

MODELS 4400 SERIES AND 4800 SERIES AUTOMATIC MIXERS

GENERAL PROCEDURE

» BEFORE CONNECTING OR DISCONNECTING THE POWER SUPPLY REAR PANEL CONNECTOR, ANY REAR PANEL WIRING, OR REMOVING OR REPLACING JUMPERS (SHUNTS), PERFORM THE FOLLOWING STEPS:

1. DEPRESS THE FRONT PANEL POWER SWITCH TO THE OFF POSITION.
2. DISCONNECT THE POWER SUPPLY FROM THE AC POWER OUTLET.

FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE EQUIPMENT AND WILL VOID THE WARRANTY.

TOOLS REQUIRED

In order to perform all of the setup procedures and installation procedures described in this document, the tools listed below will be required, but all are not required for each procedure.

1. # 2 Phillips screwdriver (for removal of the top cover)
2. Small slotted screwdriver with insulated blade (supplied with mixer) for installing/removing wiring or adjusting pots. GC 8608, or equivalent.
3. Small needle nosed pliers (for jumper removal and replacement)

JUMPERS

Jumpers, also referred to as shunts, are used extensively in the 4400 and 4800 Series Automatic Mixers to select or set up alternatives or options. A jumper consists of a small conductive clip encased in a molded plastic case. It is designed to slide onto two adjacent pins in a pin strip array. The pin strips used in this equipment have spacings of .100 inches. In the diagrams in this document, a jumper (shunt) is represented as a solid black rectangle which covers two adjacent pins. The figure below illustrates several examples of jumpers.

Also used in this document is a reversed or negative representation of some components to aid in locating them in the diagrams. Some reversed components are also illustrated in the figure below. Note particularly the difference between a reversed pin array and a pin array with a jumper in place. Reversed components are used in the overall views, only. Jumpers are shown only in the magnified views of the reversed components.



MOUNTING AND VENTILATION

The 4400 and 4800 Series Automatic Mixers are designed for rack mounting in a standard EIA 19 inch equipment rack. When rack mounting these mixers, there are several considerations which must be kept in mind.

Physically, each mixer requires one EIA rack space (1.75) inches. However, adequate ventilation space must be provided for heat removal. For this reason, one empty EIA rack space must be left between mixers. Do not cover the empty rack space with a solid panel. Use a perforated or louvered vent panel.

If they are not mounted in a rack, do not stack mixers directly on each other. Space them 1.75 inches apart, allowing for the free flow of air between them. Do not block the louvers in the tops.

Rack mounting is usually accomplished with four 10-32 flat head machine screws and cup washers. This prevents scratching of the front panel when appearance is important, but it does not provide grounding. If grounding to the rack is required, it is recommended that a grounding strap be added. If appearance is not critical, then the use of four round head or pan head screws with lock washers, but no cup washers, will provide grounding.

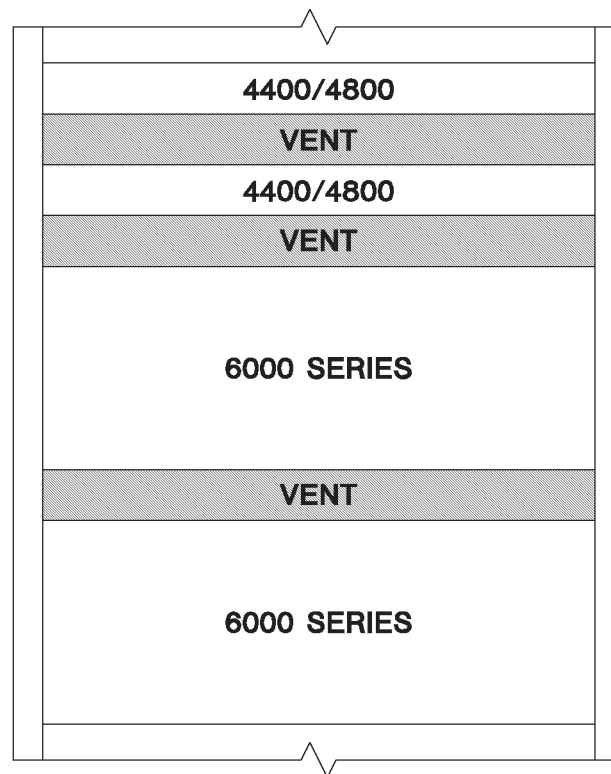


Figure 1 - Typical rack layout showing vent spaces

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REAR TERMINAL CONNECTIONS, INPUTS

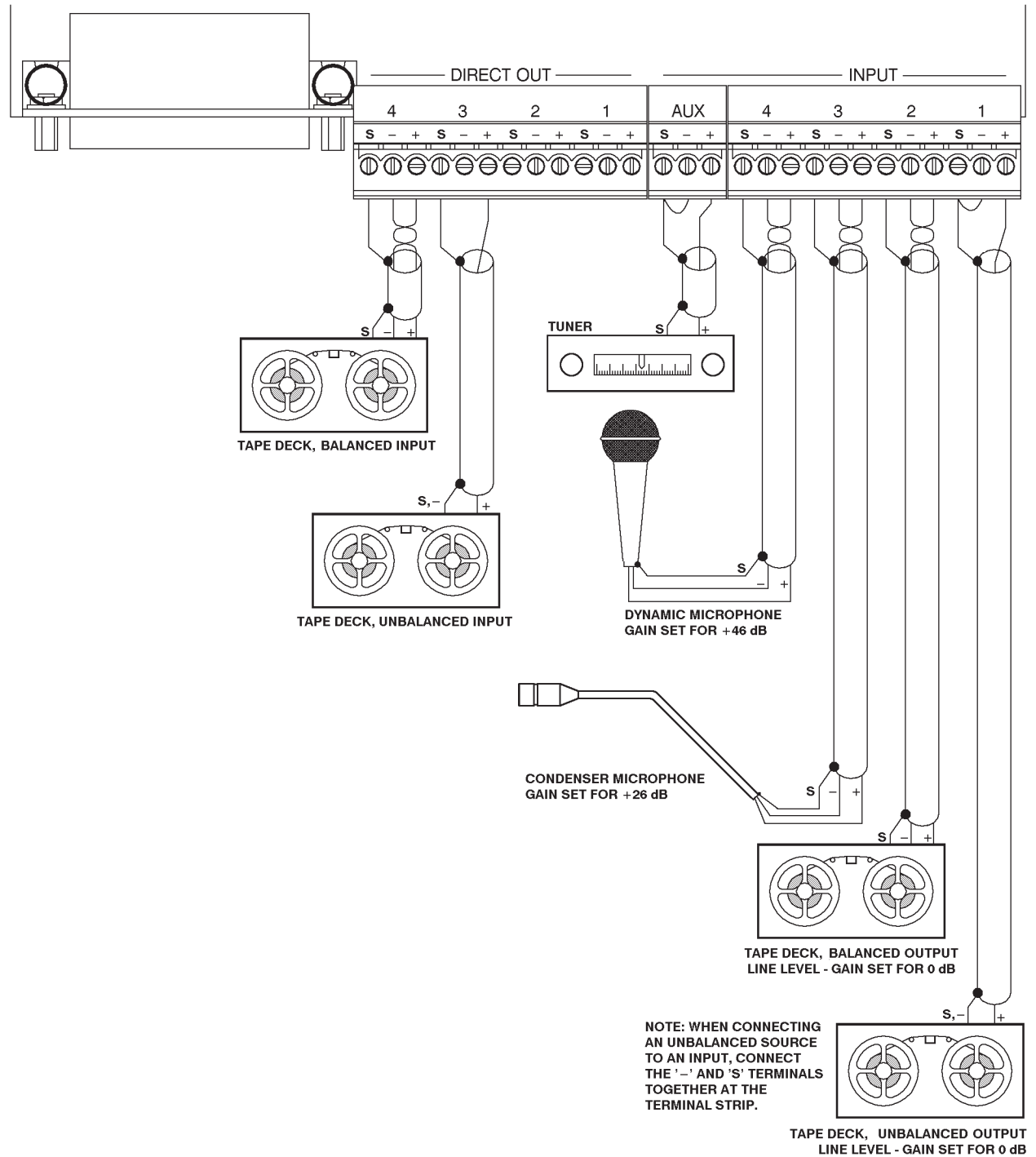


Figure 2 - Rear terminal connections
Inputs

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REAR TERMINAL CONNECTIONS, AC POWER AND OUTPUTS

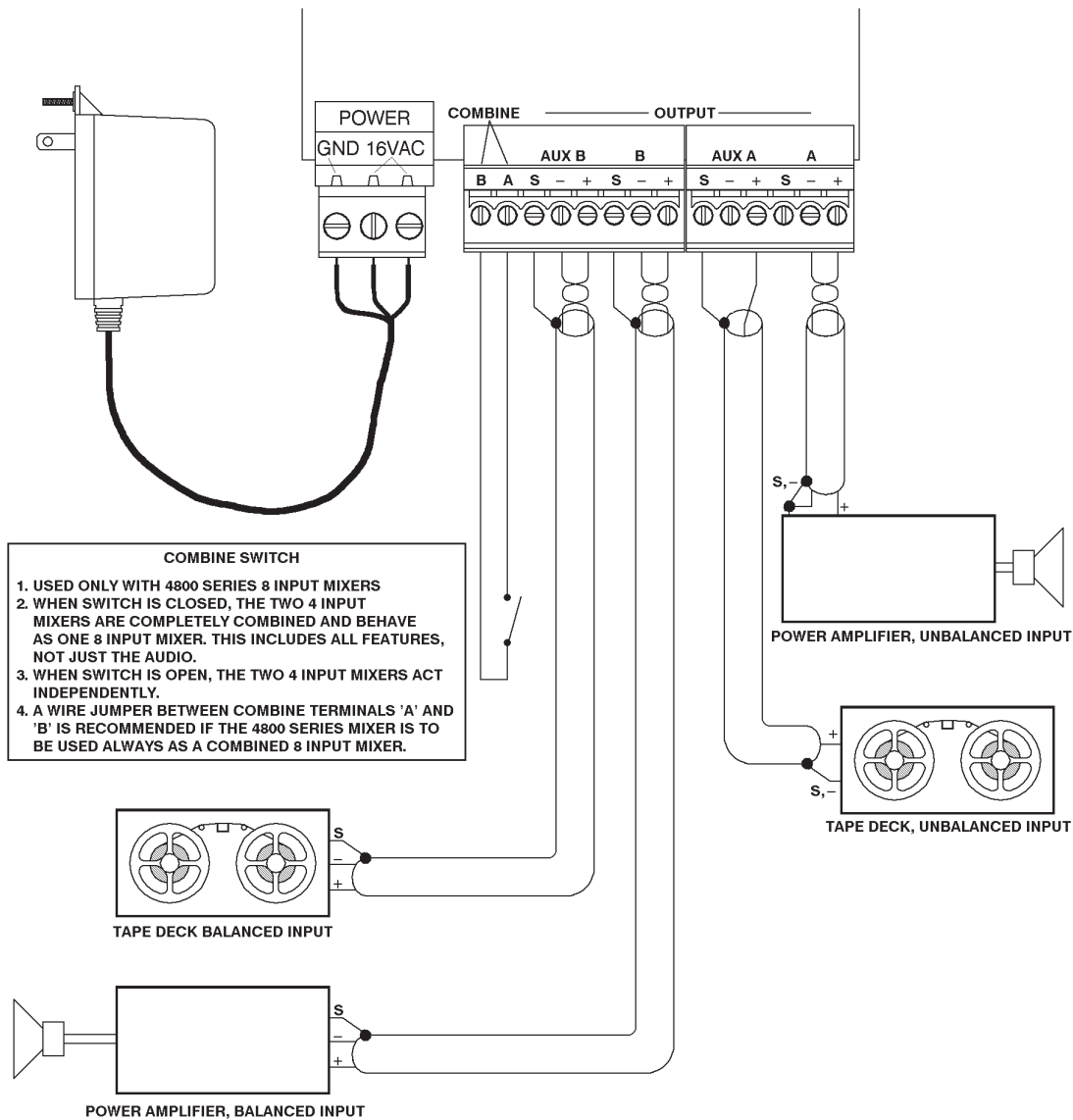


Figure 3 - Rear terminal connections
AC power and outputs



REMOTE CONNECTOR, INPUT AND/OR MAIN OUTPUT OPTION 1 AND AUXILIARY INPUT OPTION A

Wiring shown is for input and/or main output option 1, 110V Voltage Controlled Amplifier. Auxiliary Input VCA option is Option A. Use 22 AWG twisted pair with overall shield, Belden 8451 or equivalent.

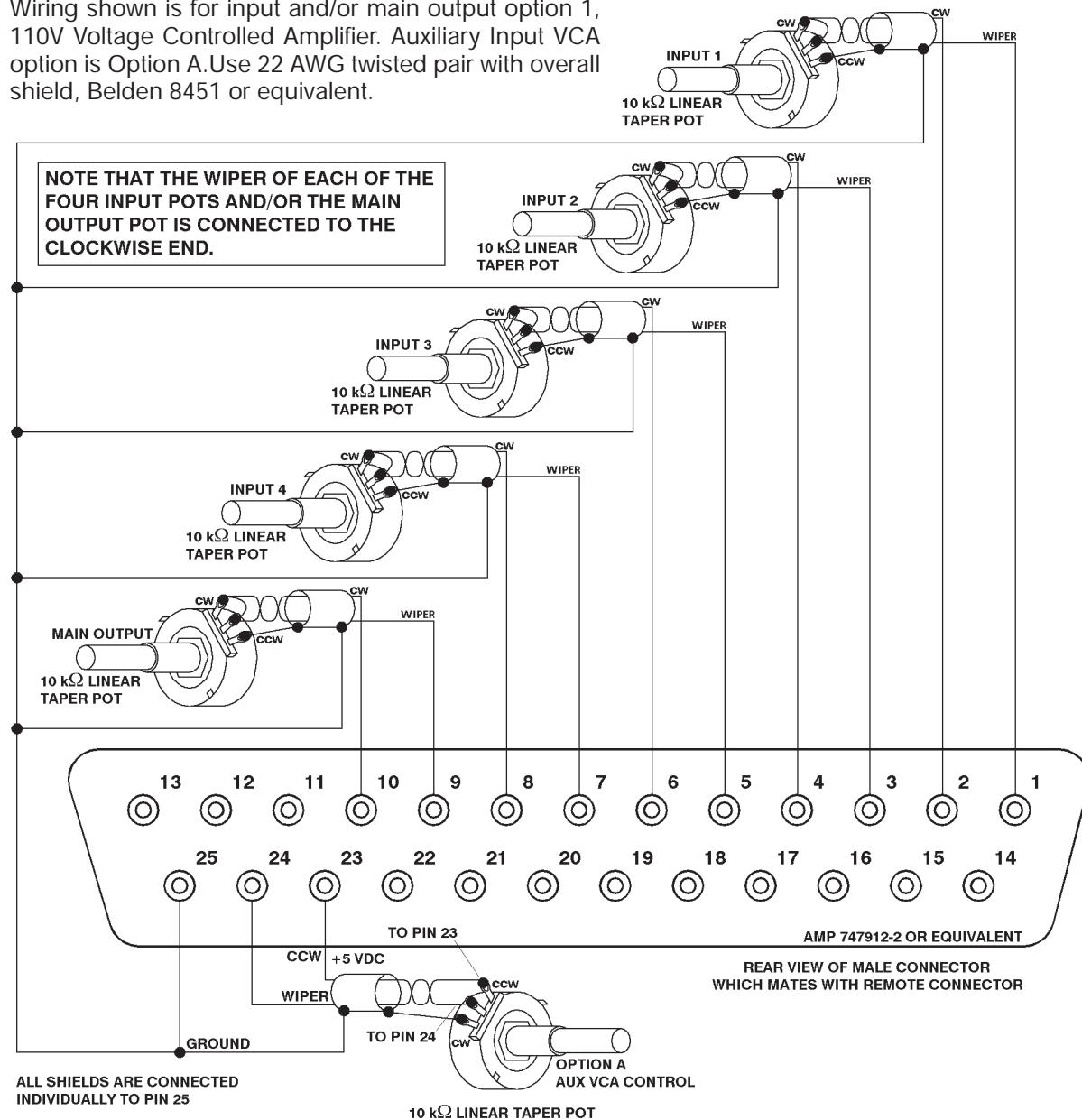
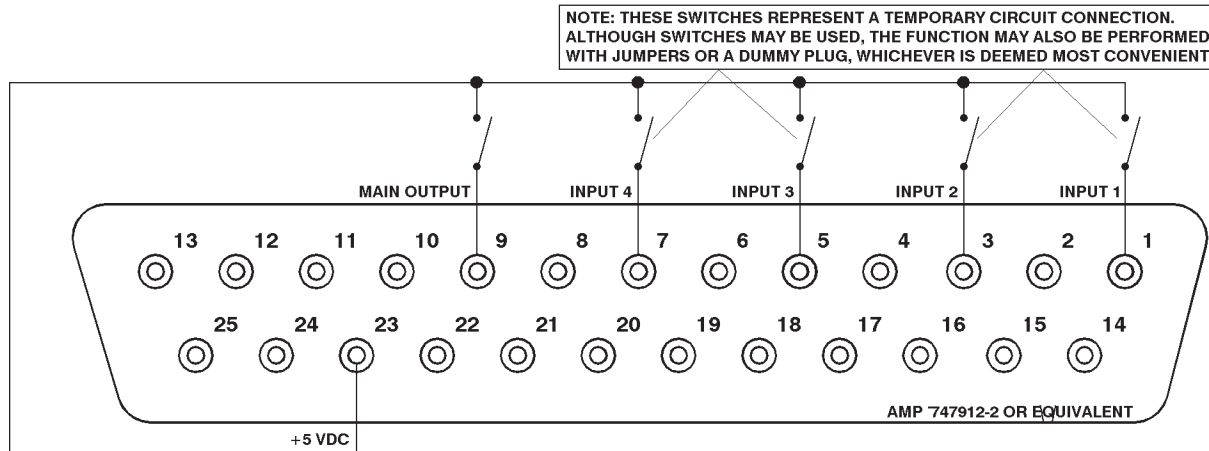


