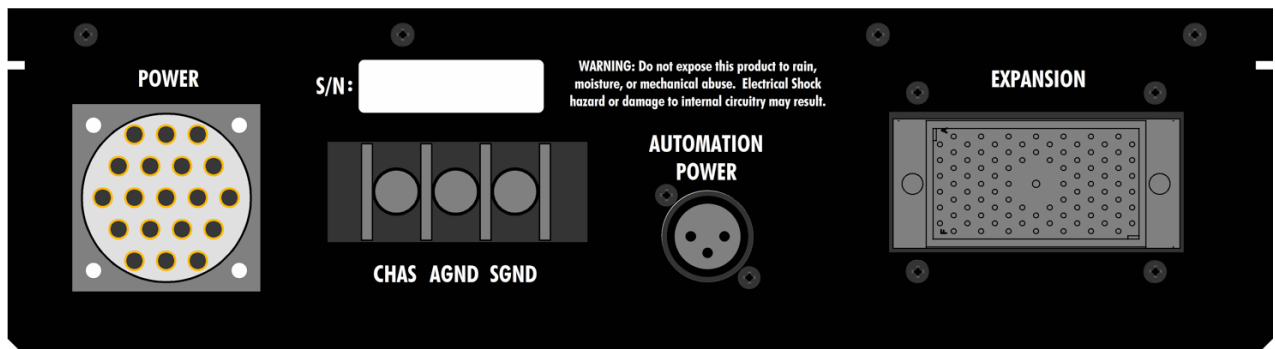
OSCILLATOR OUTPUT: Oscillator Output

- Active when the Oscillator **ON** button is engaged.
- Balanced, Line-level
- Male XLR connector

14.10 Power Supplies, Grounding, and Expansion Port

The 1608-II and 2448 consoles are equipped with a utility panel on the rear that supports the following:

- Main Power Supply Connection
- Grounding Terminations
- Optional *Final Touch™* Automation System Power Supply Connection
- Expansion Port



POWER: The main power supply unit connection is interfaced with a single multi-pin military specification connector.

GROUNDING: The grounding terminations are barrier-strip connections with Chassis (**CHAS**), Audio Ground (**AGND**), and Automation Ground (**SGND**) connection points.

AUTOMATION POWER: The optional *Final Touch™* automation system power supply unit connection is interfaced with 3-pin female XLR connector.

EXPANSION: The 1608-II and 2448 are equipped with an EXPANSION port that allows the connection of API 1608-II or 2448 expansion consoles. The EXPANSION port allows for complete integration of all major console functions:

- Program Bus
- Summing Bus
- Auxiliary Bus
- Channel Functions
- Solo Bus
- Solo-In-Place

The EXPANSION port is interfaced with a single 90-Pin male Elco connector that connects audio and logic circuits to/from the expander consoles.

14.11 Automation Rear Panel Connections

The rear panel connections for the optional *Final Touch™* automation system include the following features:

- Expander ports (up to 48 channels)
- SMPTE (LTC) timecode input
- USB port
- HDMI port
- MIDI In port



NOTE: While an overview of the Final Touch™ automation system is provided here, connection of the automation package is covered in a separate manual.

14.12 Stereo Headphone Output

Stereo Headphone Jack: (under armrest)

- Headphone amplifier output
- ¼" tip-ring-sleeve jack

NOTE: This connector is not shown.

15.0 1608-II Application Guide

The API 1608-II is a highly versatile audio production console and is at home with a wide variety of applications including:

- Multitrack Recording
- Overdubbing
- Mixing
- Broadcasting
- Audio Post Production
- Live Sound

API realizes the owners of 1608-II consoles are professional users, so this section of the manual is designed to provide quick and easy setups for basic applications.

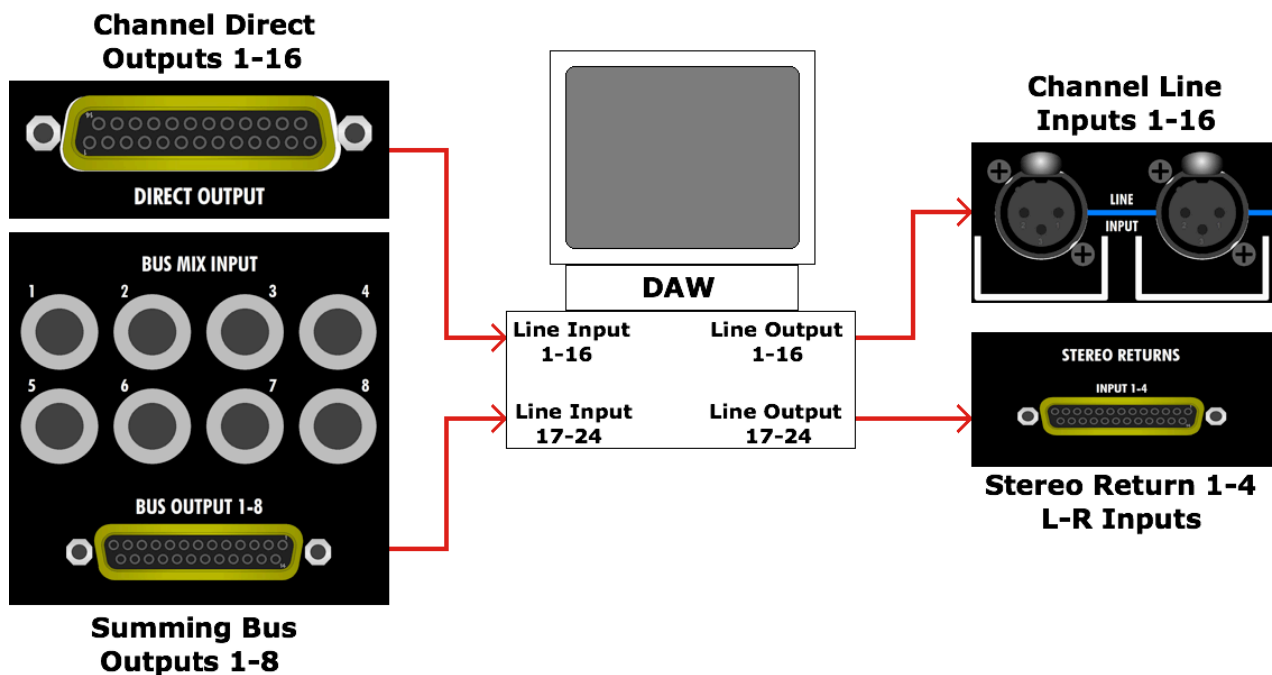
There are multiple ways to interface the 1608-II with the equipment in your studio. This allows the user to setup the console and studio to best accommodate the audio production workflows most often used in your facility. Keeping in mind that the installation and interfacing in every facility is unique, a few basic scenarios for multitrack recording and mixing are provided in the following sections of this chapter.

NOTE: These setups are intended to be a very basic "Getting Started" guide and should by no means considered to be comprehensive.

NOTE: A DAW is used as the multitrack recorder in the following examples, but any multitrack recorder or series of recording devices can substitute for the DAW.

15.1 Basic 1608-II Multitrack Connections

The diagram below shows the common basic interfacing between a 1608-II and a DAW with a 24-channel audio interface for both recording and mixing without changing connections on the rear panel.

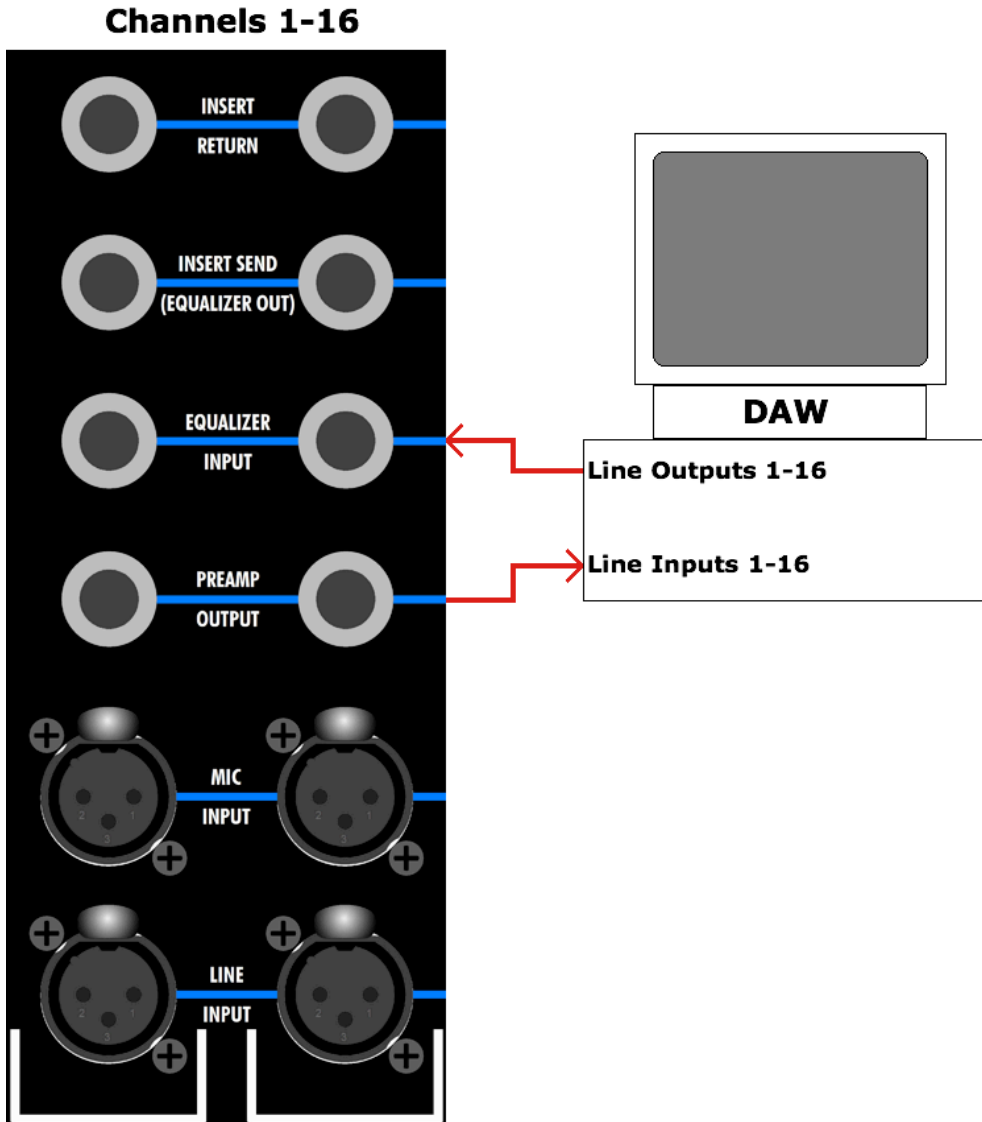


15.2 Hybrid 1608-II Multitrack Connections

It is possible to use the 1608-II channels as both the input path to a multitrack recorder or (DAW) and a return path for mixing as well. This is accomplished by interfacing the recorder or DAW within the channel signal flow. This simultaneously provides high-quality input paths for recording and powerful analog mixing capabilities. It is best suited for use with a DAW, but could be used with any multitrack recorder. Possible configurations include:

Preamp Output to DAW Input – DAW Output to Equalizer Input:

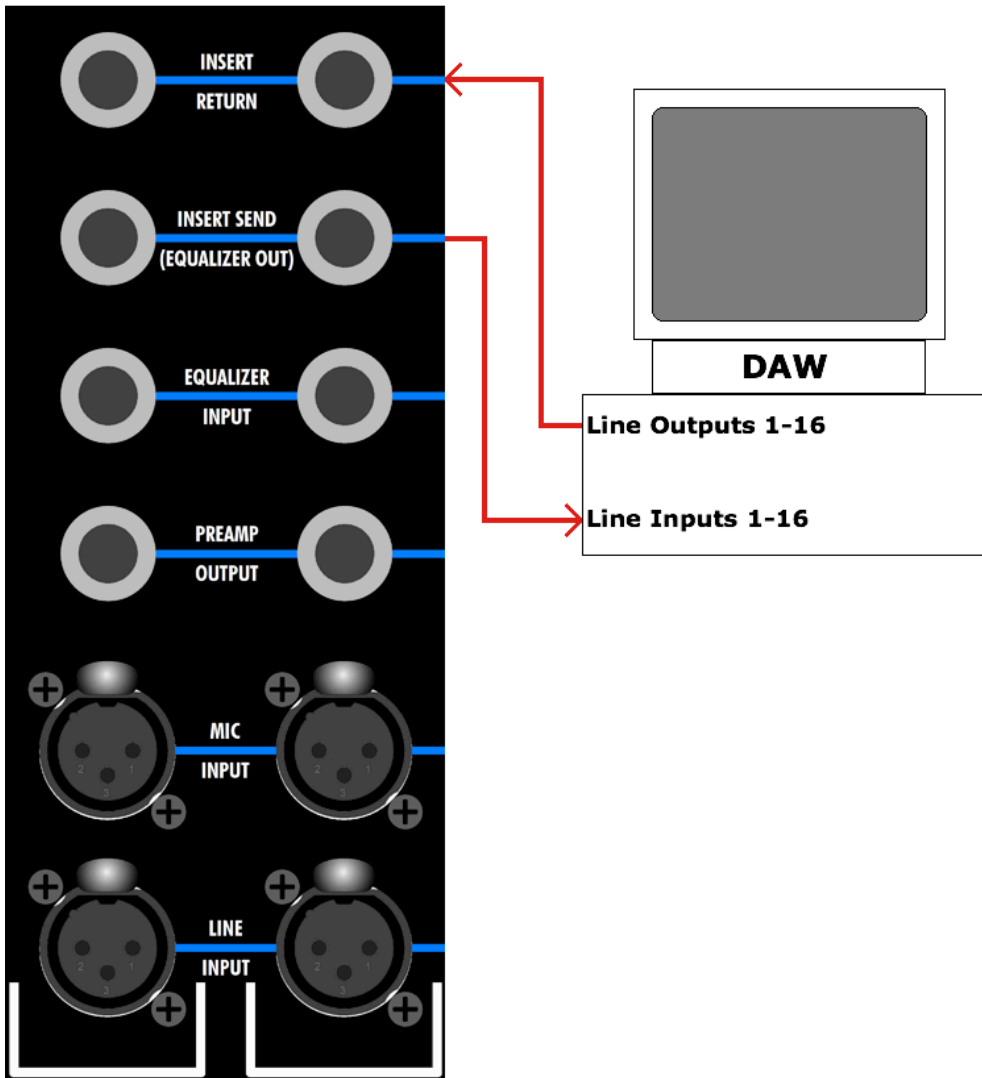
- Input Path: Preamp Only
- DAW
- Return Path: EQ, Insert, Fader, Filter, Panning, Output Assignments, Aux Sends



Insert Send (EQ Output) to DAW Input – DAW Output to Insert Return (Fader Input):

- 1608-II Input Path: Preamp and EQ
- DAW
- 1608-II Return Path: Fader, Filter, Panning, Output Assignments, Aux Sends

Channels 1-16



Additional signal processing can be added at any point in the patching if needed.

15.3 1608-II Multitrack Recording & Mixing Workflow

For those familiar with other single-path recording consoles, the channel can function as a “mic” or “channel” path to route microphones and DI’s to a multitrack recorder or function as a “monitor” or “mix” path, bringing multitrack and other sources to the Program Bus for stereo mixing. The choice of function depends on needed workflow and the operational controls and signal flow are well suited for either function.

The channel path can provide a different function during the various types of recording sessions. The signal routing of input and output of the channel audio path is handled by the 548C Channel module.

Multitrack Recording and Overdubs: In a typical multitrack recording session, the channel strip functions as follows:

- **Record Path (channel path, input path, mic path):** The channel path carries the signals from the microphone preamp, DI, or other input source to the multitrack recorder.
 - Routed via Direct Output or the 8 Summing Buses
 - Signal processing is often recorded to the multitrack so filters, EQ, and inserts are assigned to the record path as needed
- **Monitor Path (mix path, return path):** The stereo mix is accomplished in the DAW and returned to the Monitor section of the console.

Stereo Mixing: In a typical mixing session, the channel strip functions as follows:

- The channel is the main mix path from the multitrack returns to the Program Bus
- The four Stereo Returns can also be used to route additional returns from multitrack stems or other sources such as effect units to the mix
- Summing Bus Masters 1-8 have an external input (BUS MIX IN) and can be used to route stems and effects returns to the Program Bus
- In combination, a total of 32 inputs are available while mixing on a 16-channel console
- Signal processing is often applied to channels contributing to the mix, so the channel EQ, insert, and other processes are assigned to the audio path as needed while mixing
- The channels and Stereo Returns contributing to the mix are routed to the stereo Program Bus

Default 1608-II Signal Flow: With no routing buttons engaged, the default channel signal flow is as follows:

- Input: LINE IN (assignable output of the 548C Preamp)
- Signal Processing: Polarity Inverter, EQ, Insert, & High-pass Filter
- Output: Direct Output (assignable Summing Buses & Program Bus)
 - **PAN**-pot to Program Bus by default
 - **PAN**-pot assignable to Summing Buses

This default channel signal flow can be altered by changing the positions of the **MIC** button:



MIC (Microphone): Routes the output of the microphone Preamp to the channel audio path.

- Disengages LINE IN as the source for the channel audio path.
- Illuminates when engaged.

For recording, select the Mic input on the 1608-II channels and output to the DAW via channel Direct Outputs or Summing Bus assignments. During recording, a stereo mix can be created in the DAW and monitored as described in the Multitrack Recording scenarios below.

For mixing, select the Line input on the channels and assign them to the Program Bus for stereo mixing and the Program Bus and/or Summing Buses for surround mixing. The Stereo Returns can be assigned to the Program Bus and used to return additional channels from the DAW or returns from outboard effects processors.

