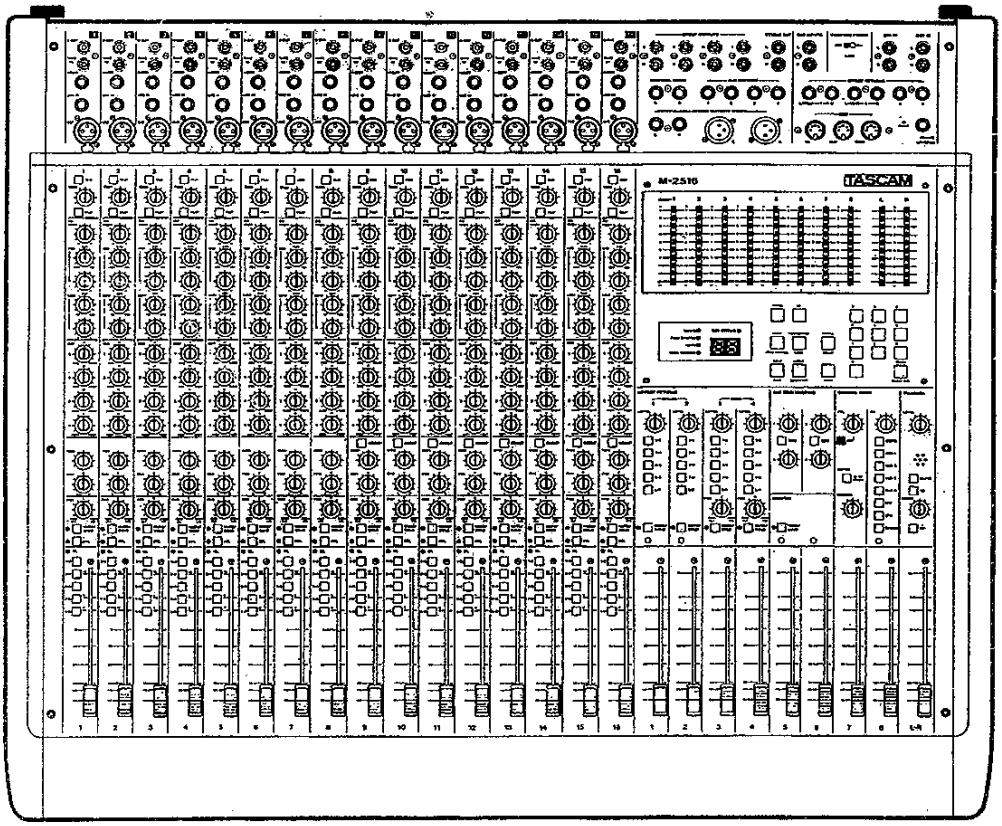
TASCAM

TEAC Professional Division

M-2516/M-2524

RECORDING MIXER



OWNER'S MANUAL

5700125000

Table Of Contents

ADVARSEL!
Lithiumbatteri — Eksplosionsfare ved fejlagtig handtering. Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

VARNING
Explosionsfara vid felaktigt batteribyte.
Anvand samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.
Kassera anvant batteri enligt fabrikantens instruktion.

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

This appliance has a serial number located on the rear panel. Please record the model number and serial number and retain them for your records.
Model number _____
Serial number _____

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Safety Instructions

CAUTION:

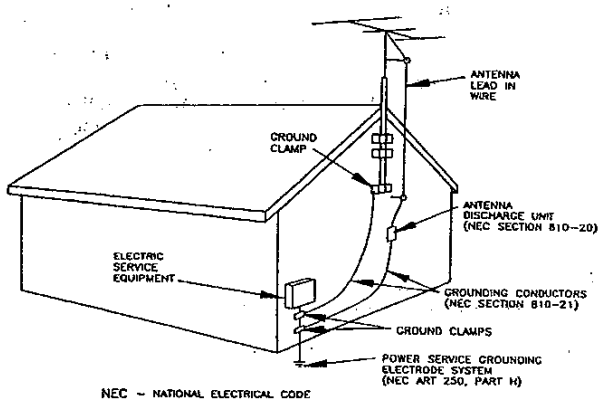
- **Read all of these instructions.**
- **Save these instructions for later use.**
- **Follow all warnings and instructions marked on the audio equipment.**

