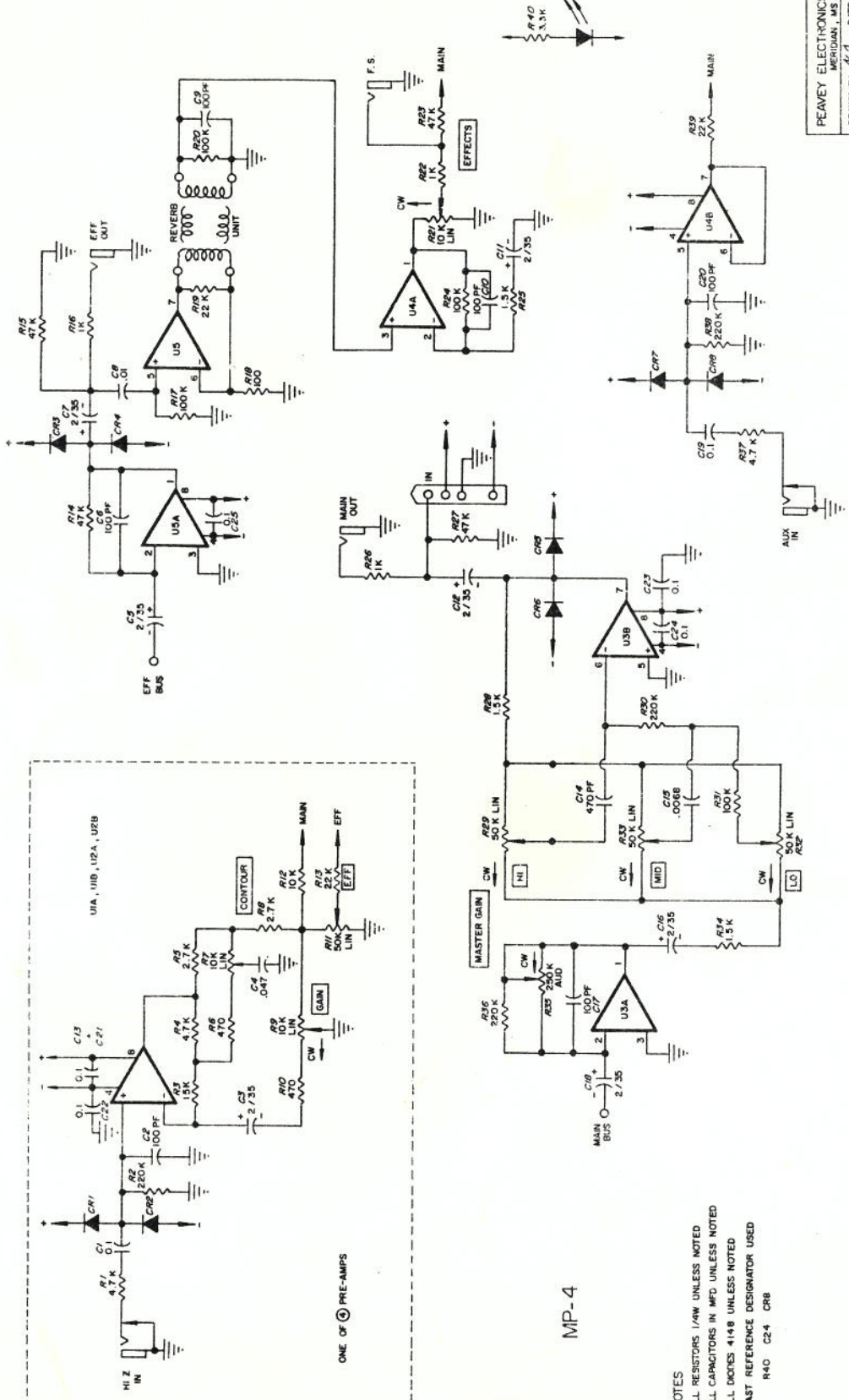


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PEAVEY ELECTRONICS CORP MERIDIAN, MS
DRAWN BY: <i>JK</i> DATE: 7-18-77
C.B. CHECK: <i>[initials]</i>
CK BY: <i>[initials]</i>
APPR. BY: <i>[initials]</i>

