

 **Euphonix**

# CSII/CS2000

*Installation and Service Manual*



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# ***CSII/CS2000 Installation and Service Manual***

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# Sec. 1: Installation/Prior to System Delivery

## Introduction

## Room Design Considerations

This section will cover many issues that should be considered prior to the arrival of your CSII/CS2000, from designing the control room to wiring components for minimum noise and hum. Although some equipment in your studio may already be configured, Euphonix recommends that you read this entire section and do as much advance preparation as possible. We have found that a well-planned wiring scheme and a proper environment with respect to grounding, cooling, power etc., will allow you to get to work on your CSII/CS2000 right away.

## Suggested Studio Layout

The CSII/CS2000 Mix Controller was specifically designed to be a low profile, low-heat, low-noise control surface. The recommended installation (see below) has the Mix Controller and patch bays located in the control room and the Audio Tower(s) and MixView Platform in a machine room or area. This layout reduces control room noise and cooling requirements while using the minimum amount of valuable control room real estate. Some prior planning is required to establish proper cable trough dimensions and routing schemes, but the resulting ergonomics are well worth the effort.

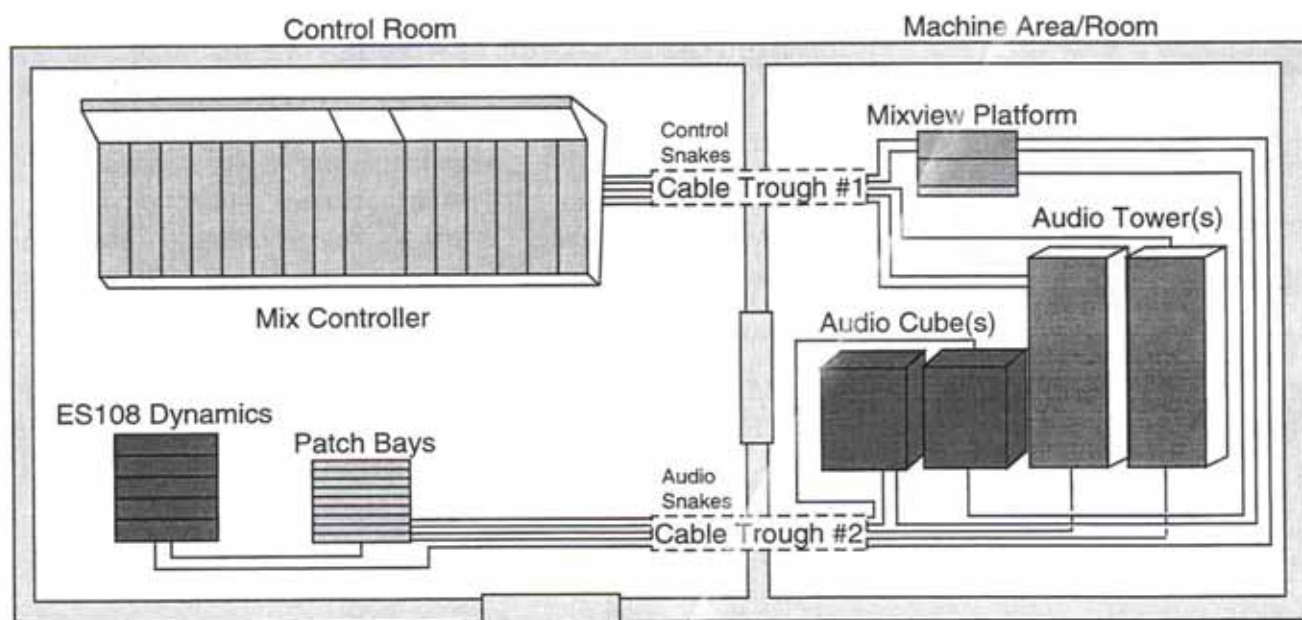


Figure 1 - Typical Control Room Layout

(Note: The above diagram is only representative and does not show all system cabling.)

## Audio Tower(s) Remote Location and Rack-mounting



It is best to locate the Audio Tower(s) in a machine room and run the multipin snakes through a trough to the control room. Depending on the number of channels in your CSII/CS2000 frame, you will have either one or two Audio Towers.

The external frame of an Audio Tower is of rack-mountable width and is 29U high. Although most studios choose to have their Tower(s) free-standing, you can mount an Audio Tower in a rack (call the factory at 415-855-0400 for more information). The fan assembly is removable, and can be bolted on either side of the Tower or mounted into the rack itself.

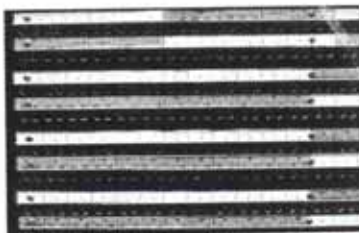
If the Audio Tower(s) are free-standing on casters, allow extra space near the fan assemblies to ensure cool air intake.

## MixView Platform Remote Location



Euphonix recommends placing the MixView Platform processor (the rack-mount unit) in the machine area/room with the Audio Tower(s). By using the MixView Platform Extender Kit, you can locate your MixView Platform up to 66 feet (20m) away from the Mix Controller. For a detailed diagram, refer to "Appendix II: System Troubleshooting and TechNotes". The Extender Kit cables should also be accounted for in your cable trough dimensions.

## Locating the Patch Bays



The patch bays are standard 19" single space rack-mount units. There will be 1 Channel patch unit per 4 channels of audio ordered with your system and 1 Master patch unit with each system. These can be conveniently placed anywhere according to the particular control room design. Make sure to allow for the large multipin connectors that attach the snakes to the rear of each patch unit. For proper clearances, see the dimensions of the multipin connectors and snakes in the following section.

## Machine Area Considerations

Because it houses about half of your Euphonix system, the separate machine area or room is an important part of your studio. The environment in the remote machine area should have adequate ventilation, temperature and humidity controls. Apparent condensation and clamminess in the room are important warning signs of an undesirable machine area climate. If, after the system has been installed, rust begins to develop on any Euphonix components (sheet metal screws, etc.), there is clearly too much humidity in the room. If the machine room is an uncomfortable environment in which to service your equipment, renovation may be required to house the Audio Tower(s), Audio Cube(s), and the MixView Platform. You should not have to walk on cables or Elco connectors to enter or exit the machine area. In extreme cases of user negligence, any outstanding warranty may be void. See page 1-17, "Power/Cooling Requirements", for more information.

## Cable Trough Considerations



The multipin snakes carry all digital (control) signals from the Mix Controller to the Audio Tower as well as analog (audio) signals from the Audio Tower to the patch units. All CSII/CS2000 systems will have 1 control snake per Audio Tower and 1 audio snake per 4 channels of audio ordered. The exact dimensions of these snakes are described on page 1-16 "Multipin Cable/Connector Dimensions". Be careful not to underestimate the size of the trough required for all necessary multipin cables, extender cables and other equipment cables. It is best to overestimate your trough size to allow for studio and equipment expansion. This approach will alleviate problems once the studio is in full operation.

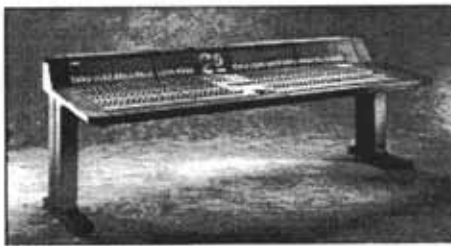
When laying cable through troughs, Euphonix recommends keeping control and especially audio snakes away from power cables, power supplies, fluorescent lighting, dimmers, and other sources of EMF that could potentially couple into signal cables. Microphone runs can be especially susceptible to external noise due to low signal levels. When power and signal cables must cross, they should be crossed as close to perpendicular as possible to avoid RF coupling. Careful consideration of cable runs will keep the console noise floor extremely low, even with many inputs assigned.

## Introduction

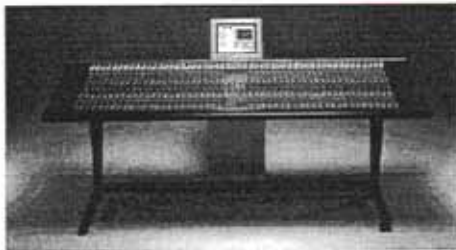
## System Dimensions

The following pages show the physical dimensions of your Euphonix system. More detailed descriptions of the system components are provided in later chapters of this manual, as well as in the Operator's Manual.

### Mix Controller Frame Types



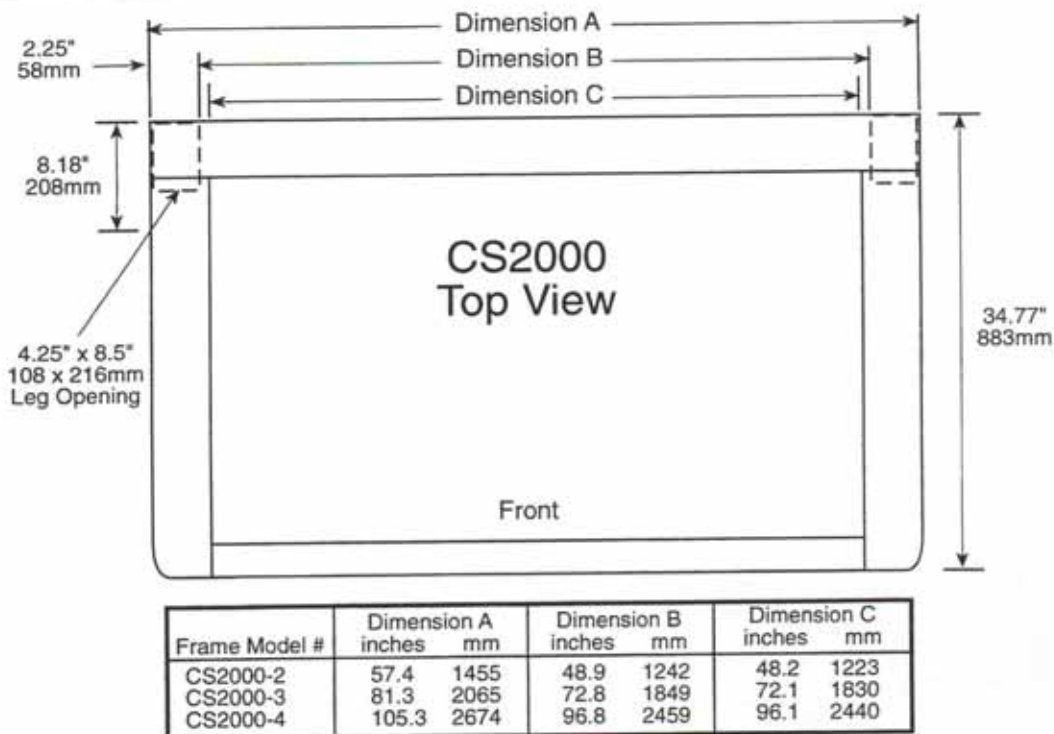
The **CS2000 frame** comes in three sizes, which are assembled in modular frame sections. The CS2000 system comes in two-, three-, and four-section sizes. Each section holds up to four modular controllers, either Input/Output (I/O), Master, blank, or the Digital Studio Controller (DSC). Each controller occupies one slot in the frame except for the DSC, which requires the space of two slots. A slot is defined both as a physical location in the frame, and also as the digital connector on the DBus (the bus that carries controller data out to the Audio Tower). CS2000 frames are designed to allow DSC placement in any position on the control surface. The Master controller is still required when a DSC is fitted.



The **CSII frame** comes in three sizes, but it is a one-piece pan that is not a modular structure. The CSII frame can accommodate either 9, 12, or 15 controllers depending on the frame size ordered. The DSC can be fitted only in the center position of a CSII, because the DSC module requires additional space at the bottom of the frame. CSII frames ship from the factory with space made for the DSC, so future upgrades are simplified.

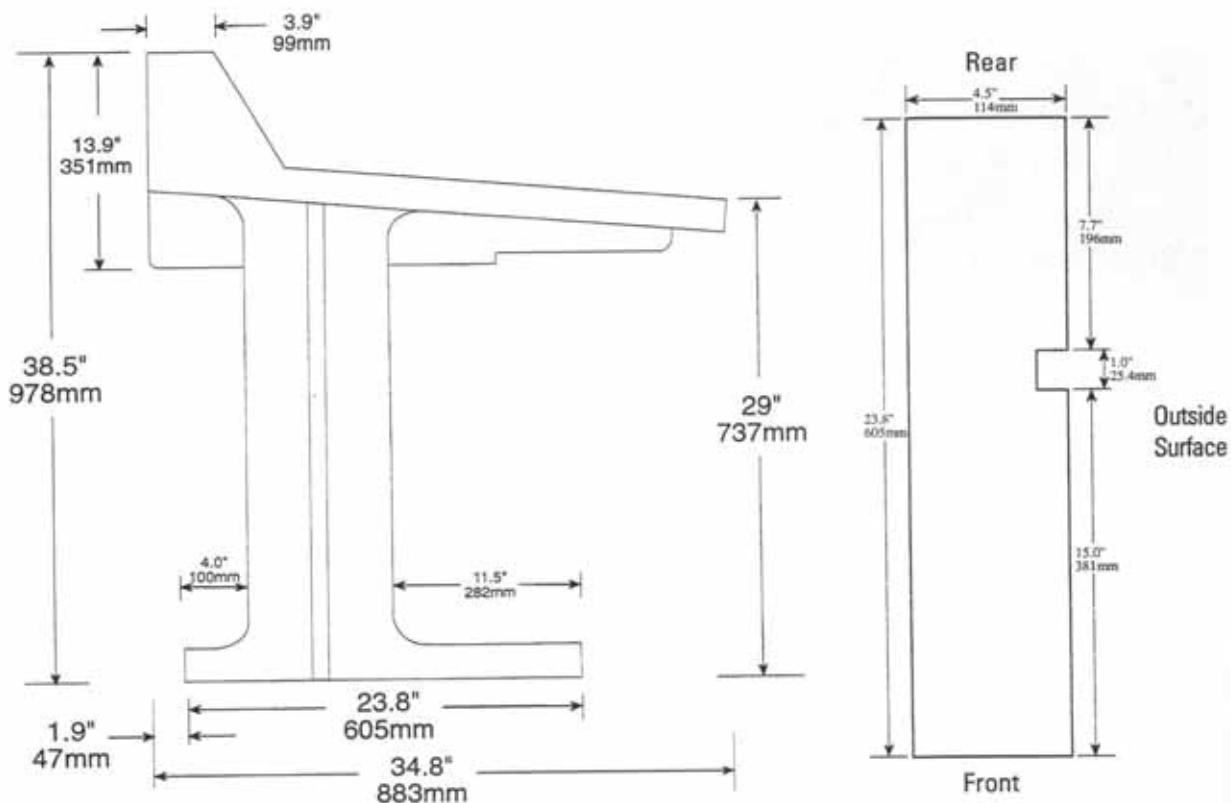
The following pages show the dimensions of available Euphonix frames.

## CS2000 Mix Controller Dimensions



**Figure 2 - CS2000 Mix Controller Dimensions**

Dimension A above refers to the outside width of both the control surface and the leg base. Dimension B shows the width between the leg openings in the back of the frame. Dimension C is the inside width between the leg bases.



**Figure 3 - CS2000 Side View and Footprint**

## CS2000 Frame Configurations

The diagram below shows two-, three-, and four-section CS2000 systems. The DSC may be located in any position the operator chooses. Note also that the Master controller may be placed on either side of the DSC.

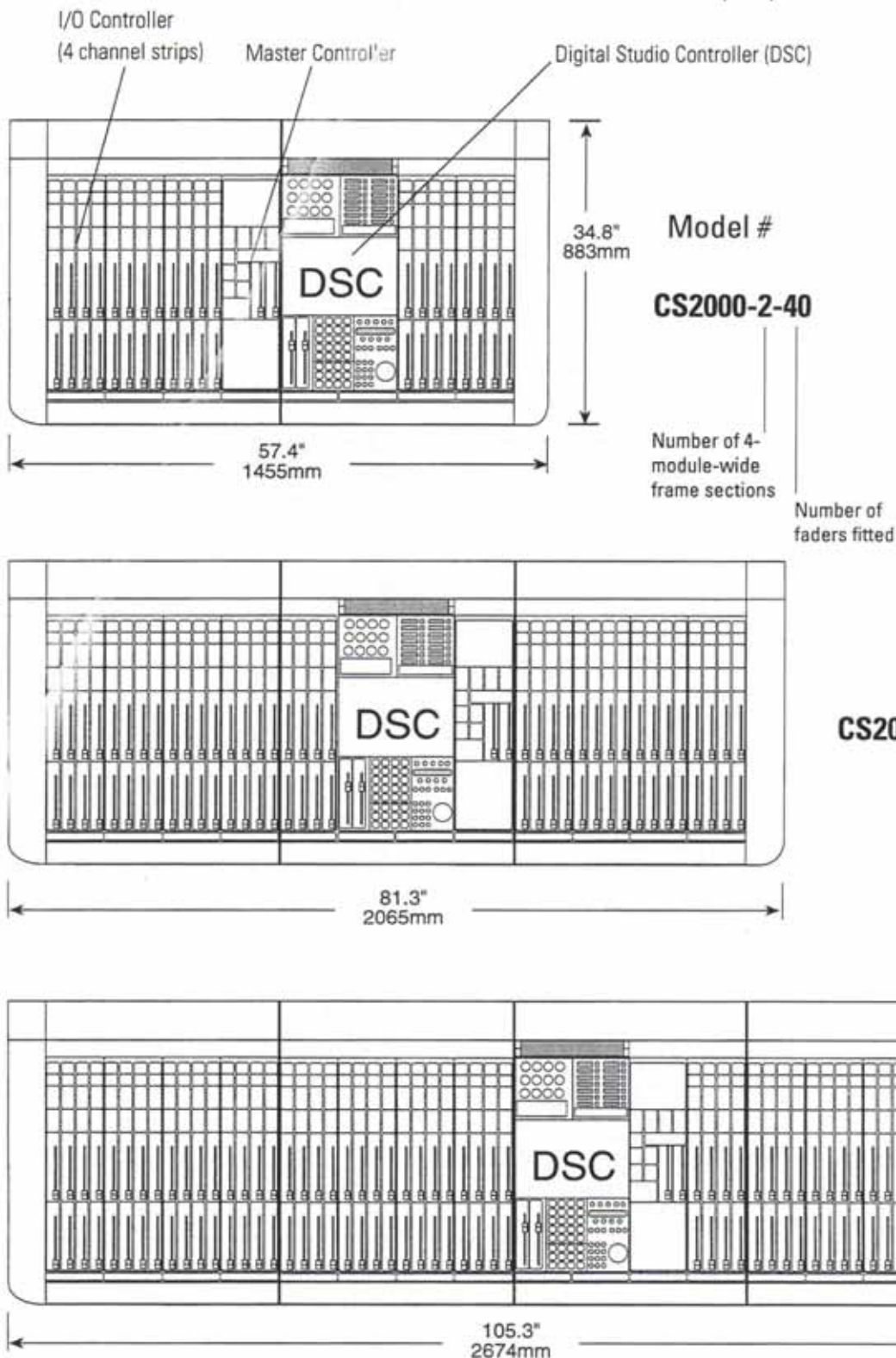
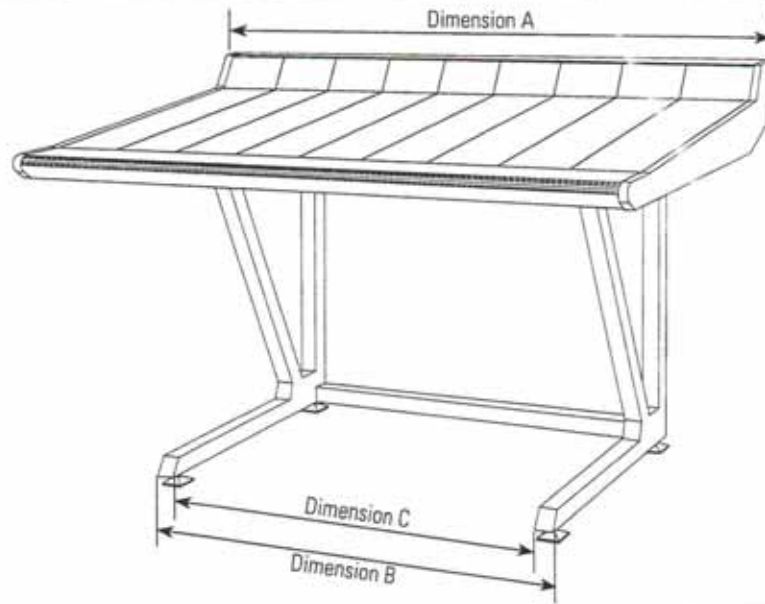


Figure 4 - CS2000 Mix Controller Configurations

## CSII Mix Controller Dimensions



Frame Model #	Dimension A		Dimension B		Dimension C	
	inches	mm	inches	mm	inches	mm
CSII, 9-slot	54"	1355	36"	914	33"	838
CSII, 12-slot	71"	1793	53"	1346	50"	1270
CSII, 15-slot	88"	2231	70.5"	1791	67.5"	1715

Dimension A above refers to the outside width of the control surface. Dimension B shows the outside width of the leg bases. Dimension C is the inside width between the leg bases.

Figure 5 - CSII Mix Controller Dimensions

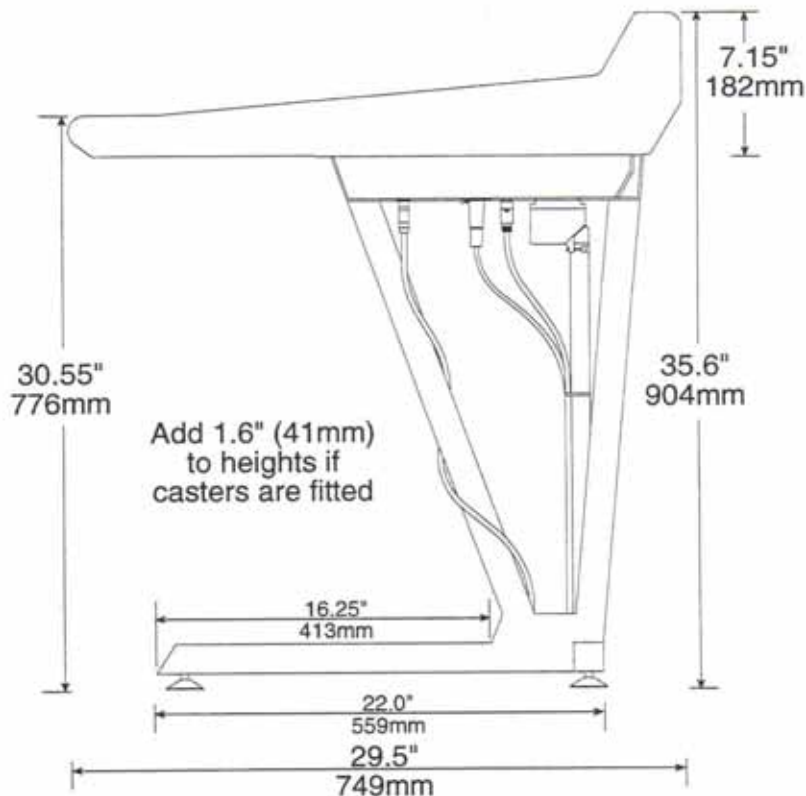


Figure 6 - CSII Mix Controller Side View

## CSII Frame Configurations

The diagram below shows 9-, 12-, and 15-slot CSII systems. Note that the DSC can be located only in the center position in the CSII. The Master controller may be located on either side.

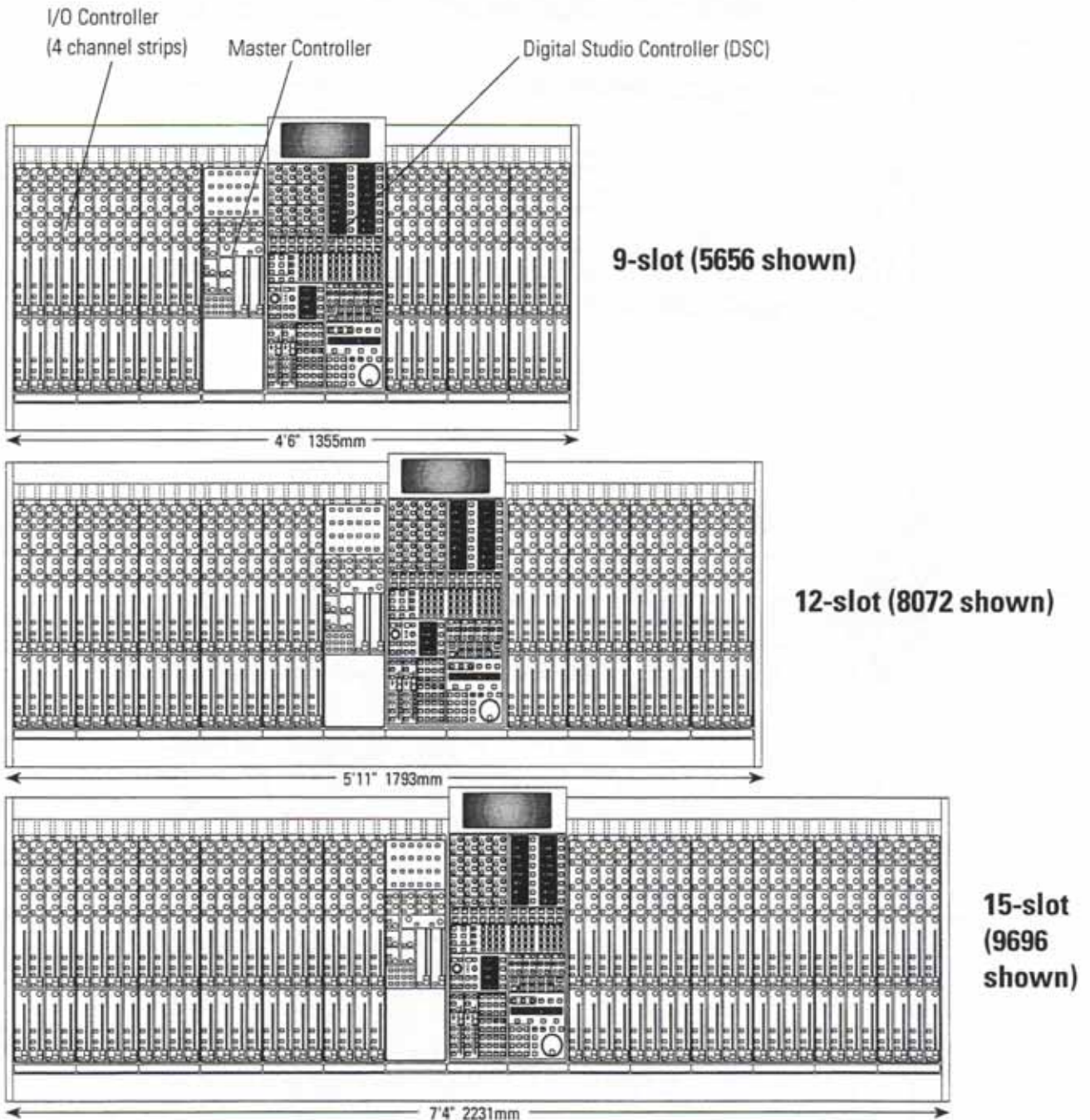


Figure 7 - Mix Controller Configurations

## Control Module Dimensions

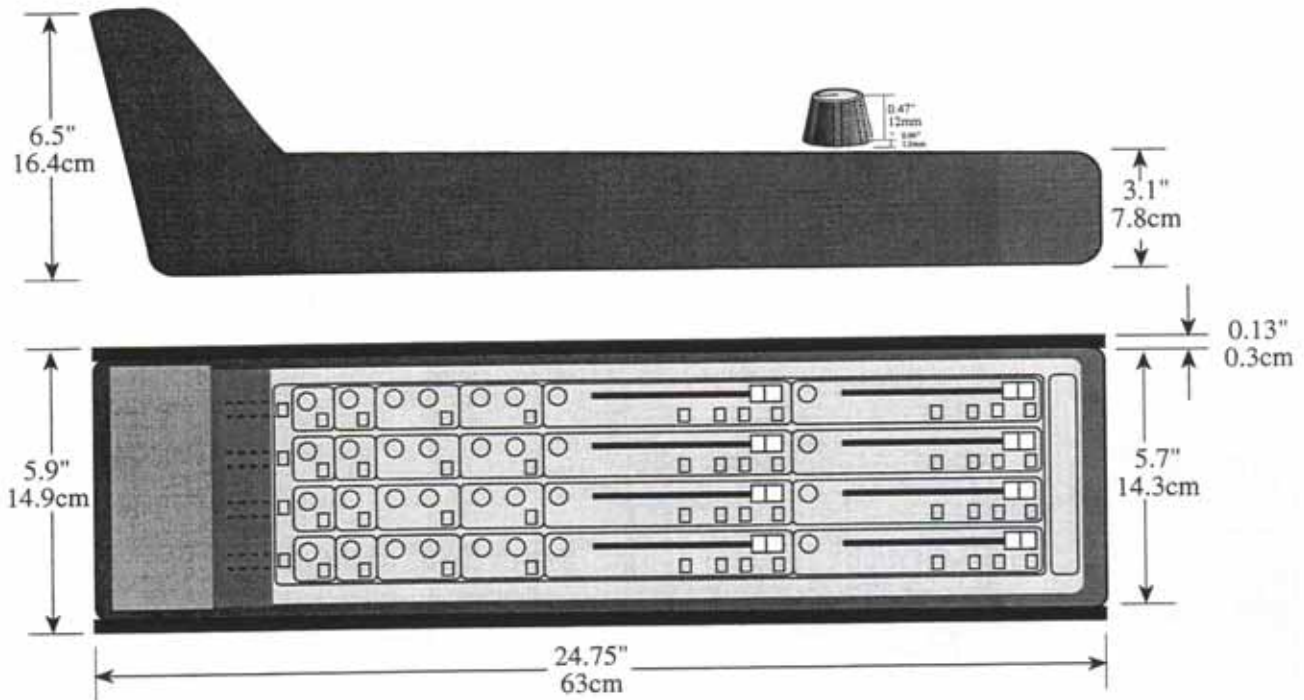


Figure 8 - I/O, Master, and Blank Controller Dimensions

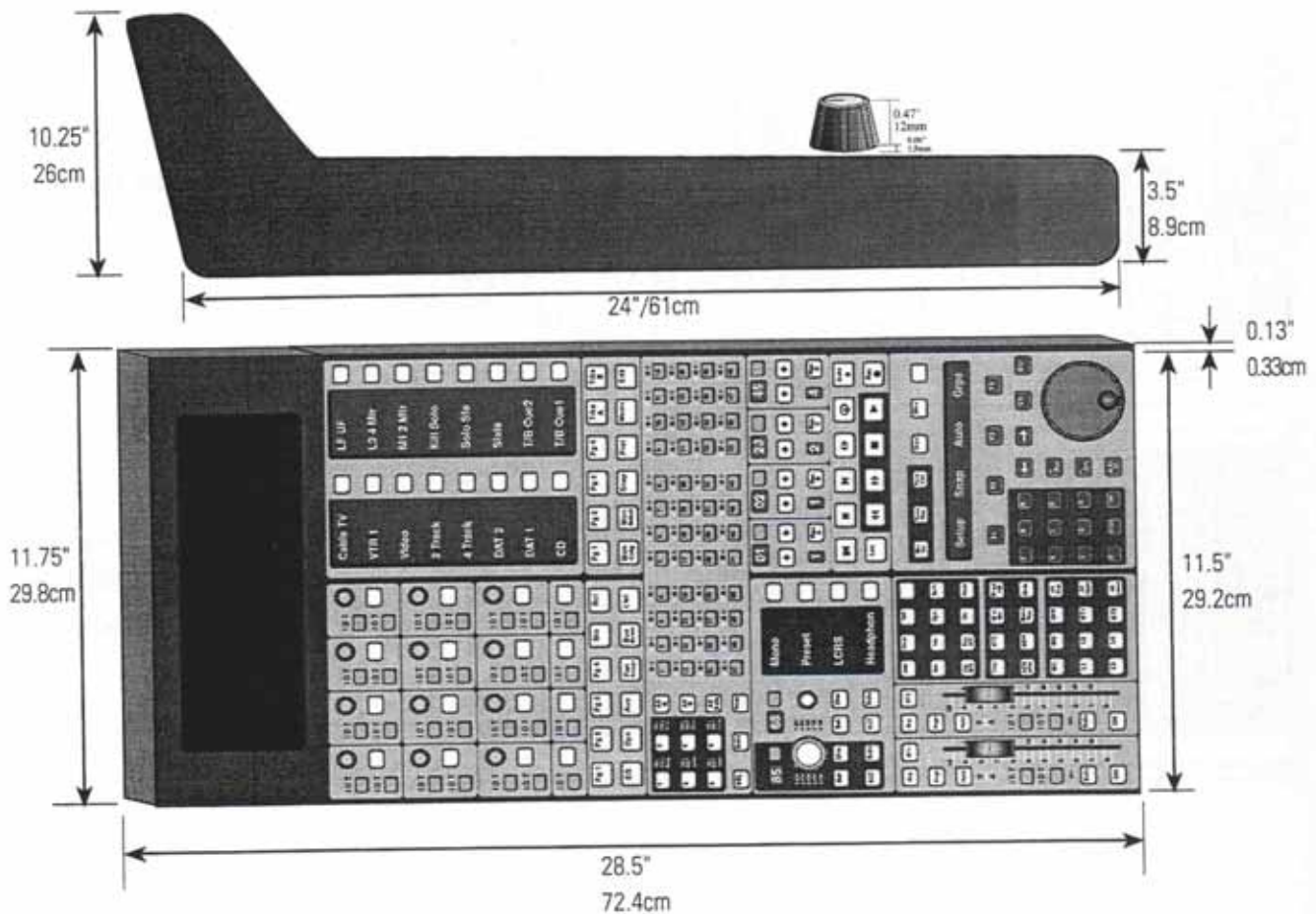


Figure 9 - DSC Dimensions

# Audio Tower Dimensions

The illustration below shows the dimensions and air flow for the CSII/CS2000 Audio Tower. The fans can be mounted on either side of the Tower enclosure. For twin Tower systems you should make sure that the exhaust of the first Tower is not blowing into the intake vents of the second.

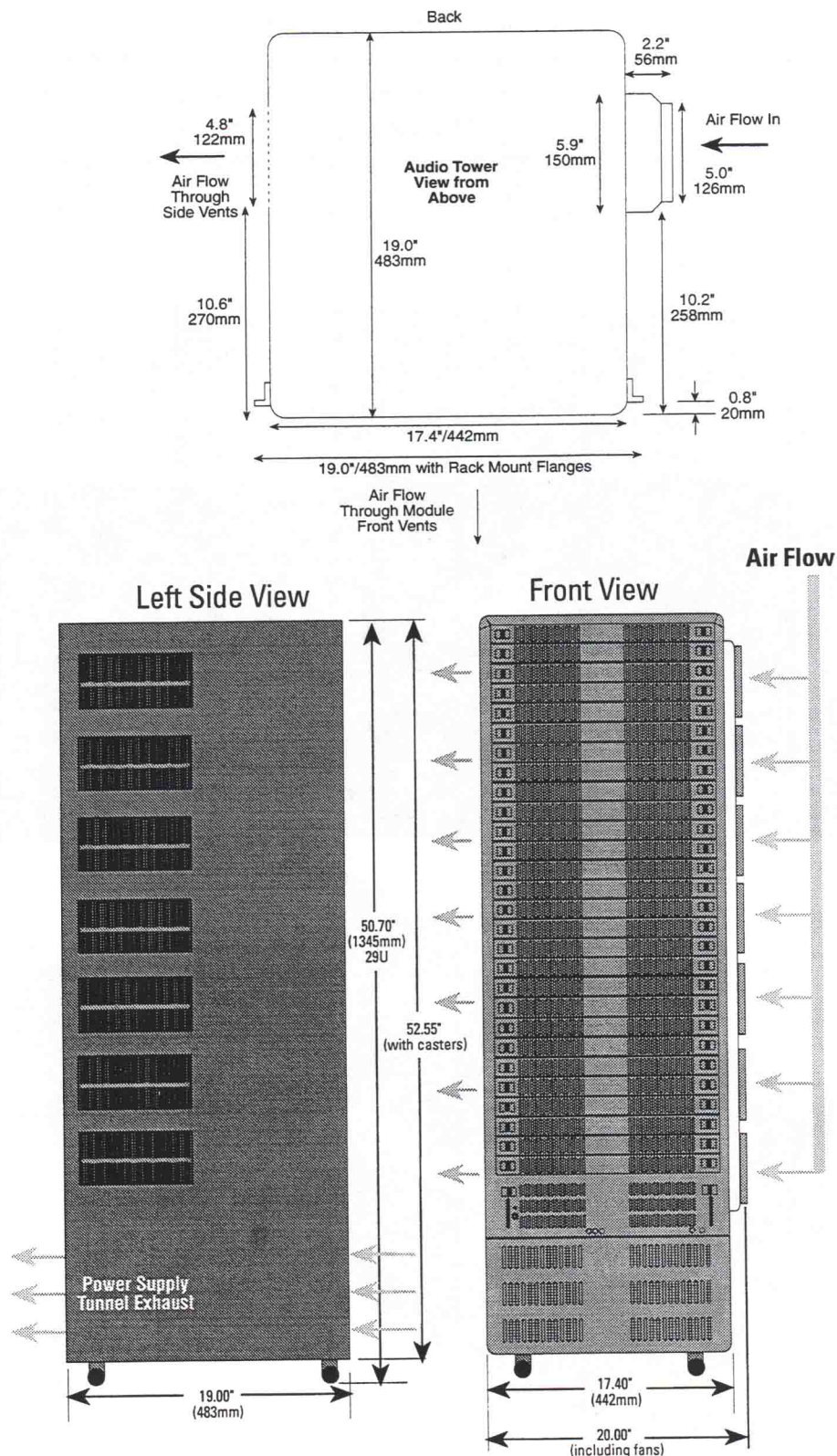


Figure 11 - Audio Tower Dimensions

### MixView Platform Dimensions

Below is a diagram of the CSII/CS2000 MixView Platform rack-mount processor. The MixView Platform is comprised of a processor with an internal hard drive, a removable hard drive, and a 3-1/2" high-density floppy drive, a mouse and a compact keyboard. It is used to display information on the graphics monitor (or DSC screen) and store session information on disk. The MixView Platform connects directly to the Mix Controller via the provided cables, or can be remotely located up to 66' (20m) away with the optional Euphonix Extender Kit. Note that the depth of the chassis below does not include the space that should be allocated for the connectors and cables that connect the MixView Platform to the rest of the system.

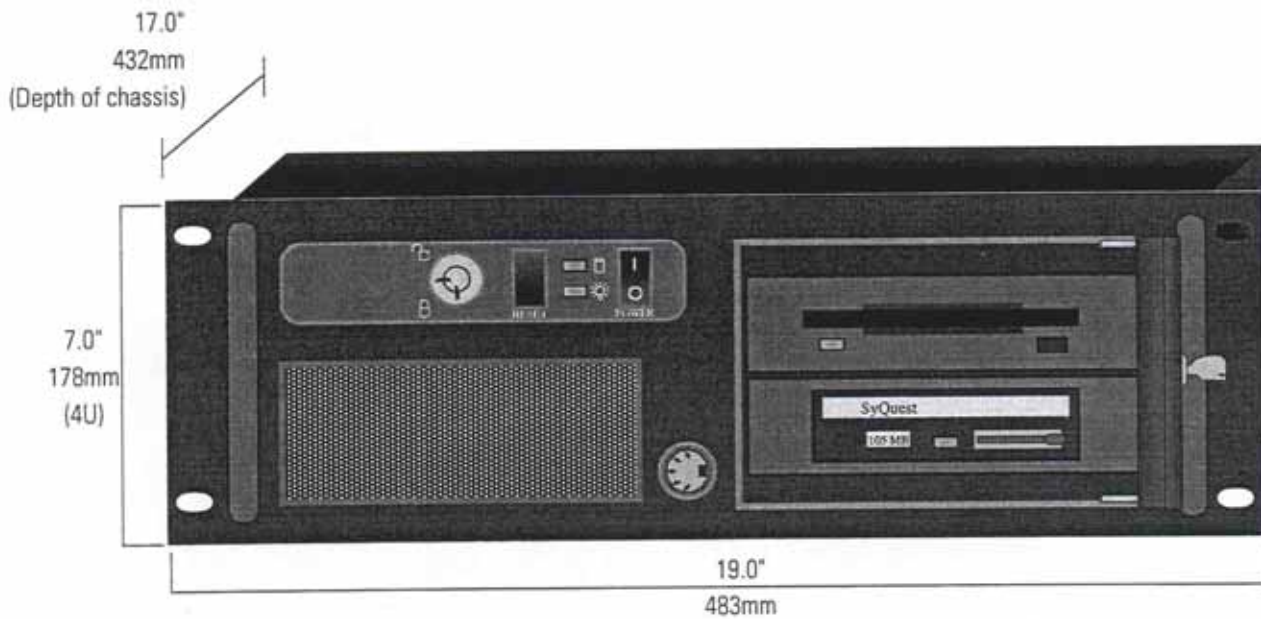


Figure 10 - Rack-mount MixView Platform

## Patch Bay Dimensions

Euphonix patch bays are standard single-space units of two types: the Channel patch unit and the Master patch unit. The standard patch accommodates four channels and is configured so that the channel inputs and outputs are grouped vertically in pairs across the unit. See the illustration below for basic unit dimensions.

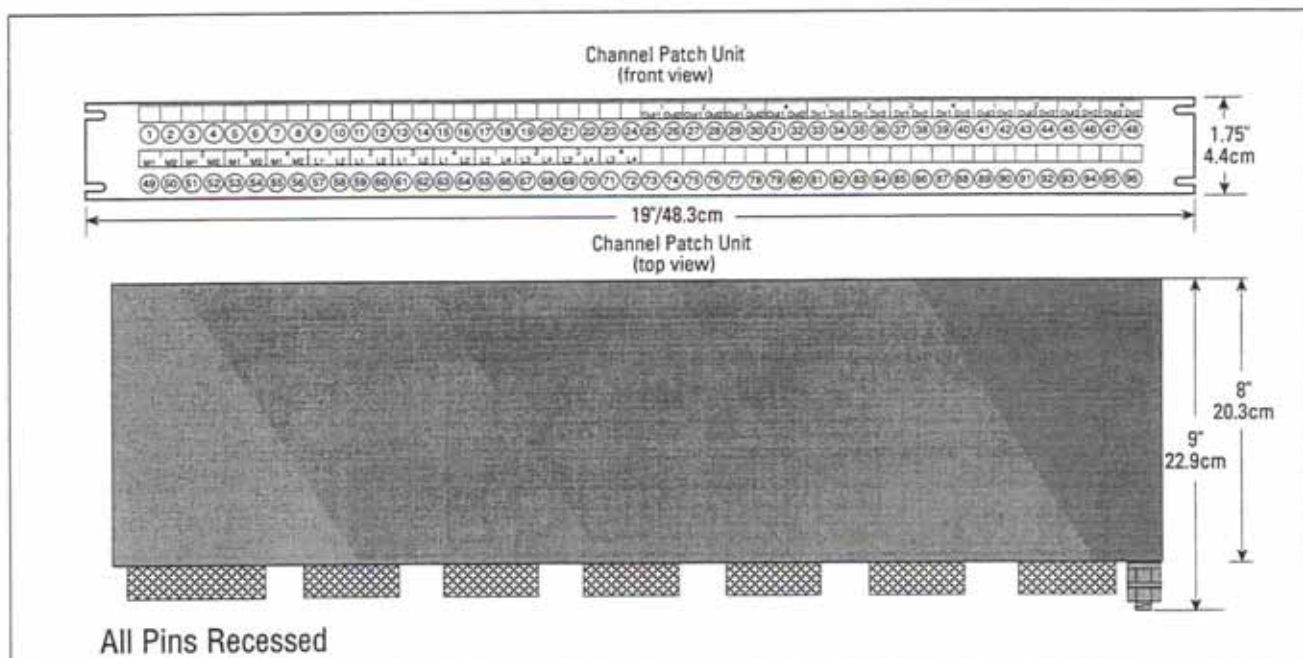
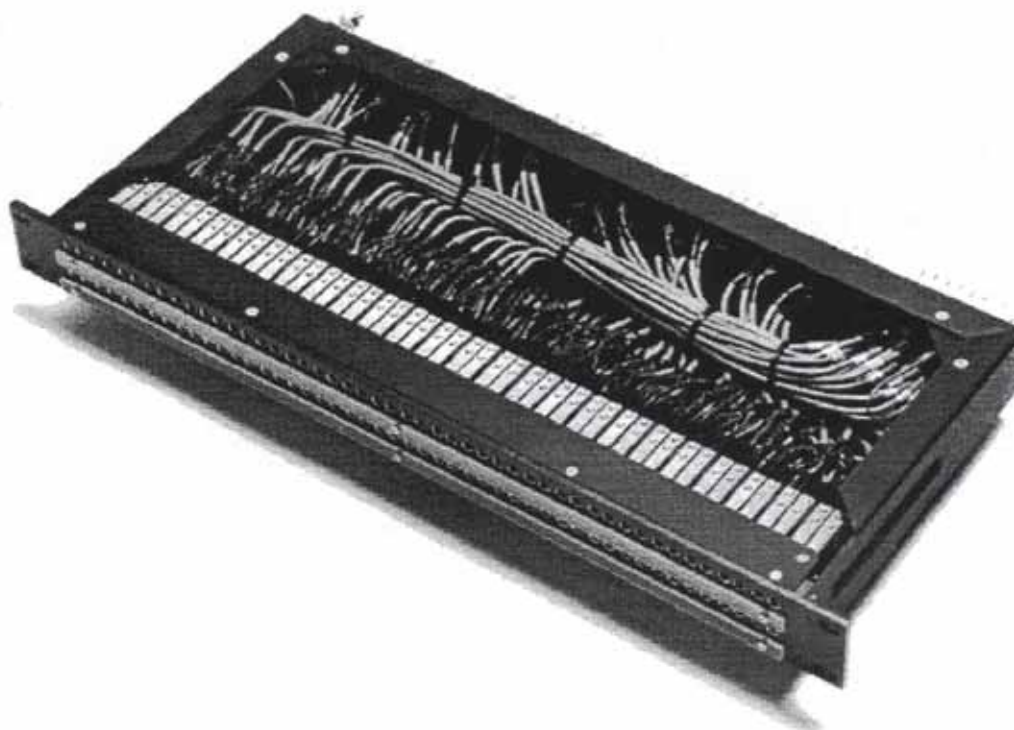


Figure 12 - Patch Bay Dimensions



### Audio Cube Dimensions

The illustration below shows the dimensions of the CSII/CS2000 Audio Cube. It is important not to obstruct air flow around the Audio Cube, since the Cube requires adequate ventilation to avoid overheating.

