

# PA MIXER PM-1000 SERVICE MANUAL

The PM-1000 is a 4-bus mixing console with 16 input channels. Yamaha engineers, in cooperation with soundmen, mixers and performers, designed this board to meet with widely varied demands of professional sound reinforcement, as well as studio applications. Modular construction and all solid state circuitry assure reliability and ease of maintenance.

To enhance its appearance, the console is finished with durable, black-anodized aluminum panels and housed in a handsome rosewood cabinet with a padded armrest. Carrying handles on the side panels and a padded leatherette cover are included as standard equipment.

Every console is delivered complete with a full complement of modules, and ready for use. Transformer isolated inputs and outputs, plus a precision, wide-range input sensitivity selector on each channel help simplify installation and optimize performance with virtually any type of audio system. Further convenience is afforded by the 40 XLR connectors, eight (8) phone jacks and two (2) stereo phone jacks that carry all input and output signals.

The PM-1000 is built to exacting standards. It is light, yet rugged enough to sustain the kind of punishment that often occurs in portable applications. For fixed installations, the console has all the features and appearance of many larger, custom boards. Top of the line performance at an economical price sets the PM-1000 in a class by itself.

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## PARTS ASSEMBLY AND WIRING DIAGRAM

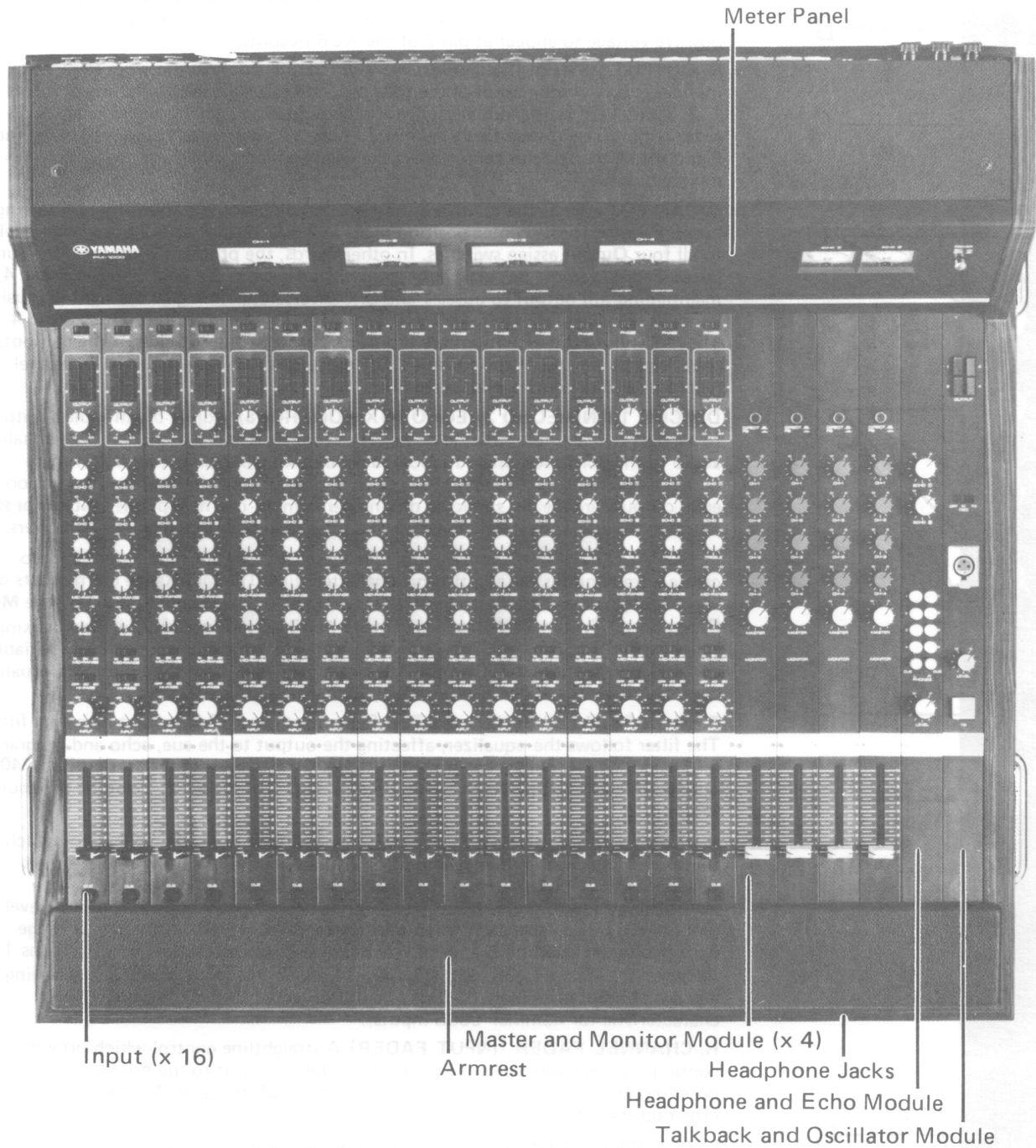
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# IDENTIFICATION OF PARTS AND CONTROLS

## MAIN COMPONENTS & SUB ASSEMBLIES\*



\*Many times there is more than one label appropriate to a console control or function. Depending on the specific application or the industry (recording or sound reinforcement), the nomenclature will vary. To avoid confusion in this manual, wherever possible, we will try to refer to the nomenclature actually printed on the

console. Where function may be unclear, an alternate term may be printed in parentheses. Some examples of this alternate terminology are: **Echo** (foldback or stage monitor), **Monitor** (speaker feed), **Line Output** (program output), and **Sub In** (auxiliary input).

## THE INPUT MODULE

**A. PHASE SWITCH** Reverse the polarity of the audio signal entering the input module. This switch eliminates the need to rewire connectors for out-of-phase audio sources. Sliding the switch from **N** (normal) to **R** (reverse) interchanges the leads joining pins 2 and 3 of the XLR connector to the input transformer's primary winding.

**NOTE:** PM-1000 XLR connectors are wired according to DIN Standards; pin 2 high and pin 3 low. Refer to the Installation Section for details. *Normal* phase for this console means that a positive voltage applied to pin 2 at the input causes a positive voltage to appear at pin 2 of the XLR outputs.

**B. OUTPUT ASSIGN (BUS ASSIGN) SWITCHES** Apply audio from the input module to any combination of the four program mixing buses. Latching switches 1, 2, 3 and 4 either individually or in any combination assign post-equalizer and fader audio to correspondingly numbered buses. As described below, adjusting the **Pan** pot to either side of center alters the level applied to the four program mixing buses.

**C. PAN POT** adjusts the relative output level available to the four program mixing buses. Panning to the center position provides equal output at full post-fader level to all four **Output** assign switches. In other words, the program is *centered* in four buses. Panning to the left gradually removes audio from the feed to buses 2 and 4, maintaining full output to buses 1 and 3. Conversely, panning to the right gradually removes the output from buses 1 and 3, maintaining full output in buses 2 and 4. The *left* and *right* designations are arbitrary, based on the rotation of the pan pot; they refer to the use of the console's line outputs for driving stereo or 4-channel recorders and/or loudspeaker systems.

**D. ECHO 1 AND ECHO 2 (ECHO MIX CONTROLS)** Adjust the module's output to each of two auxiliary mixing buses. These controls apply pre-fader, post-equalizer audio to the correspondingly numbered echo mixing buses. The audio on these buses can be fed to external reverbs, echo devices or tape delay units. In addition, the echo outputs are ideally suited to driving performers' cue headphone systems or stage monitor (foldback) systems; these applications require external power amplifiers.

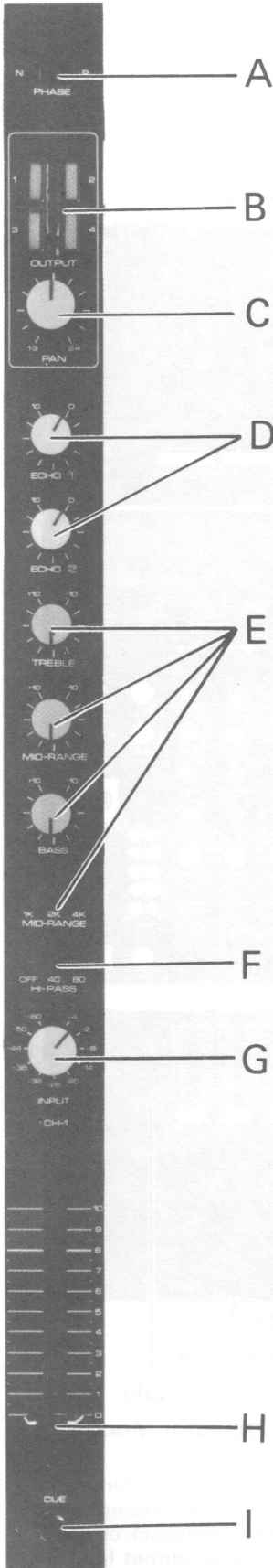
**E. EQUALIZER** Alters the frequency response of the input module in order to create a tremendous variety of tonal characteristics. The **Mid-Range** control acts on any of three *presence* frequencies (1kHz, 2kHz or 4kHz), as determined by the **Mid-Range Select Switch**. **Mid-Range** provides  $\pm 15$ dB of continuously variable peaking equalization. The **Bass** and **Treble** controls provide  $\pm 15$ dB of continuously variable shelving equalization at 100Hz and 10kHz respectively. Centering the three equalizer controls provides flat audio response by defeating all equalization.

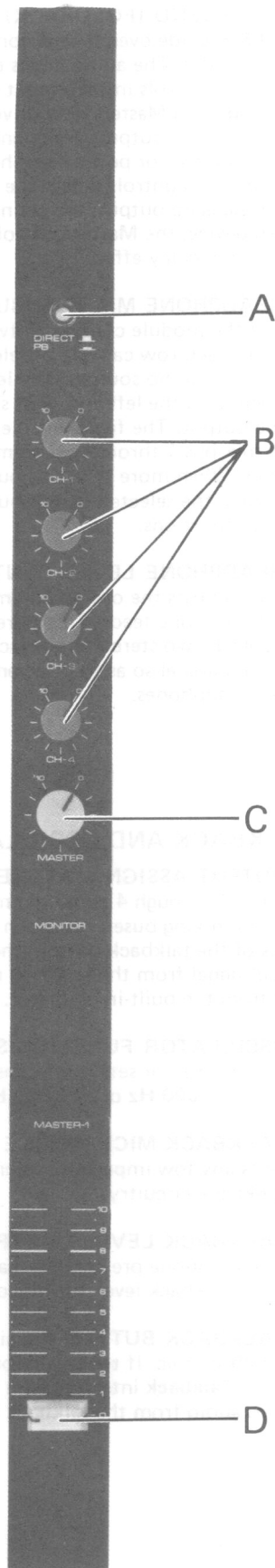
**F. HIGH PASS (LOW CUT) FILTER** Switch-actuated 12dB/octave high pass filter. The filter follows the equalizer, affecting the output to the cue, echo and program mixing buses. The switch has three positions: **OFF** bypasses the filter entirely; **40** attenuates audio below 40Hz; **80** attenuates audio below 80Hz, the most pronounced filter effect.

**G. INPUT LEVEL (INPUT SENSITIVITY) SWITCH** A precision 4-stage switch that varies the preamplifier gain and/or attenuates the incoming signal. **Input Level** affects all outputs from the module. It provides optimum results with virtually any input, from -60dB to +4dB. When correctly adjusted, **Input Level** permits the input faders and echo mix controls to be used in their best range — with maximum headroom and minimum noise characteristics. The switch has 11 settings: -60, -50, -44, -38, -32, -26, -20, -14, -8, -2 and +4dB, each corresponding to a nominal input level (i.e., -60dB is not a 60dB pad, but is the most sensitive characteristic for nominal -60dB inputs).

**H. CHANNEL FADER (INPUT FADER)** A straightline control which provides continuously variable adjustment of the module's output to the program mixing buses, completely killing the signal at the bottom of its travel. The fader has no effect on the echo or cue outputs of the module.

**I. CUE (PREVIEW/SOLO) BUTTON)** Applies audio to an auxiliary cue mixing bus when the button is depressed. The cue bus is fed with pre-fader, post-equalizer audio. Since the cue feed is unaffected by the channel fader or the echo mix controls, the incoming signal may be previewed prior to assigning any audio to the program mixing or echo mixing buses. **Cue** is monitored via the headphone output.





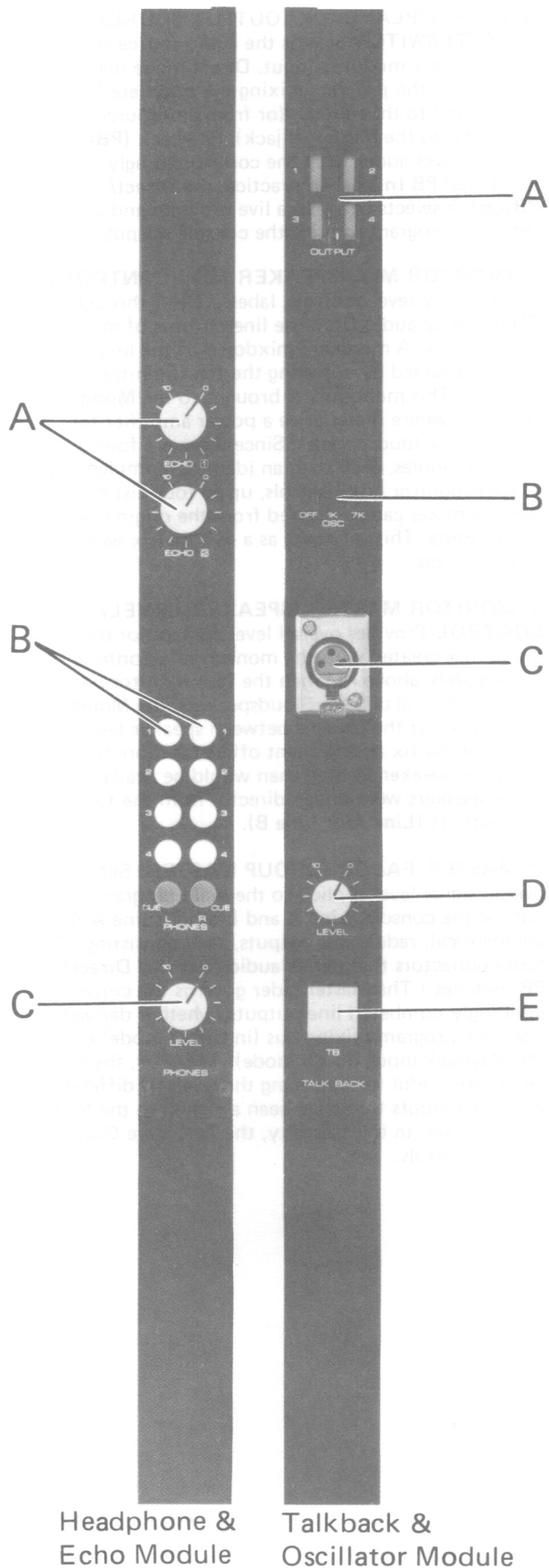
## MASTER AND MONITOR MODULE

**A. DIRECT/PLAYBACK (OUTPUT SOURCE SELECT) SWITCH** Selects the audio source applied to the master module's input. **Direct** mode derives audio from the program mixing bus numbered to correspond to the module (or from any source plugged into the **Master In** jack). **Playback (PB)** mode derives audio from the correspondingly numbered **PB In** jack. In practice, the **Direct/PB** switch selects between a live program and a recorded program to drive the console output.

**B. MONITOR MIX (SPEAKER MIX) CONTROLS** These rotary level controls, labeled **CH-1** through **CH-4**, derive audio from the line outputs of master modules 1-4. A monaural mixdown of the line outputs is obtained by adjusting the four monitor mix controls. This mono mix is brought to the **Monitor Out** jack, where it can drive a power amplifier for one or more loudspeakers. Since there are four master modules, each with an identical complement of four monitor mix controls, up to four distinct speaker mixes can be derived from the original four line outputs. This is known as a 4x4 matrix with level controls.

**C. MONITOR MASTER (SPEAKER LEVEL) CONTROL** Provides overall level control for the mono mix created with the monitor mix controls immediately above it. When the four monitor outputs are driving different loudspeakers, the **Monitor Masters** adjust the balance between speaker feeds. This 4x4 matrix arrangement offers far more flexibility for speaker feeding than would be available if the speakers were driven directly from the four line outputs (**Line A** or **Line B**).

**D. MASTER FADER (GROUP MASTER)** Sets the overall signal level applied to the main program outputs of the console, **Line A** and **Line B**. (**Line A** & **B** are identical, redundant outputs, each consisting of four connectors that derive audio from the **Direct/PB** switches.) The **Master** fader governs the correspondingly numbered line outputs, whether derived from the program mixing bus (in **Direct** mode) or the Playback input (in **PB** mode). Together, the four faders are useful for balancing the levels of different groups of inputs that have been assigned to the four mixing buses; in this capacity, the faders are Group Master controls.



Headphone & Echo Module

Talkback & Oscillator Module

## HEADPHONE AND ECHO MODULE

**A. ECHO SEND (FOLDBACK) MASTER CONTROLS** Provide overall level control for echo mixing buses 1 and 2. The audio mixes established with the echo mix controls in each input module pass through the **Echo Send Masters**, and drive the **Echo Out** jacks. When the echo outputs are connected to foldback (stage monitor) or performers' headphone systems, these master controls determine the monitor volume. When the echo outputs are connected to an echo or reverb device, the **Master** controls determine the level of the delay effect.

**B. HEADPHONE MIX PUSHBUTTONS** This portion of the module consists of two rows of pushbuttons, each row capable of selecting any combination of five audio sources. The left and right rows feed audio to the left and right sides of the headphone output. The five available sources are: program mix bus 1 through program mix bus 4, and the cue bus. When more than one pushbutton per row is latched, the selected audio sources are blended in equal proportions.

**C. HEADPHONE LEVEL CONTROL** Simultaneously adjusts the overall volume of the left and right headphone feeds. This stereo output is available at two stereo phone jacks. The jacks are wired in parallel so as to drive one or two pairs of stereo headphones.

## TALKBACK AND OSCILLATOR MODULE

**A. OUTPUT ASSIGN SWITCHES** When latched, switches 1 through 4 apply the module's output to program mixing buses 1 through 4. Depending on the status of the talkback button, the output will be either a vocal signal from the talkback mic input, or a test tone from the built-in oscillator.

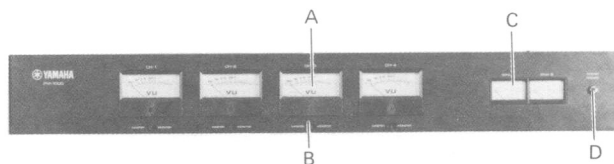
**B. OSCILLATOR FUNCTION SWITCH** Turns the oscillator **OFF**, or sets it for constant sine wave generation at **1,000 Hz** or at **7,000 Hz**.

**C. TALKBACK MICROPHONE CONNECTOR** Accepts any low impedance microphone for use with the talkback circuitry.

**D. TALKBACK LEVEL CONTROL** Adjusts the talkback microphone preamplifier gain. This control affects only the talkback level, not the oscillator.

**E. TALKBACK BUTTON** Pressing this button activates the talkback mic. If the oscillator is already switched on, pressing **Talkback** interrupts the oscillator and substitutes audio from the talkback preamplifier.

## METER PANEL



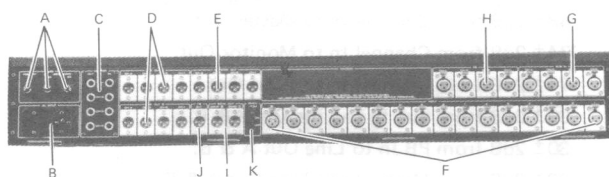
**A. MAIN (PROGRAM OUTPUT) VU METER** Four illuminated meters that provide a visual indication of the average audio output level from Master and Monitor modules 1 through 4. Depending on the setting of the function switch, each meter displays either the **Master** (Line Out) or **Monitor** Out level. A zero VU indication is equivalent to +4dBm output into a 600-ohm termination.

**B. METER FUNCTION SWITCH** Two-position slide switch allows use of the associated VU meter for monitoring either of two console outputs, **Master** (Line) or **Monitor**. The Master indication is derived from the **Line Out A** jack, and the Monitor reading is derived from the **Monitor Out** jack that corresponds in number to the VU meter.

**C. ECHO OUTPUT VU METER** Two illuminated VU meters provide a visual indication of the signal level at the Echo 1 and Echo 2 outputs. When driving monitor (foldback) systems from the echo outputs, these meters indicate the stage monitor level. A zero VU indication is equivalent to a +4dBm output into a 600-ohm termination.

**D. MAIN POWER (AC ON/OFF) SWITCH** Pushbutton alternately switches the AC power on and off. No audio passes through the console when power is off.

## REAR PANEL



**A. POWER FUSES** Protect the primary (line) and secondary (low voltage) portions of the console's power supply.

**B. POWER CORD CONNECTOR** Accepts the AC power cord provided with the console.

**C. MASTER OUT & MASTER IN** Provide a patch point between the program input to the Master and Monitor module and the input to the **Direct/PB** switch. The jacks are wired to accept standard phone plugs. Their nominal operating level is -20dB (for high impedance circuits).

