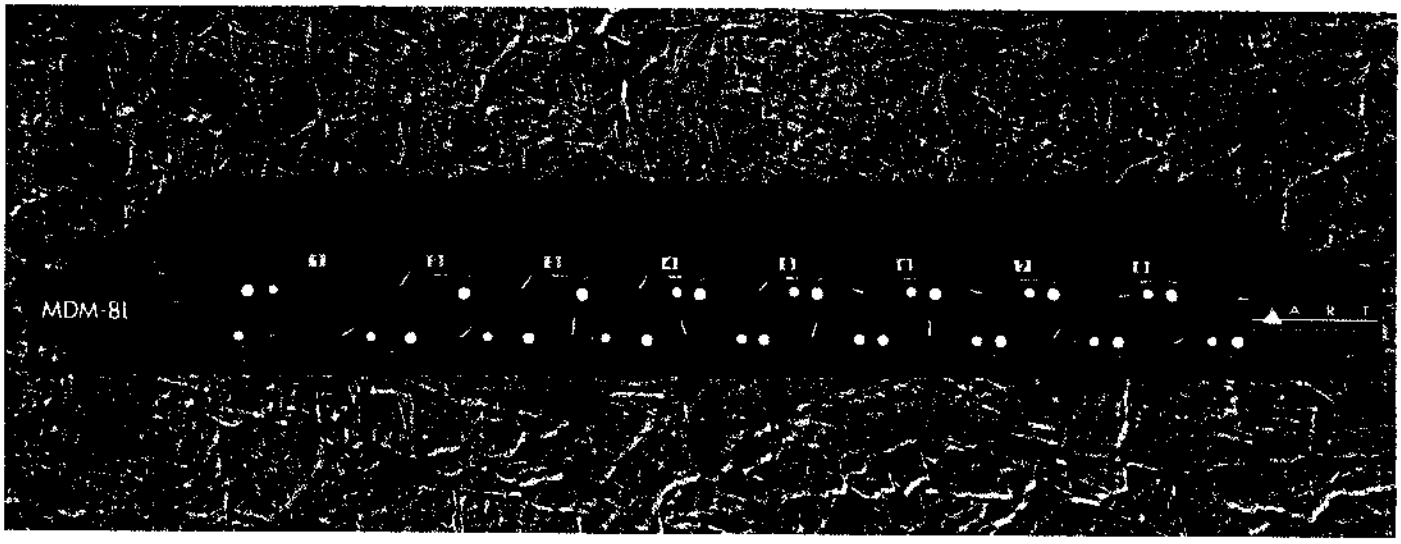
MDM-8L

8-CHANNEL LIMITER

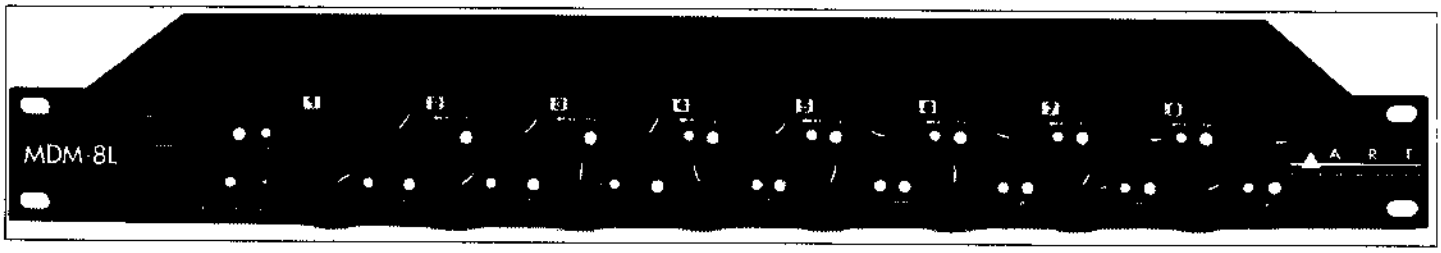


USER'S GUIDE

A R T

APPLIED RESEARCH AND TECHNOLOGY

MDM-8L
USER'S GUIDE



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MDM-8L
USER'S GUIDE

Introduction
Thank you for purchasing the Applied Research and Technology MDM-8L eight-channel limiter. The MDM-8L is designed to work seamlessly with any digital or analog recorder and in situations where having eight independent channels of dynamics control in one rack space is convenient. Please refer to this manual for long, continuous use of your MDM-8L.

Registration
If you haven't done so already, please take the time to fill out the User Registration Card for your purchase. Having you in our data base allows us to keep you informed of updates, application notes, and new product introductions. It only takes a moment and will ensure you are constantly up to date with your purchase.

Fill in the following for your reference:

DATE OF PURCHASE: _____

PURCHASED FROM: _____

SERIAL NUMBER: _____

Features
The MDM-8L is one of the finest analog compressor/limiters available. It offers the best of the old—classic sound and ease of use—and the best of the new—pristine circuit design and the absolute best components—for noise-free, continuous operation. And (perhaps best of all), you have eight independent channels of great-sounding compression/limiting in one rack space.

- Eight independent compressor/limiter complements
- Input and output level controls for each channel
- Stereo, or multi-channel linking
- Balanced 1/4" TRS inputs
- Servo-balanced 1/4" TRS outputs
- Globally switchable -10/+4 output level—in MDM mode
- Normal and MDM Modes of operation
- Bypass switch and indicator for each channel
- Threshold indicator for each channel
- Link switches and status LEDs for each channel
- 50dB of maximum compression
- Incredibly musical yet transparent sound
- Rugged, reinforced steel-and-aluminum chassis
- 5-year warranty
- Designed and Manufactured in the USA

200-5004-101

OVERVIEW

The MDM-8L is a multi-purpose tool for audio engineering and recording. Enclosed in a 1U (1.75" high) rack-mountable chassis are eight independent channels of compression and limiting designed to work seamlessly with any digital recording format and in all applications that require compression or limiting.

Each channel of the MDM-8L offers a 2.5:1 compressor followed by a peak limiter. Depending on your use of the controls, the compressor can gently raise the overall recording level of a signal or "warm-up" a signal before it is sent through an analog-to-digital (A/D) converter. All this occurs while a separate peak limiter ensures that no transients in the signal exceed the maximum input level of the A/D converter, causing digital clipping.

Digital Recording

Using an MDM-8L allows you to maximize the input headroom of your digital recorder. When recording in the digital domain, 16-bit resolution is not achieved unless the average signal level is at or very near 0dB. This is nearly impossible (without an MDM-8L), due to the transients included in audio material. Transients overload the recorder's A/D converters, causing digital clipping.

Just because a recorder is capable of producing 16-bit recordings doesn't mean it is delivering 16-bit audio. Many times, 8- or 12-bit recordings are produced under the assumption that they are 16-bit. This is the fault of the recording level rather than the recorder. If you're not getting 16 bits of information into the recorder, you cannot get 16-bit information out of it. Digital sound has often been described as grainy, or "off," sounding because of "artifacts" produced when recordings are made at levels that are too low.

An MDM-8L can work in two ways to aid in making brilliant 16-bit recordings: (1) gently raise the overall recording level into your recorder and (2) allow you to record the way you would to an analog deck—slam the input without worrying about digital clipping. The recovery of the compression and limiting circuitry are so quick, precise, and natural that the "effect" of squeezing is virtually inaudible.

Analog Recording, Sound Reinforcement, And Broadcast Applications

Having separate controls for each channel allows for the ultimate in flexibility. Each channel may be used as an independent processor, or all channels may be controlled from one set of the MDM-8L's Input and Output controls. Multiple stereo pairs may be used, and it is possible to simultaneously employ six channels of the MDM-8L for input sources while dedicating the remaining two channels to mixing.

The MDM-8L can be used to control overloads that can damage speakers in P.A. systems and studio monitors, and to prevent overmodulation in broadcasts. Because it has eight independent channels, it can protect multiple systems simultaneously.

In using the MDM-8L you will find that it affords the same ease of use and many of the wonderful sonic characteristics of the "classic" tube and broadcast compressor/limiters of days gone by—without the noise and inconsistencies associated with older equipment.

SETTING UP

Unpacking

Your MDM-8L was packed with care at the factory. The shipping carton was designed to protect it during initial shipment. Please retain this carton for use in transporting the MDM-8L when it is not installed in a rack, or in the unlikely event that you need to return your MDM-8L for servicing.

The shipping carton should contain:

- MDM-8L with same serial number as shown on shipping carton.
- The owner's manual.
- AC Power Cord.
- User Registration Card.

AC Power Hookup

The MDM-8L has an internal power supply designed to operate at 110 VAC, 50 to 60 Hz. Units manufactured for use outside the United States of America have been modified to comply with the required electrical specifications. A detachable power cable is supplied. Under no circumstances should the cable be altered. If the cable becomes cut or damaged, discontinue its use and replace it before operating the MDM-8L.

Audio Connections

All audio connections to and from the MDM-8L are 1/4" balanced TRS (Tip = Hot, Ring = Cold, Sleeve = Ground). We recommend using only high-quality shielded cables equipped with high-quality connectors. The MDM-8L may be employed in unbalanced systems by using standard cables equipped with 1/4" phone jacks. For connections using other plug types, see page 8.