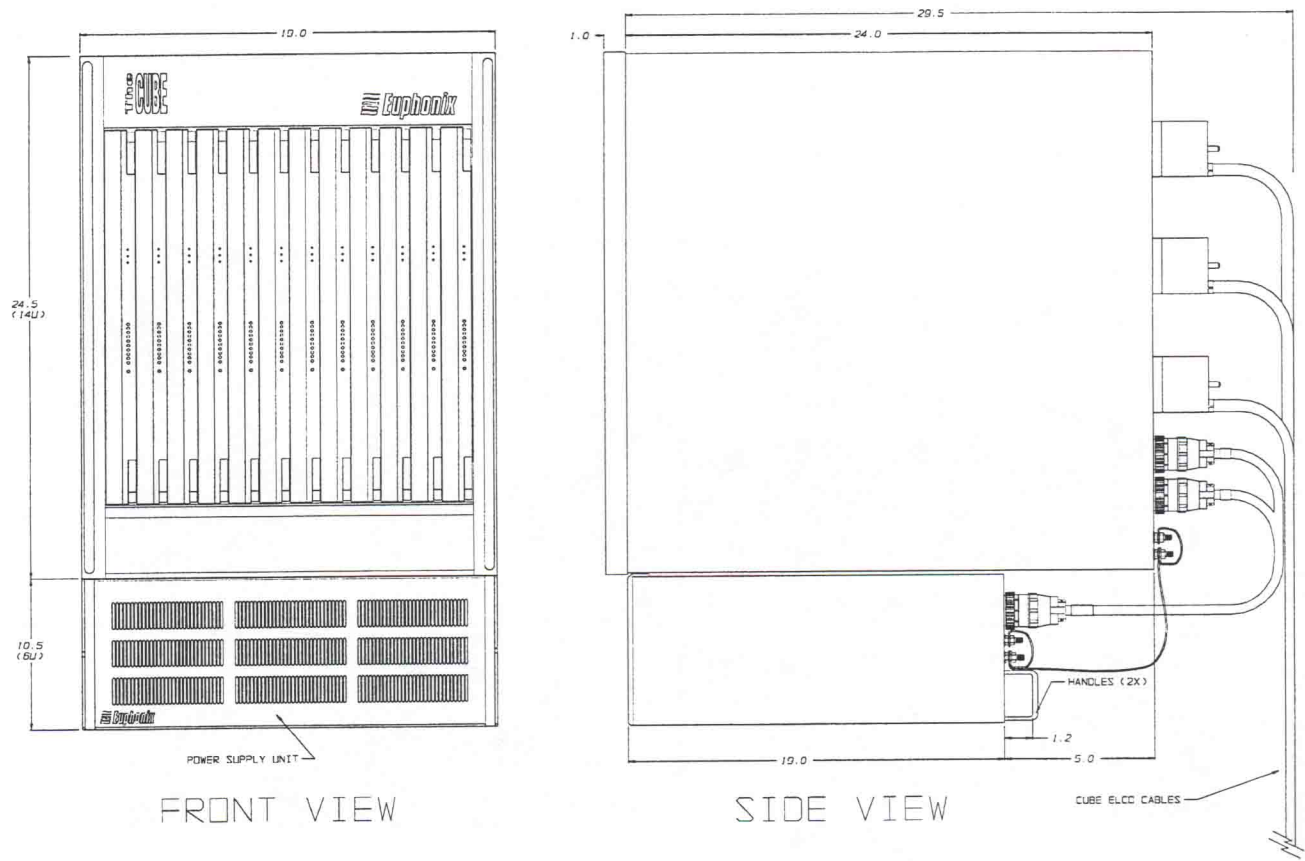


Figure 15 - Audio Cube Dimensions (in inches)

**Dynamics Dimensions**

Euphonix ES108 dynamics processors are two-space rack-mountable units. Each ES108 provides 8 channels of dynamic processing, plus 2 digitally-controlled filters per channel. See the illustration below for basic unit dimensions.

<b>Dimensions</b>	3.5" H x 19" W x 17.25" D 8.9cm H x 48.3cm W x 43.8cm D	Elco option
<b>Shipping Weight</b>	25 lbs. (11.5 kg)	
<b>Power Requirements</b>	100 Vrms/1.1 A/50-60 Hz 120 Vrms/0.9 A/50-60 Hz 220 Vrms/0.6 A/50-60 Hz 240 Vrms/0.5 A/50-60 Hz	Choose proper voltage with selector on rear panel.
<b>Cooling System</b>	Forced air cooled, internal fan Air intake and outlet through vents in rear panel.	Do not obstruct cooling vents or overheating damage may occur.

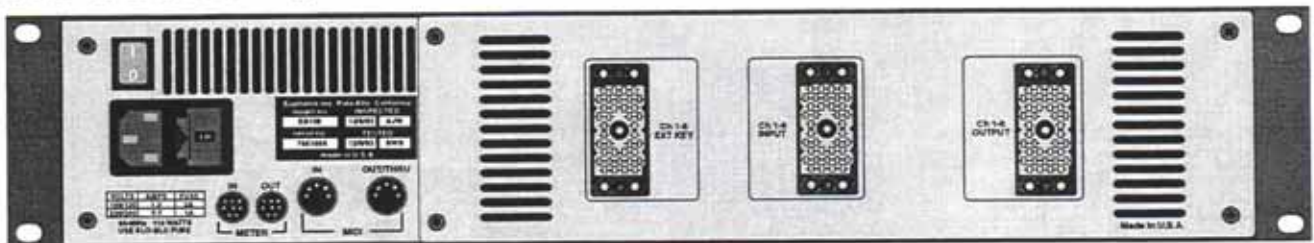
**Front View, Showing Displays****Rear View, Showing Connectors**

Figure 16 - ES108 Dynamics Dimensions

## Multipin Cable/Connector Dimensions

The patch units function with Elco connectors and audio snakes attached to the rear, so it is important to provide clearance in the rack for these cables as well as each patch unit chassis. Below is a diagram of the largest of these connectors and cables, and dimensions for additional cables are listed below. Keep in mind also that there will be coils of excess cable to accommodate after most installations. This cable is usually left dressed in the machine area, either coiled neatly on the floor or hung on the wall.

### Cable Dimensions for CSII/CS2000 Studio Systems, as of 4/95.

Specifications subject to change without notice.

Cable	"From"	"To"	Connectors	Outside Diam.
DSC Euphraphix	MixView Platform	Mix Controller	37-pin D-type	0.50"/12.7mm
Mouse	MixView Platform	Mouse	9-pin D-type	0.22"/5.6mm
External VGA Monitor	MixView Platform	Video Monitor	15-pin D-type	0.27"/6.9mm
Mix Controller Eibus	MixView Platform	Mix Controller	25-pin D-type	0.40"/10.2mm
Cube Eibus	MixView Platform	Audio Cube	25-pin D-type	0.40"/10.2mm
MIDI Control	MIDI Interface Unit	Dynamics	5-pin DIN	0.20"/5.1mm
TB/Phones Audio	Mix Controller	Audio Tower	5-pin XLR	0.30"/7.6mm
Tower Control	Mix Controller	Audio Tower	90-pin Elco	0.95"/24.1mm
Tower Audio	Audio Tower	Patch Bays	90-pin Elco	0.95"/24.1mm
Keyboard Cable	Keyboard/Extender	MixView Platform	5-pin PC	0.20"/5.1mm
Cube Audio	Audio Cube	Patch Bays	38/56-pin Elco	0.50"/12.7mm
Keyboard/VGA Extender	Keyboard/Monitor	MixView Platform	15-pin D-type	0.37"/9.5mm

Please note that the above dimensions are for each SINGLE cable, and that different Euphonix systems have different cabling requirements depending on the system configuration. It is always a good idea to configure your cable troughs and throughputs with future expansion in mind to prevent future upgrades from being both costly and logistically difficult.

Figure 13 - Euphonix Cable Dimensions

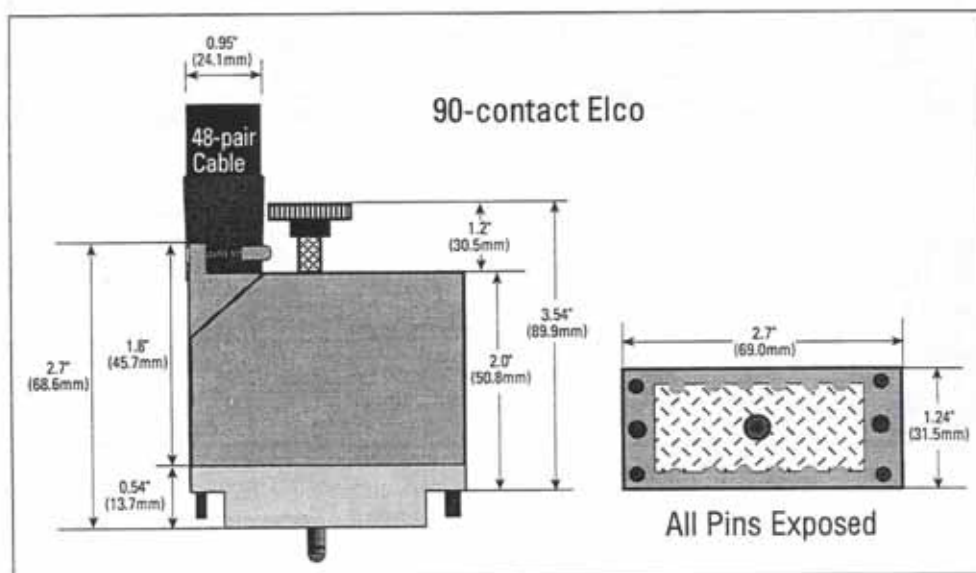


Figure 14 - Multipin Connector Dimensions

## Introduction

## Power/Cooling Requirements

This section will cover all of the specific power and environmental requirements of your CSII/CS2000 components. This should be helpful for designing your electrical system before the arrival of your Euphonix. The following section will break the CSII/CS2000 options into the following configurations:

9/12/15-slot CSII Mix Controller with or without DSC.

2/3/4-tub CS2000 Mix Controller with or without DSC.

Up to 104 faders can be supported in a 4-tub CS2000 with a DSC. This configuration requires two Audio Towers. The first Tower is fitted with 24 Audio channels and 4 BusLink trays that connect to the second Tower, which is loaded with up to 28 Audio channels. The first Tower is fitted with a Master section, and the second Tower is fitted with a Submaster section. All Audio Towers are fused for a full load of 28 channels.

### CSII Mix Controller Maximum Power Requirements

#### CSII Frames, Without DSC

Voltage	100V	100V	100V	120V	120V	120V
Size (Slots)	9	12	15	9	12	15
Rating	5.1A	7.7A	9.5A	4.3A	6.4A	7.9A

Voltage	220V	220V	220V	234V	234V	234V
Size (Slots)	9	12	15	9	12	15
Rating	2.3A	3.5A	4.3A	2.2A	3.3A	4.1A

#### CSII Frames, With DSC

Voltage	100V	100V	100V	120V	120V	120V
Size (Slots)	9	12	15	9	12	15
Rating	5.7A	7.5A	9.3A	4.8A	6.2A	7.8A

Voltage	220V	220V	220V	234V	234V	234V
Size (Slots)	9	12	15	9	12	15
Rating	2.6A	3.4A	4.2A	2.4A	3.2A	4.0A

### CS2000 Mix Controller Maximum Power Requirements

#### CS2000 Frames, Without DSC

Voltage	100V	100V	100V	120V	120V	120V
Size (Tubs)	2	3	4	2	3	4
Rating	5.1A	7.7A	9.5A	4.3A	6.4A	7.9A

Voltage	220V	220V	220V	234V	234V	234V
Size (Tubs)	2	3	4	2	3	4
Rating	2.3A	3.5A	4.3A	2.2A	3.3A	4.1A

#### CS2000 Frames, With DSC

Voltage	100V	100V	100V	120V	120V	120V
Size (Tubs)	2	3	4	2	3	4
Rating	5.1A	7.5A	9.9A	4.3A	6.2A	8.3A

Voltage	220V	220V	220V	234V	234V	234V
Size (Tubs)	2	3	4	2	3	4
Rating	2.3A	3.4A	4.5A	2.2A	3.2A	4.2A

### MixView Platform Maximum Power Requirements

Voltage	100V	120V
Max. Rating	7.7A	6.4A
Typical Rating	1.5A	1.3A

Voltage	220V	234V
Max. Rating	3.5A	3.3A
Typical Rating	0.7A	0.6A

### Audio Tower Maximum Power Requirements

Voltage	100V	120V
Rating	36A	30A

Voltage	220V	234V
Rating	16A	15A

### Audio Tower Mains Power Voltage Requirements

Nominal RMS Voltage	Peak Voltage Range		Peak-to-peak Voltage Range	
	Min	Max	Min	Max
100	132.9	149.9	265.8	299.8
120	159.5	179.9	319.0	359.7
220	292.4	329.7	584.8	659.5
230	305.7	344.7	611.4	689.5
234	311.0	350.7	622.0	701.5
240	319.0	359.7	638.0	719.4

### General Power Requirements

As with any sensitive electronic equipment, it is important that the Euphonix system is provided with an adequate source of power. **For the audio output of your console to stay within specification, the power source must be within the limits that the system can tolerate. For the CSII/CS2000, that tolerance is +/- 6% of the recommended voltage.** See above table for exact specifications.

An Audio Tower configured for use in the U.S. draws approximately 17 amperes RMS when powered by a 120 volt outlet. This means that the Tower consumes about 2kw. According to the National Electric Code, loads requiring continuous operation are only allowed to draw 80% of an outlet's rated current. For this reason, **Euphonix recommends that each Audio Tower in the system has its own dedicated 30 amp service in the USA.** Additionally, we recommend that each service has an isolated ground connection back to the facility's service entrance where the AC neutral is bonded to earth ground. Outside the USA, the Audio Tower's dedicated power outlet should be rated at 2.5kva minimum.

The Mix Controller and the MixView Platform can operate from a single circuit with isolated ground. This circuit should be rated at 20 amps in the USA.

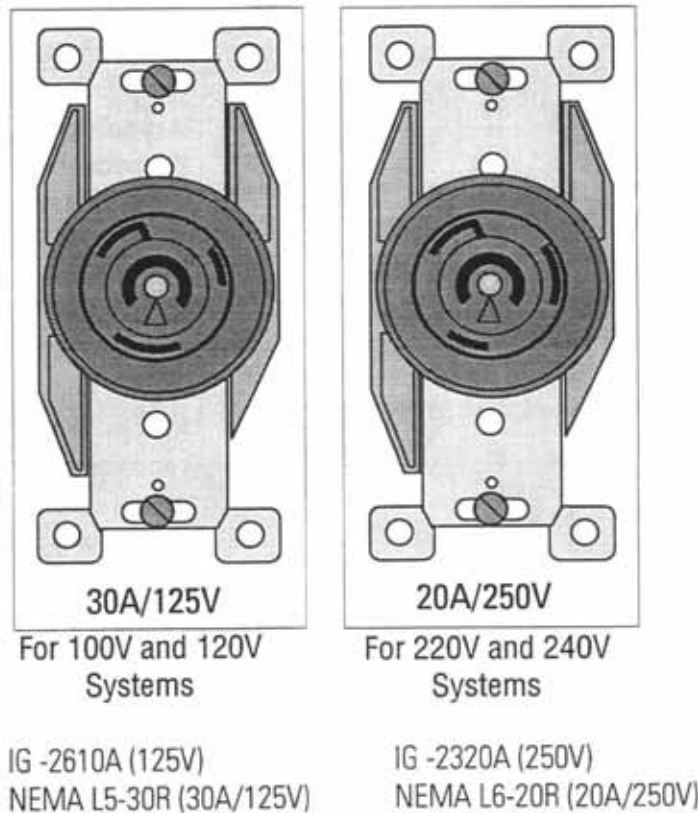
The MixView Platform is rated at 6.4 amps (US) or 3.5 amps (Europe); the Mix Controller is rated at up to 7.9 amps (US) or 4.3 amps (Europe). The largest number of faders that the system can currently accommodate is 112 (14 I/O Controllers, no DSC, 3 Audio Towers), and this is the specification given for the 15-slot CSII and the 4-tub CS2000.

## Operating Temperatures

The largest system will dissipate only about 350 watts in the control room, so air conditioning requirements are minimal for the Mix Controller and MixView Platform. The Audio Tower(s), however, dissipate much more power as heat, approximately 1.5kw per Tower. Euphonix recommends putting the Tower(s) in a separate air conditioned machine room to reduce noise and limit control room air conditioning requirements. Some operators may prefer to leave the Tower(s) in the control room. This is entirely possible providing that the air conditioner can compensate for the additional heat.

## Power Outlets

Listed below are the recommended connectors and receptacles for providing power to the Audio Tower.



Flush Cover Plate: P/N 97111- stainless steel, single gang

Figure 17 - ISO Ground Receptacle

For your reference:

Hubbell Wiring Products

\*Call these numbers to obtain listings for local distribution:

Anaheim, CA 714-995-1212 Christiansburg, VA 703-382-6111  
Bridgeport, CT 203-333-1181 St. Louis, MO 314-531-0460

## Power-indicator LEDs

The power-indicator LEDs on the back of your Audio Tower's power supply monitor the *peak* voltage of the power line at the input of the power supply. As with any typical linear power supply, the final output voltages are derived from an unregulated DC voltage which is determined by the peak level (not the rms level!) of the AC waveform coming from the wall outlet. If this unregulated DC voltage gets too low, some "ripple" will creep into your audio signals and make them buzz at 100 or 120 Hz depending on where you are in the world. If the DC voltage gets too high, your power supply will dissipate excess power, which leads to hotter air coming out of the vents and shorter component lifetime in the power supply. Euphonix has provided the power-indicator LEDs so that you can easily monitor your line voltage and avoid these problems.

If one of the red LEDs comes on, don't be alarmed. Damage will not result from an under-voltage condition, and will only occur under extreme cases of over-voltage (40% above nominal could be troublesome). The green LED will glow if the peak voltage is within about 6% of the nominal value (see below for how peak voltage relates to RMS voltage).

If your Audio Tower is powering fewer than 24 audio modules, the circuits in the power supply will undergo less voltage drop than expected, and the over-voltage LED might come on. If this is the case, measure the line voltage (RMS) to see that it is within the specified range; if it is, you have nothing to worry about. Since your power supply isn't working as hard as it is designed to, it should run cooler and the problems associated with excess power dissipation will not be present.

The under-voltage LED always means the line voltage is too low, regardless of the number of audio modules in the Tower.

## Power-line Voltages

For a pure sine wave, the peak voltage is exactly the square root of 2 (roughly 1.414) times the rms voltage. The CSII/CS2000 expects a clean sine wave at its power input. Unfortunately, in many cases the wires traveling from the breaker box to your wall outlet will cause a voltage drop (due to resistance, which increases as wires get longer and/or thinner) which means that your CSII/CS2000 gets less voltage than the breaker box is supplying.

Since the Euphonix power supply draws most of its current during the extreme peaks of the input waveform, the wiring drops more voltage during the peaks than during the rest of the waveform. (This nonlinear behavior is typical of linear power supplies!). This effect is referred to as *peak flattening* or *crest-*

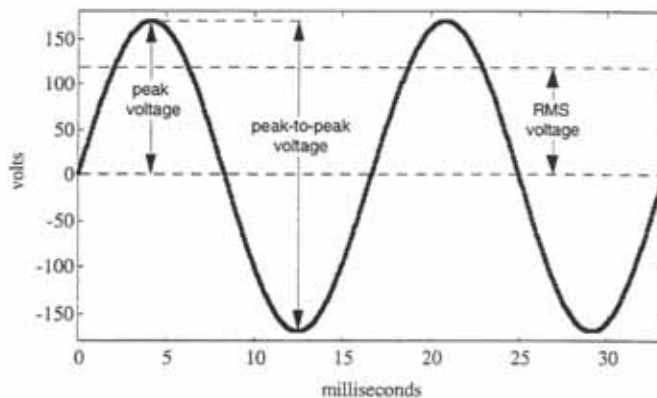
## Mains Power and the Peak Flattening Effect

Linear power supplies, like the one in the Audio Tower, operate on the peak voltage of the incoming power waveform, not the RMS voltage. This is why a simple RMS voltmeter will not always tell you if your power is in spec. Measuring your AC power with an oscilloscope gives a more complete picture, as shown in the diagrams below.

**120.0 volts RMS  
169.7 volts peak  
0% below nominal  
(ideal waveform)**

Crest Factor =  $169.7 / 120 = 1.414$

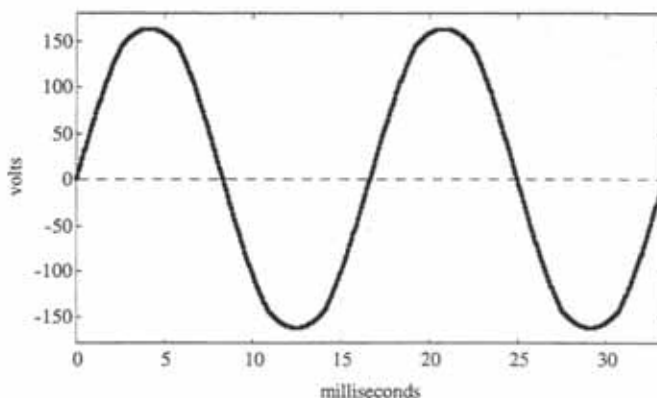
This is a pure sine wave. Notice the relatively sharp peaks.



**120.0 volts RMS  
163.2 volts peak  
3.8% below nominal  
(in spec)**

Crest Factor =  $163.2 / 120 = 1.360$

Notice that the peaks are more rounded than those of the pure sine wave above. This is a more typical mains power waveform, due to resistance in power wires.



**120.0 volts RMS  
157.4 volts peak  
7.2% below nominal  
(out of spec)**

Crest Factor =  $157.4 / 120 = 1.312$

This waveform has excessive peak flattening. Although it measures 120 volts RMS, it is out of spec because its peak voltage is too low.

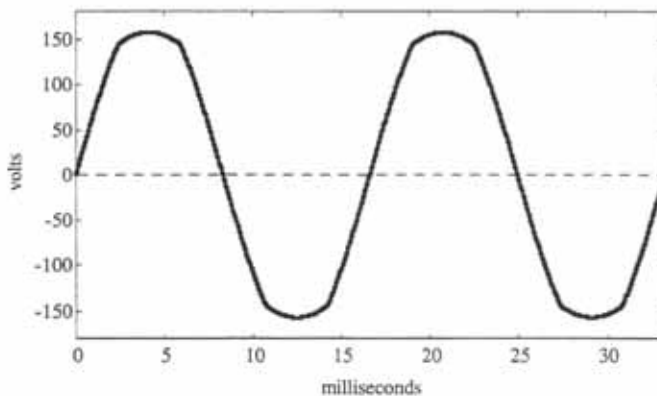


Figure 18 - Mains Power and the Peak Flattening Effect

## Power-line Voltages ...Continued

*factor reduction* and is similar to the nonlinear effect of clipping in audio signals.

When the peaks of your power waveform get flattened, the peak-to-RMS ratio (crest factor) drops below 1.414; in fact, it is not uncommon for this ratio to drop as low as 1.2 or so (for a square wave—the ultimate in clipped waveforms—the crest factor is 1.0).

How does all this relate to your CSII/CS2000 and its power-indicator LEDs? A little bit of math will show us. If you have a 120 Vrms power supply, the spec for your line voltage is 112.8 to 127.2 Vrms (that is, 120 +/- 6% of 120). Multiplying by 1.414, we see that you need a *peak* voltage in the range of 159 to 180 volts (that's 318 to 360 volts peak-to-peak) at 120 Vrms. If the wiring in your wall is not heavy-duty and your crest factor drops to 1.2, your RMS voltage requirement increases to the range 135 to 153 Vrms(!), in order to meet the **peak** voltage requirement. Thus, your low-voltage LED will go on at about 135 Vrms (measured on a "true RMS" voltmeter).

## Wiring Power to the System

It is possible that your wall outlet is incapable of delivering enough voltage to light the green (Power OK) LED, or delivering proper power to your audio modules, if your wiring is inadequate. The best way to overcome this problem is to make the wires travelling from your breaker box to your CSII/CS2000 as short and as thick as possible. Euphonix recommends 10 AWG or heavier wire. The CSII/CS2000 Audio Tower is shipped with a 10 AWG power cable; under no circumstances is this to be substituted with a lighter-duty cable (in case you're not sure, higher AWG numbers mean lighter-duty, thinner wire).

Another way of solving the low-voltage problem is to use a step-up transformer or a variac (variable transformer) to increase your line voltage. If you do this, make sure that the transformer can handle at least 2.5 kVA of power (per Audio Tower!).

## **Surge Suppressors, Uninterruptable Power Supplies**

The CSII/CS2000 should be treated as any valuable computer-based system. By using a surge suppressor for the proper power rating you can protect the CSII/CS2000 from voltage spikes and AC line noise. This will add to the reliability of the system and prevent unnecessary power problems during important sessions.

Installing an Uninterruptable Power Supply (UPS), is an even better solution, because it will provide battery backup and allow the system to keep running even during a complete power outage. A UPS generally includes the surge suppressor function. These systems vary in size and expense depending on the power rating and the size of the batteries. The useful battery backup time is usually between 5 and 15 minutes depending on the model.

Euphonix highly recommends the use of a surge suppressor, and ideally a UPS. By providing clean, uninterruptable power to the CSII/CS2000, you will be guaranteed the highest system integrity and greatest amount of trouble-free operation.

For your reference:

Sola UPS (A trade name for General Signal)  
Stocked by Newark Electronics in the USA

\*Call these numbers to obtain listings for local distribution:

New York	(212) 349-7087	Chicago	(708) 495-7740
Los Angeles	(818) 445-1420	Nashville	(615) 371-1341

## Introduction

## Audio Input/Output Signal Descriptions

This section will cover all of the signal descriptions and miscellaneous connections for your CSII/CS2000 components. The block diagrams shown later in this manual will also be useful for understanding the complete signal path for your Euphonix system.

### I/O Signal Descriptions

(All console inputs and outputs are balanced)

#### 6 Discrete Inputs

##### Universal Inputs (M1/M2)

There are 2 per channel strip. These are variable level inputs for balanced Mic and Line levels. These inputs have a low input impedance, and are therefore not suited for direct input of high-impedance sources, such as guitar pickups. High-impedance, unbalanced sources should be rebalanced (see p. 1-49) before they are directed into the console.

##### Line Inputs (L1, L2, L3, L4)

There are 4 per channel strip. These are unity-gain, balanced inputs. L1 and L2 can be used for programmable insert returns. Inputs to L3 and L4 can be metered. L4 has the option of Bus/Tape switching. The Line inputs are fixed at unity gain, and expect line-level (+4dBu) signals.

#### 5 Discrete Outputs

##### Direct Outputs (Dir 1, Dir 2, Dir 2)

There are 2 Direct outputs per channel strip. They can be configured as 2 mono or 1 stereo output (post-fader). Dir 1 and Dir 2 can be fed from any of 6 sources: post upper fader (left and/or right), post lower fader (left and/or right), that channel's bus output, or the combiner (pre-fader). Dir 2 is paralleled and delivered to two points on the patch bay.

##### Pre-Fader Outputs (OUT 1, OUT 2, OUT 3)

There are 3 pre-fader outputs per channel strip. Thus, each channel has up to three insert points (using the Line inputs as returns). These can be configured as mono inserts in either or both fader paths, or as a stereo insert in either of the fader paths plus one mono insert for the other. These outs can be sent either pre- or post-EQ.

## Master Signal Descriptions

(All console inputs and outputs are balanced)

### External Inputs (Ext 1 In [A, B, & C], Ext 2 In [A, B, & C])

Up to 6 external stereo sources can be fed to the console's monitoring system. The three inputs to EXT1 are labelled on the patch as EXT1(A)L & EXT1(A)R, EXT1(B)L & EXT1(B)R, and EXT1(C)L & EXT1(C)R. Ext 2 is labelled in the same manner.

### Auxiliary Bus Outputs (A1-A8)

There are 8 AUX send buses which have their master gain controls in the upper part of the Master controller, just below the Macro Keys, labelled A1 to A8.

### Stereo Bus Outputs (ST1 Out [A, B, & C], ST2 Out [A, B, & C])

Each Stereo bus has 3 separately buffered outputs, which are labelled on the patch bay as ST1(A)L & ST1(A)R, ST1(B)L & ST1(B)R and ST1(C)L & ST1(C)R for Stereo 1. Stereo 2 outputs are labelled as ST2(A)L, etc. These are the console's main mix outputs. Each Stereo bus has insertion points that can be switched in and out under automation control. These are placed pre-fader and fed from the "C" outputs (ST1 Out C, ST2 Out C). When an insert is not being used, each ST C Out acts as a third balanced feed for each of the stereo busses. The returns for the inserts are labelled ST1 Out Ins. Rtn C, ST2 Out Ins. Rtn. C.

### Monitor Outputs (Mon A Out, Mon B Out, Mon C Out)

Each of the 3 monitor outputs, A, B & C, can be fed with any or all of the following sources: Aux 1-8, EXT1, EXT2, ST1 & ST2. Normally the monitors work as three independent simultaneous outputs, each sending its own source selection to its output via the level control. There is only one set of EXT selectors, so whatever combination of EXT A,B,C inputs that have been selected will be picked up by each monitor when EXT is selected as a source to the monitors.

You can use these outputs as headphone feeds as they can pick up any combination of the sources in the Monitor Set area. For example, Monitor B & C could be used for the control room monitors and Monitor A could feed headphones.

These outputs can also be used as a simple 1:1 stereo line level submixer. The submixer is capable of summing up to 6 separate stereo sources, via the EXTERNAL inputs, down to one stereo output (Monitor Output) via a level control (which gives unity gain when fully turned up). This is not the normal use for a monitor selector, but you can use it this way if you wish.

**Monitor Outputs  
Continued...**

If you select SET in all three monitor menus you can select between three different monitors in the control room. Only one feed will be active at any one time. You also have the choice of sending the AFL/PFL signal to any combination of the three monitors.

The console provides switching to allow each monitor output to be fed in stereo, mono (sum of left and right), left channel only (both outputs fed from the left channel of the source) or right channel only. This function allows you to use one (or more) of your monitor outputs to obtain a mono output from a stereo mix.

**Talkback In/out  
(TB Out, TB In)**

The Talkback section allows for 3 sources: Talkback Mic, Internal Oscillator, and a patched mono external input. All of these can be routed to the AUX, Multitrack, and Main Stereo Output busses when the Talkback ON key is pressed in the Master section of the Mix Controller. A pink noise generator can be inserted from the patch bay.

## Miscellaneous Connections, etc.

### Talkback Microphone

The Talkback Microphone input is located on the connector plate under the Mix Controller. The microphone is a miniature condenser type which mounts on the back of the Mix Controller with a plastic bracket. The 5-pin XLR cable carries the talkback mic and headphones to and from the Mix Controller and the Audio Tower. See Figure 19 below for connector plate details.

### Remote Mic Switch

The CSII/CS2000 has a remote mic switch jack (1/4" TRS phone) on the connector plate under the console. By wiring a switch between the tip and ring, you can switch the talkback mic remotely. See "Talkback Microphone Mounting" in Section II.

### Timecode Connections

Timecode Input and Reshape output XLRs are on the rear of the Audio Tower.

### Headphone Outputs

As shown below, there are 3 Headphone Output jacks (wired in parallel) provided on the connector plate under the Mix Controller.

### AC Fuse

See Appendix II (Service Manual) for fuse ratings at different voltages.

### LED Brightness Knob

Turning this knob brightens or dims the LEDs on the desk according to control room lighting requirements.

### Line Voltage Selector

The Line Voltage Selector has two settings: 120v and 220v. It should be set for the appropriate voltage (the 120v setting is appropriate for countries with 100v mains).

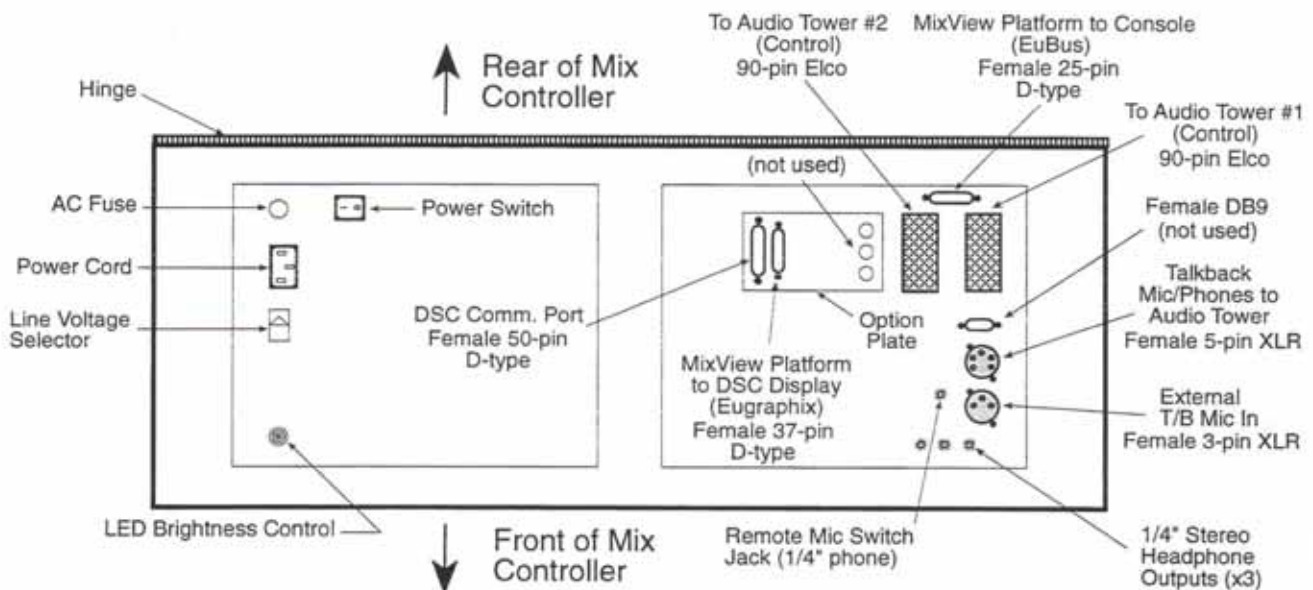


Figure 19 - Connector/Power Plates (as seen from underside of CSII Mix Controller)

# CSII/CS2000 TECHNICAL SPECIFICATIONS

- ▼ **Universal Input Amplifiers (Mic or Line)**

Balanced transformerless input  
 Input Impedance = 2.3 kΩ  
 Gain = +64 to 0 dB in 0.5 dB steps  
 Input Noise = -124 dBu equiv. @ +64 dB gain, 150Ω src.  
 Frequency Response = 15 Hz to 30 kHz, +0.10/-0.25 dB  
 Maximum Input Level = +28 dBu  
 CMRR > 50 dB 20-20k Hz  
 Phantom Power = +48 Vdc, individually selectable  
 Phase Reverse Accuracy = +/- 1° 20 Hz to 20 kHz  
 High Pass Filter = fixed 100 Hz, 18 dB/octave
- ▼ **Line Inputs**

Balanced transformerless input  
 Input Impedance > 10 kohms  
 Optimum Input Level = +4 dBu from < 1 kohms  
 Input Noise = -95dB  
 Frequency Response = 15 Hz to 30 kHz, +0.1/-0.25 dB  
 Maximum Input Level = +28 dBu  
 CMRR > 50 dB 20-20k Hz
- ▼ **Outputs**

Balanced and floating transformerless output  
 Output Impedance = 50 ohms  
 Nominal Output Level = +4 dBu  
 Max Output Level = +28 dBu into > 600 ohms balanced
- ▼ **Equalizer**

4 - band programmable parametric  
 Enhanced state-variable design, symmetrical boost/cut  
 Hi shelving, 1.32 kHz to 21.1 kHz, +/- 15 dB  
 Hi mid, 659Hz to 21.1kHz, +/- 15 dB, Q from 0.32 to 11.6  
 Lo mid, 41.2Hz to 1.32 kHz, +/- 15 dB, Q from 0.32 to 11.6  
 Lo shelving, 20.6 Hz to 330 Hz, +/- 15dB  
 Accuracy better than +/- 0.5 dB from displayed curve  
 (gains adjusted in 0.5 dB steps, frequencies in 1/12 octave steps, Q 's in 16 steps)
- ▼ **Fader/Aux Send DCA's**

Gain = +6 dB to -80 dB  
 Resolution = 4096 linear steps  
 Noise = 90 dB below nominal input  
 Frequency Response = 15 Hz to 30 kHz, +0.1/-0.25 dB  
 Distortion < 0.003 % THD+N, < 0.003 % IMD (SMPTE)  
 Accuracy = 0.01 dB repeatability  
 Step Noise = 80 dB below nominal input
- ▼ **Oscillator**

Programmable internal sine wave generator  
 Frequency Range = 20.6 Hz to 21.1 kHz in 1/12 octave steps  
 Preset Frequencies = 100 Hz, 1 kHz, 10 kHz  
 Level Range = +/- 20 dB in 0.5 dB steps  
 Distortion < 0.003% THD+N

- ▼ **Clip Indication**

+10dB to +24dB headroom warning adjustable in 1 dB steps.  
 Detected pre/post all console mic preamps, sends, and faders.
- ▼ **Maximum Gain**

+76 dB from Mic Input to Mix Output
- ▼ **Meters**

Programmable range from 60 dB or 39 dB / Peak or VU,  
 +/- .25 dB accuracy
- ▼ **Dynamic Automation**

All console functions recorded with 1/2-frame accuracy  
 Internal SMPTE time-code reader (all formats)
- ▼ **Snapshot Recall**

SnapShot store/recall entire console < 1/30th second
- ▼ **Notes**

+4dBu = nominal line input/output level (0 VU internal)  
 0 dBu = 0.775 Vrms @ any impedance  
 THD+N measured @ 1 kHz, 22 Hz to 30 kHz  
 Noise measurements are unweighted, 22Hz - 22kHz bandwidth.  
 Design and specifications are subject to change without notice.

## SYSTEM INFORMATION

- ▼ **Configurations**

CS2000 Model # is frame size followed by # of faders. Three frame sizes available which are able to accommodate the following # of faders with a DSC:

40	40 Mics, 40 Eqs, 80 Line Inputs (24 MT buses)
72	72 Mics, 72 Eqs, 144 Line Inputs (24 MT buses)
104	104 Mics, 104 Eqs, 104 Line Inputs (24 MT buses)

Standard features include: 2 stereo (4 mono) mix buses, 8 aux buses, 3 stereo monitor feeds, up to 3 programmable effect loops per channel. Stereo PFL/AFL.
- ▼ **Patch Bay**

24 jacks per channel, 96-jack master section, Elco/EDAC multipin cables from Audio Tower to Mix Controller.  
 Standard cable length 10m (32ft).  
 Two patch bay layouts available:  
 Standard Euphonix patch bay with one 19" connectorized patch unit (96 jacks) per 8 faders (4 channels) plus a master patch unit (96 jacks). TT/Bantam jacks.  
 System is fully connectorized and can be supplied without a patch bay.
- ▼ **Control Cable**

48 twisted/shielded pair multipin (Elco/EDAC)  
 2.0 MHz parallel data transmission  
 Standard cable length (minimum) 10m (32ft).
- ▼ **Version 2 Platform**

486/66 with 8 MB RAM, 290 MB hard disk, 3.5" floppy disk drive, SyQuest 105 MB removable cartridge drive, RS-232/422 studio interface port, hi-resolution color graphics monitor, compact keyboard, mouse. Flat screen TFT Active Matrix with DSC.
- ▼ **Power**

Audio Tower: 4 voltage ranges available. Not switchable. Voltage must be within +/- 6% of recommended spec.  
 Audio Cube: 4 voltage ranges available. Not switchable.  
 Mix Controller: 110 - 125 VAC, 8.6 amps (standard outlet) (Audio Tower and Mix Controller are opto-isolated)  
 Mix Controller, ES108, & computers can be switched for other voltage requirements.
- ▼ **Dimensions**

Audio Tower: H 50.70" (1345mm) x W 17.40" (442mm) x D 19.00" (483mm). May be 19" rack mounted.  
 Mix Controller CS2000: D 34.8" (883mm). H @ palmrest = 29.00" (737mm), @ meter bridge = 38.50" (978mm)
- ▼ **Mix Controller Width**

CS2000-2 57.4" (1455mm)  
 CS2000-3 81.3" (2065mm)  
 CS2000-4 105.3" (2674mm)

## OVERALL SYSTEM SPECIFICATIONS

- ▼ **Noise Floor**

Line Input to Direct Output	< -90 dB @ unity gain
Line Input to Mix Output	< -90 dB @ unity gain
24 Line Inputs to Mix Output	< -80 dB @ unity gain
- ▼ **Headroom**

+24 dB above internal 0 dB at all times
- ▼ **Dynamic Range**

Max Signal to Noise Ratio >110 dB (Line in to Mix Out)
- ▼ **Distortion**

Mic/Line In to Direct Out < 0.005%THD+N  
 IMD (SMPTE) +10dBu output  
 Mic/Line In to Mix Out < 0.005%THD+N  
 IMD (SMPTE) +10 dBu output
- ▼ **Frequency Response**

Mic/Line Input to Dir Output = 15 Hz to 30 kHz, +0/- 0.4 dB  
 Mic/Line Input to Mix Output = 15 Hz to 30 kHz, +0/- 0.4 dB
- ▼ **Crosstalk**

Channel to Channel < -90 dB @ 1 kHz  
 Mix Buses < -90 dB @ 1 kHz (-80 dB @ 10 kHz)
- ▼ **Fader Muting**

> 90 dB @ 10 kHz

## Introduction

## Patch Bays

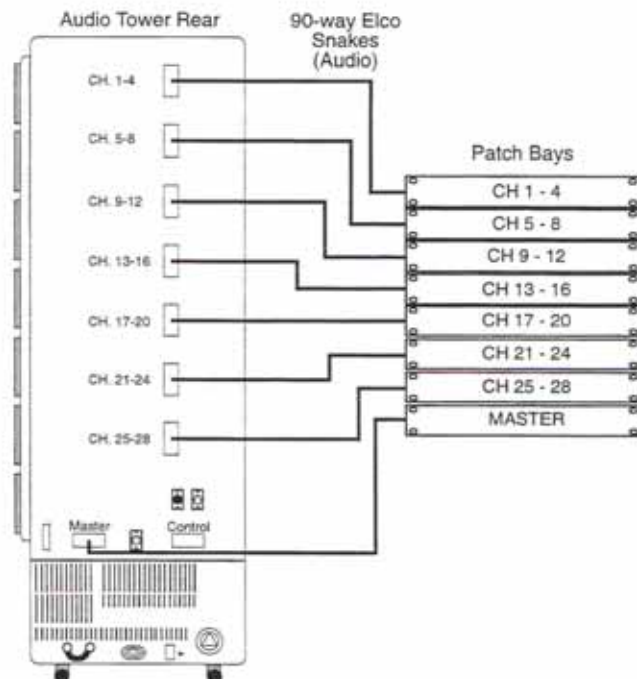
The standard Euphonix patch bay is made up of 48-jack-wide connectorized patch units. Each unit contains two rows, each with 48 jacks (96 jacks total) and occupies one unit of 19" rack space (1.75", 44mm high). The upper row of connectors is half-normalled to the lower row (see next page for explanation). These units contain TT, or Bantam, jacks.

There is 1 patch unit for every 4 channel strips (every group of 8 faders) plus 1 Master patch unit. For example, a CSII/CS2000 5656 will have a total of 8 necessary patch units (7 Channel and 1 Master patch), plus any tie-line patch units the customer requires.

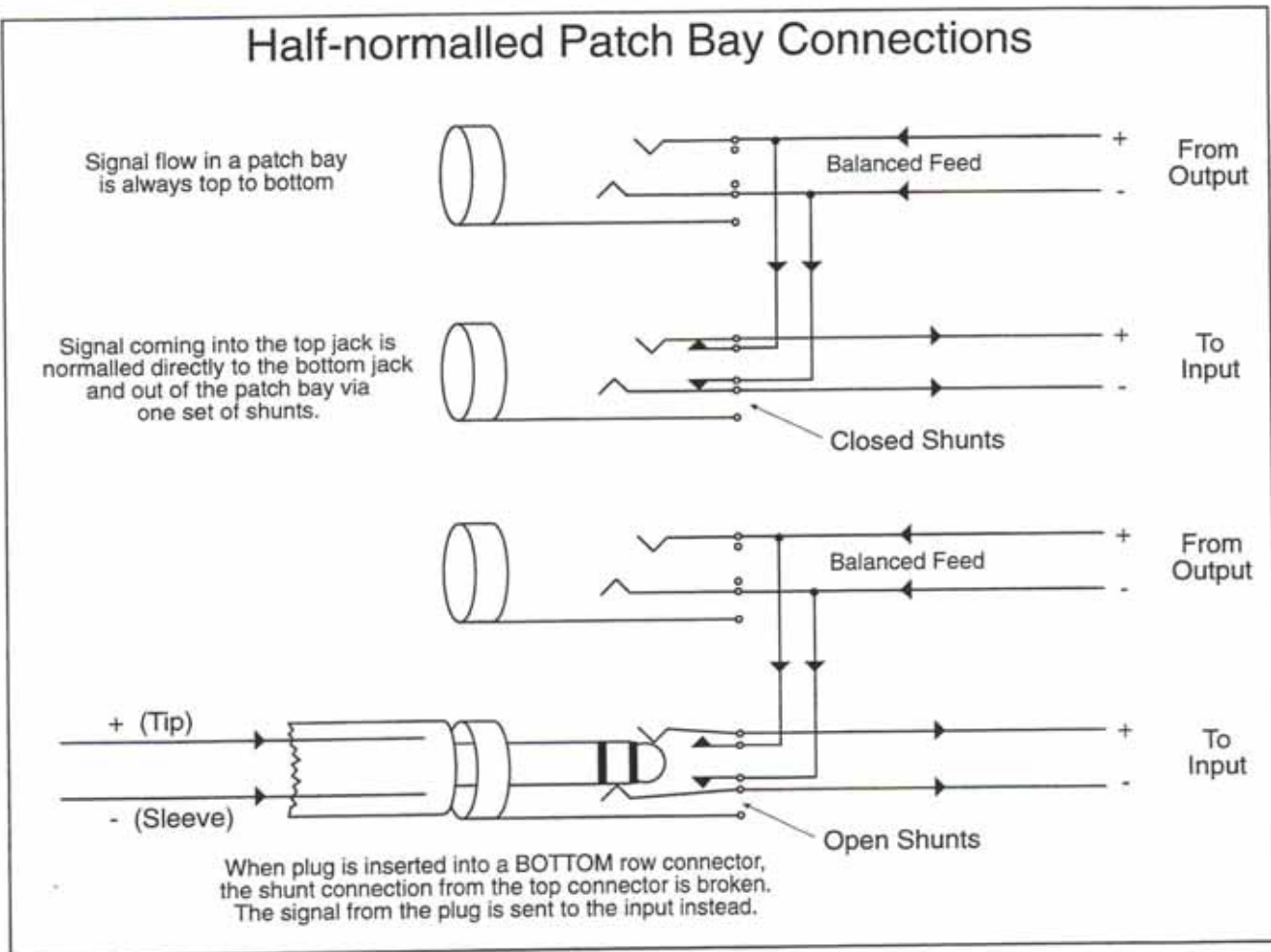
## Standard Euphonix Patch Bays

On the rear of the Audio Tower there are nine 90-contact Elco connectors. Eight of the nine carry analog audio in and out of the Tower. The ninth carries digital control information to and from the Mix Controller. There is 1 Elco connector for every 4 channels of audio, and 1 cable per patch bay which links each unit with the Tower. All the multipin connectors have gold-plated pins to ensure long lasting, low-resistance connections.