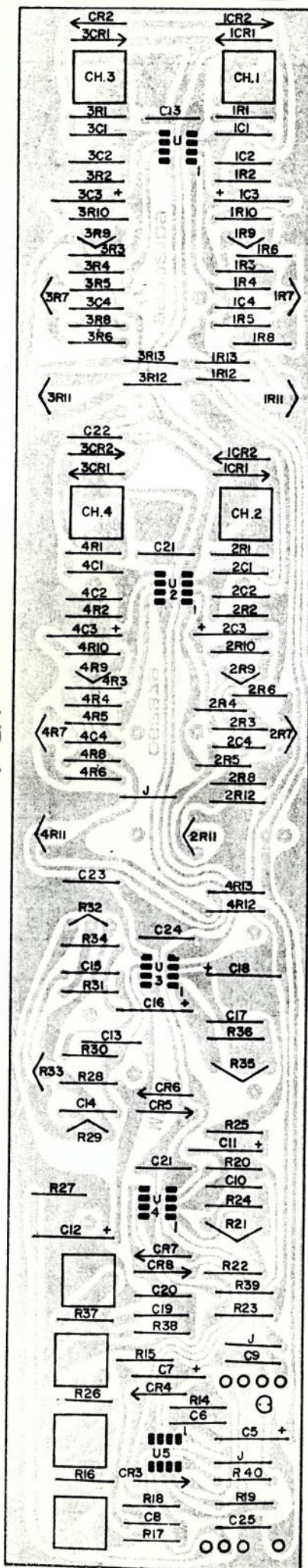


NOTES
 ALL RESISTORS 1/4W UNLESS NOTED
 ALL CAPACITORS IN MFD UNLESS NOTED
 ALL DIODES 4148 UNLESS NOTED
 LAST REFERENCE DESIGNATOR USED
 R40 C24 CR8

MP-4

ONE OF 4 PRE-AMPS

MP-4





MARK III SERIES MP-4 OPERATING GUIDE

GENERAL DESCRIPTION

Today, many companies involved in the manufacture of sound reinforcement equipment spend most of their time concentrating only on the extremely large, expensive and complex systems and tend to forget about smaller systems. Over the years, Peavey has continually tried to develop its equipment to satisfy users at both extremes of the sound reinforcement market. While large and complex systems are exciting for engineers and soundmen to design and use, by far the largest number of sound reinforcement applications exist for simpler and less complex equipment. Our continuing efforts to design, manufacture and market professional quality systems have enabled us to apply much of the experience gleaned in more sophisticated applications to the design of our less complex and powerful equipment.

Recent advances in semiconductors and computer-aided design/assembly techniques have greatly enhanced our ability to create audio systems with levels of performance that would have been totally out of the question just a short while ago. Our new MP-4 is an example of the application of advanced semiconductors and design/manufacturing techniques in order to bring to the marketplace a relatively uncomplicated system with features and performance heretofore unavailable in the low power/price range. The MP-4 is a simple audio system that, in fact, provides specifications comparable to the finest commercial sound equipment but dispenses with much of the "gingerbread" that is oftentimes not necessary in order to achieve professional results.

The four input preamplifiers of the MP-4 utilize "state-of-the-art" operational amplifiers in a variable negative feedback configuration yielding high input impedance, extremely low noise, and good dynamic range to avoid overloading the inputs. Experience has proven that our variable feedback type input circuitry consistently yields high levels of performance and has proven superior to any other design, especially those of conventional "losser" configurations wherein the noise and dynamic range are fixed and the level/gain control acts only as a simple voltage divider.

Most dynamic microphones—particularly those commonly used for sound reinforcement—tend to have adequate low frequency response while the high end generally falls off rapidly, especially if the high impedance mike has a long connecting cable. We have included a frequency contour control on each of the four channels of the MP-4 to aid in balancing the tonality of the microphones used and have tailored the response of our contour circuitry so as to allow boosting or cutting of the upper frequencies to permit correction for room acoustics and/or variations in microphone response. This equalization circuitry is connected within the feedback loop of the input circuitry and effectively allows a wide range of tonalities to be achieved. Additionally, each channel of the MP-4 features an effects send control thus enabling a secondary effects/reverb mix to be achieved which adds both flexibility and enhanced reverb/effects capabilities to the system.