15.4 Multitrack Recording with the 1608-II

This setup uses the 1608-II as an input path to a multitrack recorder or Digital Audio Workstation (DAW):

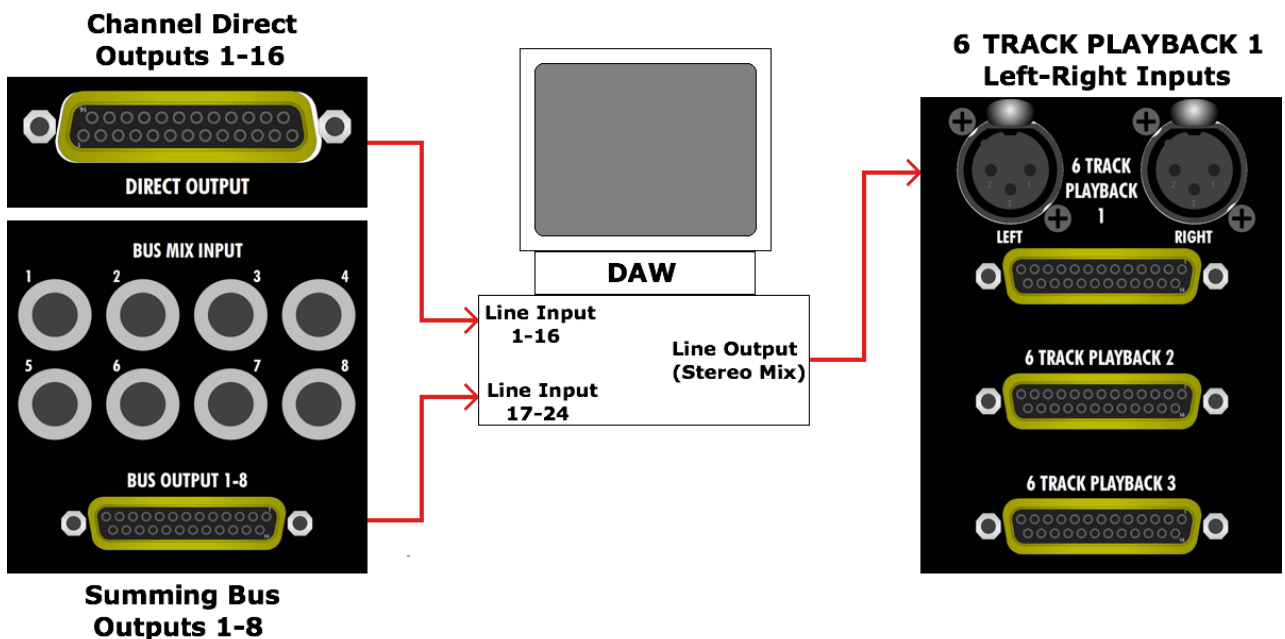
1. Connect mics and Dis to be recorded to the MIC PREAMP INPUT connectors and sources with line outputs to the LINE INPUT connectors as needed.
2. Select the appropriate channel input for the sources to be recorded
 - **MIC** (Microphone): Engage the **MIC** button
 - **LINE**: No buttons engaged
3. Connect the following to the inputs of the recorder or DAW as desired:
 - Channel Direct Output:
 - Summing Bus Master Outputs:
 - If multiple channels need to be summed before the input to the recorder
 - Connected to an 8-channel interface for versatile routing
 - Engage the pan-pot to enable Odd-Even panning if routing to a pair of Summing Buses
4. Set the input level and polarity using the channel Preamp controls, engaging **48V** phantom power and **PAD** as needed.
5. Apply the channel high-pass filter and EQ as needed. (EQ **IN** button must engaged.)
6. Additional signal processors (such as a compressor) may be patched into various places in the channel audio path via the channel Insert and/or channel connections on the rear panel.
7. Connect the Direct Outputs and/or the Summing Bus Master outputs to the desired recorder or DAW inputs.
 - The Direct Output is always fed by the channel Fader
 - Make the necessary Summing Bus assignments if needed
 - Engage the pan-pot to apply Odd-Even panning to pairs of Summing Buses if needed
8. Do not assign channels feeding the multitrack recorder to the Program bus.
9. The multitrack feed will be controlled by the channel fader and mute.
10. The channel Fader is the last adjustable gain stage before the Direct Output.
11. If the Summing Buses are used, the Summing Bus Masters (BUS 1-8) will provide a final output control before the recorder or DAW inputs.
12. If a DAW is used, it's typical to create a stereo mix of the multitrack returns in the DAW and return that mix to the console for monitoring via:
 - A pair of unused channels that are assigned to the Program Bus
 - A Stereo Return that is assigned to the Program Bus
 - A pair of Summing Bus Masters that are assigned to the Program Bus
 - The Program Bus Insert Returns
 - An external control room monitor input (6-TRACK PLAYBACK 1-3)
13. Alternately, unused channels and Stereo Returns can be used to create a mix of the multitrack/DAW returns. Tracks can be sub-grouped as needed before feeding the DAW outputs.

14. Sub-mixes for headphones and effects sends can be created “in the box” using the DAW auxiliary buses and outputs.

15.4.1 1608-II Multitrack Recording Scenario #1

The diagram below shows the connections between a 1608-II and a Digital Audio Workstation (DAW) with 24 line-inputs. The first 16 channels feed the DAW inputs 1-16 from the 1608-II channel Direct Outputs. DAW inputs 17-24 are fed from the 1608-II Summing Bus Master outputs 1-8, providing versatile assignment and summing possibilities, including Odd-Even stereo panning to pairs of Summing Buses.

This scenario requires the engineer to sum the recorded channels to a stereo mix within the DAW and output this mix for monitoring while recording. The stereo mix from the DAW is routed directly to the 845C Control Room Monitor module for monitoring, in this case via the 6-TRACK PLAYBACK 1 Left & Right inputs. The signal from these connectors can be routed to the 1608-II control room monitor outputs by selecting **6-TRACK 1** and enabling monitor outputs on the 845C module, allowing the stereo DAW mix to be monitored via the control room loud speakers and console headphone jack.

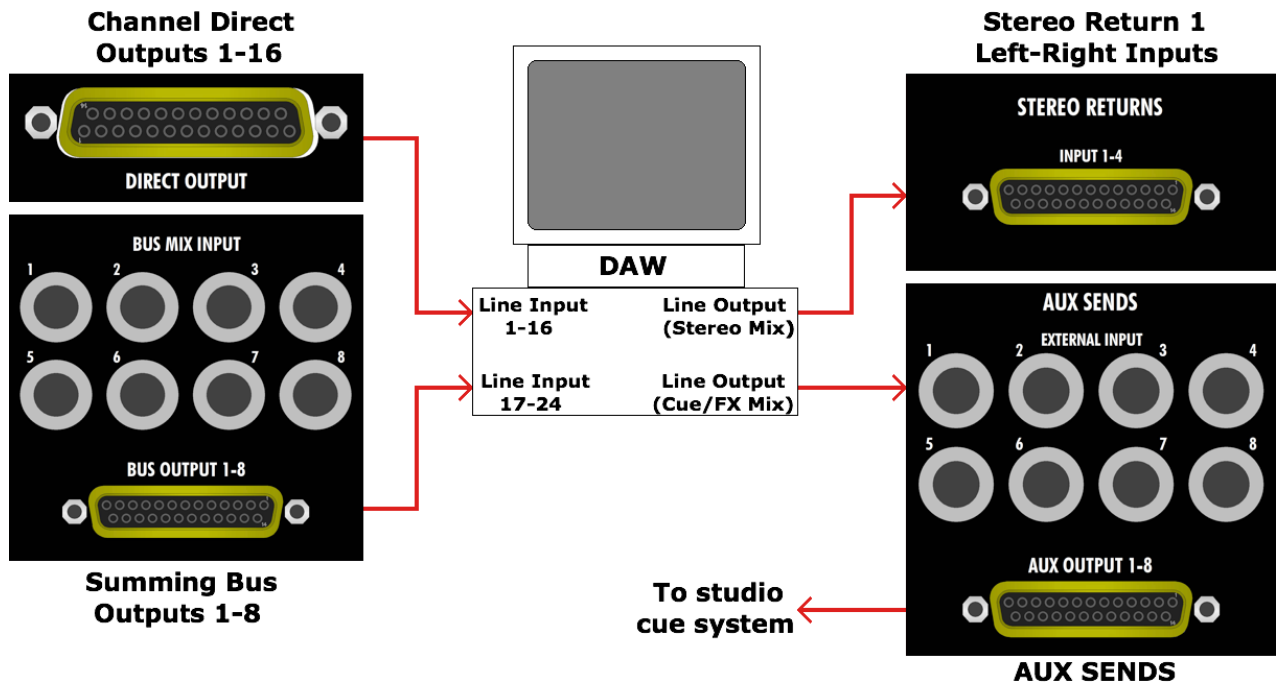


15.4.2 1608-II Multitrack Recording Scenario #2

The diagram on the next page shows the connections as above, except the stereo mix return from the DAW is routed to a 1608-II Stereo Return for monitoring. This scenario also includes headphone (cue) and effects send sub-mixes created in the DAW being routed to the 1608-II via external inputs to the Aux Send Masters for further routing and Talkback injection for headphone feeds.

This scenario also requires the engineer to create a stereo mix within the DAW output this mix for monitoring while recording. The stereo mix from the DAW is connected to a Stereo Return's inputs and the cue/effects mixes from the DAW are connected to Left & Right pairs of AUX SEND EXTERNAL INPUTS. In this scenario, the Stereo Return must be assigned to the Program Bus and the **PGM** must be selected as the **C/R SOURCE** on the 845C Monitor Control module. Enabling monitor outputs on the 845C module will allow the stereo DAW mix to be monitored via the control room loud speakers and console headphone jack.

Engaging the **EXT IN** button on the Aux Send Masters will route the sub-mixes from the DAW to the Aux Send Masters. Engaging the **T/B** button on the Aux Send Masters will allow Talkback to be routed to the Aux Send Master for headphone send purposes.



15.5 Mixing with the 1608-II

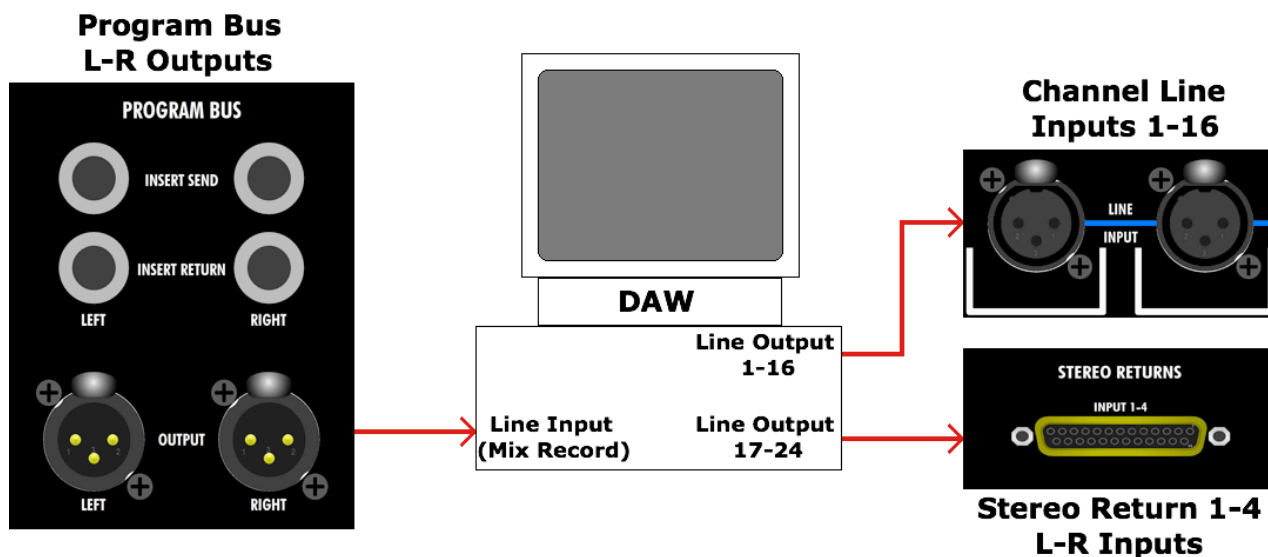
This setup uses the 1608-II as a return path and mixer from a multitrack recorder, DAW, stage, or other sources. It can be used while tracking, overdubbing, and mixing. If used during tracking or overdubbing, the input to the recorder or DAW might be fed by unused 1608-II channels or an audio path that's external to the console.

1. Connect the returns (outputs) from the recorder, DAW, or other sources to the channel Line Inputs as desired. 1608-II channels will be the primary inputs for multitrack returns.
 - If a DAW is used, tracks could be mixed to stems as needed before feeding the DAW outputs.
 - Additional mix inputs can be created using:
 - Stereo Returns 1-4 (see below)
 - Summing Bus Master External Inputs 1-8 (see below)
2. Select Line Input on the channels connected to multitrack returns.
 - Line Input is the default channel input, so no buttons need to be engaged
3. Engage the **PGM** buttons to assign the channels, Stereo Returns, and Summing Bus Masters to the stereo Program Bus (Left & Right).
 - The Summing Buses and/or Auxiliary sends can be used to create the additional mix outputs needed for multichannel surround mixing (LCRS, 5.1, 5.1EX, 7.1)
4. Use the onboard channel high-pass filters and EQ as needed.
5. Additional signal processors (such as a compressor) may be patched into various places in the channel and Stereo Return audio paths via the Insert and other connections on the rear panel.
6. Use the Stereo Return 500 Series processors as needed (if installed).

7. The contribution to the mix will be controlled by the large channel faders, mutes, and pan-pots, Stereo Return faders & mutes, and Summing Bus Masters.
8. The channel Auxiliary Sends and Auxiliary Send Masters can be used for:
 - Auxiliary Sends to feed effects units
 - Pre-fader cue/foldback sends (for tracking, overdubbing, broadcasting, live events)
 - Sub-group sends
 - Additional output paths for multichannel mixing (LCRS, 5.1, 5.1EX, 7.1)
9. While mixing, Summing Buses can also be used for:
 - Additional post-fader mono auxiliary sends
 - Audio sub-groups sends
 - Additional mix outputs
 - Additional output paths for multichannel mixing (LCRS, 5.1, 5.1EX, 7.1)
10. While mixing, Summing Bus Masters can be used as:
 - Additional post-fader mono auxiliary send masters
 - Audio sub-groups masters
 - Additional mix inputs/output masters
 - Output masters for multichannel mixing (LCRS, 5.1, 5.1EX, 7.1)
11. While mixing, Aux Send Masters can be used for:
 - Auxiliary Bus Masters for feeds to effects units and cue/foldback systems
 - Additional mix inputs
 - Sub-group masters
 - Additional output paths for multichannel mixing (LCRS, 5.1, 5.1EX, 7.1)
12. While mixing, Stereo Returns can be used for:
 - Stereo Returns for effects units and other devices
 - Additional mix inputs
 - Input channels for tracking and overdubbing
 - Sub-group mix returns
13. While mixing, unused channels can be used as:
 - Additional mix inputs
 - Input channels for tracking and overdubbing
 - Returns for effects units, stems, and other sources
 - Sub-group returns (patching required)
14. The Program Bus Inserts can be used for additional processing of the Left & Right mix (such as equalization and/or compression).
15. The contribution to Left & Right Program outputs will be controlled by the channel Left & Right Program Output Masters (PGM L and R) and the Stereo Master Fader.
16. Connect the Left & Right Program outputs (and other outputs if multichannel mixing) to the mix recorder inputs.
17. The stereo mix could be routed back to the console via channels, Stereo Returns, an external control room monitor input, or even the Program Bus Insert Return for further processing, routing, and/or monitoring.

15.5.1 1608-II Stereo Mixing Scenarios

The diagram below shows the connections between a Digital Audio Workstation (DAW) with 24 line outputs and a 1608-II for stereo or surround mixing. The first 16 DAW outputs are fed to the Program Bus via the 1608-II Line Inputs and channel audio paths. DAW outputs 17-24 are fed to the Program Bus via Stereo Return Inputs 1-4. Eight (8) additional mix inputs are available using the Summing Bus Masters 1-8 (not shown below).



The Line Input is selected by default on all channels. (**MIC** should not be engaged.)

For stereo mixing assign all channels, Stereo Returns, and any Summing Bus Master with audio contributions to the mix to the Program Bus (**PGM**).

16.0 2448 Application Guide

The API 2448 is a highly versatile audio production console and is at home with a wide variety of applications including:

- Multitrack Recording
- Overdubbing
- Mixing
- Broadcasting
- Audio Post Production
- Live Sound

API realizes the owners of 2448 consoles are professional users, so this section of the manual is designed to provide quick and easy setups for basic applications.