Figure 20 - 5656 Standard Patch Cabling



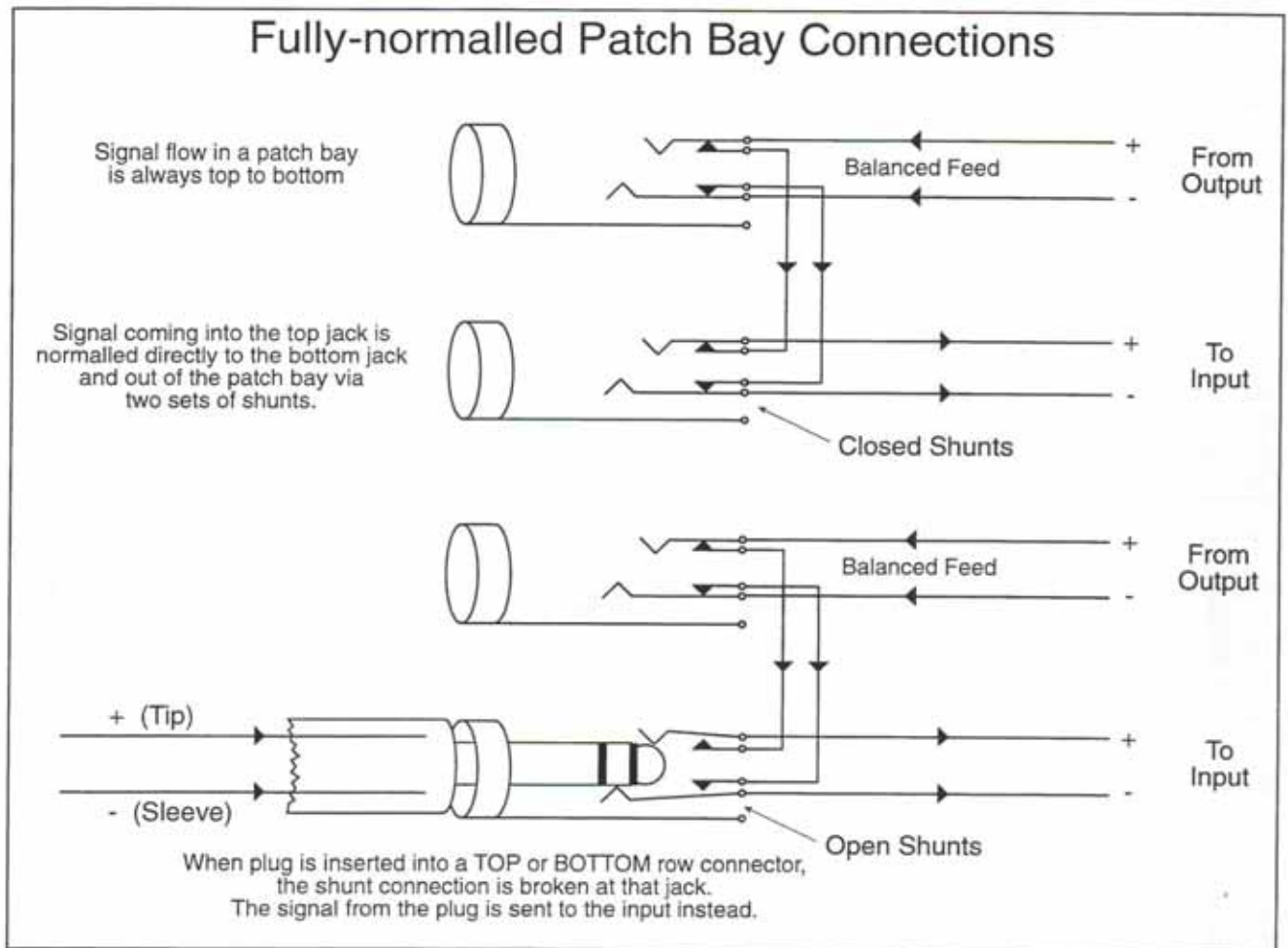
## Half-normalled Patch Bay Connections



### Half-normalled

A **half-normalled** patch bay is shown above. Note that the connection from the top row to the bottom can only be broken by a connector inserted into the bottom row. If a patch is taken from the top connector, the signal can be paralleled, that is, routed to two locations simultaneously. This is useful when many line inputs need to be split to various locations on the patch. Euphonix ships half-normalled patch bays with all systems for this reason.

When cross-patching phantom-powered inputs (microphones, DIs, etc.), it is important to break the normal in the bottom row when routing the signal to another location on the half-normalled patch bay. This can be accomplished by "dead patching": plugging one end of an extra patch cable into the bottom connector of the source pair. The other end of this cable is not plugged in, since it is only being used to break the normal in the bottom connector.



## Fully-normalled

A **fully-normalled** patch bay is shown above. Note that the connection from the top row to the bottom can be broken by a connector inserted into *either* the top or bottom row. Patches cannot be easily split in a fully-normalled patch bay.

## Other Configurations

An **unnormalled** patch bay has no internal connections from top to bottom. Each input must be patched externally for signal to flow through the patch bay. It is quite obvious why Euphonix systems, most with well over 100 inputs, do not use unnormalled patch bays!

The **1/2-half-normalled** patch bay is used for some Euphonix systems with both ES108 dynamics units and the Audio Cube. This patch bay has the left side half-normalled, and the right half is unnormalled. More information on this patch bay's applications can be found in the Audio Cube Manual.

## Channel Patch Unit

You can see from the drawing below that there are six 38-contact Elco connectors on the rear of each channel patch unit, and one 90-contact Elco. Each connector routes audio signals in and out of the patch bay. The 38-way Elcos are used to route studio equipment through the patch. The 90-way connector accepts the cable from the Audio Tower that carries the audio for four channel strips. Both the Channel and the Master patch are half-normalled.

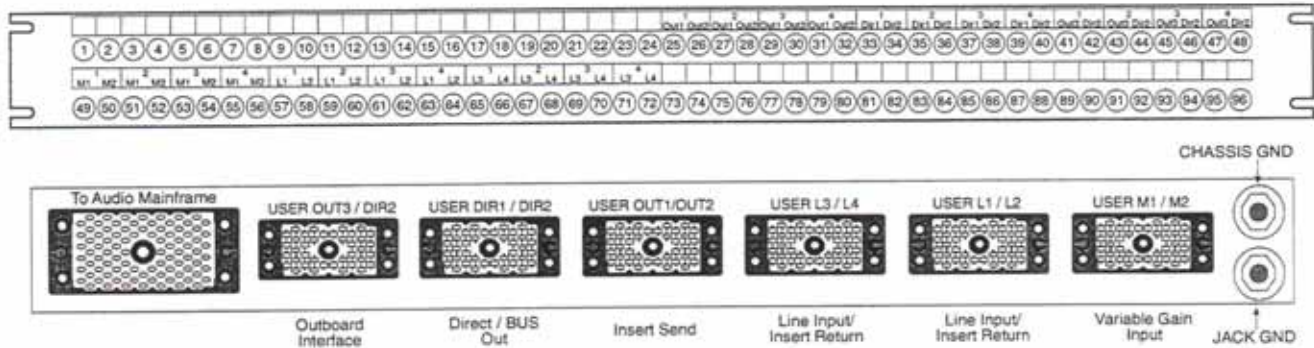


Figure 21 - 4-channel Patch Unit (Front & Rear View)

Every channel patch unit is identical except for the labels, which reflect the appropriate channel numbers. The Master patch unit is slightly different (see next section). The unit shown on this page accommodates all inputs and outputs for channels 1-4.

If you look at the front of the unit, shown above, the jacks on the left-hand side route the 6 inputs to each of 4 channels: M1, M2, L1, L2, L3 & L4. The jacks on the right-hand side of the unit handle the 5 discrete outputs from each of the 4 channels: OUT1, OUT2, OUT3, DIR1 & DIR2.

Note that DIR2 is represented twice in the patch bay, both in the Elco connectors on the back and in the jacks on the front. The DIR2 output is paralleled, or split, within the patch bay chassis. This enables the user to do 48-track work using only 24 buses, without repatching.

## Master Patch Unit

The Master patch unit is similar to the Channel patch in that there is a single 90-contact multipin that connects to the Audio Tower. This unit accommodates all the audio inputs and outputs (except for headphones and talkback mic) from the Master Audio Module. Both the Channel and the Master patch unit are half-normalled.

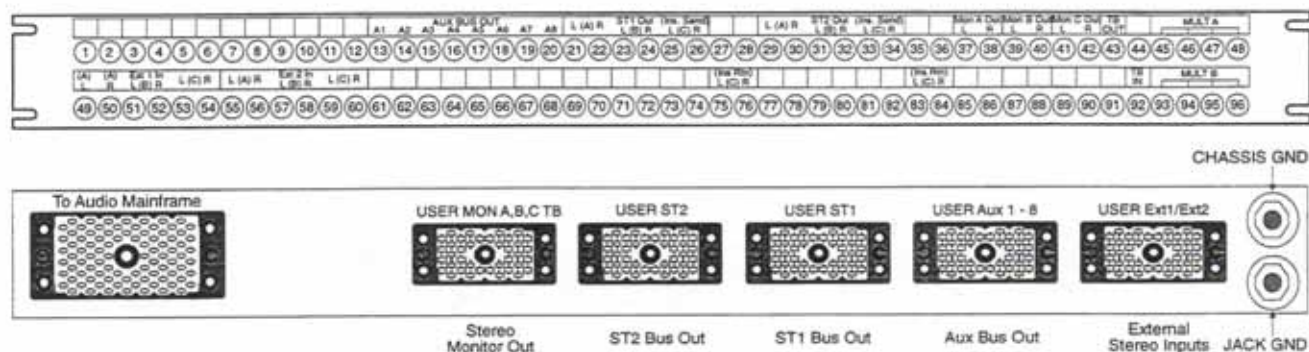


Figure 22 - Master Patch Unit (Front & Rear View)

## Mults (Mult A, Mult B)

There are a total of 8 MULT jacks in two groups, MULT A and MULT B. The MULT jacks on the Master patch unit are wired in parallel so you can feed a signal in one MULT and source that signal from the other jacks. These are useful for sending one source to multiple destinations.

## 38-contact Multipin Wiring Sheets

Refer to Appendix 1, "Connector Pinouts", for all the 38-contact multipin connectors on the rear of the Channel and Master patch units. The sheets for the Channel unit have a column for channel number ("Ch#"). When wiring to the CSII/CS2000 you should photocopy the appropriate pages in Appendix 1 for each of the Channel patch bays with your console. Thus, a 56-fader system would need 7 copies of these two sheets. The actual channel numbers that each sheet refers to can be written down in this column.

Wiring information for the 90-contact multipins can also be found in Appendix 1, "Connector Pinouts".

## Tie-line Patch Units

The tie-line patch unit is for studios that require additional patch bays in the same style and design as the patch bays for the CSII/CS2000. The bay is a 1 unit high, fully connectorized patch bay with two rows of 48 jacks. This patch unit is used for tie lines and is wired to eight 38-contact multipin connectors mounted on the rear. The patch unit can be normalled in any configuration: unnormalled, half-normalled, fully normalled, or 1/2-half-normalled depending on the application.

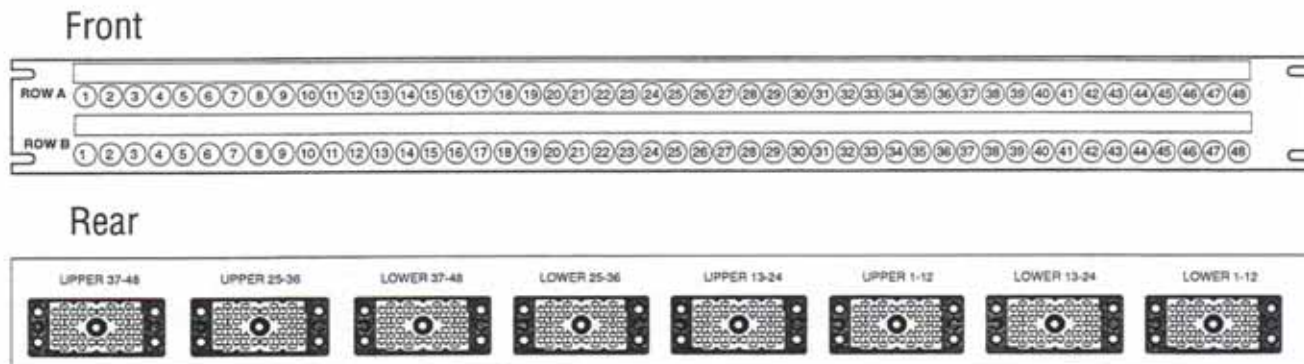


Figure 23 - Tie-line Patch Unit (Front & Rear View)

## Tie-line Patch Unit Connector Pinouts

Each of these connectors follow the Euphonix wiring convention. Multipin #1 is situated on the right and #8 is on the left (when viewed from rear). A is the upper jack row and B is the lower.

Multipin #	Jacks
1	B1-12
2	B13-24
3	A1-12
4	A13-24
5	B25-36
6	B37-48
7	A25-36
8	A37-48

Refer to Appendix 1, "Connector Pinouts", for specific wiring sheets for the 8 multipin connectors.

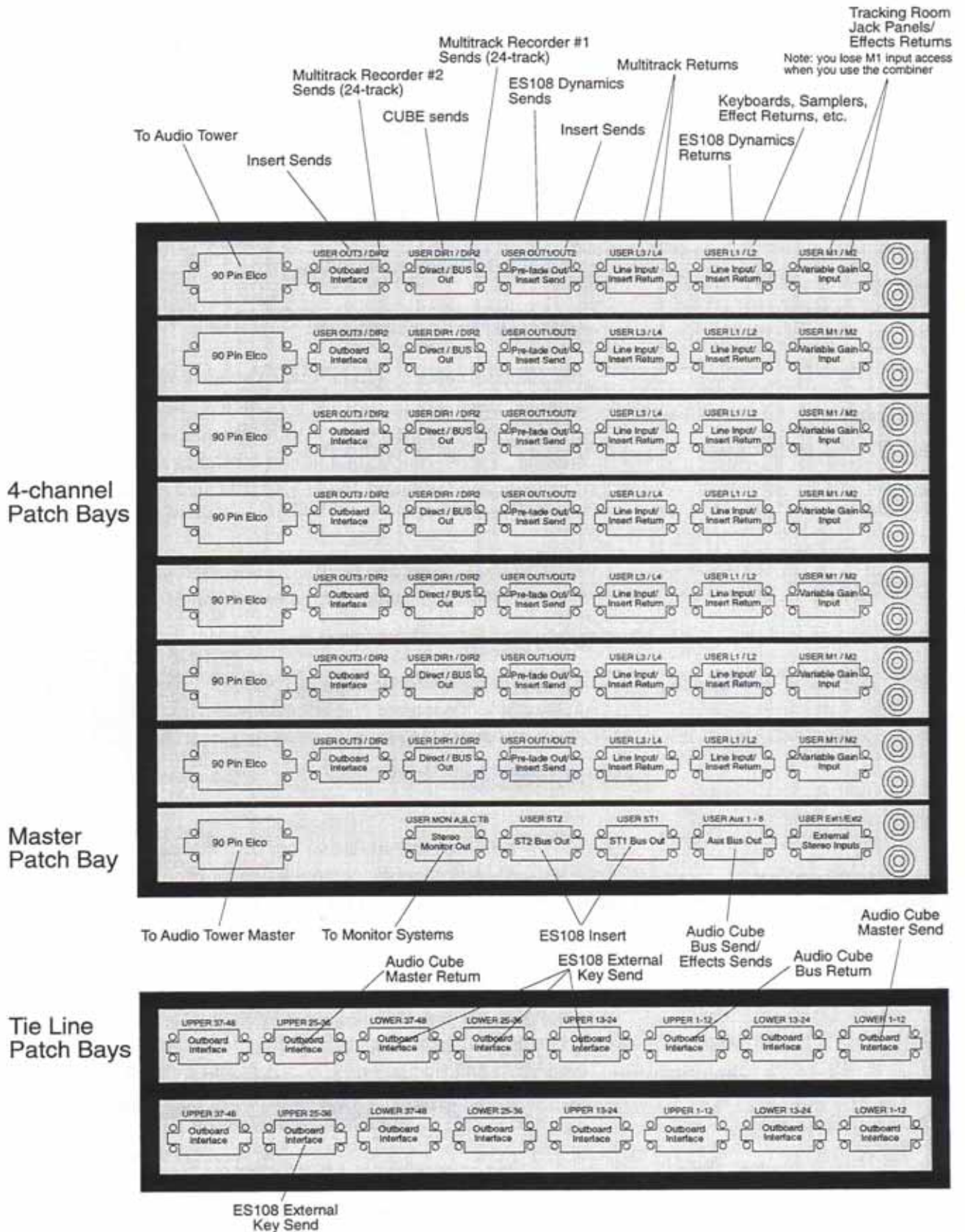


Figure 24 - Rear View of 5656 Patch System Configuration (Suggested for M Systems)

### Audio Multi-pair Cables

The system shown on page 1-31 Figure 20 is a CSII/CS2000 5656 with a standard Euphonix patch bay. The wiring of studio equipment to the patch is detailed in the next section, "Wiring for Minimum Noise and Hum".

In either case, the audio signals to and from the Audio Tower are carried from the Tower via multi-pair cables terminated in 90-contact multipin connectors. For every four channels (8 faders) there is a single multi-pair cable. There is also a multi-pair cable for the master module audio. So in a 56-fader system there are a total of 8 multi-pair audio cables.

These cables are manufactured using Gepco multi-pair.

The standard cable length for these cables is 10 meters (32.8ft), although cable lengths of 15 and 20 meters may be substituted at an additional cost. Any other lengths are specially quoted and ordered. The 90-conductor multipin control cable between the Mix Controller and the Audio Tower also specified at 10m, 15m, and 20m lengths.

Note: Control cables can be reliably specified only up to 20m/66ft. If these cables are any longer, communications problems will occur.

For your information these audio multi-pair cables are detailed in Appendix 1, "Connector Pinout Descriptions", showing exact 90-contact multipin letters for each audio signal. Euphonix supplies all of the cables required for system installation.

### System Supplied Without Patch Bays

If the system is supplied without a Euphonix patch bay, the information in Appendix I is essential for hooking up a custom patch. We do not recommend that you build your own patch bay. Euphonix patch options have been carefully manufactured and cabled to ensure the highest audio quality and to optimize system grounding. Custom installations may introduce unnecessary grounding problems. Euphonix is prepared to work with customers who insist on using a custom non-Euphonix patch bay, but we cannot accept responsibility for grounding problems that may result.

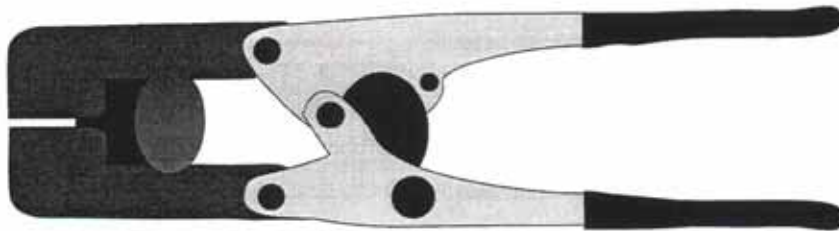
#### IMPORTANT

If you order a system without a patch bay it will not include the multipin audio snakes. It will, however, include the eight 90-contact multipin connector sets required to wire the Audio Tower. The control snake is always included.

## Tools for Multipin Crimping

For your convenience we have listed all the necessary multipin parts and tools required to complete your studio wiring. If you have difficulty locating these, your Euphonix representative can assist you.

Description	EDAC Multipin	Elco Multipin
Hand Crimping Tool (18-26 AWG)	516-280-200	06-7852-01
Pin Insertion Tool	516-280-400	06-1742-04
Pin Extraction Tool	516-280-300	06-1877-04
Polarizing Wrench	516-280-500	06-1989-02
38-pin Body (Male)	516-038-000-301	00-8016-038-000-519
Hood	516-230-538	—
Crimp Pin	516-290-590	000-60-8017-0313



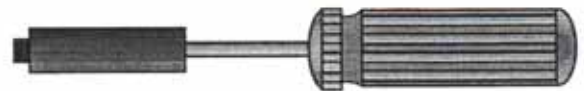
ELCO Contact Crimping Tool  
06 7852 01 Hand Tool Contact Capability - Varilok 60 8017 03 13  
Stranded -AWG #18-26



ELCO Contact Insertion Tool  
06 1742 04 Contact Capability - Varilok 60 8017 03 13, 60 8025 02 13



ELCO Contact Extraction Tool  
06 1877 04 Contact Capability - Varilok 60 8017 Family 60 8025



ELCO Polarizing Tool  
06 1989 02 - For Series 8016 and 8026



ELCO Wire Crimp Tail (Contacts Loose)  
000-06 8017 03 13  
Accepts - AWG #18-26

Figure 25 - Multipin Connector Tools

## Introduction

## Wiring for Minimum Noise and Hum

This chapter contains a great deal of information which will help you get the optimum noise performance out of your system. We strongly urge you to read this chapter thoroughly before installing your system. For those who wish an even deeper understanding, a list of books and technical papers on the subject is supplied at the end of this chapter.

---

### The Importance of Balanced Signal Transmission

Euphonix audio processing equipment uses balanced inputs and outputs exclusively. The reason for this can be stated in two words: **noise rejection**. Both balanced and unbalanced systems pick up noise; the difference is that balanced systems cancel the noise that is picked up, while unbalanced systems do not. In any large mixing system, small amounts of hum and buzz noise on multiple inputs can add up to very audible levels. For this reason, it is especially important to have balanced interconnects between all signal sources and the console. A balanced interconnect requires a balanced output (source), a balanced input (receiver) and a balanced line (cable) in between. Without these three things, the interconnect is unbalanced, and noise that is picked up cannot be fully canceled.

**Euphonix recommends that all unbalanced sources be rebalanced before connecting them to the console.**

Considering how much equipment on the market is unbalanced, it may seem that balancing everything is an impossible demand. Fortunately, there are simple techniques for re-balancing unbalanced signal sources. This section describes signal rebalancing techniques, one of which is very inexpensive.

People commonly blame noise problems, such as hum and buzz, on "bad grounding." While such problems can often be attributed to differences in ground potential, the solution to them does not lie in trying to zero out these differences; with a large audio system this is virtually impossible. Techniques such as "telescoping shields" and "star grounding" have been developed in an attempt to keep all grounds at the same potential. While these techniques can be somewhat effective in practice, they often create other problems. Cable shields are not as effective when connected at only one end. Safety is sacrificed when ground pins on power cords are lifted.

### Balanced Signal Transmission Continued...

Plugging in equipment causes headaches when one must try to remember where the shield should be connected and where it shouldn't. Even if all ground loops are eliminated, noise can be picked up in other ways. The laws of electrostatics are complicated, and they apply to signal wires as well as ground wires. Even a well-shielded twisted pair is vulnerable to noise pickup! Without any doubt, the best practice is to *expect* differences in ground potential and noise pickup in signal lines, and to use balanced I/O to make your system immune to these effects.

Although balanced I/O provides enormous advantages in rejecting noise, the performance of balanced systems can be compromised depending on the way in which cable shields are connected within the equipment. Many manufacturers fail to recognize that *the purpose of a shield is to divert unwanted energy away from signal wires and circuits*. In many cases, the shield conductor is used in an attempt to transport a ground reference from one piece of equipment to another, and so the shield pin is connected directly to a local ground reference point at the input or output circuit. While this may seem logical to many, the fact is that such a connection allows shield currents (i.e. noise) to flow right into the equipment's critical audio reference ground. The price paid for this is an unpredictable and higher overall noise floor. This violation is becoming known in the industry as the "Pin-1 Problem," and it has recently become a major topic of discussion among designers and installers of professional audio equipment.

Euphonix, along with many other manufacturers, maintains that the correct practice is to connect the cable shield directly to the equipment chassis, thereby making it an extension of the box which shields the processing circuitry. The pin-1 issue has particular relevance to balanced equipment, where the shield need not serve as a signal reference and the dynamic range is typically large. Unbalanced equipment, in which the shield must serve as a signal reference, assumes that all grounds are equal and shield currents are negligible. This assumption breaks down in large systems, and the dynamic range is lowered accordingly.

In summary, the Euphonix system accepts the inevitability of ground loops, shield currents, and noise pickup in signal lines. Our system keeps shield currents isolated from the console's internal electronics, and relies on balanced I/O to cancel any noise that is picked up. If implemented correctly, this configuration results in the cleanest and quietest possible console and system performance.

### How to Wire Your Facility Power and Grounds Before Delivery

Mains power and ground wiring can have a significant impact on the noise levels in your system. However, don't be fooled into thinking that driving a copper stake into the ground and isolating your power and ground will guarantee a noise-free system. In most cases, using balanced signal transmission throughout your studio will have a much greater impact on noise reduction than would putting in a "clean" audio ground.

## Shield Grounding Configurations

(signal wires not shown)

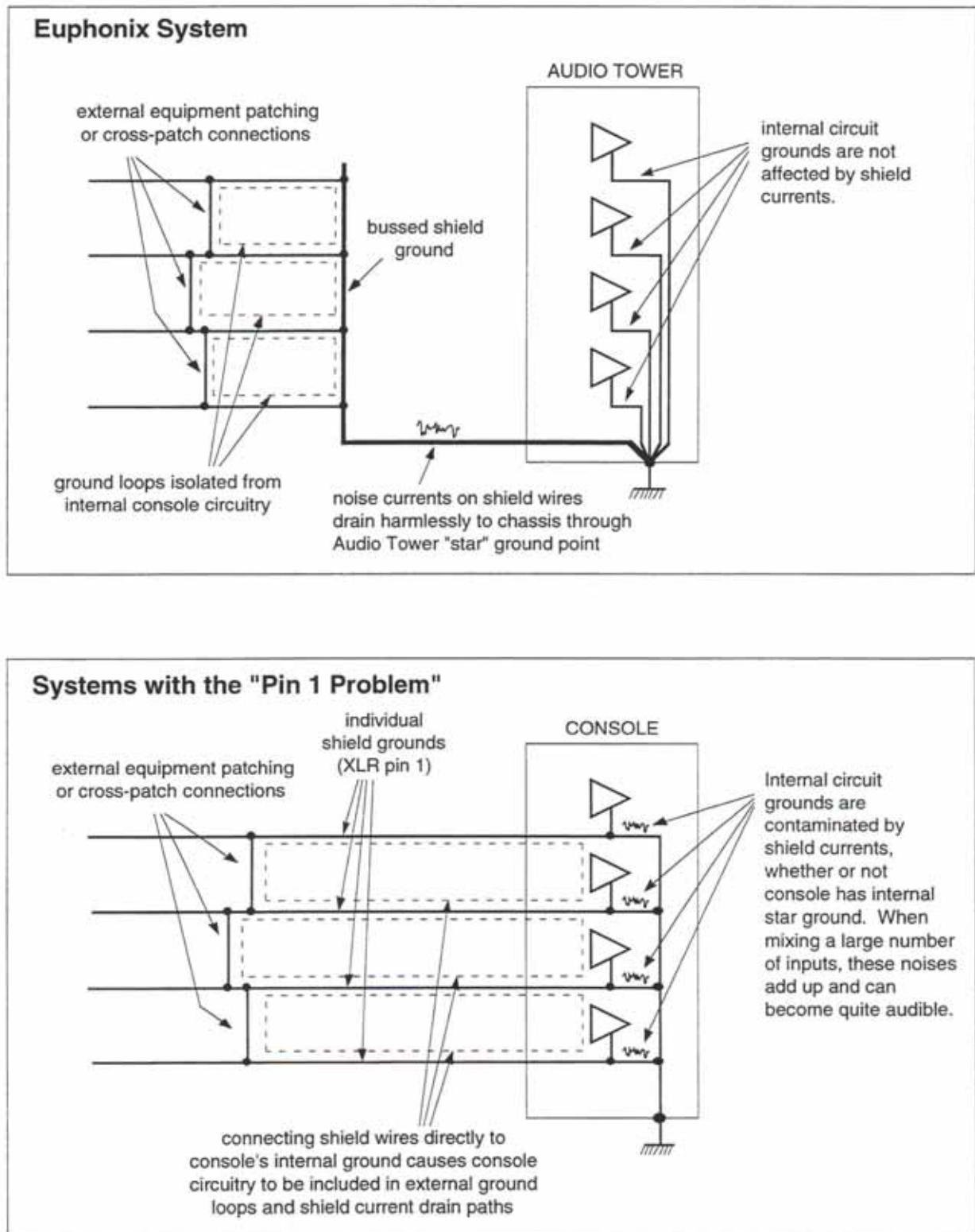


Figure 26 - Shield Grounding Configurations

## Wiring Your Facility Power and Grounds Continued...

The primary reason to isolate grounds is to gain some control over the currents flowing in your facility's ground wiring. Although mains power current is returned from equipment via the neutral wire and not the ground wire, currents can be induced into the ground wiring by various "invisible" sources. Most pieces of sensitive electronic equipment contain RFI filters which shunt high-frequency energy from the hot and neutral wires into the ground wire. Electric motors and other industrial equipment radiate significant electric and magnetic fields which will induce noise in nearby ground wiring, especially if the wiring contains large closed loops. Isolating grounds involves running a separate ground wire from each outlet back to a main ground bus, thereby keeping currents that flow in one ground wire from producing noise voltages in other ground wires.

If you choose to install isolated ground (IG) wiring in your facility, make sure that the job is done by a licensed electrician. Failure to follow the rules of the National Electrical Code (or equivalent set of standards if you are outside of the United States) is not only illegal, but it is likely to result in a dangerous system which poses the risk of fire and/or electrocution. According to the Code, the ground terminal at any power outlet must always have an unbreakable connection to the mains neutral associated with that outlet, and this connection should be made only at the power service entrance. The reason to connect ground to neutral is for safety: It guarantees that a short-circuit fault, from mains hot to an equipment chassis for example, will blow a circuit breaker rather than putting high voltage everywhere on your equipment racks, cable shields, etc.

Grounding your IG outlets to a separate ground electrode, such as a buried copper rod, is a flagrant violation of Code unless you install an isolation transformer on your mains power (see the next paragraph). In many cases, using a separate ground electrode is unnecessary to achieve a quiet audio system. Special IG sockets, which isolate the ground terminal from the mounting hardware, must be used for IG outlets. These are usually colored orange, and always bear the internationally accepted triangle symbol. The ground terminal of each IG socket (or group of sockets) should be connected, via an insulated wire of sufficient gauge, to the main facility ground bus at your service entrance panel. If your service entrance panel is very far from your studio, you may want to compromise and connect the individual IG wires together at a distribution panel nearer to your studio and then run a very heavy gauge wire back to the main facility ground bus.

Isolation transformers can reduce the coupling of common-mode noise from external power wiring into your studio power wiring. Installation should be performed only by a licensed electrician. The isolation transformer's secondary must be treated as a new power service entrance, and its neutral conductor must be connected to an earth-grounded electrode.<sup>1</sup> This electrode can be either the existing ground

## Wiring Your Facility Power and Grounds Continued...

bus at the facility's power service entrance, or a separate electrode such as a buried rod or plate. All power outlets wired from the isolation transformer, as well as the conduits which contain this wiring, must be grounded to this same electrode for safety.

Your power wiring (hot, neutral and ground) should use the heaviest wire gauge possible. This is most important, of course, for wires that run long distances and/or carry power to high-wattage equipment, such as the Audio Tower. For these circuits, 8-AWG (American Wire Gauge) is great, while 12-AWG is an absolute minimum (wire gets thinner as AWG numbers get higher). Any appreciable resistance in your mains wiring can cause insufficient voltage levels to be delivered to your equipment. See the explanation of *peak flattening* on page 1-22 of this manual.

It is important to keep magnetic field radiation from power wires out of your signal wires. Because the hot and neutral wires carry equal currents of opposite polarity, they emit fields that nearly cancel each other when the two conductors are in close proximity. Running hot and neutral alongside each other is good, but twisting them together increases the cancellation effect, and is highly recommended. Since the cancellation is more effective at a distance, you should get in the habit of physically separating your power wires and audio cables wherever possible (by a foot or more). Where power and audio cables must cross, keeping them perpendicular to each other will help to minimize coupling.

## How to Cable Your Euphonix System After Delivery

The Euphonix system is delivered to you ready to "plug and play." The multi-pair Elco snakes, included with the system, provide the necessary signal and ground connections between all the components of your system. Because the Euphonix system uses balanced I/O exclusively, it has an inherent immunity to noise coupling. All Euphonix cable shields are connected at both ends in order to maximize RF immunity. The various cable shields and power ground connections will form ground loops within the system; however, the balanced I/O circuits will reject any hum that is induced in these loops.

The Euphonix patch bay delivers a bussed (common) ground to all shield points at its front-panel jacks and rear-panel Elco connectors.<sup>2</sup> This shield ground is wired directly to the Audio Tower's main "star" ground point in the power supply, which is connected to system and chassis ground. This configuration ensures that the console's audio circuits are isolated from the currents flowing in the shield grounds, while keeping the shield potential close to the console's signal reference potential (to maximize shielding effectiveness).

Each individual piece of Euphonix equipment uses the ground wire of its power cable (third prong) to define its internal audio reference potential. For this reason, as well as for safety and maximum RF immunity, it is important that you *do not lift the ground on the power cord to any*

*Euphonix equipment.* **On the Audio Tower and Cube power supplies, make sure that the gold and zinc studs are solidly connected together.** Also, the gold and zinc studs on the back of each patch bay unit should be connected together in order to ground the patch bay chassis.

### How To Check Your System for Ground Noise

If you are interested in finding out how much ground noise (relative to the console's internal ground) is present at your patch bay's shield points, you can perform the following simple test. Take a patch cord and plug one end into a Mic input jack at the patch bay, leaving the other end free. Bring up the Mic input on the console so that you can just hear the white noise on your monitors. Next, use a small piece of wire to short the shield (plug sleeve) to the hot (plug tip) at the loose end of the patch cord. Make sure that the wire is insulated from your fingers—you don't want to measure your body voltage. Any hum or buzz that you hear is a noise voltage between the Audio Tower's local ground and the patch bay's shield conductor. You should hear the same amount of noise whether you touch the shield to the hot or the cold. Notice that if you touch the shield to both the hot and the cold, the noise disappears. This is because shorting to both conductors simulates a balanced source, while shorting to just one conductor simulates an exaggerated case of an unbalanced source. With a typical 600 ohm unbalanced source, the amplified noise would be about 30 to 40 dB lower. Each time you double the number of unbalanced sources, the noise in your mix will get about 6 dB worse. The bottom line is as follows: If your unbalanced test reveals a significant amount of ground noise, you can expect to have noise problems when connecting unbalanced sources directly into the patch bay.

### How To Wire Balanced Equipment to the Console

Connecting balanced equipment to the console is very simple. Although there can be some variation in how well a piece of equipment is balanced, most balanced devices will give you a problem-free interface to the console without having to use customized cables or isolation transformers. If you follow our recommendation and use balanced I/O throughout your studio (i.e. all unbalanced sources are rebalanced as described in the next section), your system will be virtually immune to ground loops. Therefore, we recommend that you connect the hot, cold, and shield at both ends of the cable.

### How To Wire Unbalanced Sources to Console Inputs

Connecting unbalanced sources directly to the console is the most common cause of hum and buzz pickup. This is because any noise picked up in the signal or ground wiring between the unbalanced source and the console appears in unequal amounts on the hot and



### Wiring Unbalanced Sources to Console Inputs Continued...

cold input terminals, and the console's differential input circuit is unable to cancel the noise. For this reason, we strongly urge you to re-balance all of your unbalanced sources. We recommend three techniques for doing this, and list them below in order of preference. Figure 29 on the next page illustrates these techniques.

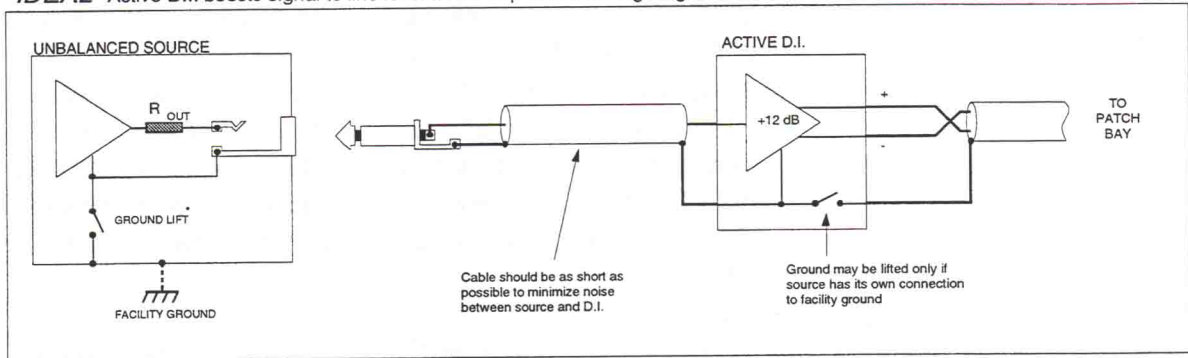
**1. Active DI (Direct Injector) with Gain.** This is a powered device which uses active electronics to derive a low-impedance, balanced output signal from an unbalanced input signal. By providing about 12 dB of gain, it can boost a -10 dBV source to line level for better compatibility with the unity-gain line inputs on the console. The DI box should be located no more than a few feet from the unbalanced source, and it should be connected with the shortest possible cable in order to minimize noise pickup along the unbalanced line. A properly designed unit will have its internal ground reference connected to the shield of the input cable and provide a "ground lift" switch which allows you to connect or disconnect the shield of the output cable. The ground should be lifted only if the source equipment has its own connection to facility ground. These units are a worthwhile investment.

**2. Resistive Source Balancer.** This is a very simple, clean, and inexpensive solution which uses only one resistor to re-balance an unbalanced source (Euphonix patent pending). Unlike a transformer or active DI, it is completely transparent to your signal. Furthermore, it will not attenuate your signal. It works by matching the noise amplitudes on both the hot and cold conductors, thereby allowing the console's balanced input stage to fully cancel the noise. For maximum effectiveness, it should be applied right at the signal source; this ensures a balanced line all the way from the source to the console and improves high-frequency noise rejection. Contact the Euphonix factory for more information.

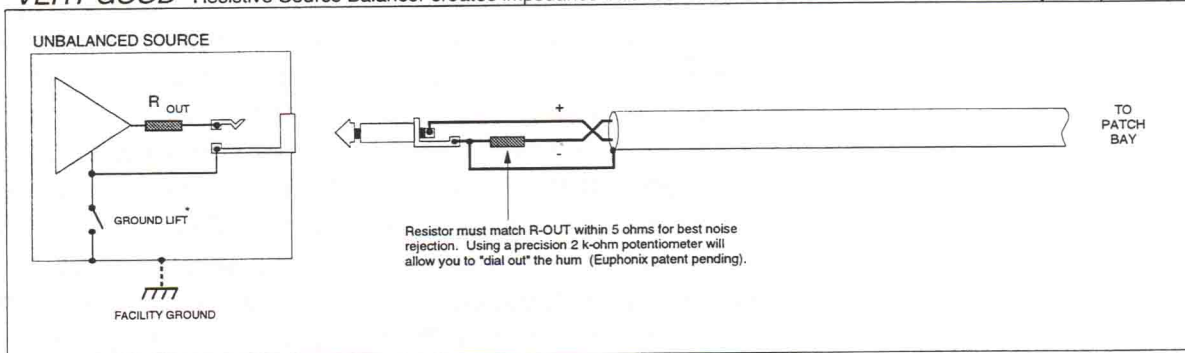
**3. Isolation Transformer (Passive DI).** This device has the inherent ability to reject any common-mode noise that appears at its input, while its "floating" output provides an effectively balanced line to the console. By incorporating turns ratios other than 1-to-1, transformers can be used to convert impedances and change signal levels. For example, a high-impedance source can be made to look like a low-impedance source at the expense of a significant drop in signal level. Similarly, a transformer can provide signal (voltage) gain at the expense of forcing the source to drive a lower impedance (which can cause attenuation or distortion, depending on the source's output circuitry). These operations always involve a trade-off, since a transformer cannot add power to a system. Any transformer used in a noise-rejection application, or with a high-impedance source, should have an electrostatic shield (sometimes called a Faraday shield) to prevent high-frequency noise from coupling through the device. Some transformers provide a center tap on their output winding which can

## Connecting Unbalanced Sources to Console Inputs

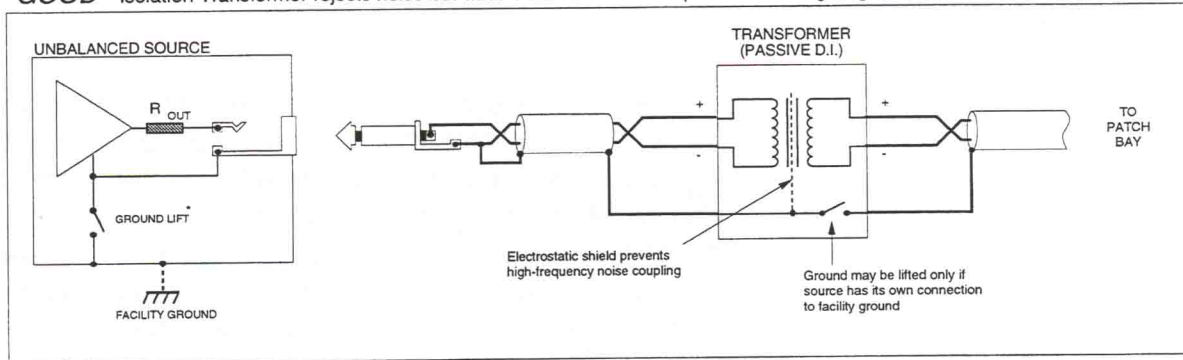
**IDEAL** Active D.I. boosts signal to line level and is capable of driving long cables.



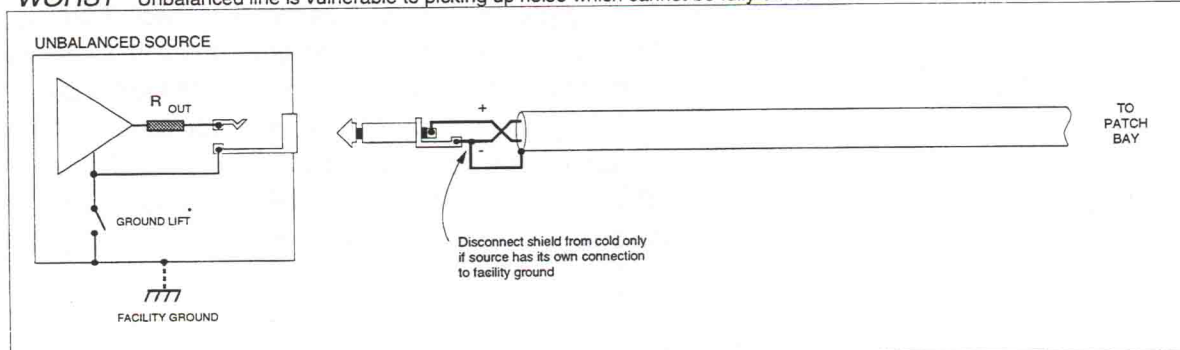
**VERY GOOD** Resistive Source Balancer creates impedance-balanced line from source to console, and is totally transparent.



**GOOD** Isolation Transformer rejects noise but adds distortion at low frequencies and high signal levels.



**WORST** Unbalanced line is vulnerable to picking up noise which cannot be fully cancelled.



\* Ground lift switch is provided on some unbalanced equipment. Lifting may reduce noise problems at the expense of decreased shielding effectiveness.

Figure 29 - Connecting Unbalanced Sources to Console Inputs

### **Wiring Unbalanced Sources to Console Inputs** **Continued...**

be connected to shield ground without disturbing the output balance. Transformers with two-terminal secondaries must not have either output leg connected to the cable shield. In most cases, it is best to connect the cable shield through to the unbalanced source. Note that the quality of isolation transformers can range from very poor to quite good, with the price varying accordingly. Lower-quality devices distort substantially at high signal levels and low frequencies and have poor frequency response characteristics. Another consideration with transformers is that they can pick up noise from external magnetic fields, so they should be located away from power supplies, speakers etc.

For cable runs approaching 100 feet or more, you should always use an active DI because of its low-impedance, high-drive output.

If you choose to plug unbalanced sources directly into the console, you are likely to experience some hum or buzzing noise; the amount depends on many factors. You should perform the test described on page 1-46 to determine how much ground noise is present at your patch bay. If the test reveals minimal ground noise you might get away with a direct unbalanced connection or two. Mixing lots of direct-connected, unbalanced sources is almost always impractical because the noise is multiplied by the number of sources. Furthermore, the amount of ground noise at the patch bay can change as connections are changed or noise sources around your studio come and go. Expect the noise levels to vary from afternoon to evening, and from day to day.

When connecting an unbalanced source directly to the patch bay, you should always connect the hot and cold of the console input to the hot and ground, respectively, of the source. As for the shield connection, the rule is that the source equipment must always be grounded in order for its shielding to work. If the device does not have its own connection to facility ground, connect both the shield and the cold to the ground terminal on the source's output connector.

If you have a telescoped grounding scheme, you don't want to create a ground loop, so you should make sure that the device is grounded by one and only one connection to facility ground. Some unbalanced devices provide a switch which lets you separate the chassis ground from the signal ground.<sup>3</sup> With these devices, you might find that the noise is reduced if you *float* the source's signal ground (disconnect it from both the chassis and the cable shield). If you do this, you must still make sure that the chassis is connected to facility ground, for safety.

## How to Wire Console Outputs to Unbalanced Equipment

The rule of thumb here is very similar to that in the previous section for connecting unbalanced sources to console inputs. Always connect the hot and cold from the console to the hot and ground, respectively, of the receiving equipment. Again, the receiving equipment must have its chassis grounded, so if it is not grounded on its own, connect both the shield and the cold to the equipment's ground terminal.

When connected to an unbalanced input, the console's servo-balanced output stage automatically references its output voltage to the remote ground at the receiving end, providing a good amount of inherent noise rejection. If there is excessive ground noise at the receiver, it may still be audible because the balanced-to-unbalanced connection does not provide 100% noise rejection. In this case, you should take steps to lower the ground noise at the receiving equipment. If this is impractical, you may insert a transformer in the signal path to further increase the noise rejection.

<sup>1</sup> With balanced (two-phase) power distribution, the center tap of the isolation transformer is technically the neutral conductor. Therefore, the center tap is connected to earth ground and becomes the safety ground return point.

<sup>2</sup> Exceptions to this are the two sets of "MULT" jacks in the Master patch bay unit. These are completely isolated from any other patch bay connections.

<sup>3</sup> This can have an adverse effect on the equipment's own shielding effectiveness, but in some cases this is outweighed by a substantial reduction in ground noise.

For your reference:

Morrison, Ralph. *Grounding and Shielding Techniques in Instrumentation, Third Edition*. New York, NY: John Wiley & Sons, Inc., 1986.