1. **Read Instructions** – All the safety and operating instructions should be read before the appliance is operated.
2. **Retain Instructions** – The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** – All warnings on the appliance and in the operating instructions should be adhered to.
4. **Follow Instructions** – All operating and use instructions should be followed.
5. **Water and Moisture** – The appliance should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.
6. **Carts and Stands** – The appliance should be used only with a cart or stand that is recommended by the manufacturer.

6A. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

7. **Wall or Ceiling Mounting** – The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. **Ventilation** – The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. **Heat** – The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. **Power Sources** – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. **Grounding or Polarization** – The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.
12. **Power-Cord Protection** – Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. **Cleaning** – The appliance should be cleaned only as recommended by the manufacturer.
14. **Power Lines** – An outdoor antenna should be located away from power lines.
15. **Outdoor Antenna Grounding** – If an outside antenna is connected to the receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70 – 1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure below.

EXAMPLE OF ANTENNA GROUNDING AS PER NATIONAL ELECTRICAL CODE



NEC – NATIONAL ELECTRICAL CODE

16. **Nonuse Periods** – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
17. **Object and Liquid Entry** – Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
18. **Damage Requiring Service** – The appliance should be serviced by qualified service personnel when:
    A. The power-supply cord or the plug has been damaged; or
    B. Objects have fallen, or liquid has been spilled into the appliance; or
    C. The appliance has been exposed to rain; or
    D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
    E. The appliance has been dropped, or the enclosure damaged.
19. **Servicing** – The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

Introduction

The TASCAM M-2516/2524 Recording Mixer is a 16/24-input and 10-output mixer designed primarily for electronic music applications. It can be used as a main console or a submixer in a recording system. The M-2516/2524 has four effect sends and four effect returns (2 stereo and 2 mono), so it can be connected to four effect devices. A MIDI-addressable muting system allows you to turn channels on and off on command, either from the top panel or from an external MIDI device. A SOLO feature makes it easy to concentrate on one input at a time.
Each channel has 3-band EQ, and because each channel has 40 dB of gain in the preamp and a trim control, low-level sources--even microphones and pickups--can be connected to the M-2516/2524. Each input has a direct output jack for connection to external submixers or directly to a multitrack recorder.

Using the manual: To get the most out of your M-2516/2524, please take the time to read through this manual. If you're familiar with mixers you could use the unit on your own without a problem, but some time spent now will keep you from overlooking some of the features that make the M-2516/2524 a more creative tool. You may discover some new tricks you haven't tried before.

It is easier to understand if you set up the system and can experiment with the console as you read. Don't make the mistake of booking a crucial recording session before you've had free time to really get to know your M-2516/2524.

Use of capital letters : In general, we use all upper case type to designate a particular switch, control, jack name or label (like PAN). Mixer modes and some features are described with an upper case first letter (like Mute control).

Recording is an art as well as a science. A successful recording is often judged primarily on the quality of sound as art, and we obviously cannot guarantee that. Your skill as a technician and your abilities as an artist will be significant factors in the results that you achieve. The M-2516/2524 console will perform properly only if it is connected and operated as stated in this manual. We cannot guarantee your skill in adjustment or your technical comprehension of this manual. However, we want to do everything we can to help you get the most out of the M-2516/2524. So, please, READ THE MANUAL! If you invest the time and are patient, you'll find it pays off in the long run.

Precautions

Changing the Memory Back-up Battery
The included battery lasts about 5 years. We recommend you to change the battery in advance to prevent accidental erasure of the contents of the 99 scene memories. If the battery has run low, when you turn on the M-2516/2524 you will see the switch settings of empty scene 01, instead of the last scene you used. For information on how to change the battery, consult TASCAM or your nearest TASCAM dealer.

Voltage Conversion
This unit is adjusted to operate on the electric voltage specified on the unit, power code tag, or packing carton.