Installation

The MDM-8L may be employed in a number of setups including:

- Between a mixer and a modular digital multi-track recorder, DAT machine, or analog recorder.
- In a mixer's channel insert points.
- Between a live or monitor console and a crossover or power amp.
- Between a mic/line preamp and a recorder for live recordings.

Note: The MDM-8L should be securely mounted in a standard 19" rack.

SAFETY PRECAUTIONS

Warning: To avoid the risk of shock or fire, do not expose this unit to moisture. Do not remove metal covers from chassis parts. Removing the chassis from its cabinet exposes extremely dangerous high voltages. There are no user-serviceable parts inside. Hazardous voltages are present inside the chassis. Refer all servicing to qualified personnel.

Caution: Always replace the line cord (mains supply) with the proper type.

Modes Of Operation

The MDM-8L has two modes of operation: Normal (or compressor) and MDM.

Normal Mode (Compressor Mode)

In normal mode, all eight channels act as independent processors, and all controls operate as labeled. Each channel's Input control adjusts the amount of gain into that channel, and its Output control adjusts the channel's output gain.

Set the Input as you would the threshold control on a compressor. You will see the LED Threshold indicator glow as the input signal reaches the point at which the MDM-8L acts on the signal. For more compression, turn the Input control clockwise. For less compression, turn the Input control counterclockwise.

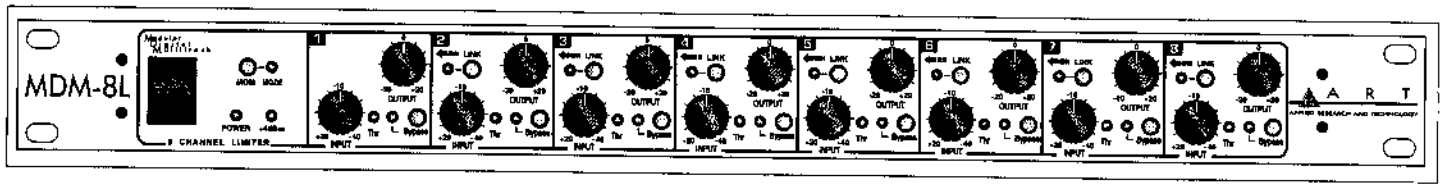
The Output control raises or lowers the channel's output level. It should be set to "make up," or recover, gain after the compressor has reduced the signal level.

MDM Mode

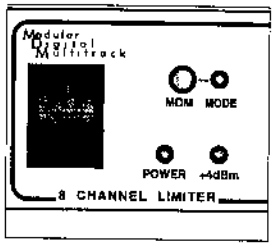
MDM Mode is a virtually foolproof way of using the MDM-8L with a digital recorder. When the MDM Mode button is pressed, the Output level controls are inactive and the output is fixed by the rear-panel level switch. The Input control on each channel of the MDM-8L now acts as an absolute gain setting for the corresponding recorder input, or as an input control to the track of your deck.

The circuit difference between normal mode and MDM mode is the addition of a very fast peak limiter in MDM mode. This limiter prevents compressor overshoots from overdriving sensitive recorder inputs. (Compressor overshoots are a necessary part of the audio; maintaining these features provides for a more dynamic feel to the source material.) The sonic difference between the two modes is very subtle. This is partly due to the fact that the limiter threshold is set to 6dB to 8dB *above* the compressor's threshold. This allows small to moderate transients to pass and the limiter action to affect huge overshoots only, maintaining the compressor's dynamic sound.

FRONT-PANEL CONTROLS & INDICATORS



Global Controls



The left side of the MDM-8L contains its global controls and indicators. The Power switch supplies and removes power from the unit; the Power indicator illuminates when power is on. If the unit does not turn on when the switch is toggled, check the AC (Mains) power cord. Also make sure that the outlet that it is plugged into is "live," by plugging in another piece of equipment that you know works (try plugging into another outlet, too). If the outlet is good but the MDM-8L does not turn on, consult your dealer or ART Customer Service.

-10/+4 Output Switch (Rear Panel)

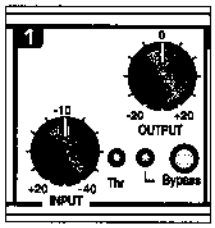
The output level of all eight channels of the MDM-8L is simultaneously switchable between +4dBm and -10dBV when in MDM mode. A single switch on the MDM-8L's rear panel is provided to match the MDM-8L's output to your digital recorder or other gear's input level. If you are using the balanced multi-pin connector on the recorder, this switch should be set to +4. If you are using the unbalanced 1/4" phono (or RCA) connectors on the digital recorder, this switch should be set for -10dB. The +4dBm LED indicator on the front panel illuminates when +4 is selected.

When using the MDM-8L in applications other than with a digital recorder, the output switch should be set to the nominal operating level of the equipment it is connected to (mixer, amplifier etc.). When the MDM mode is not used, the operating levels of the MDM-8L are as follows:

- Maximum input level +20.5dB
- Maximum output level +21dBu balanced
  +20dBu unbalanced

Channel Input Control

When the MDM-8L is in Normal mode, the Channel Input control sets the compressor's threshold. The limiter threshold is automatically set 6dB to 8dB above the compressor threshold, controlling overshoots while maintaining the dynamic content of the audio material being sent through the MDM-8L. While observing the Threshold indicator and listening to the audio signal, adjust the input control until the desired amount of compression is applied.



When the MDM-8L is in MDM mode, the Channel Input control acts as an absolute gain setting for the channel. As it is turned up, level increases (raising the overall average level of the material). As the input signal reaches the threshold, a 2.5:1 compression is applied to it. A brick-wall limiter after the compressor is also applied to protect the delicate input circuitry of digital recorders or other down-line equipment.

Channel Output Control

In Normal mode, the Output control on each channel sets the overall output gain for that channel. When applying heavy compression, this control is generally turned up in order to recover gain.

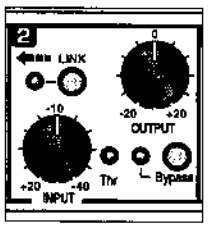
In MDM mode, all of the Output controls are defeated, and each channel's output level is dictated by the rear panel's -10/+4 switch position.

Bypass

A bypass switch and LED indicator are available on each of the MDM-8L's channels. When a channel is bypassed, that channel's input signal is routed directly to its output jack. The Bypass remains independent for linked channels. That is, even if the compression/limiting functions of two or more channels are linked, it's possible to bypass a channel's compressor/limiter.

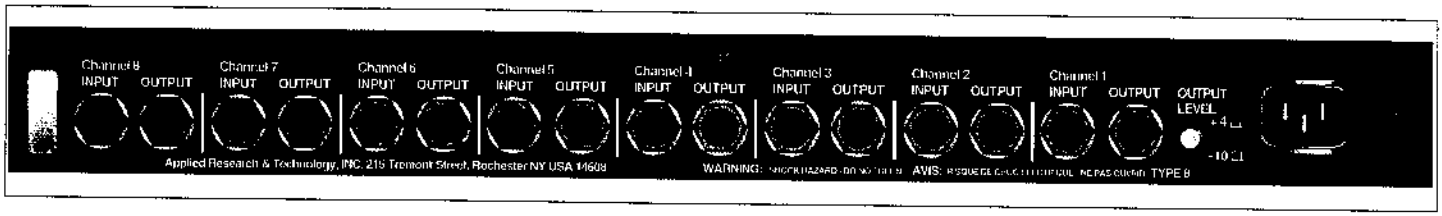
Channel Link

When a channel's Link switch is pressed (the Link indicator will light), that channel is controlled by the channel to its left. Multiple channels may be linked (up to all eight channels). When linking multiple channels, the MDM-8L looks for the channel to the left of the Linked channels that is *not* linked. This channel is the master for all the continuously linked channels. Use the Channel-Link option when employing the MDM-8L to control stereo (or multi-channel) signals such as submixes that need identical processing to maintain a defined stereo or group image. Why does this matter? Let's look at a two-channel stereo example: Without this linking, if one channel is presented with a quick burst (in the case of, say, a drum set, a cowbell-tap, cymbal crash, etc.) that's audible in the other channel, but not as loud, it's likely that the side of the stereo mix with the greatest level from that sudden burst of sound will compress while the other doesn't. If all the other sounds passing through both channels are pretty similar but one channel compresses and the other doesn't, the mix can sound like someone turning the pan control back and forth in weird, unpredictable ways. Channel linking makes both channels compress together, so that any changes in dynamics occur on both sides. If compression is set right, this results in a more natural overall sound, without strange panning effects.



This same concept applies to submixes, where the group of sounds (a string or brass section, for example) is being treated so that a specific blend is necessary. The MDM-8L allows you to choose which channels are linked, and therefore control groups of signal paths' dynamics.

REAR-PANEL CONNECTIONS



Input

The MDM-8L's Inputs are designed to accept balanced or unbalanced signal sources. The 1/4" TRS jack (Tip = hot/Ring = cold/Sleeve = ground) can be connected to balanced gear with either 1/4" tip/ring/sleeve or XLR connections (using a cable with a TRS plug on one end and an XLR plug on the other). If you aren't using the MDM-8L with a balanced source, simply use traditional cords with standard 1/4" jacks, and the connection will be unbalanced. For connections using other plug types, see page 8.