Figure 4 - Remote Control Connections
 Input and/or Main Output Option 1, Model 142 Voltage Controlled Digital Attenuator (VCDA)

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INPUT AND/OR MAIN OUTPUT OPTION 2 AND LOGIC OUT



THE WIRING SHOWN IN THIS DRAWING IS NOT PERMANENT. IT IS USED ONLY DURING SETUP OF THE SYSTEM WHEN OPTION 2, THE MODEL 120P PROGRAMMABLE GAIN CONTROL IS USED. ONLY THOSE INPUTS AND/OR MAIN OUTPUTS HAVING 120Ps SHOULD BE WIRED AS SHOWN. THIS FORCES THE 120P TO MAXIMUM GAIN SO THAT THE SYSTEM LEVELS CAN BE SET UP. THESE CONNECTIONS MUST BE REMOVED FOR NORMAL OPERATION. THEY MAY BE IMPLEMENTED BY SIMPLE JUMPERS WHICH PLUG INTO THE PROPER SOCKET PINS, SWITCHES, OR BY A DUMMY HEADER (PLUG) WITH THE APPROPRIATE INPUTS AND/OR MAIN OUTPUTS WIRED. THE DUMMY PLUG IS INSERTED DURING SETUP AND REMOVED FOR NORMAL OPERATION.

Figure 5 - Remote Control Connections, 120P Setup Control

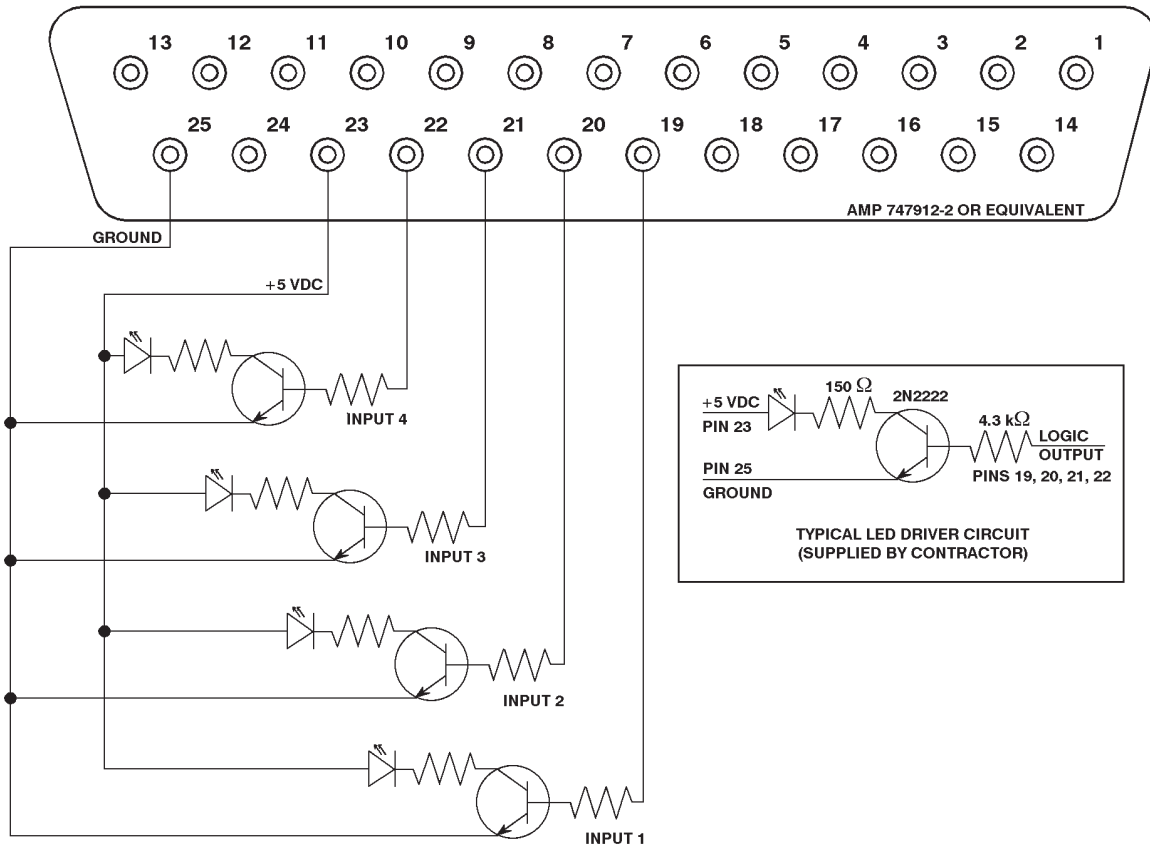


Figure 6 - Remote Control Connections, Logic Output



REMOTE CONNECTOR, INPUT AND/OR MAIN OUTPUT OPTION 1 USING 412PLCs FOR REMOTE LEVEL CONTROL

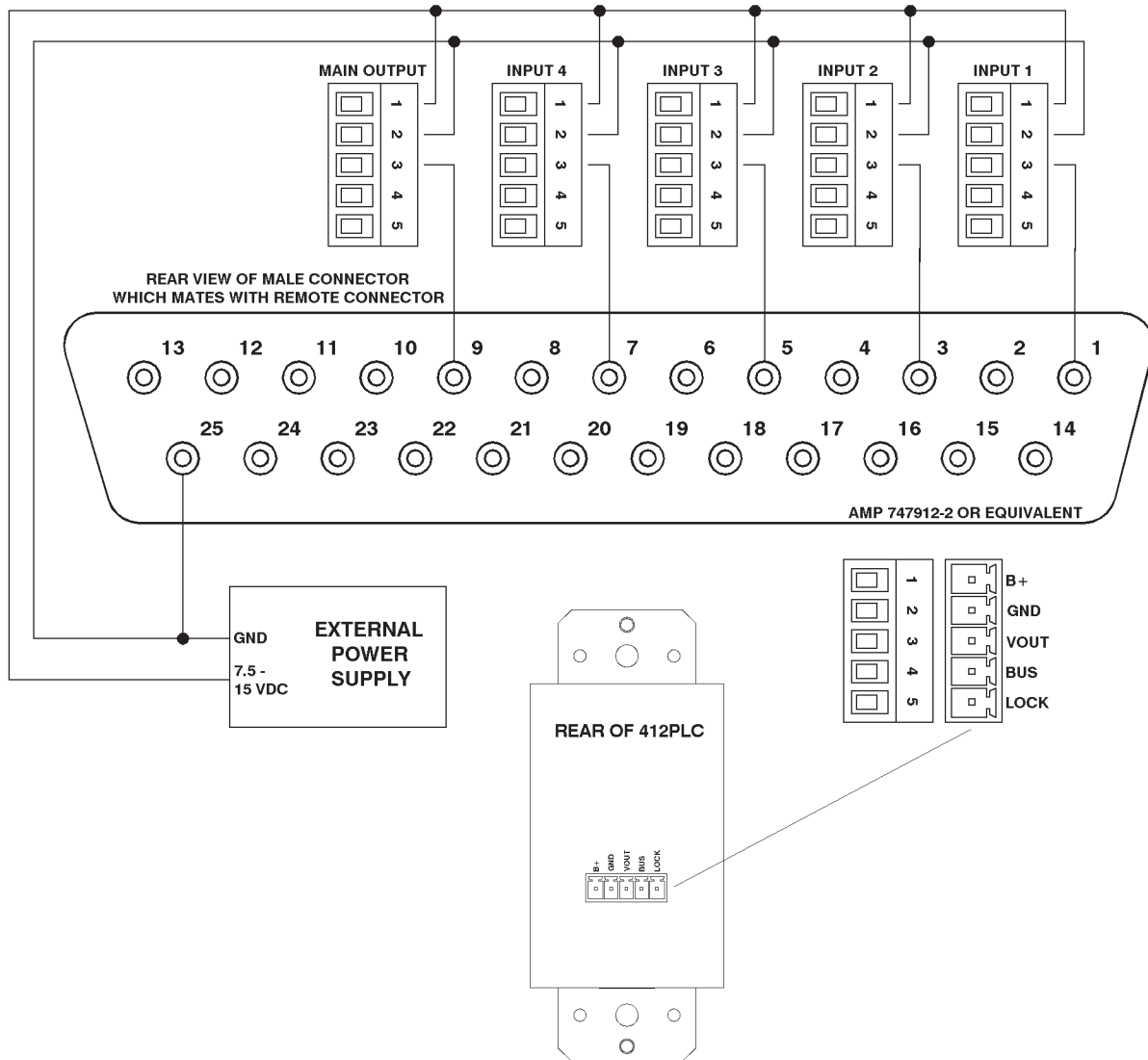


Figure 7 - Rear terminal connections
 Input and/or Main Output Option 1 using 412PLC for remote level control

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COMBINING SWITCH AND REMOTE OUTPUT LEVEL CONTROL USING 412PLC

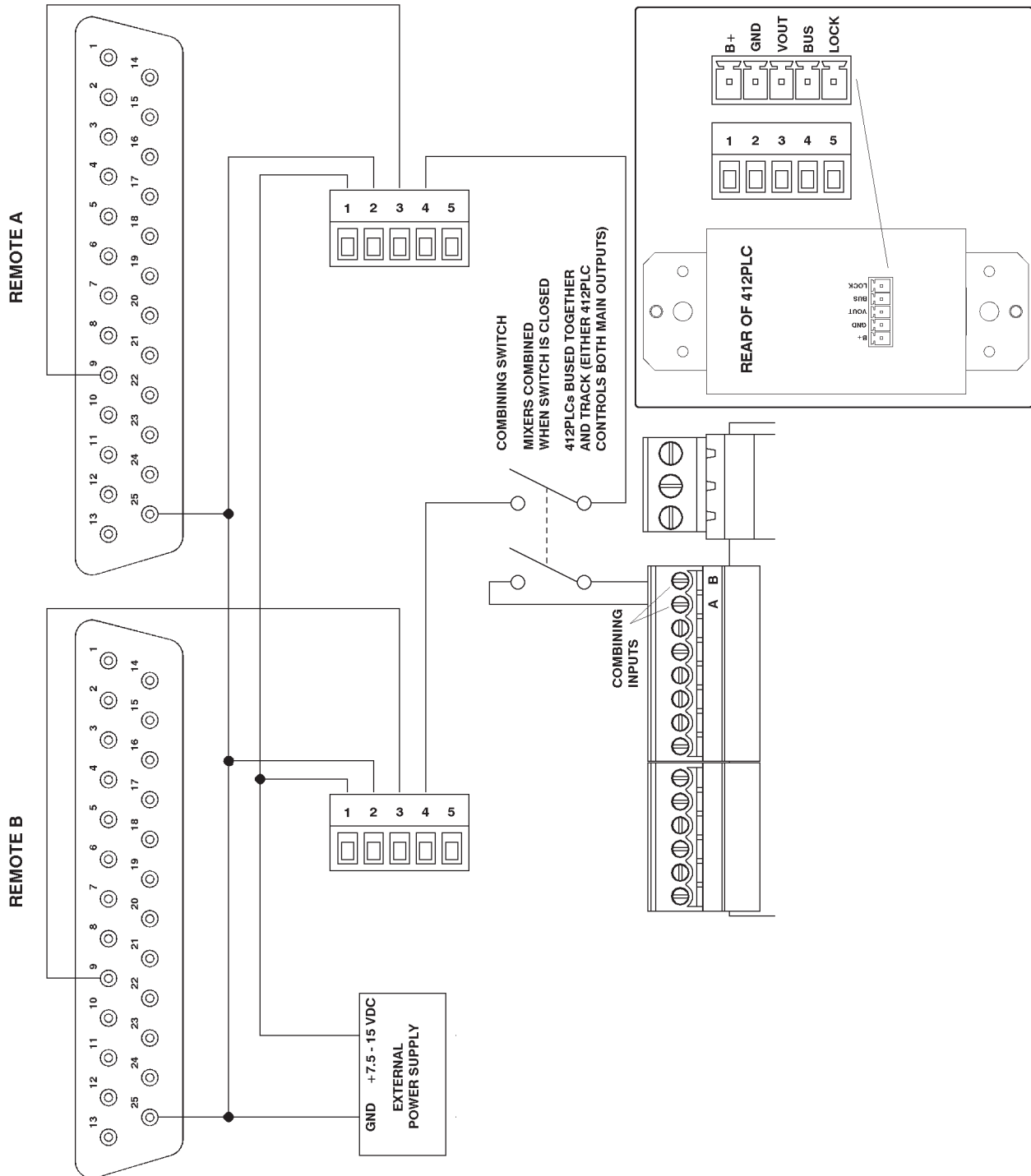


Figure 8 - Rear terminal connections
 Combining switch and remote output level control using 412PLC