NOTE: This voltage conversion is not possible on models sold in the U.S.A., Canada, U.K., Australia or Europe.

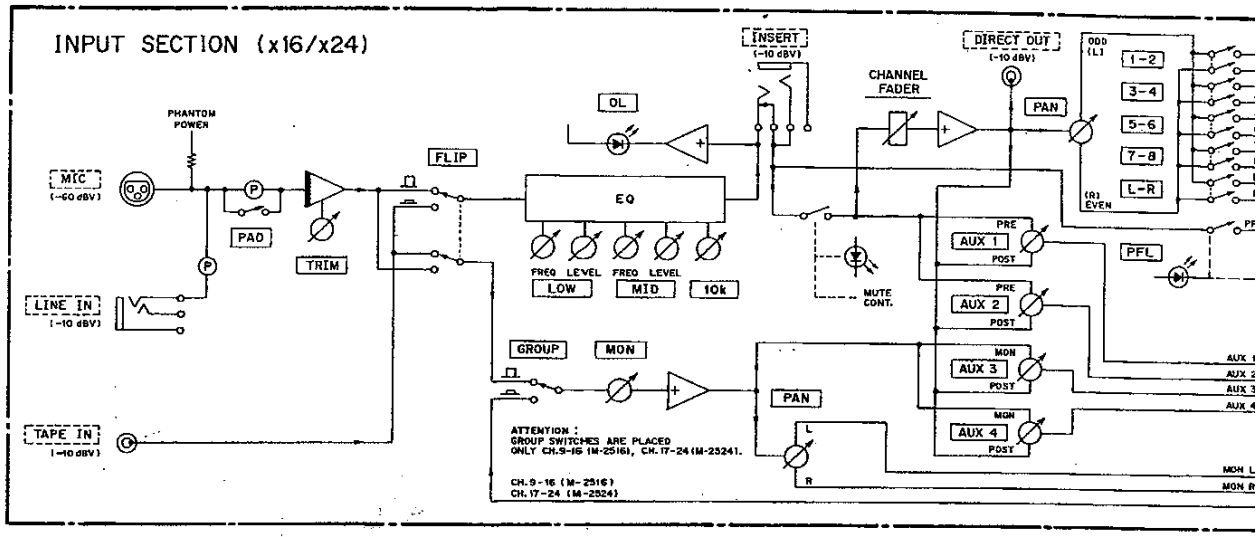
ALWAYS DISCONNECT THE POWER LINE CORD BEFORE MAKING THESE CHANGES.

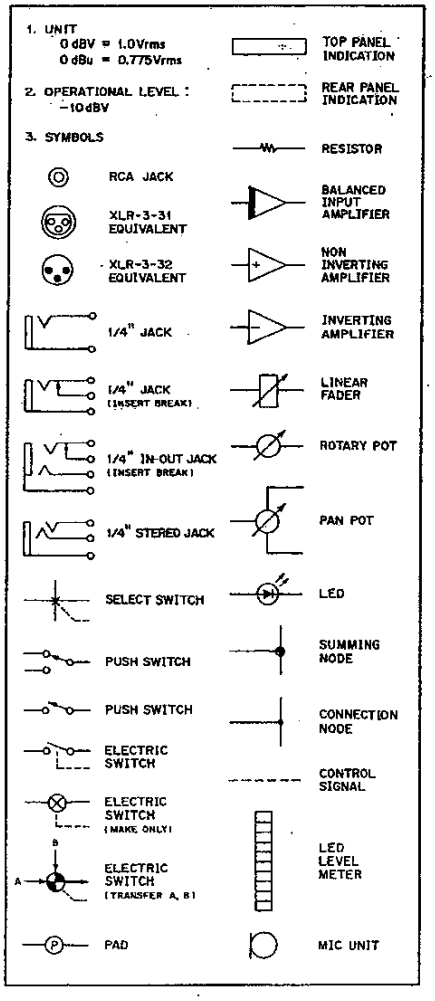
For general export units, if it is necessary to change the voltage to match your area, locate the voltage selector on the rear of the M-2516/2524 and set it to the required position.

