

1. WARRANTY EXPLANATION

Rane offers a limited warranty which covers both parts and labor necessary to repair any defects in the manufacturing of the MM 12.

The warranty period for the MM 12 is two (2) years, and is determined from either of these two methods, whichever is longer:

1. Starting from the date of retail purchase as noted on either the sales slip from an authorized Rane dealer, or on the warranty registration card sent in to the factory,

or:

2. Starting from the date of manufacture which is coded on both the inside and outside of the MM 12 chassis, in case the sales slip or warranty card is not available.

If you send in the registration card or retain your sales slip as proof of purchase, you will receive a full two (2) year warranty period from the date of purchase regardless of the date of manufacture. If you do not send in the registration card ("I forgot.."), or you do not have a sales slip from an authorized Rane dealer ("My cat ate it.."), the MM 12 will be underwarranty only within two (2) years from the date of manufacture.

All registered warranties are tracked by SERIAL NUMBER, not by owner. Once your MM 12 is registered it will be covered the full two (2) years regardless of any change in ownership.

Should you encounter any problems with the MM 12 be sure to contact either your local Rane dealer or the Rane factory before taking the MM 12 anywhere for repairs. We will help you to identify and locate any specific malfunctions, possibly avoid needless shipment, or instruct you as to the speediest method for authorized repair.

If you must send the MM 12 to the factory or warranty station, BE SURE TO INCLUDE THE FOLLOWING INFORMATION:

1. YOUR COMPLETE NAME AND SHIPPING ADDRESS.
2. THE SERIAL NUMBER OF YOUR MM 12.
3. A COMPLETE DESCRIPTION OF ANY AND ALL PROBLEMS YOU ARE EXPERIENCING WITH THE MM 12.

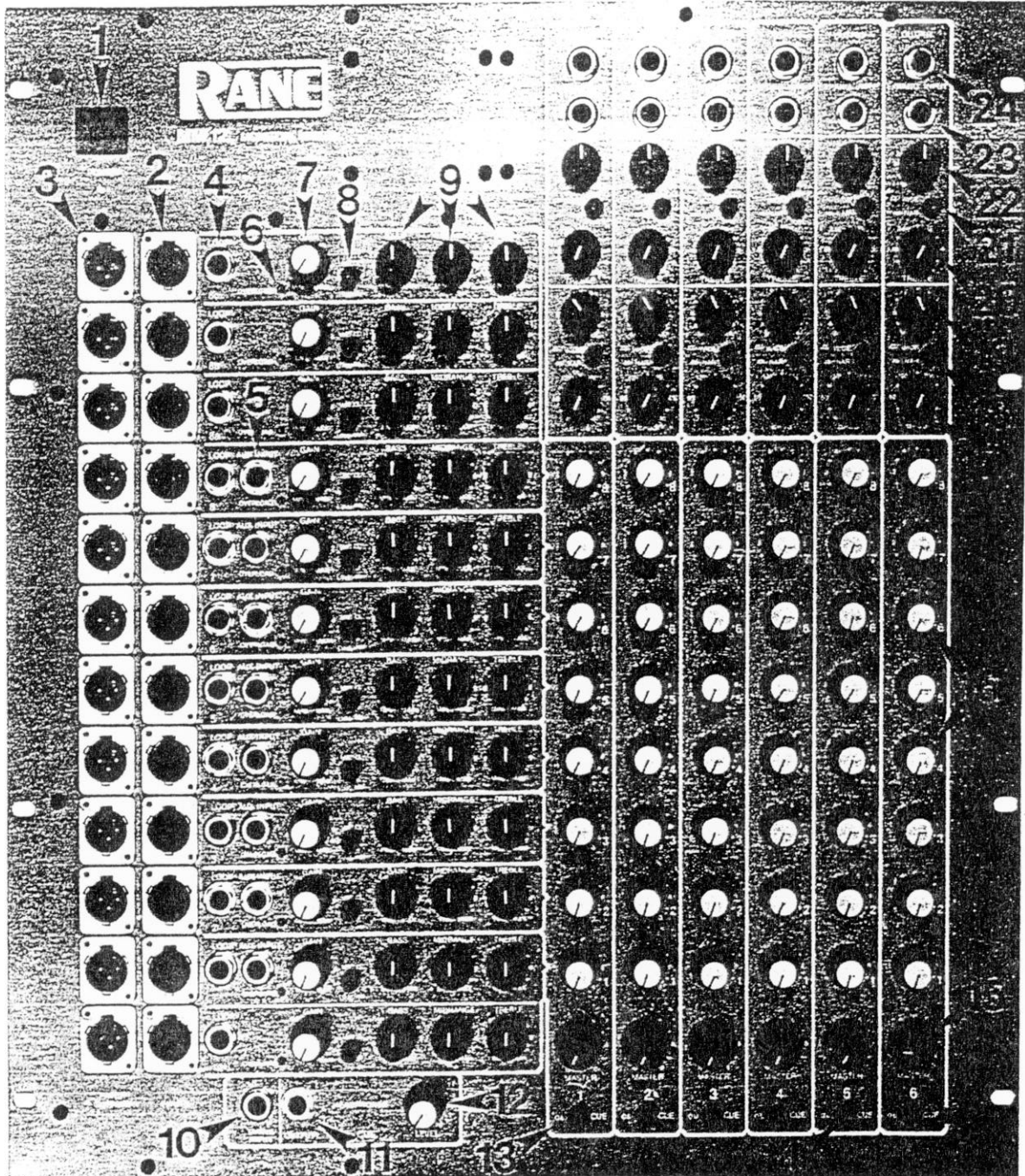
Never ship the MM 12 in any shipping carton other than the original or a replacement supplied by Rane. Ship only by a reputable carrier-we do not recommend parcel post due to a high incidence of damage or loss. Be sure to insure the package for the full replacement value.