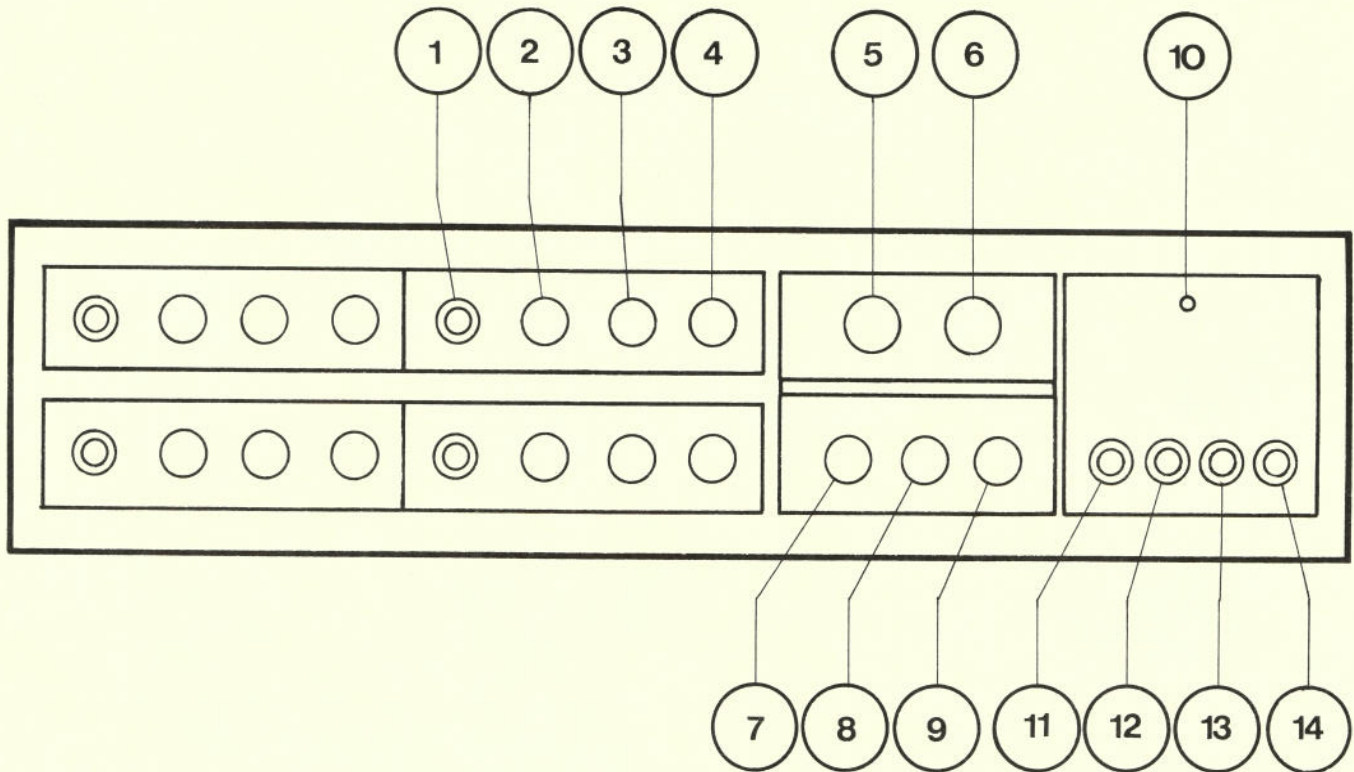
The master section of the MP-4 includes two independent mixing systems and an active three-band (low, mid, high) equalization circuit. Each of the mixing systems employ our "variable negative feedback" summing circuitry which provides virtually infinite dynamic range while maximizing the noise performance. Utilization of these types of summing circuits is another reason Peavey is able to offer such extremely low levels of distortion, high gain, and low noise. The three-band equalization is of the active type enabling both a boost and a cut in the low and high as well as the vital middle frequency range. This master equalization quite effectively allows overall frequency balance including a low frequency cut (where needed), mid-range emphasis (or de-emphasis), as well as total control over the high end frequencies. In accordance with professional practice, the low and high frequency equalization circuits are of the shelving type while the mid-range consists of the peak/notch configuration. In order to achieve acceptable professional reproduction, some sort of master equalization is generally not only necessary but oftentimes absolutely vital. The MP-4's master equalization circuitry will be found to be exceptional in performance and lends considerable flexibility to the overall system.

A patch panel has been included to allow the MP-4 to be used in conjunction with other audio devices such as external power amps, effects/delay units, tape recorders, etc., etc. To provide additional versatility, we have built in an auxiliary high impedance (220K ohm) input to allow interfacing with the outputs of other audio devices. The input impedance of the auxiliary input is high enough so as to present a "bridging" load to almost any professional or consumer grade audio equipment. This input directly feeds the main mixing buss whose level is controlled by the setting of the master gain control. A remote footswitch may be used in order to disable the internal reverberation system and this switch may be plugged into the remote footswitch jack. The two line outputs (main and effects) provide signal from the two internal mixing systems (main and effects) to drive external accessories such as power amps, tape recorders, effects devices, or other outboard audio devices.