REMOTE CONNECTOR FORCE ON/FORCE OFF

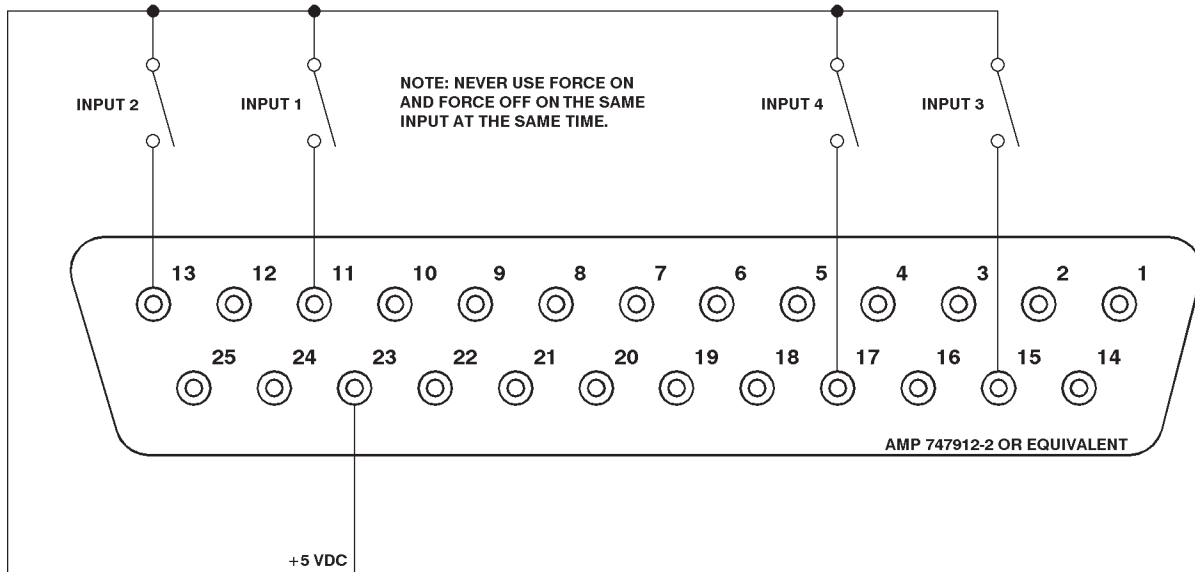


Figure 9 - Remote control connections
Force On

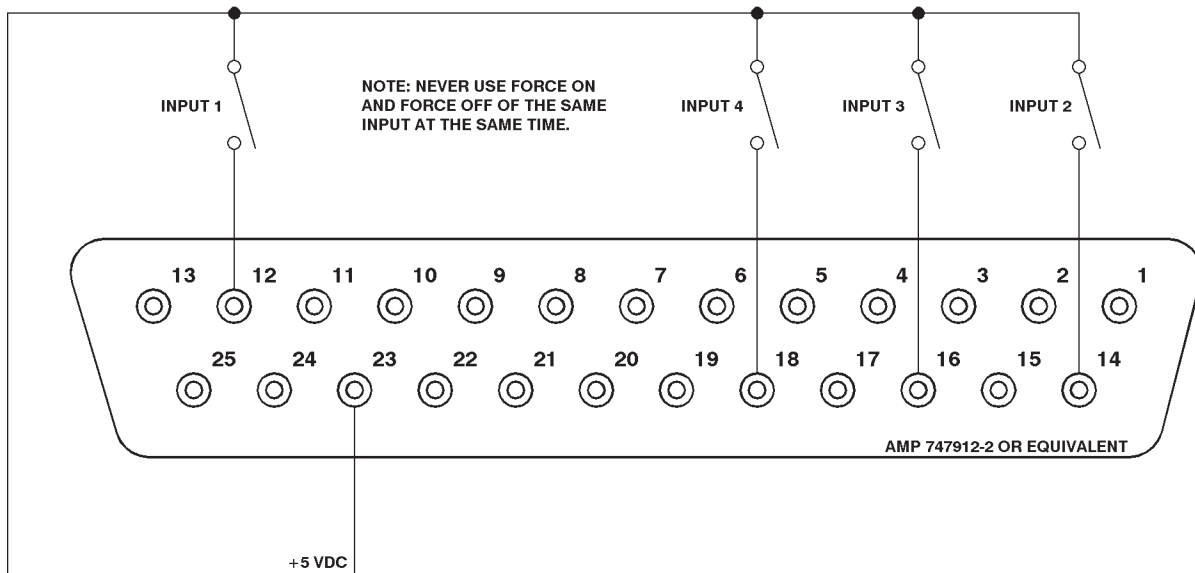


Figure 10 - Remote control connections
Force Off

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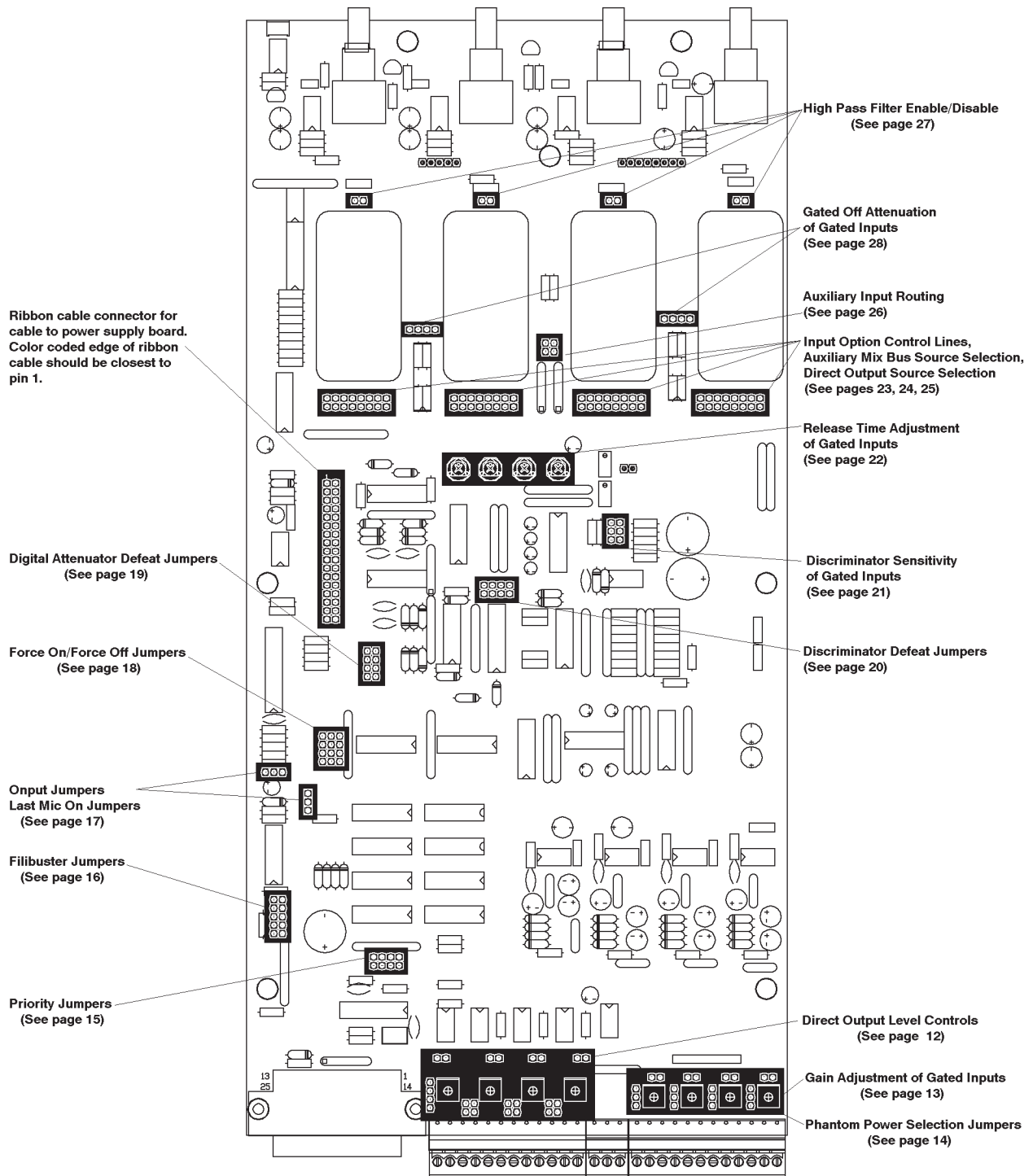
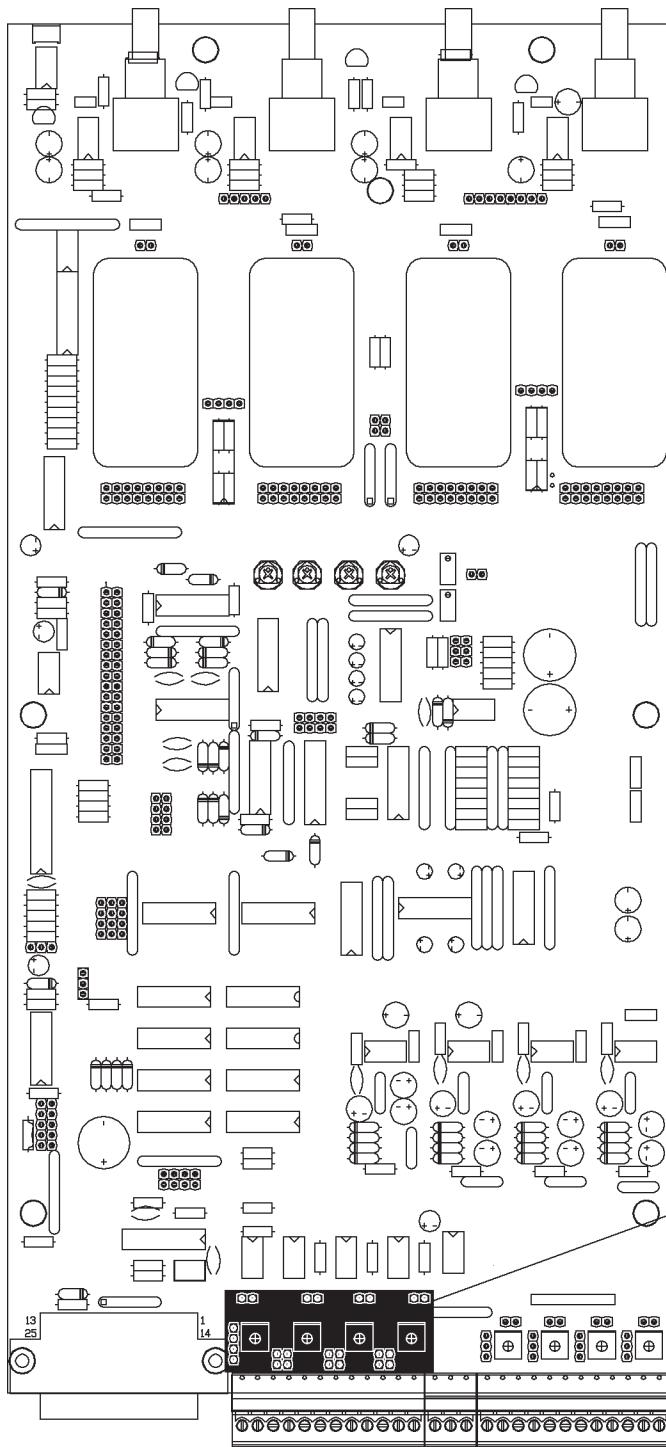


Figure 11 - Overall view of printed circuit board



DIRECT OUTPUT LEVEL CONTROLS



Either line or microphone level can be selected for each Direct Output. An overall level control for each output provides adjustment from maximum to full off. As seen in the figure, the level controls are located on the circuit board near the back edge, just in front of the screw terminal connector strip. The controls are accessible by removing the rear top cover by loosening the thumb screws provided. Level increases with clockwise rotation.

NOTES:

1. CHANNELS CAN BE SET FOR EITHER LINE LEVEL OR MICROPHONE LEVEL AS SHOWN.
2. CHANNEL SETTINGS CAN BE DIFFERENT FROM EACH OTHER.
3. USE ONLY THE JUMPER SETTINGS SHOWN.
4. POTS HAVE FULL RANGE CONTROL, FROM MAXIMUM OUTPUT TO OFF.

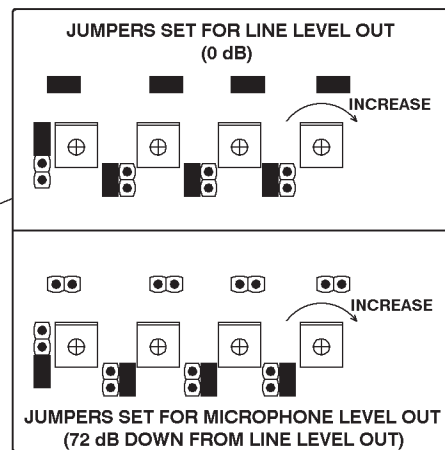
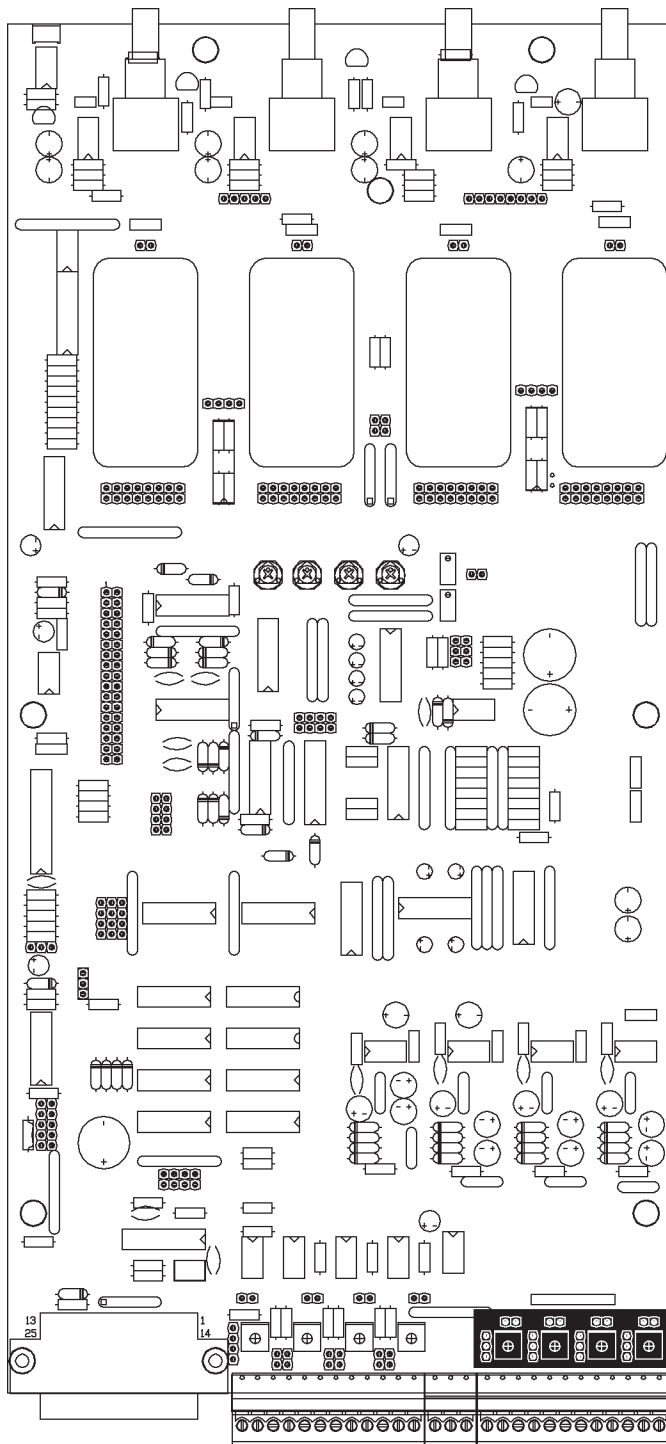


Figure 12 - Direct Output Level Controls

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GAIN ADJUSTMENT OF GATED INPUTS



Gated Inputs - The gain of gated inputs as delivered from the factory is set at +35 dB. With the proper jumpers installed, microphone level gains between +26 dB and +46 dB can be achieved by adjusting the pot as shown. By removing the jumper, a gain of 0 dB can be achieved. Other gain values are possible by changing SIP values. Consult the factory for additional information.

The controls and jumpers are accessible by loosening the thumb screws and removing the rear top cover.