Note: Be sure to remove the MM 12 from any rack or carrying case prior to shipment to the factory or a warranty station, otherwise you will be charged for the additional time to remove and reinstall the unit

If you need further assistance concerning the repair, installation or operation of your MM 12 please feel free to contact Rane galactic headquarters at

Rane Corporation
10802 47th Ave. W.
Mukilteo, WA 98275
Phone: (425)355-6000

II. FRONT PANEL DESCRIPTION



1. POWER SWITCH: The adjacent yellow LED will light when power to the MM 12 is turned on by means of this switch.

2. INPUTS: These automatic balanced/unbalanced three-pin jacks are to be used for both microphone or line level inputs. Rane adheres to the international standard pin configuration, which is:

Pin 1: Case ground.

Pin 2: Hot (signal).

Pin 3: Circuit ground.

3. PATCH OUTPUTS: The MM 12 provides a hard-wire type splitter which allows the input to each channel to be patched back out to the main mixing console or other equipment. The MM 12 simply "taps" off each splitter with high impedance amplifiers, without causing any noise contribution, distortion or signal degradation to the main mix.

4. ACCESSORY LOOP: These stereo 1/4" jacks allow the insertion of effects, additional EQ or the like in series with the input stage. These jacks are located POST EQ with the following Tip/Ring/Sleeve (TRS) configuration:

Tip is SEND (output)

Ring is RETURN (input)

Sleeve is GROUND

These LOOP jacks may also be used to patch channels 1 a, 8a, 8b or 8c to the AUX inputs of the other channels, using a mono patch cord. Refer to Section IV-1B.

5. AUX INPUT: This is a SUMMING input which allows another line level signal to be added to the regular input program. This input is POST EQ, and can also be used to reassign channels 1a, 8a, 8b, or 8c; refer to Section IV-1B.

6. OVERLOAD INDICATOR: This red LED will light whenever the input stage reaches 4 dB below clipping. More than occasional blinking of this LED means that the input gain control should be turned down to avoid clipping.

7. INPUT GAIN CONTROL: This varies the gain of the input stage to suit the requirements of various microphones, instruments and line level equipment ranging from a minimum of 10 dB in the LINE mode to a maximum of 70 dB in the MIC mode.

8. MIC/LINE SWITCH: In the MIC position (out) the input stage has a gain range of 20 dB to 70 dB; in the LINE position (in) the gain has a range of 10 dB to 30 dB.

9. INPUT EQUALIZATION SECTION: The BASS control provides +14 dB of boost/cut at 20 Hz. shelving type. The MIDRANGE control is a bandpass filter centered at 1k Hz which provides +10 dB of boost/cut. The TREBLE control provides +12 dB of boost/cut at 20k HZ. shelving type.

10. MAINS INPUT: Plug the stereo headphone output from the main mixing console into this input then you will hear the main mix program through headphones plugged into the MM 12. Whenever any of the CUE buttons on the MM 12 is pressed, the mains input will be bypassed and you will hear the desired mix in the MM 12. You may also use a stereo 1/4" patch cord to connect the Mains Input to any of the input LOOP jacks to achieve input cueing-see the following note for wiring requirements.

NOTE: To use the Mains Input for cueing input signals with the headphones, use a stereo 1/4" patch cord WITH THE TIP AND RING CONNECTED TOGETHER at either end. This will allow you to cue any input through the LOOP jack without removing the signal from any of the MM 12 outputs. IF A MONO PATCH CORD IS USED FOR INPUT CUEING, THE INPUT SIGNAL WILL BE REMOVED FROM THE MIX OUTPUTS SINCE THE LOOP RETURN IS BEING GROUNDED.

11. HEADPHONE OUTPUT: Plug any type of monitoring headphones into this stereo output to monitor any of the MM 12 outputs using the CUE buttons as well as the mains mix when no CUE button is depressed.

12. HEADPHONE LEVEL: This knob controls volume in the headphones. The MM 12 will handle headphones with impedances between 8 ohms and 2000 ohms.

13. OVERLOAD INDICATOR: This red LED will light whenever the output level reaches 4 dB below clipping which is +15 dBm output level.

14. CUE BUTTON: Press this button IN to monitor the mix of that channel through headphones.

15. MASTER LEVEL: This controls the final output level present at the output jack: it increases or decreases the volume in the monitor speaker without changing the mix levels.