The signal processing circuitry of the MP-4 is powered by a precision Zener regulated power supply to assure smooth and hum-free operation. A LED (light emitting diode) indicator, which features infinite service life, has been included to avoid the user ever having to replace burned out pilot lamps in the field. The rugged power amplifier built into the MP-4 is based around two high-voltage, high-speed bi-polar power devices bolted to a large aluminum heatsink. Four silicon rectifiers connected in a full wave bridge deliver energy into large electrolytic filter banks. The mains transformer used in the MP-4 utilizes a grain-oriented silicon steel core that has been both magnetically and electrostatically shielded to minimize extraneous hum fields. The performance and reliability of this power amplifier has been assured by short-circuit, transient, and thermal overload protection. Thermal tracking circuits automatically adjust the power amplifier to compensate for variations in operating temperatures normally encountered in rugged field applications and the built-in thermal overload (thermostat) insures that the output devices cannot exceed their safe operating temperatures. Because of the hefty power supply, the MP-4's potential music power is not reflected by the conservative 50-watt RMS power rating. Comparison of the MP-4 with any unit in its power/price category will easily illustrate its superiority over competing equipment.

Overall, the MP-4 is a relatively straightforward and simple system whose performance should not be underestimated because of the simplicity of its design functions. We believe the MP-4 will more than adequately handle many sound reinforcement applications in lounges, schools, churches, and other entertainment and institutional applications at a price unmatched on the market today.

WARNING: To prevent electrical shock or fire hazard, do not expose this appliance to rain or moisture.



FRONT PANEL

CHANNEL INPUTS (1)

The channel inputs are of the high impedance type (220K ohms) and are designed to accept high impedance microphones or other low to medium level inputs and represent a bridging load to most professional and consumer grade audio components such as tape recorders, FM tuners, and high impedance microphones. Crystal or ceramic (piezo) type microphones usually work better with extremely high input impedances (1 megohm or more), but better quality piezo units may be used satisfactorily at 220K ohms. Generally, piezo microphones are of the omni-directional (all directions) type and are poorly suited for P.A./sound reinforcement applications. The channel inputs consist of standard ¼" phone jacks.

CHANNEL CONTROLS

Each of the MP-4's four independent channels contain gain, contour, and effects controls.

CHANNEL GAIN CONTROL (2)

The channel gain control determines the amount of gain provided at each input preamplifier and acts as the individual channel volume control. Because of the unique design configuration of the MP-4's input preamplifiers, the gain control actually varies the amount of internally generated negative feedback thus optimizing signal-to-noise ratios. The operation of these controls is more or less conventional but it should be emphasized that the individual channel gain controls must be used in conjunction with the master gain control (5) in order to provide the maximum range of flexibility both in the channels and in the master gain, i.e., it's poor practice to operate the channel gain controls at high settings and the master control at extremely low settings since this tends to limit both dynamic range and the flexibility offered by the master gain control. Generally, the individual channel gain controls should be set so as to allow settings of the master gain control somewhere in the middle of its range (approximately "4" to "6"). Failure to operate either the channel gain or master gain controls properly will result in less-than-optimum performance. A little experimentation will quickly illustrate proper settings of these controls.

CHANNEL CONTOUR CONTROL (3)

Each channel of the MP-4 is provided with a frequency contour control. This control is primarily designed to add "sibilance" or to "roll off" the high end in order to avoid feedback problems caused by high frequency reflections off walls, ceilings, or other objects in the speaker/microphone acoustic environment. It should be remembered that extreme boosting or cutting is **not** a good idea and all channel equalization controls should always begin in the flat (no boost, no cut) position which occurs with the contour control knob in the straight up or vertical (12:00 o'clock) position. Experimentation will quickly illustrate the degree of boost or cut required. It should be remembered that the individual channel contour controls must be used in conjunction with the master equalization controls in order to achieve satisfactory levels of performance. One should always keep in mind that common sense, operating experience, and a little understanding of the capabilities built into your MP-4's equalization circuitry are necessary to properly set up this system in such a way that its performance can be utilized fully.

CHANNEL EFFECTS CONTROL (4)

Each channel of the MP-4 features a "post" type effects/reverb send control. This type of control is called a "post send" because it is placed in the circuit **after** (post) the channel gain control and its action and settings will change with any change in the setting of the respective channel gain controls, i.e., whenever you turn the channel gain controls, effects mix will change accordingly unless the respective effect send controls are adjusted accordingly. This is in line with conventional professional practice and should present no operating difficulty for the user. One should remember that no reverberation or effects output will occur unless one or more of the operating channels has its respective gain and effects controls turned up. Additionally, no reverberation effect will be noted unless the master reverb (6) is also turned up. Reverberation is, in a sense, a controlled and delayed acoustic signal and may be considered a controlled form of acoustic feedback. Generally, excessive amounts of reverb tend to promote acoustic feedback because of its regenerative nature. Again, experimentation combined with understanding and operating experience are the keys to satisfactory operation.

