



**ProRack – House (H1020)
OWNER'S MANUAL**

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IMPORTANT SAFETY INSTRUCTIONS

CAUTION:

PLEASE READ AND OBSERVE ALL WARNINGS AND INSTRUCTIONS IN THIS INSTALLATION AND

OPERATING GUIDE AND THOSE MARKED ON THE UNIT. RETAIN THIS GUIDE FOR FUTURE REFERENCE.

This unit has been designed and manufactured to assure personal safety. Improper use can result in electric shock or fire hazard. The safeguards incorporated in this unit will protect you if you observe the following procedures for installation, use, and servicing. This unit does not contain any parts that can be repaired by the user.

DO NOT REMOVE ANY COVERS OR SUB-ASSEMBLIES, OR YOU MAY BE EXPOSED TO DANGEROUS VOLTAGES. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.

- Read these instructions. – All of these safety and operating instructions should be read before this product is operated
- Keep these Instructions. – The safety, operating and use instructions should be retained for further reference.
- Heed all warnings. – All warnings on the product and in the operating instructions should be adhered to.
- Follow all instructions. – All operating and use instructions should be followed.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the prong does not fit into your outlet, consult an electrician of the obsolete outlet.
- Do not use this apparatus near or water. – Do not expose apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, glasses or cups are placed on this apparatus. Do not operate on or near wet surfaces such as swimming pools and do not expose to rain.
- Clean only with dry cloth. – Unplug the product from the wall outlet before cleaning. Do not use liquid cleaners.
- Do not block ventilation openings. Install in accordance with manufacturers instructions. – Slots and openings in the assembly are provided for ventilation, to ensure reliable operation of the product, and to protect from overheating. Care should be taken never to block these openings in any operating situation.
- Do not install near any heat source such as radiators, heat registers, stoves, or other apparatus that produce heat.
- Protect the power cord from being walked upon or pinched, particularly at the plugs, convenience receptacles, and the point where they exit from the unit.
- Only use attachments/accessories specified by the manufacturer.
- Use only the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- Unplug this apparatus during lightning storms or when unused for long period of times.
- Refer all servicing to qualified service personnel. Service is required when the apparatus has been damaged in any way, such as power-supply cord or plug damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- To completely disconnect mains power from this apparatus, the power supply cord must be unplugged.
- Check AC power source for correct voltage and sufficient current capacity.
- Unplug the unit from AC mains before moving, servicing, or cleaning.
- Do not use frayed or damaged power cords or connectors.
- Do not place the unit on an unstable surface.
- Do not operate and immediately unplug equipment from AC mains if liquid has entered the unit.
- Do not plug unit into AC mains if it has physically been damaged in any way.
- Secure and protect ALL cabling to and from the units to prevent they being walled on, pinched, or pulled.
- Do not install the unit in areas of high electromagnetic or RF fields.
- Observe proper procedures for lifting and moving this unit as its weight and size requires that more than a single person be employed in these operations.
- Should the unit be damaged in any way or contaminated with liquid, have the unit inspected and serviced by qualified service personnel.
- This unit contains no user serviceable parts. All servicing must be performed by a qualified service engineer or through APB-DynaSonics or its qualified dealer.
- Operate in accordance with U.S. Governments' Occupational and Health Administration (OSHA) requirements, specifications, suggestions and regulations or those of any other local governing requirements where the equipment is to be used or serviced.

YOUR PRORACK MIXER

Congratulations on your purchase of one of the finest live performance professional audio mixers manufactured in the United States. Please take a moment to review this manual. It will insure a better understanding of the operation of this mixer and may open up new possibilities into how you use this product.

In addition to the hard copy of this manual, it will appear within our web site www.apb-dynasonics.com with the latest updates as well as new supplemental information. We suggest that you occasionally check our web site for additional information about your mixer as well as for new product releases and news from APB-DynaSonics.

Should you have any questions or comments about this or any other APB product, please do not hesitate to contact us at:

Tel: 973-785-1101 Fax: 973-785-1105

e-mail: info@apb-dynasonics.com

Manual Scope

This manual is not intended to teach you how to mix or how to set up a complete sound system. Should you be looking for such information, May we suggest that you do a search for "Pro Audio Books" on the internet, or attend one of the many fine Recording Schools that may be available to you. Many of these schools offer courses in Live Performance associated subjects as well as basic mixing techniques.

One of the best sources of teaching the technical aspect of system design and operation is through the Syn-Aud-Con organization:

Synergetic Audio Concepts, Inc., 8780 Rufing Road Greenville, IN, 47124 – USA

Tel: 800-796-2831 Fax : 812-923-3610 For calls outside of the US: 812.923.0174

Email: bbrown@synaudcon.com

www.synaudcon.com

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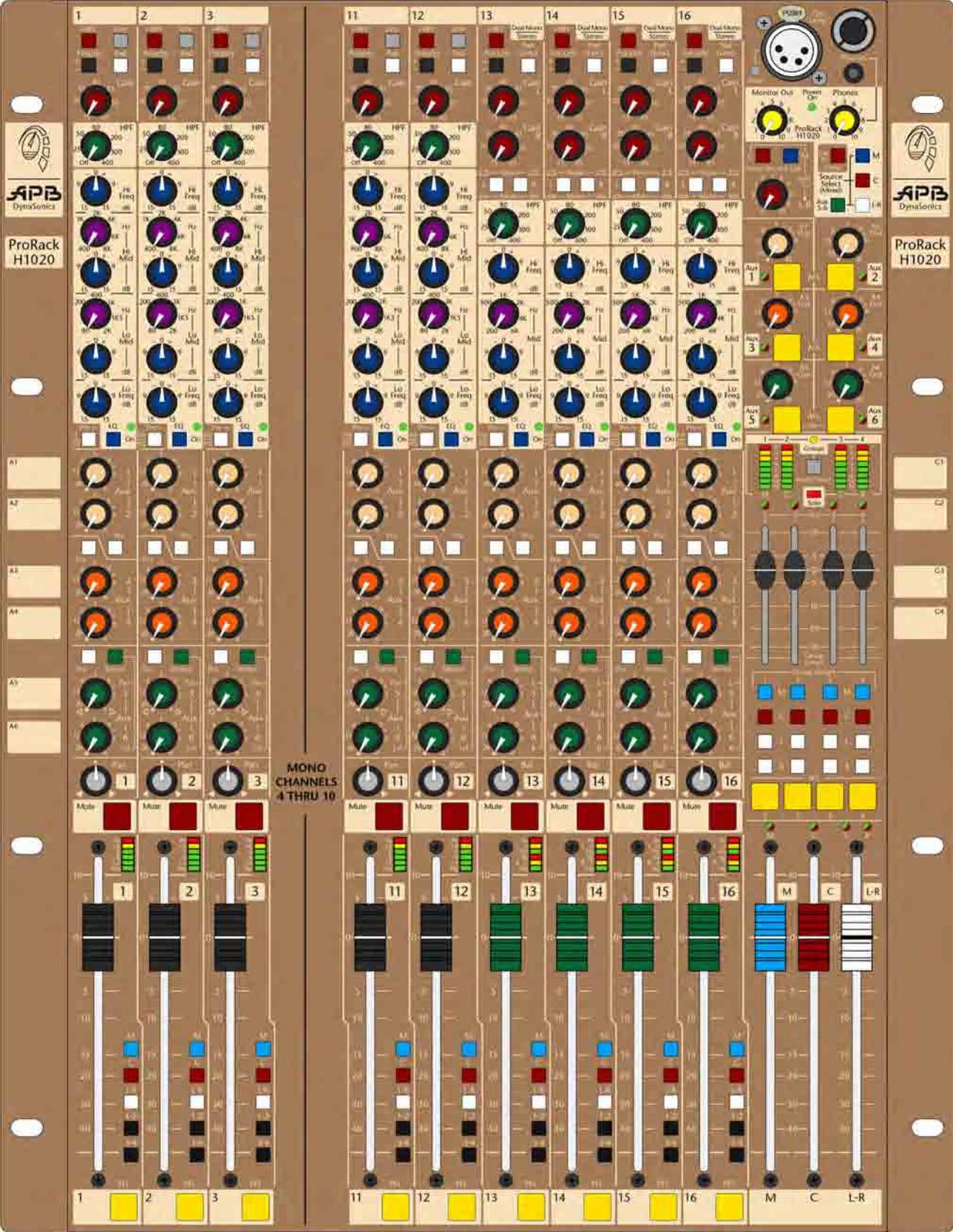
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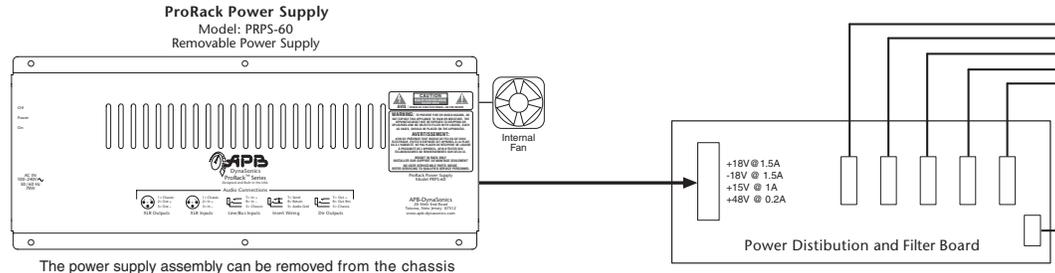
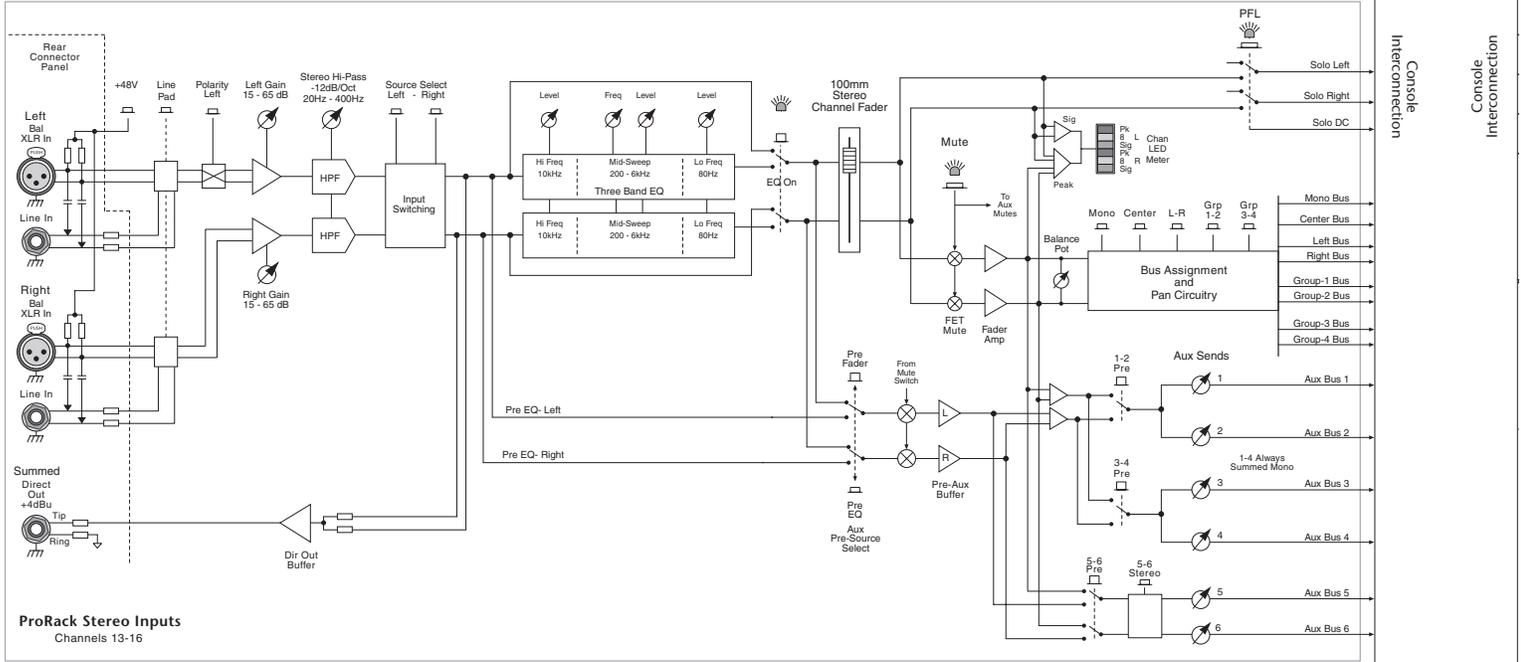
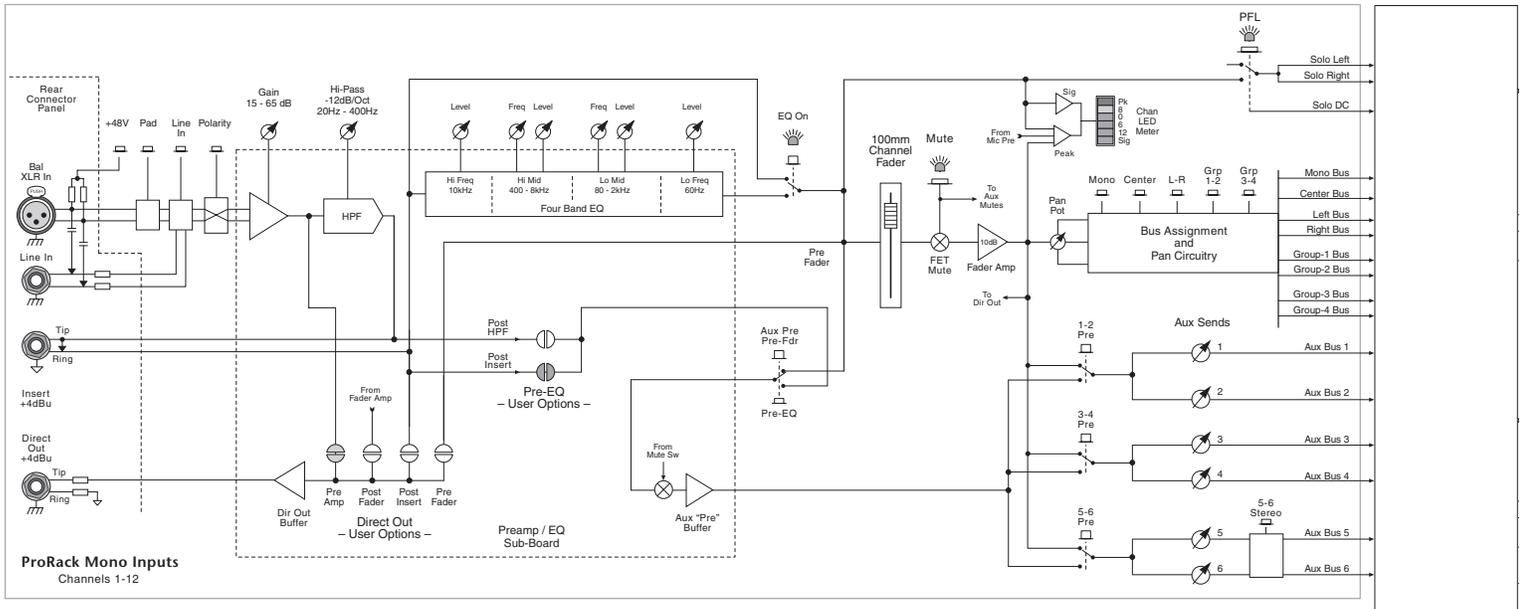
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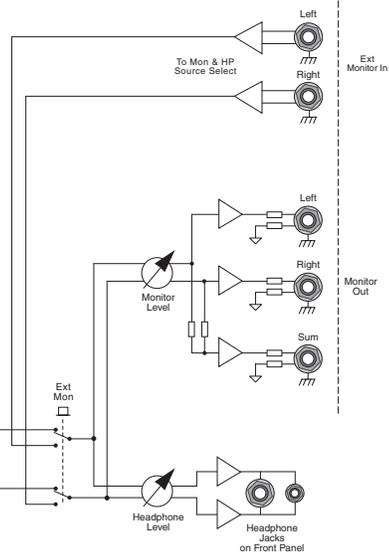
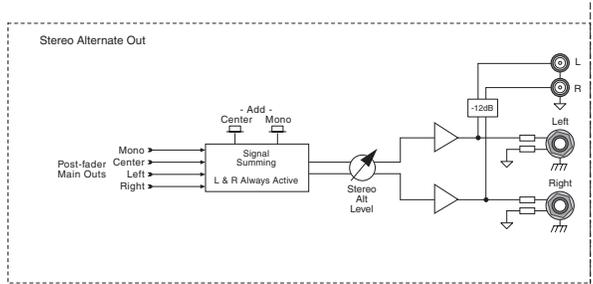
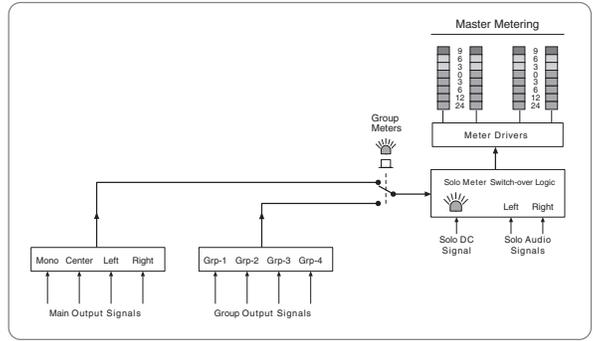
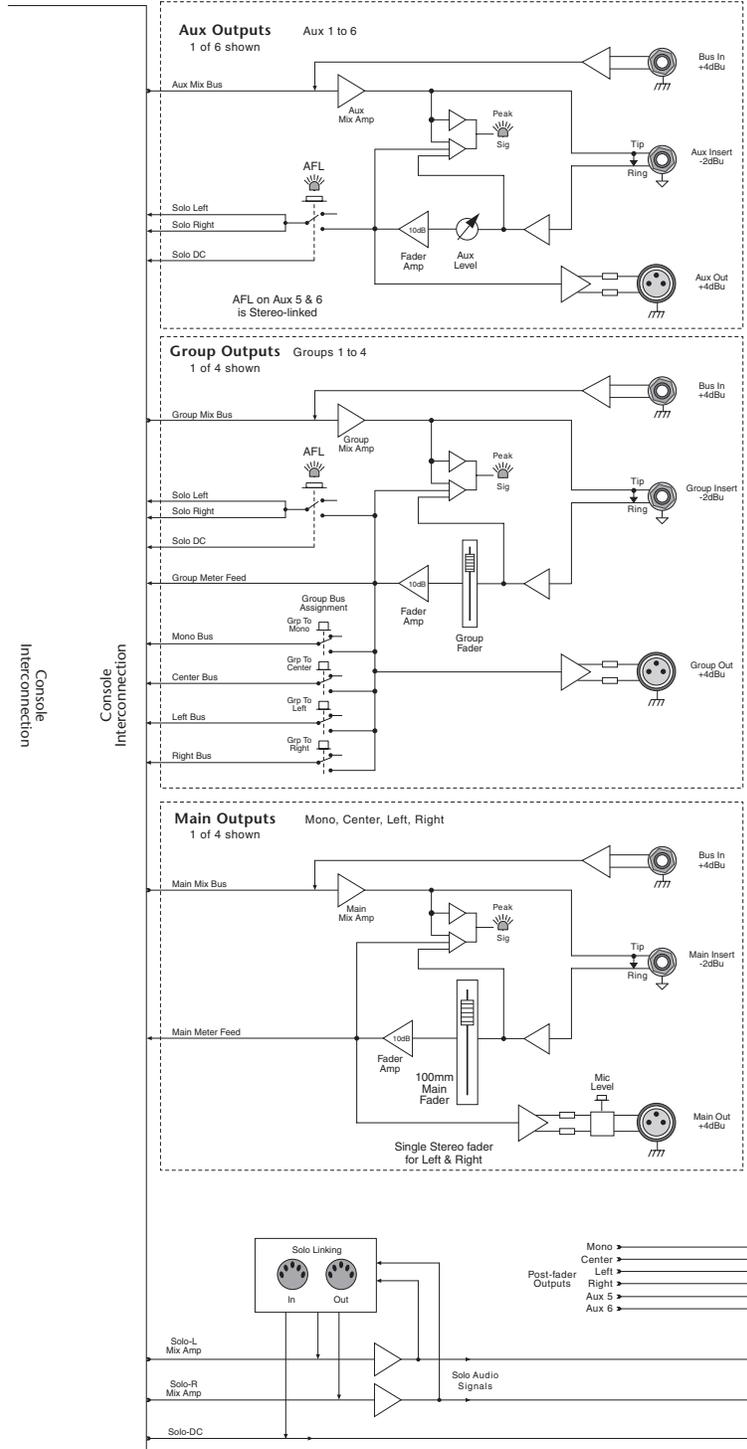
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Front Panel Overview

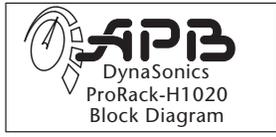


ProRack-FOH Block Diagram





Any style lamp can be used; Low-current LED to Hi-current Halogen.



PRORACK HOUSE - MONO INPUT CHANNELS (1-12)

Channel Preamp

48 Volt Phantom Power Switch

When depressed, activates 48-Volt phantom power to the XLR connector. Phantom power is required for operation of most condenser microphones. See your microphone instructions to see if phantom power is required or is to be defeated (some –though few–microphones require phantom power NOT be activated or they may be damaged). Some active Direct Boxes can also use phantom for power.

Mic/Line Switch

Selects between mic input source on XLR connector and line input source on the XLR connector or 1/4" Line input Jack. When in the UP position, the XLR source is processed as a microphone input signal. When in the DOWN position, the input is processed as a line level signal from the XLR connector or 1/4" connector, with the 1/4" connector having priority over the XLR connector. If both connectors are in-use, this switch will select between the XLR (Up) and the TRS (Down)

Polarity Reverse Switch

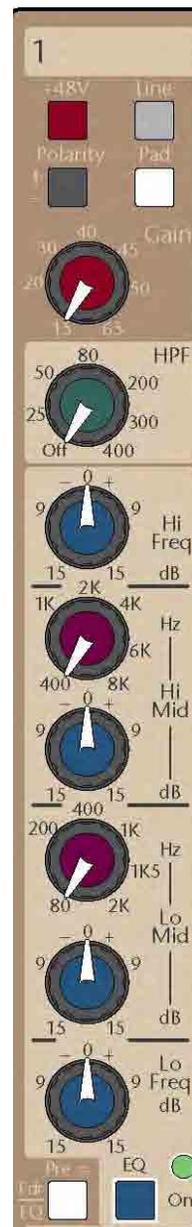
When depressed, reverses the electrical input polarity of any microphone or line level input signal. Use of this control may alter the sound quality of an input relative to other channels when multiple microphones are picking up the same sound. (In the past, many consoles labeled this function as "Phase" or used the Ø symbol).