**D. LINE-A-OUT AND LINE-B-OUT JACKS (PROGRAM MIX OUT)** These are redundant outputs. **Line A** and **B** each consist of four jacks, and the signal is derived from the Master Faders. The nominal output is +4dBm (for 600-ohm termination), and the connectors accept XLR type 3-pin female plugs.\*

**E. MONITOR OUT (SPEAKER FEED) JACKS** Carry the console output from the Monitor Mix (Speaker Matrix) section. Each **Mon Out** jack, 1 through 4, carries audio from the correspondingly numbered **Monitor Master** control. The outputs are nominal +4dBm (for 600-ohm termination), and the connectors accept XLR type 3-pin female plugs.\*

**F. CHANNEL INPUT JACKS** Numbered 1 through 16, the **Input** jacks accept audio from any low impedance, balanced or floating audio source from -60dB to +4dB nominal level. The inputs are balanced and transformer-isolated, but auxiliary matching transformers are recommended for unbalanced, high-impedance inputs. The connectors accept XLR type 3-pin male plugs.

**G. SUBMIXER INPUT JACKS** Numbered 1 through 4, these jacks accept audio from a low impedance, low level source, such as the Yamaha PM-400 mixer. The **Sub In** jacks are designed for nominal -20dB levels, and accept XLR type 3-pin male plugs.\* Audio from **Sub In** is applied to the program bus ahead of the Master Faders, thus the Master Faders control the Sub In level.

**H. PLAYBACK INPUT JACKS** Numbered 1 through 4, the **PB In** jacks accept audio from a low impedance, low level tape machine output. This audio is applied to the PB side of the **Direct/PB** switch in the correspondingly numbered Master and Monitor module. The **PB In** jacks are designed for -20dB levels and accept XLR type 3-pin male plugs.\*

**I. ECHO OUTPUT (FOLDBACK OUT) JACKS** Carry the console output from Echo Send 1 & 2 Masters. The **Echo Out** jacks are transformer-isolated, nominal +4dBm (for 600-ohm termination), and they accept XLR type 3-pin female plugs.\* As discussed previously, these jacks may be used to drive foldback (stage monitor) amplifiers or performers' headphone amplifiers.

**J. TALKBACK OUTPUT JACK** Carries the output of the Talkback & Oscillator module, even if the module's bus assign switches are not latched. The **TB Out** jack can be connected to a power amplifier, directly to headphones, or to any point where the oscillator or talkback signal is needed. For calibrated operation with optimum fidelity, **TB Out** delivers +4dBm into a 600-ohm termination. The connector accepts an XLR type 3-pin female plug.\*

**K. PHANTOM POWER SWITCH** Connects the 48Vdc phantom power supply to the center tap of all input transformer primary windings. Recommended procedure is to turn off the phantom power whenever condenser microphones are not used; however, the "phantom" switch may be left on without damaging most standard microphones, line inputs, or the phantom supply.

\*Refer to the Installation Section of this Manual for information regarding the polarity of all XLR connectors.

# SPECIFICATIONS

## GENERAL SPECIFICATIONS

<b>Frequency Response</b>	+0, -4dB, 20Hz - 20kHz; ±0.5dB, 50Hz - 15kHz.
<b>Total Harmonic Distortion</b>	Less than 0.25% @ +10dB, 20Hz - 20kHz; Less than 0.5% @ +20dB, 70Hz - 15kHz.
<b>Hum and Noise* (20Hz - 20kHz)</b>	-124dBm Equivalent Input Noise (E.I.N.). -69dB (73dB S/N) Line Out A & B: Master Fader at nominal level and all Input Faders down. -60dB (64dB S/N) Line Out A & B: Master Fader and one Input Fader at nominal level. -63dB (67dB S/N) Echo Out: Master Send at nominal level and all Echo Mix Controls down. -54dB (58dB S/N) Echo Out: Master Send and one Echo Mix Control at nominal level.
<b>Maximum Voltage Gain (Input Selectors at -60dB, where applicable)</b>	PROGRAM — 74 ± 2dB from Channel In to Line Out A & B. 48 ± 2dB from Channel In to Master Out. MONITOR — 74 ± 2dB from Channel In to Monitor Out. ECHO — 74 ± 2dB from Channel In to Echo Out. SUB IN — 30 ± 2dB from Sub In to Line Out A & B. PB IN — 30 ± 2dB from PB In to Line Out A & B. MASTER — 32 ± 2dB from Master In to Line Out A & B.
<b>Equalization</b>	BASS — ±15dB @ 100Hz, shelving. MID-RANGE — ±15dB @ 1kHz, 2kHz or 4kHz; peaking. TREBLE — ±15dB @ 10kHz, shelving.
<b>High Pass Filter</b>	12dB per octave roll-off below 40Hz or 80Hz.
<b>Oscillator</b>	1kHz or 7kHz sine wave, +4dBm @ < 0.5% THD.
<b>Talkback</b>	Microphone input jack, preamp, level control, and push-to-talk switch; to pgm. buses and/or direct out.
<b>Inputs to Console</b>	16 x Channel Inputs (microphone and line sources). 4 x Sub In (Submixer input). 4 x Master In (Hi-Fi auxiliary program input). 4 x PB In (Playback input). 1 x Talkback Mic In.
<b>Mixing Buses</b>	4 x Main Program (Line Out). 4 x Monitor (Speaker feed). 2 x Echo (Foldback/stage monitor). 1 x Cue (Preview).
<b>Console Outputs</b>	8 x Line (4 Line A, 4 Line B). 4 x Monitor (Speaker feed). 4 x Master (Hi-Fi auxiliary program output). 2 x Echo (Foldback/stage monitor). 1 x Talkback (Talkback mic or oscillator out). 2 x Stereo Headphone (Console operator's monitor).
<b>Crosstalk</b>	-60dB at 1,000Hz adjacent inputs, -50dB at 1,000Hz, input to output.
<b>VU Meters (0 VU=+4dBm)</b>	4 x large, illuminated meters; switchable for Master (Line Out) or Monitor (Monitor Out). 2 x small, illuminated meters; Echo (Foldback) Out.
<b>Phantom Power</b>	48Vdc applied to balanced channel input transformers for powering condenser microphones. May be turned On or Off with rear-panel switch.
<b>Power Supply</b>	Self-contained module inside console, fused and fully regulated. 110, 117, 130, 220 or 240 VAC, 50-60Hz, 45 Watts.
<b>Finish</b>	Black-anodized aluminum panels, padded armrest, rosewood veneer cabinet.
<b>Dimensions</b>	34 1/4" (87.2cm) wide x 34 1/2" (87.5cm) deep x 11" (27.7cm) high.
<b>Weight</b>	110 pounds (50kg).
<b>Accessories</b>	Integral carrying handles and removable leatherette cover are included with console.

*\*Measured with 6dB/octave filter @ 12.47kHz: equivalent to a 20kHz filter with infinite dB/octave attenuation.*



## DEFINITION OF TERMS: UNBALANCED, BALANCED & FLOATING

Unbalanced, balanced and floating circuits may all be transformer-isolated. The distinction between them lies in the way the circuits are referenced to ground (audio common). A **FLOATING** circuit has no ground reference, as illustrated by the primary of the PM-1000's Sub In, PB In, and Talkback Mic input transformers and by the secondary windings of the Line Out, Monitor Out, Echo Out and Talkback Out transformers.

The PM-1000's input channel transformer primaries are **BALANCED** by virtue of their center taps. A balanced circuit requires either a center tapped transformer, or resistors from each side of the transformer to ground; either condition places both sides of the transformer at an equal difference from ground potential. In other words, the transformer is *balanced* with respect ground.

Any circuit which causes one side of an input or output to be grounded is considered an *unbalanced* circuit, unbalanced in that both sides of the circuit are at different potentials with respect to ground. Most non-transformer connections, including the PM-1000's **Master In** and **Master Out** jacks, are unbalanced (there are exceptions, but they are rare).

Typical unbalanced audio sources are: direct feeds from electric instruments, from power amplifiers, and from high fidelity tape machines. In order to obtain best results when using these devices with the PM-1000's channel inputs, a matching transformer should be inserted at the remote device. The transformer prevents the console's input transformer from becoming unbalanced, which may induce noise and crosstalk. Also, the matching transformer provides the best impedance match for high impedance sources.

Typical floating sources (which maintain a balanced condition in the PM-1000 channel inputs) are: microphones, transformer-isolated submixers, and virtually any transformer-isolated output from auxiliary professional equipment.

## DEFINITION OF TERMS: dB, dBV, dBm and dB SPL

The term dB, which means decibel (1/10th of a Bel) expresses a ratio. More precisely, dB is 10 times the logarithm of a power ratio and 20 times the logarithm of a voltage or sound pressure ratio.

dBV expresses a voltage ratio. It is not directly related to current or circuit impedance. The 0 dBV reference is 0.775Vrms.

dBm expresses a power ratio. It is related to the voltage or current across a low impedance. The 0 dBm reference is 0.775Vrms in a 600-ohm circuit, which is equal to 1 milliwatt at 600 ohms.

dB SPL expresses an acoustic pressure (not power) ratio. The 0 dB SPL reference is approximately the threshold of human hearing at 1kHz, which is equal to 0.0002 dynes/cm<sup>2</sup>.

dB expresses the difference between two levels (power, voltage etc.) and is a relative term. The difference between +10dBm and +4dBm is 6dB. The difference between -20dBV and -10dBV is 10dB.

dBV and dBm are numerically equal when dealing with 600-ohm circuits. However, as the impedance is changed to other than 600-ohms (given a constant voltage), the value of dBV remains constant while the value of dBm changes. For example, consider a +4dBm output terminated by 600 ohms. The voltage level is +4dBV. This circuit has a voltage drop of 1.23Vrms, and a power dissipation of 2.5 milliwatts. Assume that the voltage now remains constant, but the termination is changed to 1200 ohms. The voltage level remains +4dBV but the power dissipation drops to 1.23mW, +1dBm. Continuing this illustration, we raise the termination to 47,000 ohms. The voltage level remains +4dBV (1.23 Vrms), but the power level drops to a mere 32 microwatts, -15dBm.

The above illustration points out that the power dissipation in high impedance circuitry is negligible. Therefore, dBV is commonly used to express signal levels in high impedance lines. dBm is commonly used to express signal (power) levels in low impedance lines, roughly between 4 and 1200 ohms. In this manual we use the term "dB" to express dBV; dBm is used when expressing power levels.

An increase of 3dBm is equivalent to double the power.  
An increase of 10dBm is equivalent to ten times the power.  
A decrease of 3dBm is equivalent to half the power.  
A decrease of 10dBm is equivalent to 1/10th the power.  
An increase of 6dBV is equivalent to double the voltage.  
An increase of 20dBV is equivalent to ten times the voltage.  
A decrease of 6dBV is equivalent to half the voltage.  
A decrease of 20dBV is equivalent to 1/10th the voltage.

(dB SPL is like dBV; i.e., 6dB SPL is twice the sound pressure.)

For approximate calculations, the open circuit output of a low-z microphone (in dBV) is obtained by adding the microphone's rated sensitivity to the DB SPL at the microphone. For instance, a mike rated at -50dB EIA sensitivity, when placed in a +20dB SPL environment, will have about a -30dBV output level.

## INPUT & OUTPUT CHARACTERISTICS

### INPUT SPECIFICATIONS

Connection	IMPEDANCE		SENSITIVITY* (At Max. Gain)	INPUT LEVEL		Connector In Console
	Actual	Nominal Source		Nominal*	Max. before Clip.	
Inputs (1-16)	1700 Ω, balanced	150 Ω Mics & 600 Ω Lines	0.25mV (-70dB)	0.8mV (-60dB)	12.3V (+24dB)	XLR-3-31
PB & Sub In (1-4)	2300 Ω, floating	600 Ω Lines & Instruments	40mV (-26dB)	80mV (-20dB)	3.2V (+12dB)	XLR-3-31
Master In (1-4)	9000 Ω, unbal.	5k Ω Lines & Instruments	31mV (-28dB)	62mV (-22dB)	12.3V (+24dB)	Phone Jack
Talkback Mic	2300 Ω, floating	150 Ω Mics	8mV (-40dB)	2.5mV (-50dB)	1.23V (+4dB)	XLR-3-31

### OUTPUT SPECIFICATIONS

Connection	IMPEDANCE		POWER OUTPUT LEVEL		Connector In Console
	Actual	Nominal Load	Nominal	Max. before Clipping	
Line A (1-4) Line B (1-4) Monitor (1-4) Echo 1 & 2 Talkback	100 Ω, floating	600 Ω	1.23V (+4dBm)	10.8V (+22½dBm)	XLR-3-32
Master Out (1-4)	200 Ω, unbal.	5,000 Ω	62mV (-22dB)	2.1V (+9dB)	Phone Jack
Headphones	3.2 Ω, unbal.	8 Ω or greater	80mV (-20dB)	1.23V (+4dB)	Stereo Phone Jack (x 2)

\* This is the level required to produce an output of +4dBm (1.23V).

# MAINTENANCE & REPAIR

## GENERAL MAINTENANCE NOTES

### SUGGESTED SPARE PARTS

The PM-1000 is designed and built to exacting standards, and it should continue to operate properly without special maintenance. Still, accidents and failures may occur, and spare modules can save the day in a matter of minutes. A spare input module, master module, headphone and echo module, and power supply module should cover any eventuality.

### PANEL AND CABINET CLEANING

The black-anodized panels should be cleaned with a damp sponge. Stubborn soil can be removed with a mild detergent solution, such as dishwashing detergent. Strong detergents and chemical solvents may damage the plastic fittings.

The rosewood cabinet will retain its beautiful finish with very little care. When it looks dull or soiled, apply any liquid or paste furniture polish and buff with a soft cloth; aerosols should be avoided because the solvents may attack adjacent portions of the console.

### FUSE REPLACEMENT

The rear panel is fitted with three fuse holders, one for the AC line, and two for the DC side of the power supply. Fuses should be replaced with identical type and value fuses. If a fuse continues to fail, do not install a higher value fuse — find the cause of the failures and correct the problem. In the event the problem cannot be located, contact your Yamaha dealer.

### REPAIRS

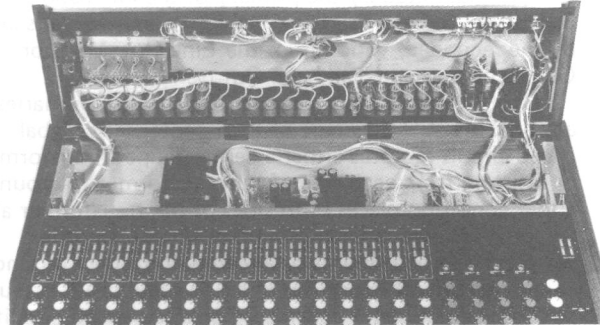
The modular construction of the PM-1000 enables almost any problem to be corrected within minutes. Defective or damaged modules should be returned to Yamaha for repair or replacement.

## ACCESS TO THE CONSOLE INTERIOR

**WARNING:** There are no user-serviceable parts inside the PM-1000. Only qualified service personnel should attempt to open the meter panel, remove a module, or gain access to the console interior for any purpose. Lethal voltages are present inside the console, and the AC line cord should be disconnected prior to opening it.

The first step is to disconnect the AC line cord. If one of the front panel modules is to be removed, the meter pod need not be opened, but the armrest must first be lifted from the cabinet. Grasp the edge of the rest that faces the console rear and lift the edge about 1" (2.5cm). Next slide the armrest toward the right side of the console (the echo meter side) about 3" (7.6cm) thereby uncoupling the hinges, then lift straight up. The binding screws and handles of the modules are now visible at the front of the console.

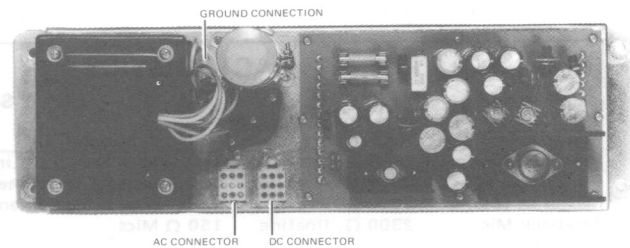
To open the meter pod, first remove the two screws from the top of the pod. The meter panel may then be tilted backward, exposing the power supply module. Exercise care not to strain the hinges on the meter pod, and avoid straining any cables connected to the rear panel.



## POWER SUPPLY REMOVAL AND REPLACEMENT

After opening the meter pod, the power supply will be visible on the bottom of the console. Grasp the locking tabs on either side of the multi-pin connectors on the top of the supply, and unplug both connectors. Then remove the four screws securing the perimeter of the power supply module to the bottom of the cabinet. Place a soft cloth on the front panel of the console, and after carefully removing the module place it onto the cloth; a ground wire is still connected to the module. Unscrew the ground wire and retain the hardware, observing the hole from which the wire is removed for future reference. This completes the removal of the supply module.

To replace the module, first reconnect the ground wire. Then lift the module into place and secure it to the cabinet with the four screws. Observe the two multi-pin connectors removed from the console; one has fewer pins actually used than the other. Observe the power supply chassis connectors, and again one connector will utilize fewer pins than the other. **BE SURE TO INSTALL THE TWO CABLES IN THE CHASSIS CONNECTORS WITH MATCHING PIN USAGE.** A key at one end of the connector assures proper orientation of the connector, but it does not prevent installation in the wrong socket.



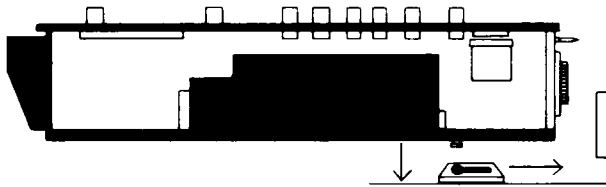
AC CONNECTOR DC CONNECTOR

## INPUT, MASTER, HEADPHONE AND TALKBACK MODULE REMOVAL AND REPLACEMENT

After removing the armrest, locate the binding screw at the front edge of the module. Remove the screw from the module and set it aside. Grasp the handle at the front edge of the module, and pull the module toward the front edge of the console about 1" (2.5cm), until it stops. Gently lift the module straight up, grasping the front and rear edges; be particularly careful not to crush any wires between the module being removed and an adjacent module.

A module must be installed in the correct portion of the console frame; while it is possible to fit an input module in the space normally occupied by a master and monitor module, the console will not function under these conditions and damage may result. When in doubt, refer to the front panel illustration in section one of this manual.

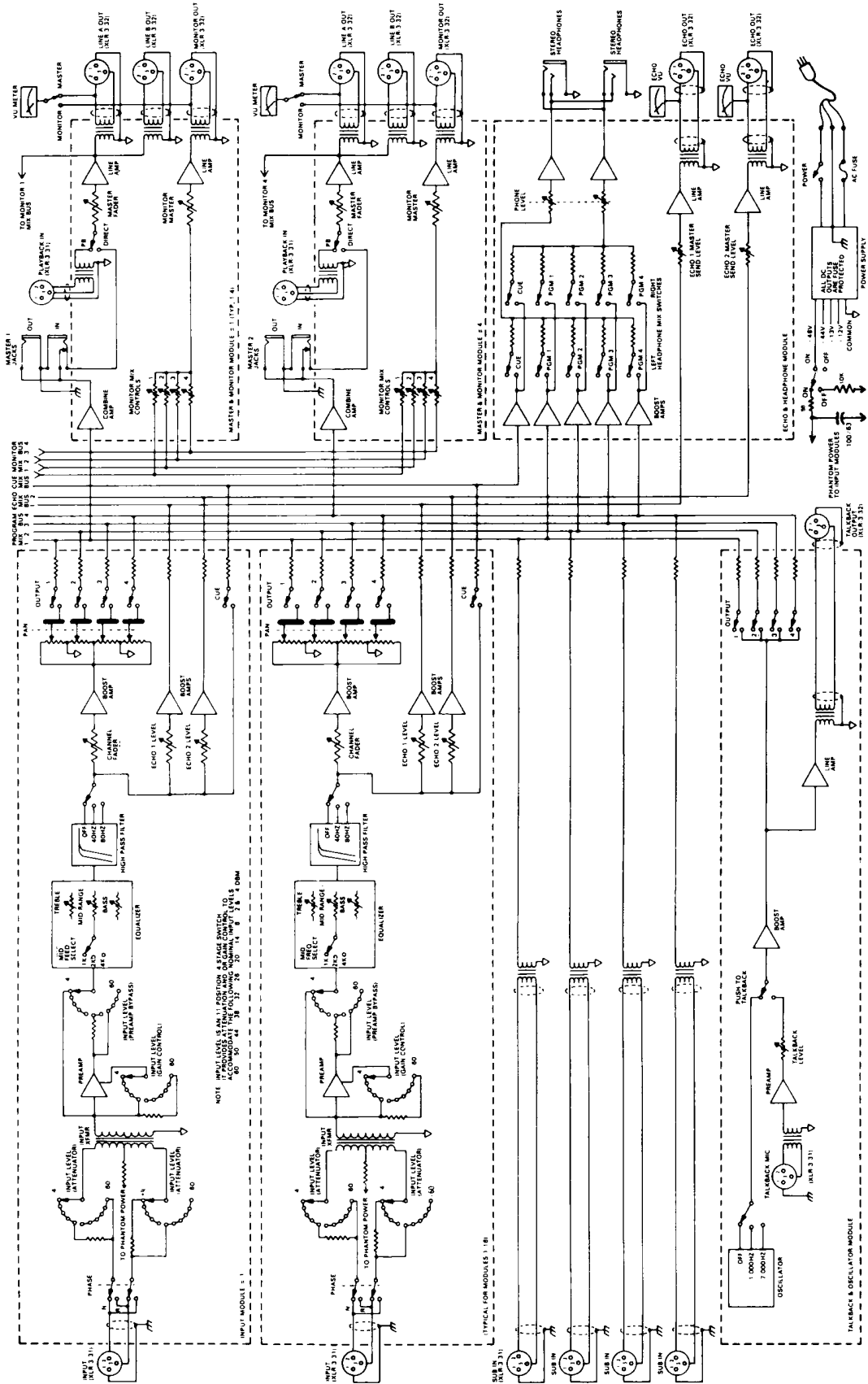
To replace a module, align it over the correct space in the frame, with the screw head in the bottom of the module frame directly over the widest part of the keyhole-locking bracket on the bottom of the cabinet. Gently push the module down until the screw head slips through the keyhole. Then push the module forward, making certain the ground pin and audio connector on the rear of the module mate with the console-mounted connectors. When the module is pressed fully forward, thread the long binding screw through the front edge and into the bottom of the cabinet. Secure the screw firmly, but do not overtighten, as this will strip the threads.