MASTER SECTION

The MP-4's master section contains the overall master gain control and the master reverb (return to master) control, as well as the master equalization controls and patch panel. As the name implies, the master controls operate as the final control element for their respective functions and the master equalization controls determine the final overall response and tonal balance.

MASTER GAIN CONTROL (5)

The master gain control is the main level control element and determines the overall system gain/loudness. Please be aware that the setting of this control **in no way** reflects the power being delivered to the speaker system but acts merely to set the overall system gain. In order for signals to pass from the system's inputs through to the speaker or line outputs, both the individual channel gain controls and the master gain control must be

turned up. It's vital that proper balance be achieved between the settings of the individual channel gain controls so as to allow master gain control settings somewhere in the middle of its range (approximately "4" to "6"). It is extremely poor practice to operate the master gain control either in the "nearly off" or "wide open" settings since low settings limit front end headroom and high settings degrade noise performance. This control determines the amount of gain produced in the summing/line amplifier and determines the signal level presented to the internal power amplifier and at the main line level (approximately 1 volt) output (13).

MASTER REVERB CONTROL (6)

This control serves as the gain control for the reverb return amplifier and determines the amount of reverberation (delayed signal) fed back into the master mixing buss. It must be remembered that the internal reverberation delay line must be driven from the individual channels by properly adjusting the channel effects send controls before any reverb signal can be obtained through the master reverb return circuit, i.e., you must turn up both the channel effects send and the master reverb controls to obtain reverb. Care should be taken so as to not overdrive the internal reverberation system from any or all of the channels and also to obtain proper blend through the use of the four effects send controls on the respective channels. The operation of the reverb return control is "straightforward" and should present no operational difficulty.

MASTER EQUALIZATION

LOW EQUALIZATION CONTROL (7)

The low frequency equalization control acts as a level control for the low frequencies and provides both a boost (clockwise) and cut (counterclockwise) capability. This circuit is of the active type having a shelving characteristic as is generally accepted in professional practice for such equalizers. In the straight up or vertical (12:00 o'clock) position, this control is effectively out of the circuit and produces no boost or cut, i.e., zero effect. Boost is accomplished by rotating the control to the right, while cut is accomplished by rotating the knob to the left. Generally, it is poor practice to utilize excessive low end boost since it tends to emphasize stage rumble, wind noise, etc., and tends to quickly overload the power amplifier (3 dB of bass boost doubles power output requirements). Excessive cutting of the low range tends to decrease dynamic range as well as removing "fullness." In certain acoustic environments, it may be necessary to cut the system's low end response in order to maximize projection and to minimize acoustic feedback. However, good operating practice generally dictates a cut of no more than 6 dB unless absolutely necessary. All equalization should begin with all equalization controls set to the vertical or "0" settings.

MIDDLE EQUALIZATION CONTROL (8)

The middle equalization control acts as a level control for the vital mid-range frequencies. This circuit is of the active peak/notch variety providing both boost (clockwise) and cut (counterclockwise) capability. The vital mid-range control is able to help correct deficiencies in microphones and/or speaker systems and is one of the most important controls on the MP-4's panel. In the straight up or vertical (12:00 o'clock) position, this control is effectively out of the circuit and produces no boost and no cut. Boost is accomplished by rotating the knob to the right, while cut is accomplished by rotating the knob to the left. As with both the high and low equalization, extreme settings are not recommended. Experimentation has shown that some degree of mid-range **cut** tends to produce a very pleasant "clean sounding" response that many consider ideal for live performance situations. Overboosting of the middle equalization often produces a "nasal" or "hollow" sound quality which often tends to detract from the intelligibility of the program material. Again, experimentation, operating experience, and understanding are the keys to satisfactory performance.

HIGH FREQUENCY EQUALIZATION CONTROL (9)

The high frequency equalization control operates in a similar manner to the low and middle frequency controls by having the ability to both boost and cut the high frequencies. This high frequency equalization is of the active shelving type as generally prescribed by professional audio practice. In the straight up or vertical (12:00) position, this control is effectively out of the circuit and produces no boost or cut. Boost is accomplished by rotating the control to the right, while cut is accomplished by rotating the knob to the left. Care should be taken to avoid extreme settings of this control since overboosting of the high frequencies tends to encourage acoustic feedback and emphasize residual preamp noise as well as creating harsh and unpleasant or "screechy" tonal effects in the output program material. Excessive treble cut tends to produce "muddy" response with a marked lack of intelligibility. Just as with the other equalization controls, all equalization should generally begin with this control in the vertical ("0") setting.