Morrison, Ralph and Warren H. Lewis. *Grounding and Shielding in Facilities*. New York, NY: John Wiley & Sons, Inc., 1990.

Muncy, Neil A. "Noise Susceptibility in Analog and Digital Signal Processing Systems". AES 97th Convention Preprint 3930, 1994.

Ott, Henry W. *Noise Reduction Techniques in Electronic Systems, Second Edition*. New York, NY: AT&T Bell Laboratories, 1988.

Whitlock, Bill. "Balanced Lines in Audio Systems: Fact, Fiction and Transformers". AES 97th Convention Preprint 3917, 1994.

## Sec. 2: Installation/Once System is Delivered

### Introduction

### Uncrating/Unpacking your CSII/CS2000

Your CSII/CS2000 has arrived! Hopefully, at this point you're ready to uncrate the system and get down to some serious mixing. This section will take you through the process of uncrating the Mix Controller, MixView Platform, Audio Tower, and patch bays. The crates are designed to make this as easy as possible and once unpacked you should have things up and running very quickly. When you receive your CSII/CS2000 you should have two fairly large crates for a single Tower system or three crates and one carton for a twin Tower system.

### Check for Damage

When you receive the crates from the shipping company, it is important to check both the outside and the inside of the crates for damage. If there is visible damage, do not accept the shipment. If there is no apparent damage on the outside of the crate, but you find visible damage on any inside pieces, do not unpack the shipment any further. Call Euphonix Customer Support immediately at (415) 855-0412 for further instructions.

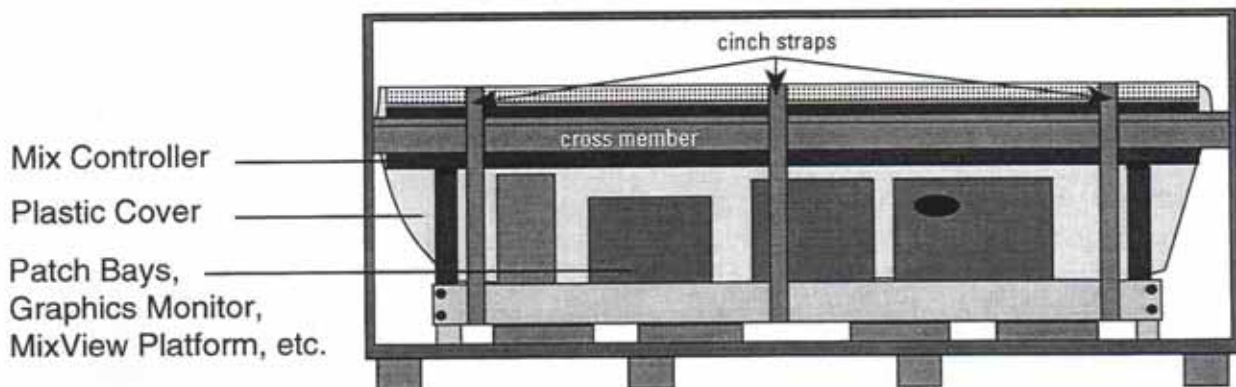


Figure 2.1 - Mix Controller Crate (front of crate removed)

### Mix Controller and MixView Platform

The larger of the two crates contains the Mix Controller, MixView Platform, graphics monitor, talkback mic, patch bays and all the necessary cabling. By removing all of the spring clips around the edges of the crate, you can remove the 1/2" bolts (numbered 1-4) across the lower front of the crate. The front cover will now be loose and should be set aside.

## Mix Controller and MixView Platform ...Continued

Remove the rest of the bolts in order as they are labeled. Bolts 5, 6, 7 and 8 are 7/16"; the remainder are 1/2". You can now lift the top and side pieces off as one piece and set them aside. If you ever intend to ship the CSII/CS2000, keep these crates.

Now, you should have a plastic-shrouded Mix Controller with the other components stored underneath, sitting on a pallet of wood. Remove the plastic and the blue nylon cinch straps, at which point you can remove all the contents underneath. Carefully lift the Mix Controller off of the wooden base.

## Audio Tower

The smaller crate(s) contain the Audio Tower(s). The best way to uncrate a Tower is first to remove all spring clips from the crate. Then remove the top cover. Once the crate is opened you'll notice that the Audio Tower is lying on its side in the crate.

Now, remove all of the bolts around the lower perimeter of the crate. Lift off the four-sided enclosure. The Audio Tower will now be exposed. Remove the re-usable cinch strap and the 2 bolts securing the piece of wood near the caster end of the Tower. Remove this piece of wood; this will allow you to carefully lift and slide the Tower out from the end of the crate platform approximately 1 foot. Using at least two strong people, have one person brace the caster end of the Tower while the other lifts the top of the Tower to stand it upright on its casters. Refer to the diagram below.

Confirm that the contents match the packing list. If so, you are almost ready to start cabling your CSII/CS2000. If not, call Euphonix Customer Support immediately at (415) 855-0412.

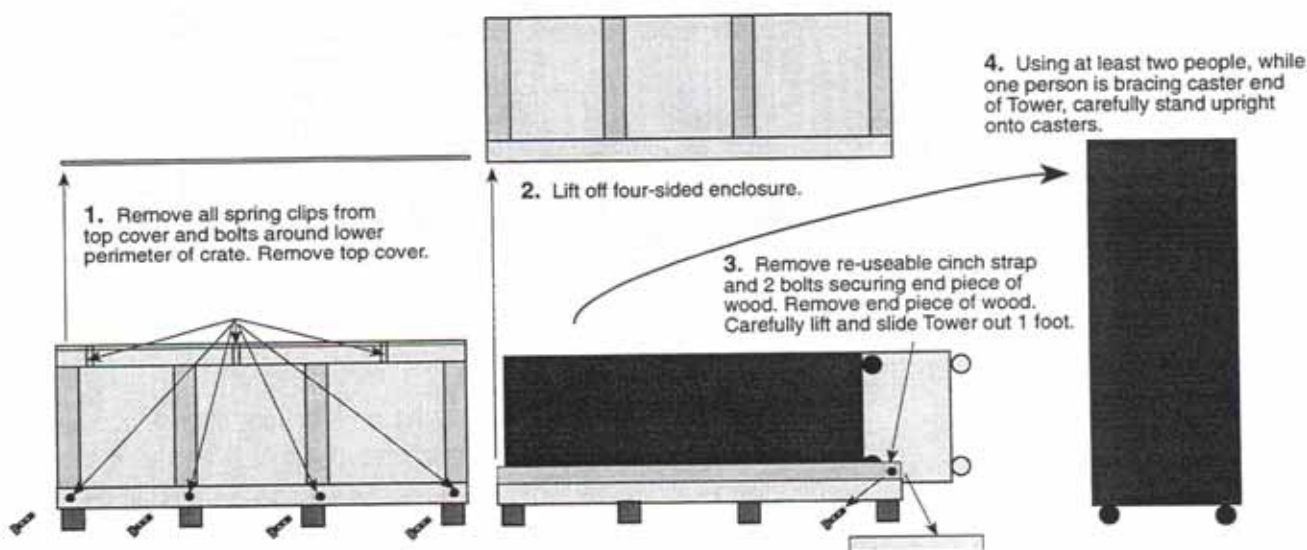


Figure 2.2 - Audio Tower Crate Removal

---

## Introduction

## Inspecting System Components

All of the CSII/CS2000 system components should now be unpacked. The Mix Controller, Audio Tower(s), MixView Platform, patch bays, and graphics monitor along with their associated cables and accessories should be together and are ready for inspection. This initial visual inspection is important in case any problems have occurred during shipping.

---

## Mix Controller

Before applying any power to the Mix Controller, visually inspect the entire unit to make sure that all of the I/O and Master Controllers are firmly seated in the frame. **Do not reseal controllers when the Mix Controller is powered up and communicating with the MixView Platform, as this will crash the computer and may cause component damage.**

## MixView Platform

The MixView Platform has four basic components: the processor, graphics monitor, keyboard and mouse. The processor (rack-mount unit) can either be placed underneath the Mix Controller or in your machine room with the Audio Towers. Make sure you have an accessible location for the graphics monitor, keyboard and mouse so they can be used comfortably during a session. With the recommended remote location of the processor, the optional Extender Kit may be necessary. See Appendix II, page 7 for details.

## Audio Tower

**IMPORTANT!** The Audio Tower(s) must be checked very carefully before installation. Replugging the Channel trays after shipping can prevent damage to the Audio Tower and its components at time of power up. Euphonix recommends pulling ALL of the Audio Channels one by one out of the Tower and reseating them firmly on their connectors. Repeat the same process with the Master Audio section below the channels. Be extremely careful while inspecting the Audio Channel trays. To avoid shearing components off the channel trays, keep the trays as straight as possible while sliding them in and out of the Tower.

**NEVER hot-plug a channel tray when the Audio Tower is powered up.** Unplugging channels is acceptable when troubleshooting, but replugging the channels without powering down the Audio Tower can cause serious component damage.

---

## Introduction

### Connecting System Components

Euphonix supplies all the interconnecting cables shown in the diagram on the next page. Connecting the system cables should take about 30 minutes. **Each audio snake's 90-contact multipin connector is missing one pin on the end that connects to the Audio Tower. The control snake is also missing one pin on the Audio Tower side.** The cables will still function if connected the wrong way but the grounding system will not be correctly wired. See p. 1-31/32, "Wiring for Minimum Noise and Hum", for more information.

---

# CSII/CS2000 System Wiring

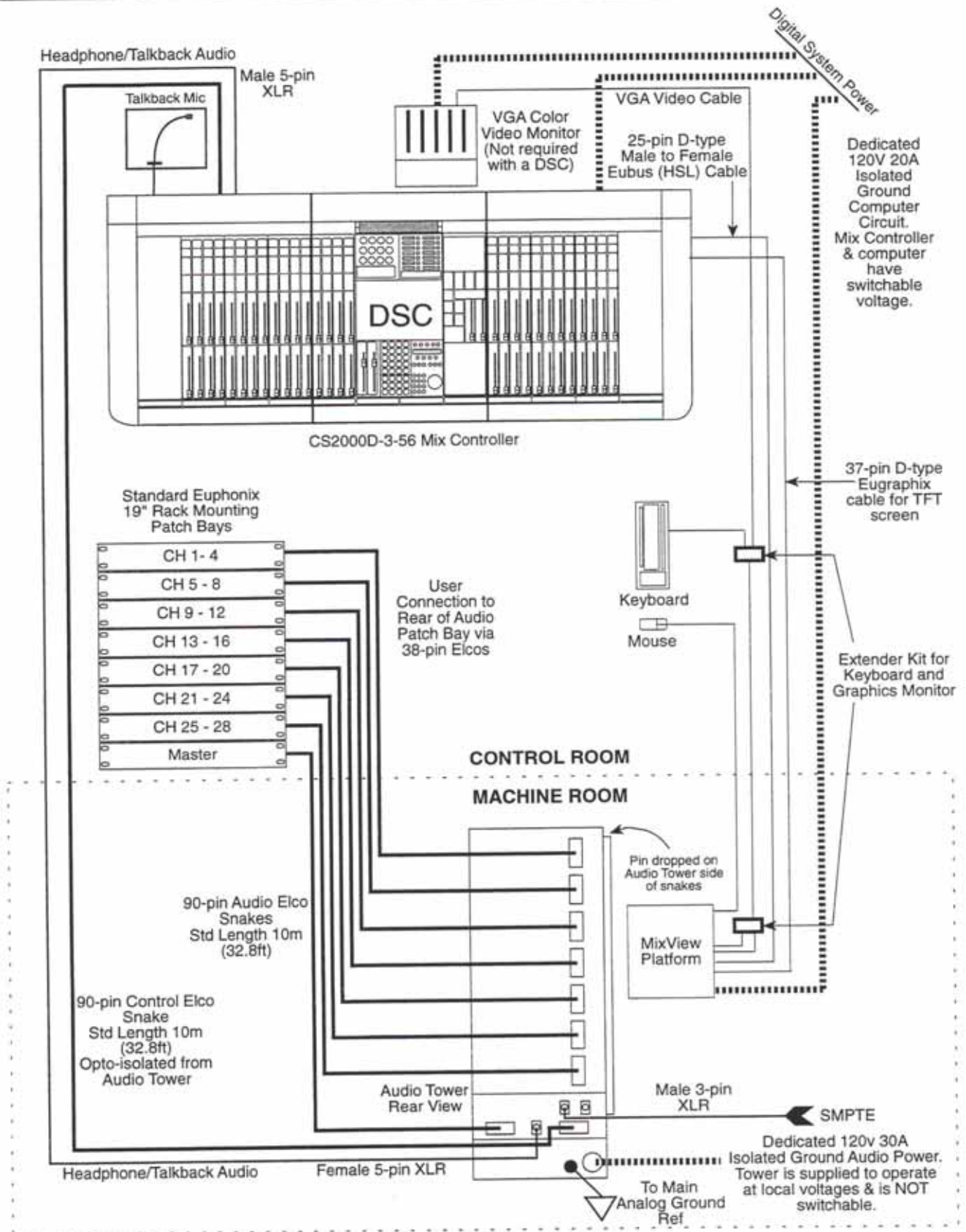


Figure 2.3 - Basic System Wiring

# CS2000 System Wiring

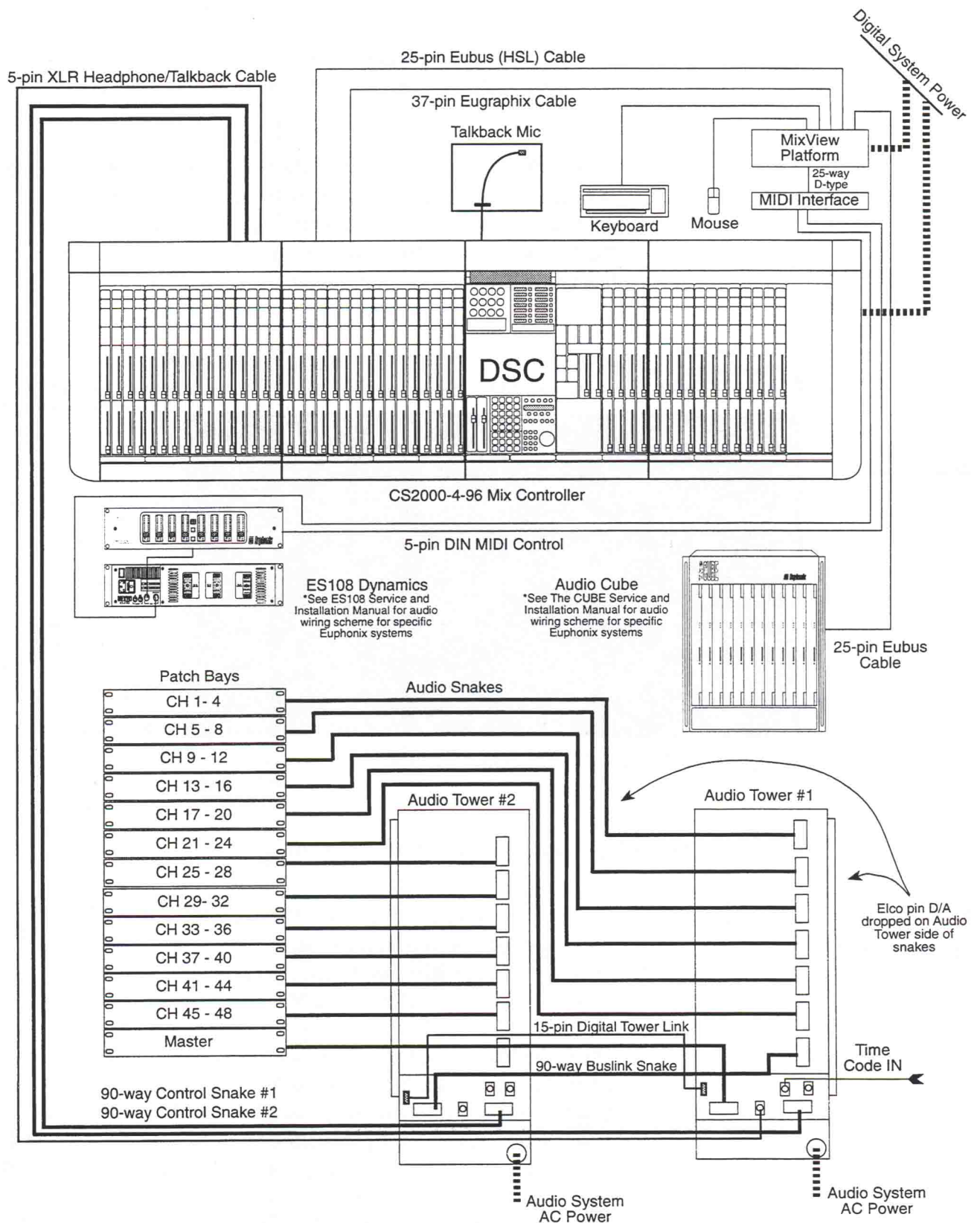


Figure 2.4 - Twin Tower System Wiring with ES108 and Audio Cube

## Connector Plate Connections

This is a diagram of the Mix Controller connector plate (on the bottom of the console) as seen if you are lying on your back looking up, head towards the rear of the console. The connector plate is where audio (headphones and talkback mic) and control snakes connect the console with the rest of the Euphonix system. The plate swings down on a hinge for easy access to the slot board and the inside of the console.

To the left of the connector plate is the power plate. This second plate is where power enters the console. To this plate are attached the internal power supplies that power the DSC, logic, and the LEDs on the console. There is also a fuse and the LED brightness knob (to brighten or dim the LEDs on the desk).

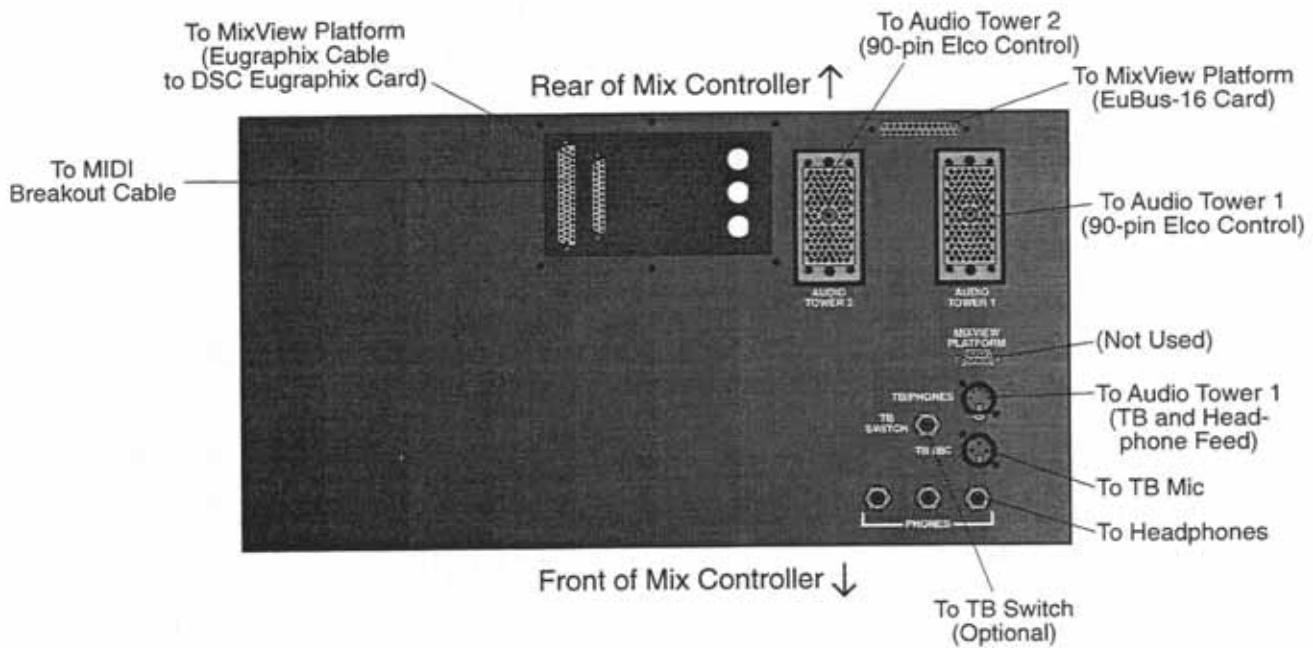
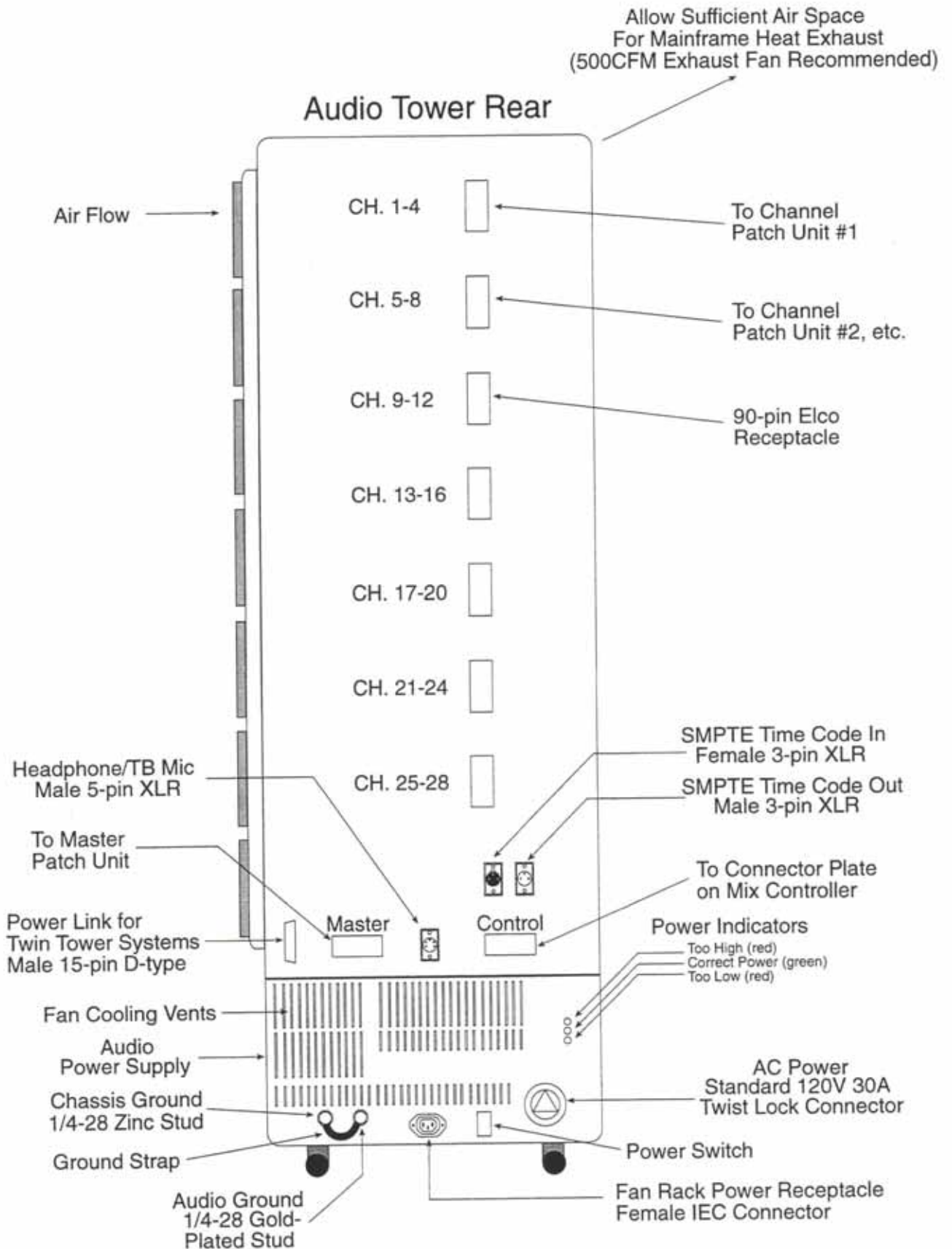


Figure 2.5 - Mix Controller Connector Plate

## Audio Tower Connections

On the following page is a diagram of the rear of the Audio Tower showing its connections with the rest of the system. Note that there should be sufficient space left around the fans so that the Tower's air flow will not be obstructed.

The Audio Tower is powered by a 30 amp service with Hubbell connectors. Due to the high startup draw of the Tower, no other power cables or connectors should be substituted for the ones supplied with the system. Using non-Euphonix adapter cables of any kind may present a fire hazard, and may invalidate any existing warranty. If additional Hubbell connectors are required for your installation, contact a local electrical supply house or call your Euphonix representative.



### **Patch Bay Connections**

On the following page is a diagram of the rear of the Euphonix patch bay, showing its connections with the rest of the system. Note that for different system configurations and for some custom applications, the connections to the patch bay may be slightly different. With the addition of the Audio Cube and extra ES108 Dynamics Processors, your patch bay configuration may change.

The patch bay rack is the crossroads for all audio within the Euphonix system, and so great care should be taken when wiring it up. The patch bay can be fed directly by studio jack panels, multitrack returns, and a host of studio gear. The inputs to the patch bay system are usually determined by the available equipment, the needs of the studio, and the personal preferences of the operator.

It is impossible to outline all relevant patch bay configurations in this manual, but see the next page for one suggested layout. If you have particular questions about your application and how to best design an elegant patch bay system, feel free to call your local Euphonix representative.

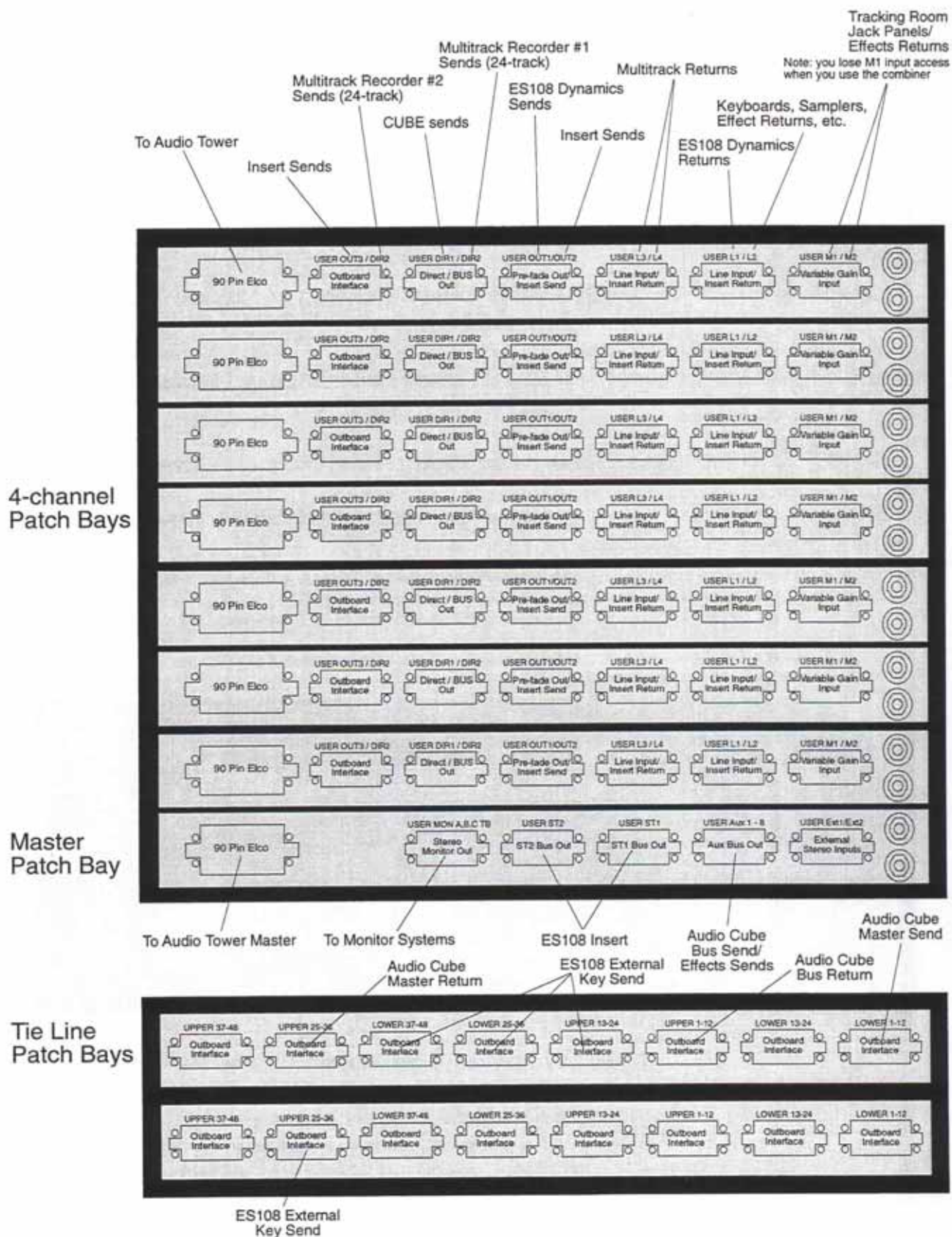


Figure 2.7 - Rear of CSII/CS2000 Patch Bay System

### MixView Platform (Front)

Make sure the SyQuest cartridge is inserted into the SyQuest drive.

Note that the key that locks the drive door can also be used to lock keyboard functionality. If you find that the keyboard does not work, make sure that the keyboard has not been locked with this key.

The keyboard jack on the front of the unit is non-operational. Make sure that you plug the keyboard (or keyboard Extender Kit) into the rear jack.

Reset switch can be used to reboot the MixView Platform without having to turn the power off.

Red LED (with cylinder icon) used to show hard disk access when MixView Platform is in use.

Green LED (with light bulb icon) used to show Power status.

Keep the front grille unobstructed for air flow through chassis.

The MixView Platform is usually rack-mounted and kept in the machine room.



Figure 2.8 - MixView Platform Front

## MixView Platform (Rear)

The blank AT card space is for future expansion options.

The DSC EUGRAPHIX cable connects to the 37-pin D-type connector on the connector plate (CS2000) or directly to the back of the DSC (CSII).

The serial and game ports currently require no external cabling.

The parallel port can be connected to a printer for DOS applications. The mouse (or Extender Kit mouse feed) connects to the 9-pin D-type.

An external VGA monitor (optional with DSC) can be connected directly to the Dolch card.

The EUBUS-16 connects to the Mix Controller via the Mix Controller EuBus cable.

The EUBUS-20 connects to the Cube (optional) via the Cube EuBus cable.

The 25-pin connector on the MIDI control card connects to the rack-mount MIDI Controller. There is no external cabling for the 8-pin DIN.

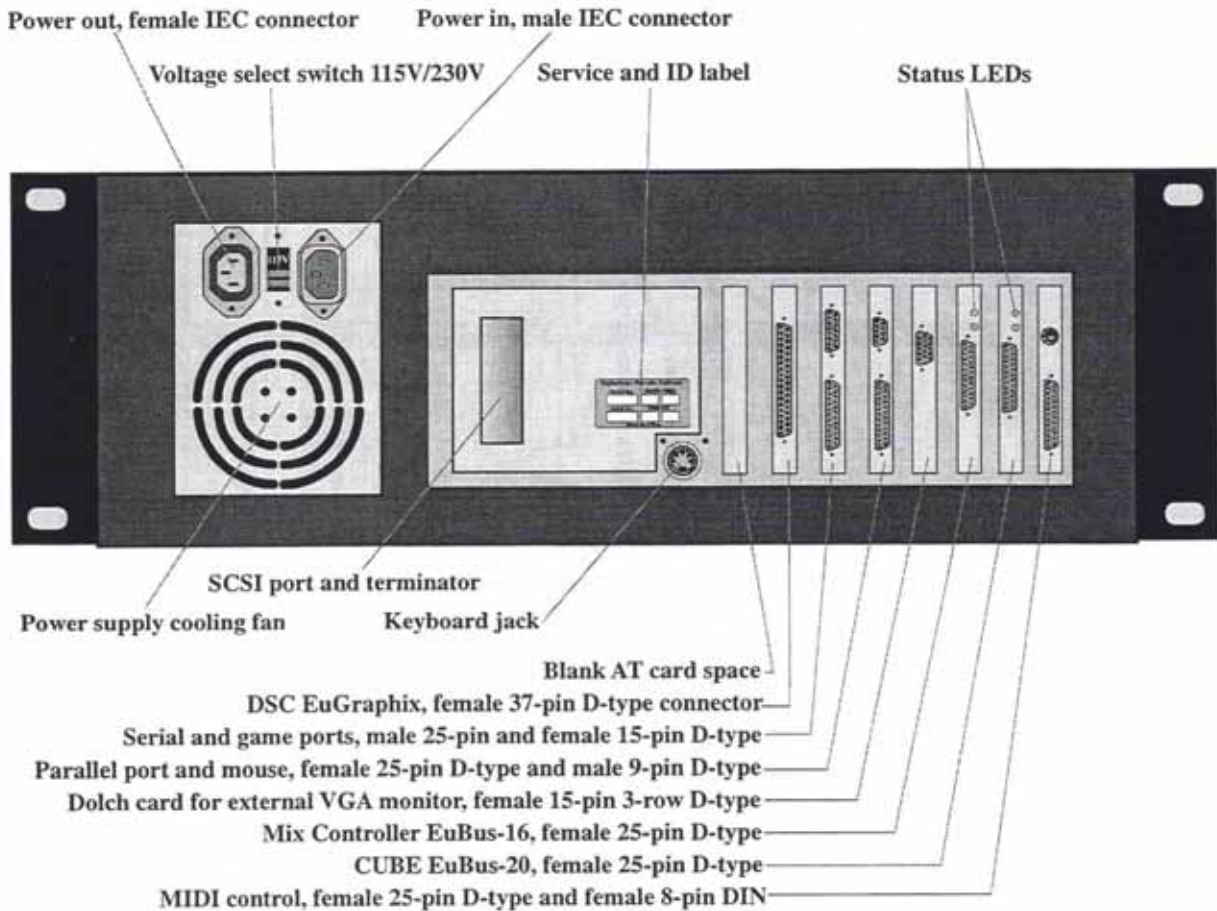


Figure 2.9 - MixView Platform Rear

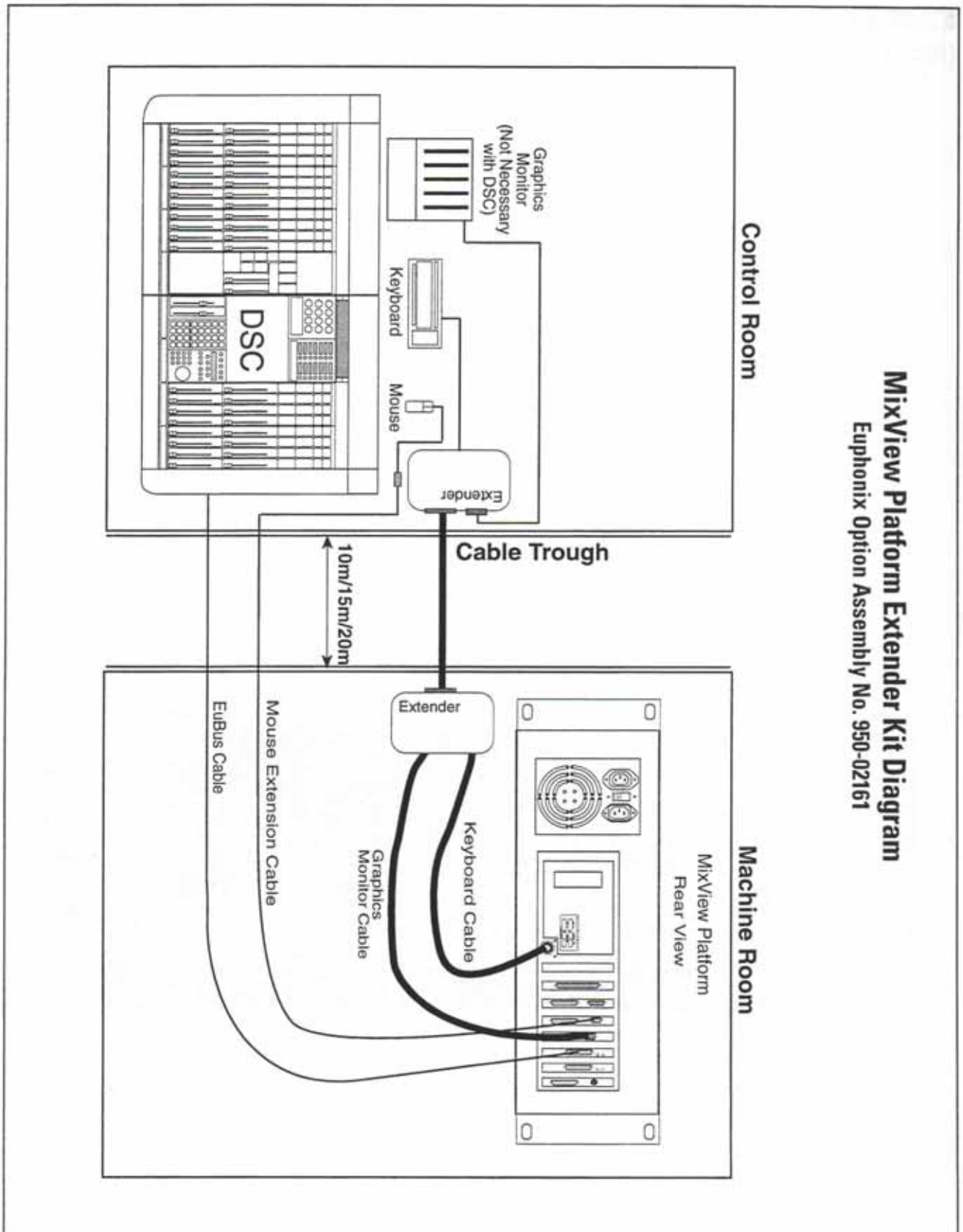
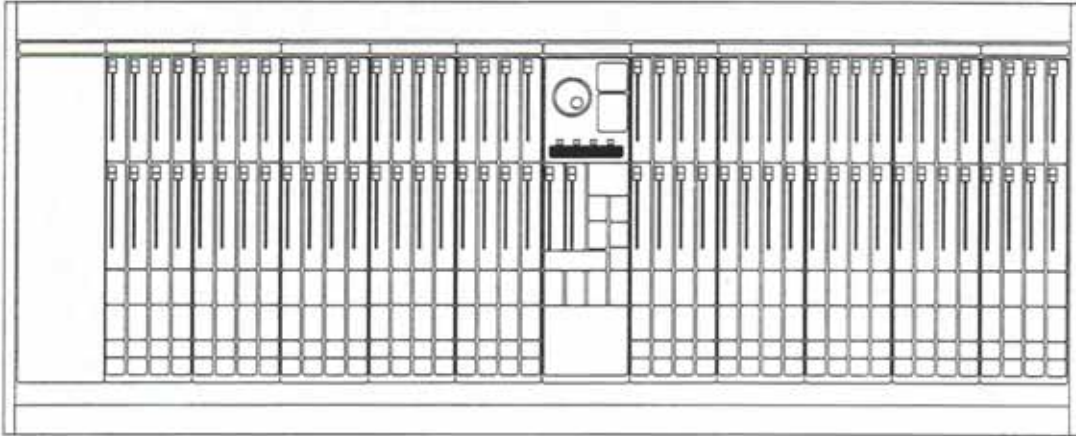


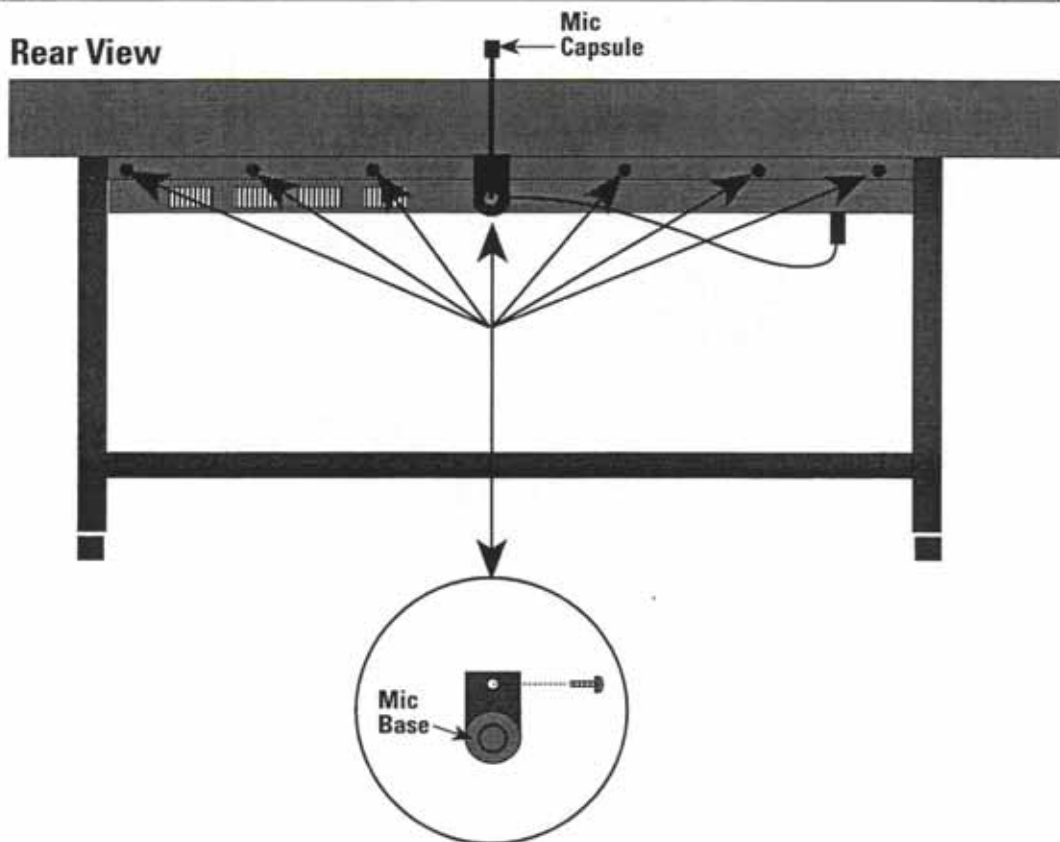
Figure 2.10 - MixView Platform Extender Kit Connections

## CSII Talkback Microphone Mounting

### Top View



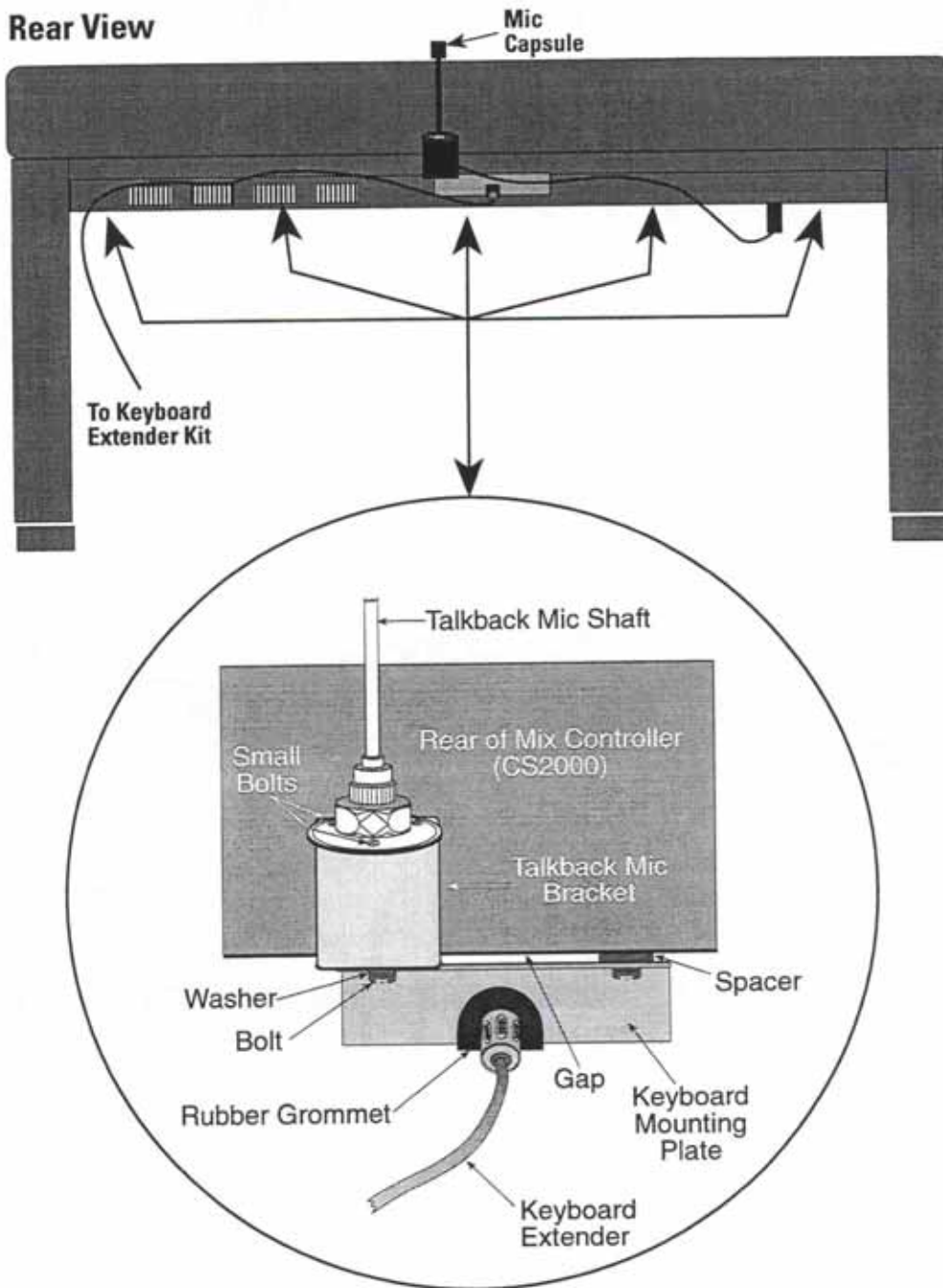
### Rear View



Using a 1/8" Allen wrench, remove bolt and attach plate to desired location. Attach microphone to mounting plate and plug XLR into Connector Panel under Mix Controller. Additional screws are supplied for mounting in locations other than the console.

Figure 2.11 - CSII Talkback Microphone Mounting and Connection

## CS2000 Talkback Microphone Mounting



Using a #3 Phillips head screwdriver, attach plate with bolts to desired location as shown. The microphone can also be attached separately from the keyboard mounting plate in one of the single-hole locations. The keyboard mounting plate should always be attached to one of the center two-hole locations, without the spacer if the microphone is on the side. Attach microphone to mounting plate and plug XLR into connector panel under Mix Controller.

Figure 2.12 - CS2000 Talkback Microphone Mounting

## CSII/CS2000 Remote Mic Key Switch

The CSII/CS2000 as shipped has a female phone jack mounted on the connector plate under the console. By wiring a switch to a phone cable and a male phone plug, you can switch the Mic Key remotely. Plug the external Talkback Mic into the 3-pin XLR jack located on the connector plate under the console.