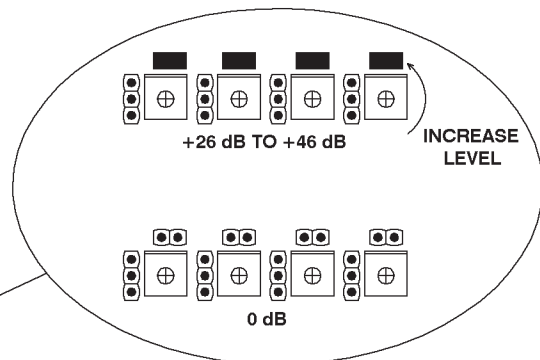
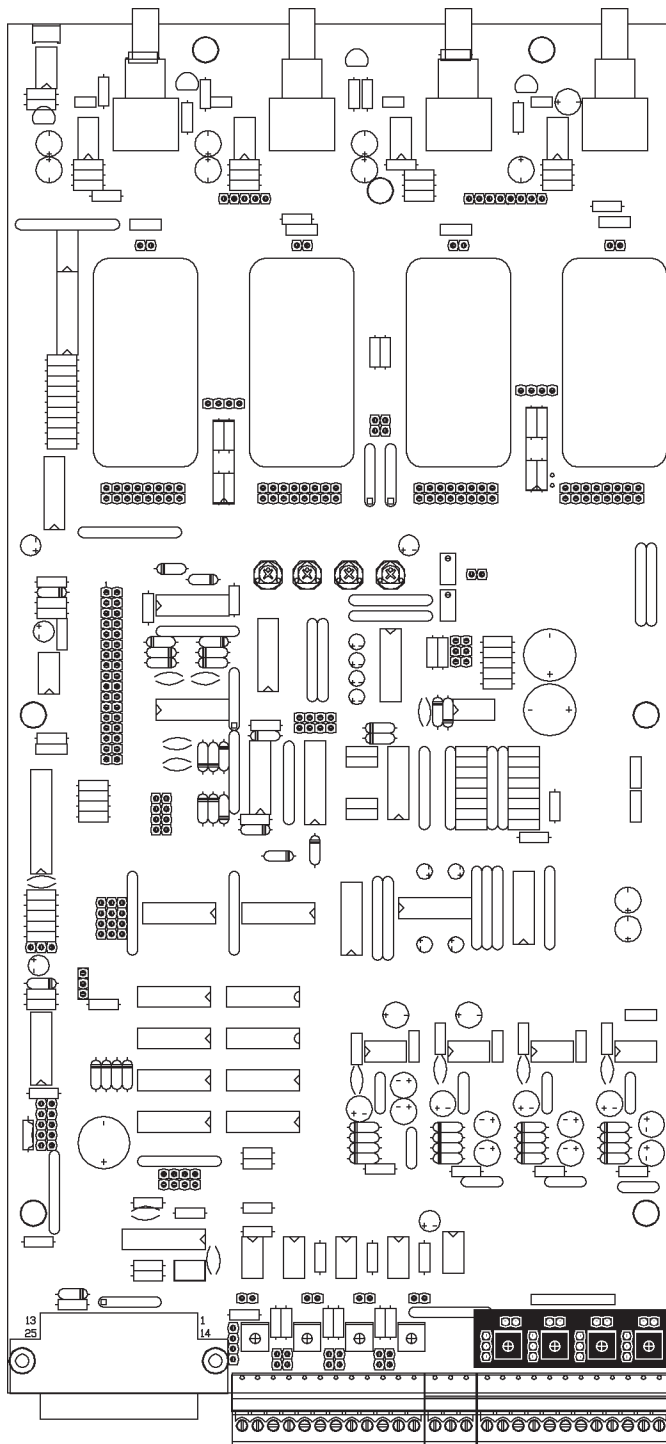


Figure 13 - Gain adjustment of gated inputs
Jumper setup



PHANTOM POWER SETTINGS



Phantom Power - Phantom powering for condenser microphones is selectable on a per input basis by jumper placement. Phantom power for the entire mixer may be turned 'on' or 'off' by a front panel switch. When the front panel switch is in the 'on' position, only those inputs which have their jumpers in the 'on' position will have phantom power available. **A jumper MUST be in place in either the 'on' or the 'off' position, or the input will be open and floating, and susceptible to extraneous noise pickup.** Phantom power jumper positions are shown in the figure below. Phantom power is provided to inputs from the 4822 card. +15 V is standard and +30/48 V can be provided with the phantom power option. See figure 31.

Phantom power jumpers are accessible by loosening the thumb screws and removing the rear top cover.

Phantom powering should be used for condenser microphones only. It should not be used for dynamic microphones or line level applications. As shipped from the factory, the phantom powering jumpers are set to the 'Off' position (for line level or dynamic microphone inputs).

CAUTION! Do not set phantom power jumpers with power on. So doing incurs the risk of damaging the inputs, and will void the warranty.

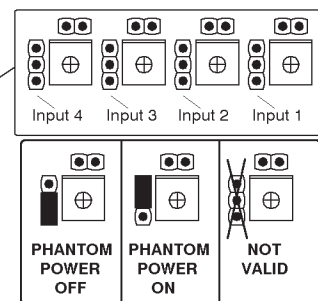
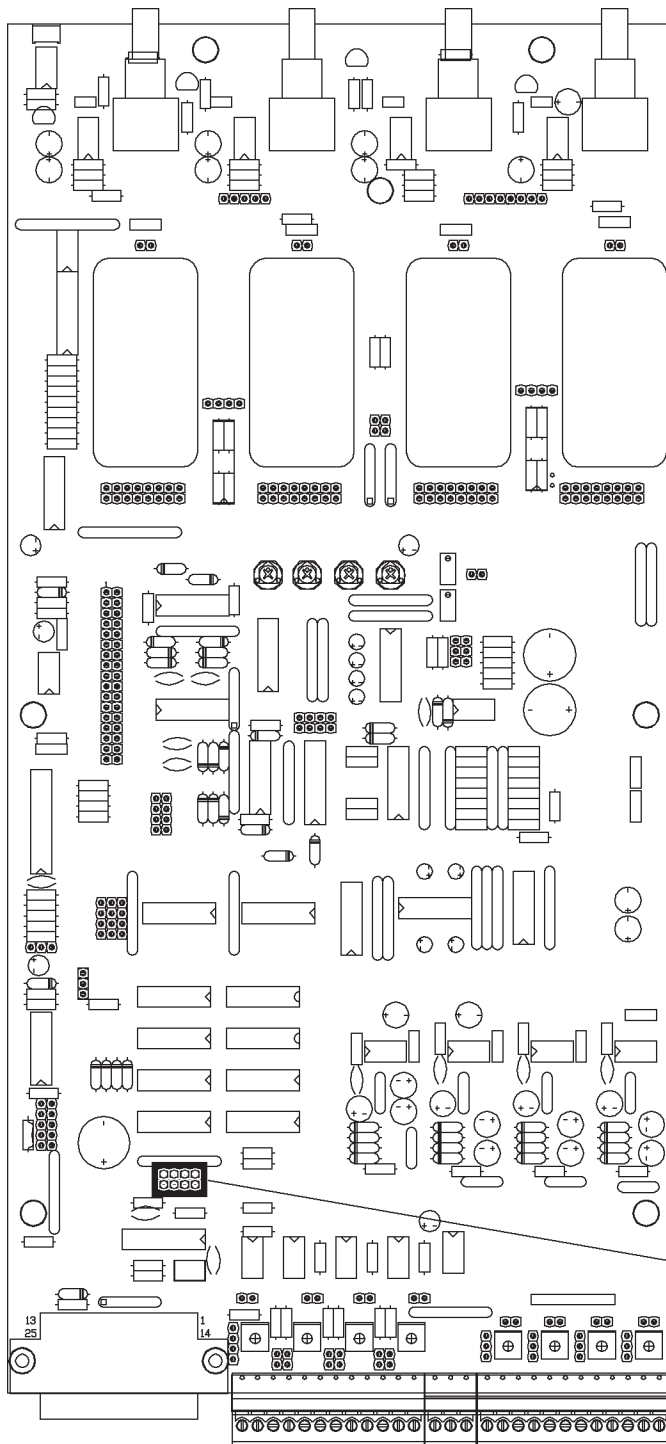


Figure 14 - Phantom power settings
Jumper setup

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ENABLING/DISABLING PRIORITY OF GATED INPUTS

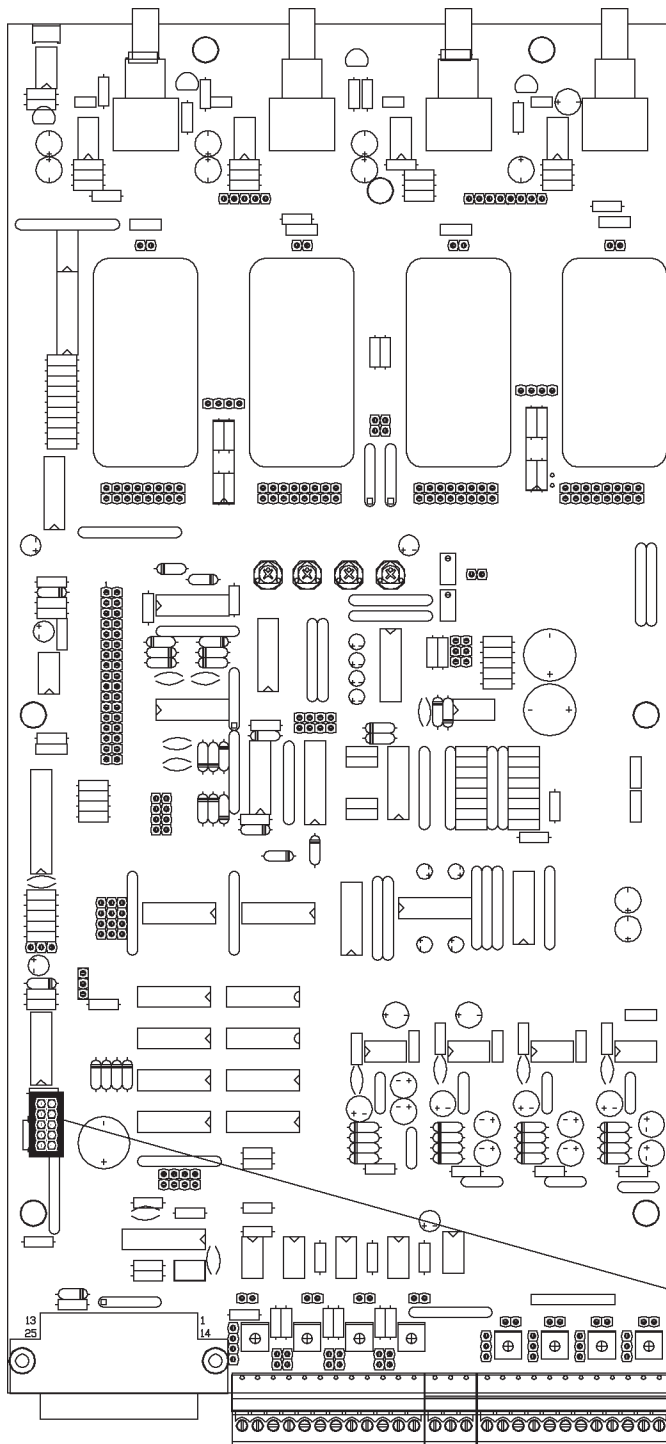


Priority - Priority is the feature, which when enabled for an input allows that input to take precedence over inputs which do not have the priority feature enabled. That is to say that when an input in priority is gated on, other inputs not in priority are immediately caused to gate off. Other inputs which are in priority are not affected. To place an input in priority, place a jumper on the appropriate pins as shown in the figure below. As shipped from the factory, no priority jumpers are in place, and no inputs are in priority.

Figure 15 - Enabling/disabling Priority of gated inputs
Jumper setup



FILIBUSTER LIMIT SET OF GATED INPUTS



Filibuster - The Filibuster feature limits the maximum number of inputs which can gate on in a given mixer. If the two 4-input mixers in a 4800 or 4800EQ are combined, the total number of inputs which are gated on in the combined mixer count toward the limit. The limit can be set at 1, 2, 3, 4, or ALL. The ALL setting defeats the feature. If mixers are combined and the limit on a particular mixer is set for 2, an input on that mixer can gate on only when the total number of inputs which are on on both mixers is less than 2. **A jumper MUST be placed in one, but not more than one of the positions, or erratic performance may result.** The figure below shows the details of jumper placement. Inputs for which the Digital Attenuator has been defeated do not contribute to or affect the Filibuster limit, although they are still subject to it. As shipped from the factory, there is a jumper in the 'All' position, defeating the Filibuster feature and allowing all inputs to be on.

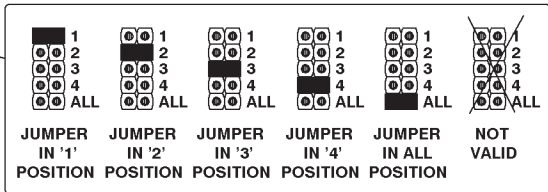
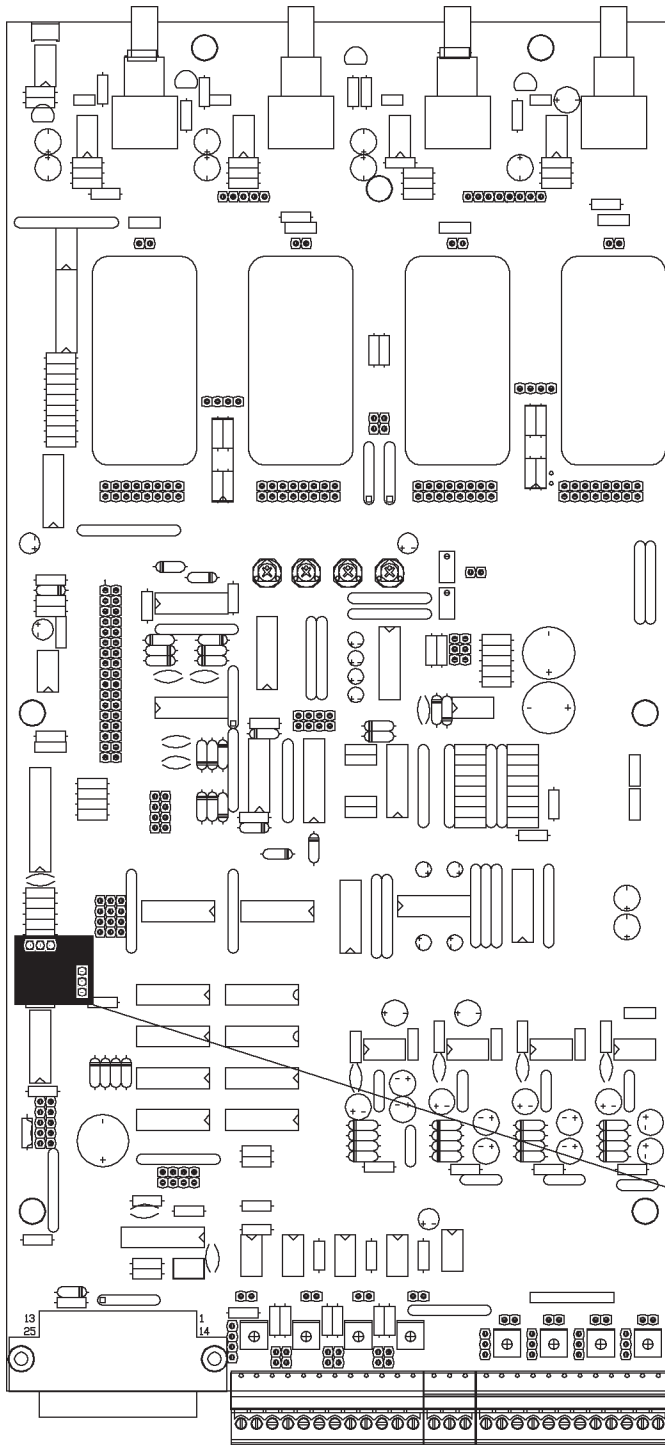


Figure 16 - Filibuster limit set of gated inputs
Jumper setup

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LAST MIC ON AND ONPUT FOR GATED INPUTS

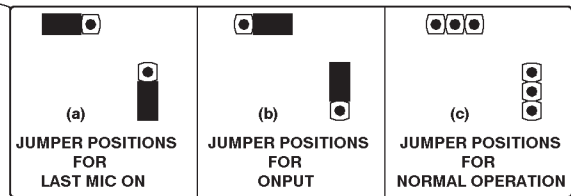


Last Mic On - When the **Last Mic On** feature is enabled, the last input which is gated on remains on until another input is gated on in its place. This feature prevents the system from sounding 'dead' by always keeping one microphone on. The figure below shows the details of Last Mic On jumper placement. When **Last Mic On** is used with a combined 8 input mixer, jumpers must be placed on both input boards in the **Last Mic On** position.