PILOT LED INDICATOR (10)

The pilot LED (light emitting diode) indicates when the electrical supply is switched on and is actually delivering power to the amplifier.

PATCH PANEL

To give additional flexibility to the MP-4, we have included a patch panel to allow interfacing the MP-4's circuitry to external devices. Reasonable care should be observed when patching into or out of the MP-4 such as using properly grounded A.C. (mains) receptacles, properly shielded low level connections, etc. (NOTE: Never use shielded wire for speaker connections.) The MP-4's line outputs have more than adequate signal and impedance levels to adequately drive most audio devices such as tape recorders, auxiliary amplifiers, etc. (Powered headphones may be connected to the MP-4's line outputs if desired.)

AUXILIARY INPUT (11)

The auxiliary input provides a high impedance input that is patched directly into the main mixing buss. This input has been provided to allow patching tape recorders, rhythm units, effects devices and other audio accessories into the main mixing buss of the MP-4. This input may be considered as a fifth channel that does not have level or contour controls and does not have effects send capability. The auxiliary input is somewhat less sensitive than the individual channel inputs since it's primarily designed for connection from tape recorders or other electronic devices instead of microphones. Its input impedance is 220K ohms and is designed for signal levels of approximately 1 V RMS. The setting of the master gain control (5) directly affects the sensitivity of the auxiliary input.

REVERB FOOTSWITCH JACK (12)

The reverb footswitch jack has been provided to allow remote cutoff of the internal reverberation system. Any properly shielded and terminated footswitch will suffice and should provide satisfactory operation. NOTE: Disabling of the reverb return function **does not** disable the effects output.

MAIN OUTPUT (13)

The main output jack provides line level signals from the main mix (which also feeds the internal power amp). This main output signal is of low impedance (approximately 1K ohms) and provides signal levels of approximately 1 V RMS. This output has been provided in order to drive external devices such as tape recorders, power amplifiers, or any other compatible audio equipment.

EFFECTS OUTPUT(14)

The effects output jack provides signal from the effects summing amplifier whose blend is determined by the relative settings of the respective channel gain/effects send controls. This line output is of relatively low impedance (approximately 1K ohms at 1 V RMS). This effects output is designed to feed external effects units such as echo devices, digital delays, etc. Any signal to be returned to the MP-4 from these devices should be plugged into the auxiliary input for mixing back into the main mixing buss.

REAR PANEL

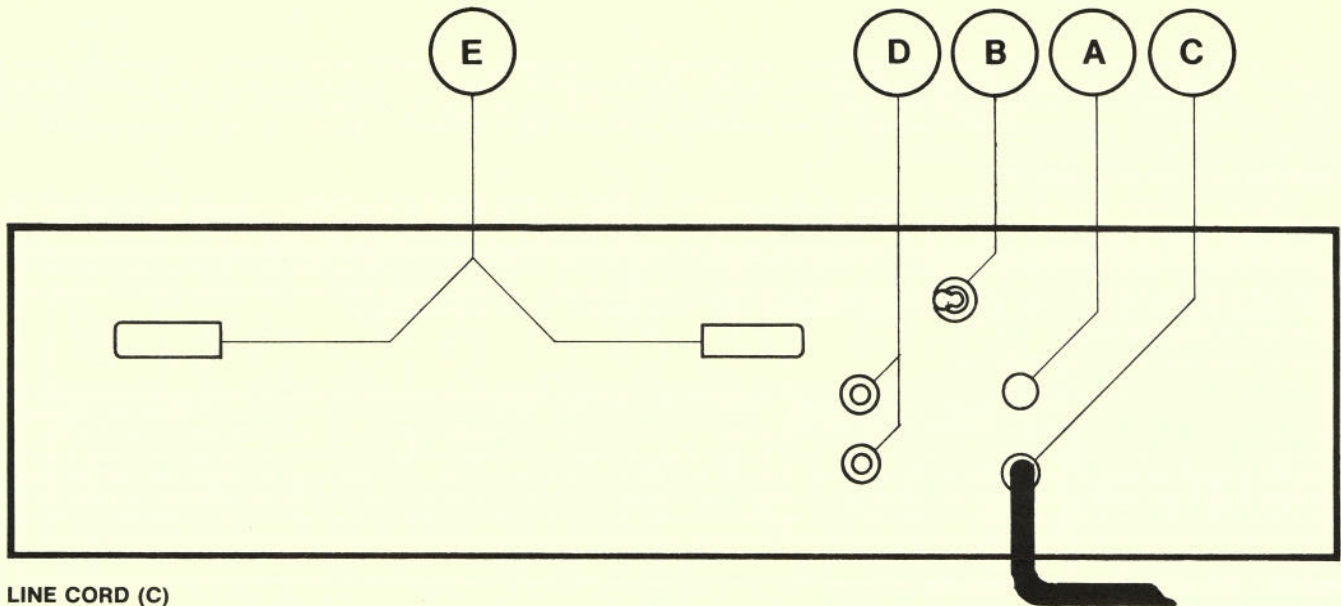
FUSE (A)