Pad Switch

When depressed, inserts a 26dB pad into the microphone input signal path prior to the microphone preamplifier to prevent overload of excessively high microphone input signal levels. Use this pad switch when you find that you are operating the gain control in the lower 20% of the control range and still showing excessive signal levels (yellow and red indications) on the channel meters.

Input Gain Control

This control adjusts the amount of gain at the input stage for the best signal performance within the console. The goal is to achieve the best signal-to-noise while amplifying input signals to workable levels, neither too high nor low. The channel's six-segment meter is used for visualization of proper channel levels while soloing the channel will give more detailed level information by using the higher resolution meters in the Master section. Proper level is achieved when there is continuous full green illumination when input sources are at their highest levels with occasional flashes of the yellow and red LEDs.



PRORACK HOUSE - MONO INPUT CHANNELS (1-12)

Channel EQ

High Pass Filter Control

Adjusts the high pass filter frequency between 20Hz and 400Hz at a roll off rate of 12dB per octave. This control is used to remove unwanted signal content below the indicated frequency, such as stage rumble. This results in a clearer signal that reduces low frequency buildup in an audio system, which is often perceived as a muddy signal. When this control is turned fully counter-clockwise, the filter circuitry is removed from the signal path to maintain optimum phase response.

NOTE: The High-Pass filter is NOT controlled by the EQ On switch (See below).

High Frequency Level Control - Shelving

Adjusts the high frequency shelving EQ response between +/-15dB. The center, or "0", position of this control has a detent to indicate that it is having no effect on the associated channel signal. Boost or cut of the high frequency level control is used for tonal adjustments. The corner frequency of the shelving filter is 10kHz.

High-Mid Frequency Control

This frequency control selects the center frequency of the high-mid frequency band EQ between 400Hz and 8 kHz with a bandwidth of approximately one octave.

High-Mid Level Control

Adjusts the high-mid frequency cut/boost between +/-15dB. The center "0" position of this control has a detent to indicate it is having no effect of this frequency band. The high-mid frequency controls are used for minor tonal adjustment or repair of a specific band of frequencies.

Low-Mid Frequency Control

This frequency control selects the center frequency of the low-mid frequency band between 80Hz and 2 kHz with a bandwidth of approximately one octave.

Low-Mid Level Control

Adjusts the low-mid frequency cut/boost between +/-15dB. The center "0" position of this control has a detent to indicate it is having no effect of this frequency band. The low-mid frequency controls are used for minor tonal adjustment or repair of a specific band of frequencies.

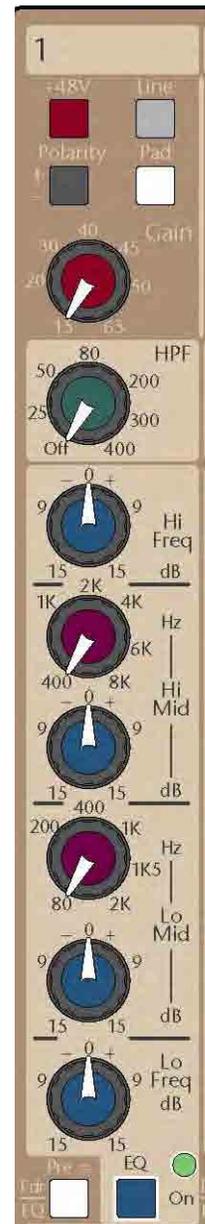
Low Frequency Level Control - Shelving

Adjusts the low frequency shelving response between +/-15dB. The center "0" position of this control has a detent to indicate that it is having no effect of the associated channel signal. Boost or cut of the low frequency level control is usually used for minor tonal adjustments. Corner freq is 60Hz

EQ ON Switch with LED

This switch inserts the 4-band EQ into the channel signal path. EQ activation is displayed by the illumination of an LED next to the EQ On switch. When not in use, it is suggested that the EQ be kept in the OFF position for the best phase performance.

NOTE: The EQ On switch only affects the 4-band EQ circuitry. The High-Pass Filter is controlled ONLY by its own rotary control



PRORACK HOUSE - MONO INPUT CHANNELS (1-12)

Aux Sends

Aux 1-6 Pre-Fader / Pre-EQ Switch

This switch defines the "Pre" signal source for all Auxes: Up is Pre-Fader (and Post-EQ), Down is Pre-EQ. Internally, the default Pre-EQ source is set to Post-insert. A qualified technician can change this to a Pre-insert (Post HPF) on a channel-by-channel basis.

Aux 1-2 Pre Switch

This switch determines the signal source for Aux mixes 1 and 2 between Post-fader (Up) or the above defined "Pre" signal (Down).

Aux Level Control 1

Adjusts the mix level of the channel into Aux bus 1.

Aux Level Control 2

Adjusts the mix level of the channel into Aux bus 2

Aux 3-4 Pre Switch

This switch determines the signal source for Aux mixes 3 and 4 between Post-fader (Up) or the earlier defined "Pre" signal (Down).

Aux Level Control 3

Adjusts the mix level of the channel into Aux bus 3.

Aux Level Control 4

Adjusts the mix level of the channel into Aux bus 4

Aux 5-6 Pre Switch

This switch determines the signal source for Aux mixes 5 and 6 between Post-fader (Up) or the earlier defined "Pre" signal (Down).

Aux 5-6 Stereo Switch

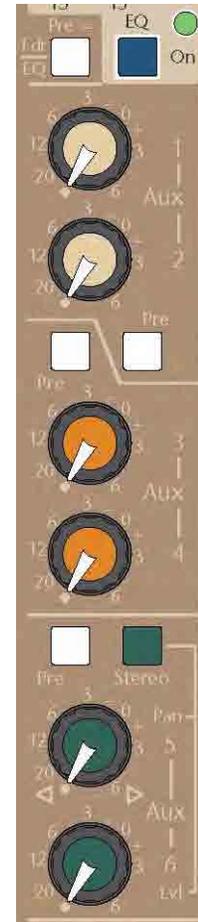
Reconfigures the individual 5 and 6 Aux level controls from two level controls to a level control (6) and a pan control (5) between bus 5 and 6. This enables a stereo mix to be generated from within this aux send section for use with stereo headphones, effects, or a discrete stereo mix for recording or broadcast use.

Aux 5 Level Control

When in normal mono mode, controls the signal level feeding Aux bus 5. When the Aux 5-6 stereo switch is depressed, this knob now operates as a pan control and adjusts the balance of the signal being fed to mix buses 5 (CCW) and 6 (CW).

Aux 6 Level Control

When in normal mono mode, controls the signal level feeding Aux bus 6. When the Aux 5-6 stereo switch is engaged, this knob becomes the Aux 5-6 level control feeding the above pan control.



PRORACK HOUSE - MONO INPUT CHANNELS (1-12)

Channel Control

Pan Control

This control blends the post fader signal between any of the assigned bus pairs: L-R, Group1-2 and Group 3-4. When at the center, detented position, both sides are fed equal amounts of signal (each down by 3dB). This pan control has no effect on the Mono or Center mix buses.

Channel Mute Switch (Internally Illuminated)

When pressed, this latching switch will mute the assigned outputs of the channel and all pre and post auxiliary sends. The Mute does not affect the channel's PFL feed, channel metering or the Direct Out (unless it was set for Post-fader). This switch illuminates RED when activated.

Channel Level Meters

6-segment LED meter indicates the pre-fader channel level. The top segment peak indicator will illuminate red if any of the multiple sample points in the signal chain approaches 3dB of clipping. A yellow LED illuminates in the caution zone at a +8 reference level. Four green LED segments indicated signal levels of 0, -6, -12, and Signal Present. The signal present LED first illuminates at approximately -30 and increases in brightness with level until it is at full intensity. Best operation is achieved when the bottom 3 green LED's are illuminated with average input signals with only occasional short yellow/red bursts of the +8 and peak LEDs.

Mono Assignment Switch

Assigns the post-fader channel signal to the Mono mix bus. It is used as a general purpose post fader output for use as an additional primary console output, aux or matrix send including use for surround or subwoofer mixes. It may also be used as part of an A-B vocal mix.

Center Assignment Switch

Assigns the post-fader channel signal to the Center mix bus. In mono sound systems, this bus can be used as the primary (Center) output (leaving the L-R output available for stereo recording). It is usually used in LCR installations to feed a discrete signal to the center speaker cluster. It may also find use as a general purpose post fader output for use as an additional aux or matrix send or as part of an A-B vocal mix.

L-R Assignment Switch

Assigns the post-fader channel signal to the Left-Right mix buses through the Pan Control.

1-2 Assignment Switch

Assigns the channel signal to the Group 1 & 2 mix buses through the Pan Control. The Groups can be used independently using their own insert & XLR output jacks, or used as subgroups and assigned back into the Main mix buses (See Master Section- Groups).

3-4 Assignment Switch

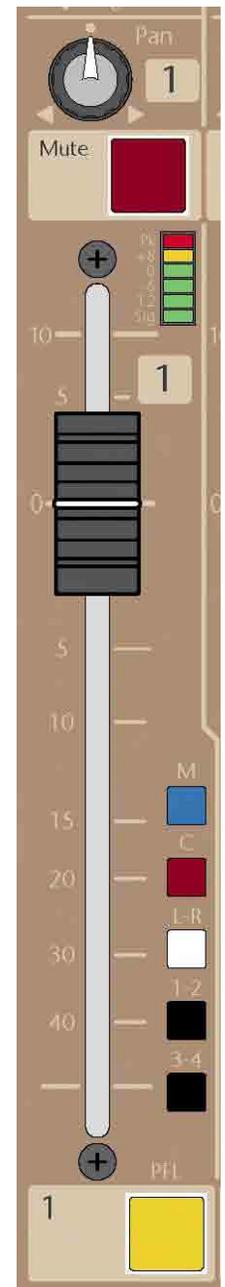
Assigns the post-fader channel signal to the Group 3 & 4 mix buses through the Pan Control. Operation is the same as the Group 1 & 2 assignment.

100mm Channel Fader

This high quality fader controls the post-fader channel level.

PFL Switch (Internally Illuminated)

When pressed, this latching switch will route the Pre-fader channel signal to the Solo system (located in the Master section). This switch illuminates Yellow when activated.



PRORACK - HOUSE Mono Input Channel Connectors (Rear Panel)

XLR Input Connector

This connector accepts microphone or line input signals, as determined by the front panel input source switch and if the TRS line input connector is occupied. When the front panel input source switch is in the microphone position (Up), this XLR connector will be used as a microphone input and will have an input impedance of >3000 ohms. When the input selector source switch is in the LINE input position (Down) and nothing is plugged into the TRS line input connector, this XLR connector is used as a balanced line input with an input impedance of >10k ohms. If a connector is plugged into the TRS line input connector, the XLR connector will always be configured as a microphone input connector with an input impedance of >3000 ohms. This is a locking connector. To remove an XLR cable, depress the Tab on the connector before attempting to remove the cable plug from the console connector.