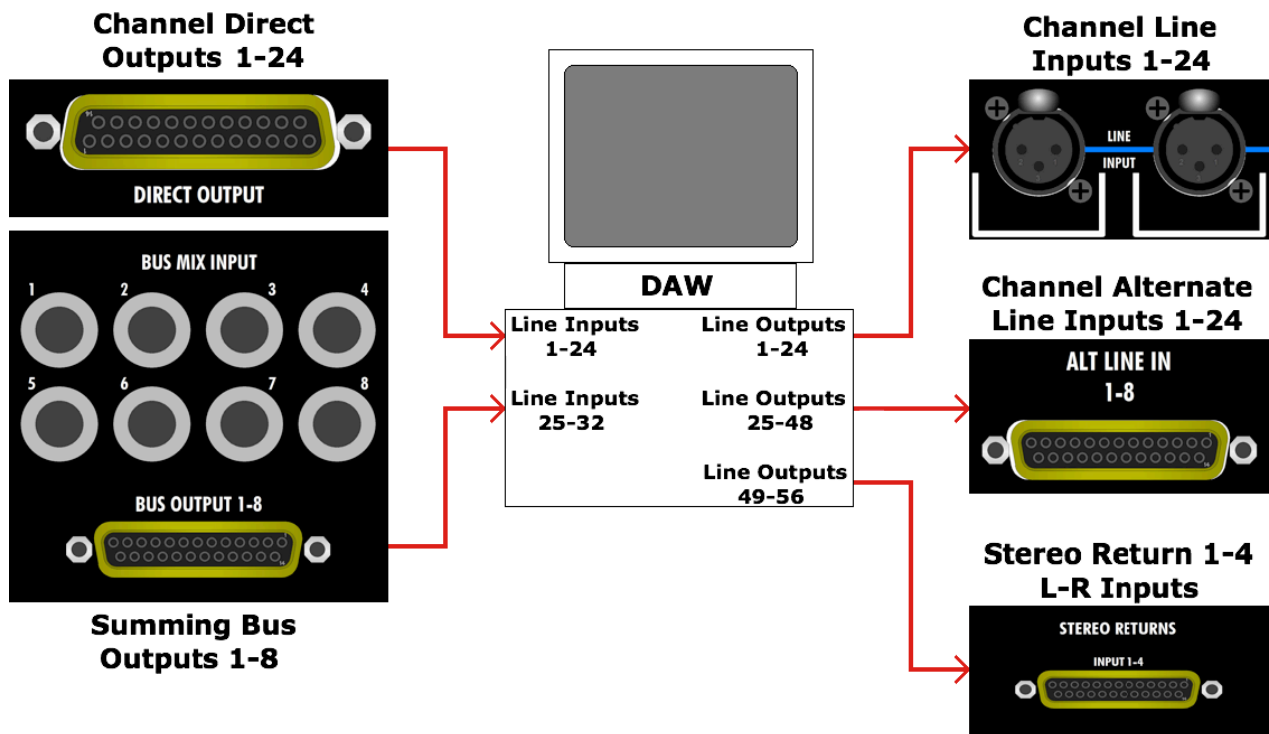
There are multiple ways to interface the 2448 with the equipment in your studio. This allows the user to setup the console and studio to best accommodate the audio production workflows most often used in your facility. Keeping in mind that the installation and interfacing in every facility is unique, a few basic scenarios for multitrack recording and mixing are provided in the following sections of this chapter.

NOTE: These setups are intended to be a very basic "Getting Started" guide and should by no means considered to be comprehensive.

NOTE: A DAW is used as the multitrack recorder in the following examples, but any multitrack recorder or series of recording devices can substitute for the DAW.

16.1 Basic 2448 Multitrack Connections

The diagram below shows the common basic interfacing between a 2448 and a DAW with a 56-channel audio interface for both recording and mixing without changing connections on the rear panel.



16.2 2448 Multitrack Recording & Mixing Workflow

The 2448 is a “dual-channel” or “in-line” console. Each channel strip provides two independent, discrete audio paths for multitrack recording and mixing. In a typical recording workflow, the Small Fader path routes microphones to a multitrack recorder and the Large Fader path route the multitrack returns to the Program Bus for mixing and monitoring. After recording, both audio paths can be routed to the Program Bus to provide additional inputs during mix-down.

For those familiar with other in-line recording consoles, one fader path functions as an “mic” or “channel” path and the other fader path functions as a “monitor” or “mix” path. The fader used for each function depends on the selected signal functions. The operational controls allow for both paths to be used for either function.

Each path can provide a different function during the various types of recording sessions. The signal routing of input and output of each path is handled by the 648C Channel module.

Multitrack Recording and Overdubs: In a typical multitrack recording session, the channel strips function as follows:

- **Record Path (channel path, input path, mic path):** One fader path carries the signals from the microphone preamp, DI, or other input source to the multitrack recorder.
 - Routed via Direct Outputs or the 8 Summing Buses
 - Signal processing is often recorded to the multitrack so filters, EQ, and inserts are assigned to the record path as needed
 - The fader used for this function (Small or Large) is determined by the user.
- **Monitor Path (mix path, return path):** The other fader path is used to mix signals from the multitrack recorder to the stereo Program Buses for monitoring.
 - The fader used for this function (Small or Large) is determined by the user
 - Alternately a monitor mix could be created in the DAW and returned to the Monitor section of the console

Stereo Mixing: In a typical mixing session, the channel strip functions as follows:

- The Large Fader path is the main mix path from the multitrack to the Program Bus
- The Small Fader path and four Stereo Returns can also be used to route additional returns from multitrack recorders or other sources such as stems, virtual instruments, and effect units to the mix
- Summing Bus Masters 1-8 have an external input (BUS MIX IN) and can be used to route stems and effects returns to the Program Bus
- In combination, a total of 64 inputs are available while mixing on a 24-channel console
- Signal processing is often applied to channels contributing to the mix, so the channel EQ, inserts, and other processes are assigned to the Large or Small Fader paths as needed while mixing
- The channel fader paths and Stereo Returns contributing to the mix are routed to the stereo Program Bus
- The optional 529C Stereo Bus Compressor and/or stereo insert can be applied to the stereo Program Bus

Default 2448 Signal Flow: With no routing buttons engaged, the default channel signal flow is as follows:

Small Fader path:

- Input: Output of the 648C Preamp (assignable ALT LINE IN via **ALT LINE** button or LINE IN via **FLIP**)
- Signal Processing: (assignable EQ), Insert, Polarity Inverter, & High-pass Filter
- Output: None (assignable Direct Output, Summing Buses, & Program Bus)
 - **PAN**-pot to Program Bus by default
 - **PAN**-pot assignable to Summing Buses

Large Fader path:

- Input: LINE INPUT (assignable Preamp output or ALT LINE IN via **FLIP**)
- Signal Processing: EQ, Insert, Polarity Inverter, & High-pass Filter
- Output: Direct Out (assignable Summing Buses & Program Bus)

This default channel signal flow can be altered by changing the positions of the channel routing buttons: **ALT LINE**, **FLIP**, **EQ SM**, **DIR SM**, and **BUS**.



ALT LINE: Switches the Small Fader path input source to the Alternate Line Input (ALT LINE IN) when engaged.

- Replaces the Preamp output with the Alt Line In as the Small Fader path source
- Illuminates when engaged



FLIP: Swaps the Large and Small fader path input sources when engaged.

- Large Fader source: Preamp output (or Alt Line Input if selected)
- Small Fader source: Line Input
- Illuminates when engaged



EQ SM (Equalizer Small): Moves the 500 Series EQ to the Small Fader path.

- Illuminates when engaged



DIR SM (Direct Small): Routes the Small Fader to the Direct Output.

- Disengages the Large Fader path from the Direct Output
- Illuminates when engaged



BUS: Routes the Small Fader to the Summing Buses.

- Disengages the Large Fader path from the Summing Buses
- Illuminates when engaged

While either configuration is appropriate, most engineers will choose the Small Fader path as the "Record Path" to route microphones and other sources to the multitrack recorder and the Large Fader path as the "Mix Path" to monitor the multitrack return via the Program Bus. Using this method, the console will be in a basic mixing configuration when tracking is completed. Many engineers also prefer to have the multitrack sends on the small faders and use the large faders to mix the multitrack returns.

Small Fader to Multitrack

To use the Small Fader path as the "Record Path," an output to the multitrack recorder must be assigned. The Direct Outputs provide the most direct audio output path and are typically normalled to the multitrack recorder inputs, so the Direct Output is often used when recording single source to a single track. Engaging the **DIR SM** button will route the Small Fader path to the Direct Output post the **MUTE** button. The signal processing desired to be recorded should be applied to the Small Fader path.

If two or more sources are to be summed together before being sent to the multitrack recorder, the Small Fader path must be routed to one or more of the eight Summing Buses. The Summing Buses are fed from the Large Fader path by default, so engage the **BUS** button to reroute the Small Fader to feed the Summing Buses, followed by the desired bus assignment(s). If Odd-Even stereo panning is to be employed to a pair of Summing Buses, the **SM PAN** button must be engaged.

In this configuration, the Large Fader path will be used to mix the returns from the multitrack recorder and must be assigned to the stereo Program Bus for monitoring. Assign the Large Fader path to the stereo Program Bus by engaging **PGM LG**.

Large Fader to Multitrack

If it is preferable to use the Large Fader path as the “Record Path” to route sources to the multitrack recorder, engage the **FLIP** button to route the output of the Preamp to the Large Fader path input. The Direct Output and Summing Bus assignments are fed from the Large Fader by default, so only the desired multitrack bus/pan-pot assignments need to be made. The Large Fader path will feed the Direct Output post the **MUTE** button. The signal processing desired to be recorded should be applied to the Large Fader path.

If two or more sources are to be summed together before being sent to the multitrack recorder, the Large Fader path must be assigned to one or more of the eight Summing Buses. The Summing Buses are fed from the Large Fader path by default, so only the desired bus assignment(s) need to be made. If Odd-Even stereo panning is to be employed to a pair of Summing Buses, the **PAN LG** button must be engaged.

In this configuration, the Small Fader path will be used to mix the returns from the multitrack recorder. The **FLIP** button routed the LINE INPUTS to the Small Fader path, so assign the Small Fader to the stereo Program Bus for monitoring. Assign the Small Fader path to the stereo Program Bus by engaging **SM PGM**.

16.3 Multitrack Recording with the 2448

This setup uses the Small Fader path as an input path to the multitrack and the Large Fader path to route the multitrack returns to the Program Bus for mixing and monitoring:

16.3.1 Console Channel Path

1. Connect mics and Dis to be recorded to the MIC PREAMP INPUT connectors and sources with line outputs to the ALT LINE INPUT connectors as needed.
2. Select the appropriate Small Fader input for the connected audio sources:
 - Microphone: No buttons engaged
 - **ALT LINE**: Small Fader line input
3. Connect the Direct Outputs and/or the Summing Bus Master outputs to the desired recorder or DAW inputs.
 - Channel Direct Outputs:
 - Summing Bus Master outputs:
 - If multiple channels need to be summed before the input to the recorder
 - Connected to an 8-channel interface for versatile routing
 - Engage the pan-pot to enable Odd-Even panning if routing to a pair of Summing Buses.
 - Direct Outputs and Summing Buses are always fed by the channel Fader
 - Make the necessary Summing Bus assignments if needed
 - Engage the pan-pot to apply Odd-Even panning to pairs of Summing Buses if needed
 - Do not assign channels feeding the multitrack recorder to the Program Bus
4. Engage the **DIR SM** to route the Small Fader path to the Direct Outputs.
5. Engage **BUS** to route the Small Fader path to the Summing Buses.
6. Set the input level and polarity using the channel Preamp controls, engaging **48V** phantom power and **PAD** as needed.
7. Apply the Small Fader path high-pass filter.

8. Engage the **EQ SM** button to route the Small Fader audio through the EQ if needed. (EQ **IN** button must engaged.)
9. Additional signal processors (such as a compressor) may be patched into the Small Fader path via the Small Fader Insert send and return on the rear panel.
10. The multitrack feed will be controlled by the channel fader and mute.
11. The channel Fader is the last adjustable gain stage before the Direct Output.
12. If the Summing Buses are used, the Summing Bus Masters (BUS 1-8) will provide a final output control before the recorder or DAW inputs.

16.3.2 Traditional Console Monitor Path

1. Connect the returns (outputs) from the DAW to the channel Line Inputs. The Large Fader path will be the primary input for multitrack returns.
 - Tracks could be mixed to stems in the DAW as needed before feeding the DAW outputs.
 - Additional mix inputs can be created using:
 - Stereo Returns 1-4 (see below)
 - Summing Bus Master External Inputs 1-8 (see below)
2. The Line Input is the default for the Large Fader path.
3. Engage the **PGM** buttons to assign the Large Fader paths, Stereo Returns, and Summing Bus Masters to the stereo Program Bus (Left & Right).
 - The Summing Buses and/or Auxiliary Sends can be used to create the additional mix outputs needed for multichannel surround mixing (LCRS, 5.1, 5.1EX, 7.1)
4. Use the Large fader high-pass filters and EQ not assigned to the Small Fader path as needed. Caution should be used when processing multitrack returns.
5. Additional signal processors (such as a compressor) may be patched into various places in the channel and Stereo Return audio paths via the Insert and other connections on the rear panel.
6. The contribution to the mix will be controlled by the large channel faders, mutes, and pan-pots, Stereo Return faders & mutes, and Summing Bus Masters.
7. The channel Auxiliary Sends and Auxiliary Send Masters can be used for:
 - Auxiliary Sends to feed effects units
 - Pre-fader cue/foldback sends (for tracking, overdubbing, broadcasting, live events)
 - Sub-group sends
 - Additional output paths for multichannel mixing (LCRS, 5.1, 5.1EX, 7.1)

16.3.3 DAW In the Box Mix Monitor Path

While the 2448 is capable of creating a full mix of the multitrack returns, some engineers prefer to create the monitor mix "In the box."

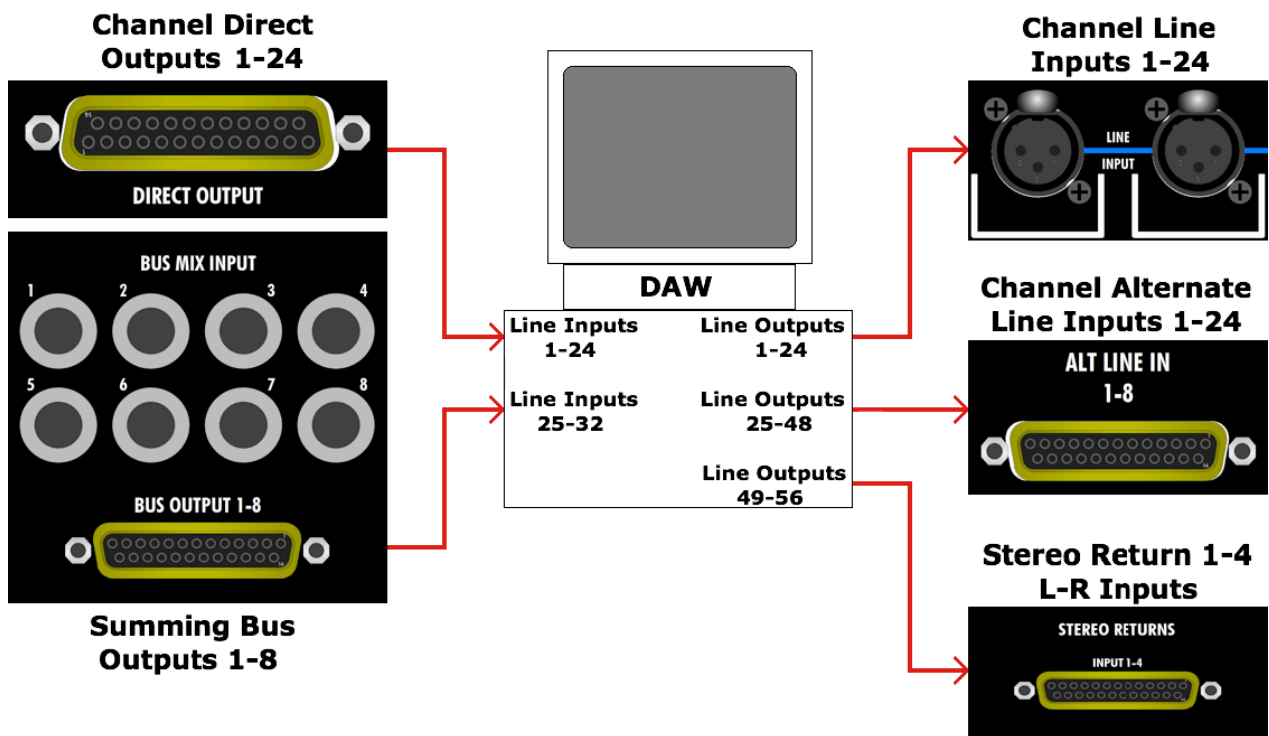
1. Create a stereo mix of the multitrack returns in the DAW and return that mix to the console for monitoring via:
 - A pair of unused channels that are assigned to the Program Bus
 - A Stereo Return that is assigned to the Program Bus
 - A pair of Summing Bus Masters that are assigned to the Program Bus
 - The Program Bus Insert Returns
 - An external control room monitor input (6-TRACK PLAYBACK 1-3)

2. Alternately, unused channels and Stereo Returns can be used to create a mix of the multitrack/DAW returns. Tracks can be sub-grouped as needed before feeding the DAW outputs.
3. Sub-mixes for headphones and effects sends can be created "in the box" using the DAW auxiliary buses and outputs.

16.3.4 2448 Multitrack Recording Scenario #1

The diagram below shows the connections between a 2448 and a Digital Audio Workstation (DAW) with 32 line inputs and 56 line outputs. The channel Direct Outputs feed the DAW inputs 1-24. DAW inputs 25-32 are fed from the 2448 Summing Bus Master outputs 1-8, providing versatile assignment and summing possibilities, including Odd-Even stereo panning to pairs of Summing Buses.

This scenario requires the engineer to create a mix of the multitrack returns to Program Bus using the Large Fader paths for monitoring while recording. The multitrack returns from the DAW are routed channel Line Inputs. The Program Bus can be routed to the 2448 control room monitor outputs by selecting **PGM** and enabling monitor outputs on the 845C module, allowing the multitrack mix to be monitored via the control room loud speakers and console headphone jack.