Note: Unbalanced connections are at a level of -10dBV. Balanced connections are at a level of +4dBm.

Output

The MDM-8L's Outputs are designed to connect with equipment requiring either balanced or unbalanced signal sources. The 1/4" TRS jack (Tip = hot/Ring = cold/Sleeve = ground) can be connected to balanced gear with either 1/4" tip/ring/sleeve or XLR connections (using a cable with a TRS plug on one end and an XLR plug on the other). If you aren't running the MDM-8L's output to gear with a balanced input, simply use traditional cords with standard 1/4" jacks, and the connection will be unbalanced. For connections using other plug types, see page 8.

Note: Unbalanced connections are at a level of -10dBV. Balanced connections are at a level of +4dBm.

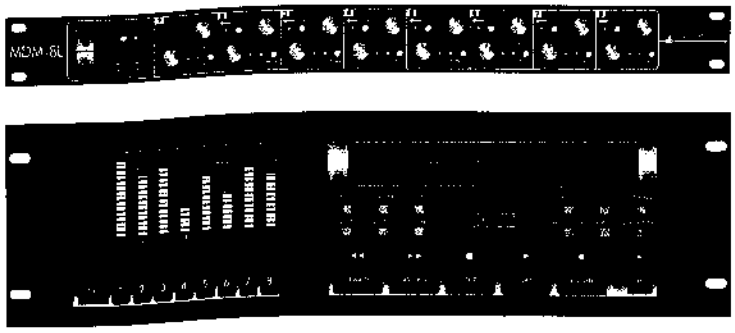
CABLES & CONNECTORS

The MDM-8L's inputs and outputs are designed to accept 1/4" plugs. For balanced operation, a TRS (tip/ring/sleeve) plug is appropriate, and for unbalanced operation, a standard mono or TS (tip/sleeve) plug is necessary. Since other gear uses a variety of input and output jacks, we've included the following chart for proper interfacing between the MDM-8L and other equipment. (Note: Because 1/4" TS to 1/4" TS and 1/4" TRS to 1/4" TRS configurations follow the logical tip-to-tip, ring-to-ring, sleeve-to-sleeve format, they are not included in the diagrams.)

MDM-8L		Connections	Other Gear	
Output	1/4" T/R/S Plug	T = T R = S S = S	1/4" T/S Plug	Unbalanced Input
Output	1/4" T/R/S Plug	T = Pin 2 R = Pin 3 S = Pin 1	XLR Male Connector	Balanced Input
Output	1/4" T/S Plug	T = Pin 2 S = Pin 3 Shield To Pin 1	XLR Male Connector	Balanced Input
Output	1/4" T/R/S Plug	T = T R (NC) S = S	Phono (RCA) Plug	Unbalanced Phono (RCA) Input
Output	1/4" T/S Plug	T = T S = S	Phono (RCA) Plug	Unbalanced Phono (RCA) Input
Input	1/4" T/R/S Plug	T = Pin 2 R (NC) S = Pin 3 Shield = Shield To S Pin 1	XLR Female Connector	Balanced Output
Input	1/4" T/S Plug	T = Pin 2 S = Pin 3 Shield = Shield To S Pin 1	XLR Female Connector	Balanced Output

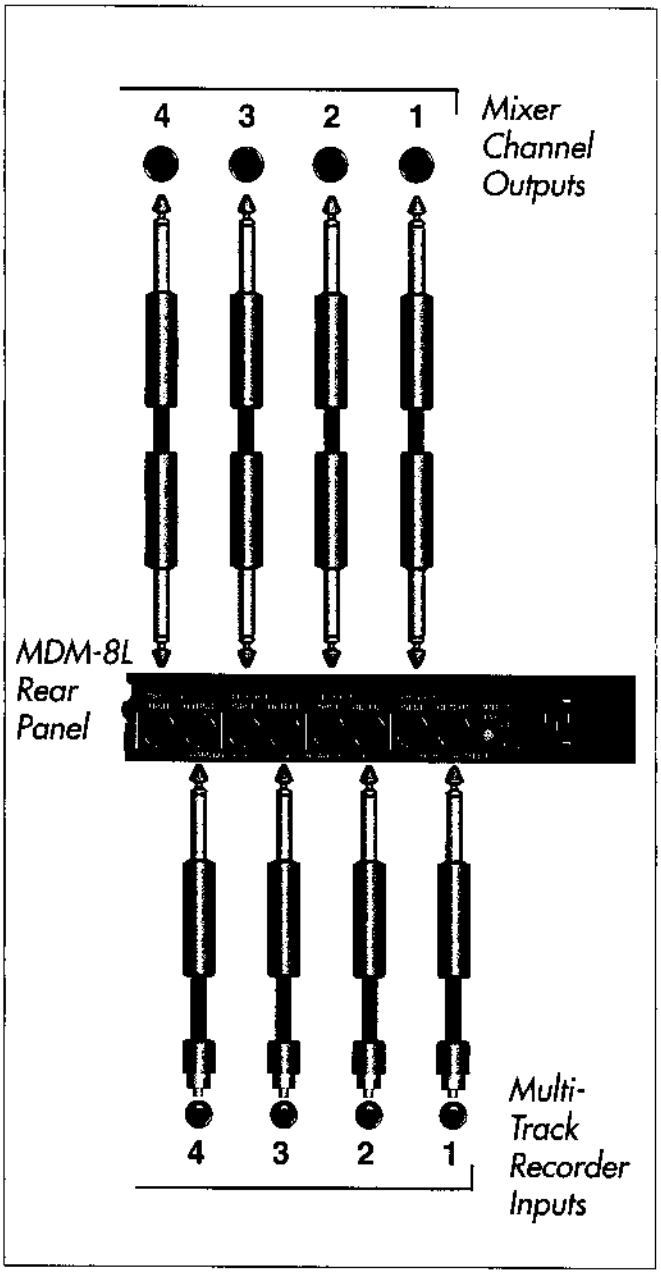
APPLICATIONS & SETUP DIAGRAMS

Using An MDM-8L With A Mixer And A Digital Multi-Track Recorder



Send the mixer's outputs (channel, mains, or subgroups, etc.) to the inputs on each channel of the MDM-8L. Connect the MDM-8L's outputs to the inputs of a modular digital multi-track recorder. For simplest operation, press the MDM-8L's front-panel switch labeled MDM (the Mode LED should glow). Set the MDM-8L's rear-panel Output Level switch as follows: If you are using the balanced multi-pin connector on the recorder, set it to +4. If you are using the unbalanced 1/4" phono (or RCA) connectors on the digital recorder, set it to -10dB. The +4dBm LED indicator on the front panel illuminates when +4 is selected.

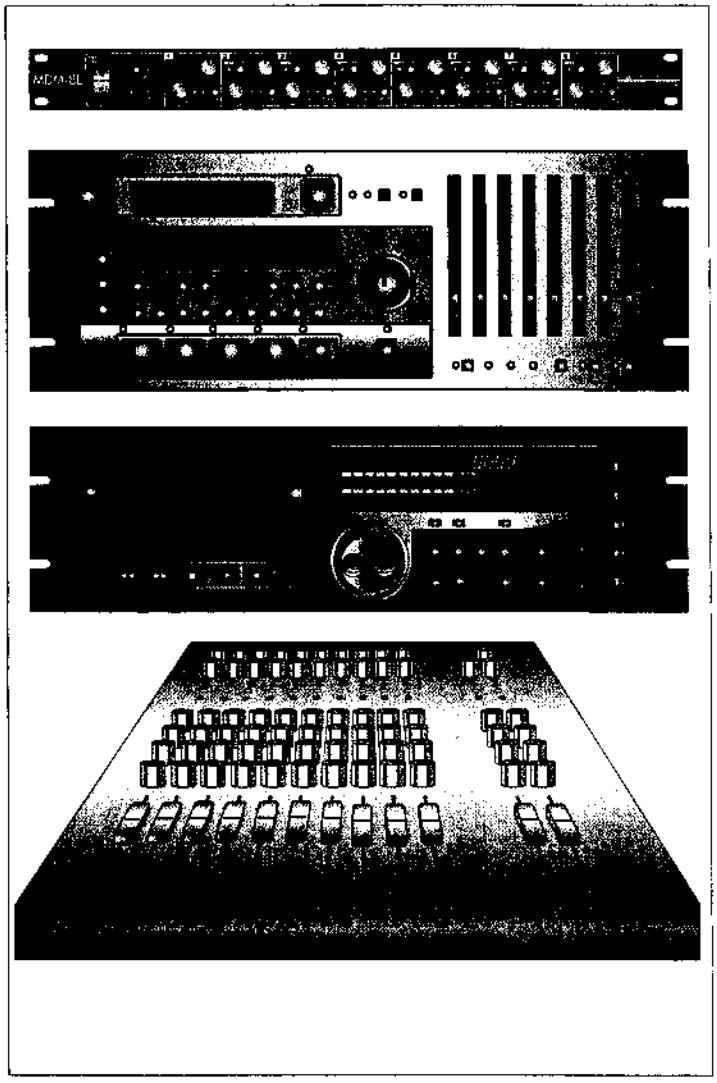
Note: Only four channels are shown in this diagram. Additional channels are connected in the same manner.