1/4" TRS Line Input Connector

This connector accepts line input signals and has an input impedance of >10k ohms. When the front panel source switch is selected to line input, signal is first sourced from this connector. If nothing is plugged into this connector, the XLR input is normaled through this connector as a line input signal. The line input may be balanced or unbalanced signal.

1/4" TRS Insert Connector

This connector allows external processing or effects electronics to be inserted into the channel's signal path after the variable high pass filter. Tip= Send, Ring= Return, Sleeve= Ground. Examples of external devices include additional equalization, notch filters, compressors, limiters, vocal doublers and harmonizers, reverb devices, etc. The insert send has an output impedance of 100 ohms unbalanced and the insert return has an input impedance of 5k ohms unbalanced.

Operating level is +4dBu.

NOTE: The user should ensure that any device inserted into the channel's signal path is capable of maintaining the signal integrity of the console. The device must be able to accept a +22dBu signal without clipping, and have an output impedance of 100 Ω or less and be capable of driving +22dBu into a 2k Ω load.

1/4" TRS Direct Output Connector

The connector provides a balanced line level output of the input channel's signal. The default DO signal is AFTER the microphone preamplifier but before all other processing. This utility output can be used to feed a multi-track recording device, effects device, or to feed another mixing or processing device including distributed monitor mixing systems. Operating level is +4dBu

Direct Output - Internal Options

Internal jumpers may be changed (on a channel-by-channel basis) to Post-insert, Pre-fader or Post-fader. The Direct Output is always active and not affected by the channel Mute switch unless the Post-fader internal-option is implemented.

(Any changes to the Direct Output source should be made by a qualified technician)



PRORACK HOUSE – DUAL-MONO / STEREO INPUT CHANNELS (13-16)

Channel Preamps

48-Volt Phantom Power Switch

When depressed, activates 48 Volt phantom power to both of the XLR input connectors. Phantom power is required for operation of most condenser microphones. See your microphone instructions to see if phantom power is required or is to be defeated (some –though few–microphones require phantom power NOT be activated or they may be damaged). Some active Direct Boxes can also use phantom for power.

Pad / Line Input Switch

This dual-purpose switch is used to pad down microphone input levels or enables input channels to accept line level input signals via the XLR connector. When depressed, it inserts a 26dB pad into the input signal path prior to the preamplifier to prevent overload of excessively high microphone input signal levels. Use this pad switch when you find that you are operating the gain control in the lower 20% of the control range and still showing excessive signal levels (yellow and red indications) on the channel dual meters. Also select this when a line input signal is plugged into the XLR input connectors. If both connectors are in-use, this switch will select between the XLR (Up) and the TRS (Down)

Polarity Reverse Switch

When depressed, reverses the electrical polarity of -only- the left-side input signal. Use of this control may alter the sound quality of an input relative to other channels when multiple microphones are picking up the same sound. (In the past, many consoles labeled this function as “Phase” or used the Ø symbol).

Left Input Gain Control

This control is used to adjust the input gain of the left-side preamp for optimum performance without producing audible noise (hiss) at high gain settings. The channel’s LED meters and the solo PFL meters are used in assisting in setting the control for correct gain levels.

Right Input Gain Control

This control is used to adjust the input gain of the right-side preamp and operates the same as (but independently of) the left-side gain control.

Dual-Mono / Stereo Source Switches

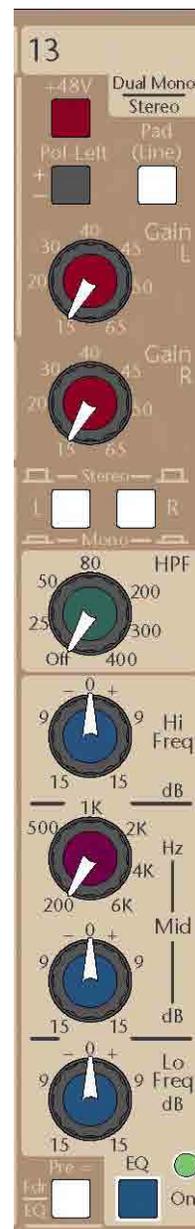
This pair of switches determines the operating mode of the channel.

If no switches are selected (both Up) the channel acts as a conventional stereo-input channel; left input signals feed the left-side of the channel, right input signals feed the right-side of the channel. Stereo separation is maintained through the EQ, fader and (stereo) bus assignments. The Balance control will adjust the relative levels of the left and right signals being sent to any assigned bus-pairs: L-R, Grp 1-2, Grp 3-4.

If both switches are depressed, the left and right inputs are summed to mono after their individual preamp circuits. The channel now acts as a dual-mono input channel and with separate trim levels for the two microphone or line inputs (usable when micing similar instruments in close proximity to each other such as a pair of toms on a drum kit or choir members). Adjustments may be made to each input for correct balance using the associated input gain control. This summed-signal is then sent equally through both sides of the channel’s EQ, fader and bus assignment circuitry. The Balance control now acts as a Pan control and pans this mono signal across any assigned bus-pairs.

If only one switch is depressed, then that single input is selected for use as a mono source and only that sided preamp is used. This single input is sent equally through the channel’s EQ, fader and bus assignment circuitry. The Balance control acts as a Pan control and pans this mono signal across any assigned bus-pairs.

NOTE: If you are going to use the channel as a single-input mono channel, we suggest using the left-side input since you then have a polarity-reverse switch available.



PRORACK HOUSE – DUAL-MONO / STEREO INPUT CHANNELS (13-16)

Channel EQ

High Pass Filter Control

Adjusts the high pass filter frequency between 20Hz and 400Hz at a roll off rate of 12dB per octave for both sides (L & R) of the channel path. This control is used to remove unwanted signal content below the indicated frequency, such as stage rumble. This results in a clearer signal that reduces low frequency buildup in an audio system, which is often perceived as a muddy signal. When this control is turned fully counter-clockwise, the filter circuitry is removed from the signal path to maintain optimum phase response.

NOTE: The High-Pass filter is NOT controlled by the EQ On switch (See below).

Hi Frequency Level Control

Adjust the high frequency shelving cut/boost between +/-15dB of both sides (L & R) of the channel. The center "0" position of this control has a detent to indicate that it is having no effect of the associated channel signal. Boost or cut of the high frequency level control is usually used for minor tonal adjustments. Use of this EQ control will affect both the left and right signal paths. Corner freq is 10kHz.

Mid Frequency Control

This frequency control selects the center frequency of the low-mid frequency band between 200Hz and 6 kHz at a bandwidth of approximately one octave.

Mid Level Control

Adjust the low-mid frequency cut/boost between +/-15dB of both sides (L & R) of the channel. The center "0" position of this control has a detent to indicate it is having no effect of this frequency band. The mid frequency controls are used for minor tonal adjustment or repair of a specific band of frequencies.

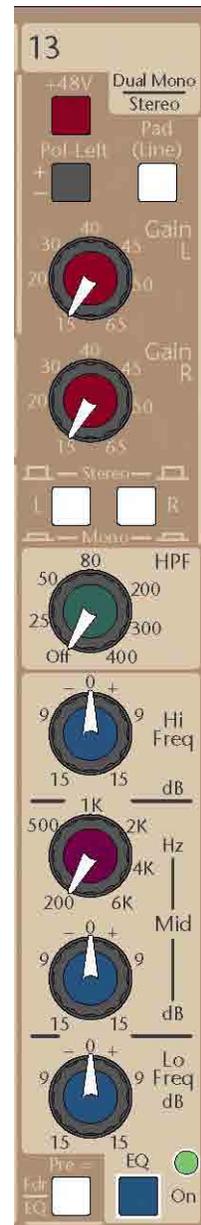
Low Frequency Level Control

Adjust the low frequency shelving cut/boost between +/-15dB at the reference frequency selected. The center "0" position of this control has a detent to indicate that it is having no effect of the associated channel signal. Use of this EQ control will affect both the left and right signal paths. Corner freq is 80Hz

EQ ON Switch with LED

This switch inserts the Left and Right EQ circuitry into the channel signal path. Stereo EQ activation is displayed by the illumination of the LED. When not in use, it is suggested that the EQ be kept in the OFF position for best phase performance.

NOTE: The EQ On switch only affects the 3-band EQ circuitry. The High-Pass Filter is controlled ONLY by its own rotary control



PRORACK HOUSE – DUAL-MONO / STEREO INPUT CHANNELS (13-16)

Channel Auxes

The signals feeding the Aux section are normally mono-mixes of the left & right side signals within the module. For Auxes 5 & 6, when they are switched to Stereo, the left-side signal feeds the Aux 5 control, the right-side signal feeds the Aux 6 control.

Aux 1-6 Pre-Fader / Pre-EQ Switch

This switch defines the “Pre” signal source for all Auxes; Up is Pre-Fader (Post-EQ), Down is Pre-EQ.

Aux 1-2 Pre Switch

This switch selects the signal source for Aux mixes 1 and 2 between Post-fader (Up) or the above defined “Pre” signal (Down). The feed to these Auxes is a sum of the left & right channel signals.

Aux Level Control 1

Adjusts the summed mono mix of the channel into Aux bus 1.

Aux Level Control 2

Adjusts the summed mono mix of the channel into Aux bus 2.

Aux 3-4 Pre Switch

This switch selects the signal source for Aux mixes 3 and 4 between Post-fader (Up) or the earlier defined “Pre” signal (Down). The feed to these Auxes is a sum of the left & right channel signals.

Aux Level Control 3

Adjusts the summed mono mix of the channel into Aux bus 3.

Aux Level Control 4

Adjusts the summed mono mix of the channel into Aux bus 4.

Aux 5-6 Pre Switch

This switch selects the signal source for Aux mixes 5 and 6 between Post-fader (Up) or the earlier defined “Pre” signal (Down). The feed to these Auxes is a sum of the left & right channel signals.

Aux 5-6 Stereo Switch

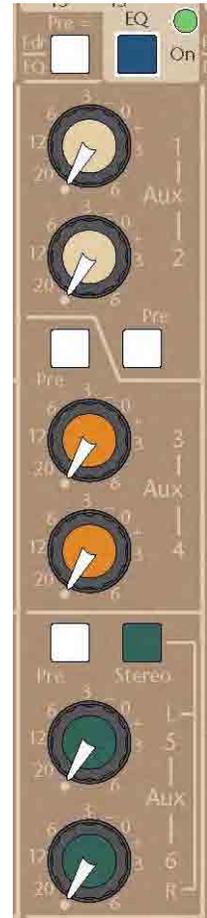
Reconfigures the signals feeding the individual Aux 5 and 6 level controls from a summed mono mix to separate left & right signals.

Aux 5 Level Control

Adjusts the summed mono mix of the channel into Aux bus 5. When the Aux 5-6 stereo switch is depressed, this control is now reconfigured to only feed the channel’s left-side signal into Aux bus 5.

Aux 6 Level Control

Adjusts the summed mono mix of the channel into Aux bus 6. When the Aux 5-6 stereo switch is depressed, this control is now reconfigured to only feed the channel’s right-side signal into Aux bus 6.



PRORACK HOUSE – DUAL-MONO / STEREO INPUT CHANNELS (13-16)

Assignment

Balance Control

This control blends the post-fader signal between any of the assigned bus-pairs: L-R, Group1-2 and Group 3-4. When at the center, detented position, both sides are fed equal amounts of signal (each down by 3dB). This Balance control has no effect on the Mono or Center mix buses. When the channel mode switches are both in their Up position (see earlier section), this control acts as a balance control between the channel's left and right assigned signals. If any of the mode switches are depressed (mono operation), this control performs as a pan control between the assigned bus-pairs.