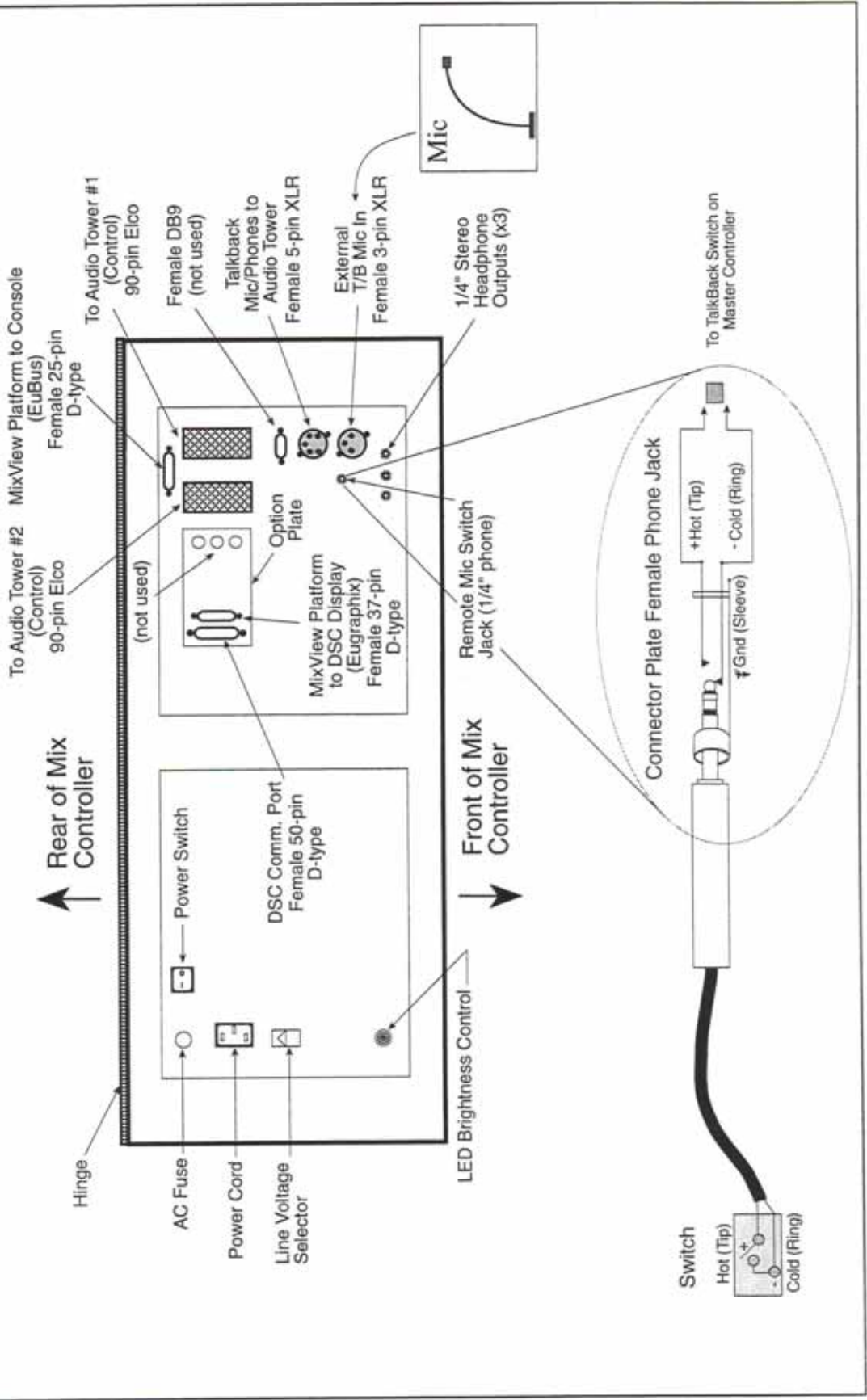


Figure 2.13 - Remote Mic Key Switch Description

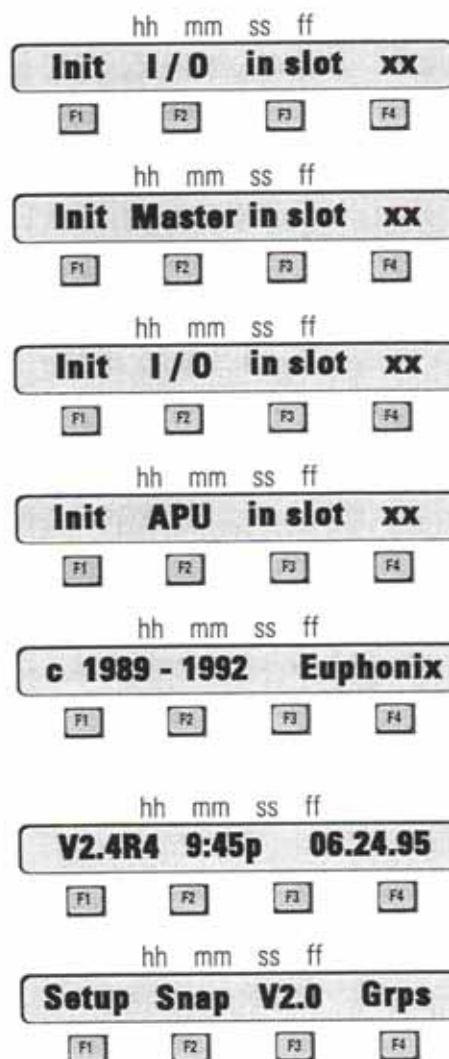
## Introduction

## Powering Up the Mix Controller

All CSII/CS2000 components should now be connected. This section will describe the sequence for powering up components, and how to verify normal operation for each component as well as the entire system.

### Checking Controller Status after Power Up

When you turn the Mix Controller Power switch to the "On" position, you should see the following sequence of information in the SmartDisplay window of the Master Controller:



Note: Your software version is probably different

Figure 2.14 - Master Controller Start-up Sequence to Main Menu

**Checking Controller  
Status after Power Up  
...Continued**

Once you have the Main Mix Controller menu you should proceed to the next section, "Powering Up the MixView Platform". If for some reason the Mix Controller does not start-up as shown, check the Master and all I/O controllers in the frame and make note of any messages displayed in the SmartDisplay window. If there is still a problem, contact Euphonix or your distributor for assistance before proceeding any further.

---

## Introduction

### Powering Up the MixView Platform

The current Euphonix MixView Platform is required to run Euphonix software versions 2.3 and higher.

The keyboard for the MixView Platform should be plugged into the jack on the rear since the front jack is not connected internally. The key included with the MixView Platform locks the door for floppy and removable hard drive access, and also locks keyboard function.

The CSII/CS2000 should now have all of the cables connected and the Mix Controller should be turned on. It's time to power up the MixView Platform. Make sure you have the 25-pin Eubus cable (HSL cable) connected between the Mix Controller and the processor, since the MixView Platform and control surface need a line of communication to operate properly.

---

### Testing MixView Platform and Mix Controller Communication

Turn on the MixView Platform with the On/Off switch on the front of the computer. The PC as shipped from the factory will have a start-up sequence that automatically executes the MixView software on power up. Once MixView has started and the Master Control Panel is on the screen, verify that communication exists between the processor and the control surface.

Identical information should be displayed in both the SmartDisplay window on the Mix Controller and in the Master Control Panel on the graphics monitor. This is the first verification of basic MixView Platform/Mix Controller communication. Moving on to the next section will further test communication by loading some factory SnapShots from the MixView Platform into the Mix Controller.

### Opening a Bank of Test SnapShots from MixView

Now that we've established basic communication, we can load the Euphonix Test SnapShots into the Mix Controller. These should already be in the Snap Directory under the MixView directory on your D: drive. See your Operator's Manual for details of how to get around in MixView.

Once the bank of Test SnapShots is loaded you can cycle through the 20 SnapShots and note their description in the Comments field. Keep in mind that until the Audio Tower(s) have been turned on you will not see the full effect of these Test SnapShots.

### Very Important!

**NOTE: Make sure your amplifiers are turned off, and speakers are not passing audio. Many of these Test SnapShots have very high levels of audio passing through them, and could damage your studio monitors.**

The purpose of loading these SnapShots now is that by loading a bank of SnapShots, we have fully verified communication between the Mix Controller and the MixView Platform. Please refer to the following section for more details on Snapshot Recall.

### Recalling Test Snapshots

Now, the Test SnapShots should be loaded into the Mix Controller. Once the Audio Tower is powered up, you will be ready to recall any of the 20 Test SnapShots. Below is a brief description of the Snap menu in the SmartDisplay. For a detailed description of Snapshot Recall, refer to your Operator's Manual.

### Important!

Before you can see the results of the Test SnapShots, you will need to power up the Audio Tower. The test SnapShots will check many functions throughout the system. Proceed to the next section, "Powering Up the Audio Tower", and then begin recalling the loaded SnapShots.

By recalling these SnapShots and reading the description in the comments field of the SnapShot window, you will be able to visually check for proper Mix Controller and Audio Tower operation. These tests will be extremely useful in diagnosing any problems that may arise with your CSII/CS2000.

## Introduction

# Powering Up the Audio Tower

Now that the entire system is cabled up, and the Mix Controller and MixView Platform are powered up and communicating, the last step is to power up the Audio Tower. Please carefully read the following section, as it is important to check the audio channels and Master Audio Section of the Tower before applying power.

## Checking Audio Tower Modules

Before doing anything else, check that all of the smaller daughter cards each Audio Tower Module are seated correctly. Pull each audio channel out of the Tower, including the Master, and physically inspect it for any shipping damage. To do this, push the two latches towards each other and slide the module forward. You will notice that on each board there are a number of ribbon cable connectors and also a number of daughter cards, which plug into the main mother board. These cards execute input switching and metering. Check that they are seated correctly, and at the same time make sure that all the ribbon cable connectors are firmly seated in their sockets. When you push the modules back into the Audio Tower, make sure that they are firmly seated to their connectors on the backplane of the Audio Tower as mentioned in the last section.

## IMPORTANT Speaker Warning

Be extremely careful when turning the Audio Tower(s) on or off. Make sure that your power amps are either turned down, turned off or you have the inputs disconnected. **You can cause serious speaker damage if you have your power amps turned up and speakers connected when turning the Tower(s) on and off.**



Figure 2.15 - Audio Tower Modules

**Audio Tower  
Reset Description**

The Audio Tower can be reset by pressing the red button on the left side of the Master Audio Section in the Audio Tower. The Tower can be reset in 1/30th of a second.

**Twin Tower  
Configuration**

See the twin Tower system diagram in Figure 21, Section II, p. 5 for connection details.

**Audio Tower  
Power Supply  
Fuse Replacement**

If you need to replace a fuse in the power supply section of an Audio Tower, refer to Section IV, "System Mechanical Diagrams - Audio Power Supply-Top View".

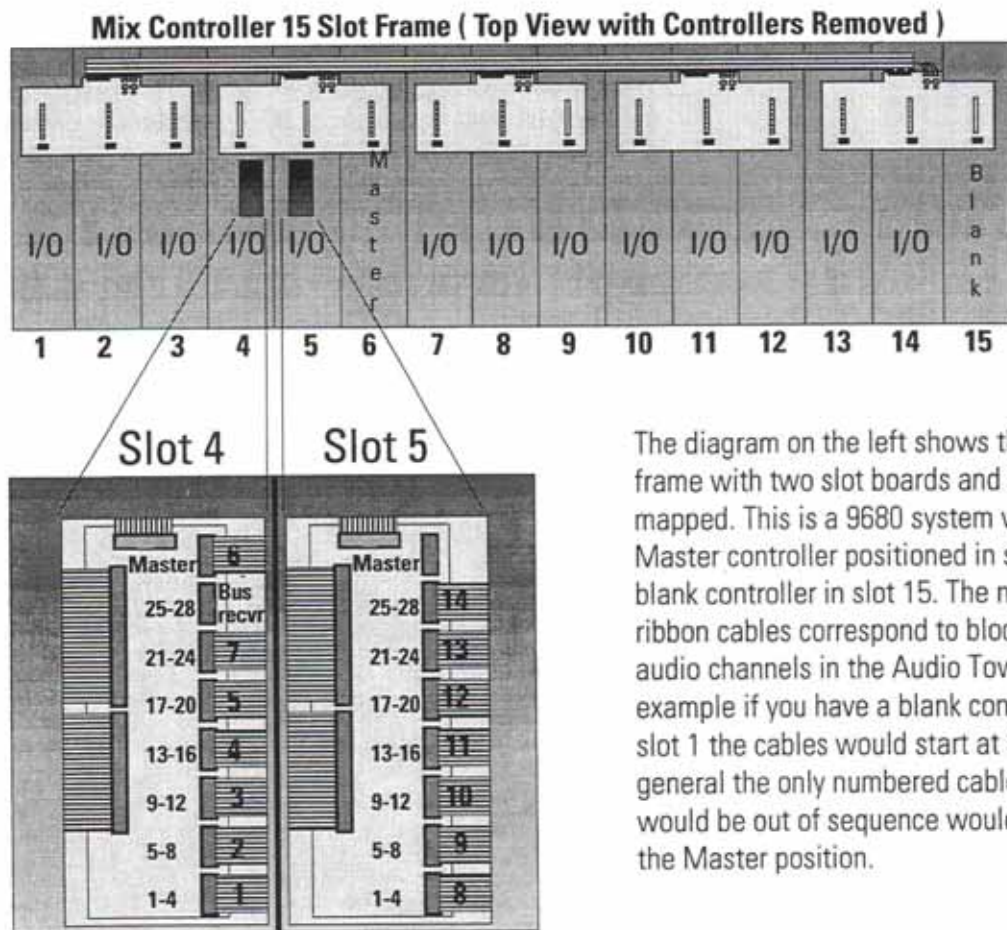
## Introduction

## Reconfiguring the System

Your Euphonix system should arrive pre-configured from the factory for the average user. However, the benefit of Euphonix modularity is that the layout of the control surface can be easily altered in the field. You can quickly change the layout by re-mapping the slot cables on the slot board and physically moving the controller(s) in slot 4 (for a 9-slot frame) or slots 4 & 5 (for a 12- or 15-slot frame). See the diagram below for a more detailed description.

### Mix Controller

A 9-slot frame will have one slot board, which will map the controllers to the Audio Tower. This is accessed via slot 4 in the frame. A 12- or 15-slot frame will have two slot boards. These are accessed via slots 4 and 5 in the frame.



The diagram on the left shows the largest frame with two slot boards and all slots mapped. This is a 9680 system with the Master controller positioned in slot 6 and a blank controller in slot 15. The numbered ribbon cables correspond to blocks of four audio channels in the Audio Tower. For example if you have a blank controller in slot 1 the cables would start at 2. In general the only numbered cable that would be out of sequence would be one in the Master position.

Figure 2.16 - Slot 4 and 5 Connector Plate Access Closeup

### Mix Controller ...Continued

On the previous page we've shown how to access the slotboard on the connector plate from the top of the Mix Controller frame. This is probably the quickest and easiest way to change your slot mapping and thus your Mix Controller layout. There are three cases where you may need to do this:

1. For changing the location of your controllers, either the Master, I/O, or blanks.
2. For upgrading your system with more modules, including the DSC. The DSC can be located anywhere in the CS2000 frame. The following table shows the required slot positions of the DSC in each CSII frame:

<b>Frame Size</b>	<b>DSC Location</b>
9-slot (CSII-56)	Slots 5 & 6
12-slot (CSII-80)	Slots 7 & 8
15-slot (CSII-96)	Slots 8 & 9

3. For troubleshooting to eliminate a slot, cable or controller problem in the Mix Controller. For further troubleshooting information refer to Appendix II, "System Troubleshooting".

You can also access the slotboard by removing the hex screws around the front, left and right sides of the connector plate under the Mix Controller. There is a hinge that runs along the back of the panel which will allow it to swing down, allowing complete access from under the console. You can also access the Headphone, Talkback Mic, Remote and Control Snake connectors by lowering the connector plate.

## Introduction

## Recalibrating the System

Every Euphonix system is calibrated at the factory, but sometimes after shipping or reconfiguration it is good idea to recheck system calibration. Below is an overview of key calibration locations within the system.

### User Calibration/Configuration Overview

System Sub-Assembly	Type of Adjustment	Reference Location
• Mix Controller		
MC Frame		
Power Plate	LED Brightness Pot Voltage Select Switch	See Figure 19 -Section 1 pg 28 See Figure 19 -Section 1 pg 28
Connector Plate	Remote TB Switch Slot Board	See Figure 2.13 -Section 2 pg 17 See Figure 2.16 -Section 2 pg 25
Master Controller SmartDisplay	Software Options	Refer to Operation Manual
MixView Platform MixView Software	Software Options	Refer to Operation Manual
• Audio Tower		
Master Section	P2 Oscillator Level Adjust P3 TB Mic Level Adjust P5 Oscillator Freq. Adjust Changing EXT Level +4 to -10 +18v Talkback Mic Power	See Figure 2.17 -Section 2 pg 28 See Figure 2.17 -Section 2 pg 28 See Figure 2.17 -Section 2 pg 28 See Figure 2.18 -Section 2 pg 29 See Figure 2.18 -Section 2 pg 30
• Modules		
Audio Channels Bus Amp	P1 Level Adjust to Zero	

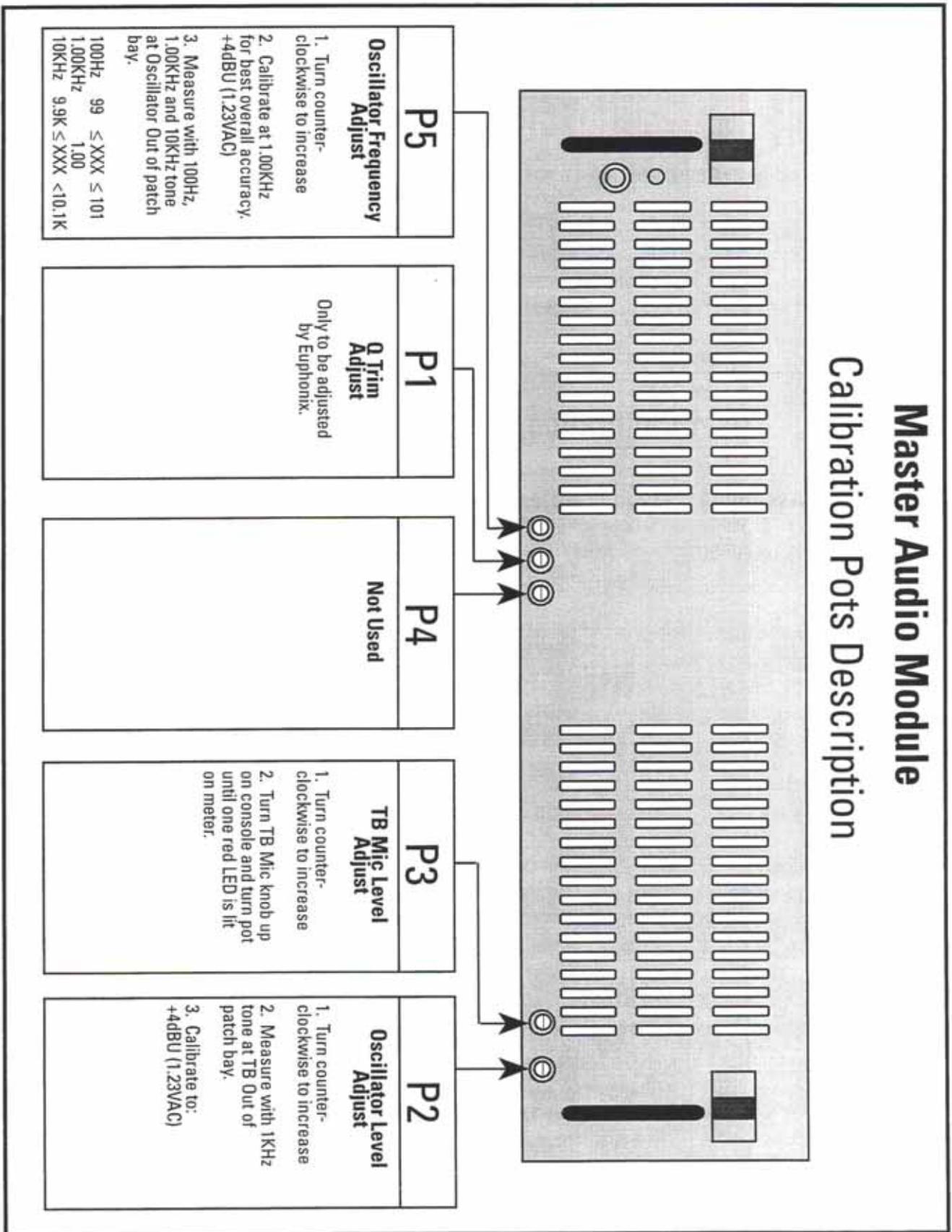


Figure 2.17 - Audio Tower: Master Audio Calibration Pot Description

## CSII/CS2000 Master Audio +/-10 Jumper for Line Amp Input

Remove 4 Phillips Head Screws

**1.** The jumpers for this change are located on the Line Amp cards situated below the Bus Amp Card Cage. Make sure that all power is off and you have completely removed the Master Audio Section from the Audio Tower. Be sure to disconnect the Link (twin Tower systems) and the Talk/Phones cables on the back of the Tower before sliding the Master Audio Section out of the Tower mainframe.

**2.** To access the Line Amp Cards, remove the Bus Amp Card Cage in the right rear corner of the Master Audio Section. Remove the 4 Phillips head screws as shown in the illustration to the left. You will need to unplug the ribbon cable connectors from their sockets on the main board. Make sure you note their location so you can return them to the correct socket.

**3.** Once you have removed the cage holding the Bus Amp Cards, you will see the Line Amp cards standing vertically. By removing the desired card, you will see a set of jumpers for each section on the card. If you move the 2 jumpers to the lower position, you can change the input from +4 to -10. See the chart below for a specific description on the Line Amp Cards 1-4 function and specific input jumper location. For further details, refer to CSII/CS2000 Electrical Diagrams that came with this Service Manual.

**4.** Carefully replace the Line Amp card to its original location (make sure that the connector pins at the bottom of the card seat firmly in the sockets on the Master board). Screw in Bus Amp Card Cage, and connect all cables back to their original location.

**5.** The chart below shows the correlation between the Line Amp cards 1-4 and the H-connectors on the Master Board that each Line Amp card plugs into. The chart shows the specific input signals that can be changed and how to configure them.

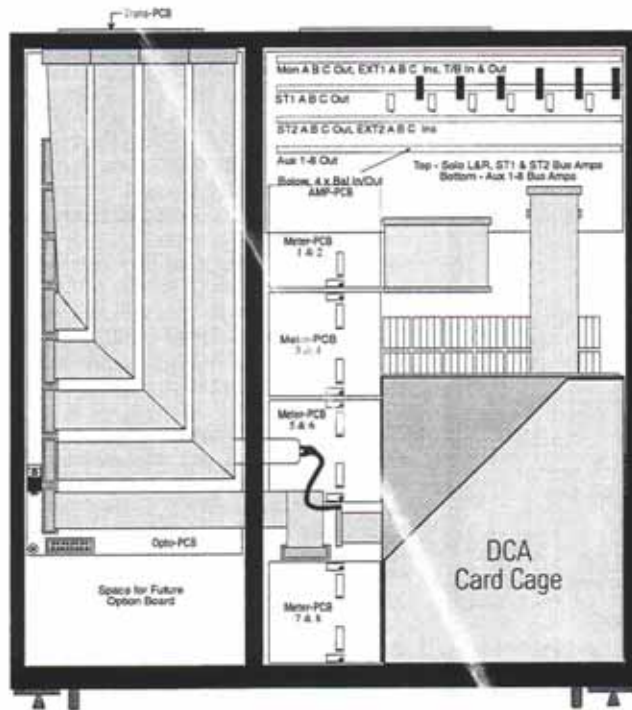
1	H11 EXT 1A L	H12 EXT 1B L	H13 EXT 1C L	H14 EXT 1A R	H19 +/-18 AGND	H15 EXT1B R	H16 EXT 1C R	H17 TB IN	H18 N/A
2	H28 ST 1R INS	H27 ST1L INS	H23 N/A	H26 N/A	H29 +/-18 AGND	H25 N/A	H22 N/A	H24 N/A	H21 N/A
3	H38 ST2R INS	H37 ST2L INS	H31 EXT2A L	H32 EXT2B L	H39 +/-18 AGND	H33 EXT2C L	H34 EXT2A R	H35 EXT2B R	H36 EXT2C R
4	H43 N/A	H41 N/A	H42 N/A	H44 N/A	H49 +/-18 AGND	H45 N/A	H46 N/A	H47 N/A	H48 N/A

**H#**

↑ +4  
↓ -10

Figure 2.18 - Master Audio Line Amp Input Jumpers

## CSII/CS2000 Master Audio +18v Talkback Mic Power



The following will describe how to access +18v Talkback Mic Power Jumper (ON/OFF) on the Main Board of the Master Audio Section in the Audio Tower. The CSII/CS2000 is shipped with the Talkback Mic power *Turned ON*. By following the steps below you can *Turn OFF* the Talkback Mic power.

1. Remove the Master Audio Section from the Audio Tower.
2. Carefully, remove the Ribbon Cables that attach the DCA Boards in the DCA Card Cage to the Main Board. There are 6 cables at the rear of the Card Cage and 3 cables to the left of the Card Cage. Make sure to pull the cables GENTLY from their sockets, and note their exact location.
3. Remove the 4 Phillips head screws attaching the DCA Card Cage to the right side of the Master Audio Section frame. Then lift the Card Cage out of the Master Audio Section.
4. The Main Board should now be exposed and you should see the only jumper on the Board (J5). This is the Talkback Mic Power ON/OFF Jumper Block. By moving the jumper to the Lower or OFF position you have turned OFF your +18v Talkback Mic Power.
5. Replace the Card Cage, screws, and ribbon cables. Replace the Master Section in Audio Tower.

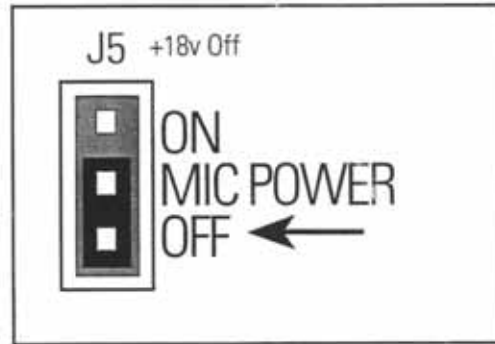
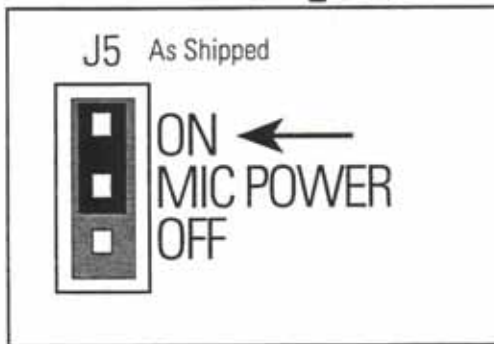
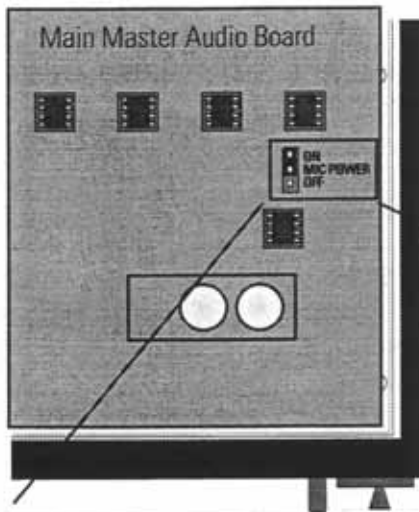


Figure 2.19 - Master Audio - Phantom Power Jumper

# SEC. 3: SYSTEM ELECTRICAL DIAGRAMS

## Introduction

## Electrical Diagrams

The following pages contain diagrams which will be helpful in understanding the various signal paths throughout your Euphonix console. There are three basic areas of diagrams in this section: the Mix Controller, the Audio Tower and the Modules. The signals in each area are shown in 4 ways: All Signals, Control, Audio, and Power. For more information about signal flow throughout the console, see the separate schematics booklet.

---

## Mix Controller

The following pages contain diagrams which will be helpful in understanding the various signal paths within the Mix Controller. These signals are shown in four ways: All Signals, Control, Audio, and Power.

---

# CSII Mix Controller

- Signal flow for:
- Control
  - Audio
  - Power

See Table of Contents or Schematic Reference for more details.

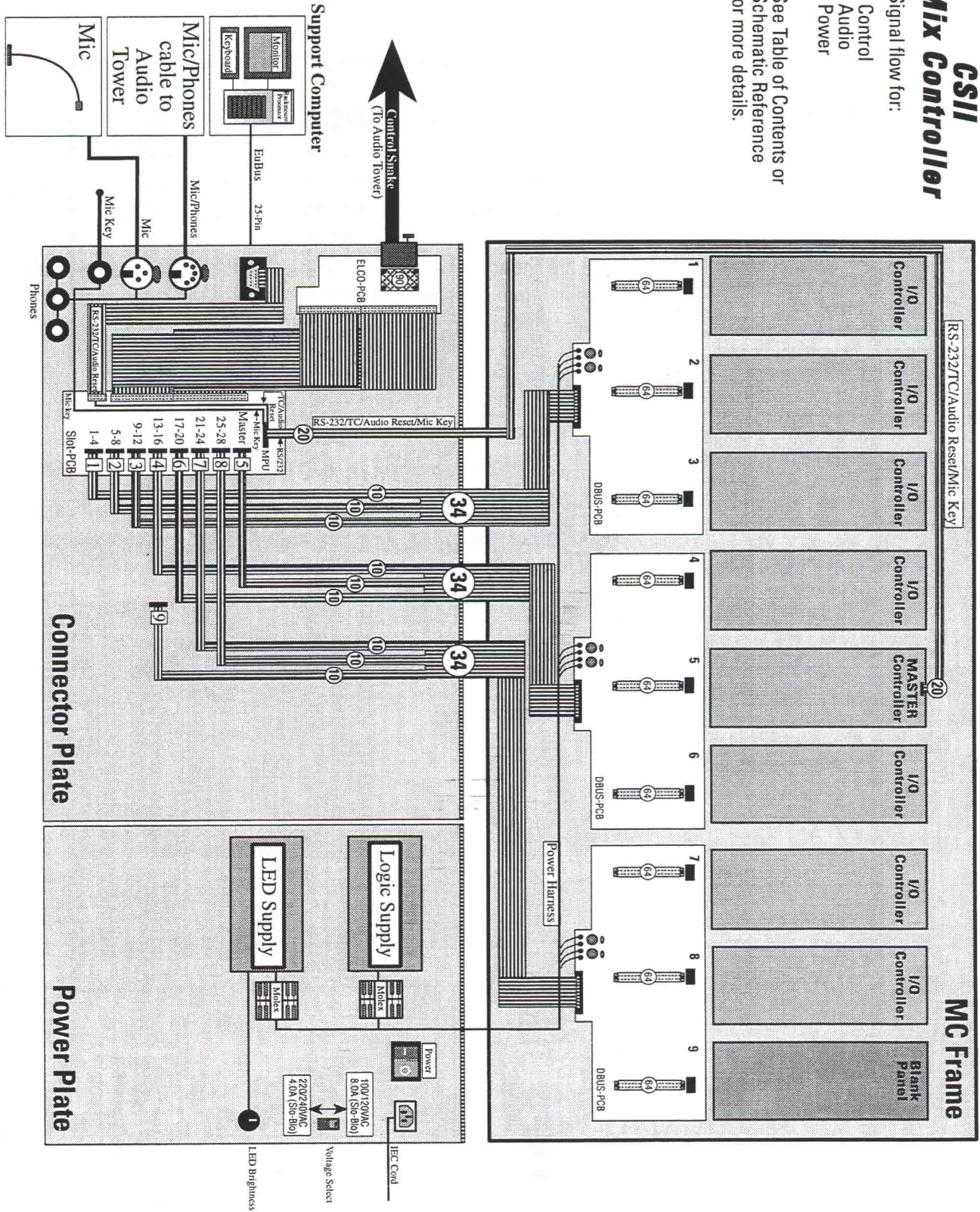


Figure 3.1 - Mix Controller - Signal Flow Diagram



# CSII Mix Controller

Signal flow for:

- Audio

See Table of Contents or Schematic Reference for more details.

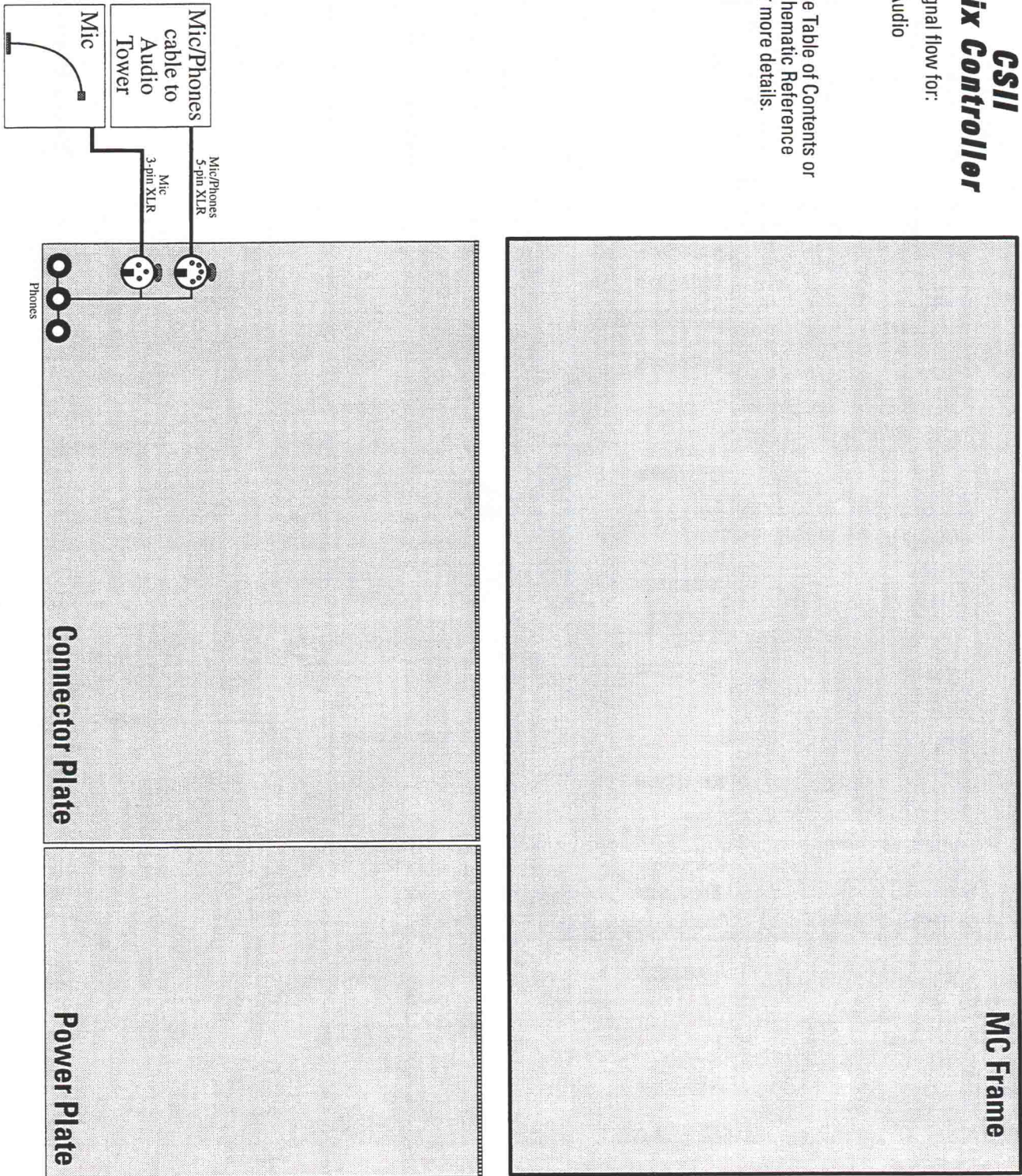


Figure 3.3 - Mix Controller Signal Flow Diagram - Audio

# CSII Mix Controller

Signal flow for:

- Power

See Table of Contents or Schematic Reference for more details.

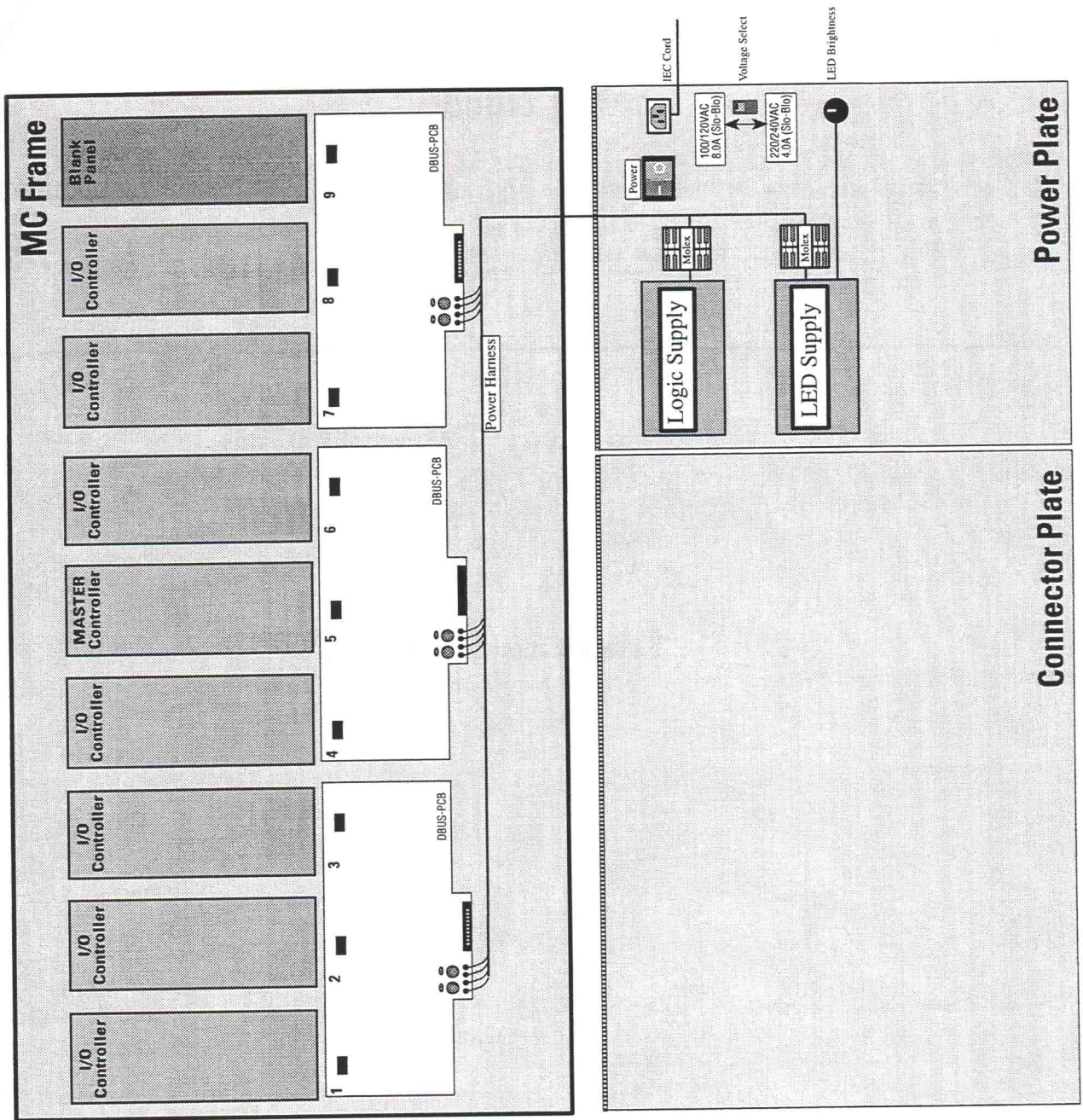


Figure 3.4 - Mix Controller Signal Flow Diagram - Power

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## Audio Tower

### Introduction

The following pages contain diagrams which will be helpful in understanding the various signal paths within the Audio Tower. These signals are shown in four ways: All Signals, Control, Audio, and Power.

---

# CSII/CS2000 Audio Tower

Signal Flow for:

- Control
- Audio
- Power

See Table of Contents or Schematic Reference for more details.

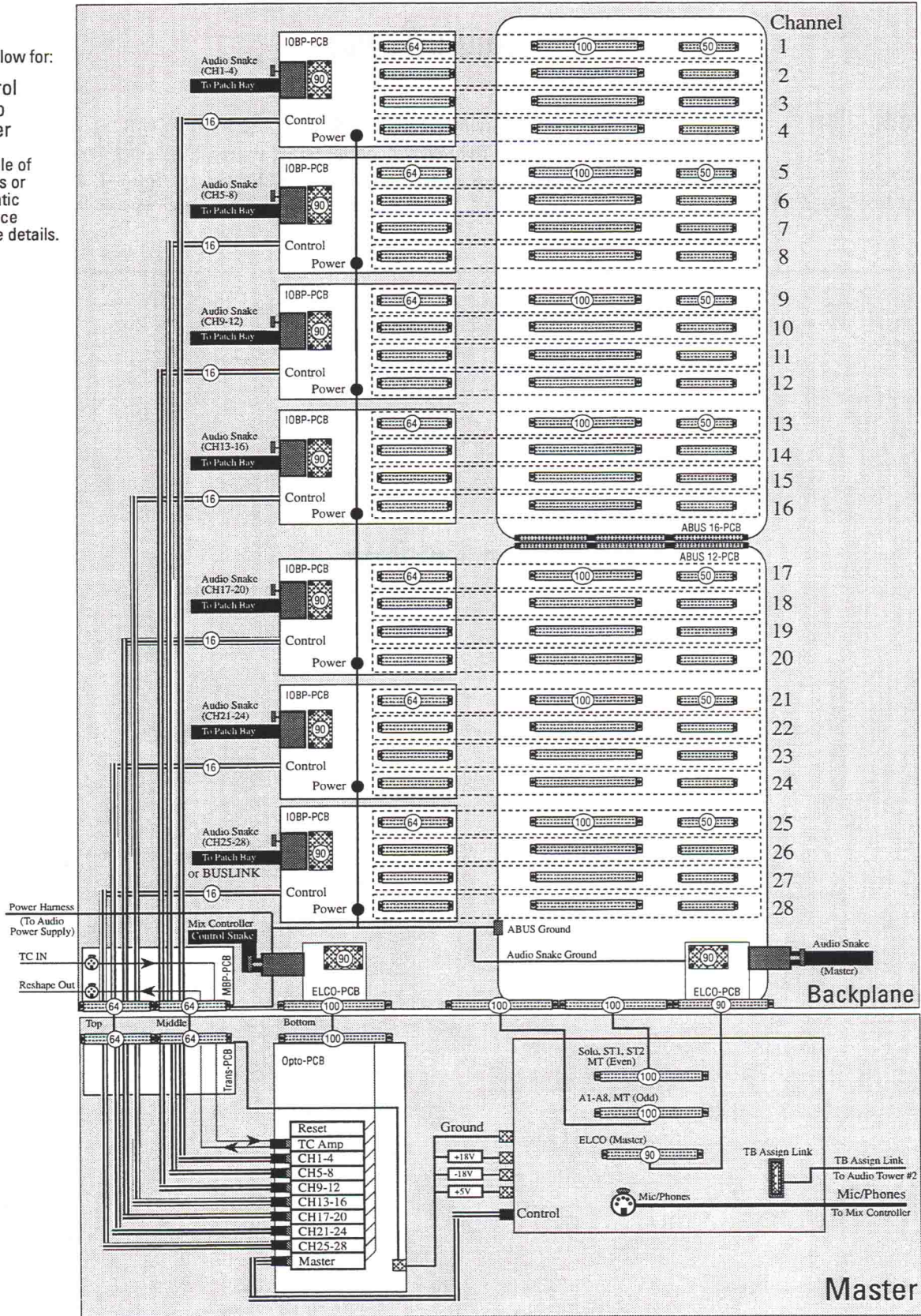


Figure 3.5 - Audio Tower Signal Flow Diagram

# CSII/CS2000 Audio Tower

Signal Flow for:  
• Control

See Table of Contents or Schematic Reference for more details.

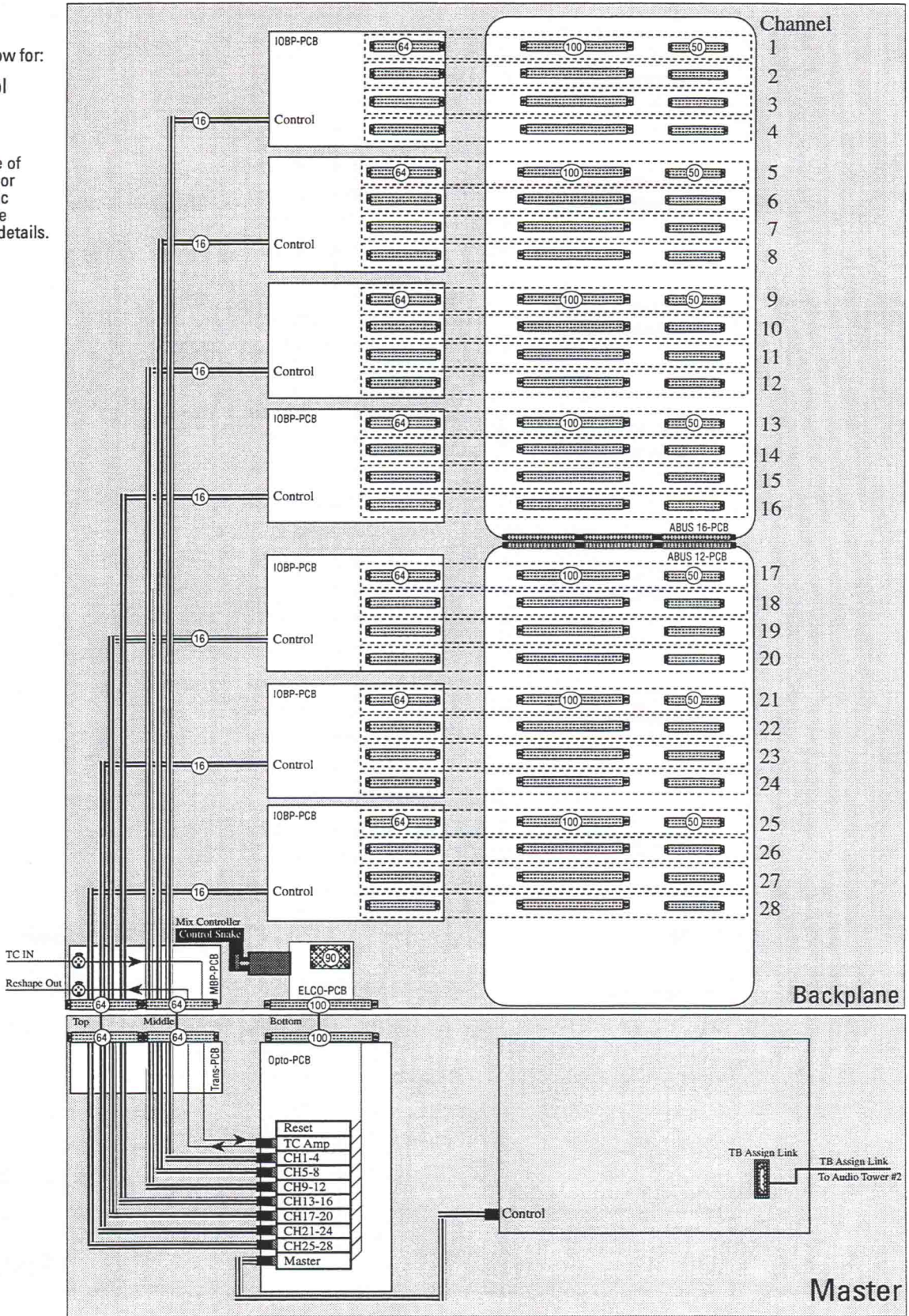


Figure 3.6 - Audio Tower Signal Flow Diagram - Control

# CSII/CS2000 Audio Tower

Signal Flow for:  
• Audio

See Table of Contents or Schematic Reference for more details.