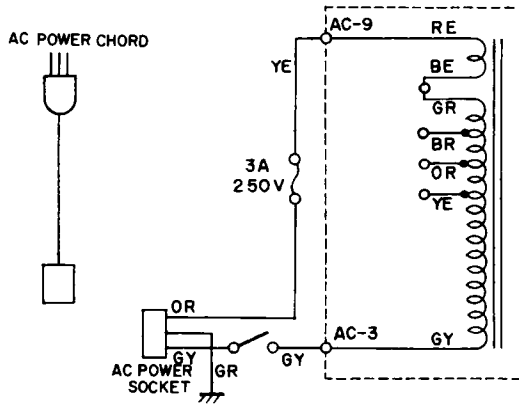
MODULE REPLACEMENT

# BLOCK & SCHEMATIC DIAGRAMS

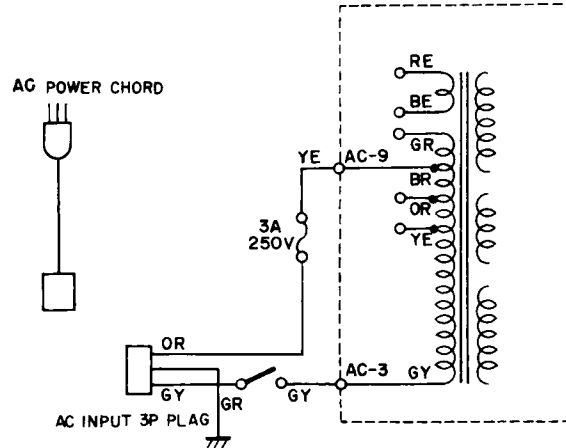
## BLOCK DIAGRAM OF PM-1000



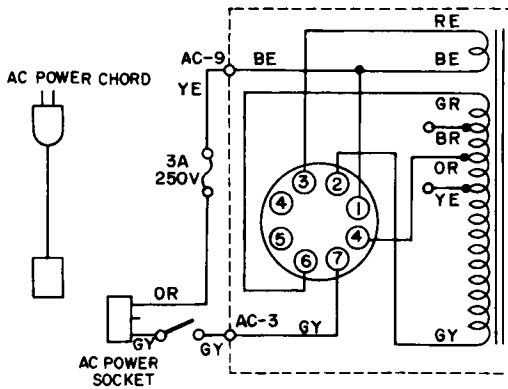
FOR AUSTRALIAN MODEL



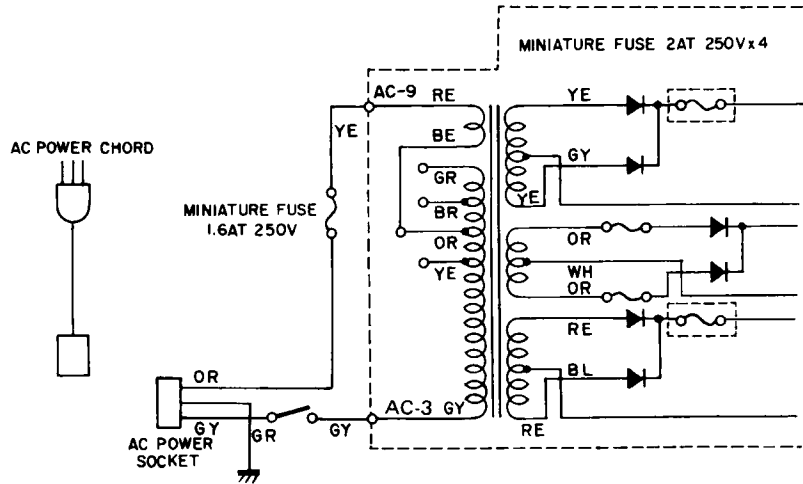
FOR U.S./CANADIAN MODEL



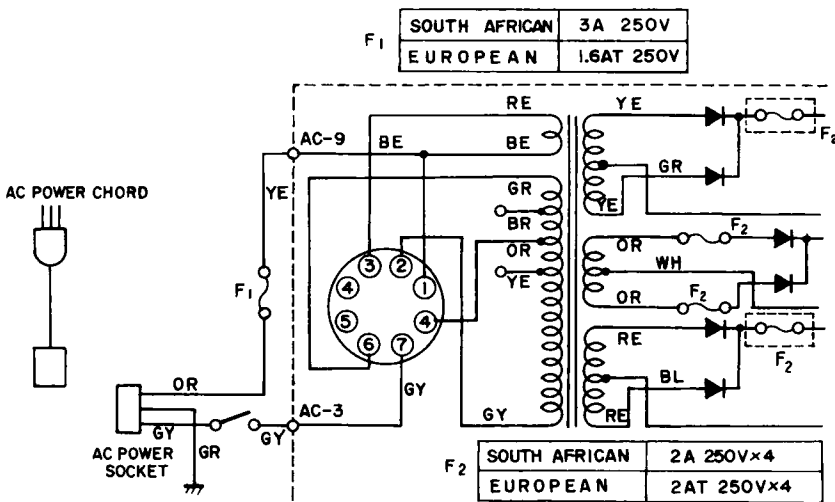
FOR GENERAL MODEL



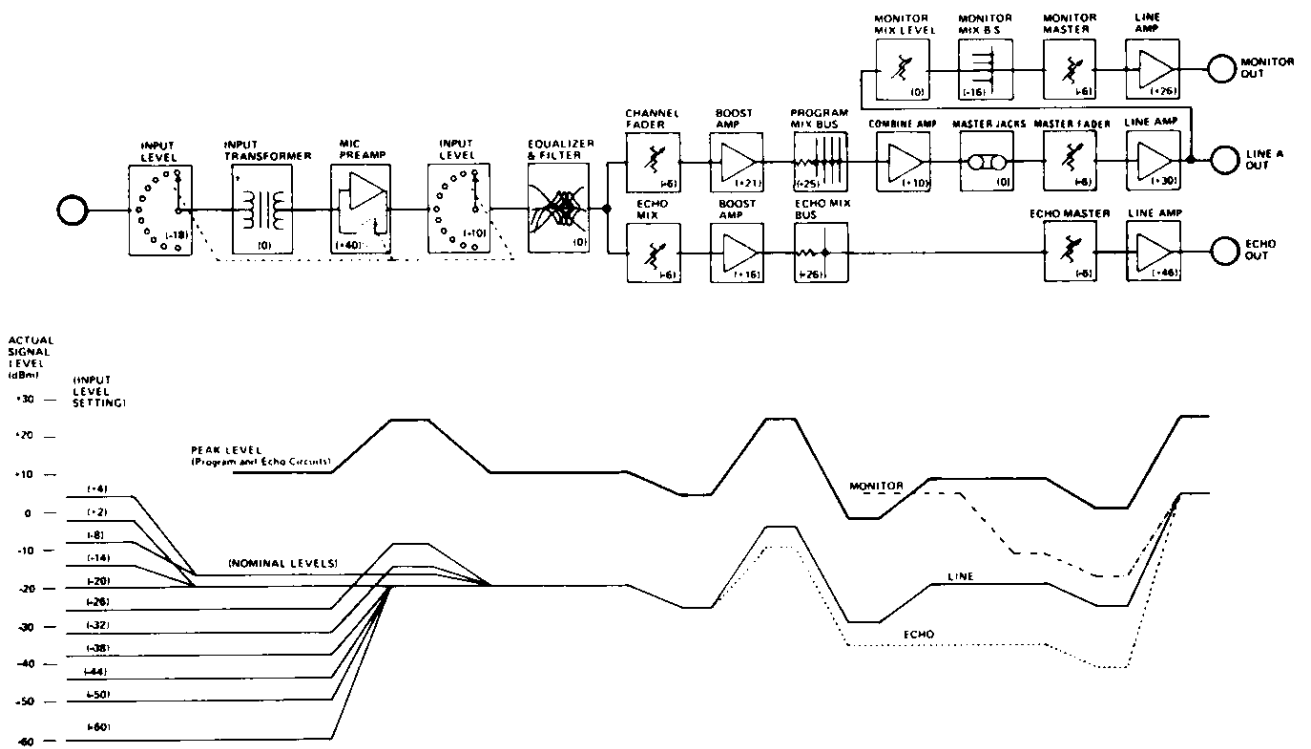
FOR NORTH EUROPEAN MODEL



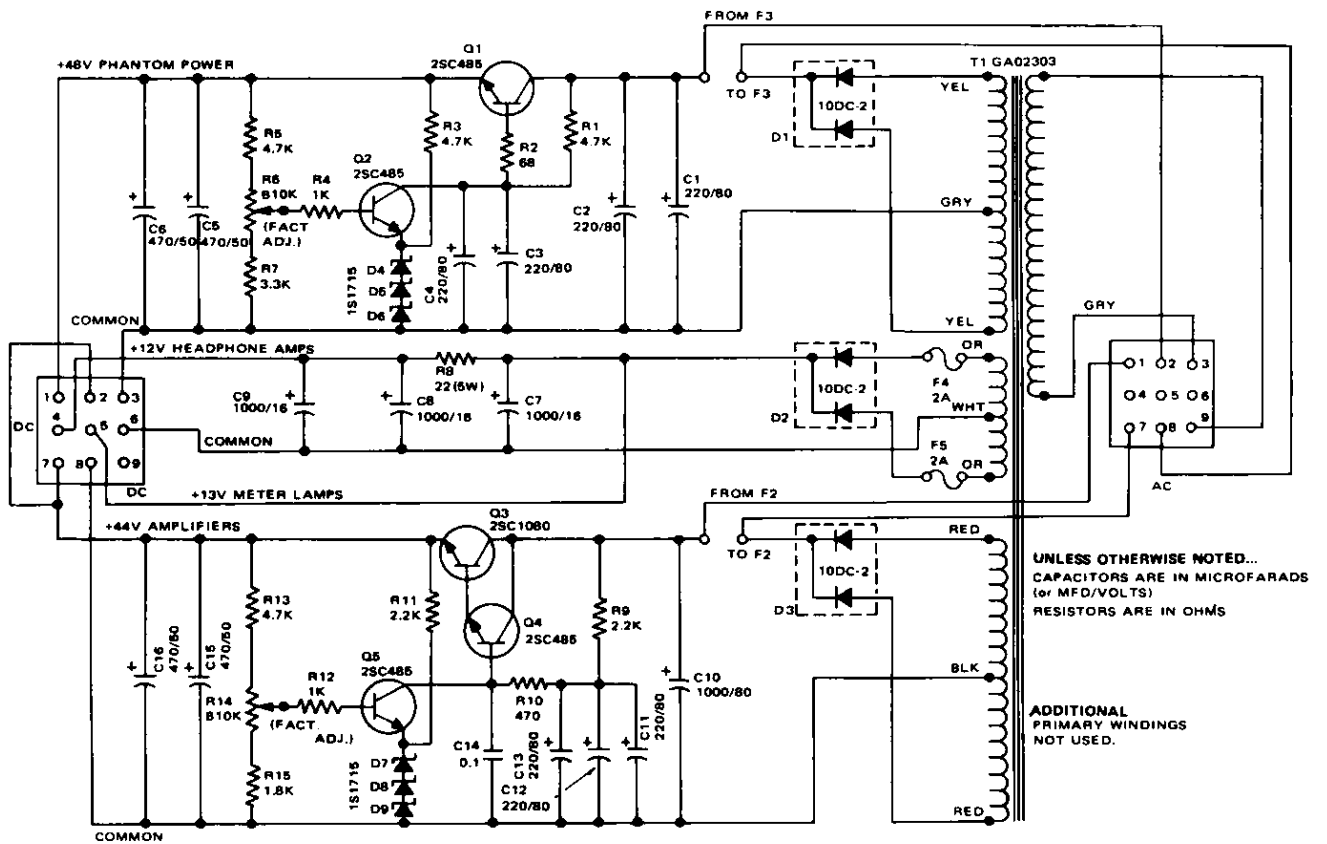
FOR SOUTH AFRICAN & EUROPEAN MODEL



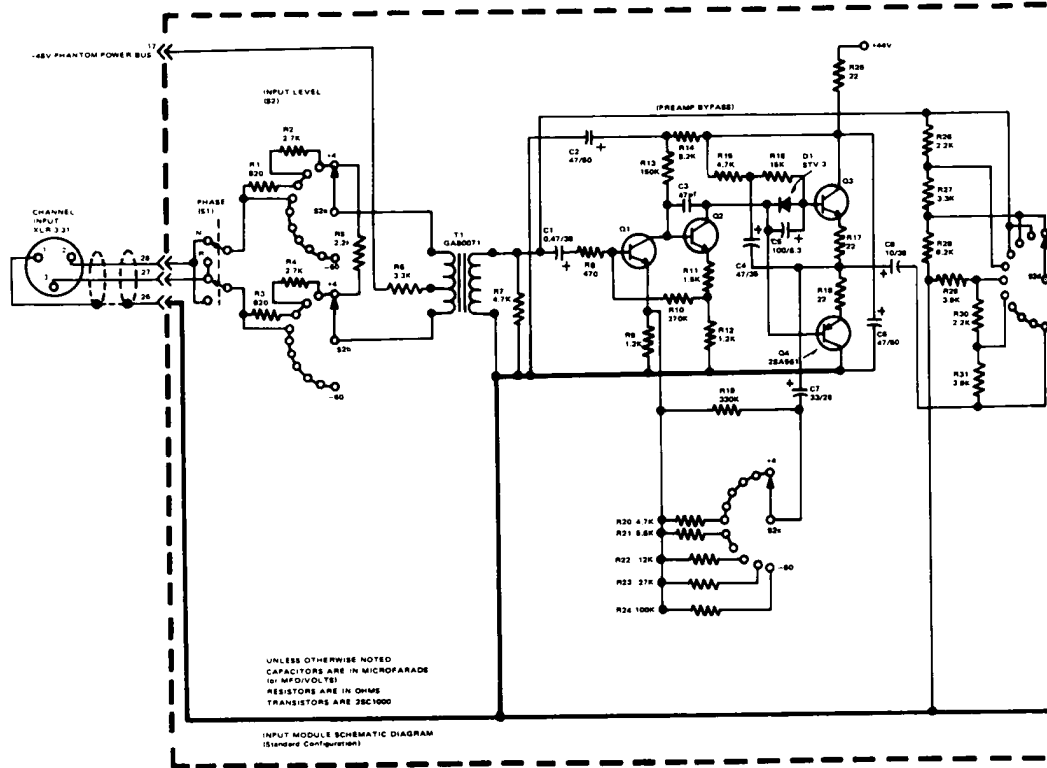
# PM-1000 SYSTEM HEADROOM



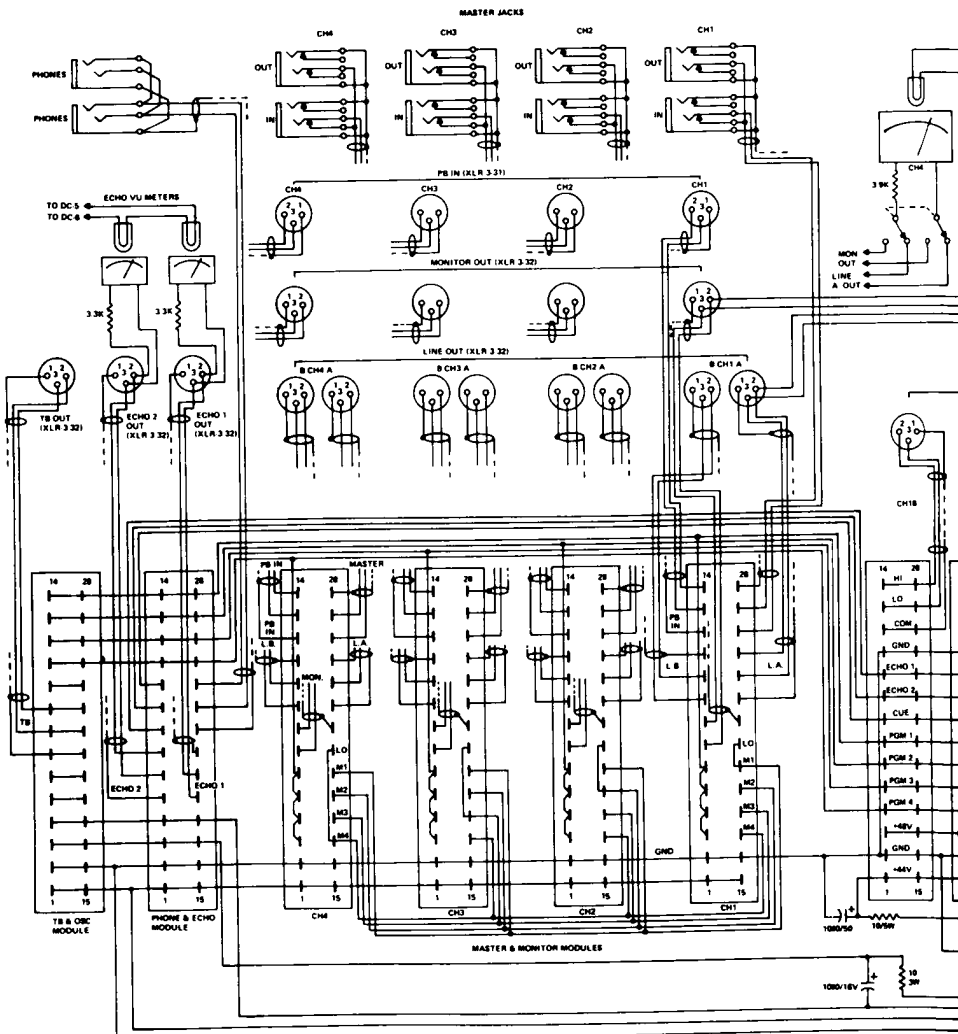
# PM-1000 POWER SUPPLY SCHEMATIC

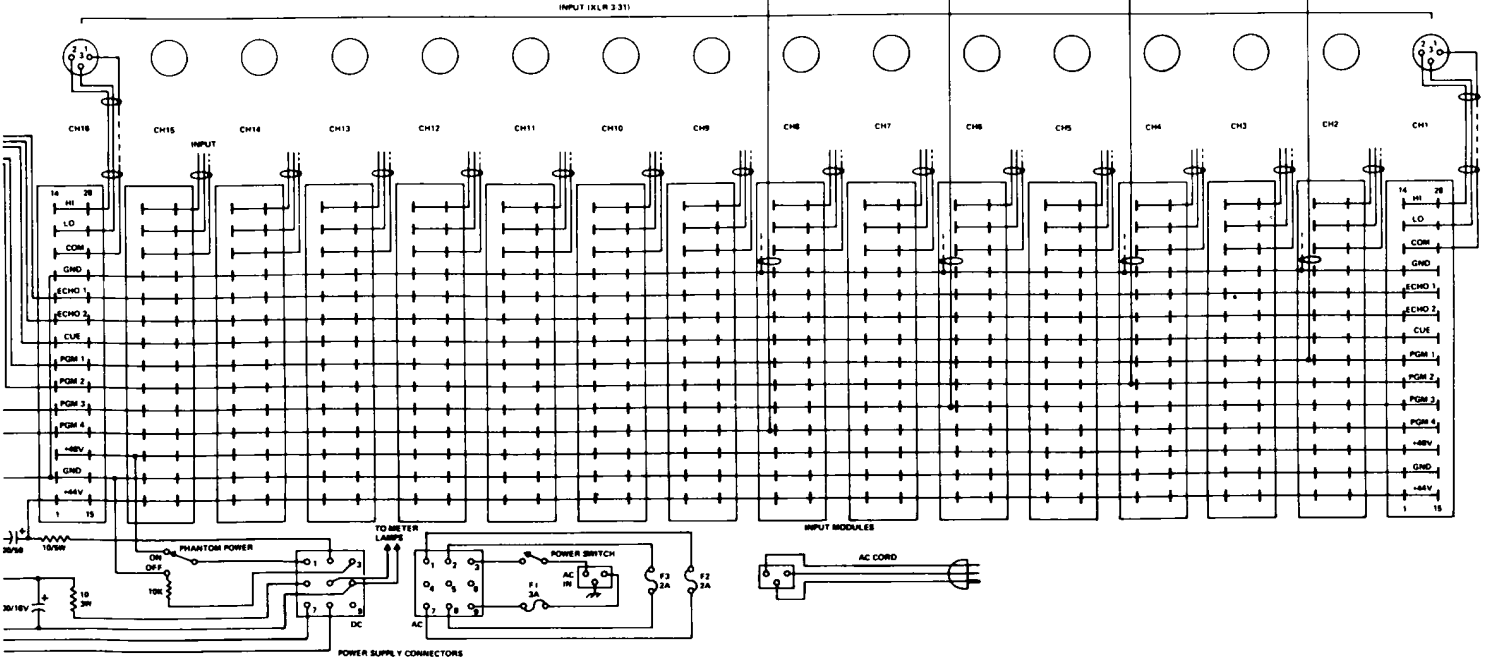
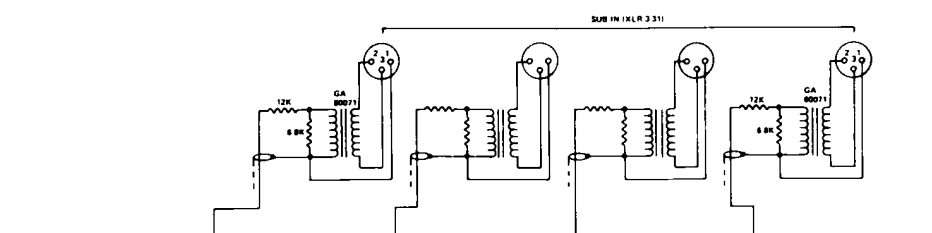
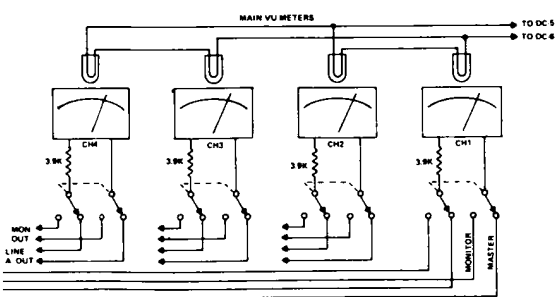
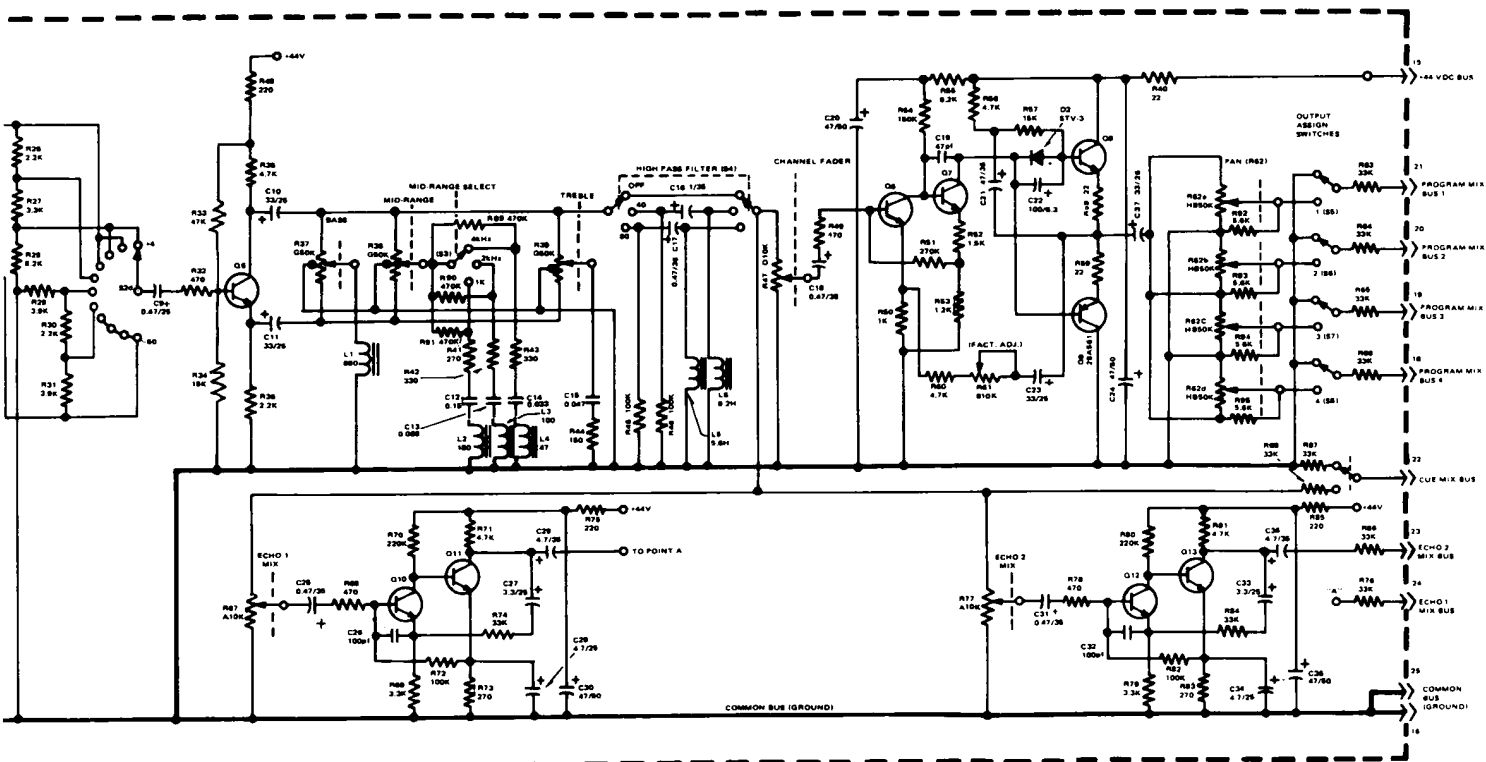


# PM-1000 INPUT MODULE SCHEMATIC



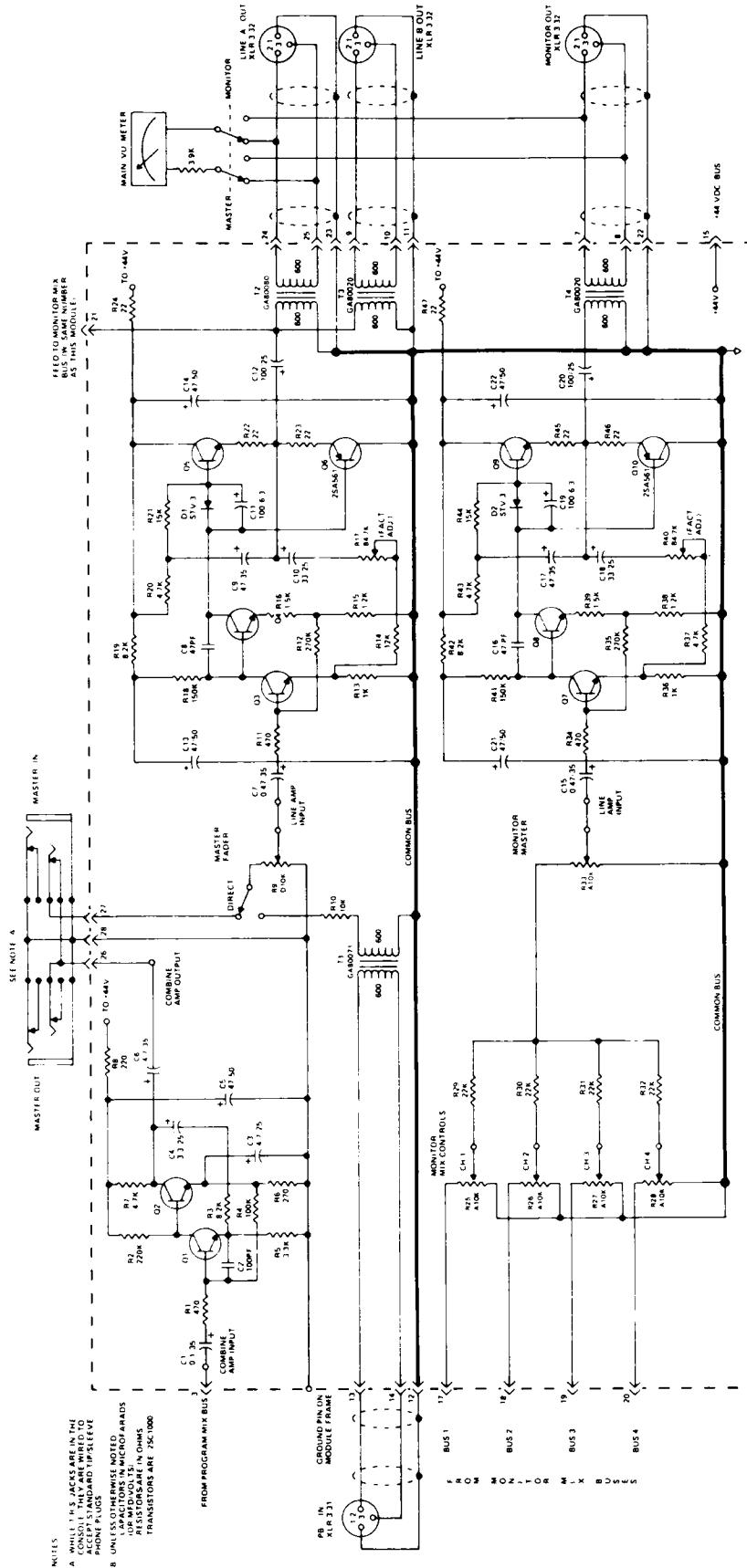
# PM-1000 FRAME SCHEMATIC



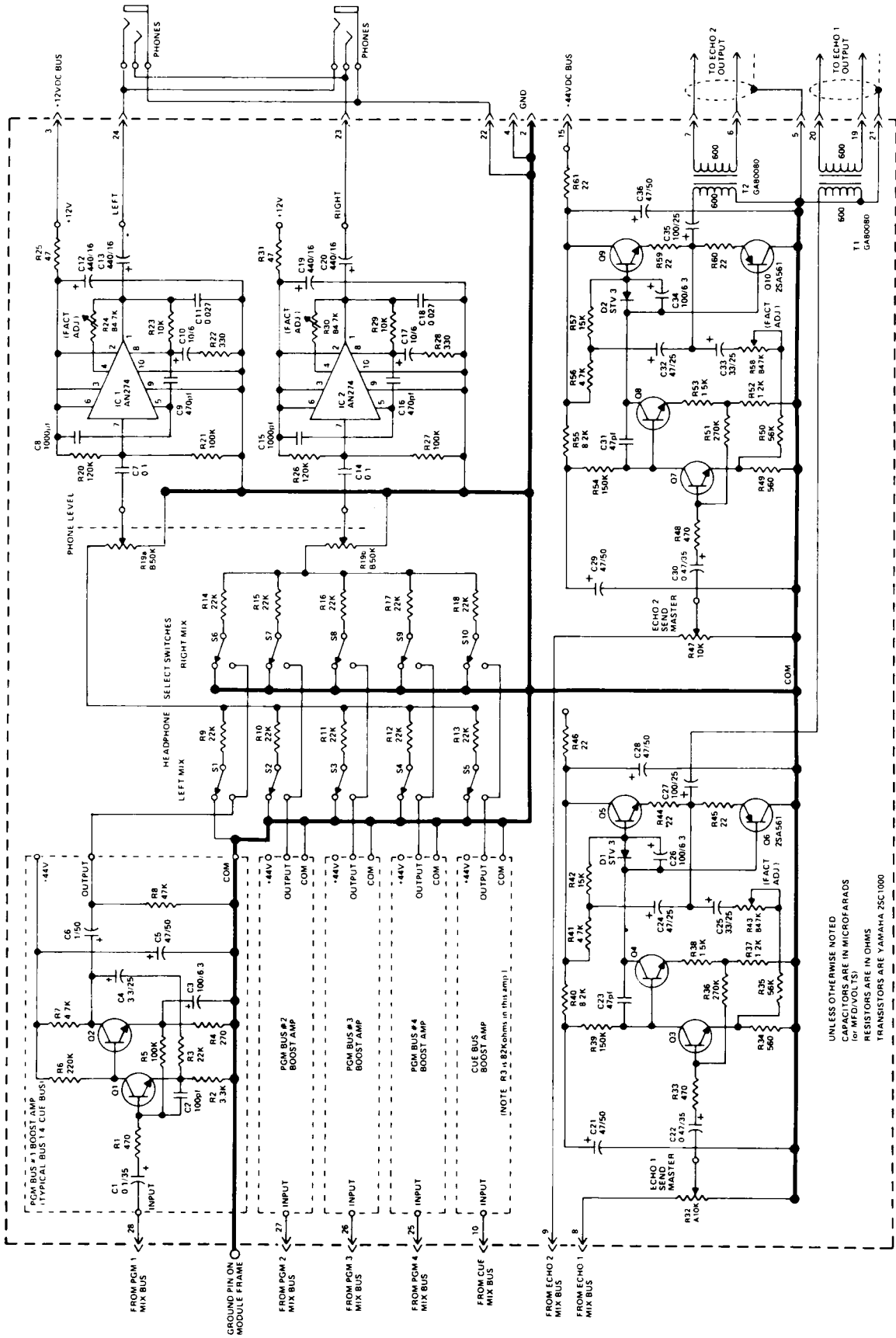




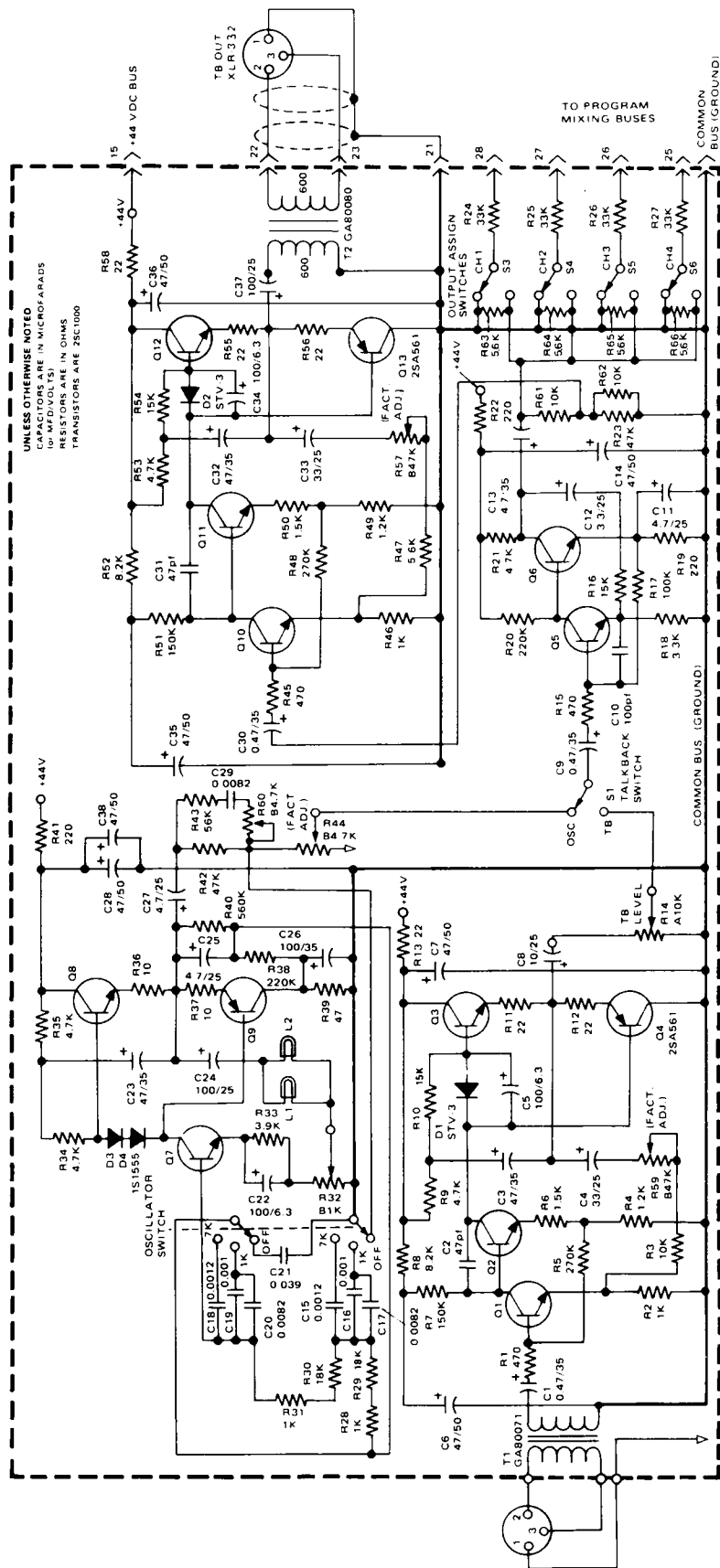
# PM-1000 MASTER & MONITOR MODULE



# PM-1000 HEADPHONE AND ECHO MODULE



# PM-1000 TALKBACK & OSCILLATOR MODULE



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## CONTENTS

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# PERFORMANCE CHECKS

## TEST EQUIPMENT

Use oscillators with an output impedance of less than 600 ohms, oscilloscopes and level meters, with input impedance of over 100 kohms.

## OUTPUT LEVEL

1. Set all controls as shown in Table 1.

Controls	Settings
Phase Switch	Normal (1-16 ch)
Output Selector Switch	1-4 On (1-16 ch)
Pan	Center (1-16 ch)
Echo 1, 2	Max. (1-16 ch)
Treble, Mid-range, Bass	Center (1-16 ch)
Mid-range Switch	1 kHz (1-16 ch)
Hi-pass Filter	Off (1-16 ch)
Attenuator	-20 dBm(1-16 ch)
Input Fader	Max. (1-16 ch)
PB Switch	Direct
Monitor	Max. (1-4 ch)
Master Monitor	Max.
Master Fader	Max. (1-4 ch)
Master Echo	Max. (1-2 ch)
Phone Selector Switch	Off (1-4 ch, Cue)
Phone Level	Min.
TB Output Selector Switch	On (1-4 ch)
OSC Switch	Off
TB Level	Max.
TB Switch	Off

Table 1

2. Feed a  $-30$  dBm / 1 kHz signal into the input socket.
3. Check that the output from each output terminal is as specified in Table 2. Be sure to attach a dummy load of 600 ohms to the output terminal. Carry out the above on all channels 1-16. When checking the TB output, make sure the TB switch is on and a  $-60$  dBm/1 kHz input is fed.

Master Out	Line Out A, B	Monitor Out	Echo Out 1, 2	TB Out
$-26 \pm 0.2$ dBm	$6 \pm 0.2$ dBm	$10 \pm 0.2$ dBm	$6.5 \pm 0.2$ dBm	$0 \pm 0.2$ dBm

Table 2

## LINE GAIN

1. Set all controls as shown in Table 1.
2. By rotating attenuator, check that line output is as shown in Table 3. Carry out the above for all channels 1-16.