Channel Mute Switch (Internally Illuminated)

When pressed, this latching switch will mute the assigned outputs of the channel and all pre and post fader auxiliary sends. The Mute does not affect the channel's PFL feed or channel metering. This switch illuminates RED when activated.

Channel Level Meters

2 x 3 segment LED meter indicates pre fader channel level. The top segment (1 left, 1 right channel) peak indicator will illuminate red if any of the multiple sample points in the stereo signal chain approaches 3dB of clipping. A yellow LED on each channel illuminates in the caution zone at a +8 reference level. The green signal present LED first illuminates at approximately -30 and increases in brightness with level until it is at full intensity on each channel. Best operation is achieved when the green LEDs are illuminated with average input signals with only occasional short yellow/red bursts of the +8 and peak LEDs.

Mono Assignment Switch

Assigns the post-fader summed-channel signal to the Mono mix bus. It is used as a general purpose post fader output for use as an additional primary console output, aux or matrix send including use for surround or subwoofer mixes. It may also be used as part of an A-B vocal mix.

Center Assignment Switch

Assigns the post-fader summed-channel signal to the Center mix bus. In mono sound systems, this bus can be used as the primary (Center) output (leaving the L-R output available for stereo recording). It is usually used in LCR installations to feed a discrete signal to the center speaker cluster.

L-R Assignment Switch

Assigns the post-fader channel signals to the Left & Right mix buses through the Balance Control. In Stereo or Dual Mono sound systems, this is the most likely used primary output assignment on the console. The Left & Right outputs are also typically used for music reproduction when Center or Mono mix buses are used for the Center-fill or sub output of the Console.

1-2 Assignment Switch

Assigns the post-fader channel signals to the Group 1 & 2 mix buses through the Balance Control. The Groups can be used independently using their own insert & XLR jacks, or used as subgroups and assigned back into the Main mix buses (See Master Section- Groups).

3-4 Assignment Switch

Assigns the post-fader channel signals to the Group 3 & 4 mix buses through the Balance Control. Operation is the same as the Group 1 & 2 assignment.

100mm Channel Fader

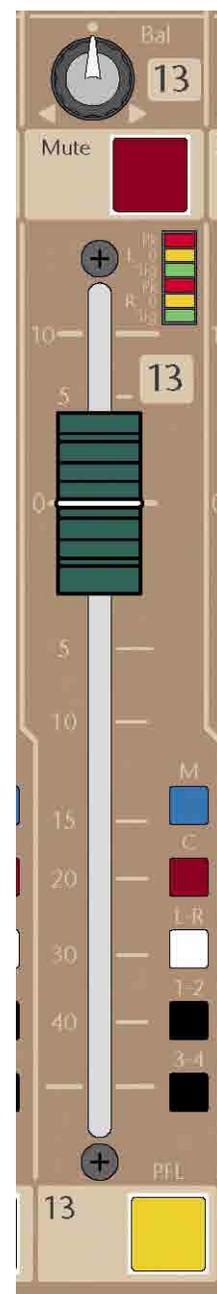
This high quality stereo fader controls the post-fader channel levels.

PFL Switch (Internally Illuminated)

This switch will internally illuminate yellow when activated. It will route Pre-Fader dual-mono/stereo signal to the master section for display on the Left/Right solo meters and into the monitor/headphone systems.

Discrete Sub Woofer Feed Using Mono Assignment Bus

The MONO bus may be used as a fixed level discrete feed to a subwoofer system. The Left-Right, Center, and Mono outputs are controlled from three individual master faders that when adjusted equally maintains balance between all outputs including the MONO sub output when master signal levels are changed.



PRORACK HOUSE – DUAL-MONO / STEREO INPUT CHANNELS

Rear Panel

XLR Input Connector (Separate for left and right inputs).

This connector accepts microphone or line input signals, as determined by the front panel combination Mic/Line – Pad switch.

This is a locking connector. To remove an XLR cable, depress the Tab on the connector before attempting to remove the cable plug from the console connector.

1/4" TRS Line Input Connector (Separate for Left and Right inputs)

This connector accepts line input signals and has an input impedance of >10k ohms. The line input may be balanced or unbalanced signal.

1/4" TRS Direct Output Connector (Summed-Mono Output)

The connector provides a line level output of the input channel's Post-HPF/Pre-EQ signal. This output can be used to feed a multi-track recording device, effects device, or to feed another mixing or processing device including distributed monitor mixing systems. Operating level is +4dBu.



PRORACK HOUSE – MASTER SECTION

GROUP CONTROL SECTION

Group Metering

When the Group Meter Select switch located above the group faders is depressed, the meters located directly above these four group faders will display the post-fader output levels as they appear on the rear panel XLR connectors. When selected, the associated "Groups" LED will illuminate (yellow) to indicate that the meters are set to display group output levels.

Signal Level LED

This bi-color Red/Green LED monitors the signal level on the associated Group mix bus. Varying intensity Green indicates proper bus levels while Red indicates the bus is at or near overload; this should be an indication to the operator that the channel input fader levels should be decreased until the red peak indicators are no longer activated. The red Peak LED monitors the mix bus output, Insert-return AND the post-fader signal levels.

Group Level Control Fader

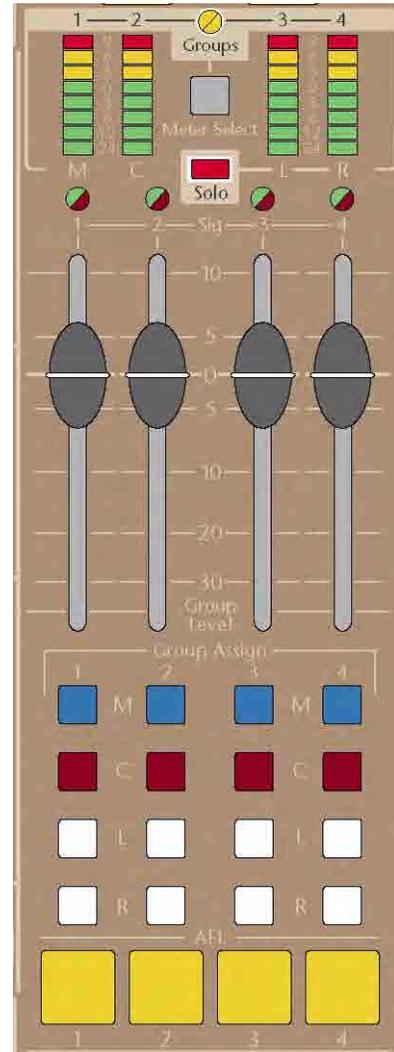
This fader will adjust the output level appearing on the XLR balanced group output connector and the levels being sent to any of the assigned Master buses.

Mono, Center, Left, Right Assignment Switches

Allows the associated Group post-fader signal (post insert) to be assigned to any of the primary output buses of the console. This is useful when an operator wishes to form an analog subgroup for the purposes of inserting a common signal processing device or to have common control a "group" of assign selected input channel signals. For subgroup control of a stereo group signal being fed to the primary outputs, an adjoining group pair would be used with the LEFT assignment switch selected on the odd number channel and the RIGHT assignment switch selected on the even number of channel.

Group AFL Switch (Internally Illuminated)

When selected, this switch will route post fader (post insert point) signal to the consoles PFL/AFL Solo system for display on the consoles master meters and to the mixers monitor/headphone system.



GROUP OUTPUT CONNECTORS – REAR PANEL

Balanced 1/4" TRS Group Bus-Inputs

The 10k ohm balanced inputs are provided to bring an external line level signal into the Group mix amp (prior to the fader level control). This allows any group fader to be used as an additional line level input into the mixer. It may also be used as part of the system to link multiple mixers together by bring the group output signal of the slave mixer (output level set to unity) into these group TRS connectors. Any signal brought into these group inputs will be mixed with any other input signals assigned to this group mix bus.

Group 1/4" TRS Insert Connector

This connector allows external processing or effects electronics to be inserted into the Group's signal path after the mix amp. Tip= Send, Ring= Return, Sleeve= Ground. Examples of external devices include additional equalization, notch filters, compressors, limiters, vocal doublers and harmonizers, reverb devices, etc. The insert send has an output impedance of 100 ohms unbalanced and the insert return has an input impedance of 5k ohms unbalanced. Operating level is -2dBu.

NOTE: The user should ensure that any device inserted into the Group signal path is capable of maintaining the signal integrity of the console. The device must be able to accept a +22dBu signal without clipping, and have an output impedance of 100 Ω or less and be capable of driving +22dBu into a 2k Ω load.

XLR Balanced Group Output

This is an 100 ohm electronically balanced line level output on an XLR connector designed to drive a 600 ohm load or greater. Operating level is +4dBu



PRORACK HOUSE – MASTER SECTION

AUXILIARY CONTROL SECTION

Auxiliary Output Level Control (1 thru 6)

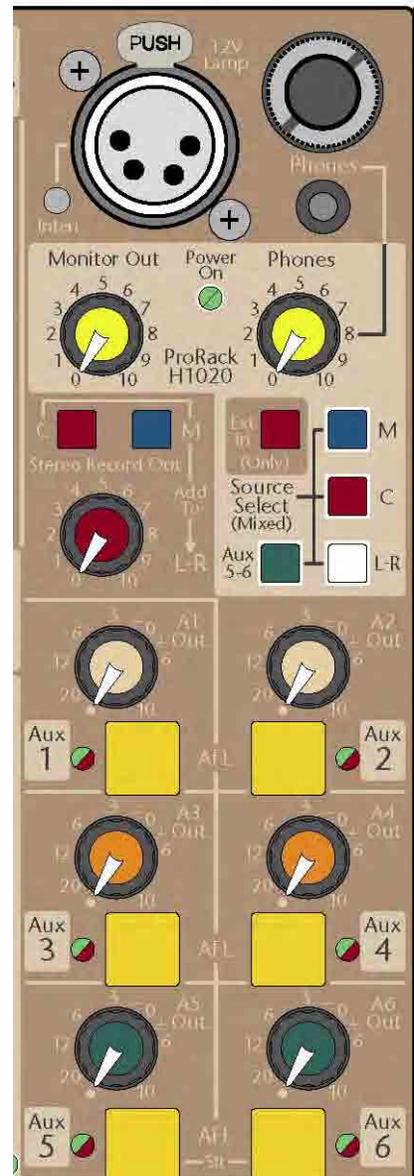
This control will adjust the auxiliary output level appearing on the associated XLR balanced output connector.

Dual-Color Bus Level LED Monitoring

This bi-color Red/Green LED monitors the signal level on the associated auxiliary mix bus. Varying intensity Green indicates proper bus levels while red indicates the bus is at or near overload, indicating that an auxiliary level control reduction should be made on the associate auxiliary mix channel. The red Peak LED monitors the mix bus output, Insert-return AND the post-level control signal levels.

Auxiliary AFL (Solo) Switch (Internally illuminated)

When selected, this switch will route post level (post insert point) auxiliary signal to the consoles PFL/AFL Solo system for display on the consoles master meters and to the mixers monitor/headphone system. If AFL switches 5-6 are simultaneously depressed, contents will be monitored as a stereo Left-Right signal into the meters and into the Monitor/Headphone system of the mixer.