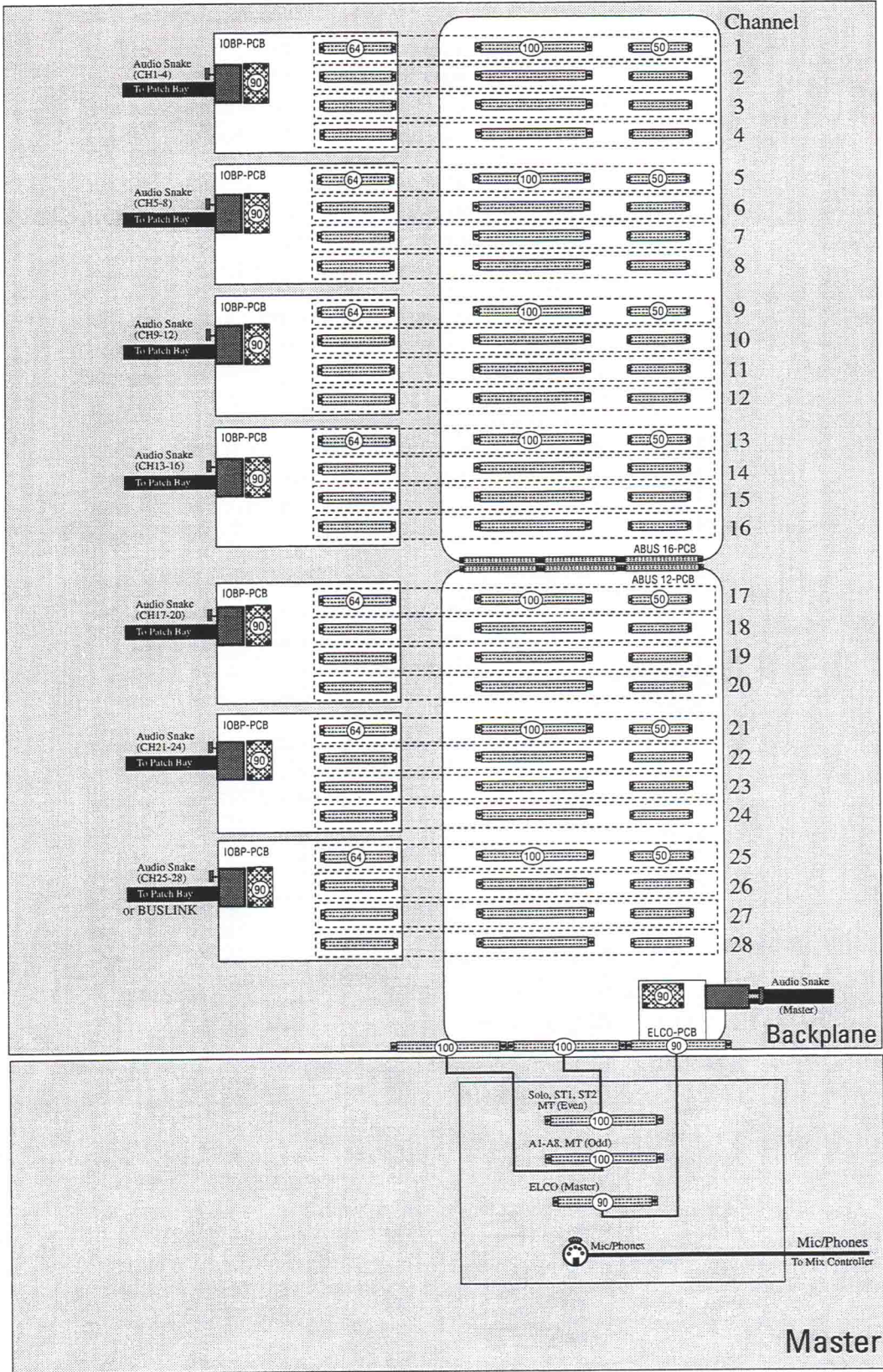


Figure 3.7 - Audio Tower Signal Flow Diagram - Audio

# CSII/CS2000 Audio Tower

Signal Flow for:

- Power

See Table of Contents or Schematic Reference for more details.

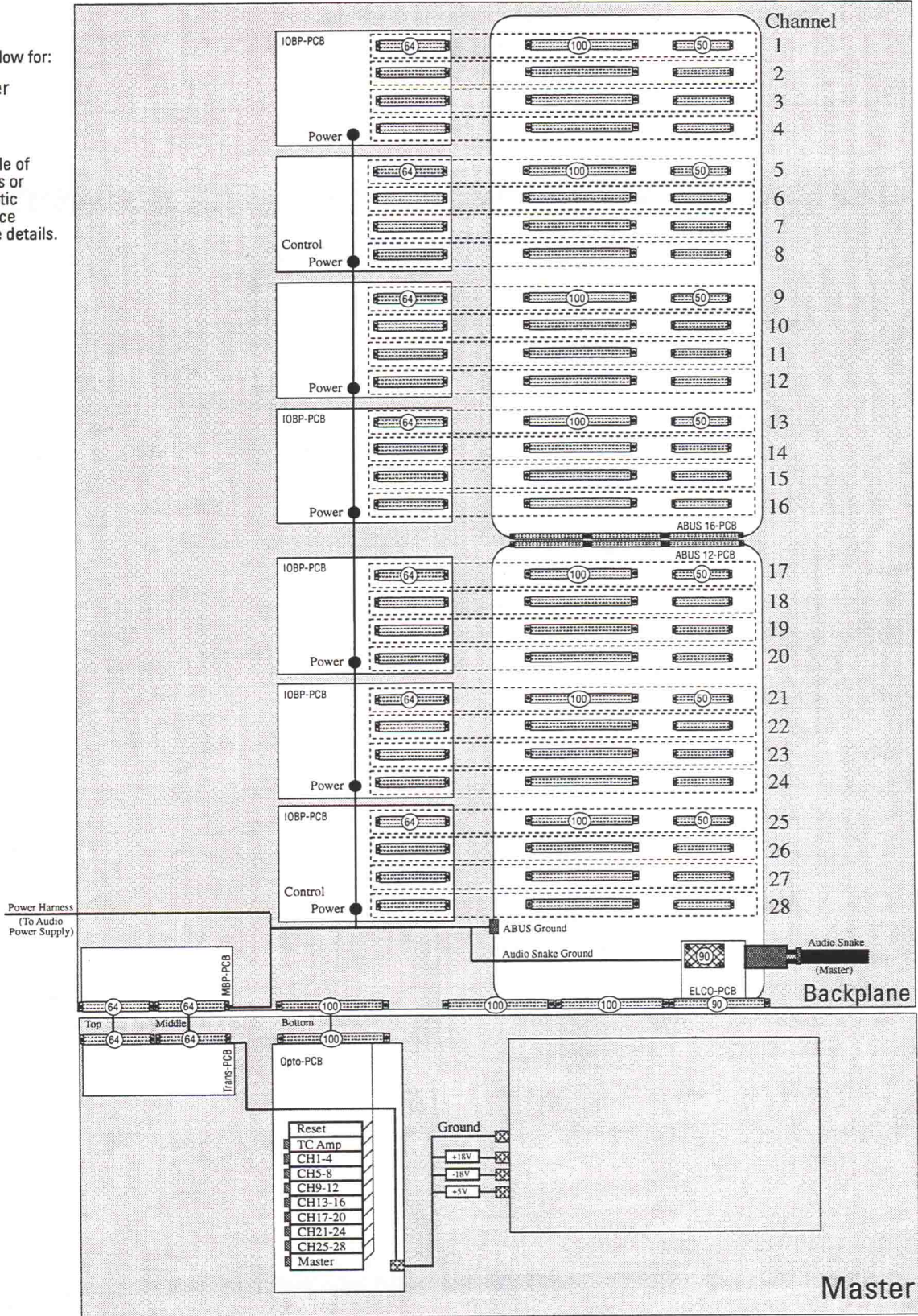


Figure 3.8 - Audio Tower Signal Flow Diagram - Power

# Modules

Below is a diagram of an audio channel as viewed from the top. These are modular trays that slide in and out of the Audio Tower. Make sure that the channels are firmly seated to the rear connectors and that the side latches are locked when in use.

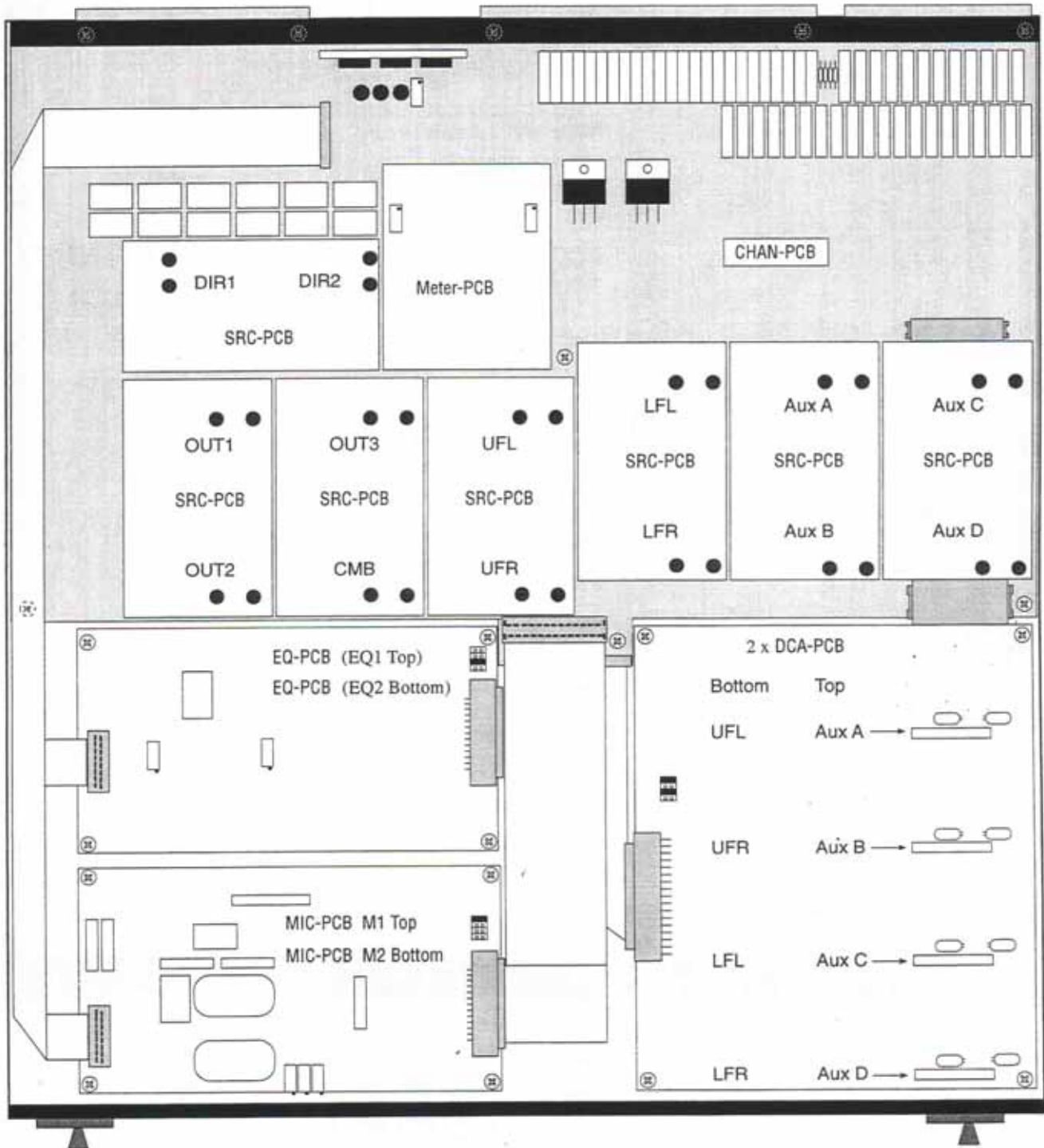


Figure 3.9 - Audio Channel - Top View

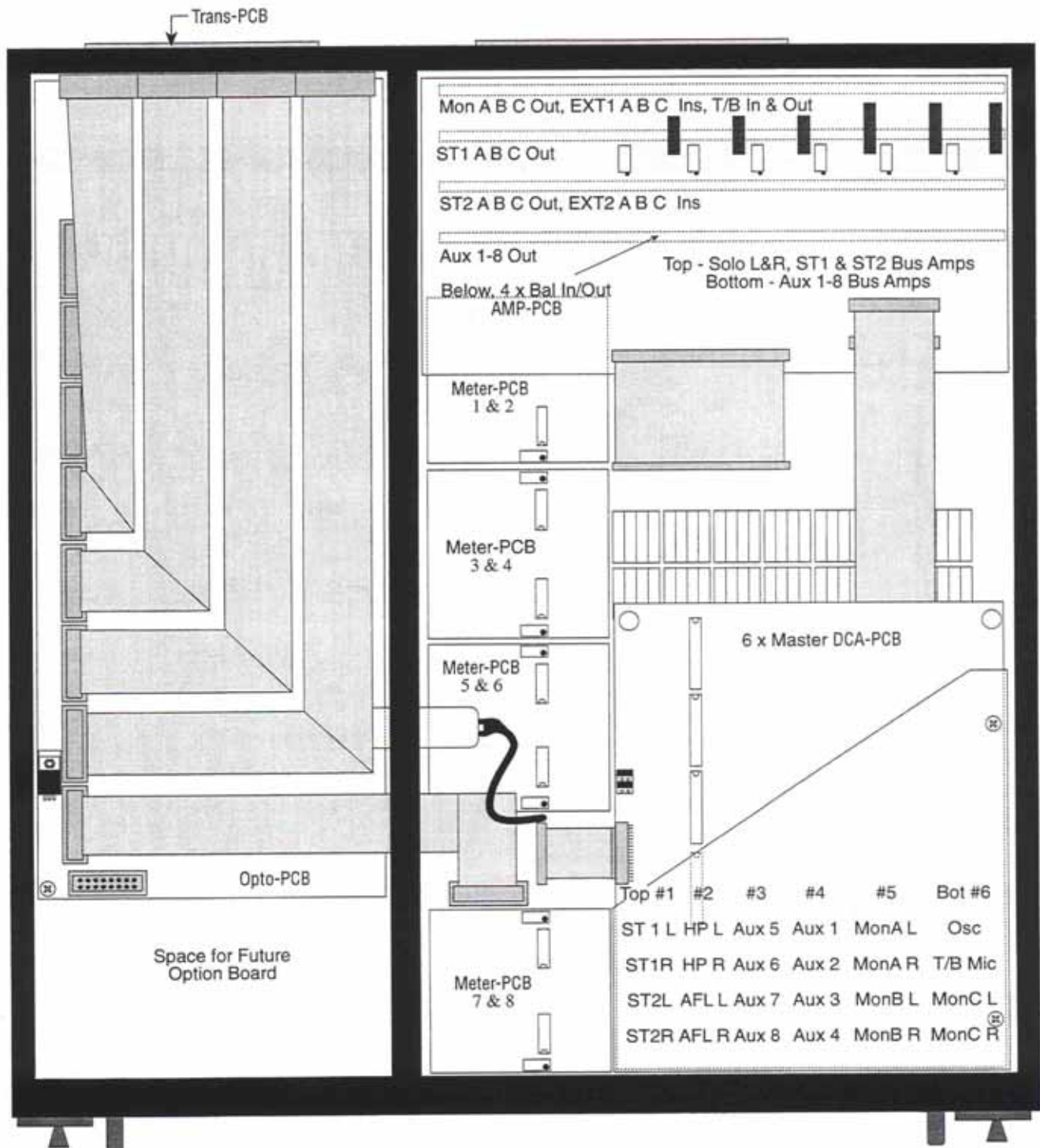
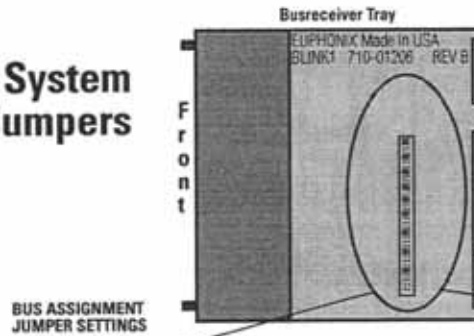
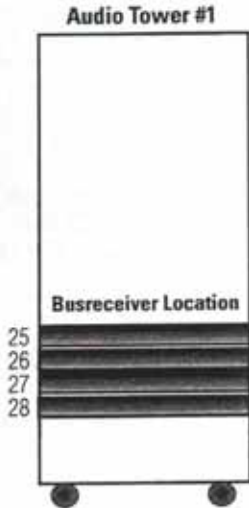


Figure 3.10 - Master Audio Module - Top View

# CSII Twin Tower System Busreceiver Jumpers



Channel Slot #25	Channel Slot #26	Channel Slot #27	Channel Slot #28
<p><b>H4</b></p> <p>OFF <input type="checkbox"/></p> <p>MT1 <input checked="" type="checkbox"/></p> <p>MT3 <input type="checkbox"/></p> <p>MT5 <input type="checkbox"/></p> <p>MT7 <input type="checkbox"/></p>	<p><b>H4</b></p> <p>OFF <input type="checkbox"/></p> <p>MT1 <input type="checkbox"/></p> <p>MT3 <input checked="" type="checkbox"/></p> <p>MT5 <input type="checkbox"/></p> <p>MT7 <input type="checkbox"/></p>	<p><b>H4</b></p> <p>OFF <input type="checkbox"/></p> <p>MT1 <input type="checkbox"/></p> <p>MT3 <input type="checkbox"/></p> <p>MT5 <input checked="" type="checkbox"/></p> <p>MT7 <input type="checkbox"/></p>	<p><b>H4</b></p> <p>OFF <input type="checkbox"/></p> <p>MT1 <input type="checkbox"/></p> <p>MT3 <input type="checkbox"/></p> <p>MT5 <input type="checkbox"/></p> <p>MT7 <input checked="" type="checkbox"/></p>
<p><b>H5</b></p> <p>OFF <input type="checkbox"/></p> <p>MT9 <input checked="" type="checkbox"/></p> <p>MT11 <input type="checkbox"/></p> <p>MT13 <input type="checkbox"/></p> <p>MT15 <input type="checkbox"/></p>	<p><b>H5</b></p> <p>OFF <input type="checkbox"/></p> <p>MT9 <input type="checkbox"/></p> <p>MT11 <input checked="" type="checkbox"/></p> <p>MT13 <input type="checkbox"/></p> <p>MT15 <input type="checkbox"/></p>	<p><b>H5</b></p> <p>OFF <input type="checkbox"/></p> <p>MT9 <input type="checkbox"/></p> <p>MT11 <input type="checkbox"/></p> <p>MT13 <input checked="" type="checkbox"/></p> <p>MT15 <input type="checkbox"/></p>	<p><b>H5</b></p> <p>OFF <input type="checkbox"/></p> <p>MT9 <input type="checkbox"/></p> <p>MT11 <input type="checkbox"/></p> <p>MT13 <input type="checkbox"/></p> <p>MT15 <input checked="" type="checkbox"/></p>
<p><b>H6</b></p> <p>OFF <input type="checkbox"/></p> <p>MT17 <input checked="" type="checkbox"/></p> <p>MT19 <input type="checkbox"/></p> <p>MT21 <input type="checkbox"/></p> <p>MT23 <input type="checkbox"/></p>	<p><b>H6</b></p> <p>OFF <input type="checkbox"/></p> <p>MT17 <input type="checkbox"/></p> <p>MT19 <input checked="" type="checkbox"/></p> <p>MT21 <input type="checkbox"/></p> <p>MT23 <input type="checkbox"/></p>	<p><b>H6</b></p> <p>OFF <input type="checkbox"/></p> <p>MT17 <input type="checkbox"/></p> <p>MT19 <input type="checkbox"/></p> <p>MT21 <input checked="" type="checkbox"/></p> <p>MT23 <input type="checkbox"/></p>	<p><b>H6</b></p> <p>OFF <input type="checkbox"/></p> <p>MT17 <input type="checkbox"/></p> <p>MT19 <input type="checkbox"/></p> <p>MT21 <input type="checkbox"/></p> <p>MT23 <input checked="" type="checkbox"/></p>
<p><b>H7</b></p> <p>OFF <input type="checkbox"/></p> <p>MT2 <input checked="" type="checkbox"/></p> <p>MT4 <input type="checkbox"/></p> <p>MT6 <input type="checkbox"/></p> <p>MT8 <input type="checkbox"/></p>	<p><b>H7</b></p> <p>OFF <input type="checkbox"/></p> <p>MT2 <input type="checkbox"/></p> <p>MT4 <input checked="" type="checkbox"/></p> <p>MT6 <input type="checkbox"/></p> <p>MT8 <input type="checkbox"/></p>	<p><b>H7</b></p> <p>OFF <input type="checkbox"/></p> <p>MT2 <input type="checkbox"/></p> <p>MT4 <input type="checkbox"/></p> <p>MT6 <input checked="" type="checkbox"/></p> <p>MT8 <input type="checkbox"/></p>	<p><b>H7</b></p> <p>OFF <input type="checkbox"/></p> <p>MT2 <input type="checkbox"/></p> <p>MT4 <input type="checkbox"/></p> <p>MT6 <input type="checkbox"/></p> <p>MT8 <input checked="" type="checkbox"/></p>
<p><b>H8</b></p> <p>OFF <input type="checkbox"/></p> <p>MT10 <input type="checkbox"/></p> <p>MT12 <input type="checkbox"/></p> <p>MT14 <input type="checkbox"/></p> <p>MT16 <input type="checkbox"/></p>	<p><b>H8</b></p> <p>OFF <input type="checkbox"/></p> <p>MT10 <input type="checkbox"/></p> <p>MT12 <input checked="" type="checkbox"/></p> <p>MT14 <input type="checkbox"/></p> <p>MT16 <input type="checkbox"/></p>	<p><b>H8</b></p> <p>OFF <input type="checkbox"/></p> <p>MT10 <input type="checkbox"/></p> <p>MT12 <input type="checkbox"/></p> <p>MT14 <input checked="" type="checkbox"/></p> <p>MT16 <input type="checkbox"/></p>	<p><b>H8</b></p> <p>OFF <input type="checkbox"/></p> <p>MT10 <input type="checkbox"/></p> <p>MT12 <input type="checkbox"/></p> <p>MT14 <input type="checkbox"/></p> <p>MT16 <input checked="" type="checkbox"/></p>
<p><b>H9</b></p> <p>OFF <input type="checkbox"/></p> <p>MT18 <input type="checkbox"/></p> <p>MT20 <input type="checkbox"/></p> <p>MT22 <input type="checkbox"/></p> <p>MT24 <input type="checkbox"/></p>	<p><b>H9</b></p> <p>OFF <input type="checkbox"/></p> <p>MT18 <input type="checkbox"/></p> <p>MT20 <input checked="" type="checkbox"/></p> <p>MT22 <input type="checkbox"/></p> <p>MT24 <input type="checkbox"/></p>	<p><b>H9</b></p> <p>OFF <input type="checkbox"/></p> <p>MT18 <input type="checkbox"/></p> <p>MT20 <input type="checkbox"/></p> <p>MT22 <input checked="" type="checkbox"/></p> <p>MT24 <input type="checkbox"/></p>	<p><b>H9</b></p> <p>OFF <input type="checkbox"/></p> <p>MT18 <input type="checkbox"/></p> <p>MT20 <input type="checkbox"/></p> <p>MT22 <input type="checkbox"/></p> <p>MT24 <input checked="" type="checkbox"/></p>
<p><b>H10</b></p> <p>OFF <input type="checkbox"/></p> <p>OFF <input type="checkbox"/></p> <p>OFF <input type="checkbox"/></p> <p>SOLOL <input type="checkbox"/></p> <p>SOLOR <input type="checkbox"/></p>	<p><b>H10</b></p> <p>OFF <input type="checkbox"/></p> <p>OFF <input checked="" type="checkbox"/></p> <p>OFF <input type="checkbox"/></p> <p>SOLOL <input type="checkbox"/></p> <p>SOLOR <input type="checkbox"/></p>	<p><b>H10</b></p> <p>OFF <input type="checkbox"/></p> <p>OFF <input type="checkbox"/></p> <p>OFF <input checked="" type="checkbox"/></p> <p>SOLOL <input type="checkbox"/></p> <p>SOLOR <input type="checkbox"/></p>	<p><b>H10</b></p> <p>OFF <input type="checkbox"/></p> <p>OFF <input type="checkbox"/></p> <p>OFF <input type="checkbox"/></p> <p>SOLOL <input checked="" type="checkbox"/></p> <p>SOLOR <input type="checkbox"/></p>
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<p><b>H12</b></p> <p>OFF <input type="checkbox"/></p> <p>A1 <input type="checkbox"/></p> <p>A2 <input type="checkbox"/></p> <p>A3 <input type="checkbox"/></p> <p>A4 <input type="checkbox"/></p>	<p><b>H12</b></p> <p>OFF <input type="checkbox"/></p> <p>A1 <input type="checkbox"/></p> <p>A2 <input checked="" type="checkbox"/></p> <p>A3 <input type="checkbox"/></p> <p>A4 <input type="checkbox"/></p>	<p><b>H12</b></p> <p>OFF <input type="checkbox"/></p> <p>A1 <input type="checkbox"/></p> <p>A2 <input type="checkbox"/></p> <p>A3 <input checked="" type="checkbox"/></p> <p>A4 <input type="checkbox"/></p>	<p><b>H12</b></p> <p>OFF <input type="checkbox"/></p> <p>A1 <input type="checkbox"/></p> <p>A2 <input type="checkbox"/></p> <p>A3 <input type="checkbox"/></p> <p>A4 <input checked="" type="checkbox"/></p>
<p><b>H13</b></p> <p>OFF <input type="checkbox"/></p> <p>A5 <input type="checkbox"/></p> <p>A6 <input type="checkbox"/></p> <p>A7 <input type="checkbox"/></p> <p>A8 <input type="checkbox"/></p>	<p><b>H13</b></p> <p>OFF <input type="checkbox"/></p> <p>A5 <input type="checkbox"/></p> <p>A6 <input checked="" type="checkbox"/></p> <p>A7 <input type="checkbox"/></p> <p>A8 <input type="checkbox"/></p>	<p><b>H13</b></p> <p>OFF <input type="checkbox"/></p> <p>A5 <input type="checkbox"/></p> <p>A6 <input type="checkbox"/></p> <p>A7 <input checked="" type="checkbox"/></p> <p>A8 <input type="checkbox"/></p>	<p><b>H13</b></p> <p>OFF <input type="checkbox"/></p> <p>A5 <input type="checkbox"/></p> <p>A6 <input type="checkbox"/></p> <p>A7 <input type="checkbox"/></p> <p>A8 <input checked="" type="checkbox"/></p>

Figure 3.11 - Busreceiver Jumper Configuration

## Audio Tower Grounding Scheme

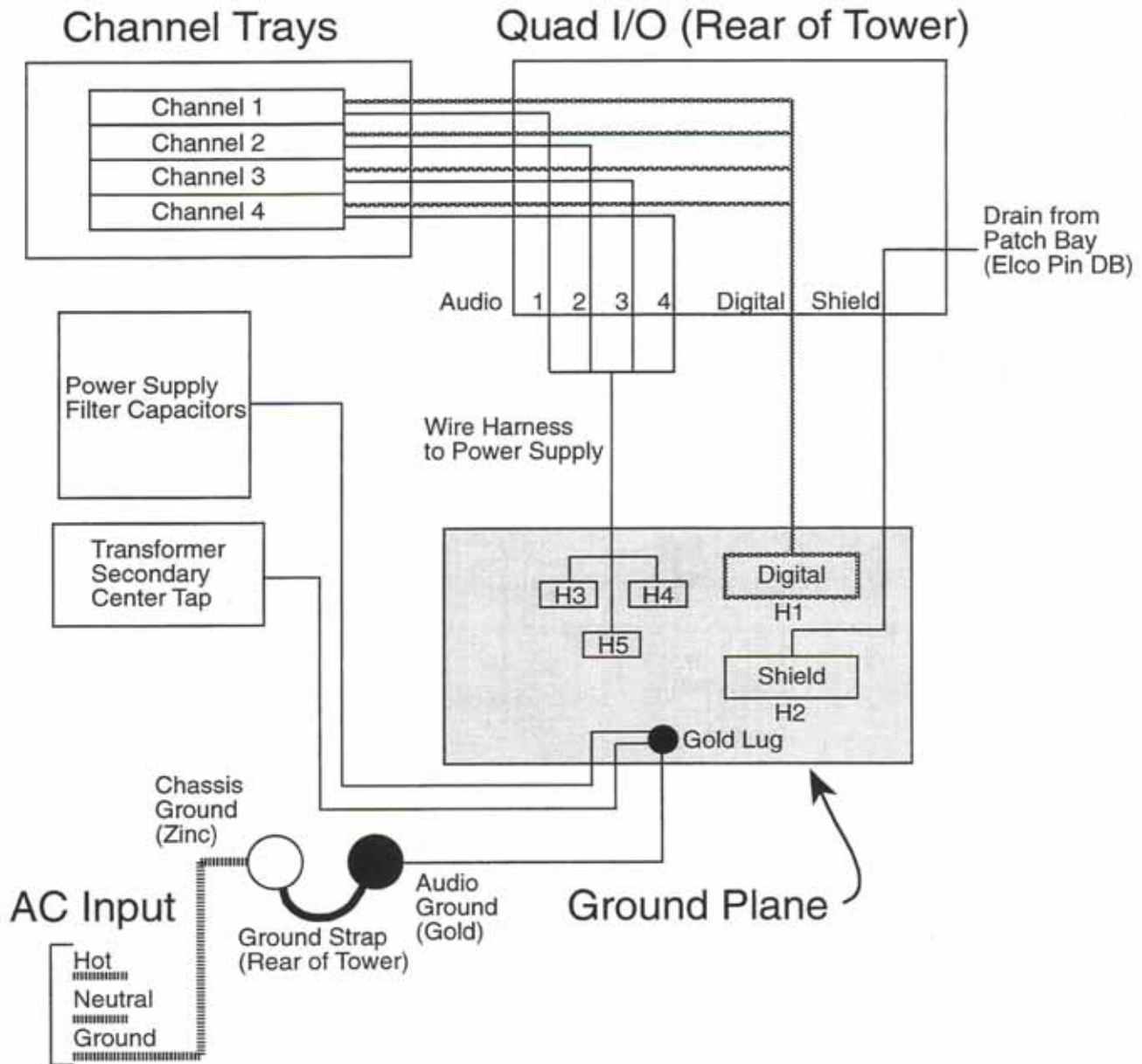


Figure 3.12 - Audio Tower Grounding Scheme

# Appendix I: CSII/CS2000 Connector Pinouts

## Elco Connector Pinouts

Cables are male, mating connectors are female, shown from the rear of their respective locations

90-contact multipin connectors are used in the following areas:

1. Audio Tower digital control
2. Audio Tower BusLink
3. 4 Channel patch unit
4. Master patch unit

As seen from the rear of Audio Tower, Mix Controller, and patch units

90-pin Female  
Elco/EDAC

(44 PAIRS)

Pin No. 1-6

7-13

14-19

20-26

27-32

33-39

40-43

44-47

48-51

52-58

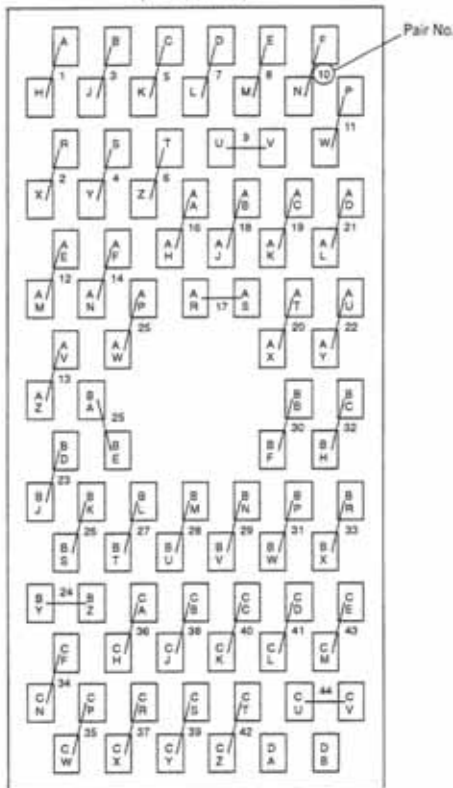
59-64

65-71

72-77

78-84

85-90



38-contact multipin connectors are used in the following areas:

1. All patch unit rear panels

As seen from the rear of patch units

38-pin Female  
Elco/EDAC

(12 PAIRS)

Pin No. 1-4

5-9

10-13

14-17

18-19

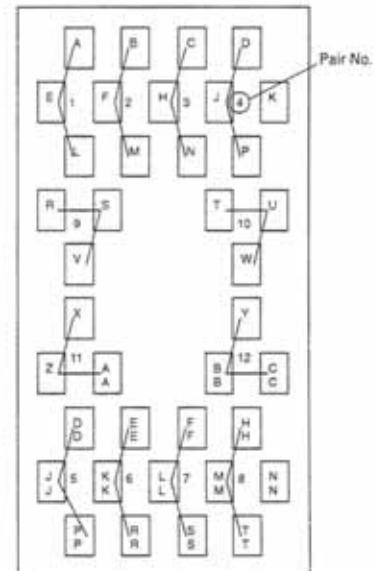
20-21

22-25

26-29

30-34

35-38



## Elco Connector Pinouts ... Continued

56-contact multipin connectors are used in the following areas:

1. Audio Cube rear panel

**As seen from rear of Audio Cube**

56-pin Female  
Elco/Edac

(16 PAIRS)

Pin No. 1-4

5-9

10-13

14-18

19-22

23-26

27-28

29-30

31-34

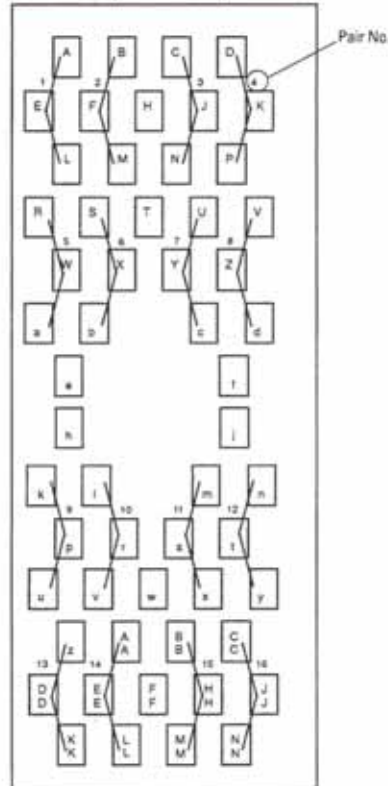
35-38

39-43

44-47

48-52

53-56



## 90-contact Multipin Connector for Digital Control

Pair #	High	Low	Description	Pair #	High	Low	Description
13	AV	AZ	TC RD+/TC RD RET-	29	BN	BV	CHA/B (17-20)
15	AP	AW	AM ON+ /AM ONRET-	31	BP	BW	Gate (17-20)
12	AE	AM	AMRSTLED+ /GRDMPU -	41	CD	CL	Meters (17-20)
14	AF	AN	CLK (1-4)	43	CE	CM	CLK (21-24)
2	R	X	Data (1-4)	44	CJ	CV	Data (21-24)
4	S	Y	CHA/B (1-4)	40	CC	CK	CHA/B (21-24)
3	B	J	Gate (1-4)	42	CT	CZ	Gate (21-24)
1	A	H	Meters (1-4)	39	CS	CY	Meter (21-24)
6	T	Z	CLK (5-8)	38	CB	CJ	CLK (25-28)
5	C	K	Data (5-8)	36	CA	CH	Data (25-28)
7	D	L	CHA/B (5-8)	37	CF	CH	CHA/B (25-28)
8	E	M	Gate (5-8)	35	CP	CV	Gate (25-28)
10	F	N	Meters (5-8)	34	CF	CV	Meters (25-28)
9	U	V	CLK (9-12)	24	BY	BZ	CLK (Master)
11	P	W	Data (9-12)	27	BL	BT	Data (Master)
16	AA	AH	CHA/B (9-12)	26	BK	BS	CHA (Master)
19	AC	AK	Gate (9-12)	23	BD	BJ	Gate (Master)
21	AD	AL	Meters (9-12)	25	BA	BE	Meters (Master)
18	AB	AJ	N/C	45	DA	DB	Shields+/Drain-
17	AR	AS	CLK (13-16)				
22	AU	AY	Data (13-16)				
32	BC	BH	CHA/B (13-16)				
20	AT	AX	Gate (13-16)				
28	BM	BJ	Meters (13-16)				
30	BB	BF	CLK (17-20)				
33	BR	BX	Data (17-20)				

**Note:**

The shields and drain are tied together at the Mix Controller end of the control cable. At the Audio Tower end, the shields are lifted. For audio cables, the drain and shield are tied at the patch bay and are also lifted at the Audio Tower end.

## Connector Pinouts for Audio Tower

### 90-contact Multipin Connector for 4 Channels of Audio

Pair #	High	Low	Description	Ch#	Notes
Drain Wire	DB		Jack Ground		Connected at both ends of Std Euphonix 90 multi-pair cable. Takes the main ground from Patch to Audio Tower
Shields	DA		Cable Shields		All cable shields are connected together at the Patch end to pin DA. They are NOT connected at the Audio Tower end.
1	A	H	M1 Ch (1)		
12	AE	AM	M1 Ch (2)		
23	BD	BJ	M1 Ch (3)		
34	DF	DN	M1 Ch (4)		
2	R	X	M2 Ch (1)		
13	AV	AZ	M2 Ch (2)		
24	BY	BZ	M2 Ch (3)		
35	CP	CV	M2 Ch (4)		
3	B	J	L1 Ch (1)		
14	AF	AN	L1 Ch (2)		
25	BA	BE	L1 Ch (3)		
36	CA	CH	L1 Ch (4)		
4	S	Y	L2 Ch (1)		
15	AP	AW	L2 Ch (2)		
26	BK	BS	L2 Ch (3)		
37	CR	CX	L2 Ch (4)		
5	C	K	L3 Ch (1)		
16	AA	AH	L3 Ch (2)		
27	BL	BT	L3 Ch (3)		
38	CB	CJ	L3 Ch (4)		
6	T	Z	L4 CH (1)		
17	AR	AS	L4 CH (2)		
28	BM	BJ	L4 CH (3)		
39	CS	CY	L4 CH (4)		

**Note:**

The shields and drain are tied together at the patch bay end of the audio cable. **At the Audio Tower end, the shields are lifted.** For control cables, the drain and shield are tied at the Mix Controller and **are also lifted** at the Audio Tower end.

## Connector Pinouts for Audio Tower

### 90-contact Multipin Connector for 4 Channels of Audio ... Continued

Pair #	High	Low	Description	Ch#	Notes
7	D	L	OUT1 Ch (1)		
18	AB	AJ	OUT1 Ch (2)		
29	BN	BV	OUT1 Ch (3)		
40	CC	CK	OUT1 Ch (4)		
8	E	M	OUT2 Ch (1)		
19	AC	AK	OUT2 Ch (2)		
30	BB	BF	OUT2 Ch (3)		
41	CD	CL	OUT2 Ch (4)		
9	U	V	OUT3 Ch (1)		
20	AT	AX	OUT3 Ch (2)		
31	BP	BW	OUT3 Ch (3)		
42	CT	CZ	OUT3 Ch (4)		
10	F	N	DIR1 Ch (1)		
21	AD	AL	DIR1 Ch (2)		
32	BC	BH	DIR1 Ch (3)		
43	CE	CM	DIR1 Ch (4)		
11	P	W	DIR2 Ch (1)		
22	AU	AY	DIR2 Ch (2)		
33	BR	BX	DIR2 Ch (3)		
44	CJ	CV	DIR2 Ch (4)		

## Connector Pinouts for Audio Tower

### 90-contact Multipin Connector for Master Audio

Pair #	High	Low	Description	Notes
Drain Wire	DB		Jack Ground	Connected at both ends of Std Euphonix 90 multi-pair cable. Takes the main ground from Patch to Audio Tower
Shields	DA		Cable Shields	All cable shields are connected together at the Patch end to pin DA. They are NOT connected at the Audio Tower end.
1	A	H	EXT 1 A L	
3	B	J	EXT 1 A R	
5	C	K	EXT 1 B L	
7	D	L	EXT 1 B R	
8	E	M	EXT 1 C L	
10	F	N	EXT 1 C R	
2	R	X	EXT 2 A L	
4	S	Y	EXT 2 A R	
6	T	Z	EXT 2 B L	
9	U	V	EXT 2 B R	
11	P	W	EXT 2 C L	
21	AD	AL	EXT 2 C R	
12	AE	AM	AUX 1 SEND	
14	AF	AN	AUX 2 SEND	
15	AP	AW	AUX 3 SEND	
16	AA	AH	AUX 4 SEND	
18	AB	AJ	AUX 5 SEND	
19	AC	AK	AUX 6 SEND	
17	AR	AS	AUX 7 SEND	
20	AT	AX	AUX 8 SEND	

**Note:**

The shields and drain are tied together at the Mix Controller end of the audio cable. **At the Audio Tower end, the shields are lifted.** For control cables, the drain and shield are tied at the patch bay and **are also lifted** at the Audio Tower end.

## Connector Pinouts for Audio Tower

### 90-contact Multipin Connector for Master Audio ... Continued

Pair #	High	Low	Description	Notes
25	BA	BE	ST1 A L	
23	BD	BJ	ST1 A R	
26	BK	BS	ST1 B L	
27	BL	BT	ST1 B R	
28	BM	BJ	ST1 C L (Ins Snd)	
29	BN	BV	ST1 C R (Ins Snd)	
13	AV	AZ	ST1 L (Ins Return)	
22	AU	AY	ST1 R (Ins Return)	
31	BP	BW	ST2 A L	
33	BR	BX	ST2 A R	
38	CB	CJ	ST2 B L	
40	CC	CK	ST2 B R	
41	CD	CL	ST2 C L (Ins Snd)	
43	CE	CM	ST2 C R (Ins Snd)	
42	CT	CZ	ST2 L (Ins Return)	
44	CJ	CV	ST2 R (Ins Return)	
24	BY	BZ	Mon A L	
36	CA	CH	Mon A R	
34	CF	CN	Mon B L	
35	CP	CW	Mon B R	
37	CR	CX	Mon C L	
39	CS	CY	Mon C R	
30	BB	BF	T/B Out	
32	BC	BH	Ext T/B In	

## Connector Pinouts for Twin Tower System

### BusLink 90-contact Multipin Connector (Twin Tower Audio Link)

Pair #	High	Low	Description	Notes
Drain Wire	DB		Jack Ground	Connected at both ends of Std Euphonix 90 multi-pair cable. Takes the main ground from Patch to Audio Tower
Shields	DA		Cable Shields	All cable shields are connected together at the Patch end to pin DA. They are NOT connected at the Audio Tower end.
1	A	H	TB1	
3	B	J	TB2	
5	C	K	TB3	
7	D	L		
8	E	M	A5	
10	F	N	A6	
2	R	X	A7	
4	S	Y	A8	
6	T	Z	A1	
9	U	V	A2	
11	P	W	A3	
21	AD	AL	A4	
12	AE	AM	ST1L	
14	AF	AN	ST1 R	
15	AP	AW	ST2 L	
16	AA	AH	ST2 R	
18	AB	AJ		
19	AC	AK		
17	AR	AS	Solo L	
20	AT	AX	Solo R	

**Note:**  
The shields and drain are tied together at the Mix Controller end of the audio cable. **At the Audio Tower end, the shields are lifted.** For control cables, the drain and shield are tied at the patch bay and **are also lifted** at the Audio Tower end.