16. MIX LEVEL CONTROLS: Each of these knobs controls the amount of input channel material to be heard in each output mix. Each of the six outputs of the MM 12 has 8 level controls which determine the particular mix for that monitor speaker.

17. BASS SWEEP CONTROL: This knob controls the center frequency of the bass filter in the output parametric EQ section: frequency range is from -10 Hz to 1k Hz as shown on the panel.

18. BASS BANDWIDTH SELECT BUTTON: In the WIDE position (out) the bandwidth of the bass filter is one octave: in the NARrow position (in) the bandwidth is 1/3 octave.

19. BASS BOOST/CUT CONTROL: This knob adjusts the amount of boost or cut of the bass filter. Maximum boost is +12 dB and maximum cut is -15 dB.

20. TREBLE SWEEP CONTROL: This knob controls the center frequency of the treble bandpass filter in the output parametric EQ section. Frequency range is from 1k Hz to 10k Hz as indicated on the panel.

21. TREBLE BANDWIDTH SELECT BUTTON: In the WIDE (out) position the bandwidth is one octave: in the NARrow (in) position the bandwidth is 1/3 octave.

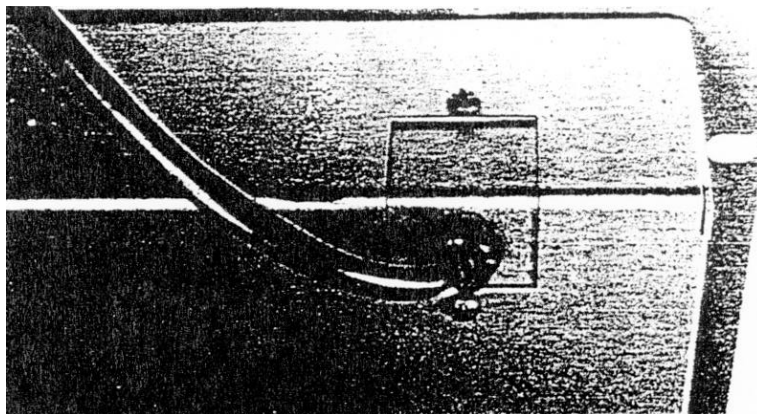
22. TREBLE BOOST/CUT CONTROL: This knob adjusts the amount of boost or cut of the treble filter. Maximum boost is +12 dB and maximum cut is -15 dB.

23. EXPAND INPUT: This is a summing input located before the output level control (pre fader). Plugging the outputs of a second MM 12 into these inputs will yield a 24-in/6-out system with the same layout logic. This input is unbalanced.

24. OUTPUT JACK: This stereo 1/4" jack delivers an automatic balanced/unbalanced, low impedance, high current output signal. Use a stereo 1/4" plug for balanced operation and a mono 1/4" plug for unbalanced operation.

NOTE: REVERSIBLE LINE CORD

By removing two phillips screws the exit of the line cord can be changed from the backpanel to the top panel. If the MM 12 is to be rack mounted, remove the two phillips screws next to the line cord, push the line cord into the chassis about an inch, then twist it so that the metal tab rotates 180 degrees. Pull the line cord outward until the metal tab is flush with the chassis, then replace the two phillips screws. For table-top operation of the MM 12, the fine cord should exit out the top panel—MM 12s are shipped in this configuration.



III. INSTALLATION

This section provides simplified diagrams indicating recommended wiring configurations for installation of the MM 12 into your sound reinforcement system. There are, of course, many other applications or configurations in which the MM 12 will work well, and we encourage you to modify your system to best suit your own particular needs.

DIAGRAM III-I. House Location of MM 12 for Use by Main Mix Operator

1. Connect the PATCH OUTPUTS of the MM 12 to the respective MIC or LINE inputs of the main mixer; use two-conductor shielded microphone cable with female three-pin connectors on the MM 12 end and male three-pin connectors or 1/4" plugs as necessary on the main mixer end.
2. If you are using a 16 channel main board, bypass the MM 12 as shown with any instrument which has a stage monitor amp, such as electric guitar, bass, etc., since these will not need to be in the monitor system. If cable lengths will permit you may plug these directly into the main mixer, otherwise you will have to use extender cables as shown.
3. Plug the male connectors from the main snake into the MM 12.
4. You will need to run up to six balanced lines up to the monitor amp rack, which should be on stage to keep the speaker lines as short as possible. Use a snake consisting of six shielded pairs, and be sure that the inputs to the monitor amp rack are BALANCED.
5. Using a STEREO 1/4" patch cord, connect the headphone output of the main mixer to the MAINS INPUT of the headphone section on the MM 12.