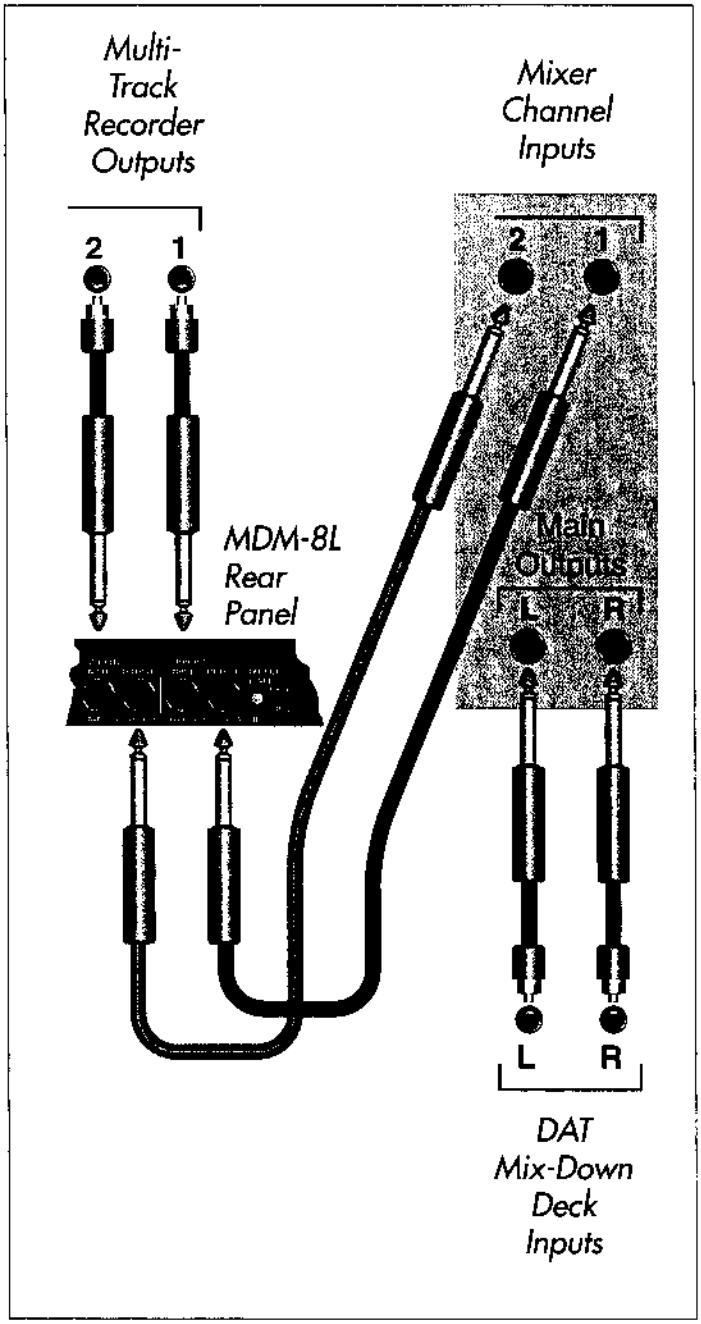


Using An MDM-8L For Mix-Down From A Modular Digital Multi-Track Recorder

Connect the outputs from the modular digital multi-track recorder to the inputs on the MDM-8L. Connect the MDM-8L's outputs to the mixer's channel inputs. Then connect the main outputs from the mixer to the left and right inputs on the mixdown deck (DAT, analog 2-track, etc.) Set the MDM-8L's output level switch to the level that your mixer is designed to accept. Also, you can either use the MDM-8L in MDM or Normal mode, depending on whether you want to set individual channel levels on the MDM-8L.

Note: Only two channels of the MDM-8L and modular digital multi-track recorder's output section are shown in the diagram. Additional channels are connected in the same manner.



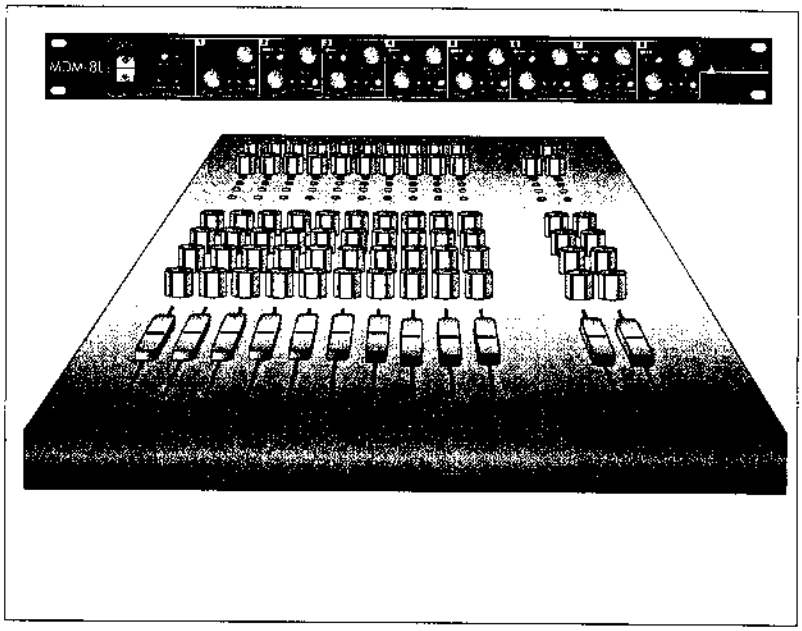


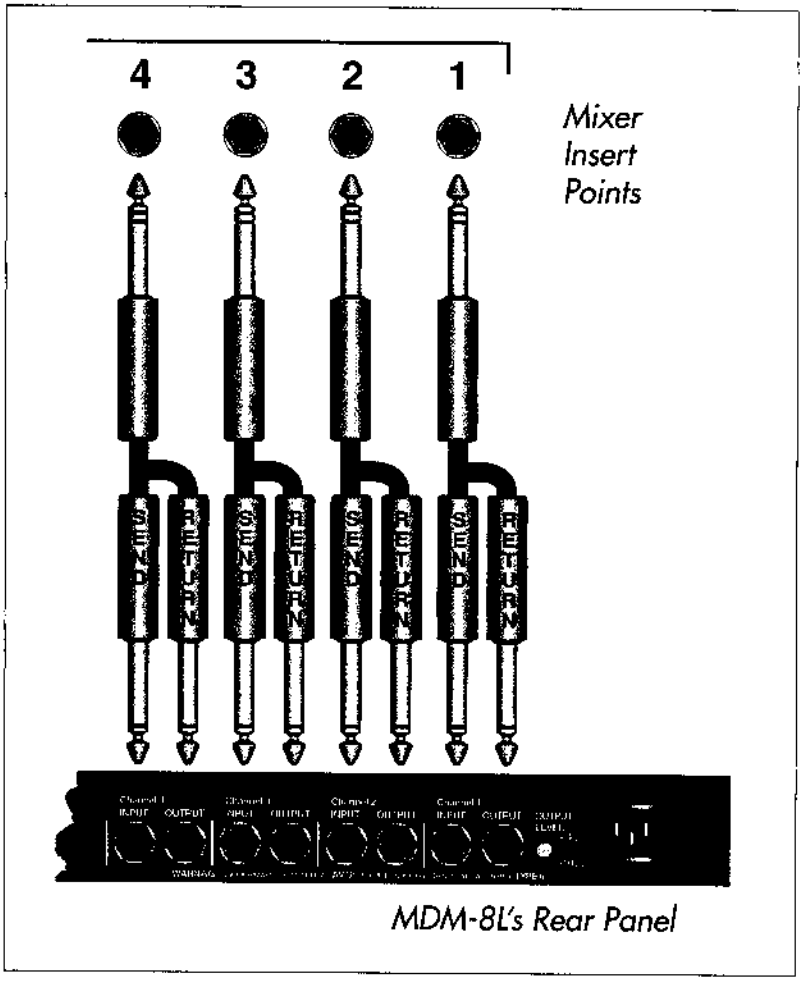
Using An MDM-8L In A Mixer's Channel Inserts

The channels of the MDM-8L are easily inserted into the insert points on a mixer, providing individual compression and limiting on multiple channels. Many mixers have a combined send/return jack for each input channel (and often, the same setup for other locations in the mixer's nomenclature). The diagram shows proper connections using a TRS-to-Dual-Mono send/return cable with 1/4" plugs. Note that sends and returns following this scheme are unbalanced.

Although TRS-to-Dual-Mono send/return cables are shown here, some mixers' insert loops have separate send and return jacks (usually 1/4") on each channel. Use either balanced or unbalanced connections, according to what is outlined in your mixer's manual.

Note: Only four channels of the MDM-8L and a mixer's insert section are shown in the diagram. Additional channels are connected in the same manner.