Onput - When the **Onput** feature is enabled, input number 1 is gated on or remains on until another input is gated on in its place. This feature prevents the system from sounding 'dead' by turning on the number 1 input when all other inputs are gated off. Shown below are the details of Onput jumper placement. When using the **Onput** feature with a combined 8 input mixer, **Onput** must be selected on only one of the two input boards. If selected on the 'A' board, input 1 will gate on when all other inputs gate off. If Onput is selected on board 'B' then input 5 will gate on when all other inputs gate off.

If neither Last Mic On nor Onput jumpers are in place as in shown below, gated inputs will gate off normally. **Do not attempt to operate the system with only one jumper in place or with other jumper combinations. Erratic operation will result.**

As shipped from the factory, neither Last Mic On nor Onput jumpers are in place (normal operation).

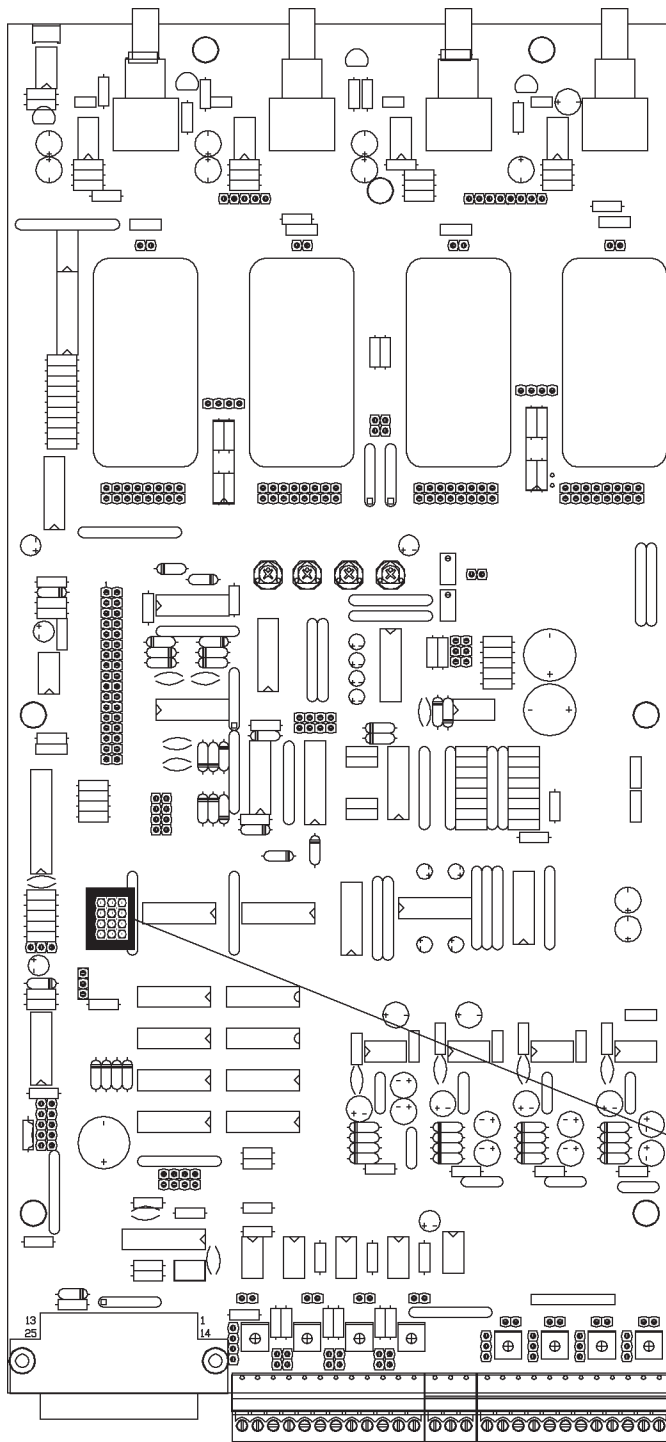


USE ONLY ONE OF THE THREE JUMPER COMBINATIONS ILLUSTRATED ABOVE. ALL OTHER COMBINATIONS ARE INVALID AND WILL RESULT IN ERRATIC OPERATION.

Figure 17 - Last Mic On and Onput for gated inputs
Jumper setup



FORCE ON AND FORCE OFF FOR GATED INPUTS



Force On/Force Off - These functions override gating operation and place the input in a continuous on state or a continuous off state, respectively. When an input is forced on it still contributes to the attenuation of the Main Output (Digital Attenuator), to the Filibuster count, and to the Discriminator, unless specifically removed from these functions by defeating the Digital Attenuator and/or the Discriminator (see pages 22 and 23).

When an input is forced off, it is continuously off and removed from the Discriminator, so that a signal to the input will not affect the gating of the other gated inputs.

For details of jumper setup, refer to the figure below.

The 4400 and 4800 Series Automatic Mixers are shipped from the factory with all inputs set for normal gating (no jumpers installed).

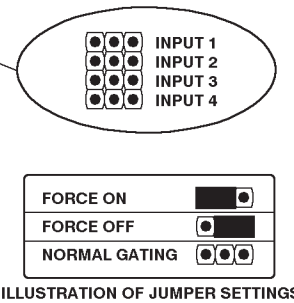
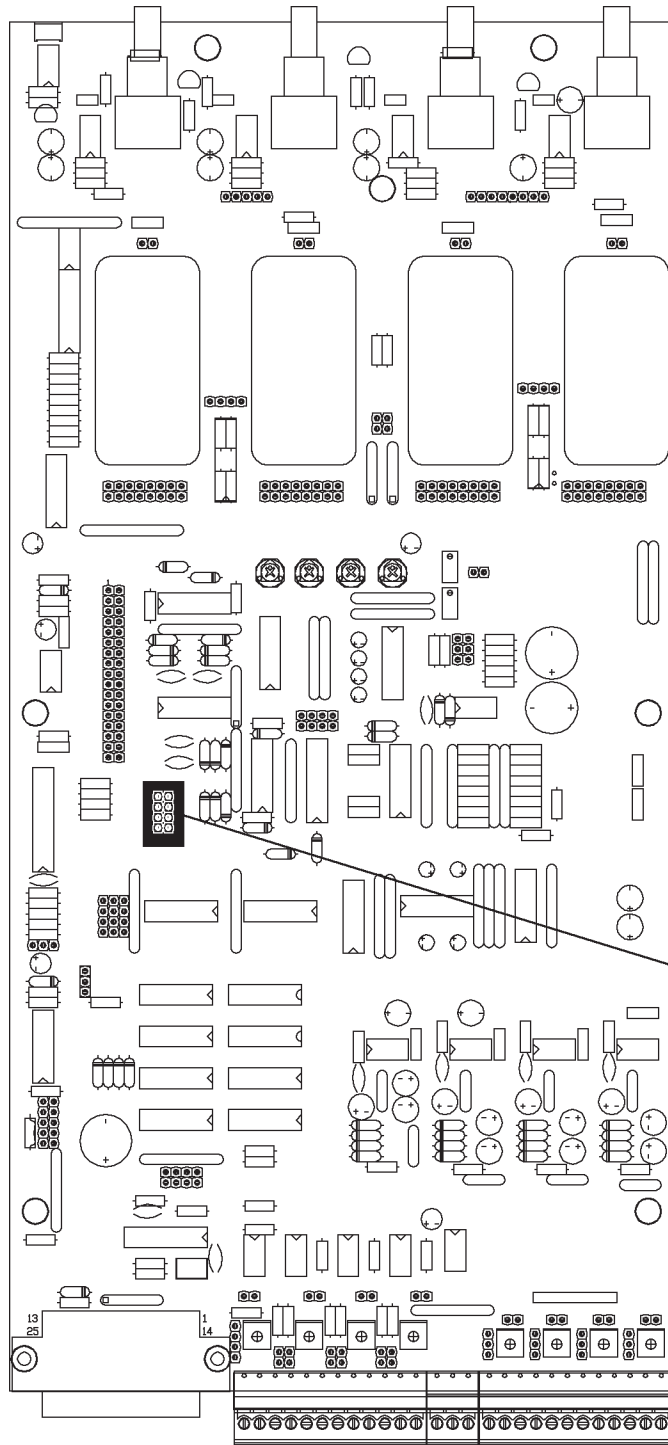


Figure 18 - Force On and Force Off for gated inputs
Jumper setup

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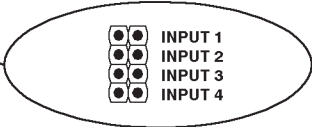
DIGITAL ATTENUATOR DEFEAT FOR GATED INPUTS



Digital Attenuator Defeat - The Digital Attenuator makes adjustments in the main output level as inputs gate on or off. For each doubling of the number of inputs which are on, the Main Output is attenuated 3 dB. This is a measure to help control feedback.

If the inputs operate at the same level, and since they are summed or added in the mix bus, doubling the number of inputs would double the output power, an increase of 3 dB. By attenuating the output by 3 dB for each doubling of the number of inputs, the output level is kept approximately constant.

If an input is used for a source which is not in the same acoustic environment such as a source of background music or a microphone which is in another room, it is desirable to prevent it from contributing to the Digital Attenuator. As shipped from the factory, jumpers are installed on all inputs (normal operation). To defeat the feed to the Digital Attenuator for a particular input remove the the appropriate jumper. Refer to the figure below for jumper application details.



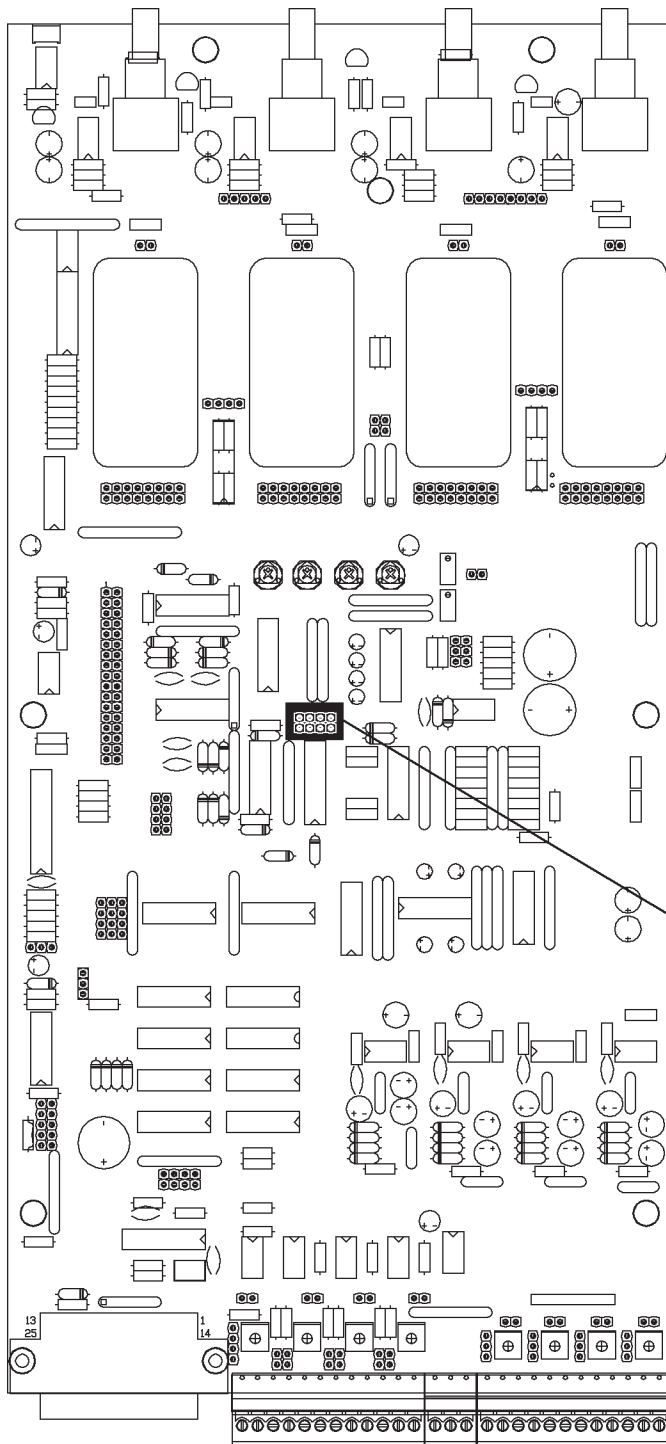
| | |
|---|--|
| DIGITAL ATTENUATOR INPUT FEED DEFEATED | |
| DIGITAL ATTENUATOR NORMAL OPERATION | |

ILLUSTRATION OF JUMPER SETTINGS

Figure 19 - Digital Attenuator defeat for gated inputs
Jumper setup



DISCRIMINATOR DEFEAT FOR GATED INPUTS



Discriminator Defeat - If an input is used for a line level source such as a tape player, then it is not desirable to have it on the discriminator bus. A line level input could raise the level of the discriminator threshold to such an extent that it would be very difficult to gate on another gated input. For this reason, the Discriminator Defeat has been provided. To defeat the Discriminator function for an input, place a jumper on the appropriate pins. When the Discriminator has been defeated for a gated input, it will no longer gate on in response to an input signal. Instead, it must be Forced On (see page 21). The figure below shows the details of jumper placement. As shipped from the factory, the Discriminator is enabled (no jumpers).

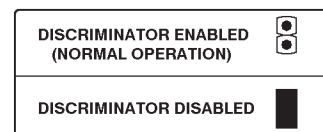
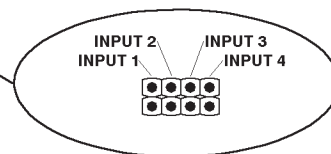
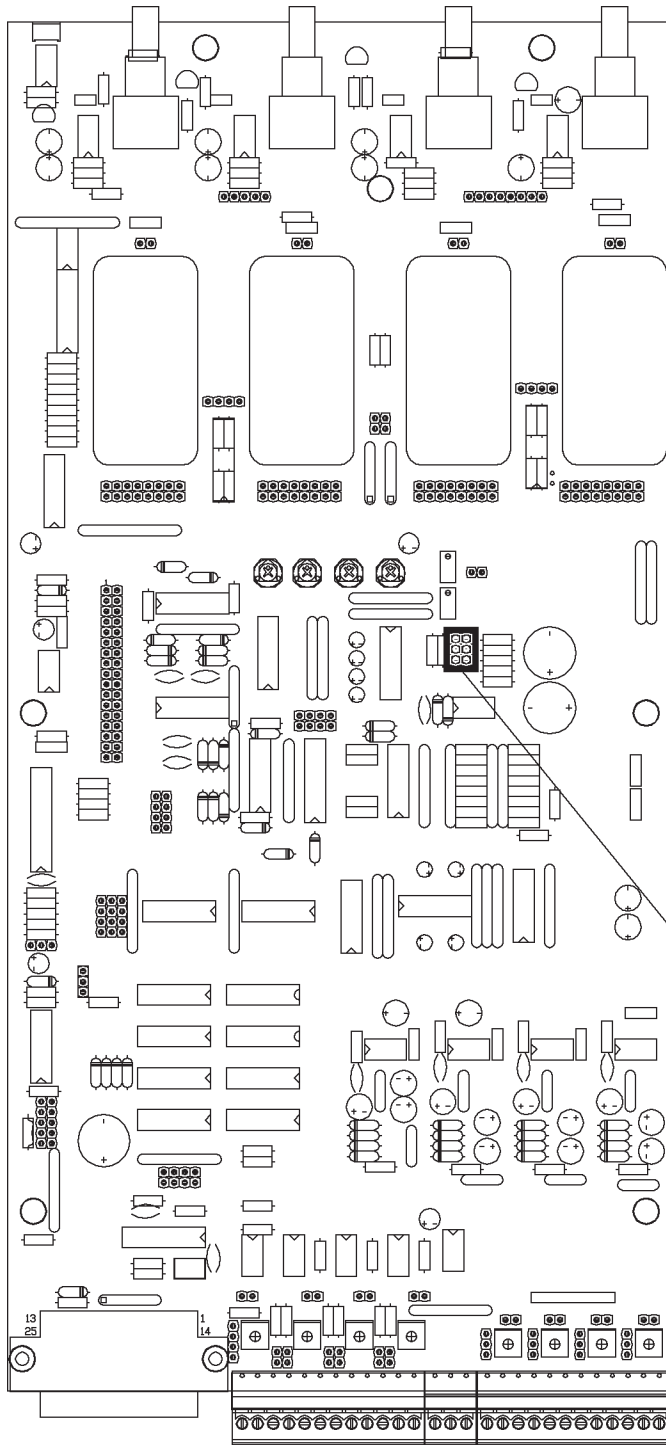


ILLUSTRATION OF JUMPER SETTINGS

Figure 20 - Discriminator defeat for gated inputs
Jumper setup

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DISCRIMINATOR SENSITIVITY OF GATED INPUTS



Discriminator Sensitivity - The mixers are shipped from the factory with the discriminator sensitivity optimized for use with 4 - 8 microphones (normal sensitivity).