DIAGRAM III-1: House Location of the MM 12

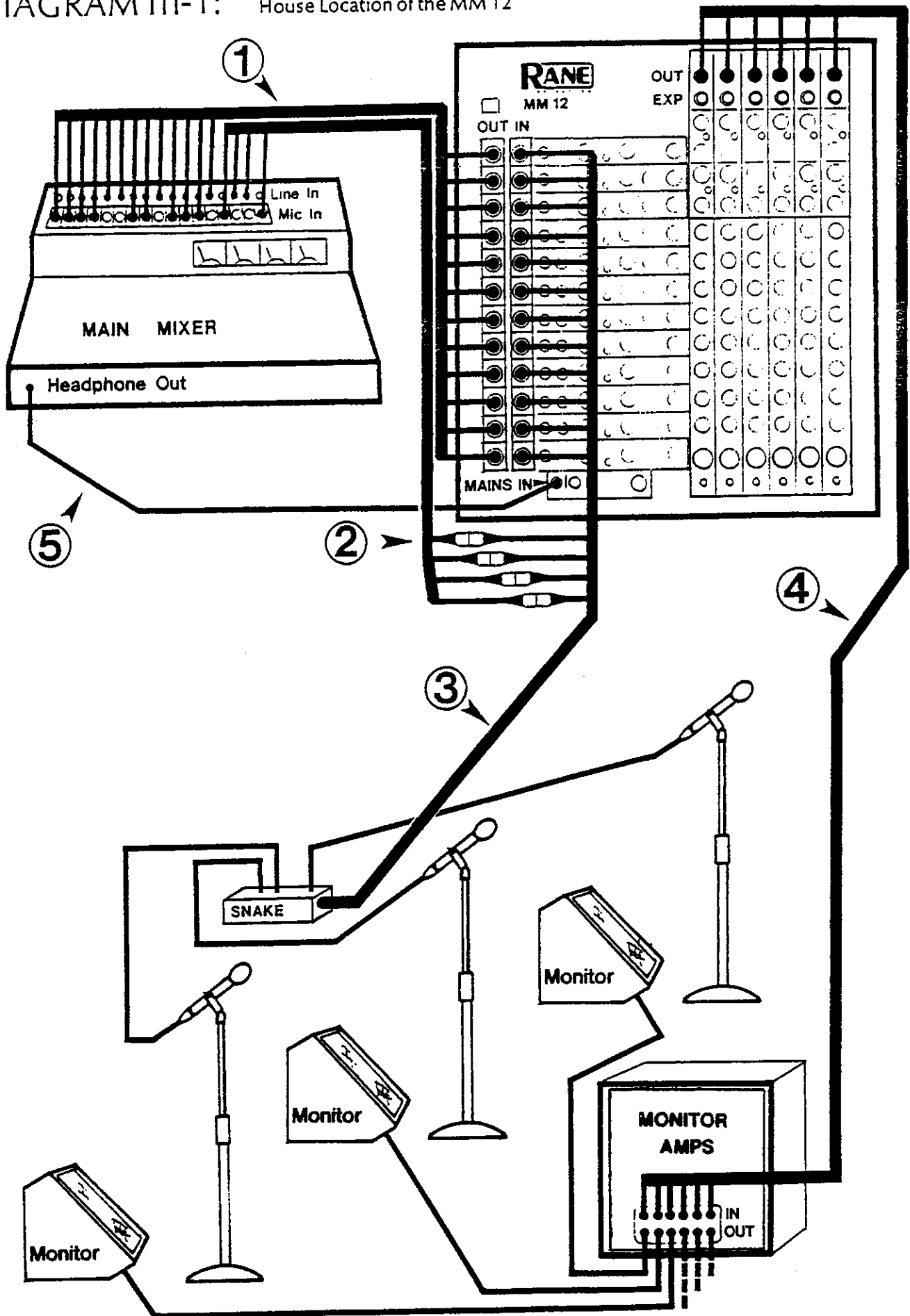


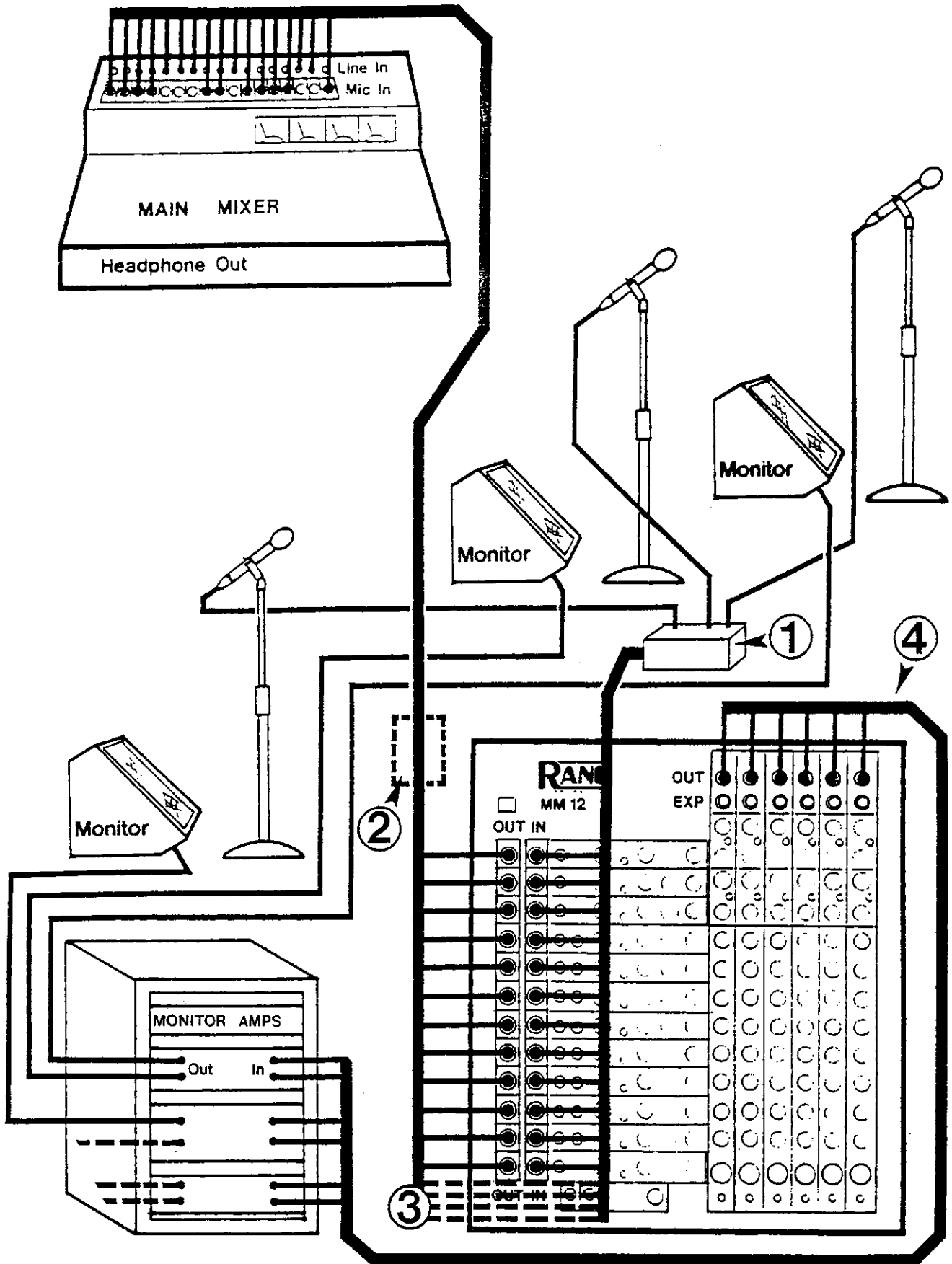
DIAGRAM III-2. Stage Location of the MM 12 for Dedicated Monitor Mix Operator

1. Run a short snake from a stage box to the inputs of the MM 12; this snake need only be long enough to reach from center stage to the MM 12 location, but it is wise to make it long enough to run it along the edge of the stage out of the way—a 25 foot length would be a minimum. This snake should have the same number of pairs (inputs) as the main snake, with all lines BALANCED.
2. Connect the main snake into the system in one of the two following ways. To keep the total numbers of cables and connectors to a minimum, modify the main snake in the following manner:
 - a. Unsolder the main snake cable from the connectors inside the stage box: be sure to label each of the shielded pairs as to which channel it belongs and which colors are connected to which pins.
 - b. Remove the snake cable from the stage box entirely; you might want to use the stage box for the short snake described in #1 above.
 - c. Strip about 18" of the outer sleeve insulation from the end of the snake cable. Separate each set of shielded pairs and install about 17" of heat shrink tubing over each pair, so that you have 12 or 16 shielded lines emerging from the snake end. Securely tape the area where the outer sleeve ends and all the heat-shrunked lines converge.
 - d. Now solder a male three-pin connector to each of the shielded pairs, making sure that the colors match the proper pins and channels are numbered as recorded in Step a.) above. Now you can plug the end of the main snake directly into the PATCH OUTPUTS of the MM 12.

if you do not want to modify the main snake, make up to 12 or 16 cables using shielded two-conductor mike cable and a male three-pin connector on one end and a female three-pin on the other end. Use these to connect the stage box of the main snake to the PATCH OUTPUTS of the MM 12.