AUX OUTPUT CONNECTORS – REAR PANEL

Balanced 1/4" TRS Auxiliary Bus-Inputs

The 10k ohm balanced inputs are provided to bring an external line level signal into an auxiliary bus prior to its level control. It may be used as part of the system to link multiple mixers together by bringing the auxiliary output signal of the slave mixer (output level set to unity) into these auxiliary input TRS connectors. Any signal brought into these auxiliary inputs will be mixed with any other input signals fed to this auxiliary mix bus.

Aux 1/4" TRS Insert Connector

This connector allows external processing or effects electronics to be inserted into the Aux signal path after the mix amp.

Tip= Send, Ring= Return, Sleeve= Ground. Examples of external devices include additional equalization, notch filters, compressors, limiters, vocal doublers and harmonizers, reverb devices, etc. The insert send has an output impedance of 100 ohms unbalanced and the insert return has an input impedance of 5k ohms unbalanced.

Operating level is +4dBu.

NOTE: The user should ensure that any device inserted into the Aux signal path is capable of maintaining the signal integrity of the console. The device must be able to accept a +22dBu signal without clipping, and have an output impedance of 100 Ω or less and be capable of driving +22dBu into a 2k Ω load.

XLR Balanced Auxiliary Output

This is an 50 ohm electronically balanced line level output on an XLR connector designed to drive a 600 ohm load or greater.

Operating level is +4dBu



PRORACK HOUSE – MASTER SECTION

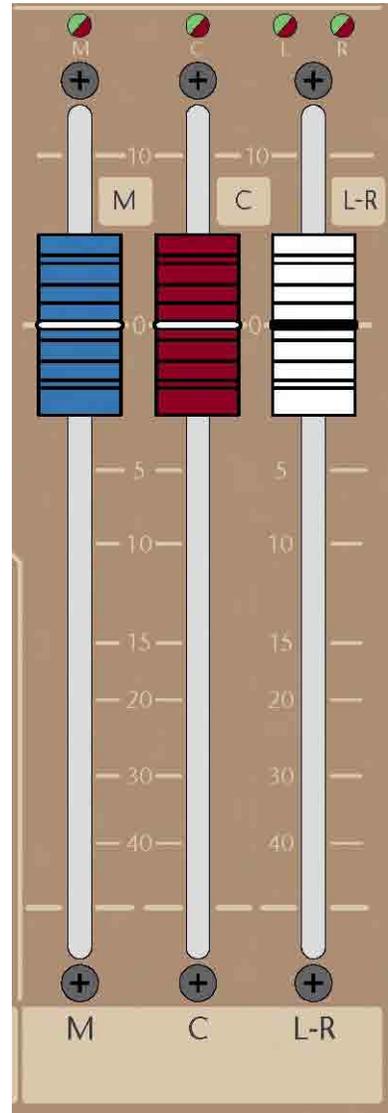
MASTER OUTPUTS (Left-Right, Center, Mono)

Peak/Signal Present Bus Monitor LED's

4 individual dual-color LEDs monitor the Mono, Center, Left and Right mix bus levels. In normal operation, varying intensity of the green LED represents acceptable bus signal levels. Should any of these levels approach clipping, the associated LED will illuminate red. This should be an indication to the operator that the channel input fader levels should be decreased until the red peak indicators are no longer activated. (Overall output levels can be adjusted by raising the master fader position to offset any decrease in level caused by lowering the input channel faders). The red Peak LED monitors the mix bus output, Insert-return AND the post-fader signal levels.

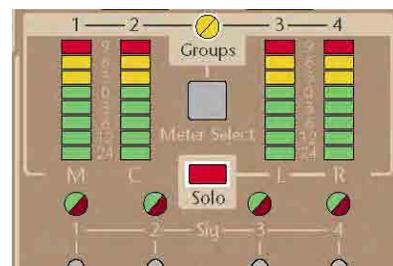
Mono, Center and Left/Right Level Control Faders

These faders adjust the output level appearing on the associated XLR balanced group output connectors. Each control has a range of from cut-off to +10dB of gain above unity. A single fader is used to control the Left/Right output level maintaining an absolute balance for these outputs as master level changes are made. Though two master faders are labeled as Center and Mono, these should be considered as two separate mono outputs that are usable for whatever application that required a mono signal derived directly from the selected input channels. These include uses to feed a center speaker cluster (use of the Center fader suggested), a sub-woofer feed (use of the Mono fader suggested), or uses as additional post fader auxiliary sends or matrix outputs.



Master Output Metering (Left - Right - Center - Mono Outputs)

The post-fader levels of the Mono, Center, Left and Right outputs are displayed on the 4 master meters. Any PFL/AFL (Solo) switch will cause the 2 right-most meters to display the solo'd signal in place of the master output signals. These same meters can be manually switched to display the 4 Group output signal levels.



MAIN OUTPUT CONNECTORS – REAR PANEL

Balanced 1/4" TRS Bus Inputs

Left, Right, Center and Mono 10k ohm balanced inputs are provided to bring an external line level signal into the Main mix buses prior to their level controls. These may be used as part of the system to link multiple mixers together by bring the master output signal of the slave mixer (output level set to unity) into these master input TRS connectors. Any signal brought into these inputs will be mixed with the associated Left, Right, Center and Mono signal on the master mixer.

Main Bus 1/4" TRS Insert Connector

This connector allows external processing or effects electronics to be inserted into the Main signal path after the mix amp. Tip= Send, Ring= Return, Sleeve= Ground. Examples of external devices include additional equalization, notch filters, compressors, limiters, etc. The insert send has an output impedance of 100 ohms unbalanced and the insert return has an input impedance of 5k ohms unbalanced. Operating level is -2dBu.

NOTE: The user should ensure that any device inserted into the Main signal path is capable of maintaining the signal integrity of the console. The device must be able to accept a +22dBu signal without clipping, and have an output impedance of 100 Ω or less and be capable of driving +22dBu into a 2k Ω load.

Line/Microphone Level Output Switches

The output level of ProRack XLR connectors is normally at +4dBu. This is designed to drive most amplifiers to their maximum levels or signal processing equipment to their optimum levels. In some situations you may need to plug the output of this mixer into the microphone input of another mixer or sound system. By depressing the Mic/Line switch next to the associated XLR output connector, output signal levels will be reduced approximately 30dB to normal microphone levels. This signal now can be applied to the microphone input channel of another mixing device. (Warning – Make sure that phantom power is turned OFF on the microphone input of the mixer into which ProRack is being connected or damage may result).

Mono, Center, Left and Right XLR Balanced Outputs

These outputs provide a +4dBu balanced line level output (100 ohm symmetrically-balanced) signal for each of the consoles primary outputs.

When Mic Level is selected, output impedance is 200 ohms and operating level is -25dBu.



PRORACK HOUSE – MASTER SECTION

HEADPHONE AND MONITOR SYSTEM

Headphone Level Control

This control adjusts the level being fed to the headphone system.

1/4" And 1/8" Headphone Connectors

A 1/4" and a 1/8" set of headphone connectors are located on the front panel of the console.

Monitor (Speaker) Level Control

This control adjusts the stereo level being fed to the Monitor TRS output connectors of the mixer.

Monitor/Headphone Source Selection Switches

These 5 switches determine the default audio source for the Monitor system (Monitor and Headphone outputs). The first 4 switches select from the internal buses: Mono, Center, L-R and Aux 5-6. These 4 sources are equally mixed together when their corresponding switch is depressed; any mono sources are sent equally to the L & R sides of the monitor circuitry. When Solo is active (PFL or AFL), the Solo audio signal interrupts this default source and only the Solo audio is fed to the monitor circuitry (*See below)

Mono (M) Headphone/Monitor Source Switch

When selected, this switch will route a post master fader Mono signal equally to the left and right stereo headphones and monitor level controls as a "phantom center" image.

Center (C) Headphone/Monitor Source Switch

When this switch is selected, it will route a post master fader Center signal equally to the left and right stereo headphones and monitor level controls as a "phantom center" image.

Left-Right (L-R) Headphone/Monitor Source Switch

When selected, this switch will route a post master fader left-right signal to the left and right stereo headphone and monitor level controls.

Aux 5-6 Headphone/Monitor Source Switch

When this switch is depressed, it will route a post level control Aux 5 (left) and Aux 6 (right) stereo signal to the monitor system. This allows for monitoring of this set of auxiliary outputs as a default signal without using the Solo system. This is useful when Aux 5-6 are being used to generate a separate broadcast output.

External Input Headphone/Monitor Source Switch

When this switch is selected, it will route an external input to the headphone and monitor system from the rear panel left and right external input connectors. (On older consoles, this input was usually referred to as tape inputs).

*** When this switch is depressed, it will override ALL other audio sources that may be selected for monitoring, including any Solo signal (PFL or AFL). If nothing is being fed to the External Line Inputs (on rear), then NOTHING will be heard in Monitor and Headphone outputs. Check this switch first if the headphones seem to be not working.**

ADDITIONAL STEREO OUTPUT

Stereo Alternate Level Control

This control adjusts an additional stereo output that can be used to feed an external recording device or additional physical location (such as a cry room). In addition to the Left & Right buses, the mixer's Center or Mono buses may also be mixed in with the Left & Right signals if desired (see below).

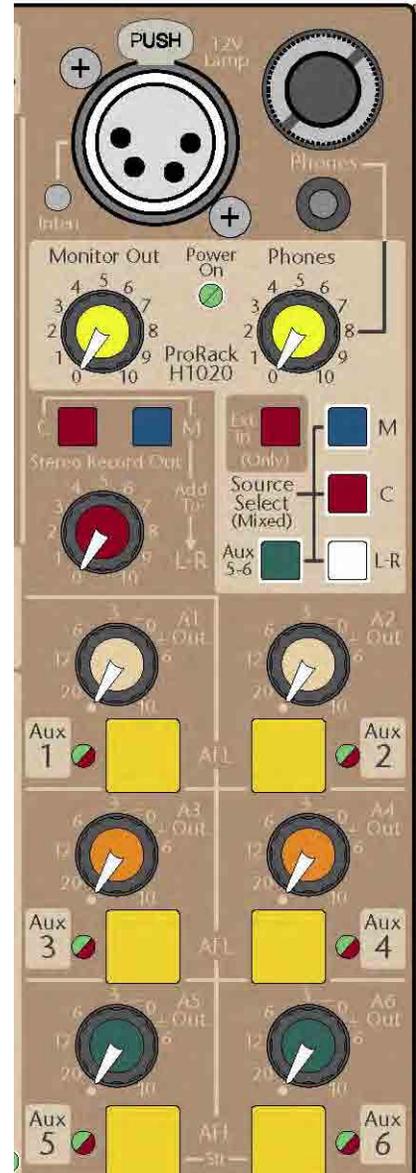
Add C(enter) To L-R

Adds the signal from the Center bus to the Left-Right Stereo Alt Outputs. This enables an LCR console output to be sent as a Left-Right signal to a recording device while in the FOH system the signals are still separated into a Left-Right music system and a Center vocal only system.

Add M(ono) To L-R

Adds the signal from the Mono bus to the Left-Right Stereo Alt Outputs. This enables the Mono bus output to be added to the left-right mix and used as an overall Left-Right signal to recording device.

NOTE: All of the signals feeding the Stereo Alt Out section are after the main faders (Post-fader)



PRORACK HOUSE – MASTER SECTION REAR PANEL

Rear Panel Monitor Output Connectors

Impedance Balanced 1/4" output connectors are provided for Left and Right monitor speaker outputs. An additional 1/4" Impedance Balanced output connector is provided which is a sum of the Left, and Right signals. This connector may be used as a summed mono output to feed a sub-woofer system or to drive a mono wedge monitor system when the console is used as a monitor console.