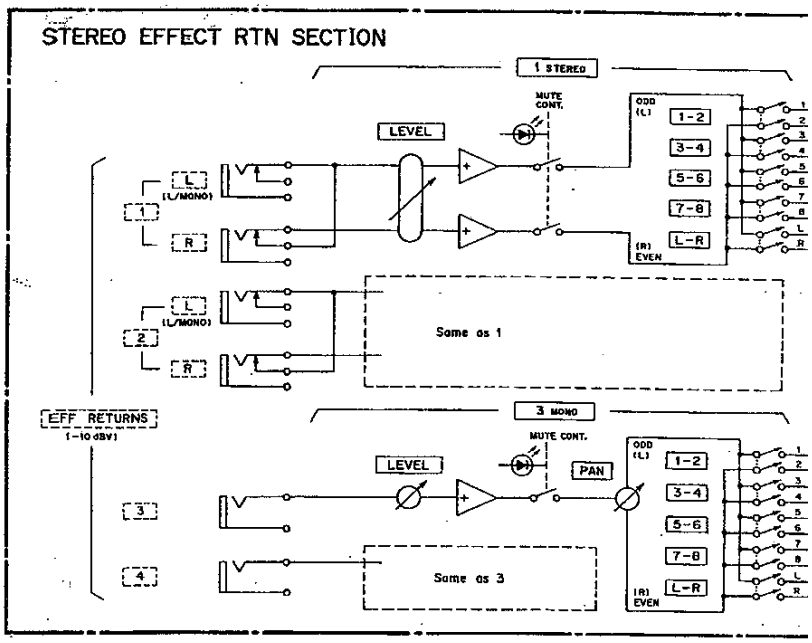
Note for U.K. Customers only
Due to the variety of plugs used in the U.K., this unit is sold without an AC plug. Please request your dealer to install the correct plug to match the mains power outlet where your unit will be used as per these instructions.

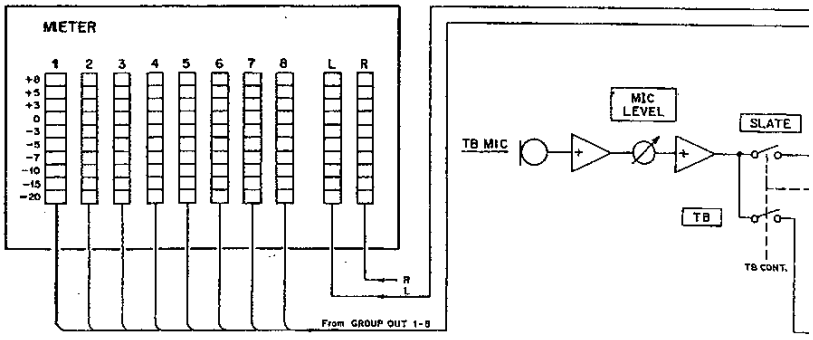
IMPORTANT
The wires in this mains lead are coloured in accordance with the following code:
BLUE: NEUTRAL
BROWN: LIVE
As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured marking identifying the terminals of your plug, proceed as follows:
The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