Output level is counted in dBm, and each output must be within  $\pm 1$  dB (within  $\pm 0.5$  dB when the attenuator is set to  $-20$ ).

Attenuator Settings Input Level	-60	-50	-44	-38	-32	-26	-20	-14	-8	-2	+4
-60 dBm	16	6	0	-	-	-	-	-	-	-	-
-38 dBm	-	-	-	16	10	4	-	-	-	-	-
-20 dBm	-	-	-	-	-	-	16	10	4	-2	-
+4 dBm	-	-	-	-	-	-	-	-	-	-	16

Table 3

### **SUB IN GAIN**

1. Set all controls as shown in Table 1.
2. When a  $-20$  dBm/1 kHz input is fed to the sub in sockets, a  $10 \pm 1$  dBm signal should appear at the line out. Carry out the above on all channels 1-4.

### **PB (PLAYBACK) GAIN**

1. Set all controls as shown in Table 1, except that master and monitor module PB switches should be on.
2. When a  $-20$  dBm/1 kHz input is fed to the PB socket, a  $10 \pm 1$  dBm output signal should appear at the line out.  
Carry out the above on all channels 1-4.

### **MASTER IN GAIN**

1. Set all controls as shown in Table 1.
2. When a  $-20$  dBm signal is fed to the master in jack, a  $10 \pm 1$  dBm output signal should appear at the line out. Carry out the above on all channels 1-4.

### **MAXIMUM OUTPUT LEVEL**

1. Set all controls as shown in Table 1.
2. Raise the input signal at the input socket. When the output waveform starts to clip (3% Total Harmonic Distortion), line out, monitor out and echo out output levels should be more than  $+23$  dBm. Carry out the above on all channels 1-16.

### **OSCILLATOR OUTPUT LEVEL**

1. Set all controls as shown in Table 1.
2. When the oscillator switch is set to either 1 kHz or 7 kHz, a  $10 \pm 0.5$  dBm signal should appear at the line out.

### **OSCILLATION FREQUENCY**

1. Set for the same conditions as the oscillator output level check.
2. Measure the oscillation frequency. It should be within  $\pm 10\%$  of the set value (1 kHz or 7 kHz).

### **PHONE OUTPUT LEVEL**

1. Set all controls as shown in Table 1.
2. Set the phone level control to maximum and connect a 8 ohm dummy load to both left and right phone output terminals.
3. Feed an input signal that creates a  $+4$  dBm output signal at line out.
4. When any signal set (both left and right) of phone selectors is switched on,  $-8 \pm 3$  dBm should appear at the end of each connected dummy load.
5. Set the phone selector cue switches (both left and right) on. Then, when the cue switch for each channel is turned on an output level of  $-15 \pm 3$  dBm should appear.

### **TOTAL HARMONIC DISTORTION**

1. Set all controls as shown in Table 1.
2. When the output terminal (line out, monitor out, echo out) level is  $+4$  dBm, THD should be less than 0.05%. Carry out the above on all channels. Oscillator THD should be, while oscillator output level is checked, less than 0.5%.