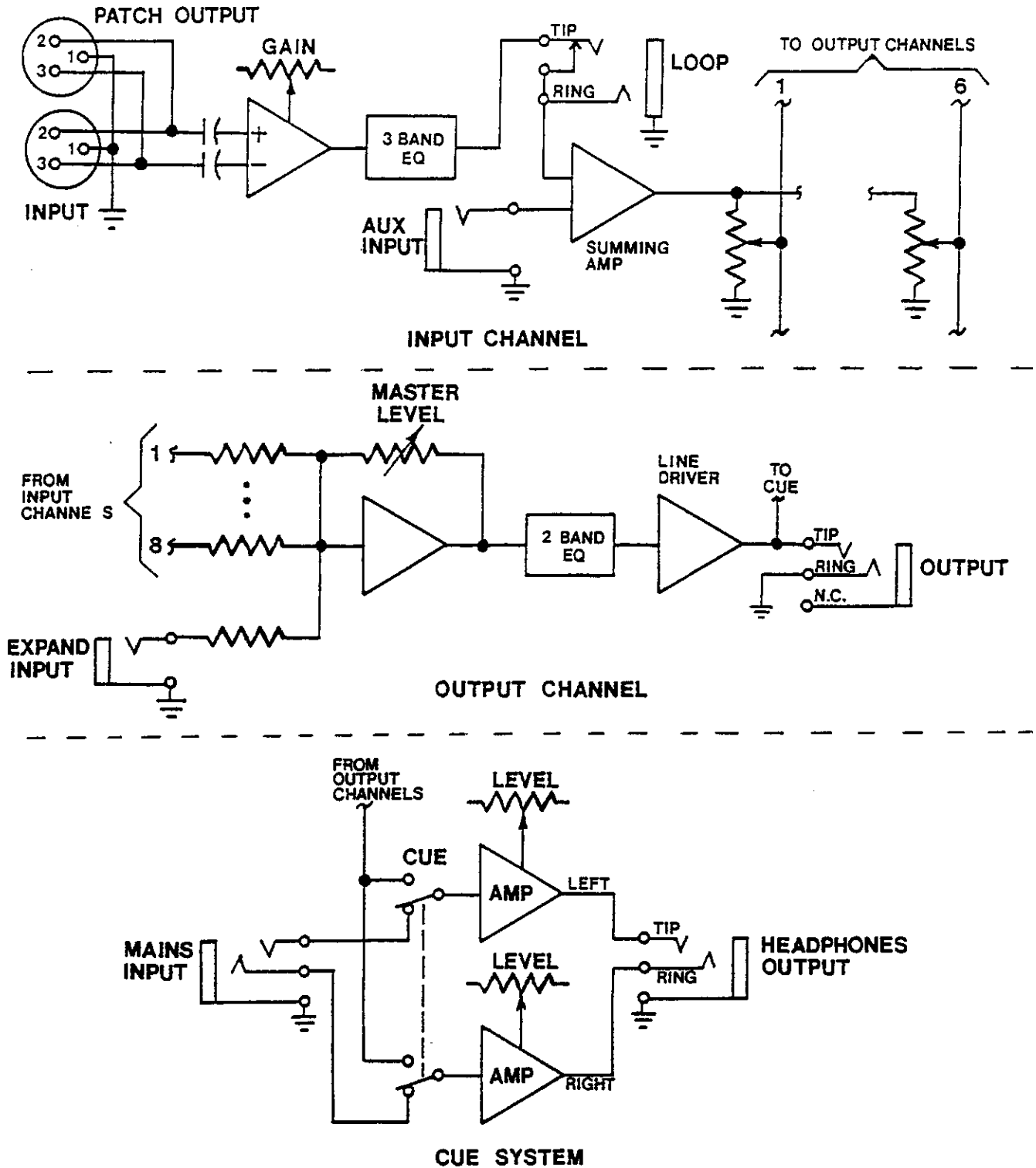
3. If you are running more than 12 channels through the main board, bypass the MM 12 with the channels that need not be in the monitor system, such as guitars or bass which have their own instrument amps on stage.
4. Connect the OUTPUTS of the MM 12 to the inputs of the monitor amplifiers—balanced lines are recommended if this run is more than six feet or so.

DIAGRAM III-2: Stage Location of the MM12



IV. OPERATION

Diagram IV-1 is a simplified block diagram of the MM 12, showing location of inputs, outputs, summing inputs, etc., which should assist you in both installation and operation of the MM 12.



IV-1. INPUT ASSIGNMENTS

A. SUBMIXING MULTIPLE INSTRUMENTS. The MM 12 has 12 inputs but only 8 monitor mix level controls above each output master level. The reason for this is to simplify monitor mixing by doing some clever sub-mixing on the inputs. Most groups possess at least one individual who plays more than one instrument (albeit never at the same time...), such as a keyboard player, drummer, lead guitarist with 4 axes, etc. In such a situation, plug one instrument into channel 8, a second instrument into 8a, a third into 8b and so on. Then adjust the INPUT GAIN controls on channels 8, 8a, 8b, and 8c of the MM 12 such that all of the instruments are of equal volume when monitored in headphones with MIX LEVEL control 8 turned up (you will also have to turn up channel 1 OUTPUT LEVEL control and depress the CUE button just below it). Now the #8 MIX LEVEL knobs in the 6 output columns will control any of the four instruments in the #8 submix group.

If the above instrumentalist (drummer, keyboardist, etc. also sings, be sure to route the vocal through input channel #7 (NOT 8, 8a, 8b or 8c so that you maintain separate control on the monitor mixes from the instruments.

Use input channels 1 and 1a in a similar fashion for a single instrumentalist with two instruments; remember to keep any vocal on a separate channel.

8. RE-ASSIGNING SUBMIXES. Instead of using the standard 4-into-1 submix, you might have a situation where you need three submixes of 2-into-1, say for three guitar players or brass players each having two separate instruments. The MM 12 may easily be re-patched to accommodate this or similar set-ups. Use inputs 8 and 8a for one pair of instruments. Then using two mono shielded 1/4" patch cables, plug the LOOP of 8b into the AUX input of channel 7; similarly connect the LOOP of 8c into the AUX input of channel 6. Now you have three separate 2-into-1 submixes: 8/8a, 7/8b, and 6/8c. Now the mix level controls 6, 7 and 8 in the OUTPUT columns each control either of two instruments, whichever is being played at the time.