There are two other sensitivities provided with each mixer. In applications where only two or three microphones are connected to the mixer the discriminator might need to be less sensitive (low sensitivity). In applications in which the microphones are mounted in the ceiling, the discriminator might need to be more sensitive (high sensitivity).

See figure below for jumper settings to change sensitivity.

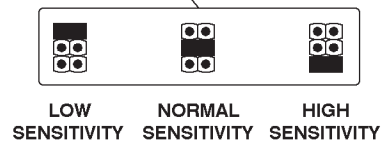
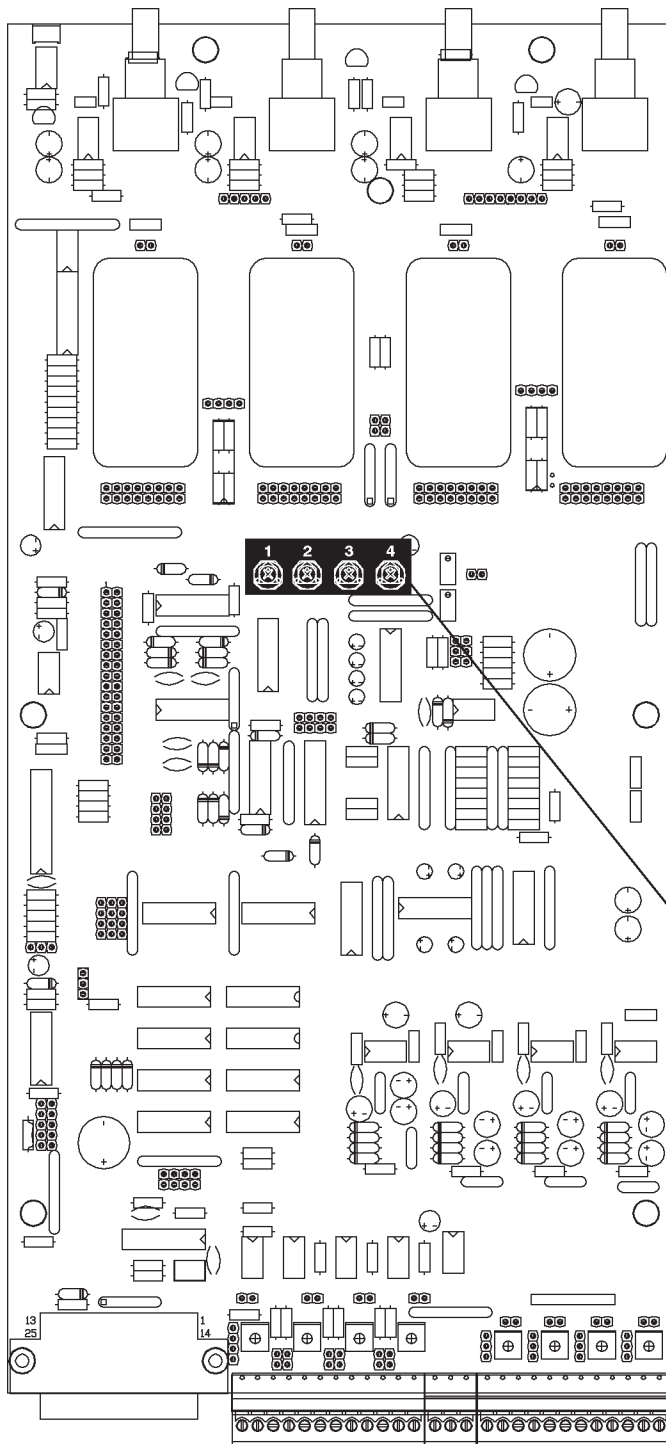


Figure 21 - Discriminator sensitivity for gated inputs
Jumper setup



RELEASE TIME ADJUSTMENT OF GATED INPUTS



Release Time - The release time is the time a gated input remains on after the input signal is removed. It should be set sufficiently long so that normal pauses in speaking will not cause the input to gate off. Release Time is factory preset to approximately 2.5 seconds, a time suitable for most typical speakers. For a speaker with different speech habits or style, it may be necessary to make adjustments. It can be set anywhere within the range of 0.5 to 8 seconds. Setting is accomplished by means of trimpots which may be accessed after removing the top cover. Details are shown in the figure below.

Turning the release time control clockwise will decrease the release time, causing the input to turn off faster. Turning the release time control counterclockwise will increase the release time, causing the input to turn off slower.

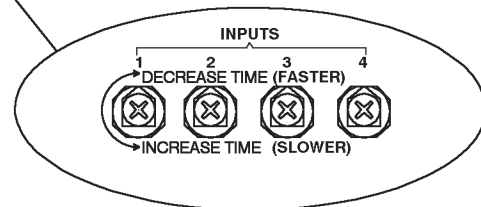
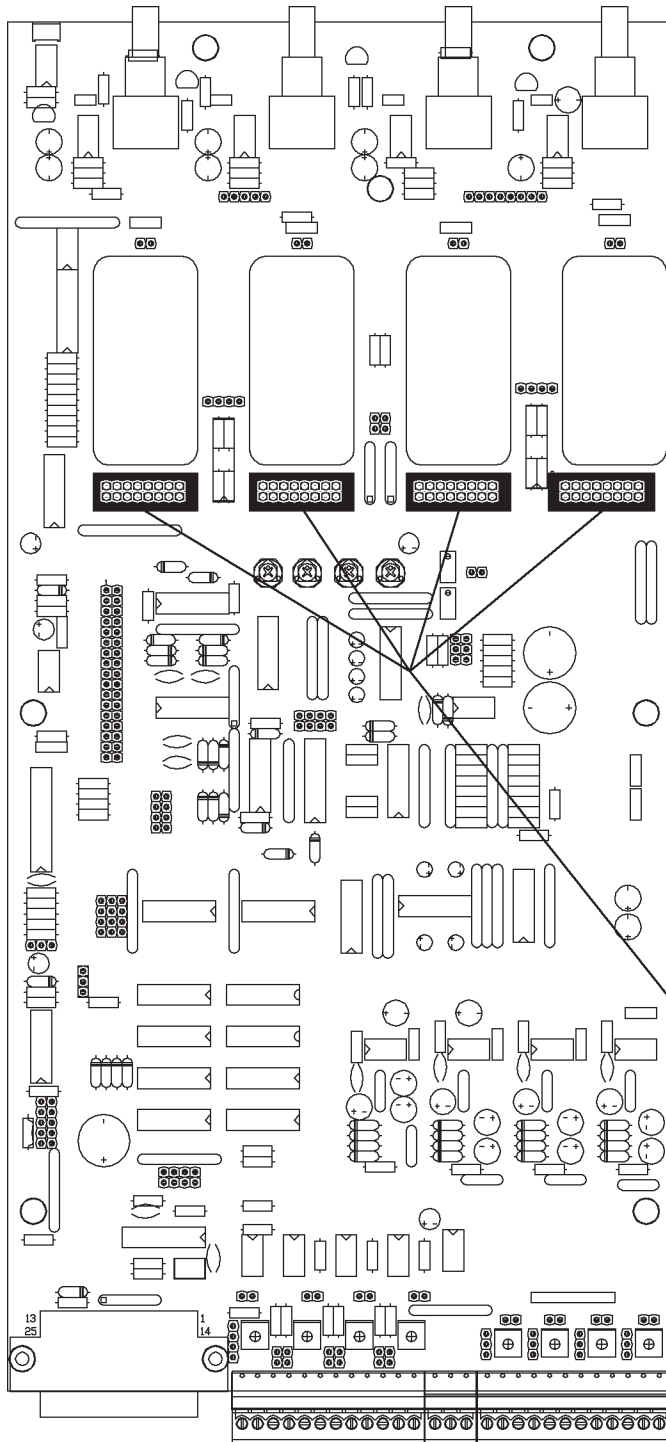


Figure 22 - Release time adjustment of gated inputs

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INPUT OPTION CONTROL LINES



The Input Option Control Lines are factory set according to the input option selected and should not be changed. Refer to the figure below for details of jumper setup.

The table below shows which control line must have a jumper in place for each input option.

| OPTION NUMBER | INPUT MODULE | CONTROL LINE |
|---------------|--------------|--------------|
| 0 | None | None |
| 1 | 110V | 2 |
| 2 | 120P | 1 |
| 4 | 110C | None |

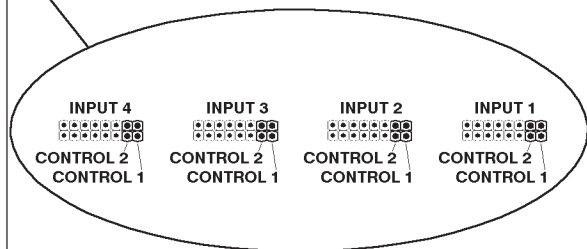
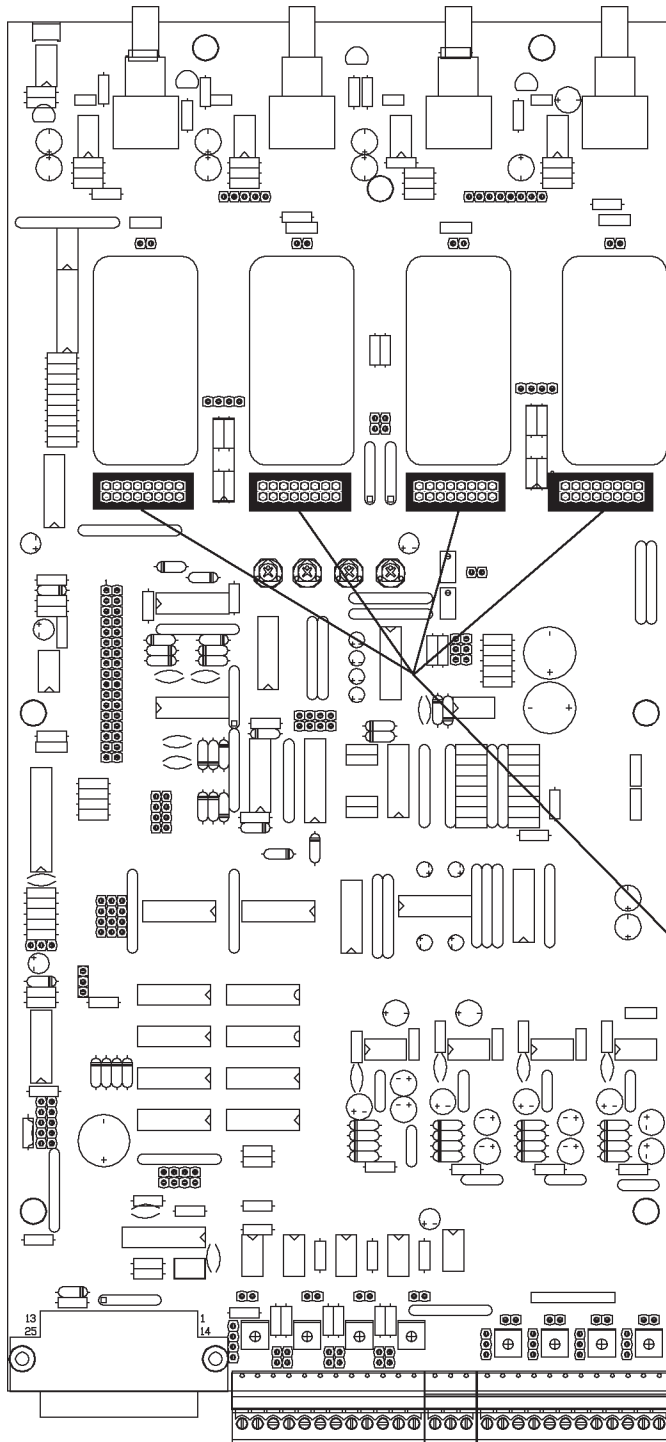


ILLUSTRATION OF JUMPER SETTINGS

Figure 23 - Input option control lines
Jumper setup



AUXILIARY MIX BUS SOURCES



The Auxiliary Output mix can be sourced from one of three points for each gated input. The three points are Pre Input Option, Post Input Option, and Post Gate. The selection is made by the placement of jumpers. Refer to the figure below for the details of jumper setup. When shipped from the factory, there is a jumper in the Post Gate position for each input.

The Pre Option selection feeds the input signal prior to input processing to the Auxiliary Output mix bus. Input processing refers to the selected input option.

The Post Option selection feeds the input signal to the Auxiliary Output mix bus after it has received input processing, but before it is gated.

The Post Gate selection feeds the input signal to the Auxiliary Output mix bus after it has received input processing and after it passes through the gating switch. This is the same signal which is fed to the Main Output mix bus.

Never install jumpers in more than one position for the pre-option, post option, or post gate setup.