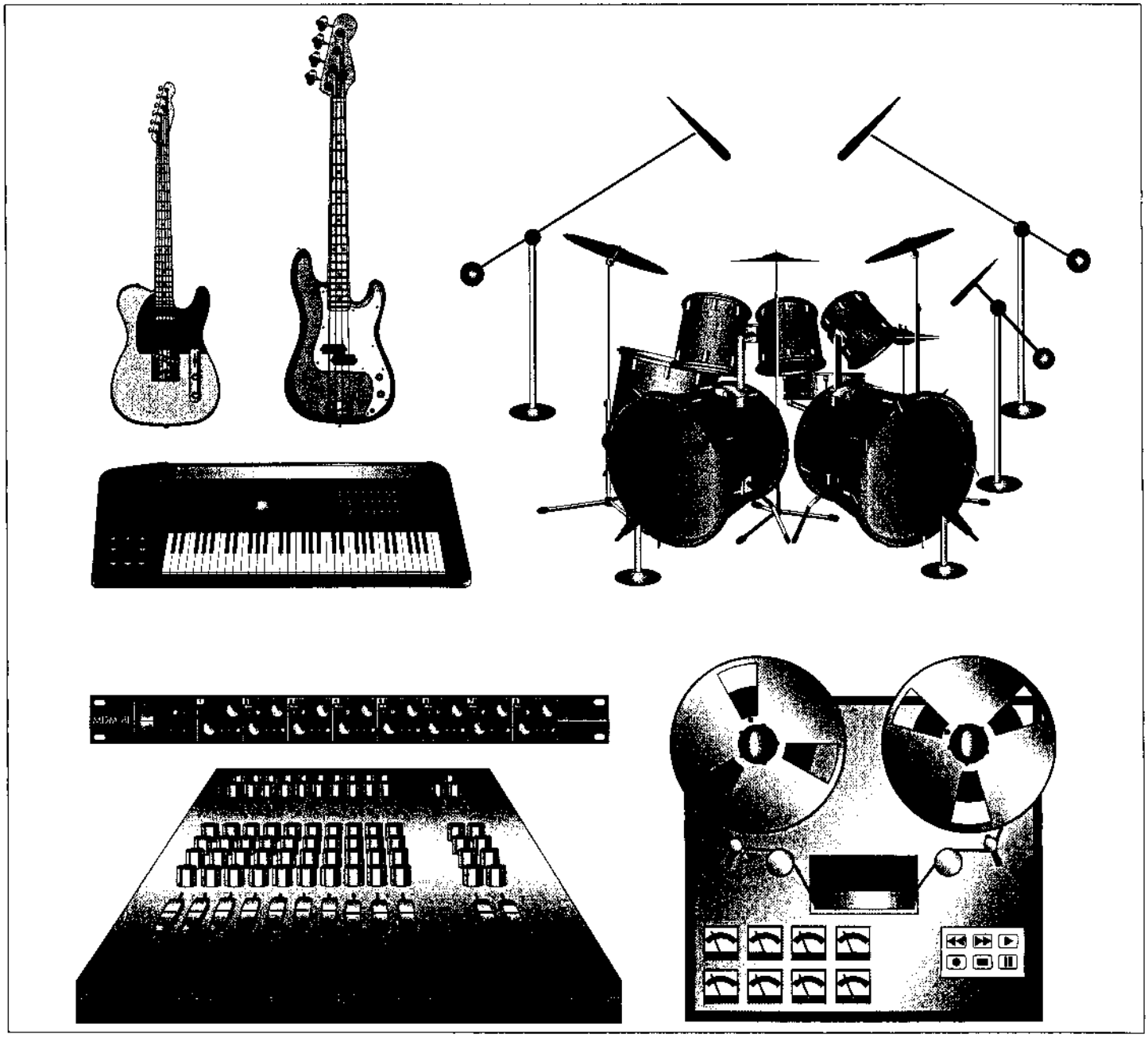


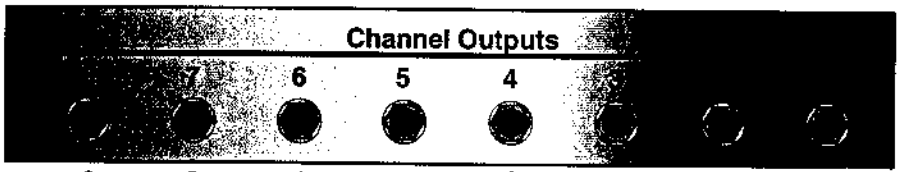
MDM-8L's Rear Panel

Using An MDM-8L When Recording A Band Onto An Analog Multi-Track Recorder

Connect the outputs from the mixer to the channel inputs of the MDM-8L. Connect the MDM-8L's outputs to the inputs of a multi-track recorder. Although the mixer's channel outputs are shown here for simplicity, it is possible to subgroup the channels in the mixer and use subgroup, monitor, or mains outputs to feed channels of the MDM-8L. For example: subgrouping the drums onto a stereo pair of channels, instead of using five channels as shown, frees up three channels of the MDM-8L for vocals, horns, etc. Likewise, horn and string sections or backing vocals can be subgrouped.

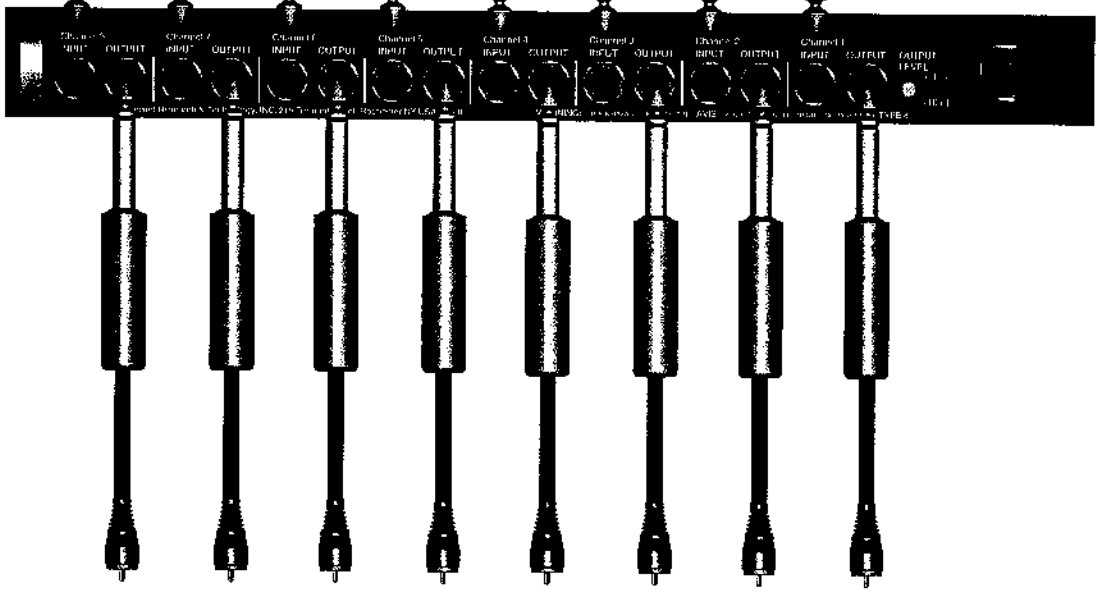
The MDM-8L can be operated in MDM or Normal modes, plus the -10/+4 switch should be set to match the MDM-8L's output level to the input level of the recorder.