### **FREQUENCY RESPONSE**

1. Set all controls as shown in Table 1.
2. After the input level is stabilized, take 1 kHz as basic. Then, when this is varied from 20 Hz to 20 kHz output level should be within  $\pm \frac{0}{3}$  dB. Carry out the above on all channels.

### **EQUALIZER CHARACTERISTICS**

1. Set for the same conditions as the frequency response check.
2. Move the treble, mid-range and bass controls and at the same time check for the values listed in Table 4. Carry out the above on all channels. Output figures indicate dB.

		Max.	Center	Min.
Bass (100 Hz)		14 ± 2	0 ± 1	-14 ± 2
Mid-Range	1 kHz	15 ± 2	0	-15 ± 2
	2 kHz	15 ± 2	0 ± 1	-15 ± 2
	4 kHz	15 ± 2	0 ± 1	-15 ± 2
Treble (10 Hz)		14 ± 2	-0.5 ± 1	-14 ± 2

Table 4

### HI-PASS FILTER CHARACTERISTICS

1. Set for the same conditions as the frequency response check.
2. Check that output levels change within the limits shown in Table 5 when the hi-pass filter setting is switched to 40 Hz and 80 Hz. Carry out the above on all channels. Output figures indicate dB.

Frequency Hi-pass Filter	20 Hz	40 Hz	80 Hz	1 kHz
40	-12 ± 2	-6 ± 2	-2 ± 2	0
80	-	-12 ± 2	-4 ± 2	0

Table 5

### CHANNEL SEPARATION

1. Set all controls as shown in Table 1.
2. Rotate the pan control all the way to the 1&3 side, then set for a +4 dBm output level on channels 1 and 3.
3. At this time the output levels on channels 2 and 4 should be less than -50 dBm. When the pan control is turned all the way to the 2&4 side, the output level from channels 1 and 3 should be below -50 dBm. Carry out the above on all channels 1-16.

### VU METER CALIBRATION

1. Set all controls as shown in Table 1.
2. When a +4 dBm signal is present at the line out sockets, large VU meter readings should be 0 ± 1 VU. When the meter selector switch is set to Monitor (with the same +4 dBm output), the reading should remain within the same range. (For all channels 1-4).
3. When the echo out output level is +4 dBm, reading on the small VU meter should fall within the range of 0 ± 1 VU.

### PHANTOM POWER SUPPLY

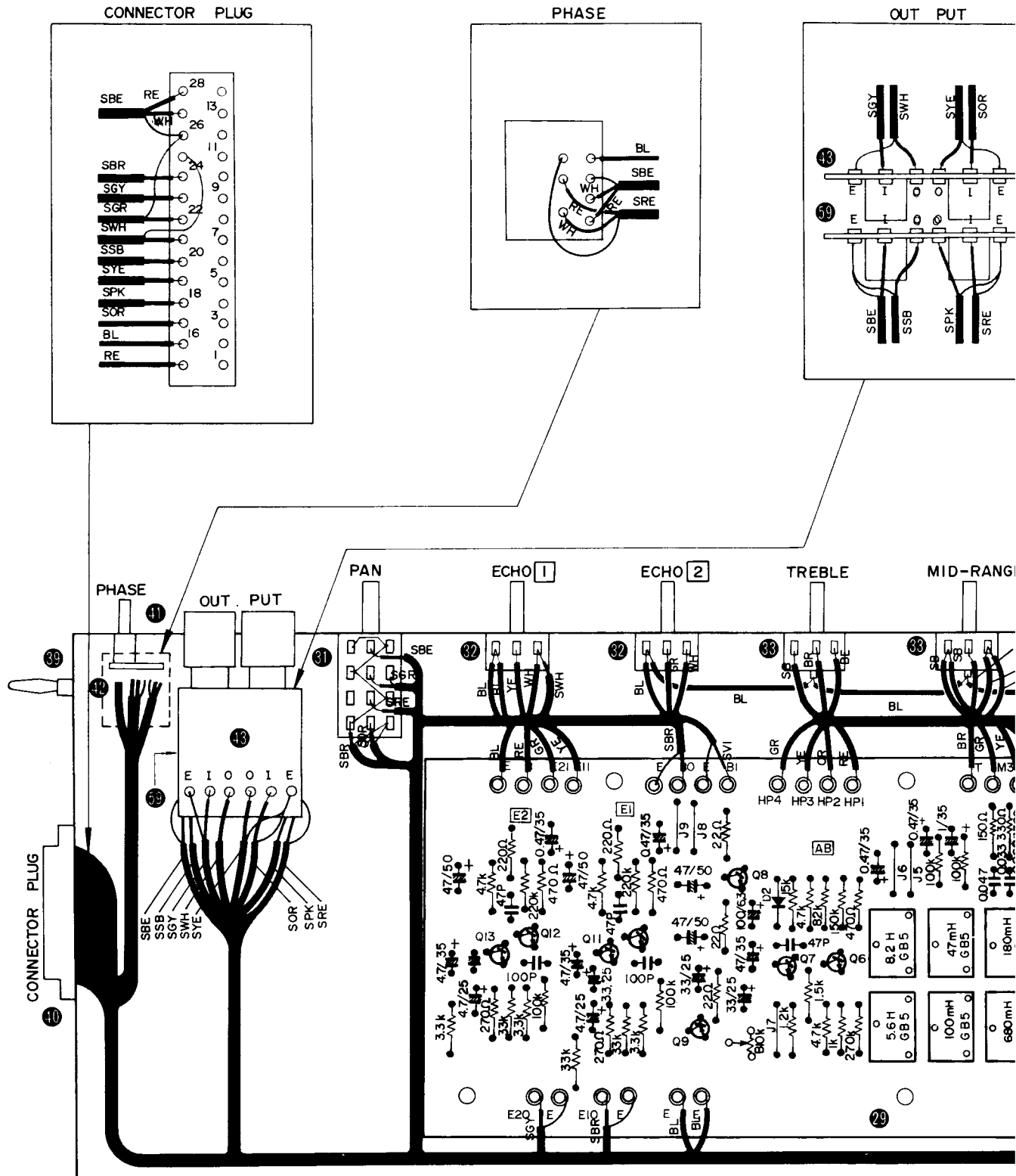
1. Turn the phantom power supply switch on.
2. Check that 48 ± 5 V is present across pins #1 and 2 of the input socket. Carry out the above on all input sockets with 10 kohm load connected.

### NOISE LEVEL

1. Set all controls as shown in Table 1 before each of the following noise level measurements.
2. Noise level at line and echo out sockets should be less than -40 dBm. Provided the master echo and monitor controls must be set at minimum while the line out noise is measured and master fader and monitor control are set at minimum while the echo out noise is measured. This procedure applies to all of the following noise measurements.
3. Keep the same settings as in (1) above, but set the attenuator to -60 dBm. At this time the noise level should be below -25 dBm.
4. Use the same settings as in (1) above, but each input fader and echo control to minimum. The noise level should be less than -60 dBm. Now, when any single channel fader or echo control is set to maximum the noise level should still stay below -50 dBm.
5. With all controls set as in (1) above, turning the master fader or master echo control to minimum should result in a noise level less than -60 dBm.

# PARTS ASSEMBLY AND WIRING DIAGRAM

## Input Module

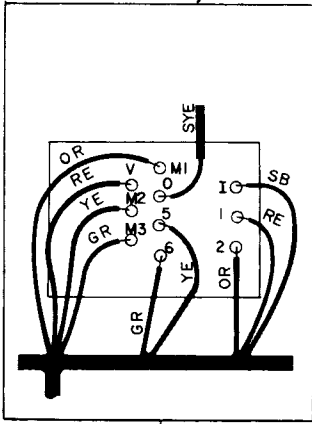


NOTE: ABBREVIATIONS OF WIRE COLOR

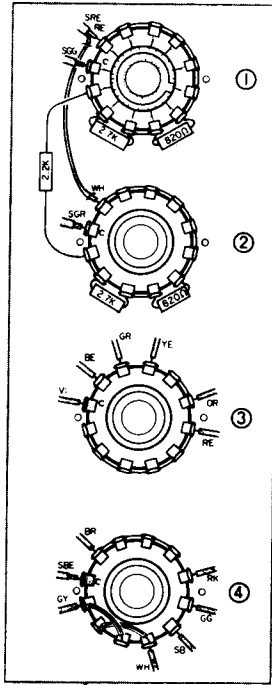
BL	BLACK	BR	BROWN	RE	RED	OR	ORANGE
YE	YELLOW	GR	GREEN	BE	BLUE	VI	VIOLET
GY	GRAY	WH	WHITE	GG	GRASS GREEN	SB	SKY BLUE
PK	PINK	S	SHIELD				



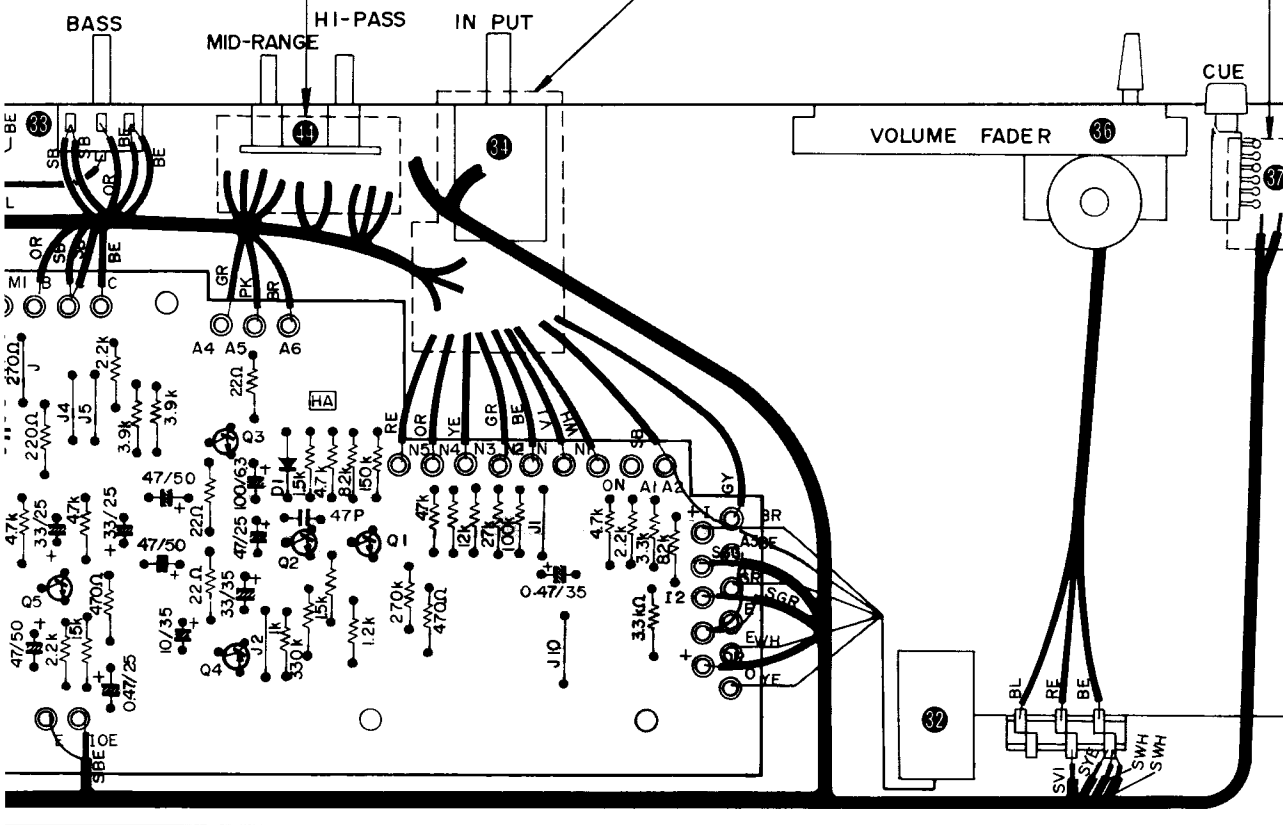
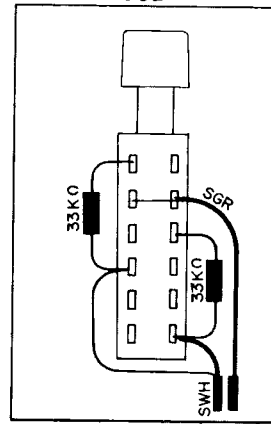
MID-RANGE, HI-PASS

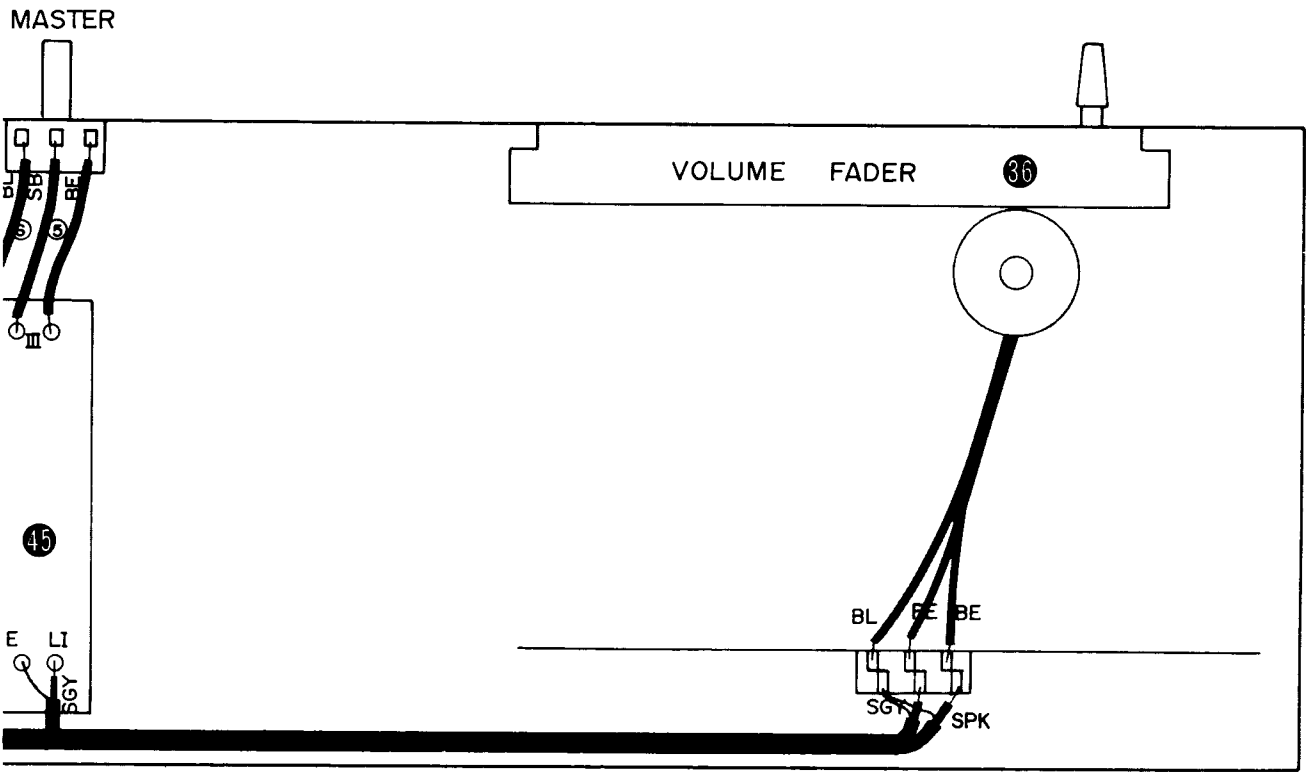
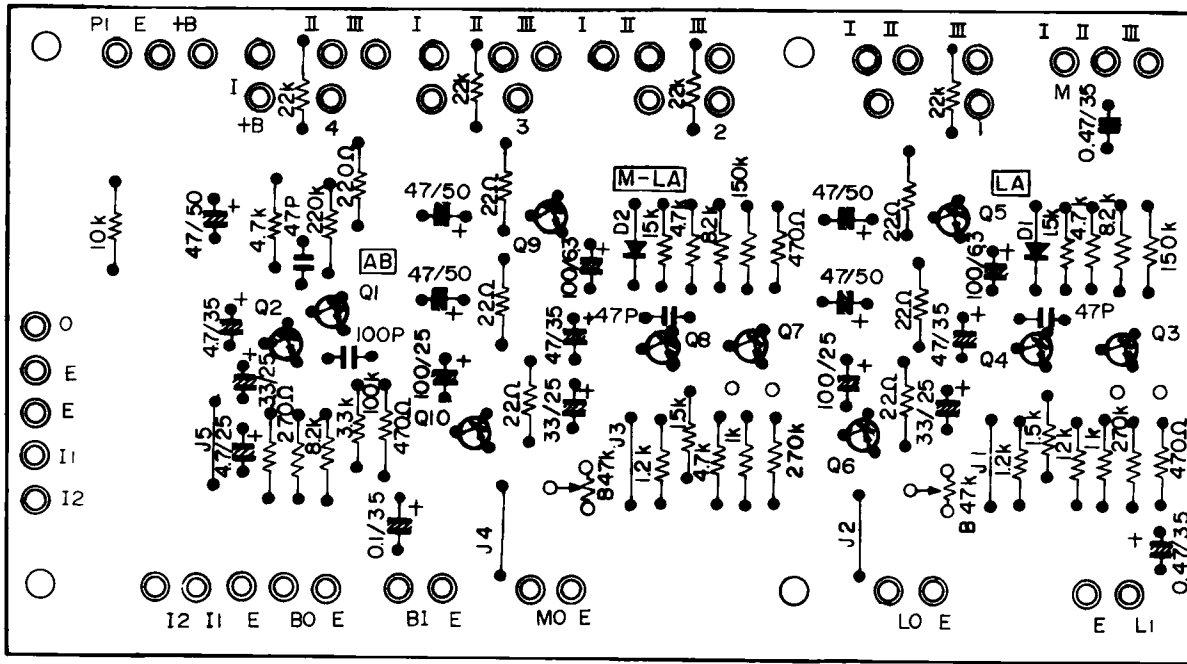