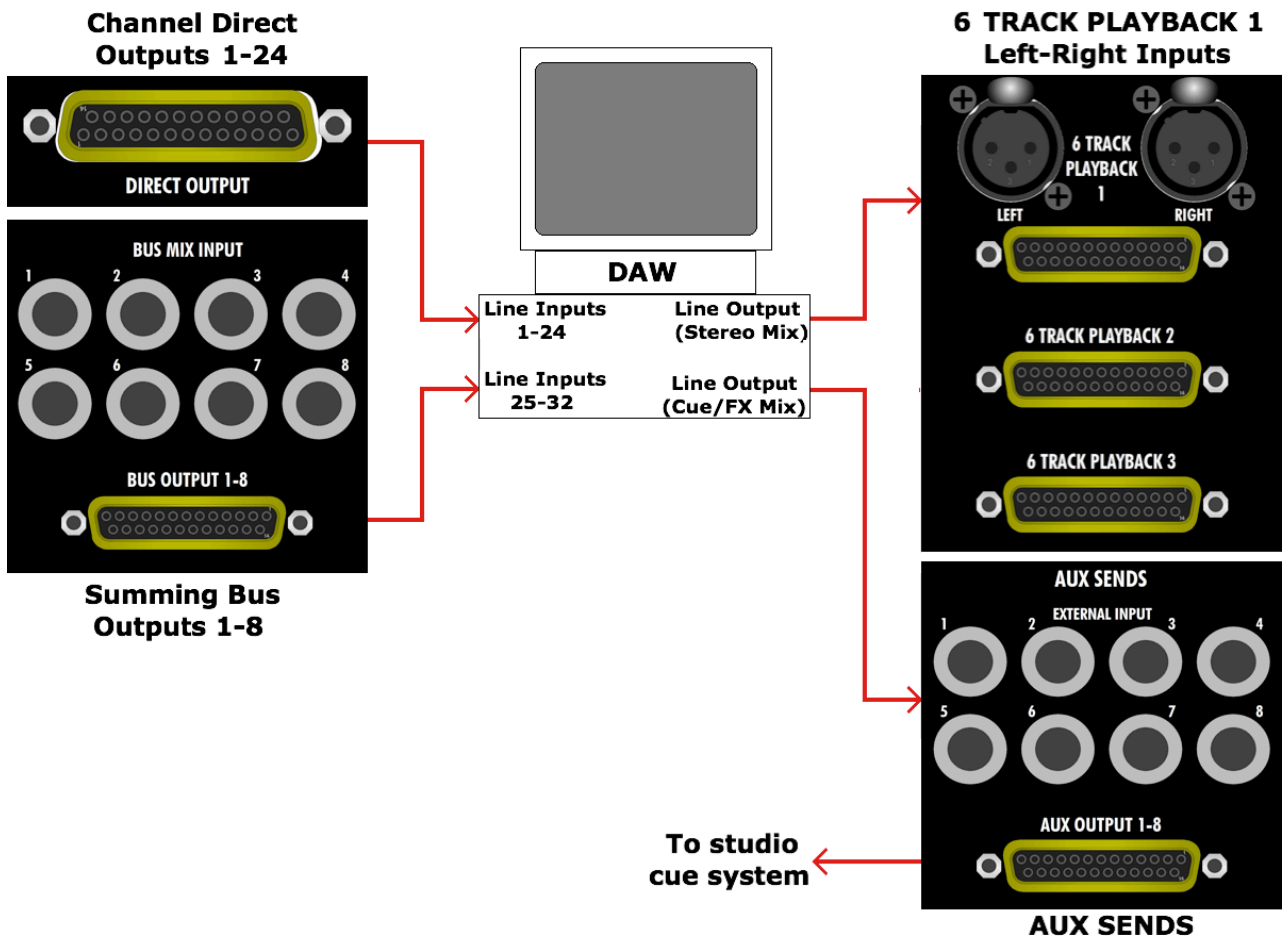


16.3.5 2448 Multitrack Recording Scenario #2 (In-the-box Monitoring)

The diagram below shows the connections between a 2448 and a Digital Audio Workstation (DAW) with 32 line inputs and 4+ line outputs. The channel Direct Outputs feed the DAW inputs 1-24. DAW inputs 25-32 are fed from the 2448 Summing Bus Master outputs 1-8, providing versatile assignment and summing possibilities, including Odd-Even stereo panning to pairs of Summing Buses.

This scenario requires the engineer to sum the recorded channels to a stereo mix within the DAW and output this mix for monitoring while recording. The stereo mix from the DAW is routed directly to the 845C Control Room Monitor module for monitoring, in this case via the **6-TRACK PLAYBACK 1** Left & Right inputs. The signal from these connectors can be routed to the 2448 control room monitor outputs by selecting **6-TRACK 1** and enabling monitor outputs on the 845C module, allowing the stereo DAW mix to be monitored via the control room loud speakers and console headphone jack.

Engaging the **EXT IN** button on the Aux Send Masters will route the sub-mixes from the DAW to the Aux Send Masters. Engaging the **T/B** button on the Aux Send Masters will allow Talkback to be routed to the Aux Send Master for headphone send purposes.



16.4 Mixing with the 2448

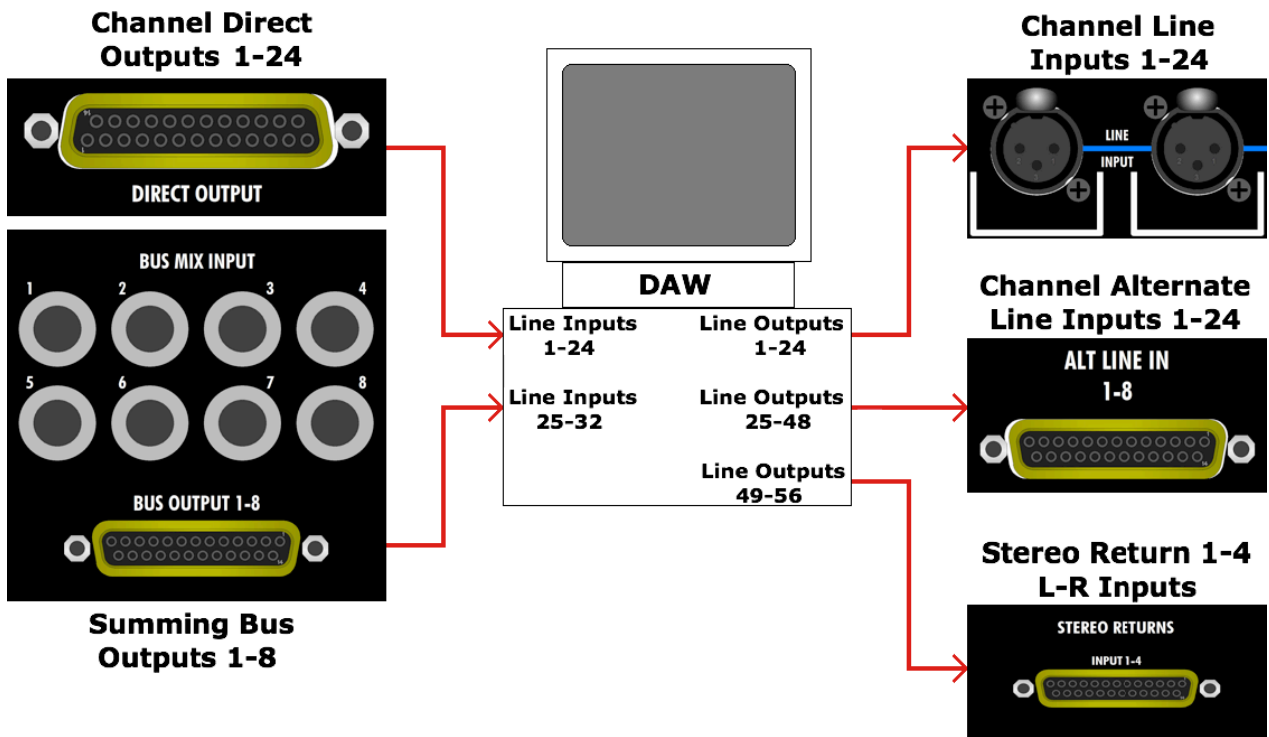
This setup uses the 2448 as a return path and mixer from a multitrack recorder, DAW, stage, or other sources.

1. Connect the returns (outputs) from the DAW to the channel Line Inputs. The Large Fader path will be the primary input for multitrack returns.
 - Tracks could be mixed to stems in the DAW as needed before feeding the DAW outputs.
 - Additional mix inputs can be created using:
 - Small Fader paths 1-24
 - Stereo Returns 1-4 (see below)
 - Summing Bus Master External Inputs 1-8 (see below)
2. The Line Input is the default for the Large Fader path.
3. If the Small Fader paths are to be used to return source to the mix, the sources should be connected to the ALT LINE Inputs and the **ALT LINE** should be selected as the Small Fader input.
4. Engage the **PGM** buttons to assign the Large & Small Fader paths, Stereo Returns, and Summing Bus Masters to the stereo Program Bus (Left & Right).
 - The Summing Buses and/or Auxiliary Sends can be used to create the additional mix outputs needed for multichannel surround mixing (LCRS, 5.1, 5.1EX, 7.1)
5. Use the channel high-pass filters and EQ as needed. The EQ will reside in the Large Fader path by default, but can be assigned to the Small Fader path by engaging the **EQ SM** button.
6. Additional signal processors (such as a compressor) may be patched into various places in the channel via the Large and Small Fader path Insert and other connections on the rear panel.
7. Additional signal processors may be patched into the Stereo Returns via the installed 500 slot modules and Insert send/return connections on the rear panel.
8. The contribution to the mix will be controlled by the Large Fader path faders, mutes, and pan-pots, Small fader path rotary **LEVEL** control and mutes, Stereo Return faders & mutes, and Summing Bus Masters.
9. The channel Auxiliary Sends and Auxiliary Send Masters can be used for:
 - Auxiliary Sends to feed effects units
 - Pre-fader cue/foldback sends (for tracking, overdubbing, broadcasting, live events)
 - Sub-group sends
 - Additional output paths for multichannel mixing (LCRS, 5.1, 5.1EX, 7.1)
10. While mixing, Summing Buses can also be used for:
 - Additional post-fader mono auxiliary sends
 - Audio sub-groups sends
 - Additional mix outputs
 - Additional output paths for multichannel mixing (LCRS, 5.1, 5.1EX, 7.1)
11. While mixing, Summing Bus Masters can be used as:
 - Additional post-fader mono auxiliary send masters
 - Audio sub-groups masters
 - Additional mix inputs/output masters
 - Output masters for multichannel mixing (LCRS, 5.1, 5.1EX, 7.1)

12. While mixing, Stereo Send modules can be used for:
 - Auxiliary Bus Masters for feeds to effects units and cue/foldback systems
 - Additional mix inputs
 - Sub-group masters
 - Additional output paths for multichannel mixing (LCRS, 5.1, 5.1EX, 7.1)
13. While mixing, Stereo Returns can be used for:
 - Stereo Returns for effects units and other devices
 - Additional mix inputs
 - Input channels for tracking and overdubbing
 - Sub-group mix returns
14. While mixing, unused channels can be used as:
 - Additional mix inputs
 - Input channels for tracking and overdubbing
 - Returns for effects units, stems, and other sources
 - Sub-group returns (patching required)
15. The optional 529C Stereo Bus Compressor will be applied to the stereo Program Bus if the **PGM INS** button is engaged. To use the Program Bus Insert without the 529C compressor, press and hold the **OUT** button to bypass compressor.
16. The Program Bus Inserts can be used for additional processing of the Left & Right mix (such as equalization and/or compression).
17. The contribution to Left & Right Program outputs will be controlled by the channel Left & Right Program Output Masters (PGM L and R) and the Stereo Master Fader.
18. Connect the Left & Right Program outputs (and other outputs if multichannel mixing) to the mix recorder inputs.
19. The stereo mix could be routed back to the console via channels, Stereo Returns, an external control room monitor input, or even the Program Bus Insert Return for further processing, routing, and/or monitoring.

16.4.1 2448 Stereo Mixing Scenarios

The diagram below shows the connections between a Digital Audio Workstation (DAW) with 56 line-outputs and a 2448 for stereo or surround mixing. The first 24 DAW outputs are fed to the Program Bus via the 2448 channel Line Inputs and the Large Fader paths. DAW outputs 25-48 fed to the Program Bus via the channel ALT LINE Inputs and the Small Fader paths. Stereo Return Inputs 1-4 are fed via DAW outputs 29-56.



The Line Input is the default input for the Large Fader path on all channels. (**FLIP** should not be engaged.) Engage **ALT LINE** to select the ALTERNATE LINE INPUT as the source for the Small Fader path.

For stereo mixing assign the Large and Small Fader paths, Stereo Returns, and any Summing Bus Masters with audio contributions to the mix to the Program Bus (**PGM**).

17.0 Surround Applications

17.1 Surround Mixing

For surround mixing, the following Program Bus and Summing Bus 1-4 assignments are suggested to create six mix paths for 5.1 mixing:

- Left = Program Bus Left
- Right = Program Bus Right
- Center = Summing Bus 1
- LFE (Sub) = Summing Bus 2
- Surround Left = Summing Bus 3
- Surround Right = Summing Bus 4

Make Program and Summing Bus assignments as needed to route the channels to the appropriate mix buses. Channels not feeding the Left & Right channels should not be assigned to the Program Bus.

On channels, turn ON Aux Sends 7 and 8 and engage the **TO BUS** button. This will allow Aux Sends 7 and 8 to act as level, mute, and pan controls for contributions to the mix via Summing Buses 1-4 (Center, LFE, Surr L, Surr R). When the **PRE** button is engaged, Aux Sends 7 and 8 are fed pre-fader. This provides independent control when a channel is also assigned to the Program Bus.

17.2 Surround Monitoring

The 845C Monitor Control module and 268C Monitor Output Masters support one set of main 5.1 monitors and two sets of stereo monitors.

The 845C Control Room Monitor Control module allows the selection of the Control Room Monitor source, including three (3) external sources that support 5.1 surround monitoring (6-TRACK PLAYBACK 1-3).

6-TRACK PLAYBACK (1, 2, 3): Routes the signal from the selected 6-track playback source to the Control Room monitor output controls.

- The input from the selected external 6-TRACK PLAYBACK source connector on the rear panel is fed to the Monitor Control section
- The selected 6-TRACK PLAYBACK button illuminates when engaged

The 268C Monitor Output controls provide ON/off switching and calibration for three (3) control room monitor systems. The MAIN system is 5.1 surround capable and provides the following monitor outputs:

- Left
- Right
- Surround Left
- Surround Right
- Center
- LFE

NOTE: The 5.1 surround channel order for the 6-TRACK PLAYBACK is Left, Right, Surround Left, Surround Right, Center, and LFE.

To monitor an external 5.1 surround source, select the desired **6-TRACK PLAYBACK** source (**1**, **2** or **3**) and select the MAIN control room monitor system (default, do not engage the **ALT 1** or **ALT 2** buttons on the 845C module).

18.0 265C Auxiliary Send Applications

The eight (8) Auxiliary Bus Masters (AUX SEND 1-8) are situated in pairs on the 265C modules, above their associated Stereo Returns. The Auxiliary Bus Masters provides control and routing for the eight (8) Auxiliary Bus outputs. The 265C AUX SENDS 1-8 function primarily as Auxiliary Bus Masters for effects sends and headphone feeds, but can function as output masters for any sub-mix.

The 548C and 648C channel modules provides eight fully functional auxiliary sends, four mono (Sends 1-4) and two stereo (Sends 5/6 and 7/8). Accordingly, both consoles are equipped with eight balanced Auxiliary Buses, Aux Masters, and outputs.