IV-2. USING THE MM 12 OUTPUT MIX MATRIX

The MM 12 is laid out differently from traditional monitor mixer designs. By being "output oriented" rather than input oriented, its use is more natural and logical, and therefore less confusing and easier to learn. In using the output mix level controls, think in terms of each vertical column of knobs controlling the content of each of the monitor speakers on stage.

For example, the large MASTER LEVEL control of output channel #1 sets the overall volume in #1 monitor speaker. The eight MIX LEVEL controls above it determine the specific mix of vocals and instruments (from the MM 12 inputs) to be heard in monitor speaker #1.

Making quick adjustments is very straightforward: if the person listening to monitor #3 wants more of his/her own vocal, which is input channel 5, simply go column #3 and turn up mix level control #5.

IV-3. USING 'THE PARAMETRIC OUTPUT EQUALIZERS.

The primary intention of the parametric output EQ is to minimize feedback problems which inherently plague monitor systems. Although versatile and economical, parametric equalizers can be a little tricky to use properly if you are not familiar with them. The following procedure is a recommended method for quickly reducing feedback problems without adversely affecting monitor sound quality.

1. Start with only ONE output MASTER LEVEL control turned up, say channel #1, and all others turned fully down.

2. Set both BASS and TREBLE boost/cut knobs to the "0" center detent position, and both BANDWIDTH buttons to the NAR (in) position.

3. Slowly turn up both the #1 MASTER level and the MIX LEVEL knob in column 1 for the microphone located next to monitor 8 on stage: turn up both level controls until feedback begins to occur.

4. If the feedback tone is high in pitch, start with the TREBLE adjustments: if the tone is low in pitch, start with the BASS adjustments. In this example we'll assume you get a high-pitched squeal first, since this is more common.

5. Turn the TREBLE BOOST/CUT control to full CUT (counter clockwise) position.

6. Now sweep the TREBLE FREQUENCY knob from full counter clockwise to full clockwise (1k Hz to 10k Hz) slowly, while keeping the master volume in the monitor speaker at a point where feedback is occurring but not loudly out of control (this takes a cool head and a supple wrist). You will notice a point on the sweep control where the feedback will be reduced or stop altogether: this is the center frequency of the feedback

7. Now that you have found the center frequency, leave the SWEEP knob set at this point. Then slowly turn the BOOST/CUT knob clockwise until feedback begins to re-occur: set the BOOST/CUT control at a point where feedback just goes away. Too much cut will detract from the sound quality of the monitor and render the monitor program harder to understand. If feedback occurs later at a higher volume level, m-adjust the BOOST/CUT control just enough to eliminate the feedback and no more. Don't readjust the center frequency control as it is difficult to find the feedback center frequency during a show without embarrassing feedback

8. Now repeat steps 5, 6 and 7 with the BASS section of the channel 1 parametric equalizer. You will notice that after one feedback tone is eliminated, increasing the volume will produce another tone of a different pitch. You could chase these tones "ad infinitum", but a good working compromise is to reduce the two primary feedback trouble tones, so that you have a system that feeds back at a much higher level with two or more different tones. Repeat steps 5 through 8 with output channels 2 through 6 as necessary.

In some cases, the acoustics of the stage or the performance of the monitor speakers is such that feedback is not a real problem, but that the overall monitor sound is lacking in quality and is therefore more difficult to understand. If the bass response of the monitor is poor, use the BASS section of the parametric to boost the low end; try both the NARrow and WIDE bandwidth positions- too much low end boost can result in boomy response that muddies up monitor sound. If presence is lacking in the monitors, use the parametric TREBLE section to add response in the high end. In either case, starting with full boost and sweeping the frequency will help you to find the right area to correct: once found, cut back on the boost as necessary to give the smoothest overall response.

IV-4. USING THE MM 12 HEADPHONE CUE SYSTEM. It is much more effective to use the CUE system to make adjustments in the monitors, especially during a performance. By depressing the appropriate CUE button you can listen to the exact mix that each performer is hearing and make adjustments by ear rather than by guesswork

A. PATCHING INTO THE MAIN MIX CUE SYSTEM. In many cases the MM 12 will be operated along side the house mixer by the same operator. As shown in the installation diagrams, be sure to plug the headphone output of the main mixer into the MAINS INPUT of the MM 12 headphone section, using a STEREO 1/4" shielded patch cord. Then plug a single

set of headphones into the MM 12 to monitor BOTH the house mix and the monitor mixes as necessary. Whenever any of the MM 12 CUE buttons is depressed, you will hear the mix in that monitor. When none of the MM 12 CUE buttons are depressed, you will automatically hear the house mix from the main mixer, allowing you to use the main mixer cue system without switching the headphones back and forth between mixers (slick, no?).

B. USING THE HEADPHONES MAINS INPUT FOR INPUT CUEING. You may use the MAINS INPUT in the headphone section of the MM 12 to verify any input to the MM 12 or make tone adjustments during the performance.