INPUT

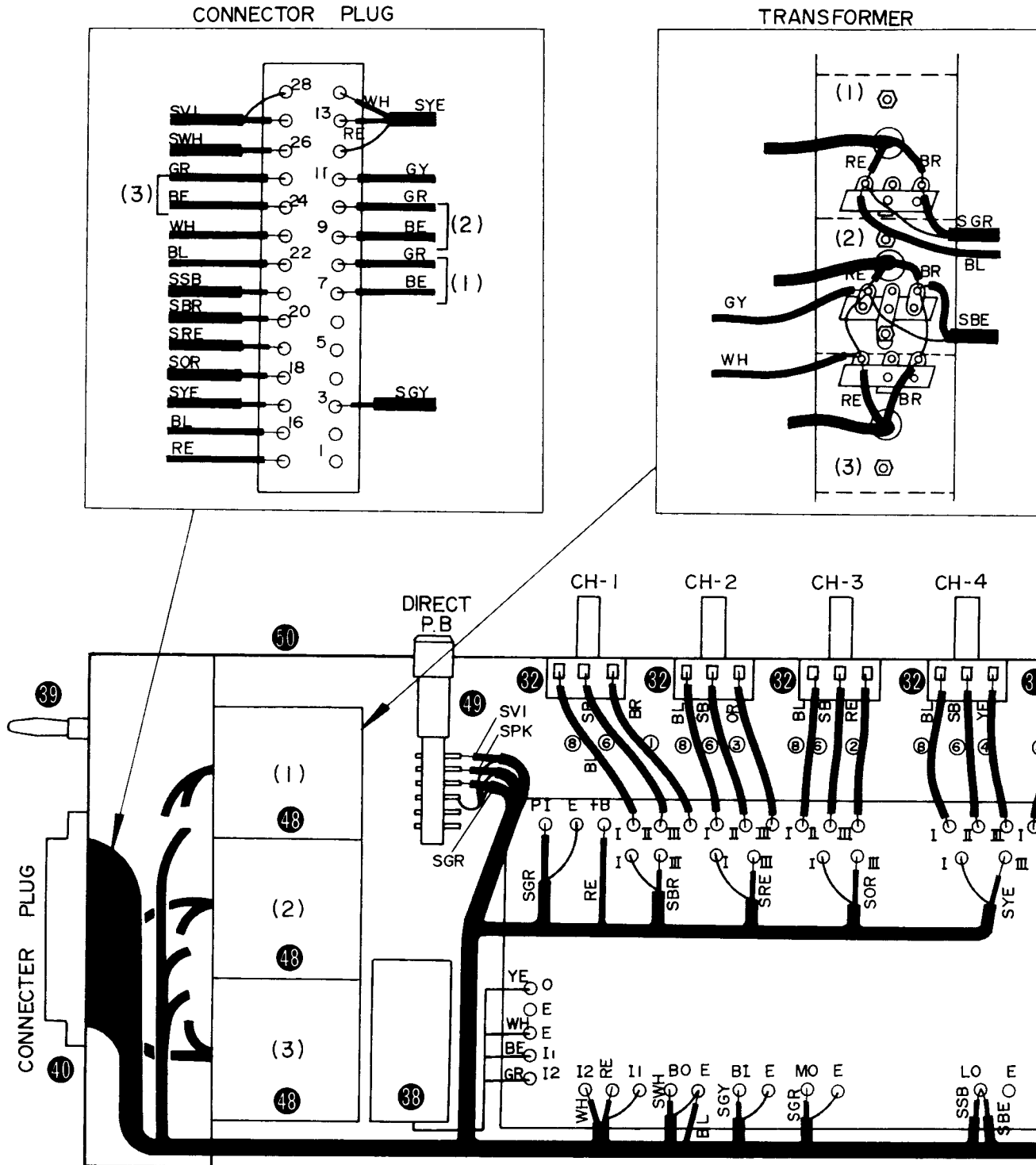


CUE



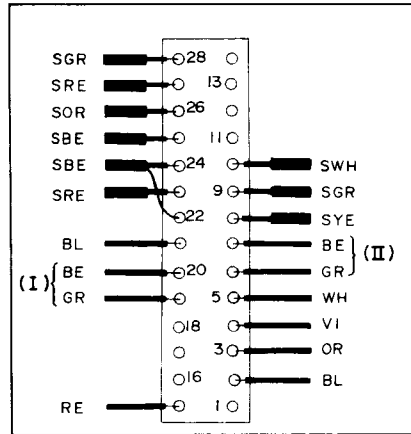


# Master and Monitor Module

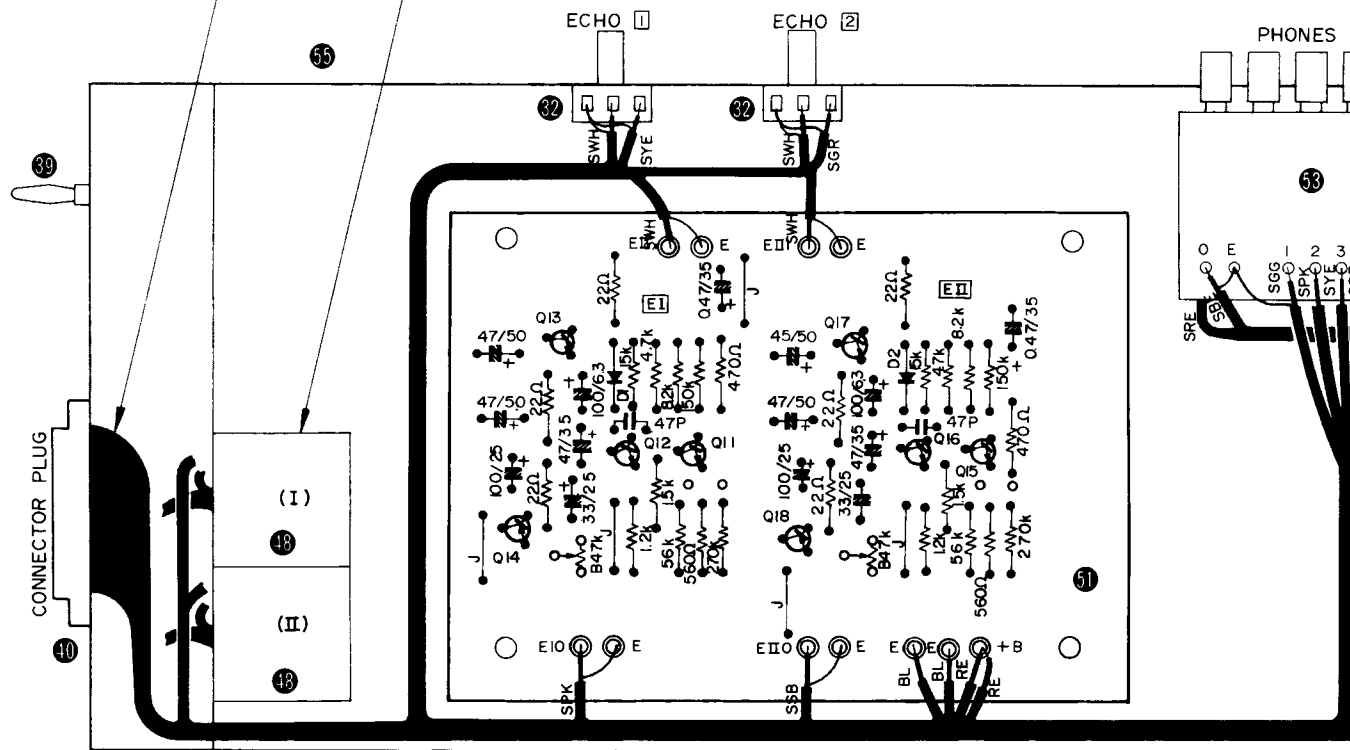
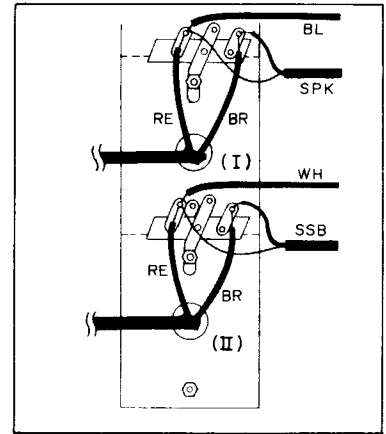


# Headphone and Echo Module

CONNECTOR PLUG

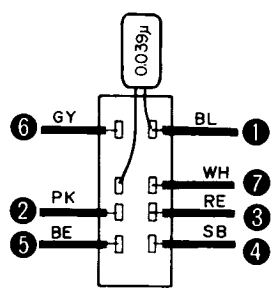


TRANSFORMER

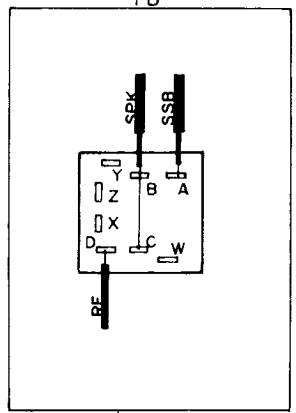




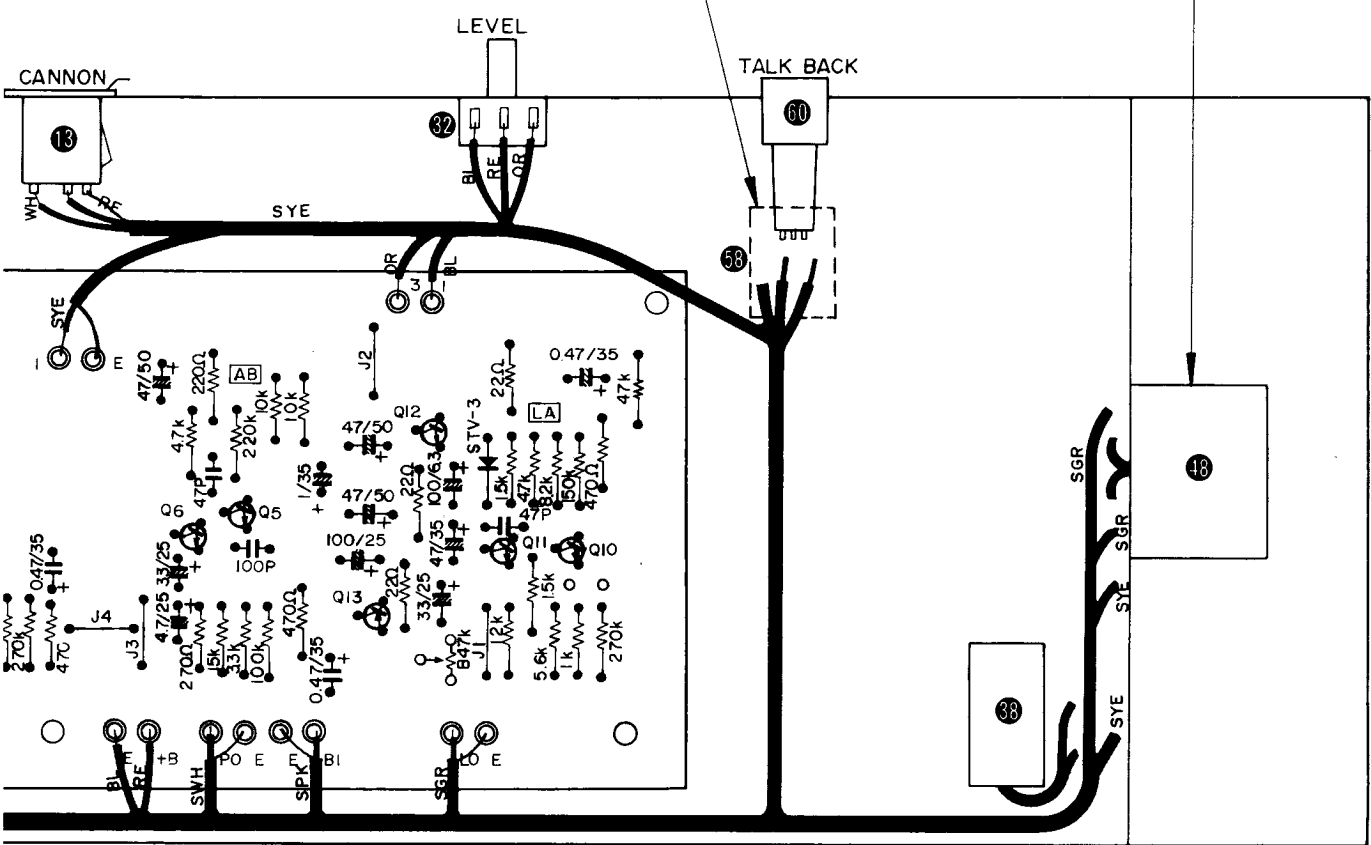
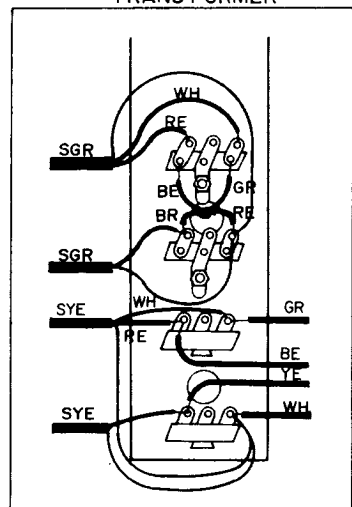
OSC