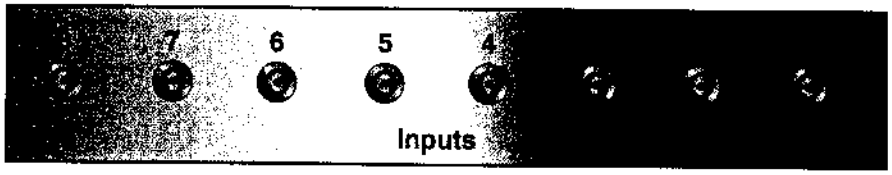




Rear Of Mixer

Rear Of MDM-8L



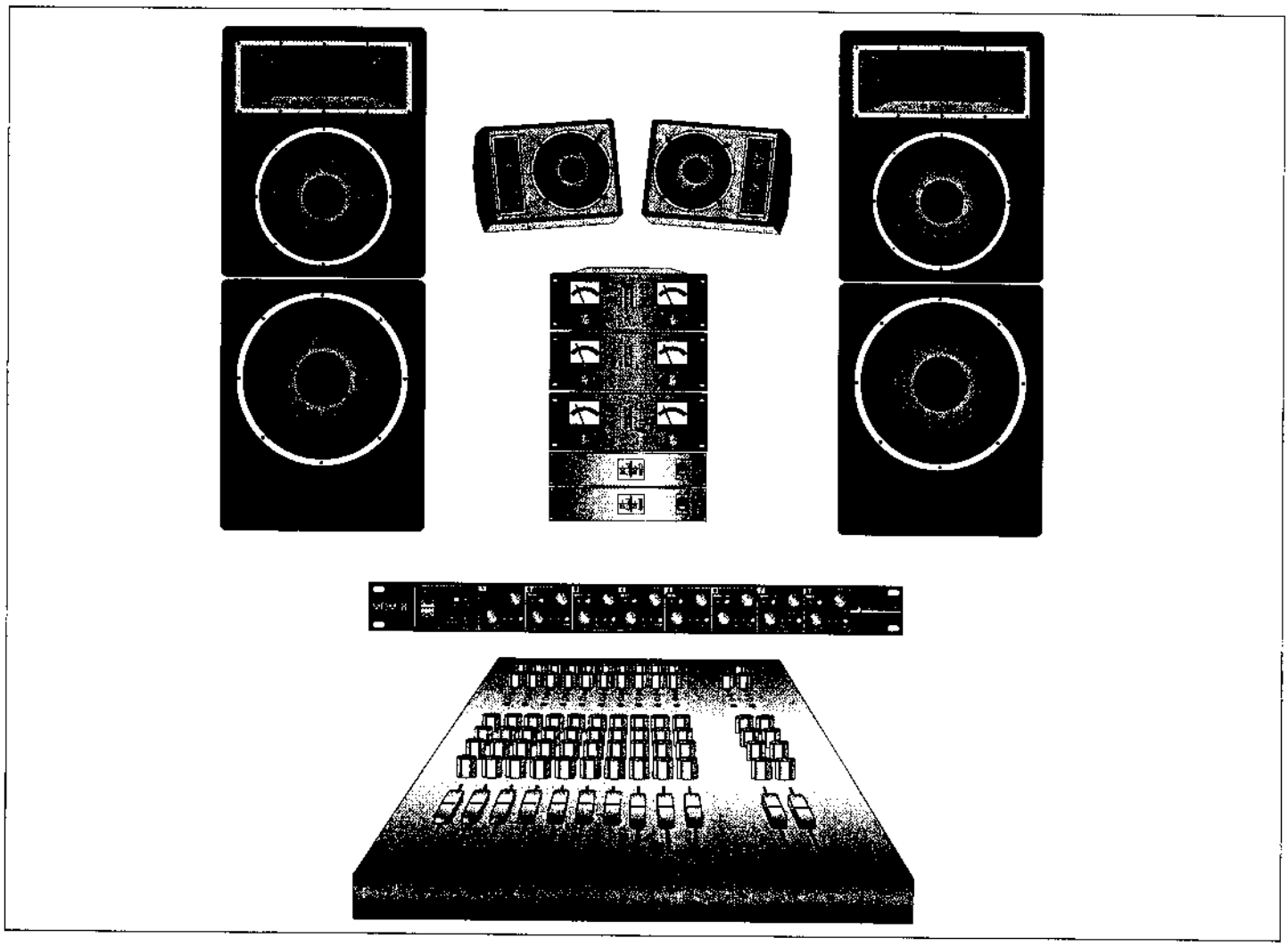


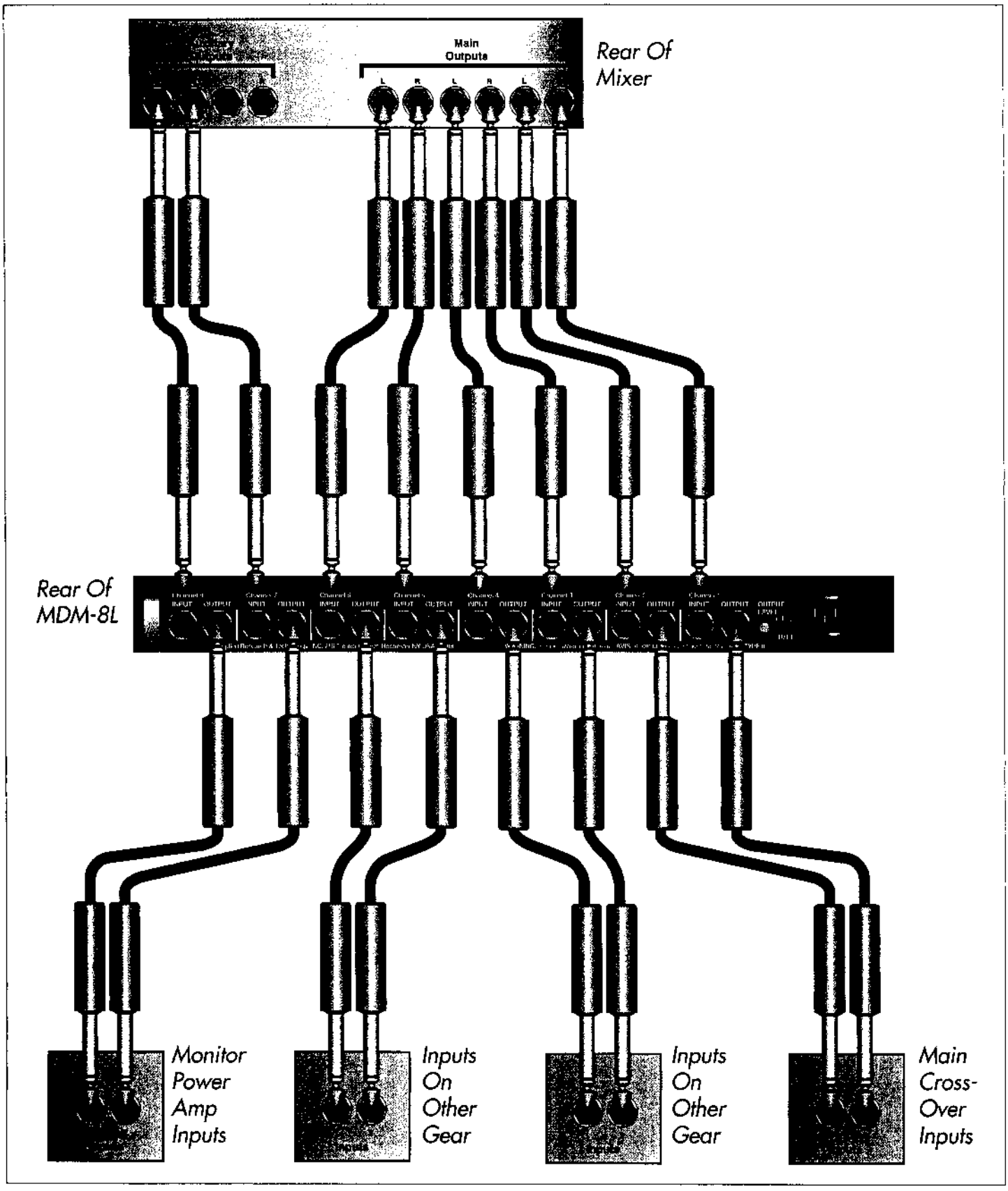
Multi-Track Recorder Inputs

Using An MDM-8L To Protect Main Amplifiers and Monitors

Place the MDM-8L between the main and auxiliary outputs and downline gear such as crossovers and power amps to protect speakers (especially high-frequency drivers) from overload. The basic system shown here includes left and right front-of-house (FOH) speaker stacks and left and right stage monitors. Each side of the FOH system consists of (1) a low-frequency driver, or subwoofer, driven by its own power amp, and (2) a cabinet housing a midrange driver and a high-frequency driver, each driven separately by one channel of a power amp. The monitors have built-in crossovers, and are each driven (full-range) by one channel of a dual-channel power amp.

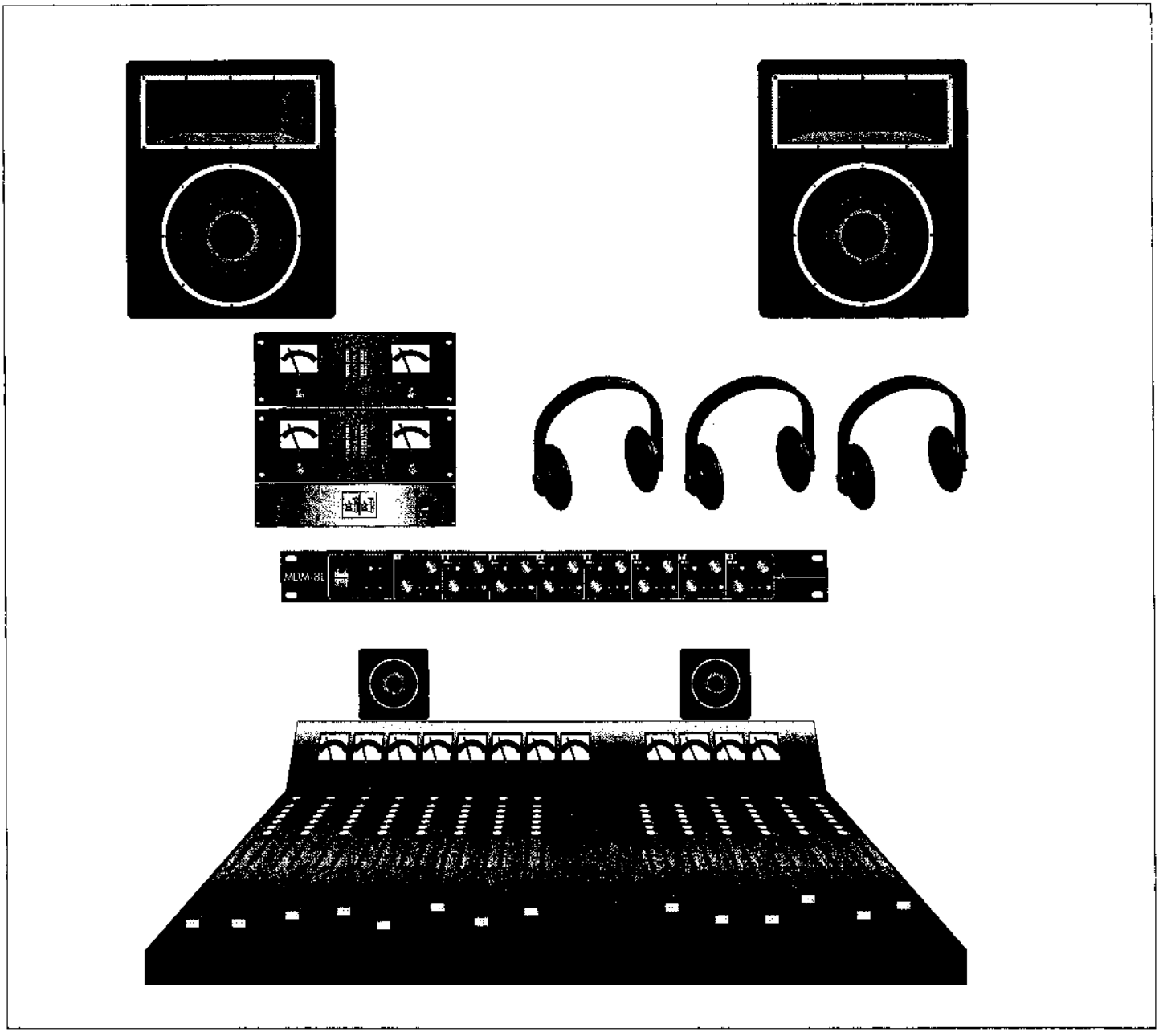
The first two main outputs send left and right signals to the MDM-8L's Channel 1 and Channel 2 en route to a stereo 3-way crossover to split the low, midrange, and high-frequency signals before delivering them separately to the power amps. Channels 3, 4, 5, and 6, can be used to feed similar systems, or they can be sent to recorder inputs or side-fill monitoring systems. Channels 7 and 8 of the MDM-8L receive the signals from the mixer's auxiliary outputs before sending the signals to the left and right channels of the power amp (which drives the onstage left and right monitors).