The fuse is located within the cap of the fuseholder. It is necessary that the fuse be replaced with the proper type and value if it should fail in order to avoid damage to the equipment and to prevent voiding the warranty. If your unit repeatedly blows fuses, it should be taken to a qualified service center for repairs.

POWER SWITCH (B)

On domestic units, the power switch is of the three-position type with the center position being "OFF." This switch has two "ON" positions, one of which is used to ground the amplifier properly. One of the "ON" positions will yield the lowest amount of residual hum or "popping" when the instrument is touched and this is the position that should be used.

On export models, we utilize a simple on/off switch that does not have multiple "ON" positions since the grounding (earthing) conditions in most other countries are positively made through standard tamper-proof plug-in systems.



LINE CORD (C)

For your safety, we have incorporated a three-wire line (mains) cable with proper grounding facilities. It is not advisable to remove the ground pin under any circumstances. If it is necessary to use the amp in a two-pin plug system without proper grounding facilities, suitable grounding adaptors should be used. Much less noise and greatly reduced shock hazard exist when the unit is operated with the proper grounded receptacles.

SPEAKER OUTPUTS (D)

The speaker output jacks are of the standard 1/4" type. Both the output jacks are wired in parallel and either or both may be used when connecting your speaker system. The 100H module has been optimized for an 8-ohm load but has adequate performance to drive loads both above and below the recommended 8-ohm impedance. Extreme care should be used when operating a unit below 8 ohms since lower load impedances tend to overload the power amplifier and may cause premature activation of the power amp's short-circuit protection system and/or thermal fault protection circuitry.

LINE (MAINS) CORD RETAINER (E)

We have provided two large molded line (mains) cord retainers on the rear panel to allow storage of the mains cable for travel. In operation, the cable should be completely unwrapped to allow maximum heat dissipation from the rear panel/heatsink.

SPECS:

POWER AMPLIFIER SECTION:

100H Module

FREQUENCY RESPONSE:

+0, -1 dB, 30 Hz to 30 KHz @ 40 watts into 8 ohms

RATED POWER & LOAD:

50 watts RMS into 8 ohms

POWER @ CLIPPING:

5% THD, 1 KHz, 120 VAC line

Typically:

30 W RMS into 16 ohms

50 W RMS into 8 ohms

45 W RMS into 4 ohms

TOTAL HARMONIC DISTORTION:

Less than 0.2%, 100 mW to 40 W RMS, 50 Hz to 10 KHz, 8 ohms, Typically below 0.1%

INTERMODULATION DISTORTION:

Less than 0.2%, 100 mW to 40 W RMS, 60 Hz and 5 KHz, 8 ohms, Typically below 0.1%

SENSITIVITY:

Master @ 12:00, Channel Gain @ 12:00, all EQ set flat @ 0 dB, 250 mV @ input for 50 watts into 8 ohms @ speaker jacks, 38 dB gain

MAXIMUM AVAILABLE GAIN:

56 dB with Channel Gain full CW
70 dB with Channel & Master full CW

MAXIMUM INPUT LEVEL:

3 V RMS @ each channel input

INPUT IMPEDANCE:

220K ohms @ each channel, Aux. in

SIGNAL-TO-NOISE RATIO:

Master @ 12:00, all EQ flat, 20 Hz to 20 KHz unweighted
84 dB, 1 Channel Gain @ 12:00, shorted input
82 dB, 1 Channel Gain @ 12:00, 22K ohm source
78 dB, 4 Channel Gain @ 12:00, 22K ohm source

CHANNEL EQUALIZATION:

+/-15 dB @ 80 Hz, 500 Hz, and 8 KHz

TOTAL SYSTEM FREQUENCY RESPONSE:

+/-2 dB, 50 Hz to 25 KHz

MAIN OUTPUT:

1 V RMS into 10K ohms @ power amp clipping,
maximum output 8 V RMS

EFFECTS OUTPUT:

Nominal Output: 1 V RMS into 10K ohms
Maximum Output: 8 V RMS into 10K ohms

DANGER

EXPOSURE TO EXTREMELY HIGH NOISE LEVELS MAY CAUSE A PERMANENT HEARING LOSS. INDIVIDUALS VARY CONSIDERABLY IN SUSCEPTIBILITY TO NOISE INDUCED HEARING LOSS, BUT NEARLY EVERYONE WILL LOSE SOME HEARING IF EXPOSED TO SUFFICIENTLY INTENSE NOISE FOR A SUFFICIENT TIME.

THE U.S. GOVERNMENT'S OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAS SPECIFIED THE FOLLOWING PERMISSIBLE NOISE LEVEL EXPOSURES:

DURATION PER DAY IN HOURS	SOUND LEVEL dBA, SLOW RESPONSE
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

ACCORDING TO OSHA, ANY EXPOSURE IN EXCESS OF THE ABOVE PERMISSIBLE LIMITS COULD RESULT IN SOME HEARING LOSS. EAR PLUGS OR PROTECTORS IN THE EAR CANALS OR OVER THE EARS MUST BE WORN WHEN OPERATING THIS AMPLIFICATION SYSTEM IN ORDER TO PREVENT A PERMANENT HEARING LOSS IF EXPOSURE IS IN EXCESS OF THE LIMITS AS SET FORTH ABOVE. TO INSURE AGAINST POTENTIALLY DANGEROUS EXPOSURE TO HIGH SOUND PRESSURE LEVELS, IT IS RECOMMENDED THAT ALL PERSONS EXPOSED TO EQUIPMENT CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS SUCH AS THIS AMPLIFICATION SYSTEM BE PROTECTED BY HEARING PROTECTORS WHILE THIS UNIT IS IN OPERATION.

CAUTION

THIS AMPLIFIER HAS BEEN DESIGNED AND CONSTRUCTED TO PROVIDE ADEQUATE POWER RESERVE FOR PLAYING MODERN MUSIC WHICH MAY REQUIRE OCCASIONAL PEAK POWER. TO HANDLE OCCASIONAL PEAK POWER, ADEQUATE POWER "HEADROOM" HAS BEEN DESIGNED INTO THIS SYSTEM. EXTENDED OPERATION AT ABSOLUTE MAXIMUM POWER LEVELS IS NOT RECOMMENDED SINCE THIS COULD DAMAGE THE ASSOCIATED LOUDSPEAKER SYSTEM. PLEASE BE AWARE THAT MAXIMUM POWER CAN BE OBTAINED WITH VERY LOW SETTINGS OF THE GAIN CONTROLS IF THE INPUT SIGNAL IS VERY STRONG.

1. Read all safety and operating instructions before using this product.
2. All safety and operating instructions should be retained for future reference.
3. Obey all cautions in the operating instructions and on the back of the unit.
4. All operating instructions should be followed.
5. This product should not be used near water, i.e. a bathtub, sink, swimming pool, wet basement, etc.
6. This product should be located so that its position does not interfere with its proper ventilation. It should not be placed flat against a wall or placed in a built-in enclosure that will impede the flow of cooling air.
7. This product should not be placed near a source of heat such as a stove, heater, radiator or another heat producing amplifier.
8. Connect only to a power supply of the type marked on the unit adjacent to the power supply cord.
9. Never break off the ground pin on the power supply cord. For more information on grounding write for our free booklet "Shock Hazard and Grounding."
10. Power supply cords should always be handled carefully. Never walk or place equipment on power supply cords. Periodically check cords for cuts or signs of stress, especially at the plug and the point where the cord exits the unit.
11. The power supply cord should be unplugged when the unit is to be unused for long periods of time.
12. Metal parts can be cleaned with a damp rag. The vinyl covering used on some units can be cleaned with a damp rag, or an ammonia based household cleaner if necessary.
13. Care should be taken so that objects do not fall and liquids are not spilled into the unit through the ventilation holes or any other openings.
14. This unit should be checked by a qualified service technician if:
 - A. The power supply cord or plug has been damaged.
 - B. Anything has fallen or been spilled into the unit.
 - C. The unit does not operate correctly.
 - D. The unit has been dropped or the enclosure damaged.
15. The user should not attempt to service this equipment. All service work should be done by a qualified service technician.