TB

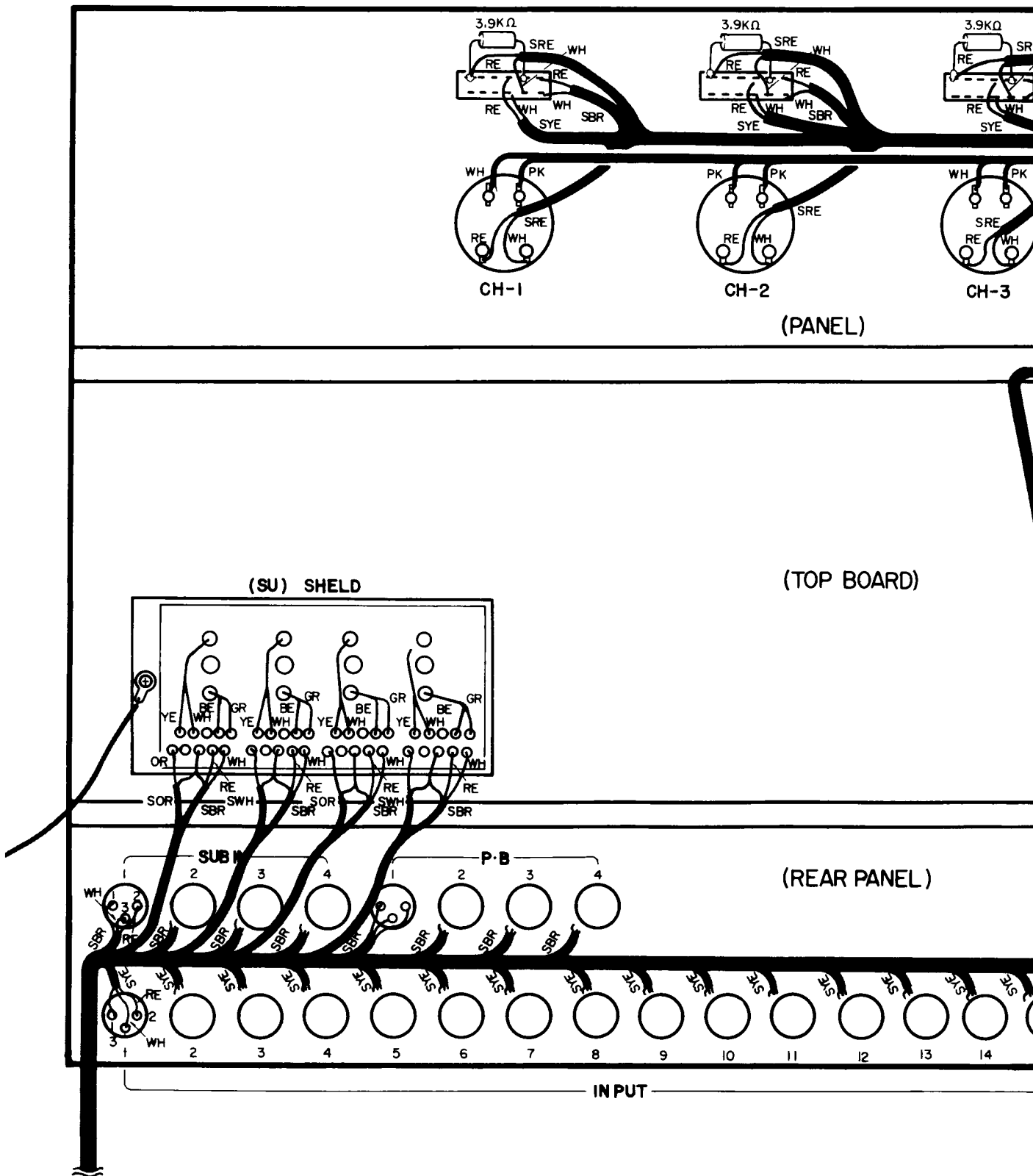


TRANSFORMER

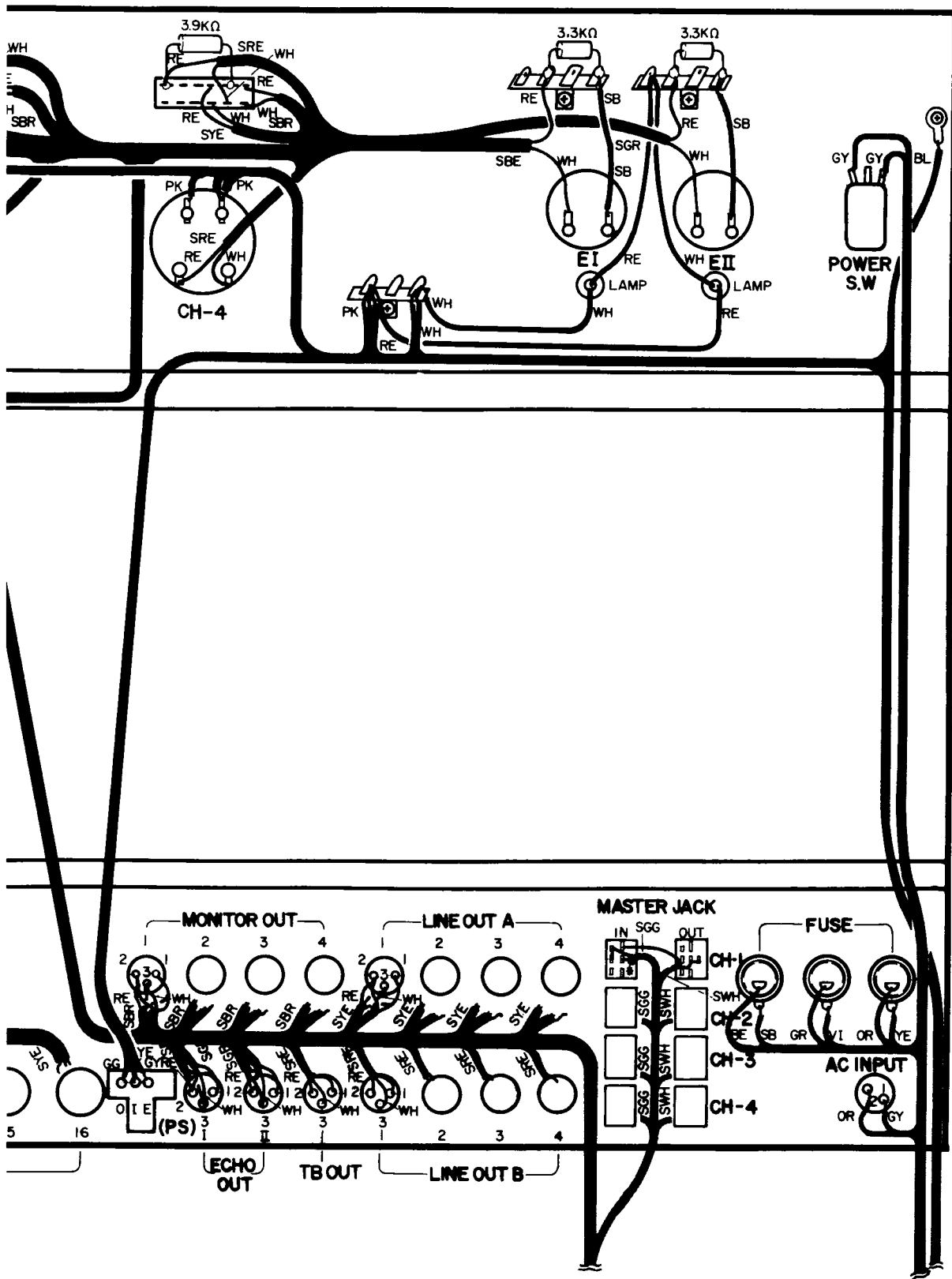


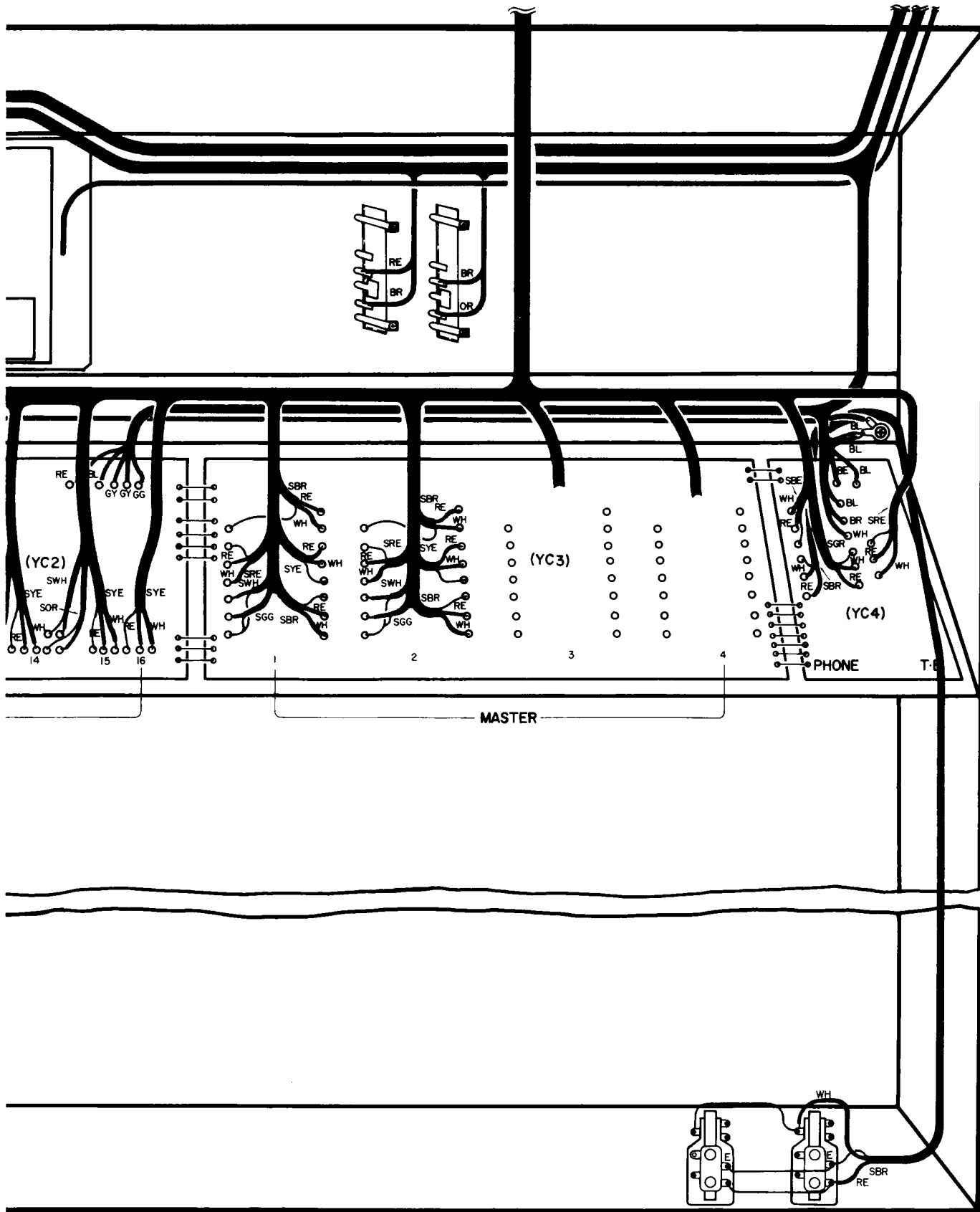


# Front and Rear Panel

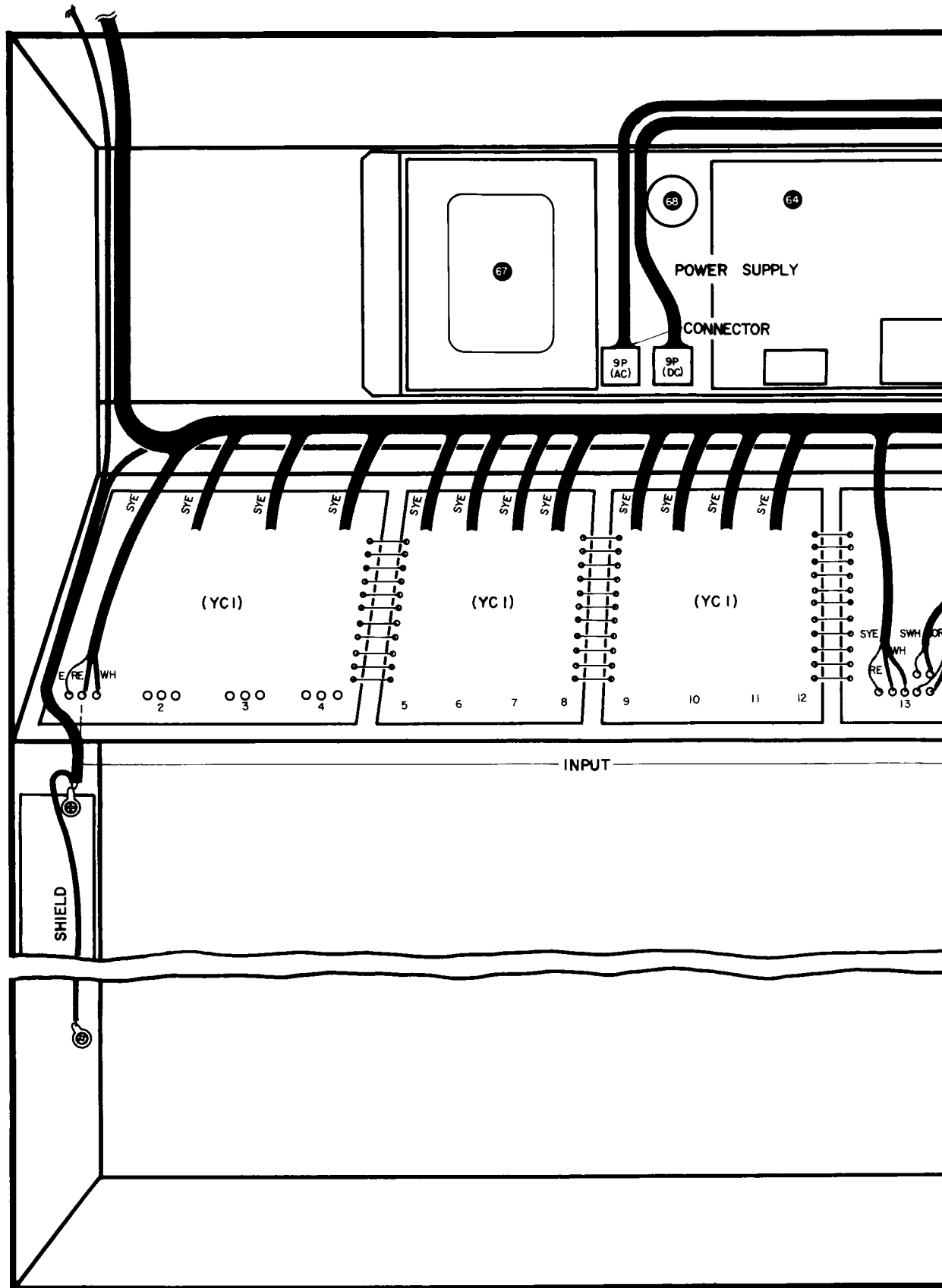




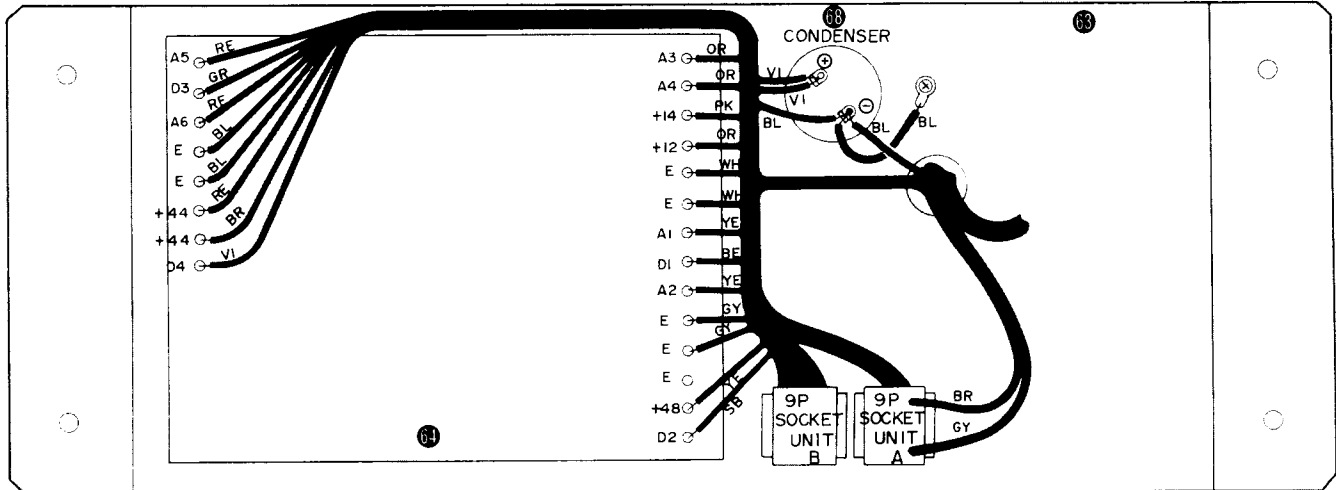




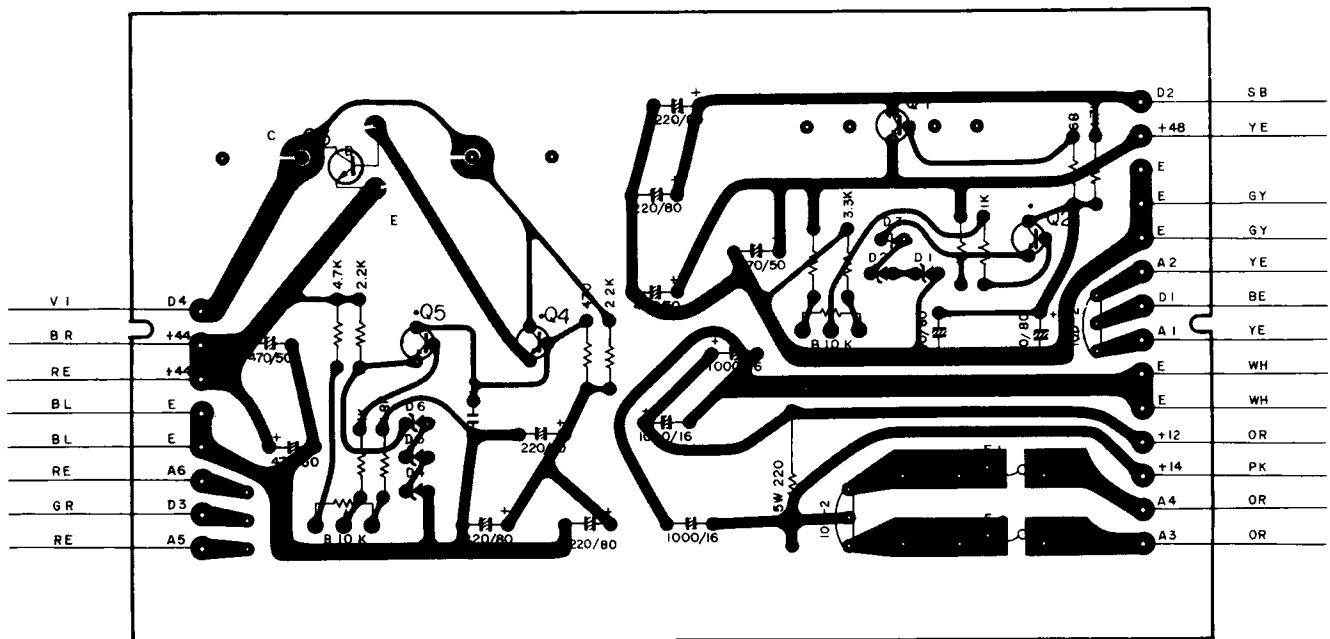
# Inside Case



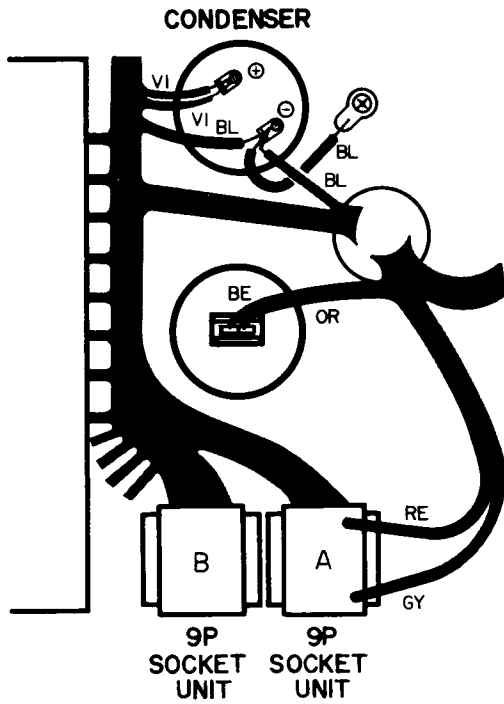
## Power Supply



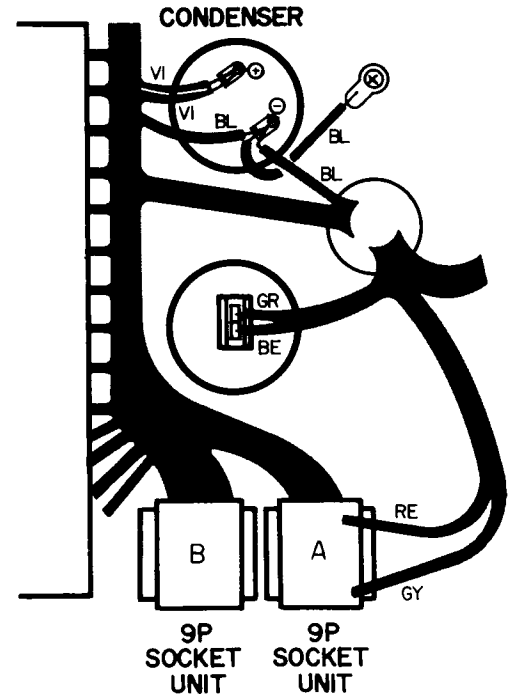
FOR U. S. / CANADIAN MODEL



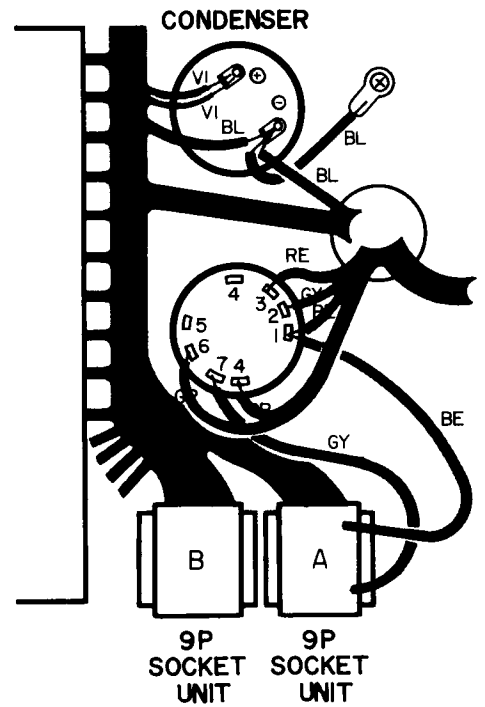
**Power Circuit Arrangements**  
**FOR NORTH EUROPEAN MODEL**



**FOR AUSTRALIAN MODEL**

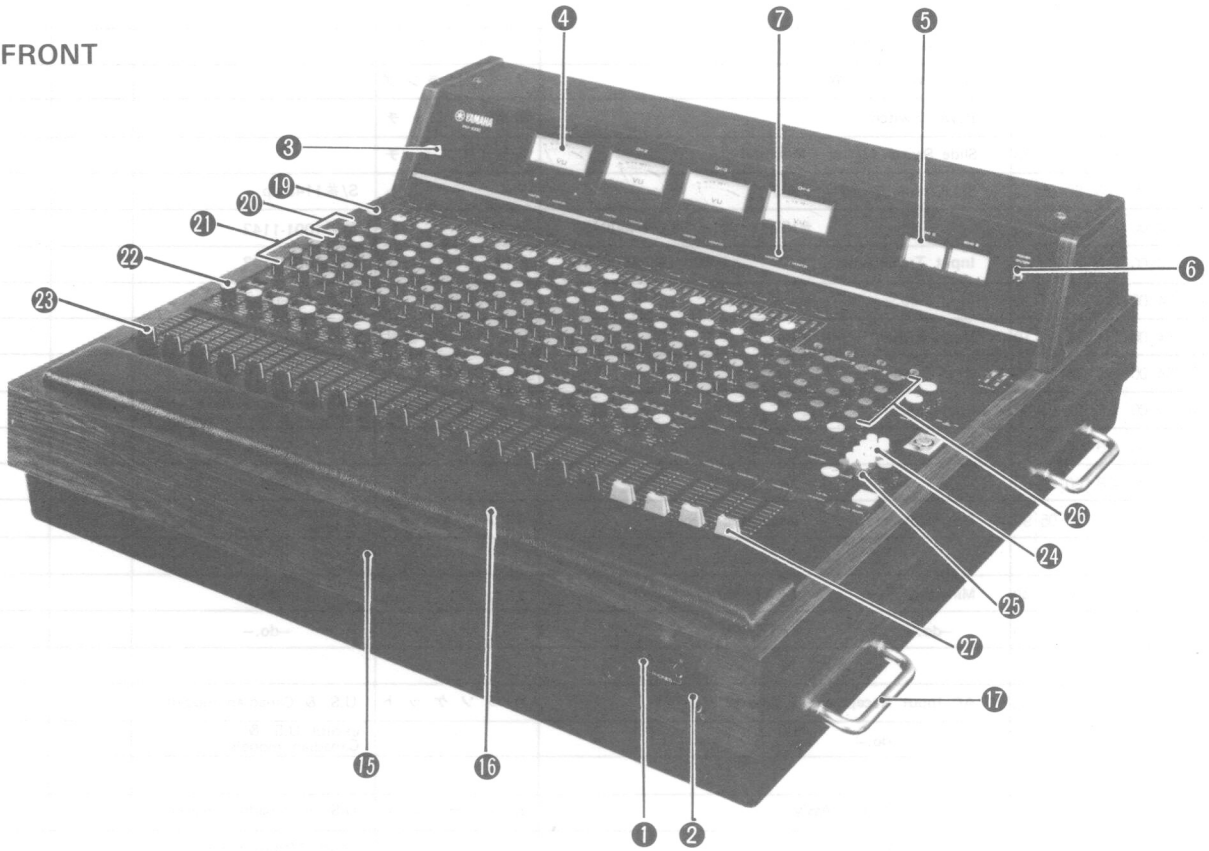


**FOR GENERAL, SOUTH AFRICAN & EUROPEAN MODELS**

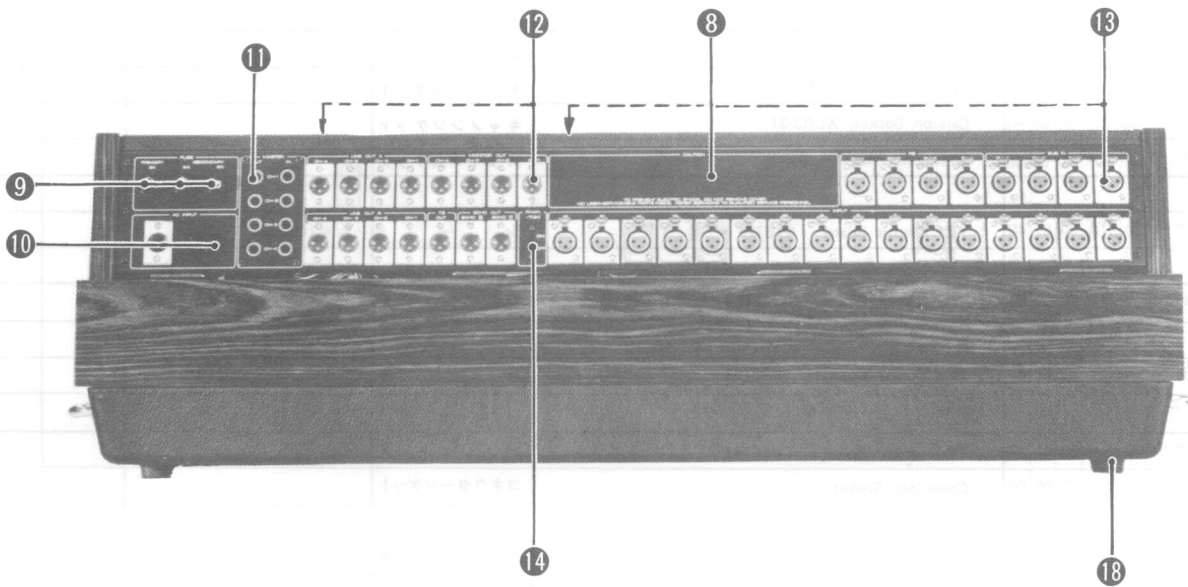


# PM-1000 PARTS LIST

FRONT



REAR



Ref. No.	Part No.	Description	Remarks	Common Models
①	40:10:00:LB:30:00:60	Phone Jack	フォンジャック	
	30:54:00:CB:06:20:10	Phone Nut	フォンジャックナット	
②	30:54:00:CB:80:01:90	Phone Panel	フォンパネル	
③	30:54:00:BA:80:02:00	Meter Panel	メーターパネル	
④	40:10:00:J:00:02:90	Level meter, Main	VUメーター, メイン	
⑤	40:10:00:J:00:02:40	-do.-, Echo	" , エコー	
	40:10:00:JB:00:02:30	Lamp with lead Wire	リード付ランプ	
⑥	40:10:00:KA:90:00:00	Power Switch	電源スイッチ	
⑦	40:10:00:KA:40:03:10	Slide Switch Master - Mouniter	スライドスイッチ	
	30:54:00:NA:80:05:70	SU Circuit Board #80270	シ - ト	S/#1143-up
	30:54:00:NA:80:04:20	-do.- #15231 ⇒ 305400NA800420	シ - ト	S/#1001-1142
	40:10:00:GA:80:03:00	Input Transformer ⇒ 305400GA500710	入カトランス	S/#1001-1142
	30:54:00:GA:80:07:10	-do.-	"	S/#1143-up
	30:54:00:GA:80:12:10	Metal Fitting, Input Trans.	トランス取付金具	-do.-
⑧	30:54:00:AA:80:03:50	Rear Panel	後面パネル	
⑨	40:10:00:LB:20:04:40	Fuse Holder	フューズホルダー	U.S., Canadian, South African, Australian & General models
	40:10:00:KB:00:03:50	Fuse 2A/250V	フューズ	-do.-
	40:10:00:KB:00:03:60	-do.- 3A/250V	"	-do.-
	40:10:00:LB:20:05:90	Fuse Holder (Miniature Type)	ミニフューズホルダー	Swedish & Norwegian models
	40:10:00:KB:00:07:40	Miniature Fuse 1.6AT/250V	ミニフューズ	-do.-
	40:10:00:KB:00:07:50	-do.- 2AT/250V	"	-do.-
⑩	40:10:00:LB:30:02:60	AC Input Receptacle, 3 pins	A C ソケット	U.S. & Canadian models
	40:10:00:LB:30:02:90	-do.-	"	except U.S. & Canadian models
	40:10:00:MG:00:03:00	AC Power Chord Ass'y	A C コード	U.S. & Canadian models
	40:10:00:MZ:80:06:50	-do.-	"	South African model
	40:10:00:MZ:80:06:60	-do.-	"	Australian
	40:10:00:MG:00:03:60	-do.-	"	North European & European models
	40:10:00:MZ:80:08:80	-do.-	"	General model
⑪	40:10:00:LB:20:07:70	Jack	ジャック	
⑫	40:10:00:LB:30:01:60	Cannon Socket, XLR3-32	キャノンソケット	
⑬	40:10:00:LB:30:01:50	Cannon Socket, XLR3-31	キャノンソケット	
⑭	40:10:00:KA:40:02:60	Slide SW, Phantom Switch	スライドスイッチ	
	30:54:00:NA:80:01:40	YC1 Circuit Board #16771	シ - ト	S/#1001-up
	30:54:00:NA:80:01:30	YC2 Circuit Board #16754	シ - ト	
	30:54:00:NA:80:01:50	YC3 Circuit Board #16761	シ - ト	
	30:54:00:NA:80:01:20	YC4 Circuit Board #16741	シ - ト	
	40:10:00:LB:60:06:50	Connector Socket	コネクターソケット	
⑮	30:54:49:0:0:01:50:90	Outside Case Ass'y	外 装	
⑯	30:54:00:NB:80:25:00	Pad	パッド	