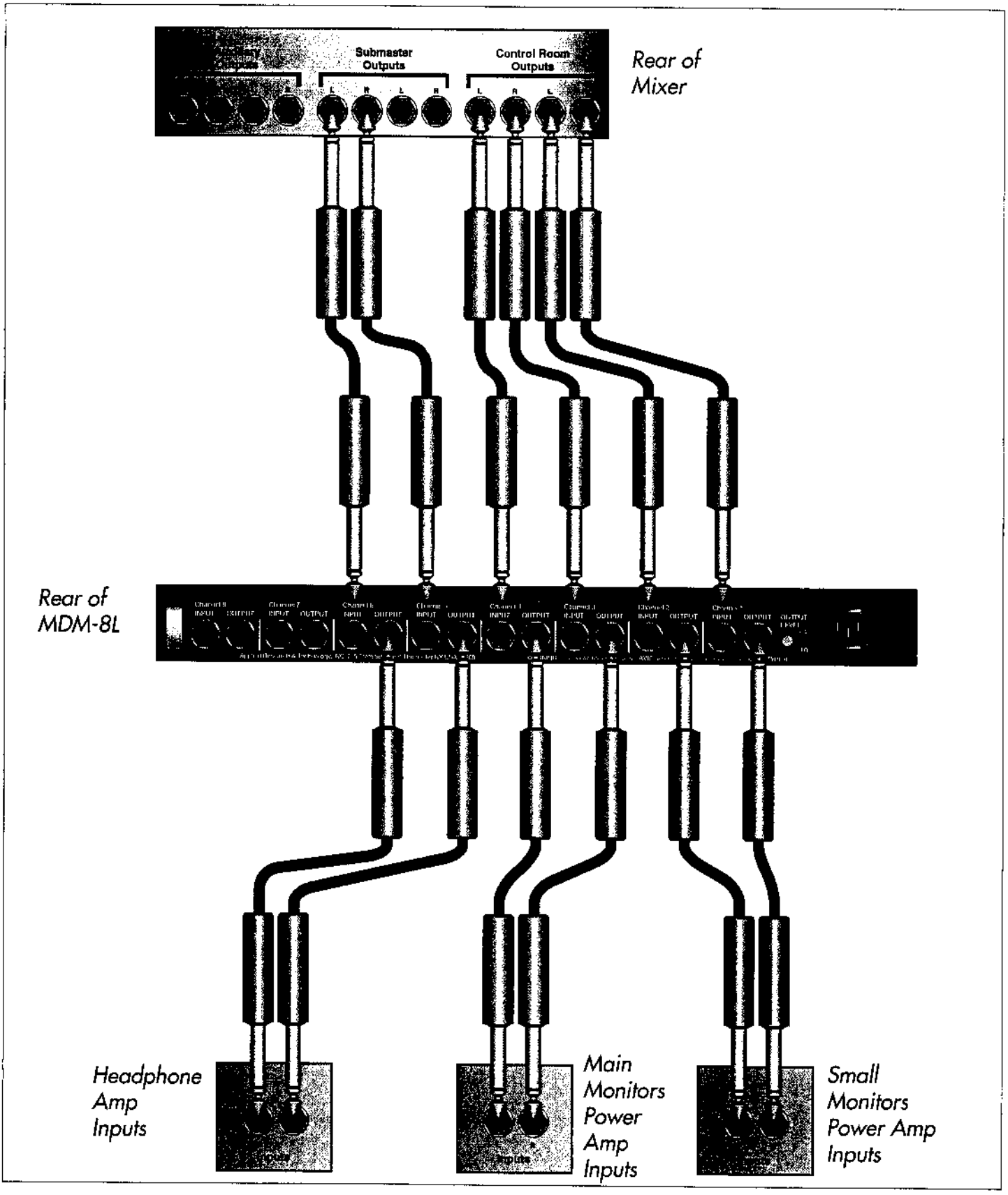



Main Outputs
L R L R L
Rear Of Mixer
Rear Of MDM-8L
Monitor Power Amp Inputs
Inputs On Other Gear
Inputs On Other Gear
Main Cross-Over Inputs

Using An MDM-8L To Protect Studio Control Room Monitors

The MDM-8L can simultaneously protect main studio monitors, small near-field reference monitors, and a headphone monitoring system. In this application, two stereo pairs of control room outputs from the mixing console are fed into the MDM-8L, which then sends its outputs to the left and right inputs of power amps driving the main monitors and the small reference monitors. Outputs from the submaster (or auxiliary outputs) with a separate mix are sent to two channels of the MDM-8L, which then outputs them to the headphone amplifier for the musicians. Note: as this application is configured, two channels of the MDM-8L are unused; they can be employed to compress/limit individual channels, another stereo pair for monitoring, etc.




Submaster Outputs
Control Room Outputs
Rear of Mixer
Rear of MDM-8L
Headphone Amp Inputs
Main Monitors Power Amp Inputs
Small Monitors Power Amp Inputs

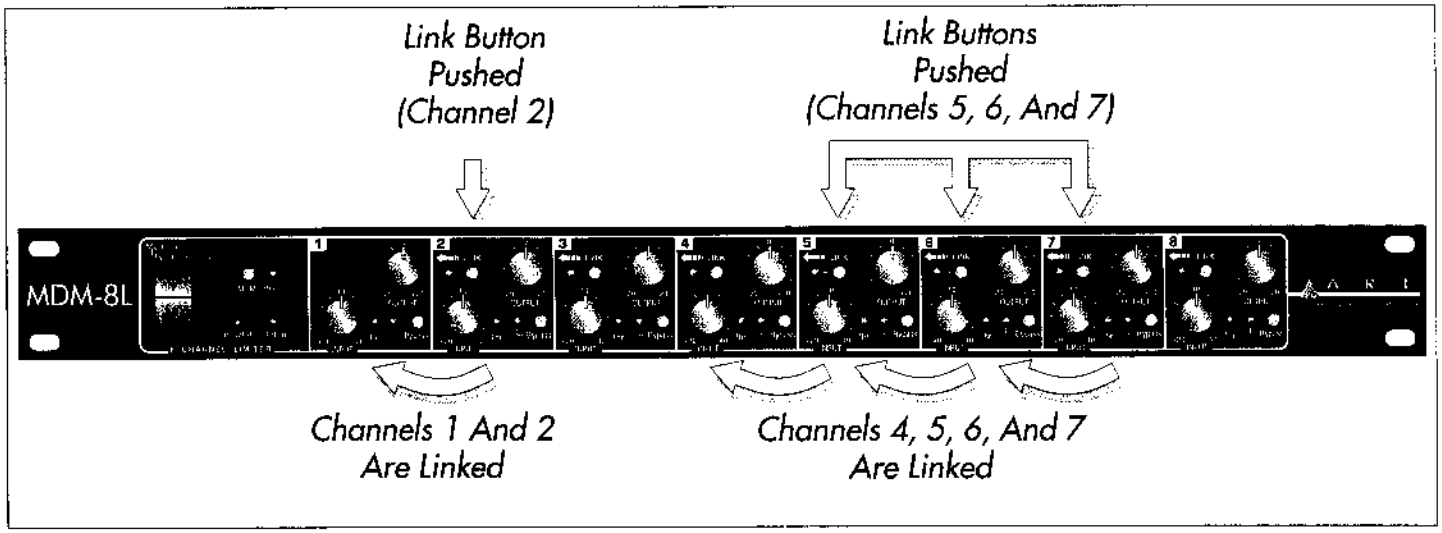
TROUBLESHOOTING

The Output Level control doesn't work.