## Connector Pinouts for Twin Tower System

### BusLink 90-contact Multipin Connector (Twin Tower Audio Link) ... Continued

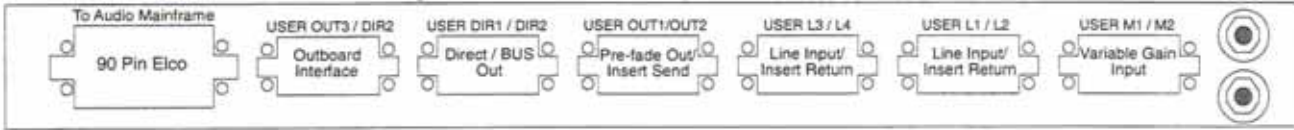
Pair #	High	Low	Description	Notes
25	BA	BE	MT 18	
23	BD	BJ	MT 20	
26	BK	BS	MT 22	
27	BL	BT	MT 24	
28	BM	BJ	MT 17	
29	BN	BV	MT 19	
13	AV	AZ	MT 21	
22	AU	AY	MT 23	
31	BP	BW	MT 9	
33	BR	BX	MT 11	
38	CB	CJ	MT 13	
40	CC	CK	MT 15	
41	CD	CL	MT 1	
43	CE	CM	MT 3	
42	CT	CZ	MT 5	
44	CU	CV	MT 7	
24	BY	BZ	MT 10	
36	CA	CH	MT 12	
34	CF	CN	MT 14	
35	CP	CW	MT 16	
37	CR	CK	MT 2	
39	CS	CY	MT 4	
30	BB	BF	MT 6	
32	BC	BH	MT 8	

## Connector Pinouts for Standard Channel Patch Bay

### Channel Patch 38-contact Multipin Connector

4-channel Patch Unit Multipin Connectors Input Jacks

4-channel Patch Rear

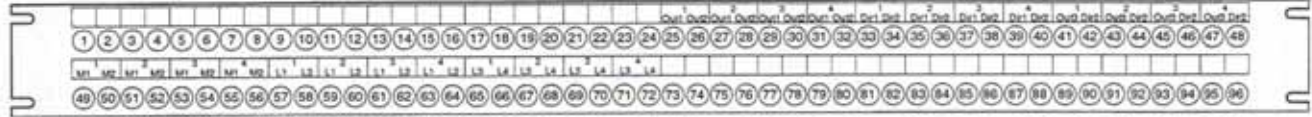


	Pair #	High	Low	Shield	Jack #	Description	Ch#	Notes (Connect Multi-pair Drain Wire to NN)
User M1/M2	1	A	E	L	1	Ch 1 M1 Input		
	2	B	F	M	2	Ch 1 M2 Input		
	3	C	H	N	3	Ch 2 M1 Input		
	4	D	J	P	4	Ch 2 M2 Input		
	5	DD	JJ	PP	5	Ch 3 M1 Input		
	6	EE	KK	RR	6	Ch 3 M2 Input		
	7	FF	LL	SS	7	Ch 4 M1 Input		
	8	HH	MM	TT	8	Ch 4 M2 Input		
User L1/L2	1	A	E	L	9	Ch 1 L1 Input		
	2	B	F	M	10	Ch 1 L2 Input		
	3	C	H	N	11	Ch 2 L1 Input		
	4	D	J	P	12	Ch 2 L2 Input		
	5	DD	JJ	PP	13	Ch 3 L1 Input		
	6	EE	KK	RR	14	Ch 3 L2 Input		
	7	FF	LL	SS	15	Ch 4 L1 Input		
	8	HH	MM	TT	16	Ch 4 L2 Input		
User L3/L4	1	A	E	L	17	Ch 1 L3 Input		
	2	B	F	M	18	Ch 1 L4 Input		
	3	C	H	N	19	Ch 2 L3 Input		
	4	D	J	P	20	Ch 2 L4 Input		
	5	DD	JJ	PP	21	Ch 3 L3 Input		
	6	EE	KK	RR	22	Ch 3 L4 Input		
	7	FF	LL	SS	23	Ch 4 L3 Input		
	8	HH	MM	TT	24	Ch 4 L4 Input		

## Connector Pinouts for Standard Channel Patch Bay

### Channel Patch 38-contact Multipin Connector

4-channel Patch Unit Multipin Connectors Output Jacks      4-channel Patch Bay Front



User Out1/  
Out2

Pair #	High	Low	Shield	Jack #	Description	Ch#	Notes (Connect Multi-pair Drain Wire to NN)
1	A	E	L	73	Ch 1 OUT1 Output		
2	B	F	M	74	Ch 1 OUT2 Output		
3	C	H	N	75	Ch 2 OUT1 Output		
4	D	J	P	76	Ch 2 OUT2 Output		
5	DD	JJ	PP	77	Ch 3 OUT1 Output		
6	EE	KK	RR	78	Ch 3 OUT2 Output		
7	FF	LL	SS	79	Ch 4 OUT1 Output		
8	HH	MM	TT	80	Ch 4 OUT2 Output		

User Dir1/  
Dir2

1	A	E	L	81	Ch 1 DIR1 Output		
2	B	F	M	82	Ch 1 DIR2 Output		
3	C	H	N	83	Ch 2 DIR1 Output		
4	D	J	P	84	Ch 2 DIR2 Output		
5	DD	JJ	PP	85	Ch 3 DIR1 Output		
6	EE	KK	RR	86	Ch 3 DIR2 Output		
7	FF	LL	SS	87	Ch 4 DIR1 Output		
8	HH	MM	TT	88	Ch 4 DIR2 Output		

User Out3/  
Dir2

1	A	E	L	89	Ch 1 OUT3 Output		
2	B	F	M	90	Ch 1 DIR2 // Output		
3	C	H	N	91	Ch 2 OUT3 Output		
4	D	J	P	92	Ch 2 DIR2 // Output		
5	DD	JJ	PP	93	Ch 3 OUT3 Output		
6	EE	KK	RR	94	Ch 3 DIR2 // Output		
7	FF	LL	SS	95	Ch 4 OUT3 Output		
8	HH	MM	TT	96	Ch 4 DIR2 // Output		



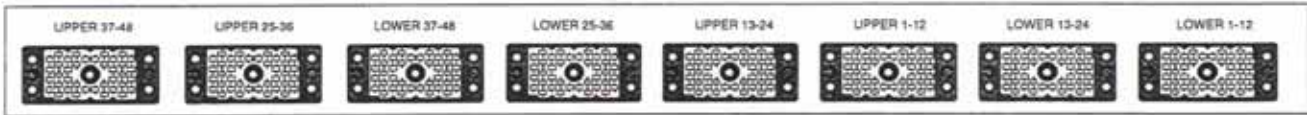


## Connector Pinouts for Tie-line Patch Bay

### Tie-line Patch 38-contact Multipin Connectors, Numbers 3 & 4

Tie-line Patch Unit Multipin Connectors

Tie-line Patch Rear



U1-12

Pair #	High	Low	Shield	Upper Jack #	Description	Notes - Multipin #3	Rear View
1	A	E	L	U1		<input type="checkbox"/>	<input type="checkbox"/>
2	B	F	M	U2		<input type="checkbox"/>	<input type="checkbox"/>
3	C	H	N	U3		<input type="checkbox"/>	<input type="checkbox"/>
4	D	J	P	U4		<input type="checkbox"/>	<input type="checkbox"/>
5	DD	JJ	PP	U5		<input type="checkbox"/>	<input type="checkbox"/>
6	EE	KK	RR	U6		<input type="checkbox"/>	<input type="checkbox"/>
7	FF	LL	SS	U7		<input type="checkbox"/>	<input type="checkbox"/>
8	HH	MM	TT	U8		<input type="checkbox"/>	<input type="checkbox"/>
9	R	S	V	U9		<input type="checkbox"/>	<input type="checkbox"/>
10	T	U	W	U10		<input type="checkbox"/>	<input type="checkbox"/>
11	X	Z	AA	U11		<input type="checkbox"/>	<input type="checkbox"/>
12	Y	BB	CC	U12		<input type="checkbox"/>	<input type="checkbox"/>

U13-24

Pair #	High	Low	Shield	Upper Jack #	Description	Notes - Multipin #4	Rear View
1	A	E	L	U13		<input type="checkbox"/>	<input type="checkbox"/>
2	B	F	M	U14		<input type="checkbox"/>	<input type="checkbox"/>
3	C	H	N	U15		<input type="checkbox"/>	<input type="checkbox"/>
4	D	J	P	U16		<input type="checkbox"/>	<input type="checkbox"/>
5	DD	JJ	PP	U17		<input type="checkbox"/>	<input type="checkbox"/>
6	EE	KK	RR	U18		<input type="checkbox"/>	<input type="checkbox"/>
7	FF	LL	SS	U19		<input type="checkbox"/>	<input type="checkbox"/>
8	HH	MM	TT	U20		<input type="checkbox"/>	<input type="checkbox"/>
9	R	S	V	U21		<input type="checkbox"/>	<input type="checkbox"/>
10	T	U	W	U22		<input type="checkbox"/>	<input type="checkbox"/>
11	X	Z	AA	U23		<input type="checkbox"/>	<input type="checkbox"/>
12	Y	BB	CC	U24		<input type="checkbox"/>	<input type="checkbox"/>


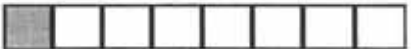
## Connector Pinouts for Tie-line Patch Bay

### Tie-line Patch 38-contact Multipin Connectors, Numbers 7 & 8

Tie-line Patch Unit Multipin Connectors

Tie-line Patch Front



	Pair #	High	Low	Shield	Upper Jack #	Description	Notes - Multipin #7
U25-36	1	A	E	L	U25		 Rear View
	2	B	F	M	U26		
	3	C	H	N	U27		
	4	D	J	P	U28		
	5	DD	JJ	PP	U29		
	6	EE	KK	RR	U30		
	7	FF	LL	SS	U31		
	8	HH	MM	TT	U32		
	9	R	S	V	U33		
	10	T	U	W	U34		
	11	X	Z	AA	U35		
	12	Y	BB	CC	U36		
							<b>Notes - Multipin #8</b>
U37-48	1	A	E	L	U37		 Rear View
	2	B	F	M	U38		
	3	C	H	N	U39		
	4	D	J	P	U40		
	5	DD	JJ	PP	U41		
	6	EE	KK	RR	U42		
	7	FF	LL	SS	U43		
	8	HH	MM	TT	U44		
	9	R	S	V	U45		
	10	T	U	W	U46		
	11	X	Z	AA	U47		
	12	Y	BB	CC	U48		

## Connector Pinouts for Tie-line Patch Bay

### Tie-line Patch 38-contact Multipin Connectors, Numbers 1 & 2

Tie-line Patch Unit Multipin Connectors

Tie-line Patch Rear



L1-12

Pair #	High	Low	Shield	Lower Jack #	Description	Notes - Multipin #1
1	A	E	L	L1		Rear View
2	B	F	M	L2		
3	C	H	N	L3		
4	D	J	P	L4		
5	DD	JJ	PP	L5		
6	EE	KK	RR	L6		
7	FF	LL	SS	L7		
8	HH	MM	TT	L8		
9	R	S	V	L9		
10	T	U	W	L10		
11	X	Z	AA	L11		
12	Y	BB	CC	L12		

L13-24

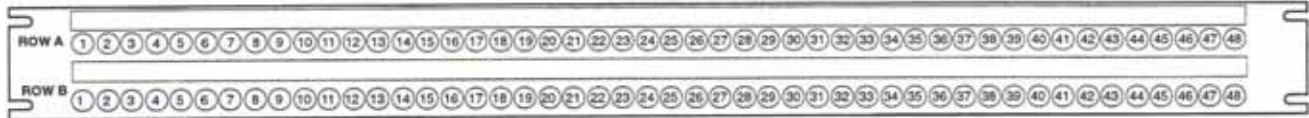
Pair #	High	Low	Shield	Lower Jack #	Description	Notes - Multipin #2
1	A	E	L	L13		Rear View
2	B	F	M	L14		
3	C	H	N	L15		
4	D	J	P	L16		
5	DD	JJ	PP	L17		
6	EE	KK	RR	L18		
7	FF	LL	SS	L19		
8	HH	MM	TT	L20		
9	R	S	V	L21		
10	T	U	W	L22		
11	X	Z	AA	L23		
12	Y	BB	CC	L24		

## Connector Pinouts for Tie-line Patch Bay


### Tie-line Patch 38-contact Multipin Connectors, Numbers 5 & 6

Tie-line Patch Unit Multipin Connectors


Tie-line Patch Front



L25-36

Pair #	High	Low	Shield	Lower Jack #	Description	Notes - Multipin #5
1	A	E	L	L25		 Rear View
2	B	F	M	L26		
3	C	H	N	L27		
4	D	J	P	L28		
5	DD	JJ	PP	L29		
6	EE	KK	RR	L30		
7	FF	LL	SS	L31		
8	HH	MM	TT	L32		
9	R	S	V	L33		
10	T	U	W	L34		
11	X	Z	AA	L35		
12	Y	BB	CC	L36		

L37-48

Pair #	High	Low	Shield	Lower Jack #	Description	Notes - Multipin #6
1	A	E	L	L37		 Rear View
2	B	F	M	L38		
3	C	H	N	L39		
4	D	J	P	L40		
5	DD	JJ	PP	L41		
6	EE	KK	RR	L42		
7	FF	LL	SS	L43		
8	HH	MM	TT	L44		
9	R	S	V	L45		
10	T	U	W	L46		
11	X	Z	AA	L47		
12	Y	BB	CC	L48		

## Connector Pinouts for Audio Cube

### Audio Cube 56-contact Multipin Connectors

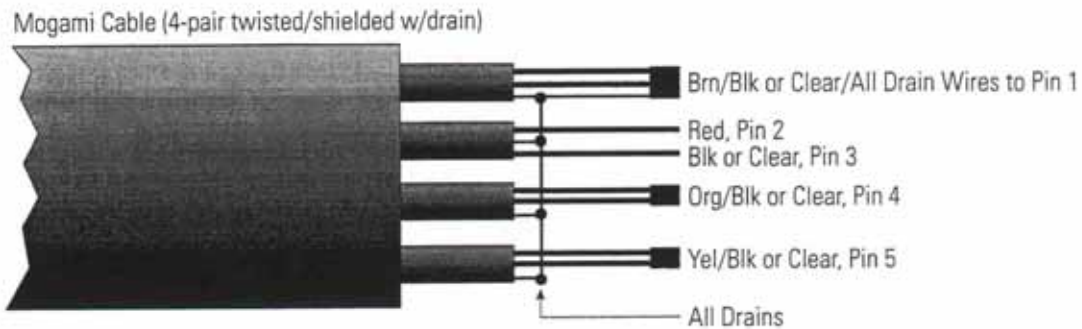
Pair #	High	Low	Gnd	Ch #	Notes
1	A	E	L	1,17,33	
2	B	F	M	2,18,34	
3	C	J	N	3,19,35	
4	D	K	P	4,20,36	
5	R	W	a	5,21,37	
6	S	X	b	6,22,,38	
7	U	Y	c	7,23,39	
8	V	Z	d	8,24,40	
9	k	p	u	9,25,41	
10	l	r	v	10,26,42	
11	m	s	x	11,27,43	
12	n	t	y	12,28,44	
13	z	DD	KK	13,29,45	
14	AA	EE	LL	14,30,46	
15	BB	HH	MM	15,31,47	
16	CC	JJ	NN	16,32,48	

# Miscellaneous Connector Pinouts

## TB Mic/Phones Cable

The Talkback/Phones cable for the CSII/CS2000 is a 10-meter Mogami cable, 4-pair twisted/shielded with drain wire. There are two 5-pin XLR connectors used on each end, one female and one male. The pinouts are as follows:

Ground Pin 1	Brown-Black or Clear (Drain)	Pair #1
Mic (+)	Pin 2 Red	Pair #2
Mic (-)	Pin 3 Black or Clear	Pair #2
Phones Left (+)	Pin 4 Orange-Black or Clear	Pair #3
Phones Right (-)	Pin 5 Yellow-Black or Clear	Pair #4



Trim shields back and tie all drain wires to Pin 1

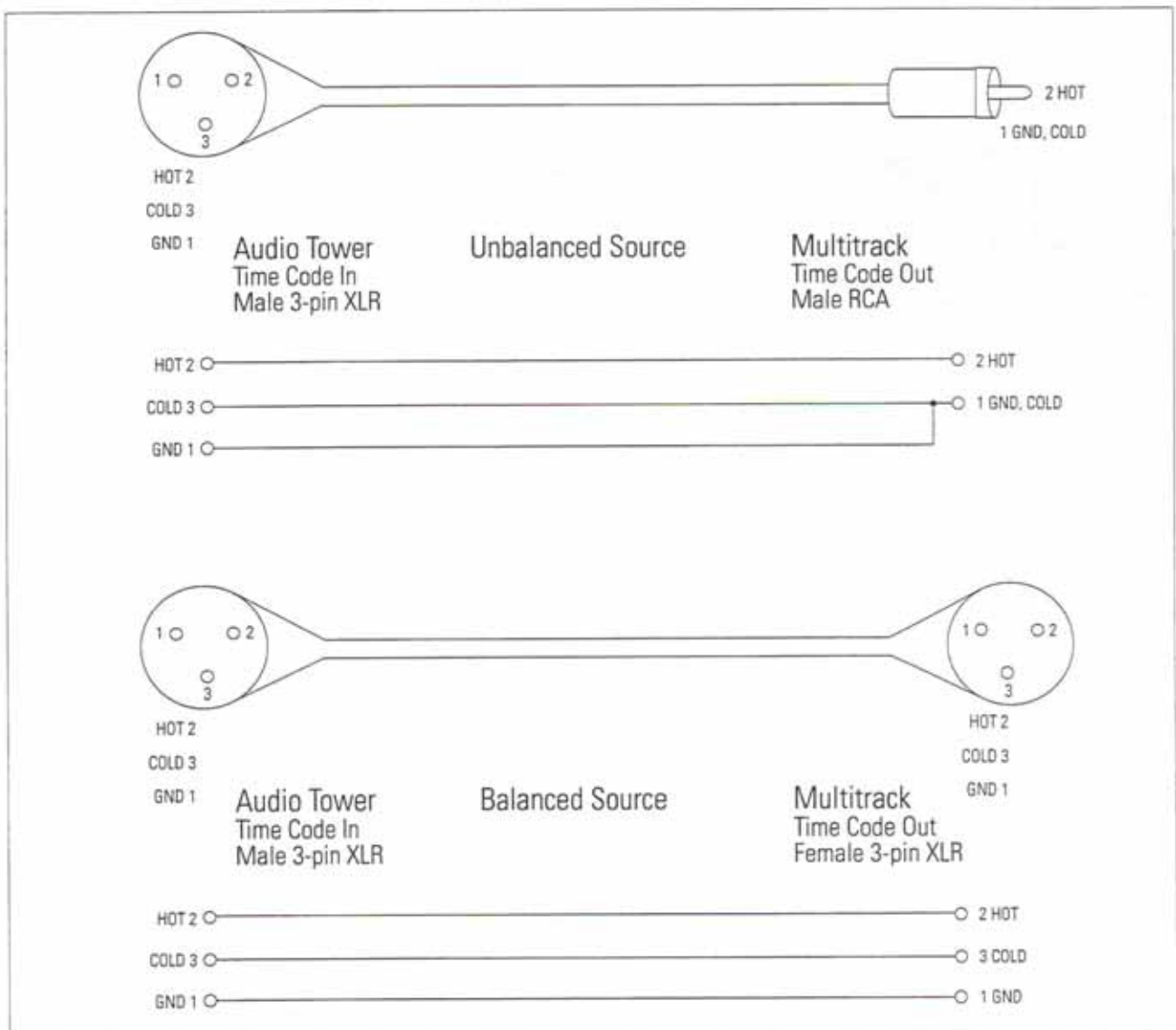
**Link Cable Description**

With twin Tower systems there is a 6' link cable required between the two Audio Towers for the Multitrack Talkback assign. This uses the DB15 connector (male) on the rear of the Audio Towers. The pinouts are as follows:

DB15 Female	Cable	Description
Pin 1	Red (+)	+/- Even Multitrack TB Assign
Pin 2	Black (-)	Ground
Pin 3	White (+)	+/- Odd Multitrack TB Assign
Pin 4	Black (-)	Ground

**Timecode Pinouts**

The following diagram shows the recommended pinout for both unbalanced and balanced timecode sources routed to the Audio Tower. Be sure to check the pinouts for your particular timecode source to make sure they coincide with the diagram.



Timecode Pinout for Audio Tower

# Appendix II: System Troubleshooting & TechNotes

## Introduction

## Troubleshooting the Euphonix

Troubleshooting the Euphonix system is much like troubleshooting any computer-based system. Observe static precautions when working with sensitive components such as firmware chips and PC cards, and refer to the enclosed schematics and block diagrams.

---

## Hardware or Software?

Because the Euphonix system exists in both the hardware and the software domains, one of the most important aims in troubleshooting is to discover in which domain the problem lies, or if the problem somehow involves both. Familiarity with the particular software release is important for locating a problem and deciding if the problem you are trying to fix is inherent in the present code. No amount of troubleshooting, for example, will fix a software-defined menu inconsistency or change the color of an EQ knob on the graphics display. In other words, first determine if the problem is actually something you can fix by discovering in which domain it lies.

## A Note About Software Bugs

Euphonix has endeavored to eliminate all severe bugs from MixView, and rigorously tests all software by putting it through alpha, beta, and early release stages before sending it directly to customers. During the early stages of release development, the code is constantly revised and updated according to feedback from our testers, sales offices, and test sites. The final result is a new release which is both more stable and offers more features than earlier releases, while still getting to customers in a timely manner.

All computer programs have bugs, or quirks within them that stop a piece of software from ever achieving its full potential. Software bugs can be classified into different levels of severity. A software bug with the highest level of severity is one that causes data loss or corruption, or causes the computer to "crash", requiring a reboot. A less severe bug would be one that requires a series of actions that can get you out of the bug state. Some can be entirely avoided by using a workaround, which is an alternate series of actions that do the same job. Finally, some bugs are not actually bugs at all, but features that would be useful to have, but which do not yet exist in the code.

## Modularity and PC Board Swapping

One of the great strengths of the Euphonix system is its modularity, and when it comes to troubleshooting there are some obvious advantages. Swapping controllers on the Mix Controller surface or

Audio Modules in the Audio Tower are two easy ways of isolating problems to this modular level. Most of the subassemblies and PCBs in Euphonix components are redundant, which makes isolating a hardware problem down to the board level extremely easy. Once the faulty module is found, swapping redundant boards within the same module or from other modules can isolate a problem further. When swapping redundant boards, note all jumpers and their positions. Often jumper settings must be changed to assign a board to a new location. See the following table for other troubleshooting tips.

## Troubleshooting the MixView Platform

Some computers tend to be more temperamental than others, and often a computer problem can be solved by blindly following a few easy steps. For a computer problem, often the best fix is to begin with a soft reboot (hitting control/alt/del at the same time or hit the Reset button on the rackmount processor) to restart MixView. If this does not help, continue with a hard reboot of the computer by power cycling it. It is often useful to power cycle the whole system along with it and start again from scratch (remember to turn your speakers off before power cycling the Audio Tower!).

If there is still a problem with the computer, try reseating the cards and cables in the processor. Problems are sometimes caused by dirt or oxidation interrupting contacts between computer components. To reseat the cards, power down the computer and the rest of the Euphonix system. Remove the lid from the rackmount processor. Observe anti-static procedures when touching computer components (wear an antistatic wrist band, or at least discharge the static from your body by touching a grounded chassis somewhere nearby). Remove the cabling from the back of the processor. **Note: some of the cables connected to the processor carry power, so it is important that you have turned off the rest of the system.** CAREFULLY pull each of the cards completely out of its bus and replace. Do physically remove each card from its slot, since just pushing down on the card will not dislodge oxidation and dirt on the contacts.

Replace each of the cables on the back of the processor, making sure that each one is in the correct location. Inspect all connectors, and make sure none of the housings has cracked, and that the internal pins are not bent. Then replace the lid on the processor. Now is also a good time to go to the other end of each respective cable and make sure that they are properly connected to the other components in your system.

Other good troubleshooting approaches for the support computer include checking and confirming CMOS settings, and reformatting the

**Troubleshooting the  
MixView Platform  
...Continued**

hard drive and reinstalling MixView. However, these procedures are outside the realm of this manual. Call Euphonix Customer Support at (415) 855-0412 if you think these procedures may be necessary.

## Euphonix System Troubleshooting

Symptoms	Solutions
1. No 48v (Phantom Power)	Pull channel trays one by one until 48v returns. Usually this problem is a bad capacitor on Mic Pre pulling the 48v down. Measure @ D1.
2. Loss of Meters in I/O, Master Controller	Reseat Meter PCBs in Master Section and Audio Channels. If problem is channel specific, swap Meter PCB with another working channel.
3. Loss of Headphone Outputs	Check Master Section-Output Amps (LH4104) Reference Schematic CS2VH6-1_B1.
4. No Communication-MixView Platform/Mix Controller	Check serial cable (Eubus), check ribbon cable connection on back of Master Controller, check console baud rate setting in Master Controller.
5. MixView Platform will not boot up	Check power cord, monitor power cord. Monitor on? Fan & hard disk turning?
6. MixView Platform running slow	Make sure TURBO switch is ON.
7. No Headpone Level control	Check Meter Level/Phones Amp in Master
8. System does not lock to timecode	Check cable, chase Start and End times
9. Mix Controller will not power up	Check fuse, voltages on power plate
10. Hum/Buzz in Talkback Mic circuit	Check for ground loop between TB mounting plate and Mix Controller frame
11. Relays clicking randomly in Audio Tower	Check control cable from Mix Controller Confirm that Mix Controller is powered up
12. Master Controller Keypad requires double key press	Check DPU battery shorting to MPU
13. I/O Controller (slot) does not initialize	Re-seat, swap DPU with different controller

## Boot and System ROM Replacement

To perform a ROM upgrade to your console, you will need to gain access to the Boot ROMs on all DPU boards in the I/O and Master Controllers. Also, you need to change the System ROMs and Boot ROM residing on the MPU board which is mounted on top of the DPU in the Master Controller (or in the DSC).

1. Power down the entire system, Mix Controller, MixView Platform, and Audio Tower.
2. Remove meter bridge cover by removing 5/64" Allen bolts along the back of the Mix Controller (5 or 6 depending on the size of your system). Make sure you make note of the location of each controller so you can put it back in the same slot when you are done. Even though the controllers are interchangeable, it will reduce the possibilities for introducing any new problems.
3. All the I/O Controllers are now ready to be removed. Grasp the handle at the back of the first controller and lift up and toward yourself while standing in front of the Mix Controller.
4. **Be careful** when you remove the Master controller as there is a ribbon cable attached to the back under the handle. This needs to be removed before the Master controller will come out. Lift it up about 8" and remove the cable, then remove the rest of the way.
5. Remove the lower 3 Phillips screws on both sides of the controller (total of 6). You can fold the DPU back and see the component side of the board. In the I/O controllers you should see a ROM with a label. In the Master controller you will have 2 boards; the MPU board mounted on top of the DPU. You need to remove the 6 standoff screws and separate the two boards. The MPU has 6 System ROMs and 1 Boot ROM which are labeled on the ROMs themselves and on the PC board next to the ROM Sockets. The DPU underneath the MPU also has a boot ROM which should be labeled.

The I/O Boot ROMs:      System ROMs:      The MPU Boot ROM:      The Master Boot ROM:

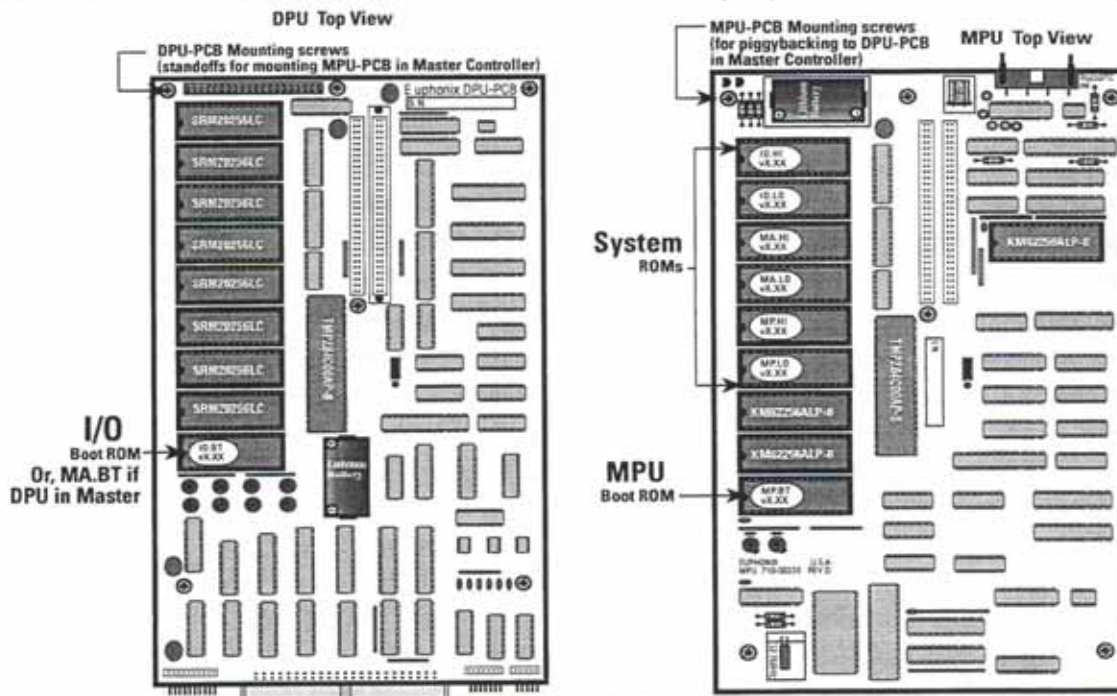
I/O.BT

I/O.HI  
I/O.LO  
MA.HI  
MA.LO  
MP.HI  
MP.LO

MP.BT

MA.BT

The System ROMs are easily removed by pressing on the ROM ejector tabs at both ends of the ROM Socket. The Boot ROMs need to be removed using an IC extractor, a flat blade screwdriver or a knife blade. **BE EXTREMELY CAREFUL NOT TO BEND ANY PINS** when you put the new ROMs in the sockets.



## CSII/CS2000 Console Bus Noise Measurement Steps 1&2

This page describes how to measure the CSII/CS2000 console bus noise. By following this procedure exactly you can verify the Euphonix factory specifications of your system as it was shipped. Make sure that you use a 20Hz to 20kHz filter on your measuring system.

### Steps 1&2

From the SnapShot Menu

in the Master SmartDisplay;

-Press the M1 key to Initialize,

-Confirm Yes,

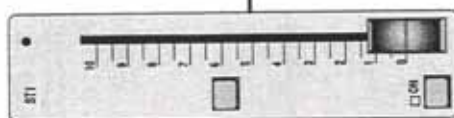
-Press the M2 key to zero the entire console

### Step 1

ST1 Master

Fader Down

Off



Measurement Taken From:  
ST1 A Left  
@ Patchbay

Step 1 -95 dB (relative to +4 dBu)  
-91 dBu  
21.8  $\mu$ V RMS  
(All measurements 20Hz-20KHz)

### Step 2

ST1 Master

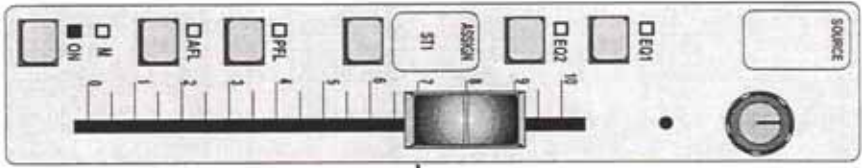
@ 0.00 dB ON



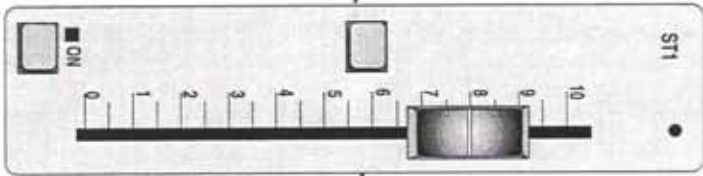
Step 2 -90 dB (relative to +4 dBu)  
-86 dBu  
38.8  $\mu$ V RMS

### CSII/CS2000 Console BUS Noise Measurement Step 3

This page describes how to measure the CSII/CS2000 console bus noise. By following this procedure exactly you can verify the Euphonix factory specifications of your system as it was shipped. Make sure that you use a 20Hz to 20kHz filter on your measuring system.

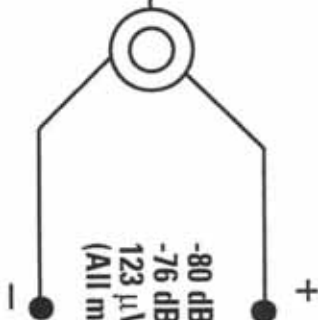


**Lower Faders**  
**1-24 ONLY**  
 Assigned to ST 1.  
 Mode - Mono @ 0 dB, Fader ON  
 No Source.



**ST1 Master**  
 @ 0.00 dB ON

Measurement Taken From:  
**ST1 A Left**  
 @ Patchbay



**-80 dB (relative to +4 dBu)**  
**-76 dBu**  
**123  $\mu$ V RMS**  
 (All measurements 20Hz-20KHz)

## Fuses for Euphonix CSX Studio Systems

### Fuses for Euphonix CSII/CS2000 Studio Systems

Part No.	Description	Location	Rating	Qty.
303-02581	1A_FUSE	CSII Eubus	1A	1
303-03350	FUSE-2.0ASB/3	Mix Controller, 100V, 120V	2A, slo blo	1
303-03248	FUSE-1.5ASB/3	Mix Controller, 220V, 240V	1.5A, slo blo	1
303-03490	3A-FUSE	Host Processor Board, DSC, +/- 12V	3A	2
303-02581	1A-FUSE	Host Processor Board, DSC, +5V	1A	1
303-03350	FUSE-2.0ASB/3	Dynamics, 100V, 120V	2A, slo blo	1
303-03248	FUSE-1.5ASB/3	Dynamics, 220V, 240V	1.5A, slo blo	1
303-02256	3.5A_FUSE_QB	CUBE QBC	3.5A	3
303-01005	6.3A_FUSE	CUBE Power Supply	6.3A	8
303-03490	3A-FUSE	Computer, Eugraphix Card	3A	1
303-01005	6.3A_FUSE	Audio Tower Power Supply	6.3A	8
620-03700		Digital Power Corp. PSU, US150-321	SOCMQ4/5A/250V	1
620-00725		Vicor PSU, LED, 300W/620-00725	ABC12/250V	1
620-01188		Vicor PSU, Logic, 100W/620-01188	SOCNT3/7A/250V	1
620-00724		Vicor PSU, Logic, 50W/620-00724	SOCNT3/7A/250V	1
		Computer PSU-see manual		

# Euphonix System Component Part Numbers

## *EUPHONIX UPGRADES/TRADE-INS*

### Basic System Cables

#### **Mix Controller**

15m/50ft MC, CS2000-X-16  
15m/50ft MC, CS2000-X-24  
15m/50ft MC, CS2000-X-32  
15m/50ft MC, CS2000-X-40  
15m/50ft MC, CS2000-X-48  
15m/50ft MC, CS2000-X-56  
15m/50ft MC, CS2000-X-64  
15m/50ft MC, CS2000-X-72  
15m/50ft MC, CS2000-X-80  
15m/50ft MC, CS2000-X-88  
15m/50ft MC, CS2000-X-96  
15m/50ft MC, CS2000-X-104

20m/66ft MC, CS2000-X-16  
20m/66ft MC, CS2000-X-24  
20m/66ft MC, CS2000-X-32  
20m/66ft MC, CS2000-X-40  
20m/66ft MC, CS2000-X-48  
20m/66ft MC, CS2000-X-56  
20m/66ft MC, CS2000-X-64  
20m/66ft MC, CS2000-X-72  
20m/66ft MC, CS2000-X-80  
20m/66ft MC, CS2000-X-88  
20m/66ft MC, CS2000-X-96  
20m/66ft MC, CS2000-X-104

### DSC System Cables

#### **Mix Controller**

15m/50ft MC, CS2000D-X-16  
15m/50ft MC, CS2000D-X-24  
15m/50ft MC, CS2000D-X-32  
15m/50ft MC, CS2000D-X-40  
15m/50ft MC, CS2000D-X-48  
15m/50ft MC, CS2000D-X-56  
15m/50ft MC, CS2000D-X-64  
15m/50ft MC, CS2000D-X-72  
15m/50ft MC, CS2000D-X-80  
15m/50ft MC, CS2000D-X-88  
15m/50ft MC, CS2000D-X-96  
15m/50ft MC, CS2000D-X-104

20m/66ft MC, CS2000D-X-16  
20m/66ft MC, CS2000D-X-24

### Basic System Cables

#### **Patch Bay**

15m/50ft PB, CS2000-X-16  
15m/50ft PB, CS2000-X-24  
15m/50ft PB, CS2000-X-32  
15m/50ft PB, CS2000-X-40  
15m/50ft PB, CS2000-X-48  
15m/50ft PB, CS2000-X-56  
15m/50ft PB, CS2000-X-64  
15m/50ft PB, CS2000-X-72  
15m/50ft PB, CS2000-X-80  
15m/50ft PB, CS2000-X-88  
15m/50ft PB, CS2000-X-96  
15m/50ft PB, CS2000-X-104

20m/66ft PB, CS2000-X-16  
20m/66ft PB, CS2000-X-24  
20m/66ft PB, CS2000-X-32  
20m/66ft PB, CS2000-X-40  
20m/66ft PB, CS2000-X-48  
20m/66ft PB, CS2000-X-56  
20m/66ft PB, CS2000-X-64  
20m/66ft PB, CS2000-X-72  
20m/66ft PB, CS2000-X-80  
20m/66ft PB, CS2000-X-88  
20m/66ft PB, CS2000-X-96  
20m/66ft PB, CS2000-X-104

### DSC System Cables

#### **Patch Bay**

15m/50ft PB, CS2000D-X-16  
15m/50ft PB, CS2000D-X-24  
15m/50ft PB, CS2000D-X-32  
15m/50ft PB, CS2000D-X-40  
15m/50ft PB, CS2000D-X-48  
15m/50ft PB, CS2000D-X-56  
15m/50ft PB, CS2000D-X-64  
15m/50ft PB, CS2000D-X-72  
15m/50ft PB, CS2000D-X-80  
15m/50ft PB, CS2000D-X-88  
15m/50ft PB, CS2000D-X-96  
15m/50ft PB, CS2000D-X-104

20m/66ft PB, CS2000D-X-16  
20m/66ft PB, CS2000D-X-24

**EUPHONIX UPGRADES/TRADE-INS**

20m/66ft MC, CS2000D-X-32  
 20m/66ft MC, CS2000D-X-40  
 20m/66ft MC, CS2000D-X-48  
 20m/66ft MC, CS2000D-X-56  
 20m/66ft MC, CS2000D-X-64  
 20m/66ft MC, CS2000D-X-72  
 20m/66ft MC, CS2000D-X-80  
 20m/66ft MC, CS2000D-X-88  
 20m/66ft MC, CS2000D-X-96  
 20m/66ft MC, CS2000D-X-104

20m/66ft PB, CS2000D-X-32  
 20m/66ft PB, CS2000D-X-40  
 20m/66ft PB, CS2000D-X-48  
 20m/66ft PB, CS2000D-X-56  
 20m/66ft PB, CS2000D-X-64  
 20m/66ft PB, CS2000D-X-72  
 20m/66ft PB, CS2000D-X-80  
 20m/66ft PB, CS2000D-X-88  
 20m/66ft PB, CS2000D-X-96  
 20m/66ft PB, CS2000D-X-104

**Music System Cables**

**Mix Controller**

15m/50ft MC, CS2000M-X-16  
 15m/50ft MC, CS2000M-X-24  
 15m/50ft MC, CS2000M-X-32  
 15m/50ft MC, CS2000M-X-40  
 15m/50ft MC, CS2000M-X-48  
 15m/50ft MC, CS2000M-X-56  
 15m/50ft MC, CS2000M-X-64  
 15m/50ft MC, CS2000M-X-72  
 15m/50ft MC, CS2000M-X-80  
 15m/50ft MC, CS2000M-X-88  
 15m/50ft MC, CS2000M-X-96  
 15m/50ft MC, CS2000M-X-104

**Music System Cables**

**Patch Bay**

15m/50ft PB, CS2000M-X-16  
 15m/50ft PB, CS2000M-X-24  
 15m/50ft PB, CS2000M-X-32  
 15m/50ft PB, CS2000M-X-40  
 15m/50ft PB, CS2000M-X-48  
 15m/50ft PB, CS2000M-X-56  
 15m/50ft PB, CS2000M-X-64  
 15m/50ft PB, CS2000M-X-72  
 15m/50ft PB, CS2000M-X-80  
 15m/50ft PB, CS2000M-X-88  
 15m/50ft PB, CS2000M-X-96  
 15m/50ft PB, CS2000M-X-104

20m/66ft MC, CS2000M-X-16  
 20m/66ft MC, CS2000M-X-24  
 20m/66ft MC, CS2000M-X-32  
 20m/66ft MC, CS2000M-X-40  
 20m/66ft MC, CS2000M-X-48  
 20m/66ft MC, CS2000M-X-56  
 20m/66ft MC, CS2000M-X-64  
 20m/66ft MC, CS2000M-X-72  
 20m/66ft MC, CS2000M-X-80  
 20m/66ft MC, CS2000M-X-88  
 20m/66ft MC, CS2000M-X-96  
 20m/66ft MC, CS2000M-X-104

20m/66ft PB, CS2000M-X-16  
 20m/66ft PB, CS2000M-X-24  
 20m/66ft PB, CS2000M-X-32  
 20m/66ft PB, CS2000M-X-40  
 20m/66ft PB, CS2000M-X-48  
 20m/66ft PB, CS2000M-X-56  
 20m/66ft PB, CS2000M-X-64  
 20m/66ft PB, CS2000M-X-72  
 20m/66ft PB, CS2000M-X-80  
 20m/66ft PB, CS2000M-X-88  
 20m/66ft PB, CS2000M-X-96  
 20m/66ft PB, CS2000M-X-104

**Dynamics**

10m/33ft DYN, CS2000M-X-16  
 10m/33ft DYN, CS2000M-X-24  
 10m/33ft DYN, CS2000M-X-32  
 10m/33ft DYN, CS2000M-X-40  
 10m/33ft DYN, CS2000M-X-48

**Dynamics**

10m/33ft DYN, CS2000M-X-64  
 10m/33ft DYN, CS2000M-X-72  
 10m/33ft DYN, CS2000M-X-80  
 10m/33ft DYN, CS2000M-X-88  
 10m/33ft DYN, CS2000M-X-96

---

## ***EUPHONIX UPGRADES/TRADE-INS***

10m/33ft DYN, CS2000M-X-56

10m/33ft DYNCS2000M-X-104

### ***Upgrades***

8 Fader Upgrade (10m/33ft)

8 Fader Upgrade (15m/50ft)

8 Fader Upgrade (20m/66ft)

CS2000 DSC Upgrade

CSII DSC Upgrade

2nd Tower Upgrade

Backup Media Upgrade

### ***Trade-ins***

CS2000-4 Frame Trade-in

CS2000-3 Frame Trade-in

CS2000-2 Frame Trade-in

CSII-96 Frame Trade-in

CSII-80 Frame Trade-in

CSII-56 Frame Trade-in

Master Control Mod. Trade-in

### ***System Shortloads***

ES108 and Cables(2m/7ft) \*

ES108 and Cables(10m/33ft) \*

941-01810        QUAD BUS CARD-48L \*

950-01098        4 CHANNEL PATCH

950-01097        MASTER PATCH

950-02014        AUDIO/CONTROL -10M

950-02015        AUDIO/CONTROL -15M

950-02016        AUDIO/CONTROL -20M

**EUPHONIX ASSEMBLIES****Mix Controller**

940-01734	CS2000-4 FRAME
940-01733	CS2000-3 FRAME
940-01732	CS2000-2 FRAME
940-01722	CSII-96 FRAME-REFURBISHED
940-01719	CSII-80 FRAME-REFURBISHED
940-01704	CSII-56 FRAME-REFURBISHED
940-01701	I/O CONTROL MODULE
940-01702	MASTER CTRL MODULE
940-03517	MASTER CTRL MOD-DSC
944-01640	DSC (CS2000)**
944-01641	DSC (CS2)**
940-01703	BLANK CONTRL MODULE
940-03722	BLANK-METER MOD 1W
940-03455	BLANK-METER MOD 2W
940-01737	BLANK-METER MOD 4W

**Support Computer**

940-03659	MIXVIEW PLATFORM
820-00994	VGA MONITOR
820-03893	SQ105M HD-FORMATTED

**Audio Processing**

940-03660	AUDIO TOWER FRAME
940-01705	I/O AUDIO MODULE
940-01714	BLANK I/O AUDIO MOD
940-01706	MASTER AUDIO MODULE
940-01713	SUBMASTER
940-01712	BUS RECEIVER MODULE
953-03050	ES108

**Audio Routing**

941-01803	AUDIO CUBE FRAME
941-03719	CUBE I/O MODULE-16
941-01804	CUBE I/O MODULE-16AB
941-01812	BLANK-CUBE I/O MOD
941-01805	QUAD BUS CARD-16S
941-01806	QUAD BUS CARD-32S
941-01807	QUAD BUS CARD-48S
941-01808	QUAD BUS CARD-16L
941-01809	QUAD BUS CARD-32L
941-01810	QUAD BUS CARD-48L
941-01811	BLANK QUAD BUS CARD

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## **EUPHONIX ASSEMBLIES**

### **Power Supplies and Cables**

940-03672	TOWER PSU-100VAC
940-03673	TOWER PSU-120VAC
940-03674	TOWER PSU-220VAC
940-03675	TOWER PSU-234VAC
940-02110	TWR PSU CORD-120VAC
940-02133	TWR PSU CORD-250VAC
032-03613	IEC CORD-100/120VAC
032-03612	IEC CORD-220VAC
032-03611	IEC CORD-234VAC
030-00882	IEC CORD-RA-100/120V
032-03676	IEC CORD-RA-220VAC
032-03677	IEC CORD-RA-234VAC
030-03567	CUBE POWER CABLE-Y
030-02583	CUBE PWR CABLE-STRT
941-01813	PSU RACK MOUNT KIT

### **Patch Units**

950-01098	4 CHANNEL PATCH
950-01097	MASTER PATCH
950-01128	TIE LINE PATCH-UN
950-03770	TIE LINE PATCH-HN
950-03772	TIE LINE PATCH-FN
950-03771	TIE LINE PATCH-1/2HN

### **Audio Cables**

950-02014	AUDIO/CONTROL -10M
950-02015	AUDIO/CONTROL -15M
950-02016	AUDIO/CONTROL -20M
030-03789	CUBE AUDIO-DIR1-10M
030-03790	CUBE AUDIO-DIR1-15M
030-03791	CUBE AUDIO-DIR1-20M
030-03640	CUBE AUDIO-8AUX-10M
030-03664	CUBE AUDIO-8AUX-15M
030-03665	CUBE AUDIO-8AUX-20M
030-03641	CUBE AUDIO-12AUX-10M
030-03666	CUBE AUDIO-12AUX-15M
030-03667	CUBE AUDIO-12AUX-20M
030-03629	DYNAMICS 1/CHAN-2M
030-03794	DYNAMICS 1/CHAN-10M
030-03628	DYNAMICS 2/CHAN-2M
030-03795	DYNAMICS 2/CHAN-10M
030-03724	STEREO BUS XLR-.60M
030-03725	DYN 1/CHAN ST SND-2M
030-03814	DYN 1/CHAN ST SND-10M
030-03726	DYN 1/CHAN ST RET-2M

**EUPHONIX ASSEMBLIES**

030-03815	DYN 1/CHAN ST RET-10M
030-03784	DYN 38ELCO/8MXLR-2M
030-03816	DYN 38ELCO/8MXLR-10M
030-03786	DYN 38ELCO/8FXLR-2M
030-03817	DYN 38ELCO/8FXLR-10M
030-02108	TALK/PHONES -10M
030-03668	TALK/PHONES -15M
030-03669	TALK/PHONES -20M
030-02011	TOWERLINK-AUDIO-2M
030-03670	TOWERLINK-CTRL-2M

**Digital Cables**

032-03818	VGA/KEYBD CABLE-10M
032-02158	VGA/KEYBD CABLE-15M
032-03819	VGA/KEYBD CABLE-20M
032-03820	SERIAL CABLE-10M
820-02160	SERIAL CABLE-15M
032-03821	SERIAL CABLE-20M
030-02599	EUBUS CABLE-10M
030-02978	EUBUS CABLE-15M
030-02036	EUBUS CABLE-20M
030-03810	EUGRAPHIX CABLE-10M
030-03511	EUGRAPHIX CABLE-15M
030-03797	EUGRAPHIX CABLE-20M
032-03671	MIDI CABLE-15M
	MIDI EXTENDER KIT-20M

**Connectors**

100-02099	38 MALE ELCO W/HOOD
100-03638	56 MALE ELCO W/HOOD
100-03661	90 MALE ELCO W/HOOD
100-02100	ELCO CRIMP PIN

**Wire**

MULTI-PAIR AUDIO CABLE-48  
sold in 500ft. spools

**Manuals**

840-03343	OPERATION MANUAL-2.2
840-02127	SERVICE MANUAL-SYS
840-03792	MANUAL-OPERATION/V2.3
840-03793	MANUAL-INSTALL/DYN

---

## ***EUPHONIX SERVICE***

### ***Labor***

ONSITE SERVICE LABOR/HOUR  
CONSOLE SPLITTING CHARGE

### ***Repair***

EXPRESS REPAIR/LOANER  
STANDARD REPAIR/RETURN

1. Express Repair/ Loaner Service-Euphonix Support will ship a loaner module to the customer immediately. The customer will ship the faulty module back to Euphonix for repair. When the repair is complete, Euphonix will return the original module to the customer, and the customer will return the loaner to Euphonix.
2. Standard Repair/Return Service-The customer will ship the faulty module to Euphonix for repair. Euphonix will repair the module and return it to the customer. There is no loaner module provided.
3. If damage is so severe that complete replacement is required on any portion of an item returned under either the Express or Standard Service, the customer will be notified and subsequently invoiced for the World Wide List Price of that item.
4. Repair charges do not include shipping.
5. There is a \$50 minimum charge on any repair.