- Each mono Auxiliary Send (1-4) has an individual level control and an ON/off switch
- Each stereo Auxiliary Send (5/6 & 7/8) has a stereo level control, a pan-pot, and an ON/off switch
- Sends 7 & 8 can be routed to feed the Summing Buses 1-4 in addition to their Auxiliary Buses
- Auxiliary Sends 1-8 are fed from the Large Fader path by default
- Auxiliary Sends 5-8 can be routed from the Small Fader path

Auxiliary Send Master:

- Turn the Aux Send Master ON
- Set the **LEVEL** to unity gain
- The Aux Send Master is fed by the corresponding Auxiliary Bus
- The Aux Send Master output is fed to the AUX OUTPUT 1-8 connector on the rear panel

Audio Sub-group Master:

- Use channel Aux Sends to feed the channels to be grouped to the audio sub-group
- De-assigning these channels from the Program Bus may be desirable
- Turn the Aux Send Master ON
- Set the Aux Send Master **LEVEL** to unity gain
- The Aux Send Master is fed by the corresponding Auxiliary Bus
- Engage the **AUX IN** button on the corresponding Stereo Returns to route the output of the Aux Send Master to the Stereo Return inputs
- Engage the **PGM** button on the corresponding Stereo Returns to route the output of the Stereo Return to the Program Bus

Multichannel Mix Output Master (5.1 surround):

- Use the Program Bus for the Left & Right channels
- Select four channel Aux Sends for use as Center, Surround Left, Surround Right, and LFE channels
- Using a stereo Aux Send for the Surround Left & Surround Right channels is suggested
- Using a mono aux send for the Center and LFE channels is suggested
- Make sure the **PRE** buttons are not engaged if you want the send to follow the Fader and use the channel fader to adjust the contribution to the assigned 5.1 mix channels
- Engage the **PRE** buttons if independent level control is needed
- Turn the selected channel Aux Sends ON and set the levels to unity gain or as needed
- Turn the selected Aux Send Masters ON
- Set the Aux Send Master levels to unity gain
- The Aux Send Master is fed by the corresponding Auxiliary Bus
- The Surround Left, Surround Right, Center, and LFE mix outputs are fed to the AUX SEND OUT connector
- Use addition Aux Sends if additional mix outputs are needed

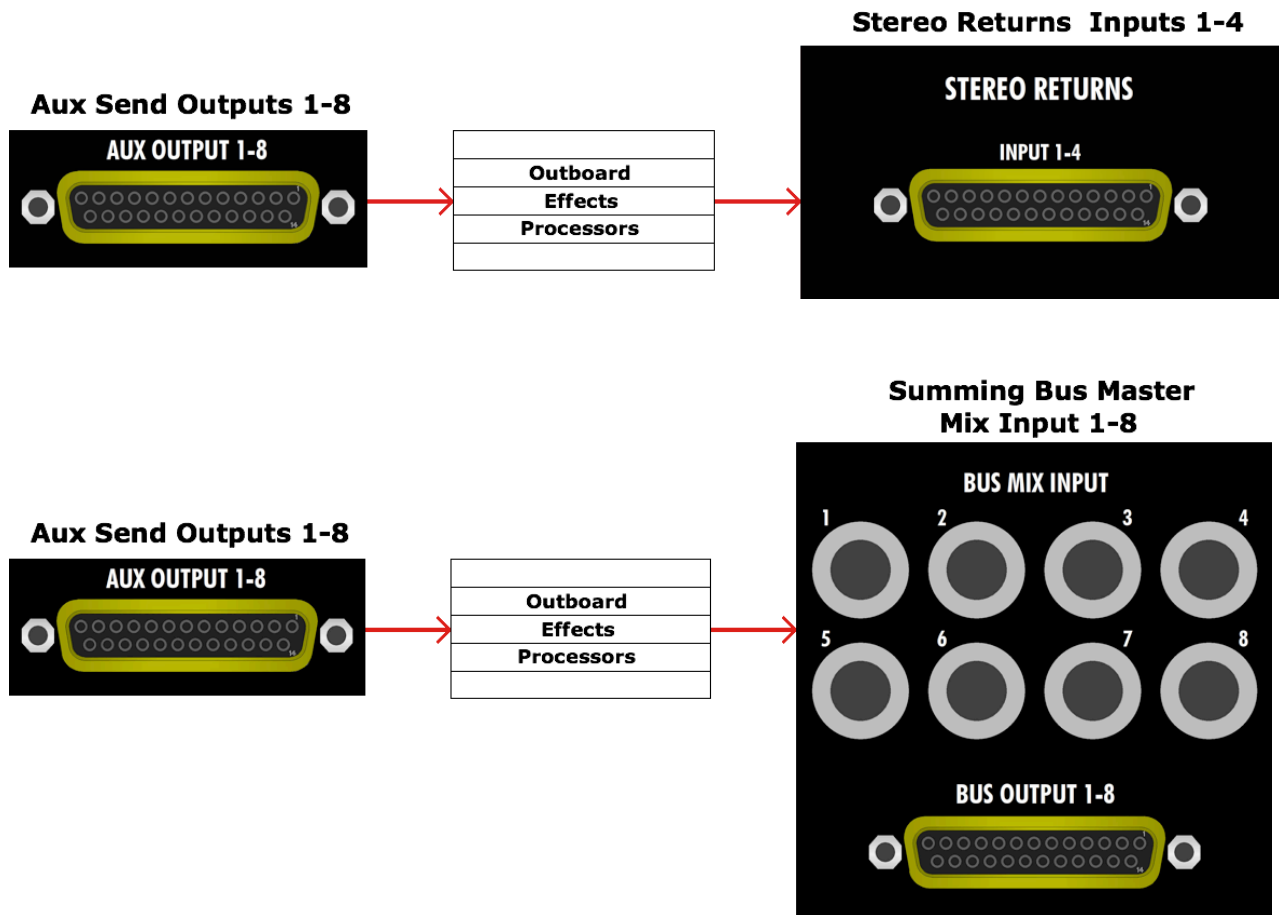
19.0 265C Stereo Returns Mix Applications

The 265C Stereo Returns can be used to return additional channels from the DAW, returns from virtual instruments, returns from parallel processors, returns from outboard effects processors, or any other line-level sources. If the Stereo Return 500 slots are fitted with VPR Alliance certified modules, the audio returning to the Stereo Returns can be further processed before contributing to the mix. Engage the **PGM** button to assign the Stereo Return to the stereo Program bus.

Stereo Returns can also be used as “audio sub-group masters” to return audio sub-groups created with Aux Sends to the Program Bus. This is achieved by engaging the **AUX IN** button on the Stereo Return associated with the Aux Send Masters used to create the audio sub-group. Engaging the **AUX IN** button will replace the Stereo Return inputs with the output of the associated Aux Send Master.

20.0 Effects Send and Return Applications

The diagrams below show the connections between a 1608-II or 2448 and outboard effects processors. In both diagrams the Aux Send outputs are connected to the inputs of the outboard effects devices. The outputs of the outboard effects processors can be connected to the Stereo Return 1-4 Inputs and/or the Summing Bus Master BUS MIX INPUTS.



Refer to chapters 18 and 19 for mix applications.

21.0 168C Summing Bus Master Applications

The 168C Summing Bus Masters have three functions when mixing:

- Extra Aux/Effects Sends
 - Channels and Stereo returns can be assigned to Summing Buses in addition to the Program Bus
 - Assignment to the Summing Buses serve as post-fader aux sends
 - Connect the BUS OUTPUT connectors to the inputs of the effects devices
 - Connect the effects devices outputs to unused channels, Stereo Returns, or unused Summing Bus Masters (MIX IN connectors)
- Return of audio sub-groups to the Program Bus
 - Channels and Stereo returns can be assigned to Summing Buses for sub-grouping instead of being assigned to the Program Bus.
 - The associated Summing Bus Masters will serve as “sub-group masters” and be assigned to the Left & Right Program Buses individually. If a pair Summing Bus Masters is used as stereo group masters, the Odd Summing Bus Master should be assigned to the Left Program Bus and the Even Summing Bus Master should be assigned to the Right Program Bus.
 - The Summing Bus Master level will control the contribution to the Program Bus.
- Return of additional channels from the DAW, returns from virtual instruments, returns from parallel processors, returns from outboard effects processors, or any other line-level sources (such as compressor outputs for parallel processing). via the Summing Bus Master MIX INs.
 - If a pair Summing Bus Masters is used to return a stereo stem or other Left-Right input, the Odd Summing Bus Master should be assigned to the Left Program Bus and the Even Summing Bus Master should be assigned to the Right Program Bus.

Summing Bus Master:

- Turn the Summing Bus Master ON
- Set the level to unity gain
- The Summing Bus Master is fed by the corresponding Summing Bus
- The Summing Bus Master output is fed to the BUS OUTPUT 1-8 connector on the rear panel

Audio Sub-group Master:

- Use channel Bus assignments to feed the channels to be grouped to the audio sub-group
- De-assigning these channels from the Program Bus may be desirable
- Turn the Summing Bus Master ON
- Set the Summing Bus Master level to unity gain
- The Summing Bus Master is fed by the corresponding Summing Bus
- Engage the **PGM LT** & **PGM RT** buttons on the corresponding Summing Bus Masters to route the output of the Bus Master to the Program Bus
- Set the Summing Bus Master **LEVEL** as desired

Multichannel Mix Output Master (5.1 surround):

- Use the Program Bus for the Left & Right channels
- Select four Summing Buses for use as Center, Surround Left, Surround Right, and LFE channels
- Use the channel fader or level to adjust the contribution to the assigned 5.1 mix channels
- Turn the selected Summing Bus Masters ON
- Set the Summing Bus Master **LEVEL** to unity gain
- The Summing Bus Master is fed by the corresponding Summing Bus
- The Surround Left, Surround Right, Center, and LFE mix outputs are fed to the BUS OUTPUT connector
- Use additional Summing Bus assignments if additional mix outputs are needed

22.0 Stereo Return 500 Slot Applications

Both consoles are equipped with eight (8) 500 Series module slots. These 500 slots are built to power and interface any certified VPR Alliance 500 Series signal processor modules other than microphone preamps.

The 500 slots are associated with Stereo Return 1-4 in Odd-Even pairs. Odd-Even pairs of 500 slots are internally normalised to an associated Stereo Returns as follows:

<u>500 Series Slot</u>		<u>Stereo Return</u>
1-2	=	1
3-4	=	2
5-6	=	3
7-8	=	4

The features of the 500 Slots are as follows:

- All eight 500 Slots are empty in the standard 1608-II and 2448 configurations
- The input to Odd-Even pairs of 500 slots have their normal fed from STEREO RETURNS INPUT connector
- If the **500 INS** button is engaged, the module in a slot will process the audio before the signal arrives at the Stereo Return input, assuming nothing is patched to the RETURN 500 SLOTS INPUTs
- The modules loaded into the 500 slots can be used independently of the Stereo Returns by patching to/from the RETURN 500 SLOTS INPUTs and OUTPUTs

The modules in the Stereo Return 500 Slots may be used elsewhere by using the RETURN 500 SLOT INPUT and OUTPUT patch points on the rear panel. Inserting a plug into the RETURN 500 SLOT INPUT jack will defeat the signal from the Stereo Return Input connector, but the output of the slot is still sent to the Stereo Return module.

The range of available API 500 Series modules as of this writing include:

- 505 Direct Input
- 525 Compressor
- 527 Compressor
- 529 Stereo Compressor (2 slots)
- 550A 3-Band EQ
- 550b 4-Band EQ
- 560 Graphic EQ
- 565 Filter Bank

Third-party modules that have been approved by API as part of the VPR Alliance can be fitted into the slots. Additional information about approved 500 series modules and the VPR Alliance is available at: http://apiaudio.com/vpr_alliance.html

IMPORTANT NOTE: Installation of any module that's not approved by the API VPR Alliance will void the console warranty!

Some possible applications of the 500 Slots include:

- Extra signal processing for the Stereo Return inputs
- Patchable signal processing for use in the channel Inserts
- Patchable signal processing for use in the Program Bus Inserts
- Patchable signal processing for use anywhere else (internally, externally, etc.)

As indicated by these examples, the 500 Slots can be custom configured to add versatility and maximize performance.

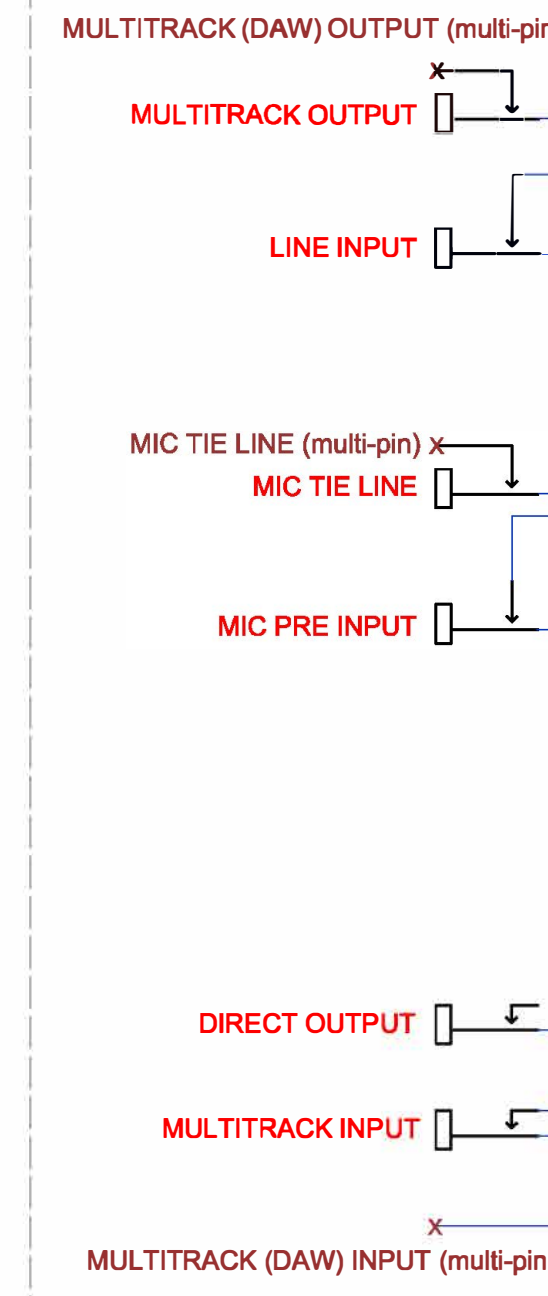
Appendix

- A1 1608-II Block Diagram**
- A2 2448 Block Diagram**
- A3 25-Pin D-Sub Pinouts**
- A4 1608-II 548C Channel Setup Sheet**
- A5 2448 648C Channel Setup Sheet**
- A6 550A EQ Setup Sheet**
- A7 550b EQ Setup Sheet**
- A8 560 EQ Setup Sheet**
- A9 265C Stereo Return & Aux Send Master Setup Sheet**
- A10 Optional 529C Stereo Bus Compressor Setup Sheet**
- A11 API Limited Warranty and Service**