The output level control is disabled when you use the MDM-8L in MDM Mode. When in this mode, the output level of the MDM-8L is fixed to whatever level the rear-panel -10/+4 switch is set to.

The channel controls don't seem to work.

The channel is linked to another channel or bypassed. When a channel's Link switch is pressed (the Link indicator will light), that channel is controlled by the channel to its left. The Link feature is available for setting channels for stereo sources. Multiple channels may be linked (up to all eight channels). When linking multiple channels, the MDM-8L looks for the channel to the left of the Linked channels that is *not* linked. This channel is the master for all the continuously linked channels.



The -10/+4 switch doesn't do anything.

The -10/+4 switch only affects the output level of the MDM-8L when in MDM mode.

The MDM-8L doesn't pass audio on any channels.

The unit is turned off. The MDM-8L has bypass controls for each channel. The MDM-8L was designed to not pass audio when power is discontinued, due to the fact that it can be used to protect speakers and amplifiers. Switching to a hard bypass when power was discontinued could lead to damage to other equipment

ART MDM-8L SPECIFICATIONS

Connections	1/4" TRS Balanced inputs, 1/4" TRS Servo-balanced outputs
Maximum output level	+21dBu Balanced +20dBu Unbalanced
Frequency response	10 Hz to 40kHz ±1dB
Total harmonic distortion	<.05%, 20 Hz to 20kHz
Maximum compression	50dB
Output level	+4dBu, -10dBV, selected globally
Output noise	>-98dBu, 20 Hz to 20kHz >-101dBu "A"-weighted
Dynamic range	>118dB
Crosstalk	-98dB, 20 Hz to 20kHz (worst case)
Attack time	Compressor: 1.5ms Limiter: 100µsec
Release time	100ms to 2 seconds
Output trim range	-20dB to +20dB
Dimensions	19" W x 1.75" H x 10" D
Weight	8 lbs.

ART retains a policy of constant product improvement. ART reserves the right to make changes in design or make additions to or improvements upon this product without any obligation to install the same on products previously manufactured. Therefore, specifications are subject to change without notice.

Designed and manufactured in the United States of America.

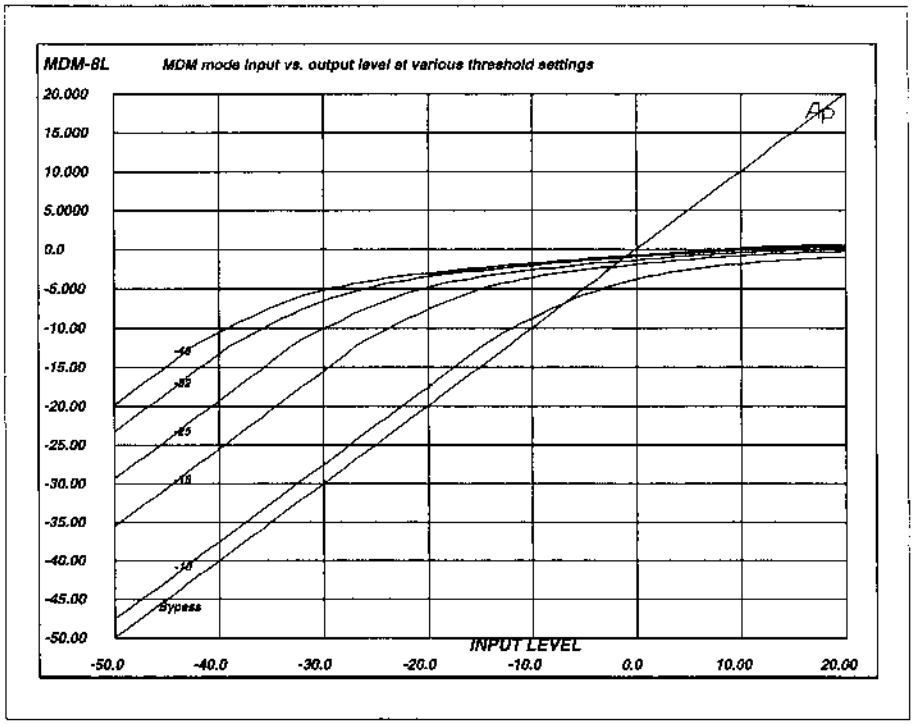
Applied Research & Technology, Inc.
215 Tremont Street
Rochester, NY 14608 USA

(716) 436-2720
(716) 436-3942 (FAX)

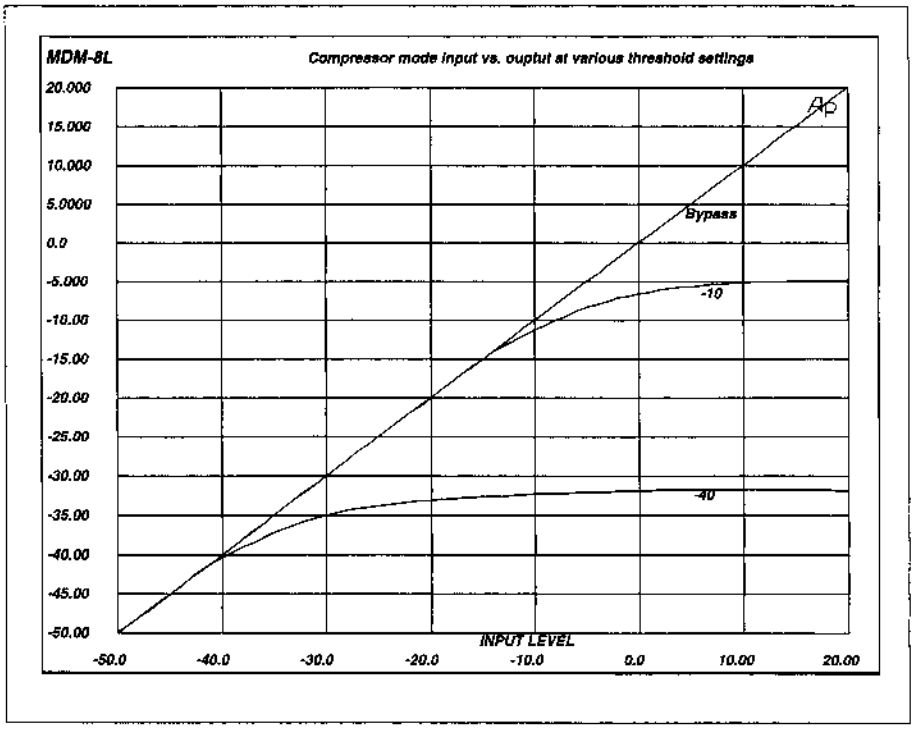
TECHNICAL INFORMATION

The following charts show the MDM-8L's performance characteristics.

Compressor Mode: Input Vs. Output Limiter Mode



Input vs. Output At Various Input Threshold Settings



WARRANTY INFORMATION

LIMITED WARRANTY
Warranty and Service for this unit will be provided by Applied Research and Technology, Inc. in accordance with the following warrant statement.

Applied Research and Technology, Inc. (ART) warrants to the original purchaser that this product and the components thereof will be free from defects in workmanship and materials for a period of five years from the date of purchase. Applied Research and Technology, Inc. will, without charge, repair or replace, at its option, defective product or component parts upon prepaid delivery to the factory service department or authorized service center, accompanied by proof of purchase date in the form of a valid sales receipt.

EXCLUSIONS: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. This warranty is void if the serial number is altered, defaced, or removed.

ART reserves the right to make changes in design or make additions to or improvements upon this product without any obligation to install the same on products previously manufactured.

ART shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitations of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific rights and you may also have other rights which vary from state to state.

For units purchased outside the United States, service will be provided by an authorized distributor of Applied Research and Technology, Inc.

SERVICE

The following information is provided in the unlikely event that your unit requires service.

1) Be sure that the unit is the cause of the problem. Check to make sure the unit has power supplied, all cables are connected correctly, and the cables themselves are in working condition.

2) If you find the unit to be at fault, write down a complete description of the problem, including how and when the problem occurs. Please write down a description of your complete setup before calling Customer Service.

3) Call the factory for a Return Authorization (RA) number.

4) Pack the unit in its original carton or a reasonable substitute. The packing box is not recommended for a shipping carton. Put the packaged unit in another box for shipping. Print the RA number clearly on the outside of the shipping box. Print your return shipping address on the outside of the box.

5) Include with your unit: a return shipping address (we cannot ship to a P.O. Box), a copy of your purchase receipt, a daytime phone number, and a description of the problem.

6) Ship only your unit and its power cord (keep your manual!) to:

APPLIED RESEARCH AND TECHNOLOGY, INC.
215 TREMONT STREET
ROCHESTER, NEW YORK 14608
ATTN: REPAIR DEPARTMENT
RA#_____

7) Contact our Customer Service department at (716) 436-2720 for your Return Authorization number or questions regarding technical assistance or repairs. Customer Service hours are 8:30 AM to 6:00 PM Eastern Time, Monday through Friday.

FUNCTIONAL DIAGRAM OF THE ART MDM-8L