**EUPHONIX SUB-ASSEMBLIES****Mix Controller**

620-00724	5V-50W PWR SUPPLY
620-01188	5V-100W PWR SUPPLY
620-00725	5V-300W PWR SUPPLY
620-03700	5V-75W +/-12V-36W
910-01381	DBUS2000
910-01382	DBUS
910-01383	DBUS-LEFT
910-01387	DBUS-RIGHT
910-01378	CS2 EUBUS
940-01739	KEYBOARD TRAY
720-03548	TOP CAP-M
910-01301	I/O METER PANEL
910-01303	DPU PROCESSOR CARD
910-01309	MASTER METER PANEL
910-01311	MPU PROCESSOR CARD
302-02091	SM 99 MICROPHONE
720-02754	BRACKET-TALKBACK MIC
720-00841	BLANK LEXAN
720-00160	I/O LEXAN
720-00179	I/O FRONT PANEL

**DSC**

914-01602	MASTER LED
914-01603	FADER IF
914-01604	MASTER SW
914-01605	MASTER IF
914-01606	MACH CTRL LED
914-01607	MACH CTRL SW
914-01608	MACH CTRL IF
914-01609	MACRO LED
914-01610	MACRO SW
914-01611	MACRO IF
914-01612	ACS LED
914-01613	ACS SW
914-01614	ACS IF
914-03705	DSC PROCESSOR
914-03445	MPU-DSC

**Support Computer**

820-03588	PC MIDI I/F-6IN/6OUT
914-01616	PC EUGRAPHIX
910-01414	PC EUBUS-16
911-01401	PC EUBUS
820-03796	VGA DOLCH 520/30/35
820-03697	HDD 3.5"SCSI>290M

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## **EUPHONIX SUB-ASSEMBLIES**

820-01268	MINI KEYBOARD BLACK
820-02157	VGA/KEYBD EXT UNITS
820-03777	REMOVABLE HDD/SQ105M

### **Audio Processing**

910-01314	SOURCE SELECTOR
910-01315	METER
910-01368	QUAD DCA-DIGITAL AMP
910-01317	FOUR BAND EQ
910-01318	UNIVERSAL INPUT
910-01320	LOWER BUSAMP
910-01373	UPPER BUSAMP
910-01321	LINEAMP
910-01322	OPTO ISOLATOR
910-01316	QUAD DCA-LONG
910-01379	HEADPHONE AMP
910-01374	BUS SUBMIX
910-01375	BUS CONNECTOR
910-01323	ELCO CONNECTOR
910-01324	4 CH I/O BACKPLANE
910-01325	MASTER BACKPLANE
910-01326	UPPER AUDIO BUS
910-01327	LOWER AUDIO BUS
602-00671	AUDIO TOWER FAN A30769-10

### **Dynamics**

913-03003	DUAL DYN PROCESSOR
913-03005	FRONT PANEL
913-03681	DYN HOST PROC
943-03021	POWER MODULE
602-03472	80MM 26CFMFAN

### **Audio Routing**

911-01402	CUBE EUBUS
911-01403	FRONT B-PLANE
911-01404	REAR B-PLANE
911-01405	I/O MOTHER-B
911-01406	AUDIO 56 ELCO
911-01407	DUAL I/O
911-01408	QUAD BUS CARD
911-01409	SWITCH
911-01410	LEVEL
911-01415	FIVE ELCO
911-01416	I/O BUFFER
030-03501	CA-CUBEGND/3.0

**EUPHONIX SUB-ASSEMBLIES**

**Power Supplies and Power Cables**

910-01331	PDB TERMINAL
910-01330	CAPACITOR
940-01710	TUNNEL REGULATOR
602-00671	A3079-10 WHISPER XL FAN
000-01180	4"X45PPI FAN GUARD
000-03845	4 1/2" FAN FILTER
420-00721	BREAKER 15A
420-01259	BREAKER 25A
330-03470	BRIDGE RECT 200V 50A
940-03880	RECTIFIER ASSY-FRONT
940-03881	RECTIFIER ASSY-REAR

**Patch Units**

	CLEAR STRIP
	PATCH LABEL SET(104)

# ■ Appendix 3: CS2000 Audio/Electrical Specifications ■



## **Audio/Electrical Specifications: CS2000 Series Mixing Systems**

June 1995

**June 1995**

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## **0. Introduction**

This document contains the complete audio performance specification for the CSII and CS2000 console systems. It is intended to serve as a reference for evaluating console performance and for interfacing the console with other equipment in a facility. Because Euphonix strives to continually improve the performance of our systems, this specification is subject to change without notice.

## **1. Units of Measurement**

<b>dBu</b>	An ac voltage measurement, in decibels, referenced to 0.775 volts.
<b>dBqps</b>	Quasi-peak amplitude as per CCIR recommendation 468-4. This is a frequency-weighted, peak-detected noise measurement.

## **2. Operating Conditions**

The specifications outlined in this document apply only under the following conditions.

### **2.1 Mains Power Voltage**

Must be within the specified operating range, as outlined in the Service and Installation Manual.

### **2.2 Ambient Temperature**

0°C to 40°C

### **2.3 Humidity**

0% to 90% non-condensing.

### **3. Universal Inputs (M1, M2)**

#### **3.1 Description**

Electronically balanced, transformerless, differential input with low-noise, variable-gain preamplifier and switchable, constant-impedance, 20dB pad.

#### **3.2 Input Signal Levels**

##### **Optimum Input Level Range**

-60dBu to +10dBu (for S/N ratio > 64dB; headroom > 18dB)

##### **Maximum Input Level Before Clipping**

+28dBu (sine wave) or 55 volts peak-to-peak

##### **Common Mode Voltages**

±50 volts maximum (relative to Audio Tower Ground)

#### **3.3 Gain Ranges**

##### **Low Range**

0dB to +24dB; graduated in 0.5dB steps.  
20dB attenuator (pad) inserted before preamplifier.

##### **Medium Range**

20dB to +44dB; graduated in 0.5dB steps.

##### **High Range**

+40dB to +64dB; graduated in 0.5dB steps.

##### **Gain Accuracy**

±0.15dB

#### **3.4 Input Impedance**

##### **Differential**

2.3k $\Omega$  (±3%) at any gain setting, when driven from a balanced or floating source.  
1.8k $\Omega$  (±3%) at any gain setting, when driven from an unbalanced, grounded source.

##### **Common-Mode**

4k $\Omega$  (±3%) with pad out (MED and HIGH gain ranges).  
5k $\Omega$  (±3%) with pad in (LOW gain range).  
Hot and cold input legs matched within 2%.

##### **Variation with Frequency**

Input impedance constant to within 5%, from 30Hz to 15kHz.

### 3.5 Noise and Dynamic Range

All measurements made with a 150Ω resistor connected across the input terminals. Measurements are given in both dBu (22Hz to 22kHz, unweighted, rms) and dBqps.

Gain Range	Gain Setting (dB)	Max Output Noise (dBu)	Equivalent Input Noise (dBu)	Available Dynamic Range (dB)
LOW	0	-90	-90	118
LOW	+6	-86	-92	114
LOW	+12	-81	-93	109
LOW	+18	-75	-93	103
MED	+24	-89	-113	117
MED	+30	-85	-115	113
MED	+36	-80	-116	108
HIGH	+42	-81	-123	109
HIGH	+48	-75	-123	103
HIGH	+54	-69	-123	97
HIGH	+60	-64	-124	92
HIGH	+64	-60	-124	88

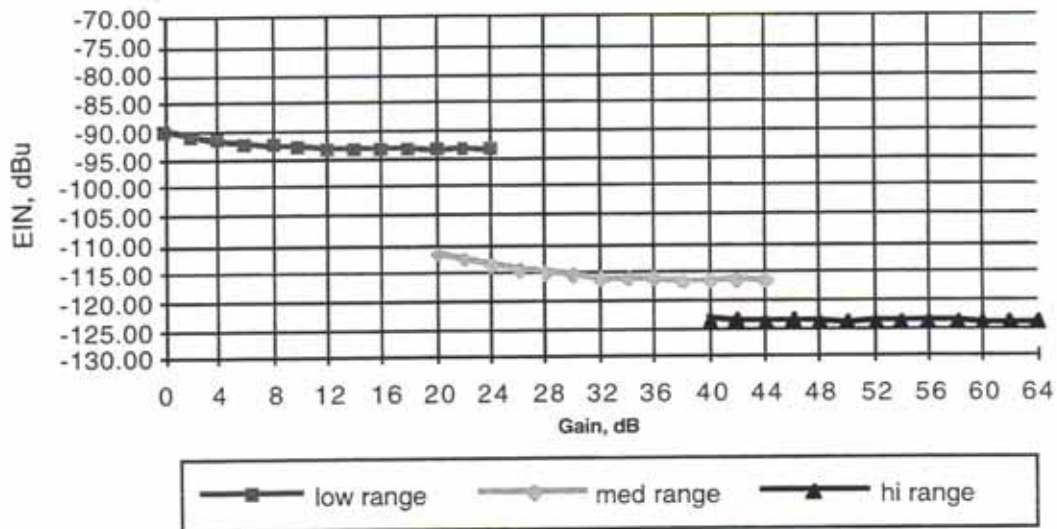


Fig 3.5.1. Universal Input Amplifier equivalent input noise versus gain (22Hz-22kHz rms unweighted, 150Ω source).

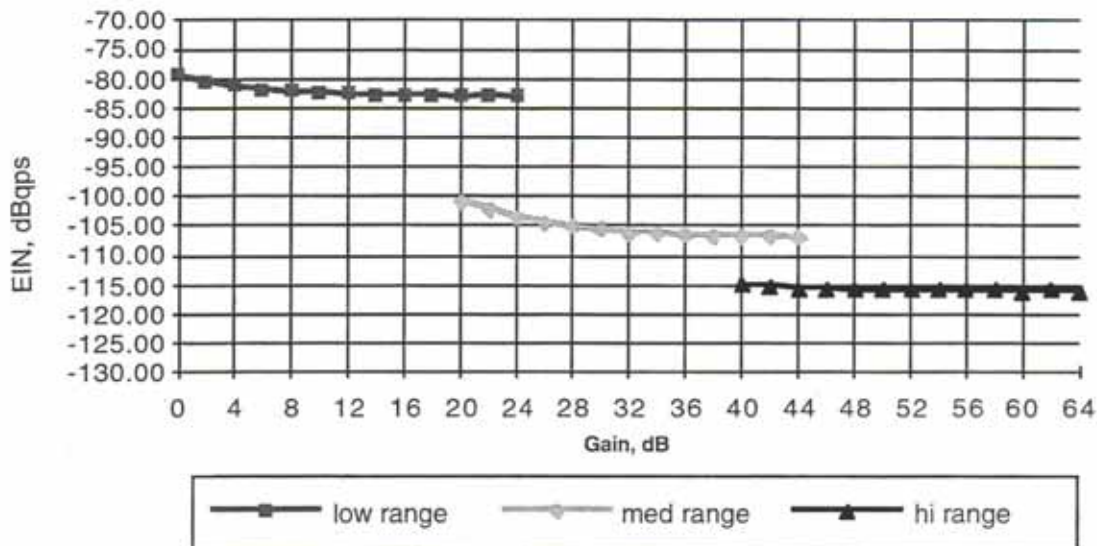


Fig 3.5.2. Universal Input Amplifier equivalent input noise versus gain (quasi-peak measurement method, 150 $\Omega$  source).

### 3.6 Common Mode Rejection Ratio

Test source connected to both inputs through equal source impedances of 25 $\Omega$ .  
> 40dB (typically 50dB) from 20Hz to 20kHz, with or without phantom power present

### 3.7 RF Immunity

Common mode source: 300mV rms carrier, 70% amplitude modulated by 1kHz sine wave.  
Demodulated 1kHz tone attenuated by more than 65dB (referred to the input), carrier frequency swept from 100kHz to 30MHz.

### 3.8 Phantom Power

Switchable on/off per input.  
+48 volts ( $\pm$  3%) supplied to each input terminal through a source impedance of 6.8k $\Omega$ .  
Noise: no data available at this time.

### 3.9 High-Pass Filter

Switchable on/off per input.  
18dB/octave slope; -3dB at 100Hz ( $\pm$ 5Hz); butterworth (maximally flat magnitude) characteristic.

### 3.10 Phase Invert

Switchable on/off per input.  
Equivalent to reversing polarity of input signal source.

## **4. Line Inputs (L1, L2, L3, L4, EXT1, EXT2)**

### **4.1 Description**

Electronically balanced, transformerless, differential input; fixed at unity gain.

### **4.2 Input Signal Levels**

#### **Optimum Input Level Range**

0dBu to +10dBu (for S/N ratio > 90dB; headroom > 18dB)

#### **Maximum Input Level Before Clipping**

+28dBu (sine wave) or 55 volts peak-to-peak.

#### **Common Mode Voltages**

±50 volts maximum (relative to Audio Tower ground).

### **4.3 Gain Range**

Fixed at 0dB (±0.1dB).

### **4.4 Input Impedance**

#### **Differential**

13.3kΩ (±3%) when driven from a balanced or floating source.

6.65kΩ (±3%) when driven from an unbalanced, grounded source.

#### **Common-Mode**

7.5kΩ (±3%), hot and cold inputs legs matched within 2%.

#### **Variation with Frequency**

Input impedance constant to within 5%, from 30Hz to 15kHz.

### **4.5 Noise and Dynamic Range**

Noise less than -90dBu; 22Hz to 22kHz unweighted; any source impedance.

Greater than 118dB available dynamic range.

### **4.6 Common Mode Rejection Ratio**

Test source connected to both inputs through equal source impedances of 25Ω.

> 40dB (typically 50dB) from 20Hz to 20kHz

### **4.7 RF Immunity**

Common mode source: 300mV rms carrier, 70% amplitude modulated by 1kHz sine wave.

Demodulated 1kHz tone attenuated by more than 70dB, carrier frequency swept from 100kHz to 30MHz.

## 5. Line Outputs (All Console Outputs)

### 5.1 Description

All console outputs (except for headphone outputs) utilize electronically servo-balanced, transformerless output circuitry.

### 5.2 Output Signal Levels

#### Nominal Output Level

+4dBu

#### Maximum Output Level

+28dBu (sine wave), 55 volts peak-to-peak into balanced input.

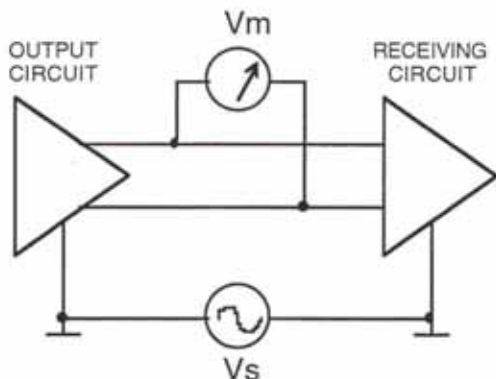
+22dBu (sine wave), 27.5 volts peak-to-peak into unbalanced input.

### 5.3 Output Impedance

52Ω (±5%) into balanced or unbalanced input.

### 5.4 Common-Mode Rejection Ratio

Measured by applying a common mode signal between the ground references of the output circuit and the receiving circuit, and measuring the resulting signal between the two output terminals.



$$\text{CMRR} = 20 \log \frac{V_m}{V_s}$$

> 60dB into balanced (>5kΩ) input, 30Hz to 15kHz.

> 25dB into unbalanced input, 30Hz to 15kHz.

### 5.5 Loading Effects

Either or both output terminals may be shorted to ground without damaging the output circuitry. Shorting output terminals to a dc voltage source can cause damage due to the low dc impedance of the output circuitry. Therefore, any dc source connected to a console output terminal must be current limited (by a resistor or other means) according to the following formula:

$$\text{max current (in amperes)} = 0.25 \text{ watts} / \text{dc voltage (in volts)}$$

Gain variation less than 0.15dB with load varying between balanced (both terminals driving equal impedances above 10kΩ) and unbalanced (one side shorted to ground).

Capacitive loads up to 100nF (to ground and/or between the output terminals) can be driven without instability.

Resistive loads down to 300Ω can be driven without degrading distortion or frequency response specifications.

## 6. Gain

### 6.1 Available Gain

#### Universal Input Amplifiers

+64dB with input routed from M1 or M2 patch points.

+24dB with input routed from Multitrack Bus or internal Combiner.

#### Channel Faders

+6 dB

#### Stereo and Auxiliary Bus Master Faders

+6 dB

#### Maximum Gain, Mic In to Mix Out

+76dB

### 6.2 Gain Tolerances

#### Universal Input Amplifiers

$\pm 0.15$ dB from value indicated in Mix Controller Smart Display

#### Channel Faders

$\pm 0.5$ dB matching between any two channel faders set to the same position in the range 2-10 on the graticule.

The following table shows fader gain as a function of fader position:

<u>Fader Position</u>	<u>Fader Gain</u>
max	+6dB
9	+5dB
8	0dB
7	-5dB
6	-10dB
5	-15dB
4	-20dB
3	-25dB
2	-30dB
1	-52dB
off	<-95dB

#### Master Faders

$\pm 0.5$ dB from value indicated in Mix Controller SmartDisplay

## 7. Signal Throughput - Mic or Line Input to Mix or Monitor Output

All specifications are with equalizers and dynamics processors out of circuit. Specifications for equalizer and dynamics processor signal throughput are given in later sections.

### 7.1 Frequency Response

#### Amplitude vs. Frequency

+0/-0.4dB, 15Hz to 30kHz (ref 1kHz)

+0/-0.25dB, 20Hz to 20kHz (ref 1kHz)

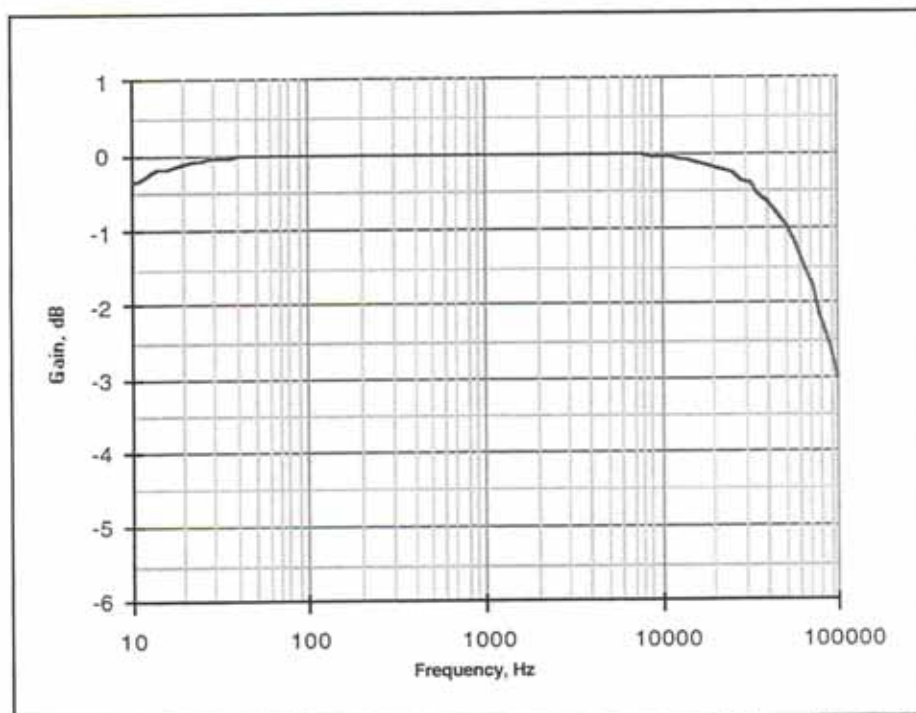


Fig 7.1.1. Typical Frequency Response - Universal Input to Mix or Monitor Output, 50dB gain (graph normalized to gain at 1kHz)

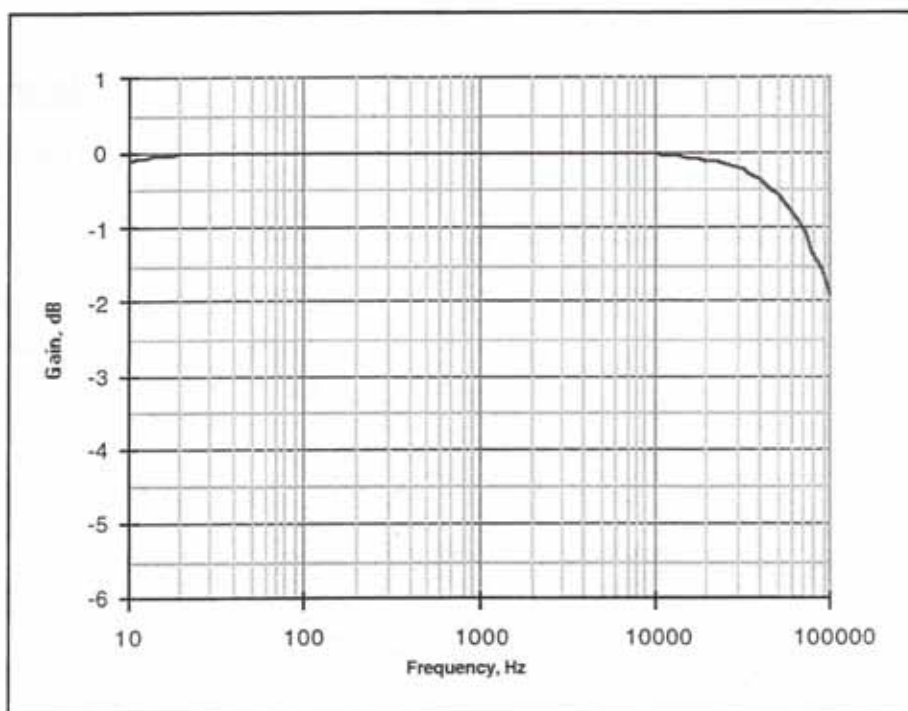


Fig 7.1.2. Typical Frequency Response - Line Input to Mix or Monitor Output

## 7.2 Phase Linearity

Within 5 degrees of linear phase, 20Hz to 20kHz

### 7.3 Distortion

#### Total Harmonic Distortion (plus noise)

Less than 0.01%, 30Hz to 15kHz, +15dBu output level

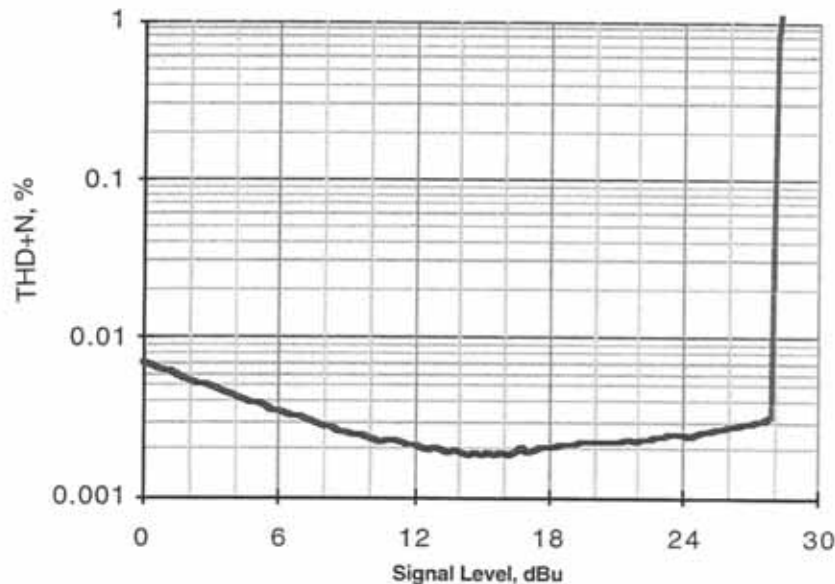


Fig 7.3.1. Typical THD+N vs. Level @1kHz - Mic or Line Input to Mix or Monitor Output

#### Inter-Modulation (Difference Frequency) Distortion

Less than 0.01% at +15dBu output level, (CCIF two-tone method or SMPTE 4:1 method).

### 7.4 Group Delay

Defined as the change in phase lag per unit change in radian frequency ( $-\Delta\theta/2\pi\Delta f$ ).  
Group delay is less than 7 $\mu$ sec at all frequencies between 20Hz and 20kHz

### 7.5 Signal Polarity

All signal paths through the console preserve correct polarity.

## 8. Equalizers

### 8.1 Description

Four bands: two fully parametric plus two shelving.  
Symmetrical (reciprocal) boost/cut.

### 8.2 Signal Throughput With All Gain Controls Set To 0dB

Tested with EQ inserted between channel line input and pre-fader output.

#### Frequency Response

+0.1/-0.25dB 15Hz to 30kHz (ref 1kHz)

#### Phase Linearity

Less than 5 degrees deviation from linear phase, 15Hz to 30kHz

#### Total Harmonic Distortion

Less than 0.005% at 1kHz, +10dBu

#### Inter-Modulation Distortion

Less than 0.008% at +10dBu (CCIF two-tone method or SMPTE 4:1 method).

#### Noise

Less than -85dBu, 22Hz to 22kHz, rms, unweighted

Less than -76dBqps

#### Group Delay

Defined as the change in phase lag per unit change in radian frequency ( $-\Delta\theta/2\pi\Delta f$ ).

Group delay is less than 3μsec at all frequencies between 20Hz and 20kHz

### 8.3 Parameter Ranges

#### Gain

±15 dB (graduated in 0.5dB steps)

#### Frequency

<u>Frequency Band</u>	<u>Curve Type</u>	<u>Range (Hz)</u>	<u>Pitch Range</u>
low	shelving	20.6Hz - 330Hz	E0 - E4
low mid	parametric	40.2Hz - 2.64kHz	E1 - E7
high mid	parametric	659Hz - 21.1kHz	E5 - E10
high	shelving	1.32kHz - 21.1kHz	E6 - E10

Frequency resolution is 12 steps per octave for all bands (A4 = 440Hz).

#### Q

0.32 to 11.6, in 16 steps (parametric bands only)

### 8.4 Accuracy

Actual response for each band within 0.5dB of EQ curve graphical display.

Phase response between any two equalizers with the same settings matched within 10 degrees, from 20Hz to 20kHz.

## **9. Dynamics Processors**

### **9.1 Description**

Packaged in outboard, rack-mountable units, each with eight channels of dynamics processing. DSP-controlled gain riding with software-based signal processing algorithms.  
Two high-quality, programmable analog filters per channel.  
External key input per channel.  
Fully balanced audio I/O.

### **9.2 Audio Inputs and Outputs**

External Key inputs and Main inputs use identical input circuitry.

#### **Maximum Input Level**

+22dBu (sine wave) or 27.5 volts peak-to-peak

#### **Input Impedance**

35k $\Omega$  ( $\pm 2\%$ ) from balanced source

#### **Common-Mode Rejection Ratio**

>45dB, 20Hz to 20kHz

#### **Maximum Output Level**

+22dBu (sine wave) or 27.5 volts peak-to-peak

### **9.3 Signal Throughput With All Gain Controls Set To 0dB, VCA In Circuit**

#### **Frequency Response**

+0/-0.3dB, 15Hz to 30kHz (ref 1kHz).

#### **Phase Linearity**

less than 5 degrees deviation from linear phase, 15Hz to 30kHz.

#### **Total Harmonic Distortion**

less than 0.01% at 1kHz, +10dBu

#### **Inter-Modulation Distortion**

Less than 0.02% at +10dBu (CCIF two-tone method or SMPTE 4:1 method).

#### **Noise**

Less than -92dBu, 22Hz to 22kHz, rms, unweighted.

Less than -82dBqps.

#### **Group Delay**

Defined as the change in phase lag per unit change in radian frequency ( $-\Delta\theta/2\pi\Delta f$ ).  
Group delay is less than 4 $\mu$ sec at all frequencies between 20Hz and 20kHz

## 9.4 Parameter Ranges

The types of dynamics processing functions currently available include gate/compressor, expander/compressor, gate/auto-makeup compressor, peak limiter, and ducker. A filter-only mode is also available.

### Dynamic Gain Range

-80dB to +24dB

### Detector Types

Compressor, Expander, Ducker: RMS (50msec integration period)  
Gate, Peak Limiter: Peak

### Time Constants (Attack, Hold, Release)

100 $\mu$ sec to 10sec

Gate has fast (10 $\mu$ sec or 30 $\mu$ sec) attack, using analog override circuit.

### Filters

Each filter is selectable between low-pass, high-pass, band-pass, or notch.

2nd-order (two-pole) response,  $Q = 0.7$

Frequency tuning (twelve steps per octave,  $A_4 = 440\text{Hz}$ )

LF filter: 10.3Hz to 2.64kHz (E-1 to E7)

HF filter: 165Hz to 42.2kHz (E3 to E11)

Frequency accuracy: one half semitone (3.0%)

Notch filter depth >30dB

## 10. System Dynamic Range

### 10.1 Headroom

24dB of headroom, above nominal operating level, is maintained in all signal paths and summing points within the Audio Tower. (Nominal operating level is +4dBu external, -2dBu internal.)

### 10.2 Noise Floor

#### Output Noise vs. Number Of Channels Assigned To Bus

Channels assigned and ON, faders at minimum gain. Master fader at unity gain.

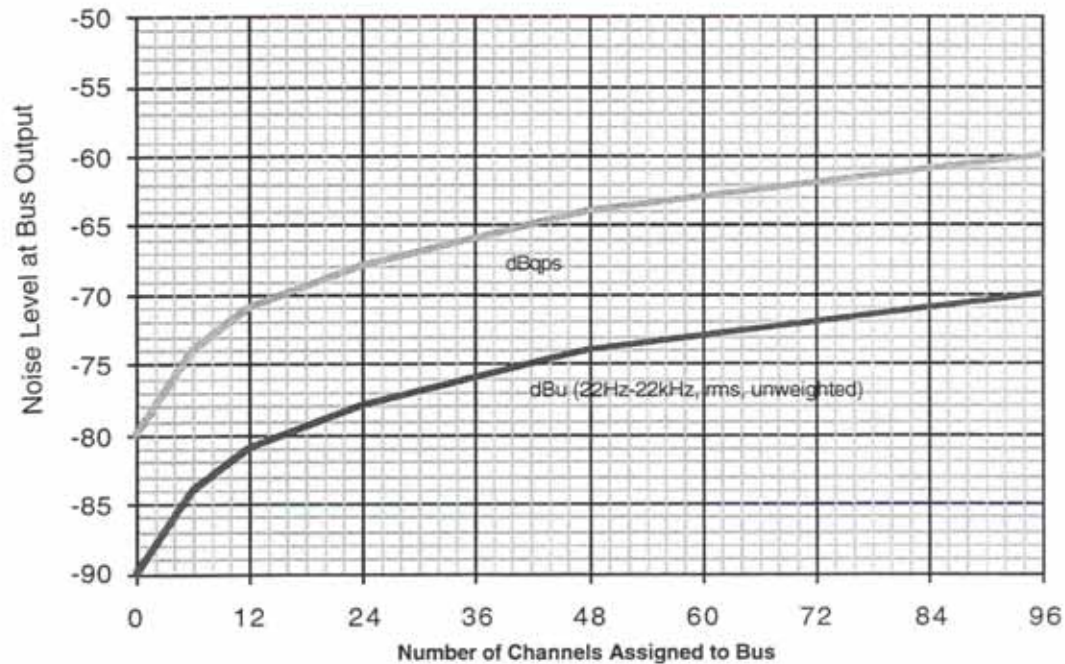


Fig 10.2.1. Output noise from mixing bus versus number of channels assigned (showing both rms and quasi-peak measurement methods).

## **11. Crosstalk**

### **11.1 From Channel Line Input to M1 or M2 Inputs**

- @1kHz: Better than -130dB
- @15kHz: Better than -105dB  
(measurements referred to preamplifier input)

### **11.2 Between Any Two Channels**

- @1kHz: Better than -130dB
- @15kHz: Better than -105dB

### **11.3 Across Muted Faders or Aux Sends**

- @1kHz: Better than -100dB
- @15kHz: Better than -95dB

### **11.4 Between Upper and Lower Faders**

- @1kHz: Better than -100dB
- @15kHz: Better than -90dB

### **11.5 Across Pan Pots**

- @1kHz: Better than -90dB
- @15kHz: Better than -80dB

### **11.6 Across Stereo Busses**

- @1kHz: Better than -90dB
- @15kHz: Better than -80dB

### **11.7 Onto Unassigned Summing Busses**

- @1kHz: Better than -100dB
- @15kHz: Better than -90dB

## **12. Other Sources of Noise**

### **12.1 Switch Operating Noise**

All measurements made with peak program meter conforming to the proposed IEEE PPM standard, and are referenced to 0dB on PPM scale (+4dBu).

**Fader/Aux Mute On/Off**

< -70dB

**Equalizer In/Out**

< -50dB

**Dynamics Processor In/Out**

< -40dB

**Source Selection On/Off**

< -44dB

**Bus/Track Assign On/Off**

< -40dB

### **12.2 Microphony**

No data available at time of publication.

Note: Audio Tower may be located in a separate machine room, away from control room sound pressure levels.

## 13. Program Level Meters

### 13.1 Range and Scaling

Selectable between two resolution scales (see diagram below).

0dB corresponds to nominal operating level (+4dBu external or -2dBu internal).

LED		"18-42" scale	"6-33" scale
10 -	R	+18	+6
-	R	+15	+5
9 -	R <	+12	+4
-	Y	+9	+3
8 -	Y	+6	+2
-	Y	+3	+1
7 -	Y <	0	0
-	G	-3	-1
6 -	G	-6	-2
-	G	-9	-3
5 -	G	-12	-4
-	G	-15	-5
4 -	G	-18	-6
-	G	-21	-9
3 -	G	-24	-12
-	G	-27	-15
2 -	G	-30	-21
-	G	-36	-27
1 -	G	-42	-33

(dB value in chart indicates the level above which the corresponding LED is lit)

### 13.2 Detection Modes and Ballistics

Selectable between rms and peak detection modes.

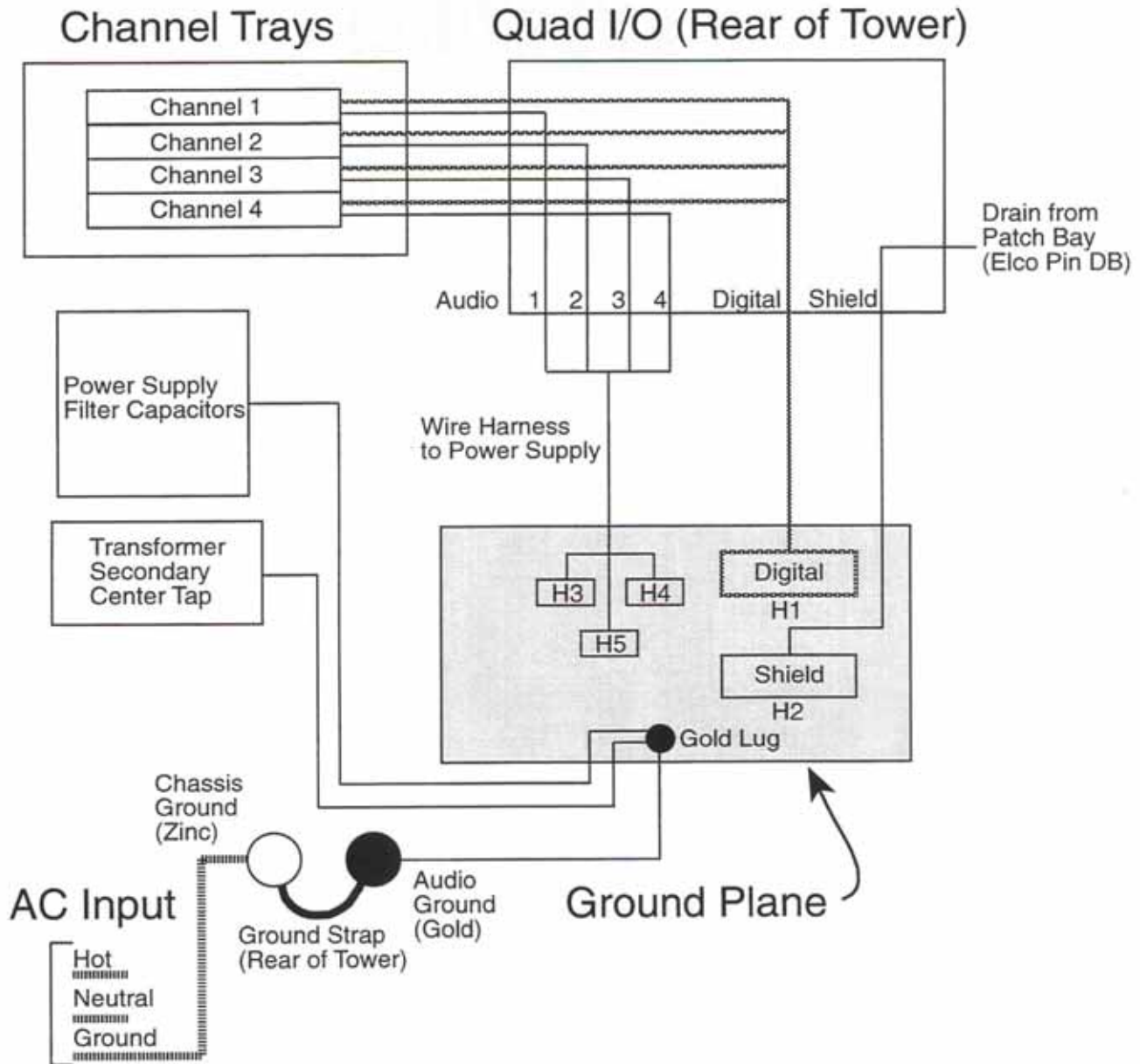
### 13.3 Accuracy

$\pm 0.25$ dB from -30dB to +18dB.

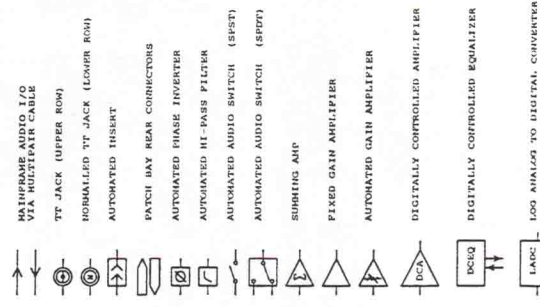


## Block Diagrams for the CSII/CS2000

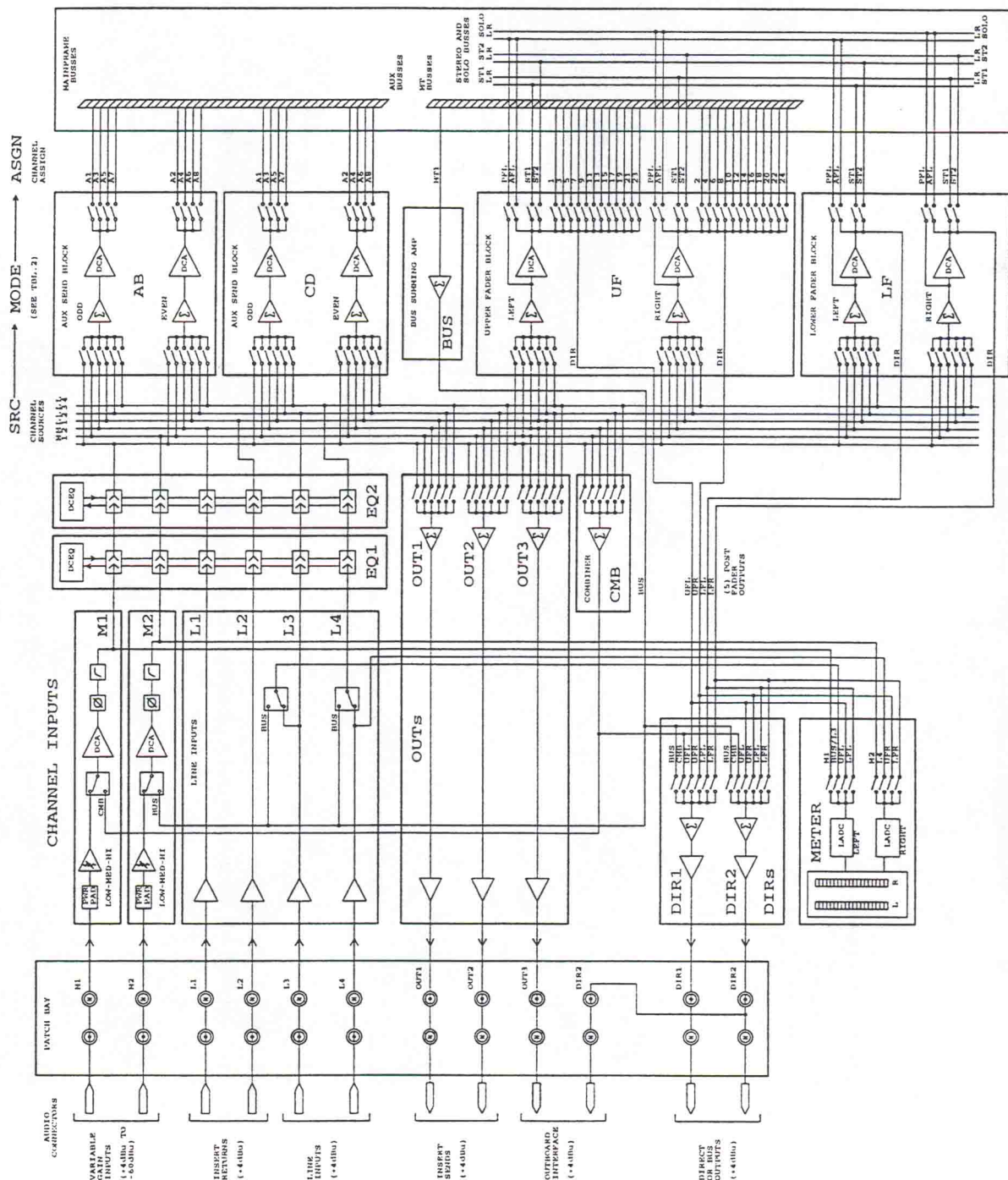
# Audio Tower Grounding Scheme



TBL.1 SYMBOL TABLE



BLOCK ROUTING



TBL.2 BLOCK ROUTE

0. NONE (DEFAULT)
1. MONO PAN CENTER
2. MONO INDEPENDENT
3. MONO INDEPENDENT
4. STEREO CHANNELS
5. STEREO THRESHOLD

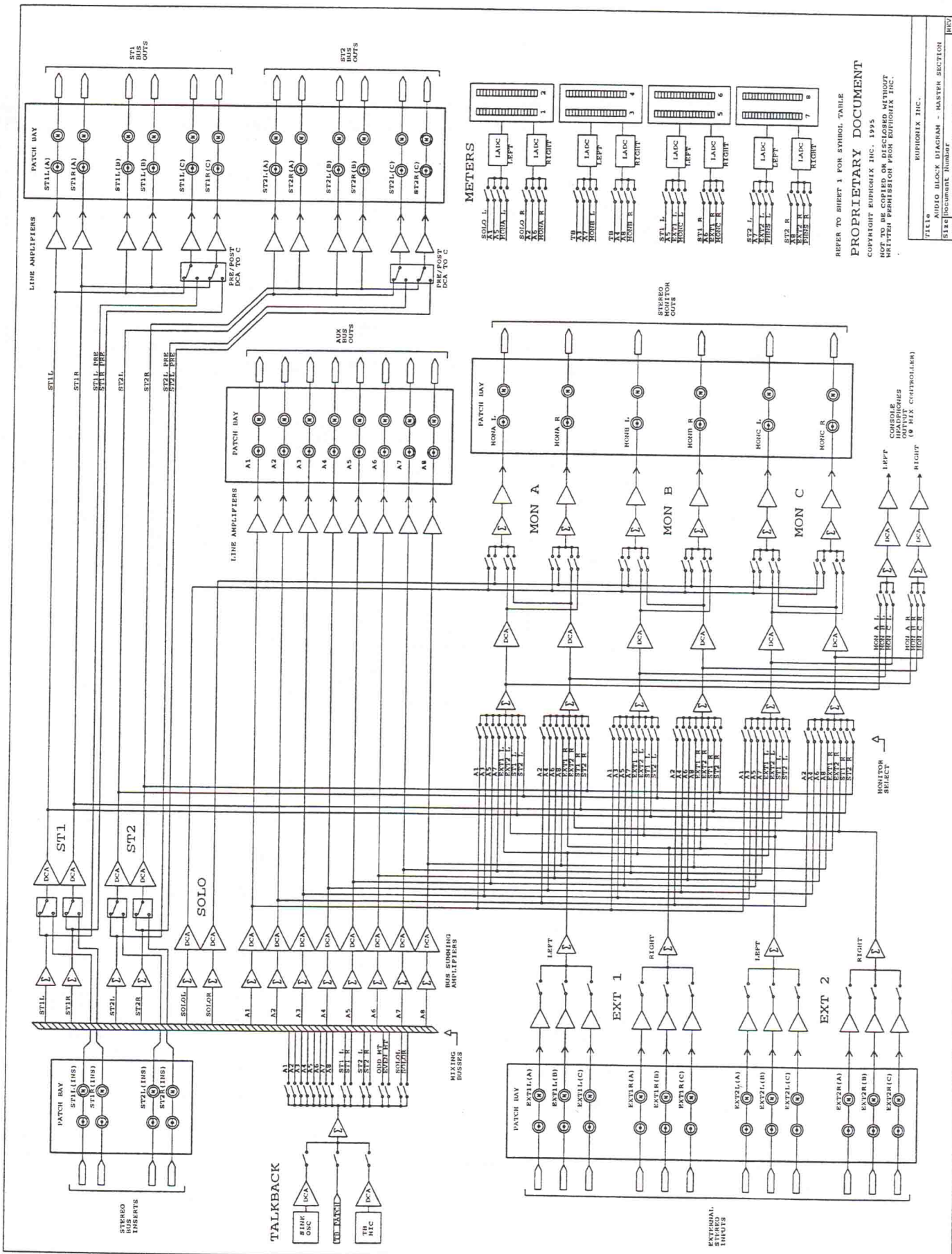
TBL.3 BLOCK COMMANDS

1. CHANNEL ORDER
2. ZERO PADER
3. STEREO REVERSE
4. FOLLOW UPPER FADER
5. FOLLOW LOWER FADER

TBL.4 METER SELECT

1. M1 MIC
2. M2 MIC
3. M3 MIC
4. M4 MIC
5. BUS L4 BUS/LINE
6. BUS M2 BUS/MIC
7. UPL UPR UPPER FADER
8. UPL LFR LOWER FADER

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