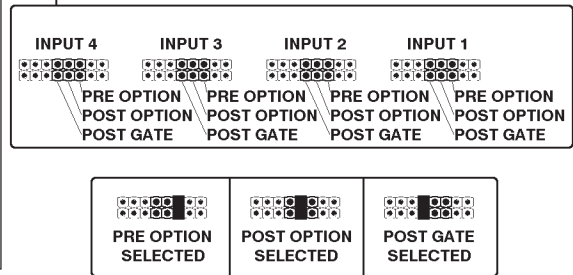
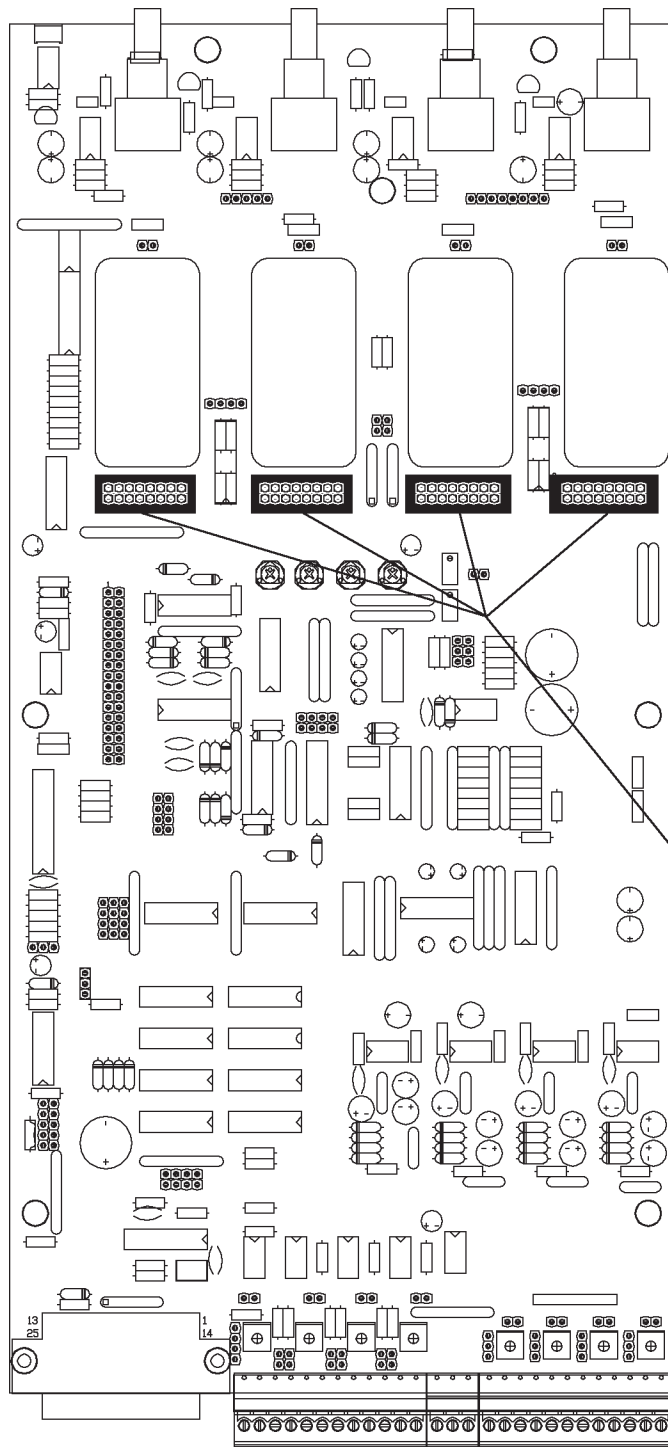


ILLUSTRATION OF JUMPER SETTINGS

Figure 24 - Auxiliary Mix Bus sources
Jumper setup

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DIRECT OUTPUT SOURCE SELECTION



The Direct Output mix can be sourced from one of three points for each gated input. The three points are Pre Input Option, Post Input Option, and Post Gate. The selection is made by the placement of jumpers. Refer to the figure below for the details of jumper setup. When shipped from the factory, there is a jumper in the Post Gate position for each input.

The Pre Option selection feeds the input signal prior to input processing to the Direct Output. Input processing refers to the selected input option.

The Post Option selection feeds the input signal to the Direct Output after it has received input processing, but before it is gated.

The Post Gate selection feeds the input signal to the Direct Output after it has received input processing and after it passes through the gating switch. This is the same signal which is fed to the Main Output mix bus.

Never install jumpers in more than one position for the pre-option, post option, or post gate setup.

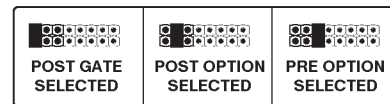
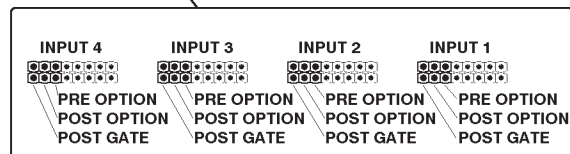
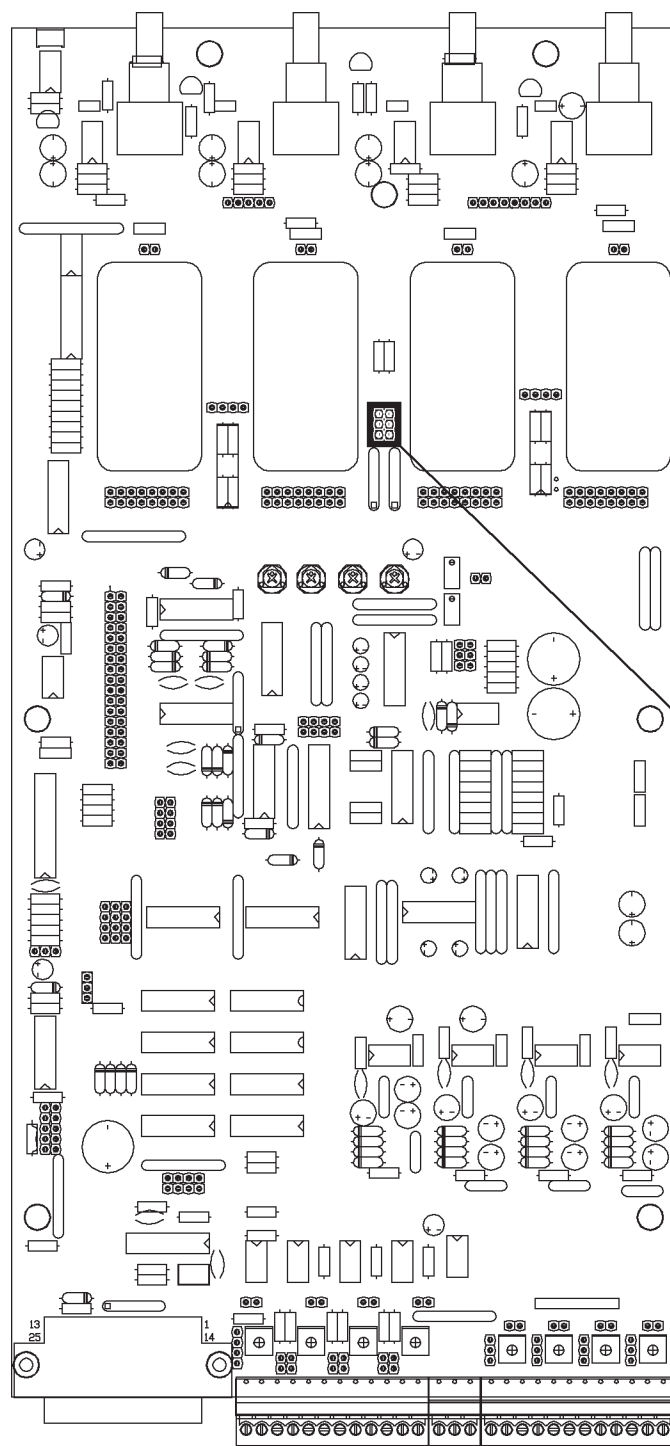


ILLUSTRATION OF JUMPER SETTINGS

Figure 25 - Direct Output source selection
Jumper setup



AUXILIARY INPUTS ROUTING



There is one electronically balanced Auxiliary (Aux) Input for each four Gated inputs. The Aux Input can be made to feed either the Main Mix Bus, pre- or post- combining, the Aux Mix Bus, pre- or post- combining, any of these buses, or none, by the placement of the appropriate jumpers. See the figure below for the details of jumper setup. The post-combining jumper location is offered only if stereo is needed on a 4800 mixer. Placing jumpers in the post-combining positions on both input boards of a 4800 creates two separate channels which can be used for stereo. This can be done for either or both the Main mix bus and the Auxiliary mix bus.

When shipped from the factory, a jumper is placed to feed the main mix bus (pre combining). Jumpers must be added as required to activate the Auxiliary Input(s).

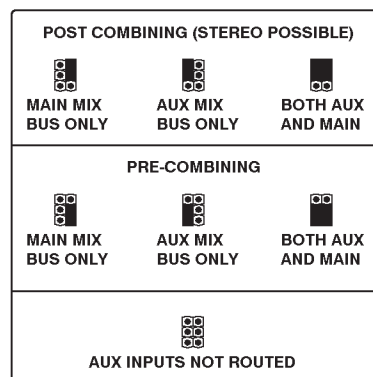
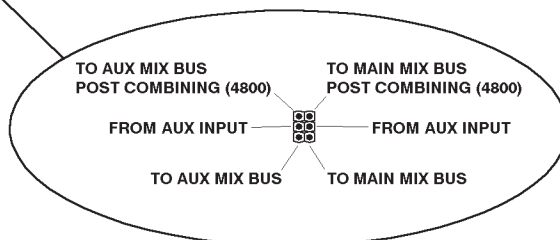
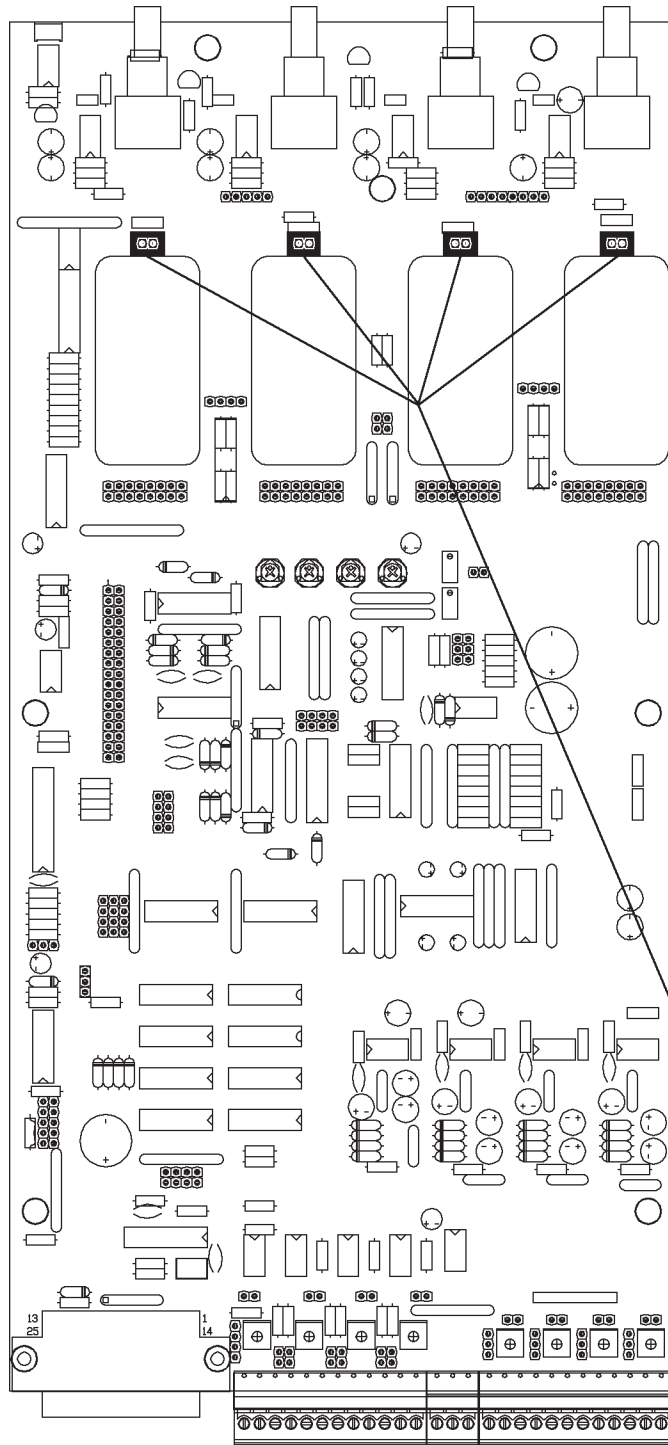


ILLUSTRATION OF JUMPER SETTINGS

Figure 26 - Auxiliary Input routing
Jumper setup

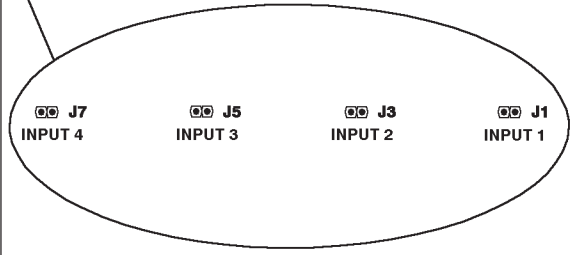
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HIGH PASS FILTER ENABLE/DISABLE



High Pass Filter - High pass filters are included (one per gated input) to reduce unwanted low frequency signals introduced into the gated inputs. The filters have a slope of 6 dB per octave, and are 3 dB down at 150 Hz.

As delivered from the factory, the high pass filters are bypassed (no filtering). To enable the filter for an input, remove the appropriate jumper. Refer to the figure below for jumper setup.



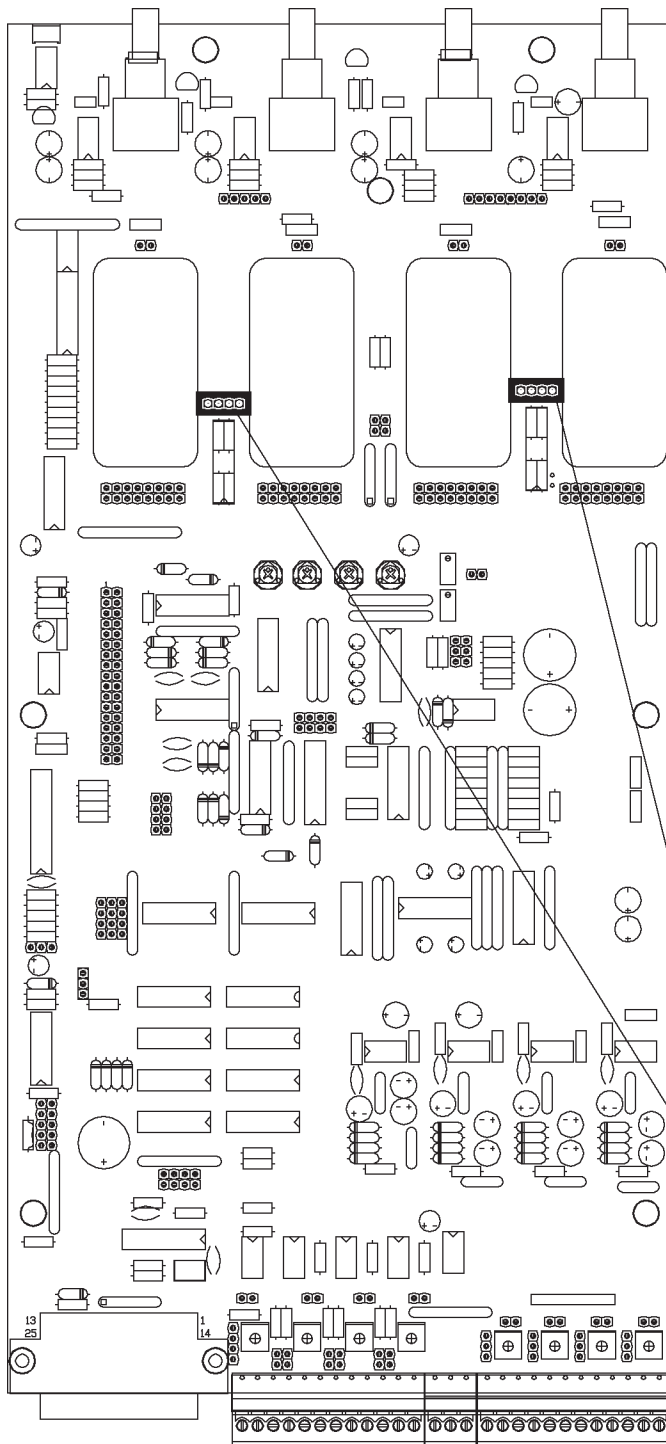
FILTER ENABLED
 FILTER BYPASSED

ILLUSTRATION OF JUMPER SETTINGS



Figure 27 - High Pass Filter enable/disable Jumper setup




GATED OFF ATTENUATION OF GATED INPUTS



Gated Off Attenuation - When a gated input is 'Off', its signal to the outputs is attenuated by a given amount. Two 'Off' attenuation levels are jumper selectable. As shipped from the factory, the 'Off' attenuation is set at full mute. By placing a jumper as shown in the figure, the 'Off' attenuation can be set at 22.5 dB. Consult the factory for other custom 'Off' attenuations.