1. Obtain a stereo 1/4" PATCH CORD at least 18" long.
2. Remove the case from one of the stereo plugs on this cord: using a small piece of wire, connect the TIP lug to the RING lug so that the TIP and RING are shorted together but remain isolated from the GROUND. By doing this, the SEND and RETURN in the MM 12 LOOP jack will remain connected when this special cable is inserted. preventing signal loss at the MIX LEVEL controls.

NOTE: If a mono patch cable or un-modified stereo patch cable is plugged into the LOOP jack on any input, the SEND/RETURN link will be interrupted and that channel will no longer be present in the output mixes.

3. Plug one end of your modified cable into the MAINS input on the MM 12 headphone section: then plug the other end into any of the input LOOP jacks to listen to the input program without interrupting monitor mix content.

BEWARE: The MM 12 has a powerful headphone amplifier—keep the headphone volume control turned down before plugging into the LOOP jacks. A sudden blast in the headphones when plugging in just might render you cross-eyed for several minutes.

IV-S. USING THE EXPAND INPUTS. Expand inputs are provided on the MM 12 to enable two MM 12's to be used "piggy-back" for 24 inputs into 6 outputs. Simply plug the OUTPUTS of one MM 12 into the EXPAND inputs of the second MM 12 and you will have 24-in/6-out with the same layout logic. Use the following procedure:

1. Plug the OUTPUTS of one MM 12 into the EXPAND inputs of the second MM 12.
2. Plug the OUTPUTS of the second MM 12 into the monitor amplifiers.
3. Set the MASTER level controls of the first MM 12 to full output level; then use only the MASTER levels of the second MM 12 to control the volume in each of the monitor speakers.
4. Now each of the six monitor speakers will have 16 MIX LEVEL controls. Use the submixing capability of each MM 12 to best suit your needs as described in Section IV-1A.
5. Whenever possible, locate the first MM 12 ABOVE the second MM 12 to maintain the vertical columns of MIX LEVEL knobs for each monitor speaker.
6. In using two MM 12s. you now will have TWO two-stage parametric equalizers for each monitor speaker, giving you greater feedback control. Use the parametrics as outlined in Section IV-3.

V. SPECIFICATIONS

12 INPUTS with the following:

- Transformerless electronically balanced/unbalanced female three-pin connector input.
- Passive MIC splitter with male three-pin connector output.
- Built-in RFI filters.
- Input impedance: 8k ohms in MIC or LINE.
- Active gain control: 20 dB to 70 dB in MIC. 10 dB to 30 dB in LINE.
- Maximum input levels: +2 dBm (1V) in MIC. +12 dBm (3V) in LINE.
- Overload LED indicator: lights at 4 dB below clipping (+16 dBm).
- Three-way input equalizer:
 - Bass: ± 14 dB @ 20 Hz, shelving type
 - Midrange: ± 10 dB @ 1k Hz, bandpass type
 - Treble: ± 12 dB @ 20k Hz, shelving type
- Equivalent input noise: -120 dBm unweighted, with source impedance of 200 ohms, 20k Hz bandwidth.
- Effects loop: TRS (Tip/ring/sleeve) 1/4" jack tip=send, ring=return, sleeve=ground, located POST EQ.
- AUX input: 1/4" jack, summing input located POST EQ.

6 OUTPUTS with the following:

- Transformerless, high-current floating stereo 1/4" output jack, compatible with balanced or unbalanced inputs.
- Maximum output level: +19 dBm (7.0 V into 600 ohms, 20-20k Hz).
- Minimum output load impedance: 600 ohms.
- Output impedance: 50 ohms.
- Two-band parametric equalizer
 - Amplitude: 12 dB boost 15 dB cut
 - Frequency: 40 - 1k Hz in Bass, 1k - 10k Hz in Treble.
 - Bandwidth: 1 octave in WIDE, 1/3 octave in NARrow.
- Overload LED indicator: lights at 4 dB below clipping (+16 dBm).
- Expand input 1/4" summing input pre-fader and preEQ, unbalanced.

HEADPHONE CUE AMPLIFIER:

- 700 mW maximum average (RMS) power output per 8 ohm headset 350 mW per channel, 20 - 20k Hz
- Maximum Gain: 28 dB.
- THD + Noise: less than 0.1% typical; less than 0.4% 20 - 20k Hz
- Signal/Noise Ratio: 98 dB below rated 350 mW into 8 ohms, A-weighted.
- Frequency response: 20 - 20k Hz, $\pm 0/-3$ dB.
- Mains Input: auxiliary input to cue system, patched to headphone output when all CUE buttons are disengaged; input impedance of 2.2 k ohms.

OVERALL PERFORMANCE: Any MIC input to any output with EQ flat

- THD + Noise: less than .03% @ +4 dBm.
- IM Distortion (SMPTE) @ +4 dBm: less than .03%
- Frequency Response: 20 - 20k Hz, $\pm 0/-3$ dB.
- Slew Rate: 10 V/ μ S.

GENERAL SPECIFICATIONS:

- Dimensions: 21" H X 19" W X 2½" Rack depth, EIA Rack mountable.
- Construction: All steel chassis.
- Weight: 24 lb net