External Input Connectors

Balanced 1/4" input connectors are provided for monitor of an external signal such as monitoring a signal directly off of a radio broadcast; separate left & right connectors are provided. If a mono source needs to be monitored, plugging into just the Left input jack will feed the signal to both the left & the right sides of the monitor system.

1/4" Left and Right Stereo Alternate (Record) Output Connectors

Impedance-balanced left and right 1/4" TRS connectors are provided at a +4dBu operating level for the Stereo Alternate Output. (Output Impedance = 100 ohms Impedance Balanced).

RCA Stereo Alternate (Record) Outputs

RCA connectors are also provided for low level outputs (-10dBV) of the stereo alternate output to better match the input requirements of consumer grade recording devices.

SOLO (PFL/AFL) LINKING SYSTEM

Two 5-pin DIN connectors are provided that allow the Solo systems of multiple ProRack mixers to be linked together. Thus, a single set of headphones can be used to monitor the solo functions of multiple mixers. This Solo-linking can also be used with a larger APB Spectra console if it is fitted with a Solo Linking option.

Use a 5-pin circular DIN cable to link the OUT connector of the Slave console to the IN connector of the Master console. Any Solo activity on the Slave console will still show up on that console but will now also activate the Solo function on the Master console where the Slave's solo audio can be heard, mixed in with any Master Solo activity.

The DIN cable should be wired pin-to-pin with an overall shield tied to the connector shells on each end.

Contact APB about where to obtain a Solo-Linking cable.



PRORACK HOUSE – ADDITIONAL FEATURES

LAMP AND DIMMER SYSTEM

4-Pin XLR Lamp Connector

A four-pin XLR connector can be used with a Littlite® or other similar gooseneck lamp. Compatible with Hi-intensity (Halogen), regular incandescent or LED lamps. A straight, 12-inch length gooseneck works best for this console. A locking connector is provided for this lamp which must be depressed and held while removing the plug in lamp.

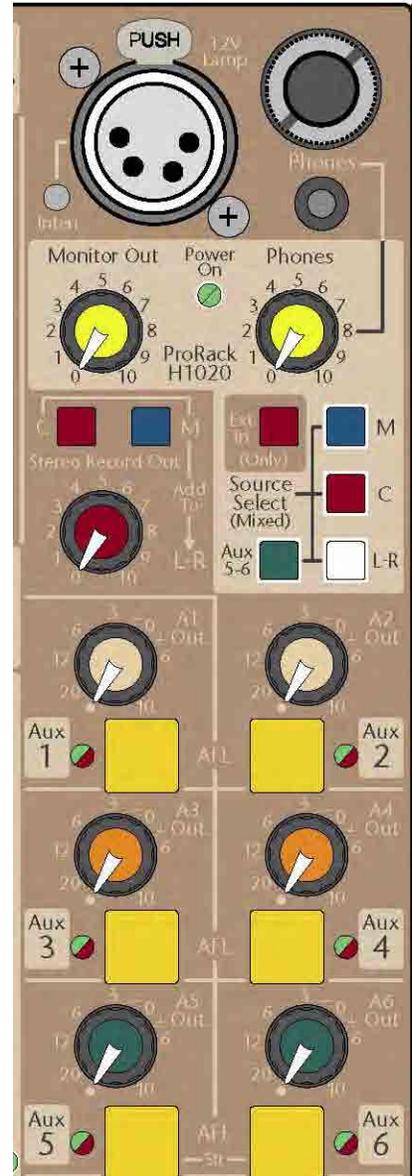
Positive voltage on Pin-4, 0V on Pin-3, No Connection to Pins 1 & 2.

An internal resettable fuse protects against shorts on this connector.

Maximum allowed current draw is 350mA @ 12V.

Lamp Intensity Control

A recessed trimmer control is provided adjust the brightness of the plug-in lamp. This may be adjusted with a small flat-blade or jeweler's screwdriver. Maximum brightness is achieved by turning this control to its full clockwise position (12V); minimum brightness at full counter-clockwise (< 2V).



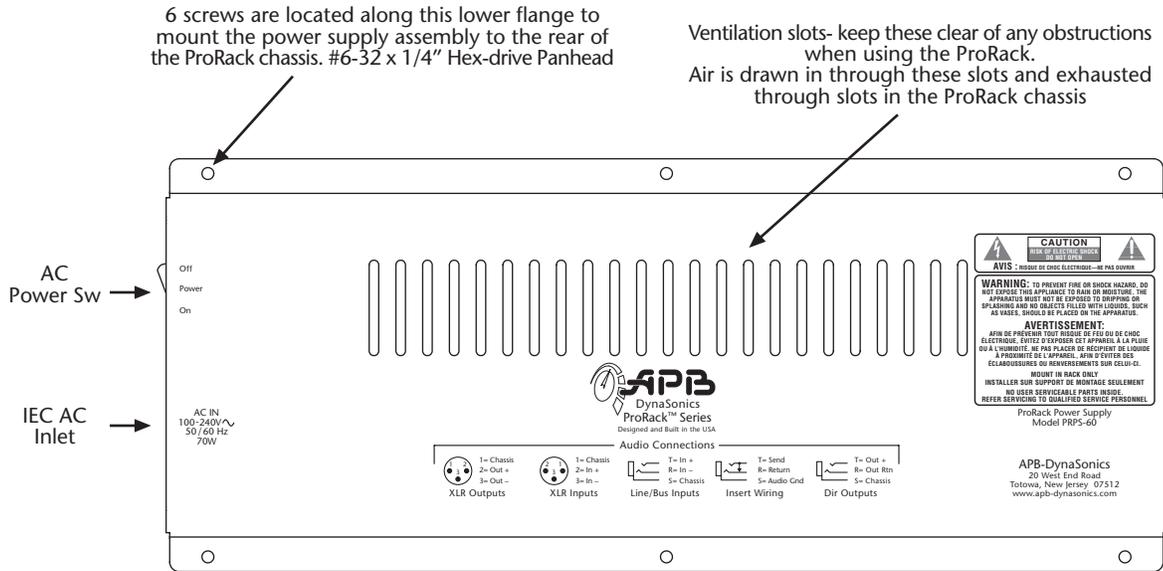
ROTATING CONNECTOR POD

The rear connector chassis may be rotated between three different locking positions. When used freestanding on a desktop, the fully opened 90-degree position is recommended. When mounted in an upright rack, the 180-degree position may be selected. In an angled rack, a mid position may be the best choice. The connector panel is locked into position using the two provided #10-32 screws on each side of the panel. Remove these screws before trying to rotate panel or damage (maybe to you) may result. It is suggested to reinstall these screws once the panel position is selected.

If these screws are lost, replace with #10-32 x 1/4" Flat-head Stainless Steel screws- maximum length allowed is 3/8".

Do not transport the mixer with the rear panel unsecured. See the following pages for additional mounting information.

ProRack Power Supply Model PRPS-60



The power supply for the ProRack is designed to be easily field-replaced: 6 screws secure it to the rear panel of the ProRack; a captive wire-lead with locking connector is used to mate with the circuits within the Mixer. A small internal fan circulates air through the supply into the Mixer. All internal power supply assemblies are medically-rated and agency approved (UL/CSA/VDE/CE). There are no user-serviceable parts inside; heed all printed warnings.

Input Voltage: 100 to 240 VAC 50/60Hz

Input Power: <72W

AC Mains Connector: IEC 15A Receptical

ProRack is supplied with mating IEC cordset with either an Edison-plug (USA/Canada) or Euro-plug (Export)

DC Output Voltages & Currents (as used by the ProRack):