-  JUMPER ON=22.5 dB 'Off' ATTENUATION FOR THE CHANNEL
-  JUMPER OFF=FULL MUTE 'Off' ATTENUATION FOR THE CHANNEL

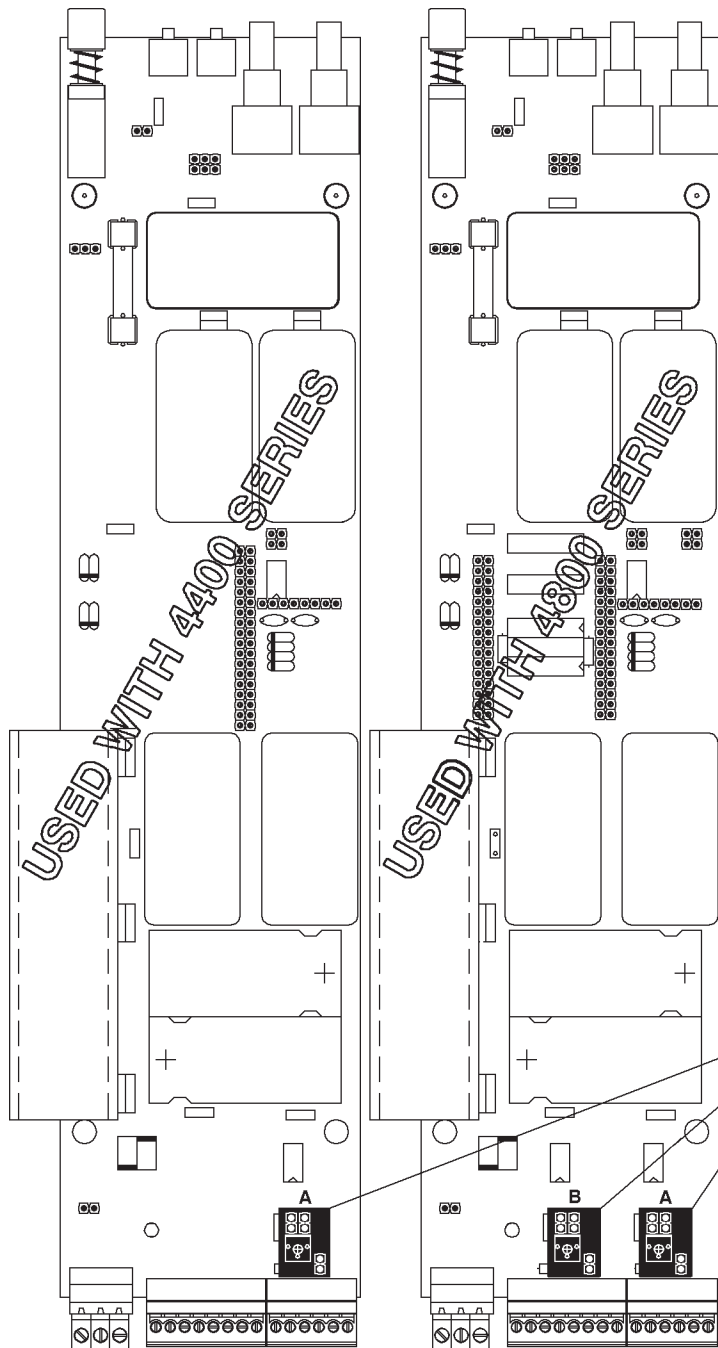
CHANNEL
4 3


CHANNEL
2 1


Figure 28 - Gated Off Attenuation of Gated Inputs
Jumper setup

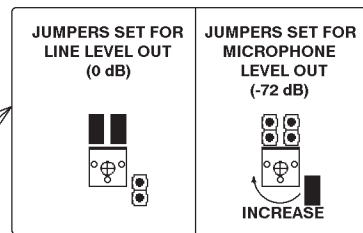
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AUXILIARY OUTPUT LEVEL CONTROLS



Either line or microphone level can be selected for each Auxiliary Output. An overall level control for each output provides adjustment from maximum to full off. As seen in the figure, level controls are located on the circuit board near the back edge, just in front of the screw terminal connector strip. The controls are accessible by loosening the thumb screws and removing the rear top cover.

Level increases with clockwise rotation of the controls.

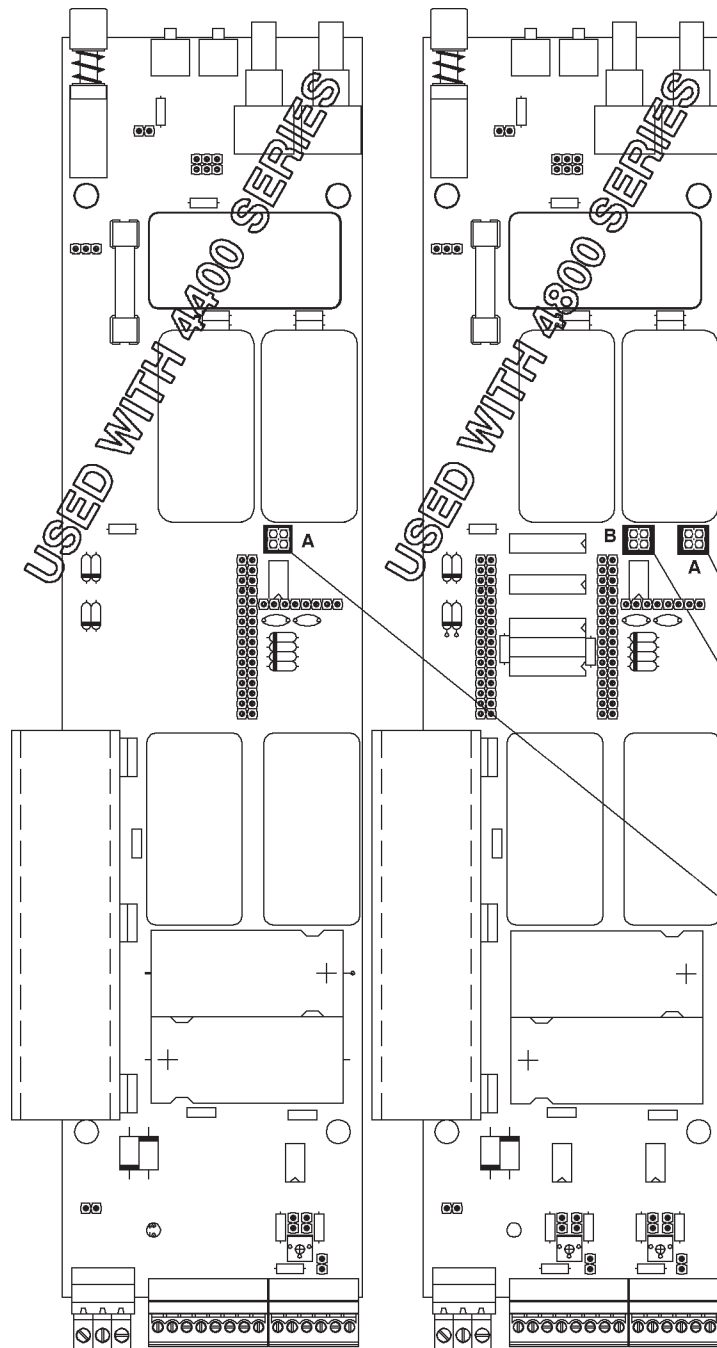


- NOTES:**
1. CHANNELS CAN BE SET FOR EITHER LINE LEVEL OR MICROPHONE LEVEL AS SHOWN.
 2. CHANNEL SETTINGS CAN BE DIFFERENT FROM EACH OTHER.
 3. US ONLY THE JUMPER SETTINGS SHOWN.
 4. POTS HAVE FULL RANGE CONTROL, FROM MAXIMUM OUTPUT TO OFF.

Figure 29 - Auxiliary Output Level Controls Jumper Setup



OUTPUT OPTION CONTROL LINES



The Output Option Control Lines are factory set according to the output option selected and should not be changed. Refer to the figure below for details of jumper setup.

The table below shows which control line must have a jumper in place for each output option.

| OPTION NUMBER | OUTPUT MODULE | CONTROL LINE |
|---------------|---------------|--------------|
| 0 | None | None |
| 1 | 110V | 2 |
| 2 | 120P | 1 |
| 4 | 110C | None |

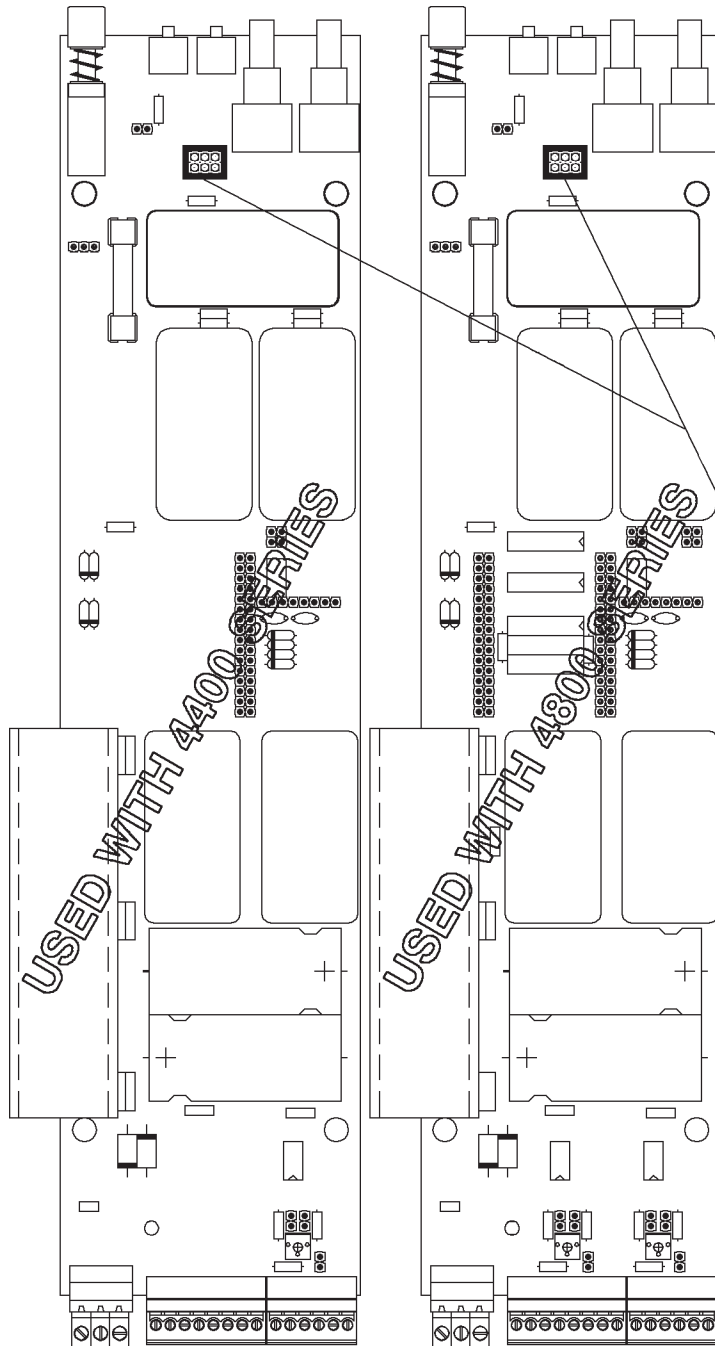


ILLUSTRATION OF JUMPER SETTINGS

Figure 30 - Output option control lines
Jumper setup

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PHANTOM POWER OPTION VOLTAGE SELECTION



If the 30 V/48 V Phantom Power option is installed, the voltage for phantom powering of condenser microphones can be selected to be 15 V, 30 V, or 48 V. The selection is made on the 4822 board as illustrated below. Only one voltage can be selected for all inputs. **Do not apply more than one jumper, or system failure could result.** If no jumper is used, there will be no phantom power.

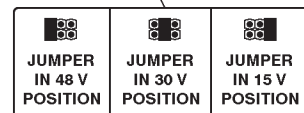


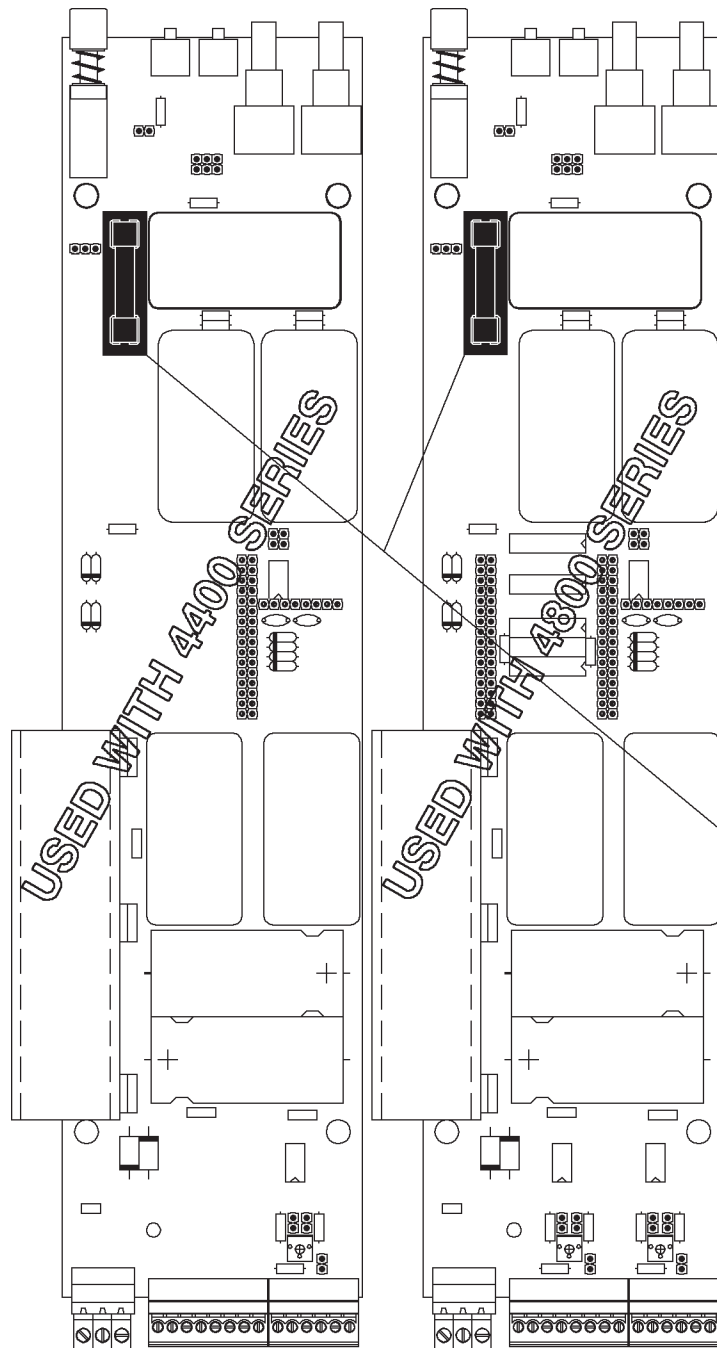
ILLUSTRATION OF JUMPER SETTINGS

WHEN THE 30/48 V PHANTOM POWERING OPTION IS NOT INSTALLED, THERE IS A JUMPER (HARD WIRED) IN THE 15 V POSITION.

Figure 31 - Phantom Power Option Voltage Selection Jumper Setup



FUSE REPLACEMENT

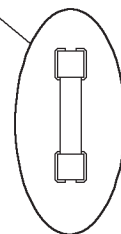


Before concluding that the fuse is defective, be sure that 1) the transformer is plugged into an active AC outlet of the proper voltage, 2) the On/Off switch is in the 'On' position (depressed) and 3) the power indicator (located to the left of the switch) is not lit.

If these conditions are met, proceed with fuse replacement.

Turn 'Off' the power switch (switch protrudes from the case) and unplug the power transformer before removing the cover, or damage to the mixer could result. Refer to the figure below for fuse location. Using an appropriate fuse puller, remove the old fuse. **Replace only with the same type and rating fuse.**

Replace the cover before reconnecting the transformer to the AC power.



**3 AMP 3AG SLOW BLOW FUSE.
REPLACE ONLY WITH A FUSE
OF THE SAME TYPE AND RATING.**

Figure 32 - Fuse replacement

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