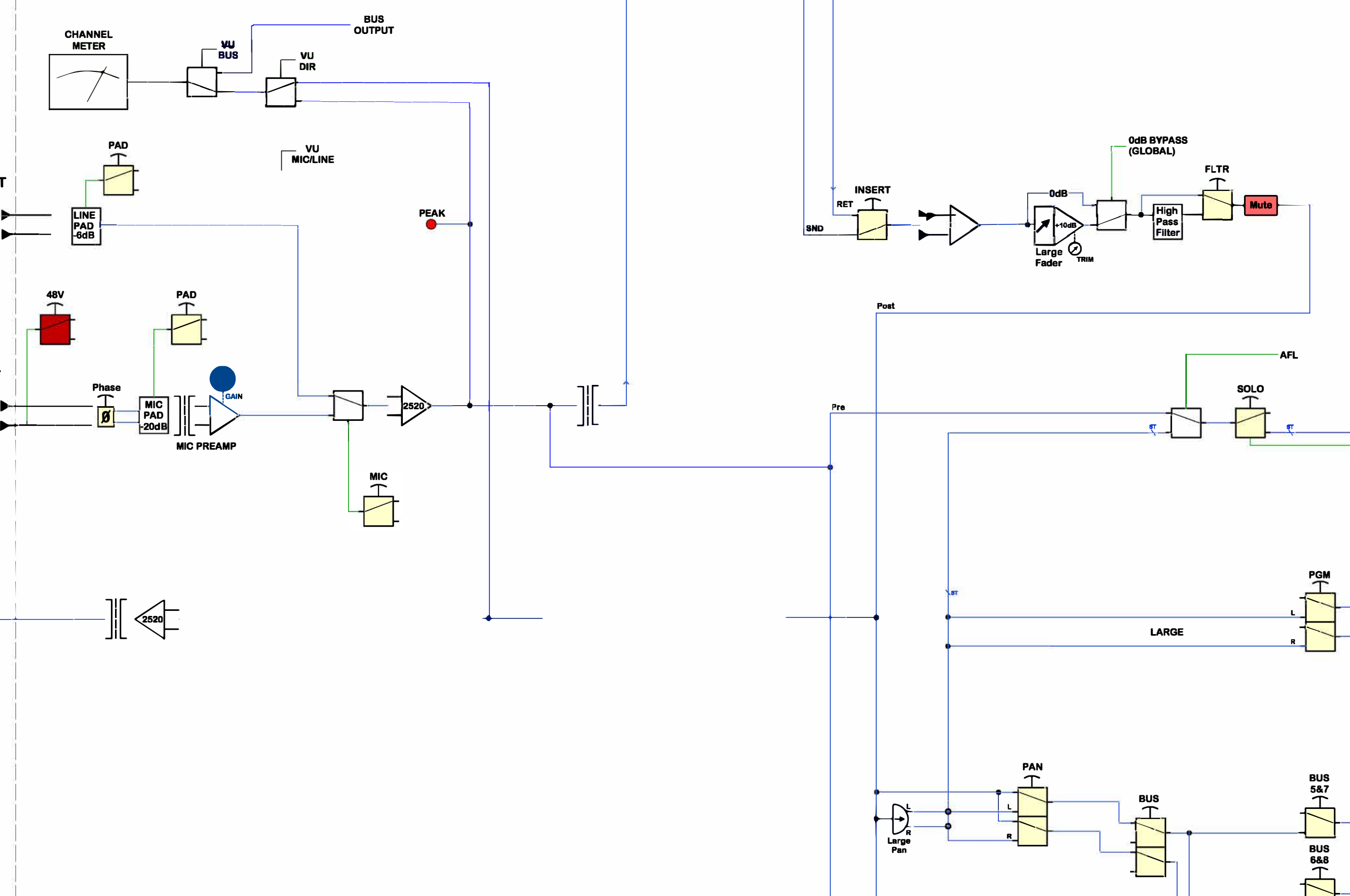


A1 1608-II Block Diagram

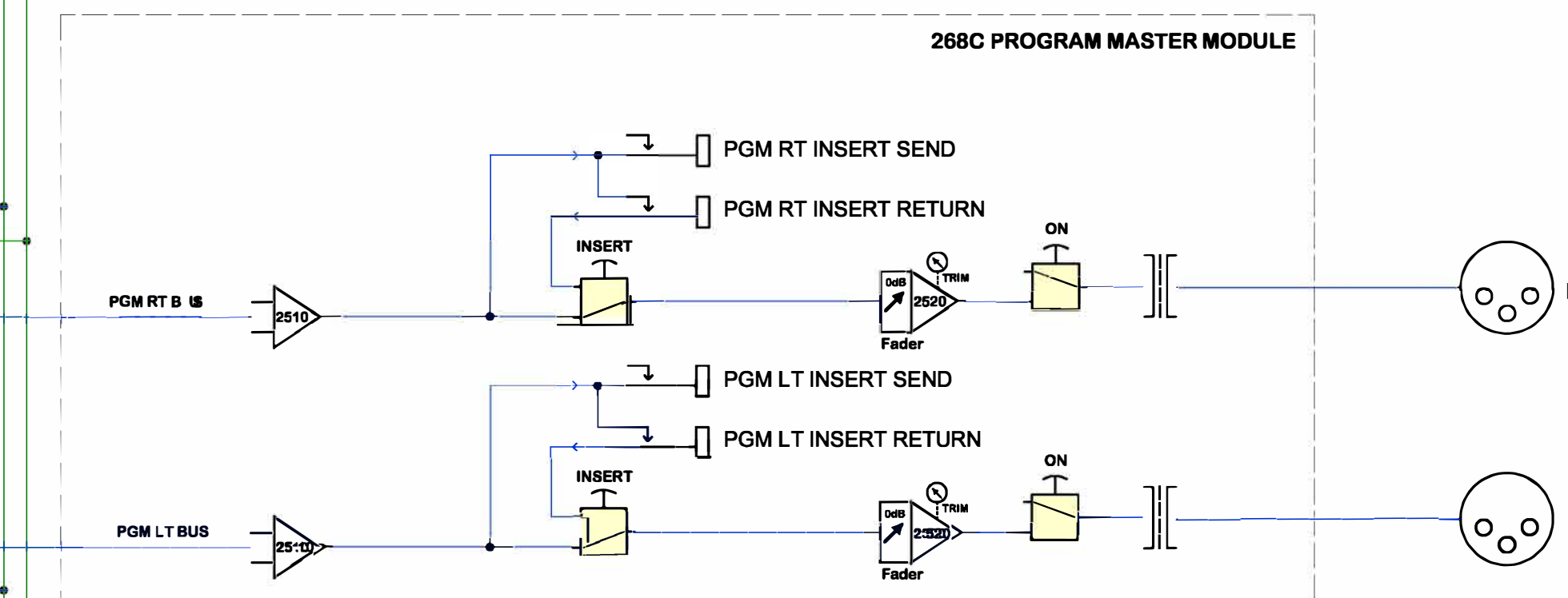
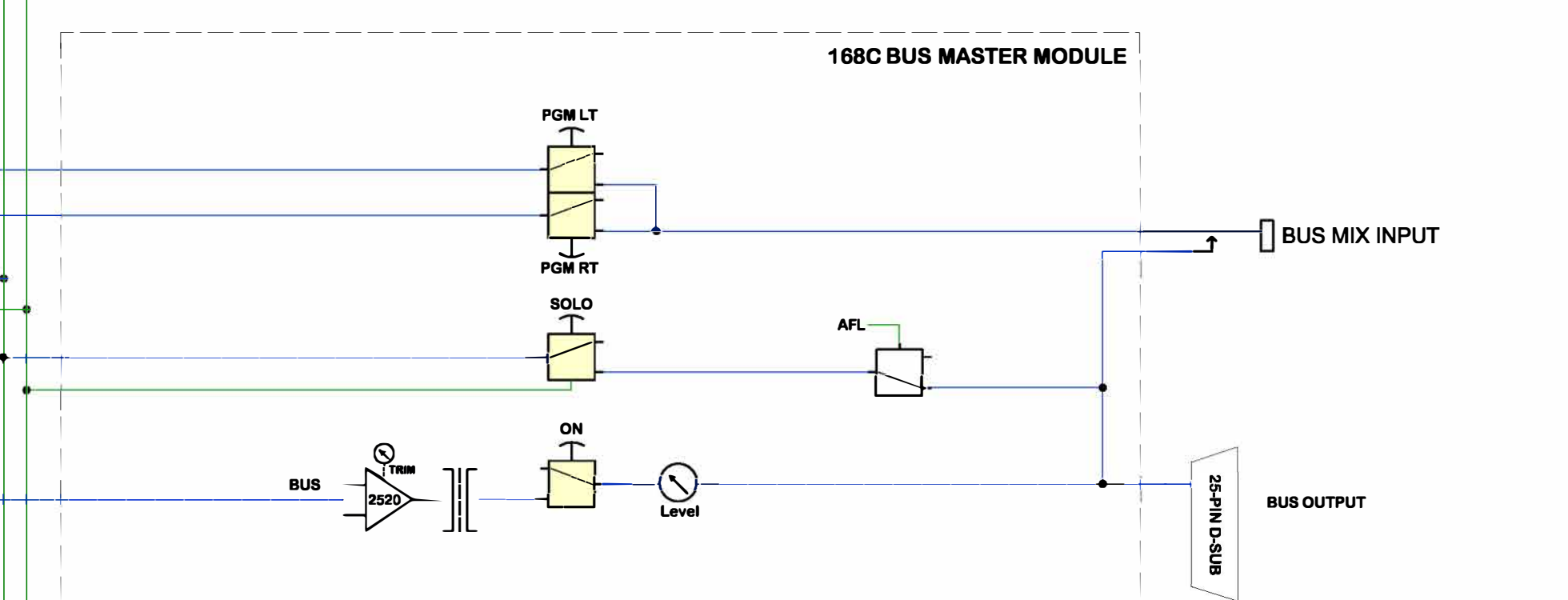
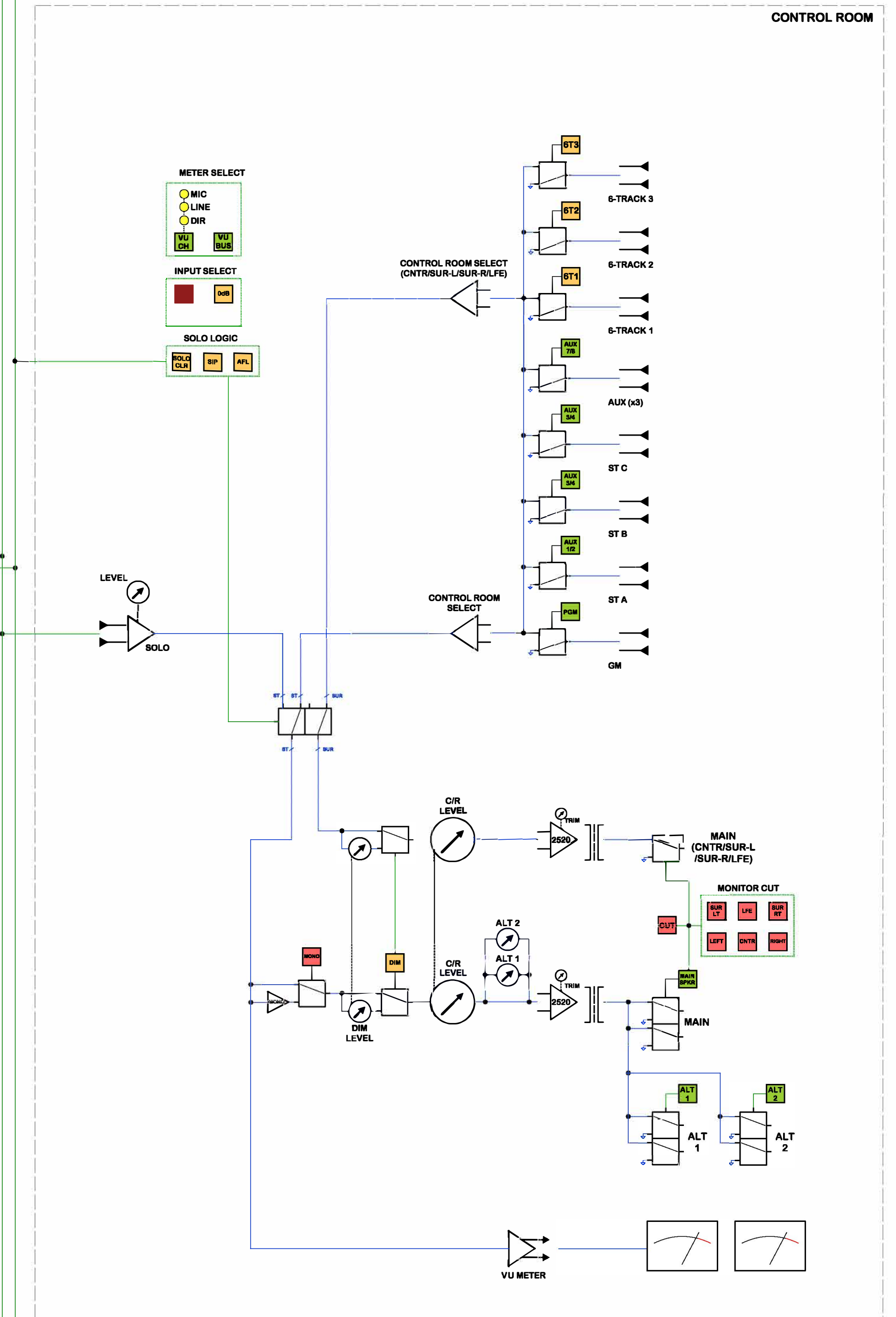
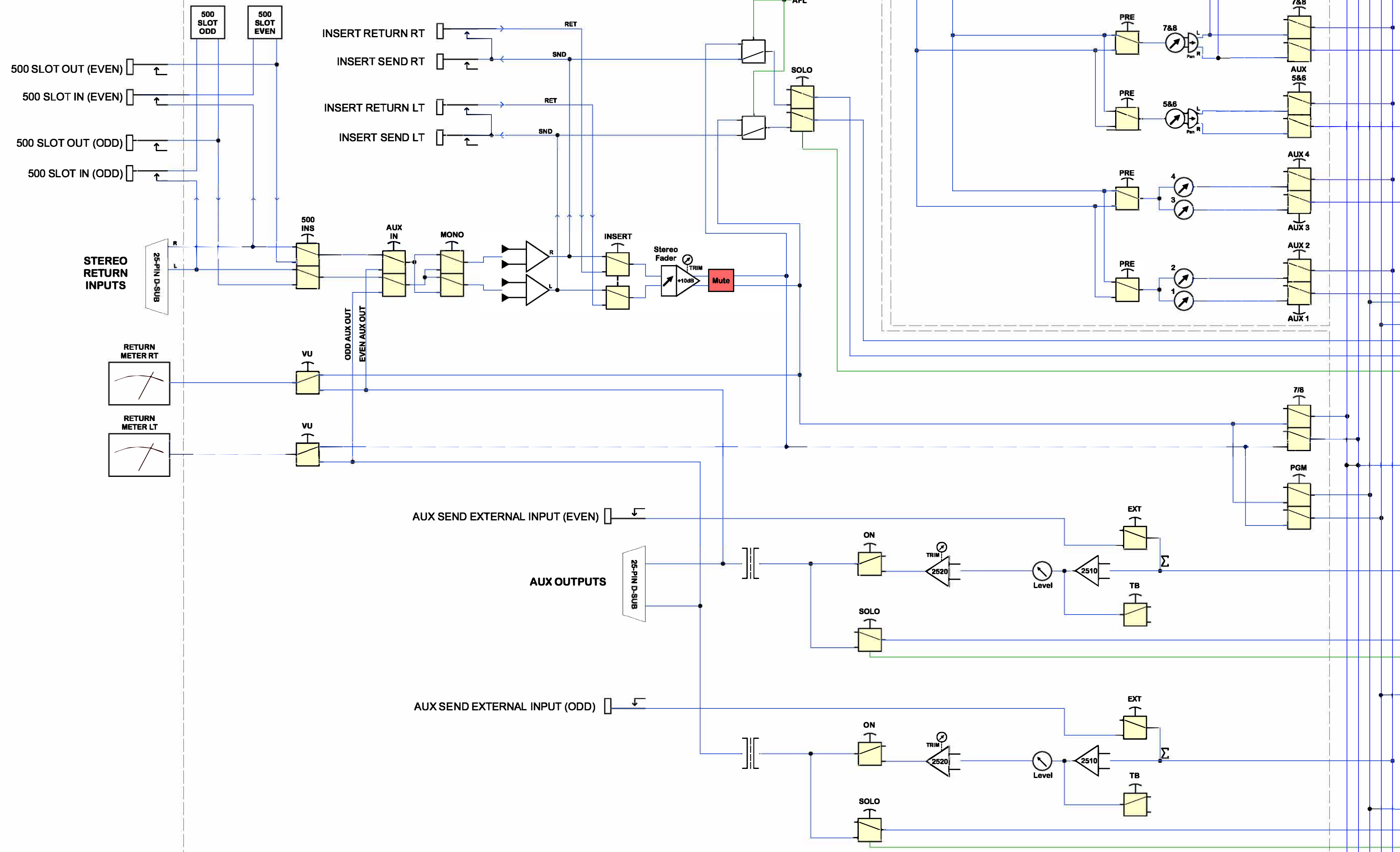
OPTIONAL PATCHBAY CONNECTIONS