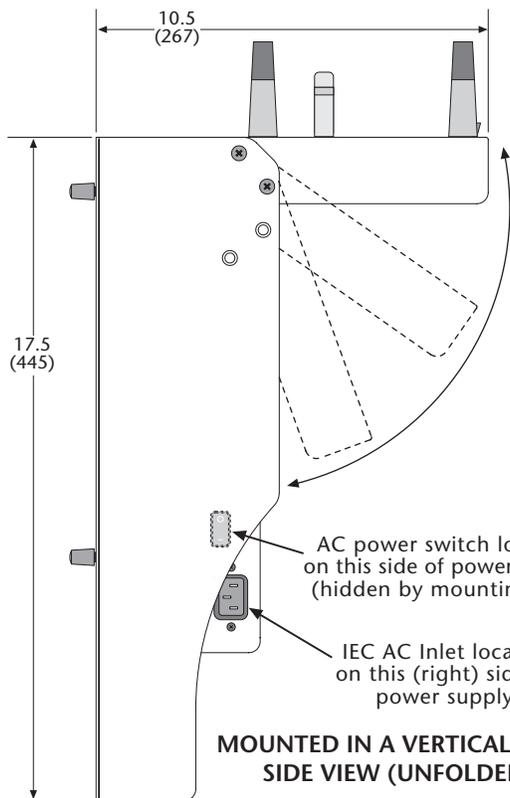
+17.6V @ 1.3A

-17.6V @ 1.3A

+15V @ 1A

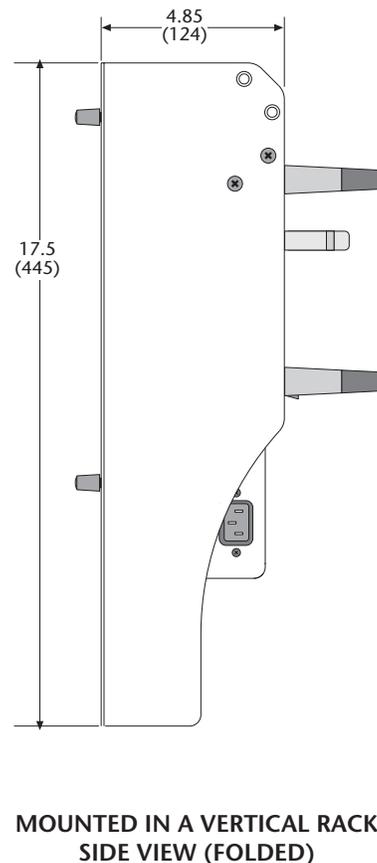
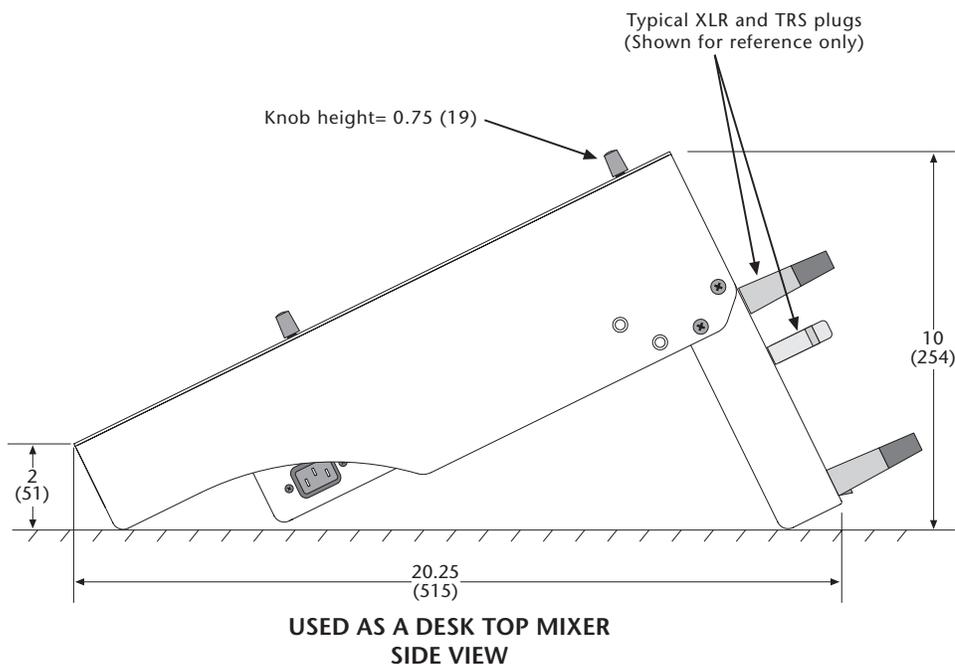
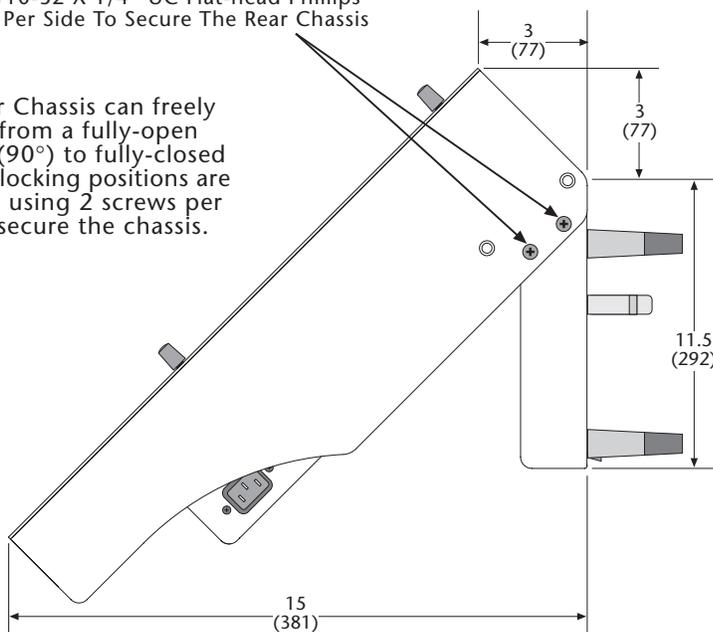
+48V @ 0.2A

DC Output Connector: 7-Way Molex 0.156" pitch



Note Different Position Of Locking Screws For Each Orientation Of The Rear Chassis:
#10-32 X 1/4" UC Flat-head Phillips
2 Per Side To Secure The Rear Chassis

The Rear Chassis can freely rotate from a fully-open position (90°) to fully-closed (180°). 3 locking positions are provided using 2 screws per side to secure the chassis.

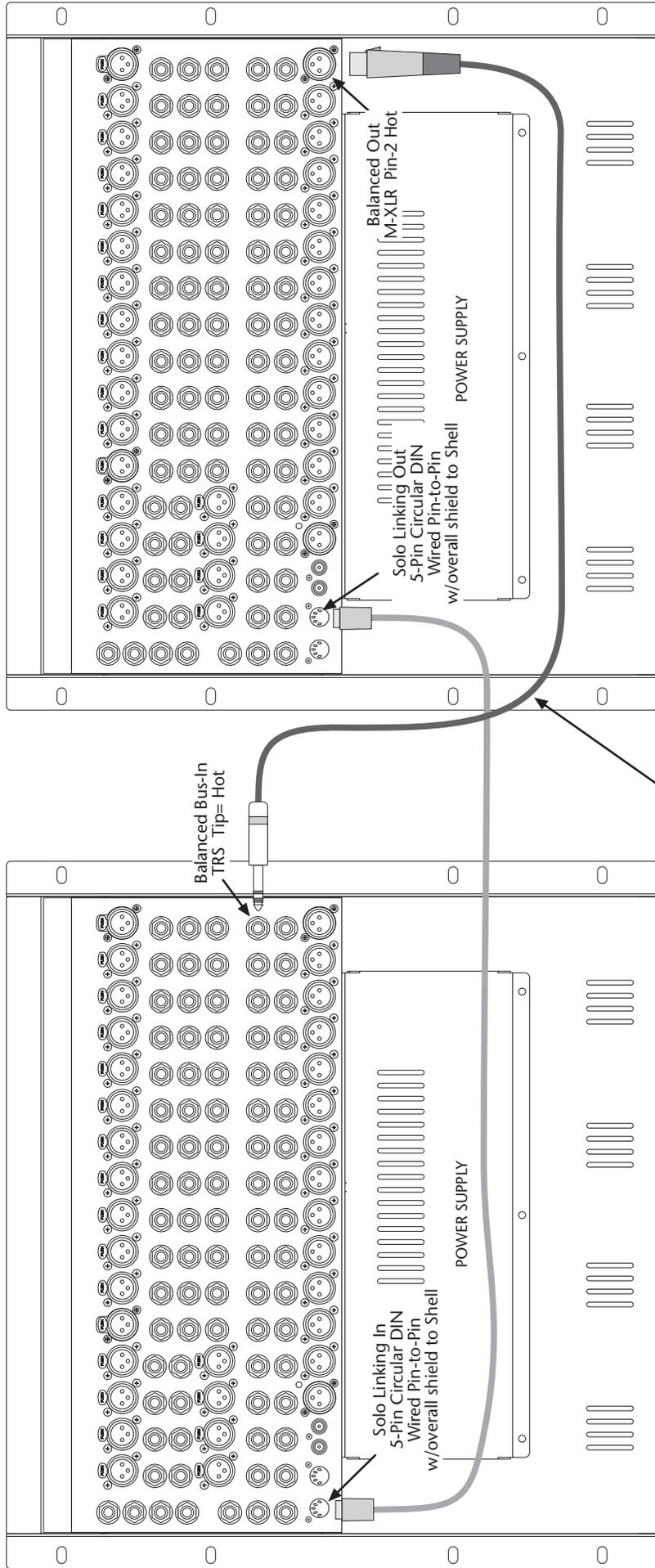


Dimensions shown for the different orientations
Given in inches and (mm)
-to the closest 1/4" or mm -

Weight= 34 lbs (15.5kg) for all orientations
Shipping Weight (boxed)= 40 lbs (18kg)

ProRack Mounting Options

Interconnecting two ProRack Mixers as Master and Slave



Repeat this connection for each of the Bal-Out / Bus-In pairs that will be shared across the 2 consoles.
 14 connections needed to tie all like-buses together
 6 Auxes, 4 Groups, 4 Main (M, C, L, R)
 16-way XLR to 1/4" TRS Audio Snake can be used

- Master Console -
 Audio signals from all buses in the Slave Console are mixed into the Master Console buses at unity gain.
 Solo also monitored from this Mixer

- Slave Console -
 To ensure correct mixing levels into the Master console, all bus output controls on the Slave console should be set to "0" (unity).
 Solo System is linked between Consoles with a single DIN cable: Each end fitted with 5-Pin circular DIN connector wired pin-to-pin with 5 conductor (overall) shielded cable. Shield tied to connector shell at both ends of the cable.

APB-DynaSonic
ProRack-FOH
Track Sheet

Artist

Song

Date

Engineer

	1	2	3	4	5	6	7	8	
	<input type="checkbox"/> +48V <input type="checkbox"/> Line <input type="checkbox"/> Polarity <input type="checkbox"/> Pad Gain: 30 40 45 50	<input type="checkbox"/> +48V <input type="checkbox"/> Line <input type="checkbox"/> Polarity <input type="checkbox"/> Pad Gain: 30 40 45 50	<input type="checkbox"/> +48V <input type="checkbox"/> Line <input type="checkbox"/> Polarity <input type="checkbox"/> Pad Gain: 30 40 45 50	<input type="checkbox"/> +48V <input type="checkbox"/> Line <input type="checkbox"/> Polarity <input type="checkbox"/> Pad Gain: 30 40 45 50	<input type="checkbox"/> +48V <input type="checkbox"/> Line <input type="checkbox"/> Polarity <input type="checkbox"/> Pad Gain: 30 40 45 50	<input type="checkbox"/> +48V <input type="checkbox"/> Line <input type="checkbox"/> Polarity <input type="checkbox"/> Pad Gain: 30 40 45 50	<input type="checkbox"/> +48V <input type="checkbox"/> Line <input type="checkbox"/> Polarity <input type="checkbox"/> Pad Gain: 30 40 45 50	<input type="checkbox"/> +48V <input type="checkbox"/> Line <input type="checkbox"/> Polarity <input type="checkbox"/> Pad Gain: 30 40 45 50	<input type="checkbox"/> +48V <input type="checkbox"/> Line <input type="checkbox"/> Polarity <input type="checkbox"/> Pad Gain: 30 40 45 50
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	<input type="checkbox"/> 1-2 <input type="checkbox"/> 3-4								
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	1	2	3	4	5	6	7	8	

TECHNICAL SPECIFICATIONS

General Specifications	
Frequency Response (any input to any output)	+0/-0.5dB 20Hz to 20kHz (ref to 1kHz)
THD + Noise (Mic Input to Main Output)	<0.01% @ +15dBu output
Phase Response (Mic Input to Main Output)	+10/-15 degrees 20Hz to 20kHz (ref to 1kHz)
Noise	
Mic EIN	-128dBu @ 60dB gain, 150Ω source
Main Bus (L-R-C-M) Output Noise	-85dBu (All channels assigned w/faders down, Master faders at unity)
Group Bus (1-4) Output Noise	-85dBu (All Chan assigned w/faders down, Group Master fader at unity)
Aux Bus (1-6) Output Noise	-90dBu (Aux Sends down, Aux Master at unity)
Crosstalk (measured at 1KHz)	
Channel Mute	>100dB
Channel Fader Attenuation	>100dB
Channel Routing	>80dB
Channel Pan Isolation	>80dB
Channel to Channel Isolation	>90dB
Aux Send Attenuation	>90dB
Aux Pan Isolation	>70dB
Input / Output Impedance	
Channel XLR Input	>3KΩ Balanced (with or without Pad)
Channel Line Input (via TRS)	>20KΩ Balanced
Channel Line Input (via XLR w/Pad)	>4KΩ Balanced
Channel TRS Direct Out	100Ω Impedance-Balanced
Bus XLR Outputs (Main, Group, Aux)	100Ω Symmetrically-Balanced (To Feed 600Ω or greater)
Channel and Bus Insert Sends>Returns	100Ω Unbalanced / 5KΩ Unbalanced (To Feed 2kΩ or greater)
Monitor TRS Outputs	100Ω Impedance-Balanced
Input / Output Levels	
Channel Insert	+4dBu (Tip= Send, Ring= Return, Sleeve= Audio Gnd) Max Out= +22dBu
Channel Direct Out	+4dBu (TRS Impedance Balanced, Tip= "Hot") Max Out= +22dBu
XLR Balanced Outs	+4dBu (Symmetrically-Balanced, Pin 2= "Hot") Max Out= +26dBu
TRS Balanced Outs	+4dBu (Impedance-Balanced, Tip= "Hot") Max Out= +22dBu
Bus Insert	-2dBu (Tip= Send, Ring= Return, Sleeve= Audio Gnd) Max Out= +22dBu