Ref. No.	Part No.	Description	Remarks	Common Models
	30 54 00 AA 01 50 90	Box Catcher	パッド取付金具	S/# 1143-up
①	30 54 00 AA 80 08 40	Handle	取 手	
②	30 54 00 AA 01 81 80	Slip Fitting Plate	ス ペ リ 座	
	30 54 00 AA 80 08 60	Hing, for Pat	蝶 番	S/# 1001-1142
	30 54 00 AA 80 00 90	Hing, for Back Panel	"	
	30 54 00 CB 80 01 80	Panel Illumination Tip, CH-1	パネル表示チップ	
	30 54 00 CB 80 02 30	-do.- , CH-2	"	
	30 54 00 CB 80 02 40	-do.- , CH-3	"	
	30 54 00 CB 80 02 50	-do.- , CH-4	"	
	30 54 00 CB 80 02 60	-do.- , CH-5	"	
	30 54 00 CB 80 02 70	-do.- , CH-6	"	
	30 54 00 CB 80 02 80	-do.- , CH-7	"	
	30 54 00 CB 80 02 90	-do.- , CH-8	"	
	30 54 00 CB 80 03 00	-do.- , CH-9	"	
	30 54 00 CB 80 03 10	-do.- , CH-10	"	
	30 54 00 CB 80 03 20	-do.- , CH-11	"	
	30 54 00 CB 80 03 30	-do.- , CH-12	"	
	30 54 00 CB 80 03 40	-do.- , CH-13	"	
	30 54 00 CB 80 03 50	-do.- , CH-14	"	
	30 54 00 CB 80 03 60	-do.- , CH-15	"	
	30 54 00 CB 80 03 70	-do.- , CH-16	"	
	30 54 00 CB 80 03 80	-do.- , Master-1	"	
	30 54 00 CB 80 03 90	-do.- , Master-2	"	
	30 54 00 CB 80 04 00	-do.- , Master-3	"	
	30 54 00 CB 80 04 10	-do.- , Master-4	"	
	30 54 00 CB 80 04 20	-do.- , Phones	"	
	30 54 00 CB 80 04 30	-do.- , Talkback	"	
③	30 10 00 CB 02 31 80	Knob, Pan (Orange, large)	橙 ツ マ ミ 大	
④	30 10 00 CB 02 31 60	-do.-, Echo (Blue-gray, Small)	青 灰 ツ マ ミ 小	
⑤	30 54 00 CB 80 02 20	-do.-, Equalizer (Green, Small)	緑 ツ マ ミ 小	
⑥	30 54 00 CB 80 02 00	-do.-, Input Selector (Blue-gray, large)	青 灰 ツ マ ミ 大	
⑦	30 54 00 CB 02 38 30	-do.-, CH. Fader (Black)	黒 ツ マ ミ	
⑧	30 54 00 CB 80 12 50	-do.- (White)	白 ツ マ ミ	Phone Module
⑨	30 54 00 CB 80 12 60	-do.- (Green)	緑 ツ マ ミ	-do.-
⑩	30 54 00 CB 80 02 10	-do.- (Blue)	青 ツ マ ミ	-do.-
⑪	30 54 00 CB 02 38 40	-do.- (Orange)	橙 ツ マ ミ	-do.-
	30 54 00 NB 80 05 30	Input Module Assembly	インプットモジュール	
⑫	30 54 00 NA 80 01 00	IN Circuit Board #15284⇒305400NA800600	シ ー ト	S/# 1001-1142
⑬	30 54 00 NA 80 06 00	-do.- #15285	"	S/# 1143-up
	40 10 00 C 10 00 10	Transistor 2SC1000	ト ラ ン ジ ス タ ー	
	40 10 00 A 05 61 70	-do.- 2SA561	"	
	40 10 00 F 00 02 30	Varistor STV-3	バ リ ス タ ー	



Ref. No.	Part No.	Description	Remarks	Common Models
	40 10 00 GB 05 36 80	Coil 68mH	コイル S/# 1001 - 1170	
	40 10 00 GB 05 41 50	-do.- 150mH	" -do.-	
	40 10 00 GB 05 43 30	-do.- 330mH	" -do.-	
	40 10 00 GB 05 51 00	-do.- 1H	" -do.-	
	40 10 00 GB 05 55 60	-do.- 5.6H	" -do.-	
	40 10 00 GB 05 58 20	-do.- 8.2H	" -do.-	
	40 10 00 GB 05 34 70	-do.- 47mH	" S/# 1171-up	
	40 10 00 GB 05 41 00	-do.- 100mH	" -do.-	
	40 10 00 GB 05 41 80	-do.- 180mH	" -do.-	
	40 10 00 GB 05 46 80	-do.- 680mH	" -do.-	
	40 10 00 FP 15 54 70	Tantalum Capacitor 0.47 $\mu$ F/35V	タンタルコン	
	40 10 00 FP 15 61 00	-do.- 1 $\mu$ F/35V	"	
	40 10 00 FP 15 63 30	-do.- 3.3 $\mu$ F/35V	"	
	40 10 00 HT 41 00 70	Solid Semi Variable Resistor B-10K $\Omega$	ソリッドボリューム	
㉔	40 10 00 GA 80 03 00	Input Transformer $\Rightarrow$ 305400GA800710	入カトランス S/# 1001-1142	
㉕	40 10 00 HS 31 00 60	Pan Potentiometer BH-50K $\Omega$ x 4	ボリューム	
㉖	40 10 00 HS 31 00 20	Echo Potentiometer A-10K $\Omega$	"	
㉗	40 10 00 HS 31 00 50	Equalizer Potentiometer G-50K $\Omega$	"	
㉘	40 10 00 KA 50 05 00	Lotary Switch, Input Selector	ロータリースイッチ	
㉙	40 10 00 HQ 50 00 10	Slide VR A-10K $\Omega$ $\Rightarrow$ 305400NB801650 (Must be changed together with Sub Panel)	スライドボリューム S/# 1001-1142	
㉚	30 54 00 NB 80 16 50	VR. Fader Assembly	フェーダーアッセン S/# 1143-up	
	40 10 00 HR 50 00 10	Potentiometer D-10K $\Omega$	ボリューム -do.-	
	30 54 00 AA 80 15 00	Sub Panel	サブパネル	
㉛	40 10 00 KA 80 01 50	Push Switch, Cue	プッシュスイッチ	
㉜	30 54 00 GA 80 07 10	Input Transformer	入カトランス S/# 1143-up	
	30 54 00 AA 80 11 80	Metal Fitting, Input Trans.	トランス取付け金具 -do.-	
㉝	40 10 00 LB 10 02 60	Tip Pin	ミノムシクリップ	
㉞	40 10 00 LB 60 06 60	Connecting Plug	接続プラグ	
㉟	30 54 00 BA 80 01 40	Module Panel (Input Module)	パネル	
	40 10 00 CA 80 01 70	Dust Proof Cloth	防塵クロス	
㊱	30 54 00 NA 80 00 60	PR Circuit Board # 15183	シート S/# 1001-up	
	40 10 00 KA 40 03 10	Slide Switch	スライドスイッチ	
㊲	30 54 00 NA 80 00 80	OS1 Circuit Board # 15202	シート S/# 1001-up	
	40 10 00 KA 80 01 70	Push Switch	プッシュスイッチ	
㊳	30 54 00 NA 80 00 70	FL Circuit Board # 15194	シート S/# 1001-up	
	40 10 00 KA 40 03 20	Slide Switch	スライドスイッチ	
	30 54 00 NB 80 05 40	Master Module Assembly	マスターモジュール	
㊴	34 54 00 NA 80 05 90	MT Circuit Board # 15272	シート S/# 1143-up	
	40 10 00 IC 00 00 10	Transistor 2SC1000	トランジスター	
	40 10 00 IA 05 61 70	-do.- 2SA561	"	
	40 10 00 IF 00 02 30	Varistor STV-3	バリスター	
	40 10 00 FP 15 54 70	Tantalum Capacitor 0.47 $\mu$ F/35V	タンタルコン	
	40 10 00 FP 15 51 00	-do.- 0.1 $\mu$ F/35V	"	
	40 10 00 HT 41 01 40	Solid Semi Variable Resistor B-47K $\Omega$	ソリッドVR	
㊵	30 54 00 NA 80 00 90	MT Circuit Board # 15271 $\Rightarrow$ 305400NA800590	シート S/# 1001-1142	
	40 10 00 HS 31 00 20	Potentiometer A-10K $\Omega$	ボリューム	
㊶	40 10 00 GA 80 02 00	Output Transformer $\Rightarrow$ 401000GA800800	出カトランス S/# 1001 - 1142	

Ref. No.	Part No.	Description	Remarks	Common Models
④	40 10 00 GA 80 08 00	-do.- (Must be changed together with Sub Panel)	"	S/# 1143-up
	30 54 00 AA 80 02 80	Metal Fitting, Output Trans.	出力トランス取付金具	
⑤	40 10 00 KA 80 01 60	Push Switch	プッシュスイッチ	
⑥	30 54 00 BA 80 01 50	Module Panel (Master Module)	パネ ル	
	30 54 00 NB 80 05 50	Phone Module Assembly	フォーンモジュール	
⑦	30 54 00 NA 80 01 90	EM Circuit Board #15242	シ ー ト	S/# 1001-up
	40 10 00 C 10 00 10	Transistor 2SC1000	トランジスター	
	40 10 00 A 05 61 70	-do.- 2SA561	"	
	40 10 00 F 00 02 30	Varistor STV-3	バリスター	
	40 10 00 FP 15 54 70	Tantalum Capacitor 0.47 $\mu$ F/35V	タンタルコン	
	40 10 00 HT 41 01 40	Solid Semi Variable Resistor B-47K $\Omega$	ソリッドVR	
⑧	30 54 00 NA 80 01 70	HP Circuit Board #15261	シ ー ト	S/# 1001-up
	40 10 00 C 10 00 10	Transistor 2SC1000	トランジスター	
	40 10 00 G 00 00 40	IC. AN274	I、C	
	40 10 00 BA 00 51 20	Fin Radiator	放 熱 器	
	40 10 00 FP 15 51 00	Tantalum Capacitor 0.1 $\mu$ F/35V	タンタルコン	
	40 10 00 HT 41 00 40	Solid Semi Variable Resistor B-4.7K $\Omega$	ソリッドVR	
⑨	30 54 00 NA 80 02 00	HS Circuit Board #15220	シ ー ト	
⑩	40 10 00 HS 31 00 30	Potentiometer B-50K $\Omega$ x 2	ホリユーム	
⑪	30 54 00 BA 80 01 60	Module Panel (Phone Module)	パネ ル	
	30 54 00 NB 80 05 60	Talk Back Module Assembly	トークバックモジュール	
⑫	30 54 00 NA 80 06 10	TB Circuit Board #16785	シ ー ト	S/# 1143-up
⑬	30 54 00 NA 80 01 60	-do.- # 16782 $\rightarrow$ 305400NA800610	"	S/# 1001-1142
	40 10 00 C 10 00 10	Transistor 2SC1000	トランジスター	
	40 10 00 A 05 61 70	-do.- 2SA561	"	
	40 10 00 F 00 00 40	Diode 1S1555	ダイオード	
	40 10 00 F 00 02 30	Varistor STV-3	バリスター	
	40 10 00 EP 15 54 70	Tantalum Capacitor 0.47 $\mu$ F/35V	タンタルコン	
	40 10 00 EP 15 61 00	-do.- 1 $\mu$ F/35V	"	
	40 10 00 HT 41 00 40	Solid Semi Variable Resistor B-4.7K $\Omega$	ソリッドVR	
	40 10 00 HT 41 01 40	-do.- B-47K $\Omega$	"	
	40 10 00 HT 41 00 20	-do.- B-1K $\Omega$	"	
⑭	40 10 00 JB 00 02 30	Lamp with Lead Wire 12V 60mA	リード付ランプ	
	30 54 00 NA 80 01 10	OS2 Circuit Board #15202	シ ー ト	S/# 1001-up
⑮	40 10 00 KA 80 01 70	Push Switch	プッシュスイッチ	
⑯	40 10 00 KA 40 03 20	Slide Switch	スライドスイッチ	
⑰	30 54 00 BA 80 01 70	Module Panel (Talkback Module)	パネ ル	
	30 54 00 NB 80 05 80	Power Supply Unit	電 源 ユ ニ ッ ト	South African model
	30 54 00 NB 80 25 10	-do.-	"	U.S. & Canadian model
	30 54 00 NB 80 25 20	-do.-	"	North European model
	30 54 00 NB 80 25 30	-do.-	"	Australian model
	30 54 00 NB 80 26 50	-do.-	"	European model
	30 54 00 NB 80 26 60	-do.-	"	General model
⑱	30 54 00 NA 80 02 40	DC Power Circuit Board	シ ー ト	Without North European & European models

Ref. No.	Part No.	Description		Remarks	Common Models
	30:54:00:NA:80:04:30	—do.—	"	North European & European models	
	40:10:00:IC:04:84:40	Transistor 2SC485	トランジスタ	Substitution part 2SC484	
	40:10:00:IC:10:80:00	—do.— 2SC1080	"		
	40:10:00:IH:00:01:40	Diode 10DC-2	ダイオード	Substitution part 10DC-4	
	40:10:00:IF:00:01:00	Zener Diode 1S1715	ツエナーダイオード		
	40:10:00:IL:00:01:20	Metal Fitting	取付け金具		
	40:10:00:BA:00:51:20	Fin Radiator	放熱器		
●	30:54:00:BA:80:01:80	Plate Radiator (Large)	放熱板(大)		
●	30:54:00:BA:80:01:90	—do.— (Small)	" (小)		
	40:10:00:HM:55:42:20	Cement Resistor 22Ω/5W	セメント抵抗		
	40:10:00:HT:14:01:90	Semi Variable Resistor B-10KΩ	半固定抵抗		
●	40:10:00:GA:02:30:30	Power Transformer	電源トランス		
●	40:10:00:FL:18:92:20	Electrolytic Capacitor 2,200μF/80V	電解コンデンサ		
	40:10:00:LB:20:02:50	Voltage Selector	電圧切換器		
	40:10:00:CB:00:75:70	9 Pin Connecting Socket Housing	9ピンソケットハウジング		
	40:10:00:BB:00:14:40	9 Pin Socket Unit with Rock	ロック式9ピンソケット		
	40:10:00:KB:00:03:50	Fuse 2A/250V	フューズ	Without North European & European models	
	40:10:00:KB:00:07:50	Miniature Fuse 2A/250V	ミニフューズ	North European & European models	
	40:10:00:EK:80:00:40	Oval Countersunk Tapping Screw M5 x 135 (50)	尖先丸皿小ネジ	For Top Board Fixing	
	40:10:00:EK:80:00:30	Trim Washer 5S FCM3-BL	山形ワッシャー	—do.—	
	30:54:00:EK:80:00:10	Pan Head Tapping Screw M5 x 135 (25)	尖先ナベ小ネジ	For Module Fixing	
	40:10:00:EA:06:01:60	Pan Head Screw 6 x 16 ZMC2-Y	ナベ小ネジ	For Power Supply Fixing	
	40:10:00:EV:20:00:60	Flat Washer (Plain) 6S ZMC2-Y	平座金ミガキ丸	—do.—	
	40:10:00:EV:43:00:60	Lock Washer (Internal Teeth) 6S	歯付座金	—do.—	
	40:10:00:EB:22:60:60	Flat Countersunk Head Screw 2.6 x 6	皿小ネジ	For Panel Illumination Tip	
	40:10:00:EF:34:02:00	Flat Head Screw 4 x 20 (Black-Bronze)	丸皿小ネジ	For Slip Fitting	
	40:10:00:EA:06:02:50	Pan Head Screw 6 x 25 ZMC2-Y	ナベ小ネジ	For Handle	
	40:10:00:AA:80:15:10	Flat Washer 6-20-1.6 ZMC2-Y	平座金	—do.—	
	40:10:00:EO:02:71:00	Round Head Wood Screw 2.7 x 10 ZMC2-Y	丸小ネジ	For Box Catcher	
	40:10:00:EO:12:71:30	—do.— 2.7 x 13 Nickel	"	—do.—	
	40:10:00:CA:80:01:40	Insulating Paper	絶縁紙		



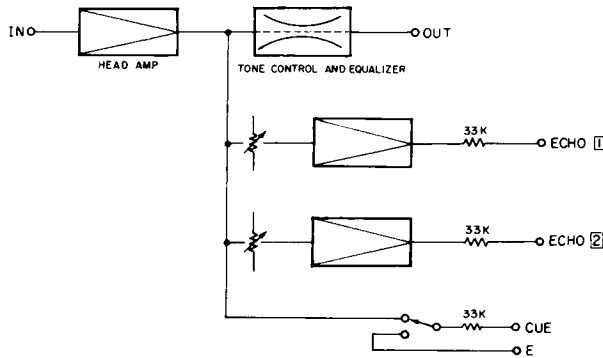
2. Service parts      Stock new circuit board only.

**Change of ECHO ① and ② and CUE circuits for Input Module (Ser. No. 1171~)**

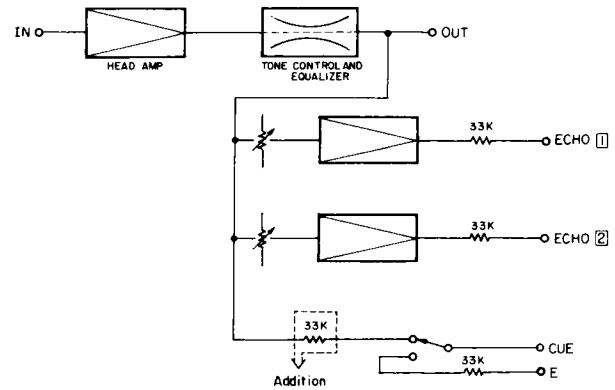
\* The ECHO ① and ② and CUE circuits, which used to be connected after the head amp, are now connected after the equalizer, as shown below.

1. Alterations

Old



New



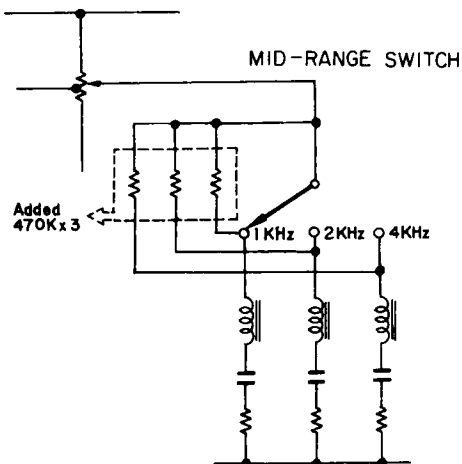
**Alteration of Input Module FL circuit board (Ser. No. 1143~)**

\* In order to prevent noise when the Hi-Pass and Mid-Range switches are activated, 470K carbon resistors (401000HA158470) have been added to the input module FL circuit board.

1. Alteration

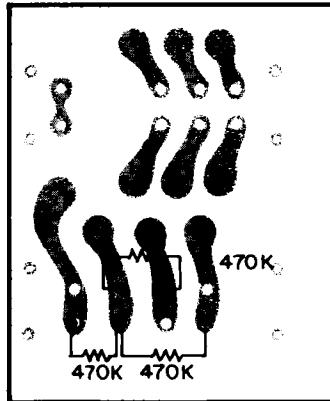
Part number (305400NA800070) will be not change.

Old	New
circuit board LC15193	circuit board LC15194



Note: To prevent noise with the old FL sheet, the 470K resistors should be attached to the back of the circuit board.

#15193 (Old)-----BACK



2. Service parts      Stock new circuit board only.

**Replacement of output transformer for Master and Headphone Modules (Ser. No. 1143~)**

\* The output transformer for master and headphone modules has been changed. All specifications are the same, however the lead wire and method of attachment are different.

1. Replacement	Old Ser. No. 1001 ~ 1142	New Ser. No. 1143 ~
	Output transformer 401000GA800200	401000GA800800

2. Service parts      After the stock of old parts is used up, new parts will be used.

PM-1000 Parts changes according to product number

Product No.	Remarks	No. 1001~	No. 1143~	No. 1171~	No. 1218~	Remarks
Unit Input module Fader	Change metal fitting	Slide volume	Fader ass'y	Connected after equalizer	Change of terminal location	
Echo 1 2 CUE Input transformer IN circuit board	Specification change in altered module only Add metal fitting Must be changed together with input transformer	*Connected before equalizer 401000GA800300 305400NA800100	*305400GA800710 Due to change of input transformer 305400NA800600	Range of tone control is changed ± 10dB → ± 15dB		*The Echo out trans- former phase is shifted *Method is changed
Master module Fader	Change metal fitting	Slide volume	Fader ass'y		Change of terminal location	
Input & Output transformers	Add metal fitting in input transformer only	401000GA800300 (input) 401000GA800200 (output)	305400GA800710 (input) 401000GA800800 (output) Due to change of input transformer 305400NA800590			
MT circuit board	Must be changed together with input transformer	305400NA800090				
Headphone module Output transformer	Method isn't changed	401000GA800200	401000GA800800			
Talkback module Input & Output transformer	Add metal fitting in input transformer only	401000GA800300 (input) 401000GA800200 (output)	305400GA800710 (input) 401000GA800800 (output) Due to change of input transformer 305400NA800610			
TB circuit board	Must be changed together with input transformer	305400NA800160				
Main body SU circuit board Input transformer pad	Should be changed at the same time Must be changed together with metal fitting	305400NA800420 401000GA800300 Hinge method	305400NA800570 *305400GA800710 Catch-box method			*Add metal fitting
						The old and new type for each module are interchangeable