548C INPUT MODULE



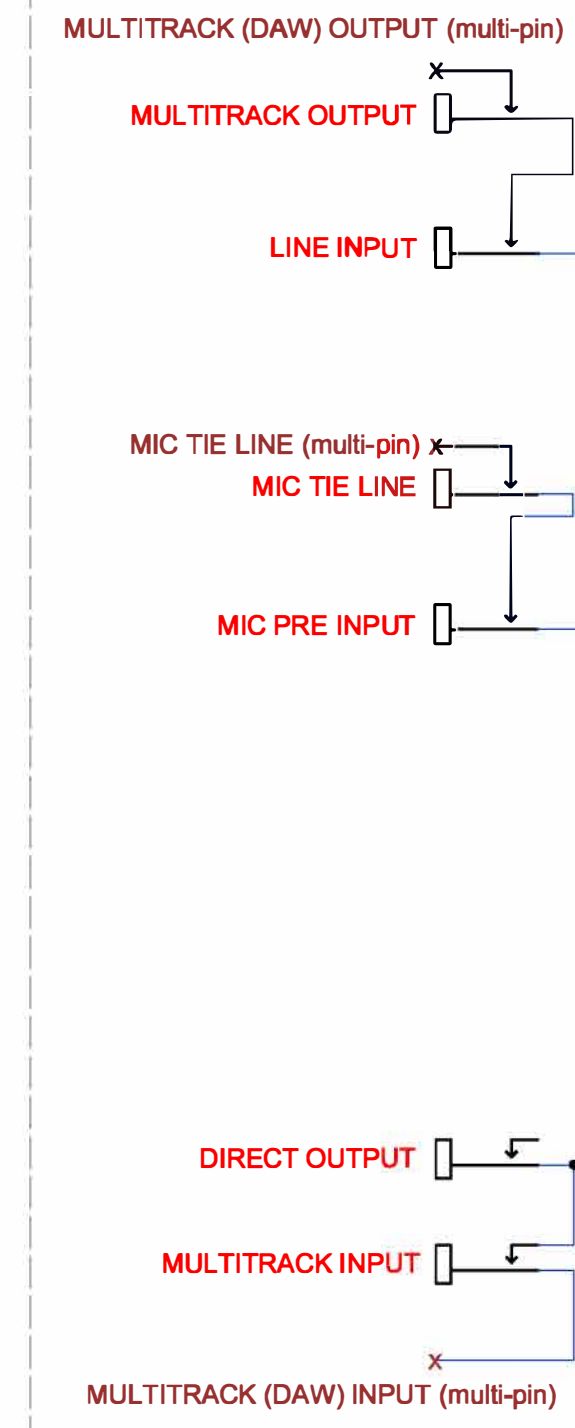
265C STEREO RETURN & AUX MASTER MODULE



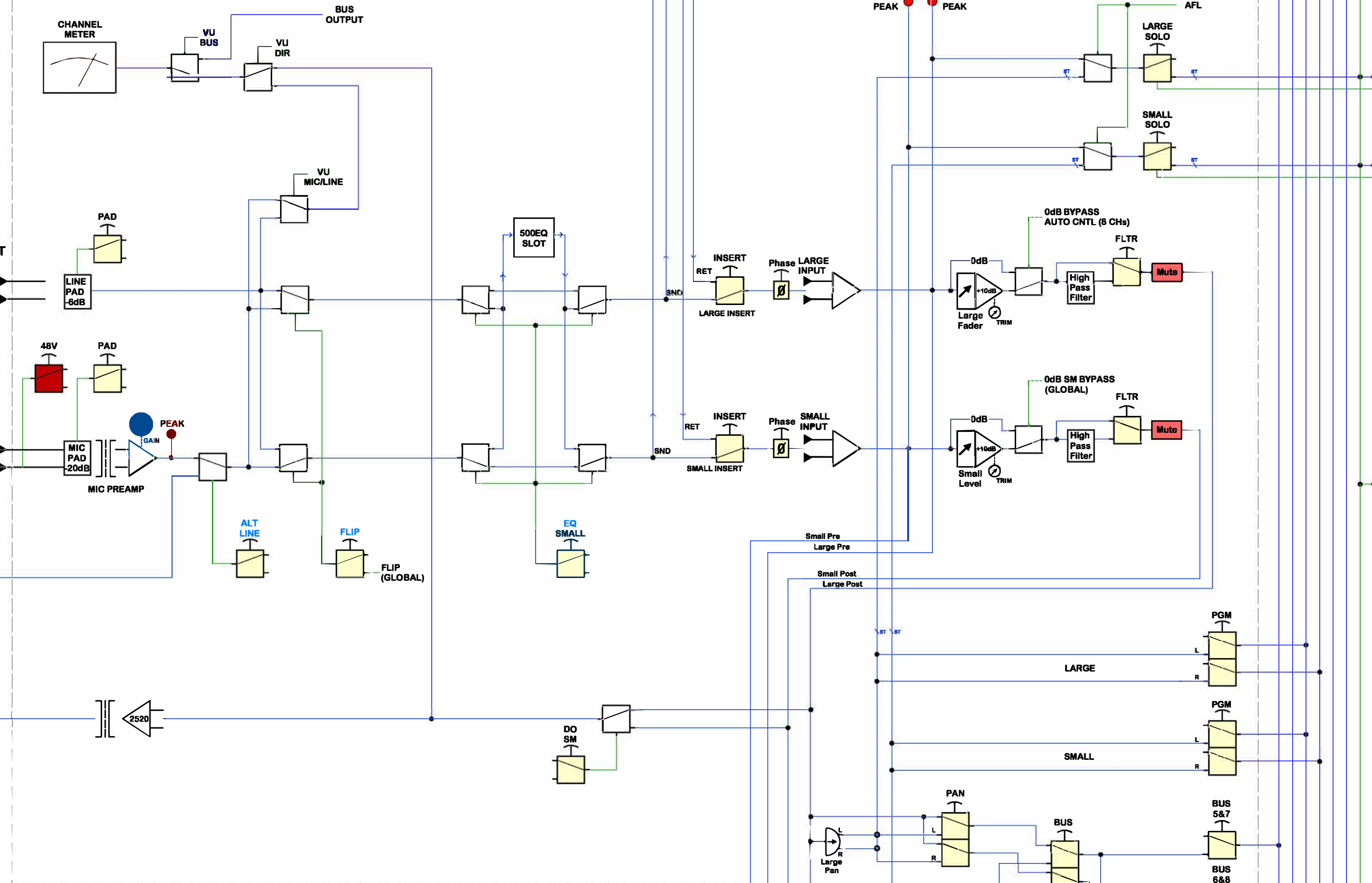


A2 2448 Block Diagram

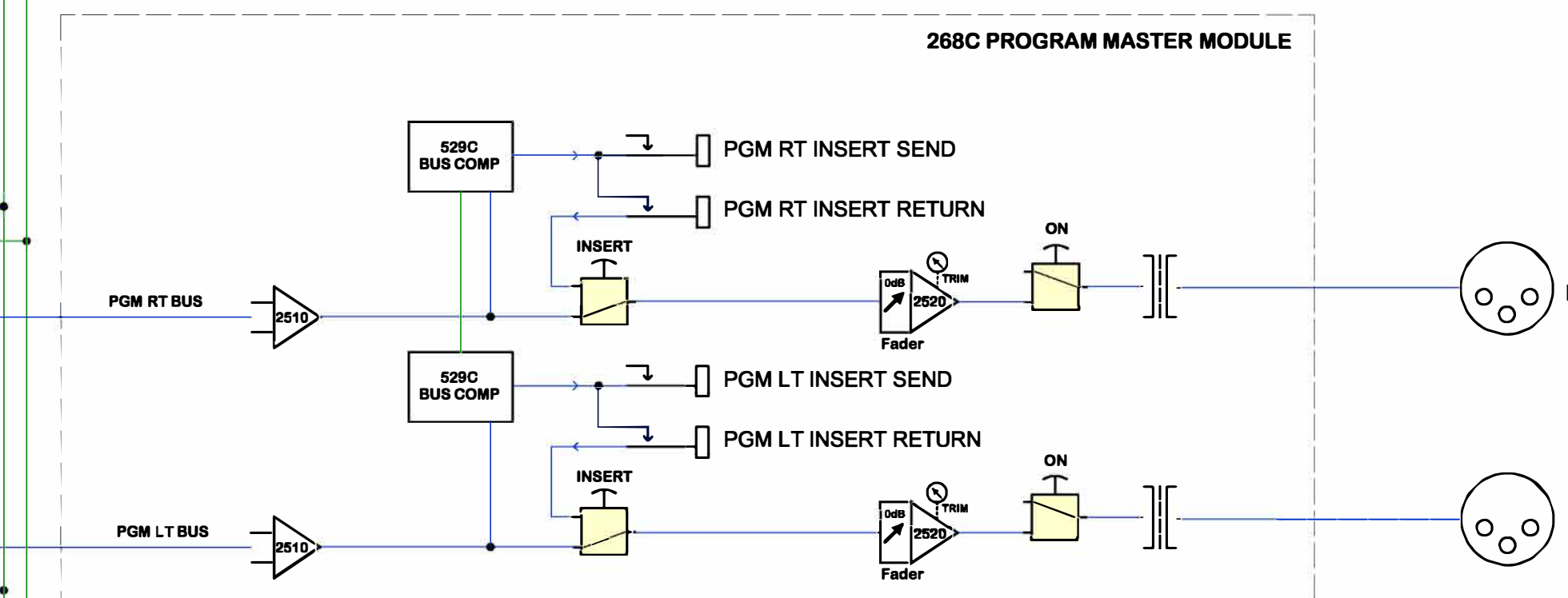
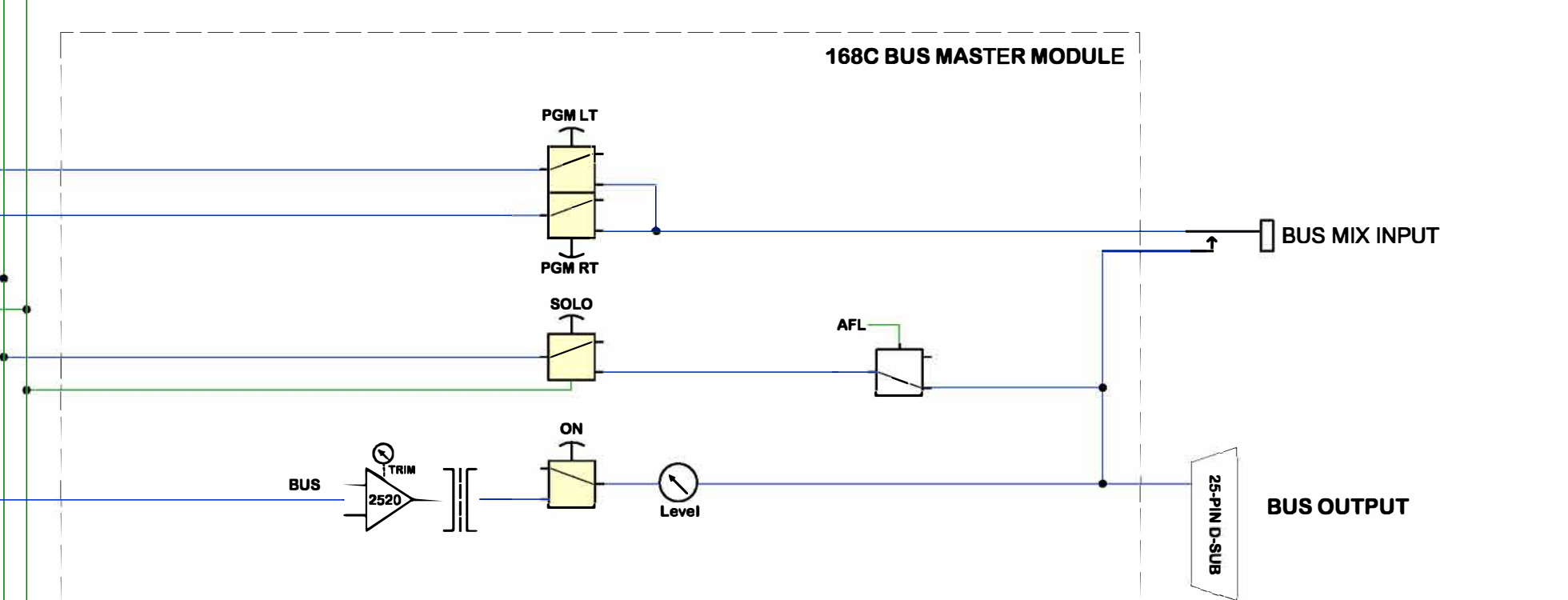
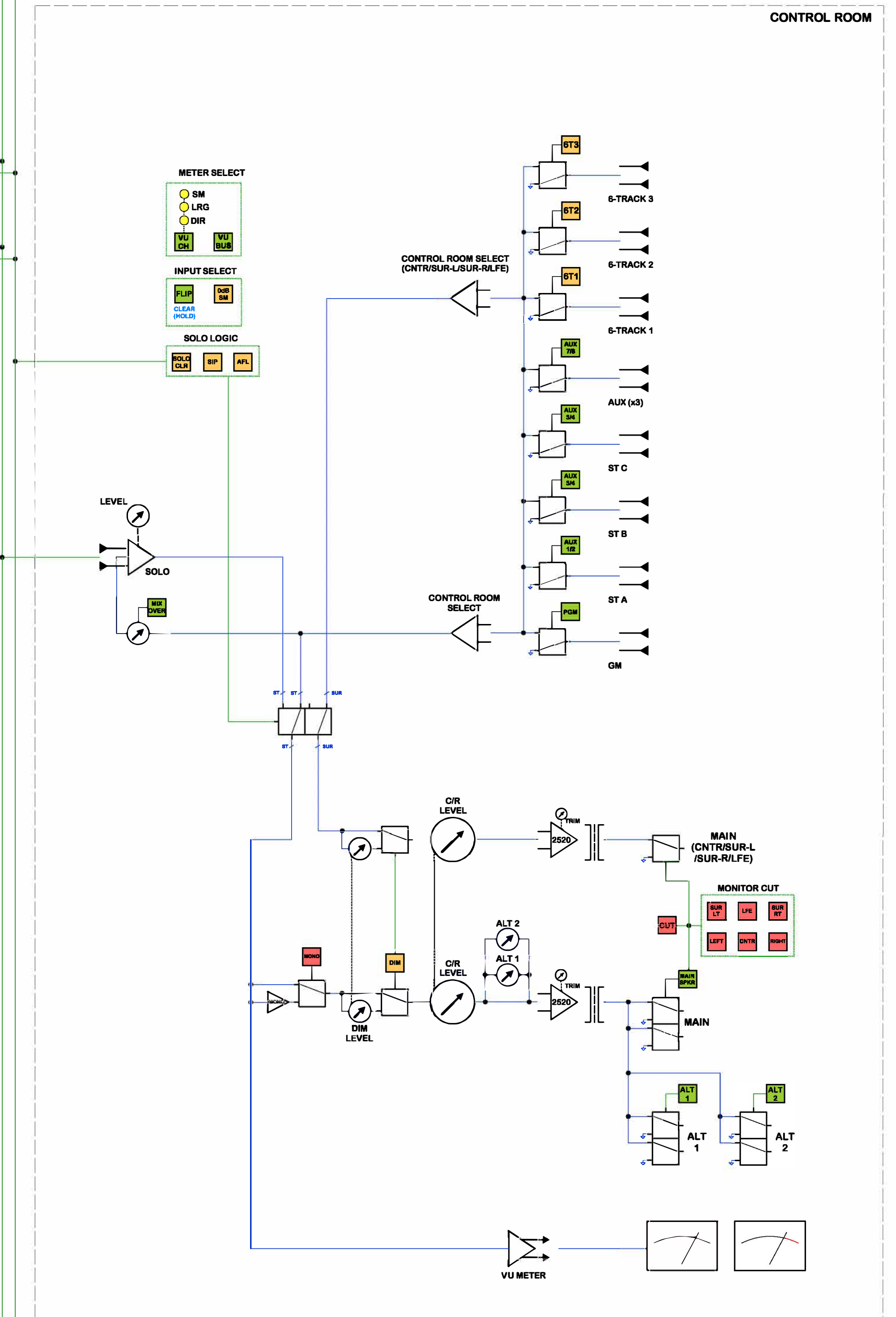
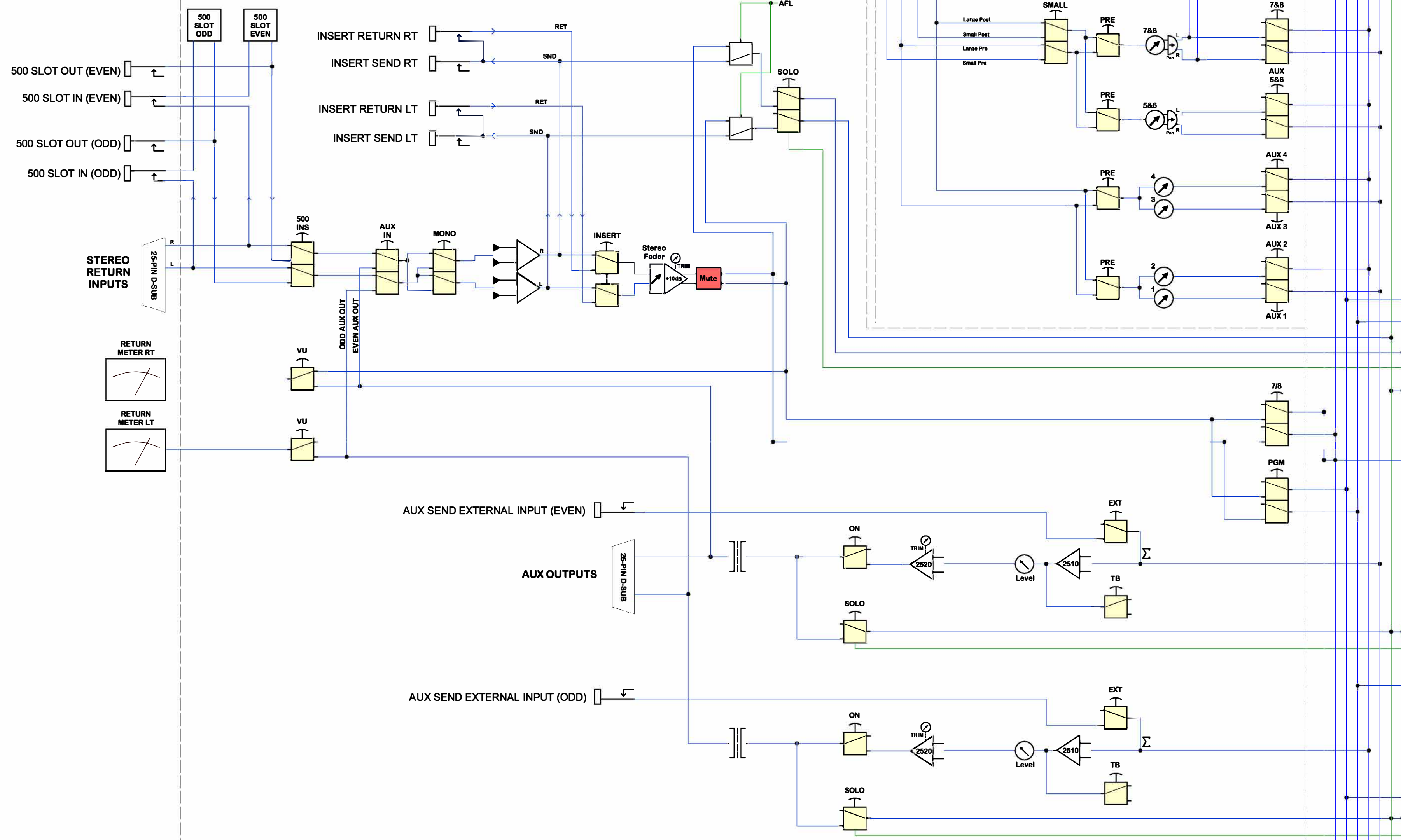
OPTIONAL PATCHBAY CONNECTIONS



648C INPUT MODULE



265C STEREO RETURN & AUX MASTER MODULE

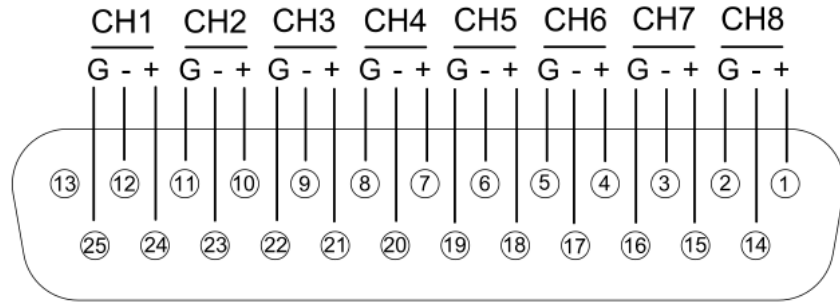


A3 25-Pin D-Sub Pinouts

A3.1 Standard 8-Channel 25-Pin D-Sub Pinouts

The Standard 8-channel 25-pin D-sub connector pinout is used for the following connections:

- Alt Line In
- Direct Out
- Bus Out
- Aux Out

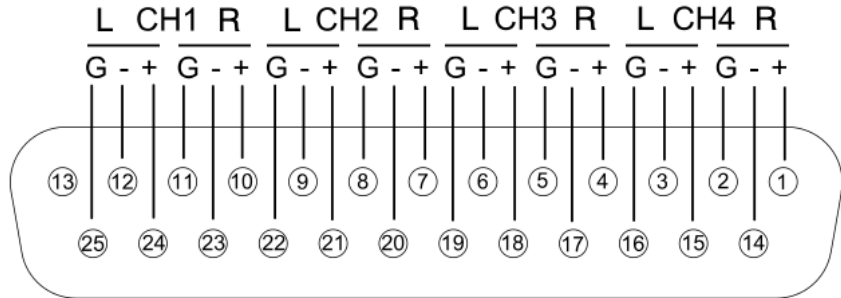


Standard 8-Channel D-Sub Pinout

A3.2 4-Channel Stereo 25-Pin D-Sub Pinouts

The 4-channel Stereo 25-pin D-sub connector pinout is used for the following connections:

- Stereo Returns 1-4

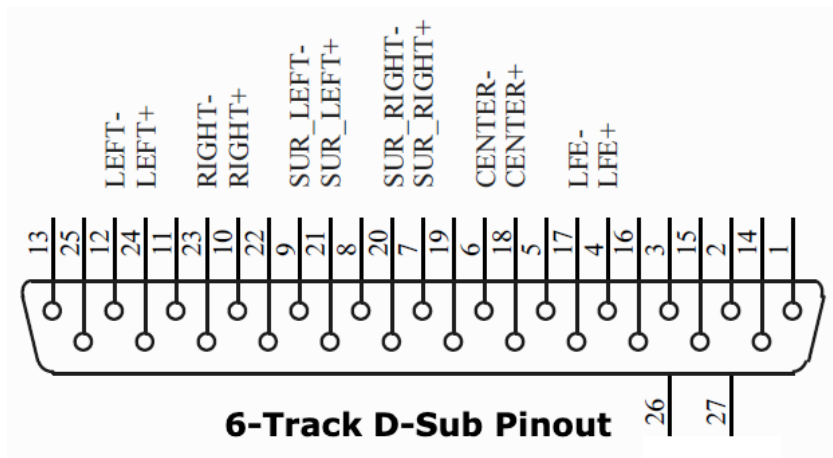


4-Channel Stereo D-Sub Pinout

A3.3 6-Channel Playback 25-Pin D-Sub Pinouts

The 6-channel Playback 25-pin D-sub connector pinout is used for the following connections:

- 6-Track Playback 1-3



6-Track D-Sub Pinout

A4 1608-II 548C Channel Setup Sheet

ARTIST:
ENGINEER:
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STUDIO:

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A5 2448 648C Channel Setup Sheet

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DRAWN BY:
STUDIO:

<p>48V <input type="checkbox"/> PAD <input type="checkbox"/></p> <p>PREAMP <input type="checkbox"/> PK <input type="checkbox"/></p> <p>GAIN* <input type="checkbox"/> ALT LINE <input type="checkbox"/></p> <p>7 <input type="checkbox"/> 8 <input type="checkbox"/></p> <p>5 <input type="checkbox"/> 6 <input type="checkbox"/></p> <p>3 <input type="checkbox"/> 4 <input type="checkbox"/></p> <p>1 <input type="checkbox"/> 2 <input type="checkbox"/></p> <p>PAN <input type="checkbox"/> PAN <input type="checkbox"/></p> <p>SM LG PGM <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 7/8 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 5/6 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 4 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 3 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 2 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 1 <input type="checkbox"/></p> <p>BUS <input type="checkbox"/> FLTR <input 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<input type="checkbox"/></p> <p>3 <input type="checkbox"/> 4 <input type="checkbox"/></p> <p>1 <input type="checkbox"/> 2 <input type="checkbox"/></p> <p>PAN <input type="checkbox"/> PAN <input type="checkbox"/></p> <p>SM LG PGM <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 7/8 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 5/6 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 4 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 3 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 2 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 1 <input type="checkbox"/></p> <p>BUS <input type="checkbox"/> FLTR <input type="checkbox"/></p> <p>AUX 5-8 <input type="checkbox"/> LEVEL+10 <input type="checkbox"/></p> <p>PK <input type="checkbox"/> PAN* <input type="checkbox"/></p> <p>SAFE <input type="checkbox"/></p> <p>EQ SM <input type="checkbox"/></p> <p>INS <input type="checkbox"/></p> <p>LINE PAD -48V <input type="checkbox"/> DIR SM <input type="checkbox"/></p> <p>FLTR <input type="checkbox"/></p> <p>PK <input type="checkbox"/> PAN* <input type="checkbox"/></p> <p>SAFE <input type="checkbox"/></p> <p>FLIP <input type="checkbox"/></p> <p>INS <input type="checkbox"/></p> <p>NOTES</p>	<p>48V <input type="checkbox"/> PAD <input type="checkbox"/></p> <p>PREAMP <input type="checkbox"/> PK <input type="checkbox"/></p> <p>GAIN* <input type="checkbox"/> ALT LINE <input type="checkbox"/></p> <p>7 <input type="checkbox"/> 8 <input type="checkbox"/></p> <p>5 <input type="checkbox"/> 6 <input type="checkbox"/></p> <p>3 <input type="checkbox"/> 4 <input type="checkbox"/></p> <p>1 <input type="checkbox"/> 2 <input type="checkbox"/></p> <p>PAN <input type="checkbox"/> PAN <input type="checkbox"/></p> <p>SM LG PGM <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 7/8 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 5/6 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 4 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 3 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 2 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 1 <input type="checkbox"/></p> <p>BUS <input type="checkbox"/> FLTR <input type="checkbox"/></p> <p>AUX 5-8 <input type="checkbox"/> LEVEL+10 <input type="checkbox"/></p> <p>PK <input type="checkbox"/> PAN* <input type="checkbox"/></p> <p>SAFE <input type="checkbox"/></p> <p>EQ SM <input type="checkbox"/></p> <p>INS <input type="checkbox"/></p> <p>LINE PAD -48V <input type="checkbox"/> DIR SM <input type="checkbox"/></p> <p>FLTR <input type="checkbox"/></p> <p>PK <input type="checkbox"/> PAN* <input type="checkbox"/></p> <p>SAFE <input type="checkbox"/></p> <p>FLIP <input type="checkbox"/></p> <p>INS <input type="checkbox"/></p> <p>NOTES</p>	<p>48V <input type="checkbox"/> PAD <input type="checkbox"/></p> <p>PREAMP <input type="checkbox"/> PK <input type="checkbox"/></p> <p>GAIN* <input type="checkbox"/> ALT LINE <input type="checkbox"/></p> <p>7 <input type="checkbox"/> 8 <input type="checkbox"/></p> <p>5 <input type="checkbox"/> 6 <input type="checkbox"/></p> <p>3 <input type="checkbox"/> 4 <input type="checkbox"/></p> <p>1 <input type="checkbox"/> 2 <input type="checkbox"/></p> <p>PAN <input type="checkbox"/> PAN <input type="checkbox"/></p> <p>SM LG PGM <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 7/8 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 5/6 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 4 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 3 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 2 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 1 <input type="checkbox"/></p> <p>BUS <input type="checkbox"/> FLTR <input type="checkbox"/></p> <p>AUX 5-8 <input type="checkbox"/> LEVEL+10 <input type="checkbox"/></p> <p>PK <input type="checkbox"/> PAN* <input type="checkbox"/></p> <p>SAFE <input type="checkbox"/></p> <p>EQ SM <input type="checkbox"/></p> <p>INS <input type="checkbox"/></p> <p>LINE PAD -48V <input type="checkbox"/> DIR SM <input type="checkbox"/></p> <p>FLTR <input type="checkbox"/></p> <p>PK <input type="checkbox"/> PAN* <input type="checkbox"/></p> <p>SAFE <input type="checkbox"/></p> <p>FLIP <input type="checkbox"/></p> <p>INS <input type="checkbox"/></p> <p>NOTES</p>	<p>48V <input type="checkbox"/> PAD <input type="checkbox"/></p> <p>PREAMP <input type="checkbox"/> PK <input type="checkbox"/></p> <p>GAIN* <input type="checkbox"/> ALT LINE <input type="checkbox"/></p> <p>7 <input type="checkbox"/> 8 <input type="checkbox"/></p> <p>5 <input type="checkbox"/> 6 <input type="checkbox"/></p> <p>3 <input type="checkbox"/> 4 <input type="checkbox"/></p> <p>1 <input type="checkbox"/> 2 <input type="checkbox"/></p> <p>PAN <input type="checkbox"/> PAN <input type="checkbox"/></p> <p>SM LG PGM <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 7/8 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 5/6 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 4 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 3 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 2 <input type="checkbox"/></p> <p>PRE <input type="checkbox"/> 1 <input type="checkbox"/></p> <p>BUS <input type="checkbox"/> FLTR <input type="checkbox"/></p> <p>AUX 5-8 <input type="checkbox"/> LEVEL+10 <input type="checkbox"/></p> <p>PK <input type="checkbox"/> PAN* <input type="checkbox"/></p> <p>SAFE <input type="checkbox"/></p> <p>EQ SM <input type="checkbox"/></p> <p>INS <input type="checkbox"/></p> <p>LINE PAD -48V <input type="checkbox"/> DIR SM <input type="checkbox"/></p> <p>FLTR <input type="checkbox"/></p> <p>PK <input type="checkbox"/> PAN* <input type="checkbox"/></p> <p>SAFE <input type="checkbox"/></p> <p>FLIP <input type="checkbox"/></p> <p>INS <input type="checkbox"/></p> <p>NOTES</p>
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A6 550A EQ Setup Sheet

550A Set Up Sheet

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ENGINEER:

DATE:

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DRAWN BY:

STUDIO:

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A7 550b EQ Setup Sheet

550b Set Up Sheet

ARTIST:

ENGINEER:

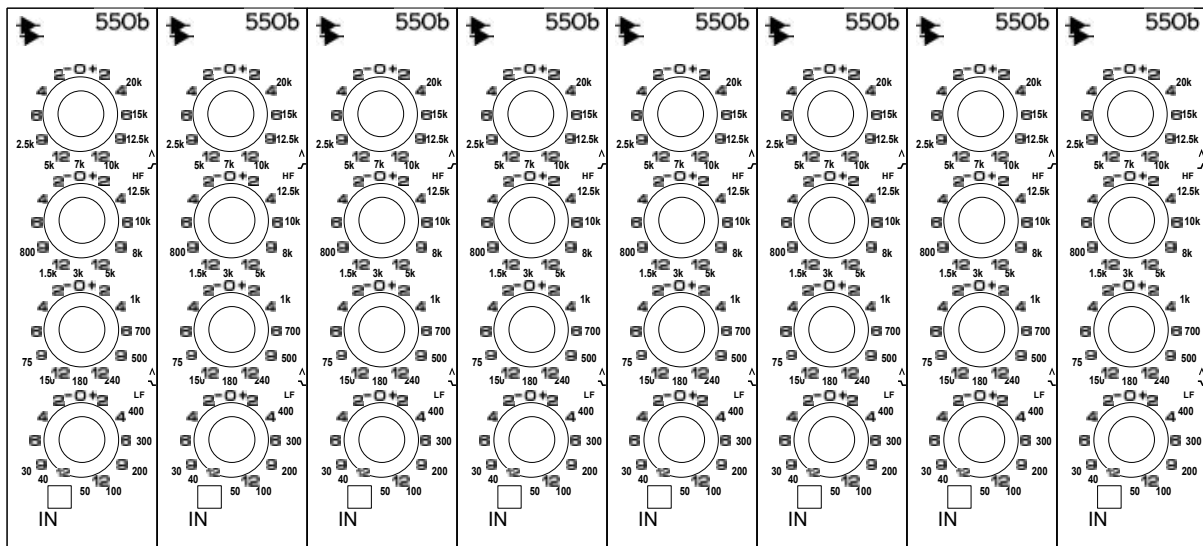
DATE:

NOTES:

DRAWN BY:

STUDIO:

CHAN#	CHAN#	CHAN#	CHAN#	CHAN#	CHAN#	CHAN#	CHAN#
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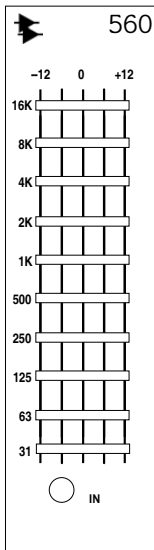
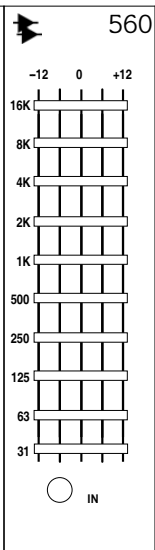
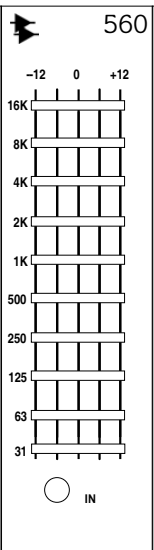
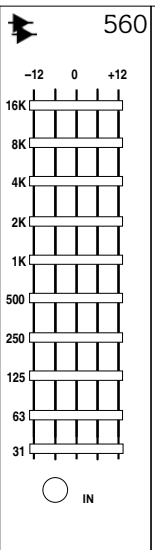
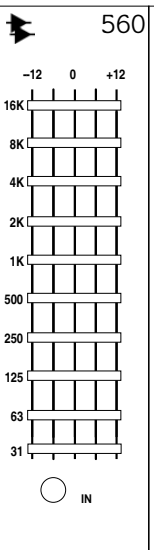
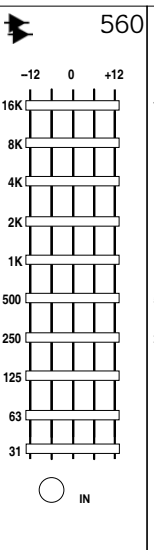
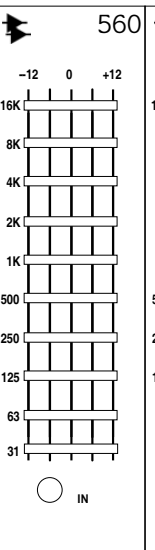
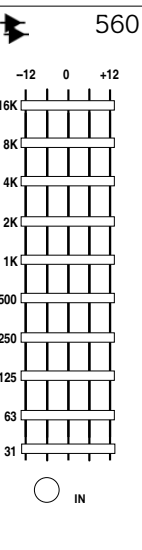
A8 560 EQ Setup Sheet

560 Set Up Sheet

ARTIST:
ENGINEER:
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DRAWN BY:
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A9 265C Stereo Return & Aux Send Master Setup Sheet

ARTIST:
ENGINEER:
DATE:

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DRAWN BY:
STUDIO:

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A10 529C Stereo Bus Compressor Setup Sheet

ARTIST:
ENGINEER:
DATE:

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DRAWN BY:
STUDIO:

Control panel diagram for the API 529C Stereo Bus Compressor. It features several knobs and switches for adjusting the compressor's behavior. The knobs include Release (0.05 to 0.7 seconds), Ratio (1.5 to infinity), Attack (1 to 30 m/sec), Threshold (+20 to -10 dB), and Gain (+2 to +24 dB). There are also switches for Loud/Hard, Bypass (BYP), Input (IN), Output (OUTPUT), and various modes (MED, SOFT, OLD F BACK, NEW F FWD, MAN., AUTO). A VU meter is shown with a scale from -15 to 18 dB. A 'MIX OVER SOLO' switch is located on the right side. The API logo and '529C STEREO BUS COMPRESSOR' are prominently displayed in the center.

NOTES

Control panel diagram for the API 529C Stereo Bus Compressor. It features several knobs and switches for adjusting the compressor's behavior. The knobs include Release (0.05 to 0.7 seconds), Ratio (1.5 to infinity), Attack (1 to 30 m/sec), Threshold (+20 to -10 dB), and Gain (+2 to +24 dB). There are also switches for Loud/Hard, Bypass (BYP), Input (IN), Output (OUTPUT), and various modes (MED, SOFT, OLD F BACK, NEW F FWD, MAN., AUTO). A VU meter is shown with a scale from -15 to 18 dB. A 'MIX OVER SOLO' switch is located on the right side. The API logo and '529C STEREO BUS COMPRESSOR' are prominently displayed in the center.

NOTES

Control panel diagram for the API 529C Stereo Bus Compressor. It features several knobs and switches for adjusting the compressor's behavior. The knobs include Release (0.05 to 0.7 seconds), Ratio (1.5 to infinity), Attack (1 to 30 m/sec), Threshold (+20 to -10 dB), and Gain (+2 to +24 dB). There are also switches for Loud/Hard, Bypass (BYP), Input (IN), Output (OUTPUT), and various modes (MED, SOFT, OLD F BACK, NEW F FWD, MAN., AUTO). A VU meter is shown with a scale from -15 to 18 dB. A 'MIX OVER SOLO' switch is located on the right side. The API logo and '529C STEREO BUS COMPRESSOR' are prominently displayed in the center.

NOTES

A11 API Limited Warranty and Service

- a. **Warranty Information:** This product carries a one year labor and a five year parts warranty from date of purchase. API (Automated Processes, Incorporated) does not cover claims for damage due to alteration and/or abuse. This warranty is limited to failures during normal use, which are due to defects in material or workmanship. If any defects are found in the materials or workmanship, or if the product fails to function properly during the applicable warranty period, API, at its option, will repair or replace the product.
- b. **PLEASE NOTE:** The design or quality of any non-authorized third party service or vendor is beyond the control of API. Accordingly service or modification of any API unit except by an authorized API representative may VOID this warranty.
- c. API reserves the right to inspect any products that may be the subject of any warranty claims before repair or replacement is carried out. Final determination of warranty coverage lies solely with API.
- d. This warranty is extended to the original purchaser and to anyone who may subsequently purchase this product within the applicable warranty period. Proof of purchase may be required.
- e. For questions regarding operation, interfacing or service of your API product, please contact your API dealer from whom you purchased the unit. Many times your authorized API dealer is the fastest and most cost-effective way to maintain and service your product.
- f. You may also contact API's Service Department directly.
 - a. Call API at 301-776-7879 (ext. 252) between 8:30 AM and 5:00 PM Monday through Friday (Eastern Time) to get a Return Authorization (RA). Products returned without an RA number may not be accepted.
 - b. Pack the defective part by wrapping in plastic and cushioning material. Seal securely in an approved shipping container. If you do not have a sufficient shipping container, ask API for advice when calling for the RA number.
 - c. Include a note explaining the problem and conditions of the service request. Include your complete return address (no P.O. Boxes, please).
 - d. Ship the product freight prepaid to:

API
8301 Patuxent Range Road
Jessup, MD 20794

IMPORTANT: Be sure the RA number is plainly written on the shipping carton.

- g. This is your sole warranty. API does not authorize any third party, including any dealer or sales representative, to assume liability on behalf of API or to make any warranty for API.
- h. THE WARRANTY GIVEN ON THIS PAGE IS THE SOLE WARRANTY GIVEN BY API AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WARRANTY GIVEN ON THIS PAGE SHALL BE STRICTLY LIMITED IN DURATION TO FIVE (5) YEARS FROM THE DATE OF THE ORIGINAL PURCHASE FROM API OR AN AUTHORIZED API DEALER. UPON EXPIRATION OF THE APPLICABLE WARRANTY PERIOD API SHALL HAVE NO FURTHER WARRANTY OBLIGATION OF ANY KIND. API SHALL NOT BE LIABLE FOR ANY INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES THAT MAY RESULT FROM ANY DEFECT IN THE API PRODUCT OR ANY WARRANTY CLAIM.

This warranty provides specific legal rights and you may have other rights, which vary from state to state.



Automated Processes, Inc.

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<http://www.apiaudio.com>