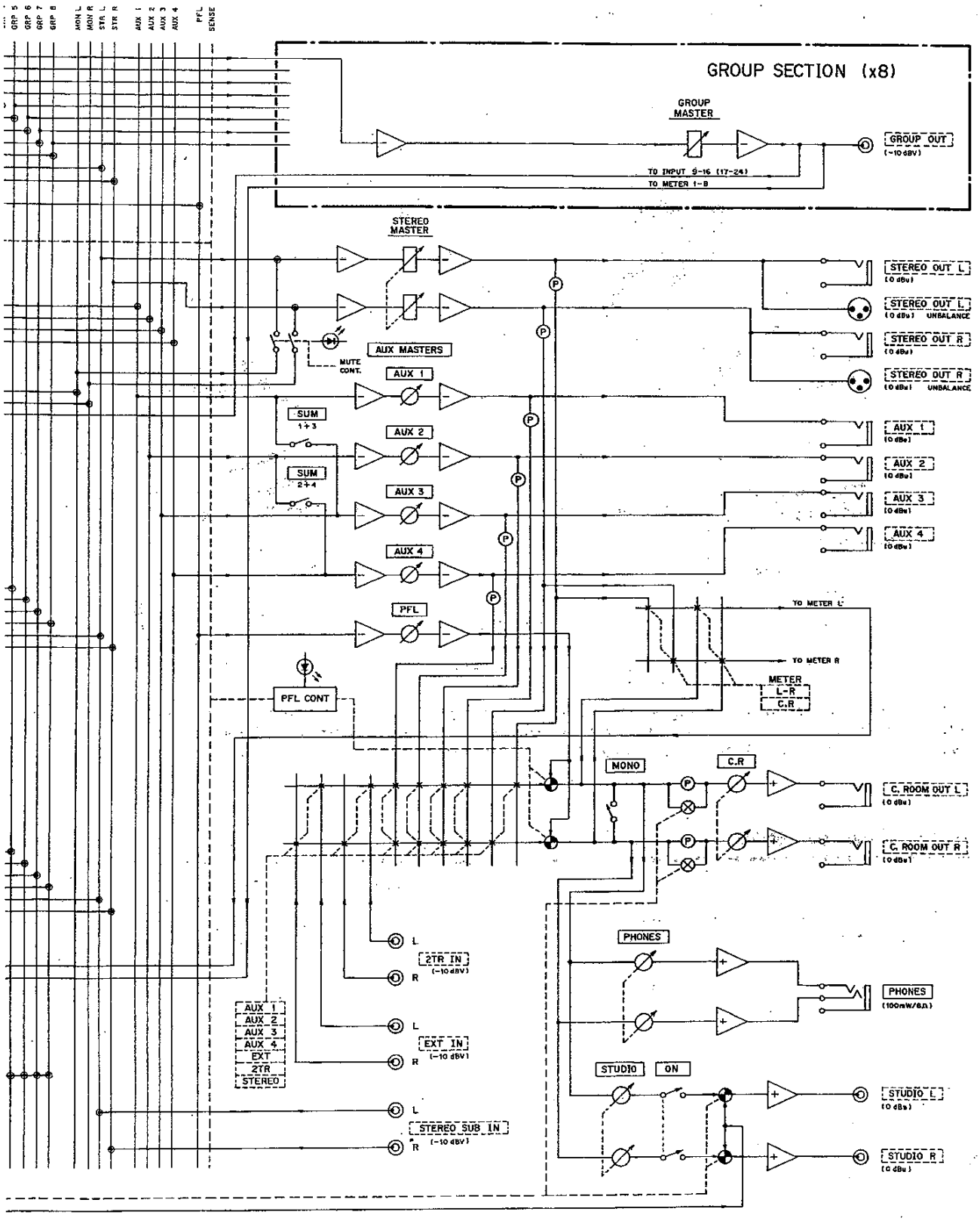
Block Diagram

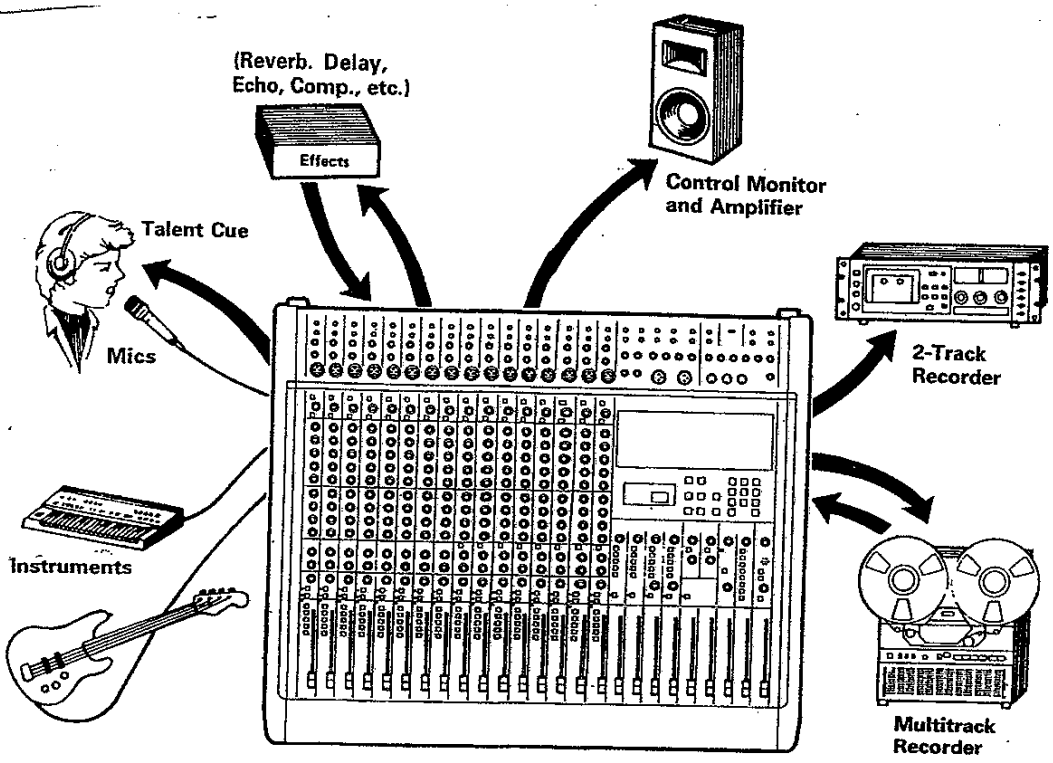









GRP 5
GRP 6
GRP 7
GRP 8
MON L
MON R
STR L
STR R
AUX 1
AUX 2
AUX 3
AUX 4
PFL
SENSE
GROUP SECTION (x8)
GROUP MASTER
GROUP OUT
(-10 dBV)
TO INPUT 9-16 (17-24)
TO METER 1-8
STEREO MASTER
STEREO OUT L
(0 dBu)
STEREO OUT L
(0 dBu) UNBALANCE
STEREO OUT R
(0 dBu)
STEREO OUT R
(0 dBu) UNBALANCE
AUX MASTERS
MUTE CONT.
AUX 1
SUM 1+3
AUX 2
SUM 2+4
AUX 3
AUX 4
PFL
PFL CONT
TO METER L
TO METER R
METER
L-R
C.R
MONO
C.R
C. ROOM OUT L
(0 dBu)
C. ROOM OUT R
(0 dBu)
PHONES
PHONES
(100mW/8Ω)
STUDIO
ON
STUDIO L
(0 dBu)
STUDIO R
(0 dBu)
2TR IN
(-10 dBV)
EXT IN
(-10 dBV)
STEREO SUB IN
(-10 dBV)
AUX 1
AUX 2
AUX 3
AUX 4
EXT
2TR
STEREO



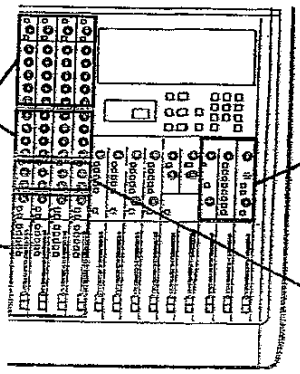
Note that the M-2516/2524 is acting as the traffic control center for all the other system elements. It takes multiple inputs, processes them for level and tone, and sends or assigns them to multiple outputs. The mixer is easier to understand if you look at its relationship with the other elements one at a time.

Mixer Subsystems

The M-2516/2524 is actually a collection of different sub-systems. Each subsystem is a "mixer" in its own right, with its own task to perform. Each subsystem has its own inputs, processing, and outputs.

Aux Mix: This section gets its signal from the Main and Monitor section, and sends it out to external signal processing devices.

Main Mix: This is the recording mixer. It gets signal from MIC/LINE inputs, processes them for level and tone, and send them to multitrack/ mixdown recorder via eight Group output and Stereo output.

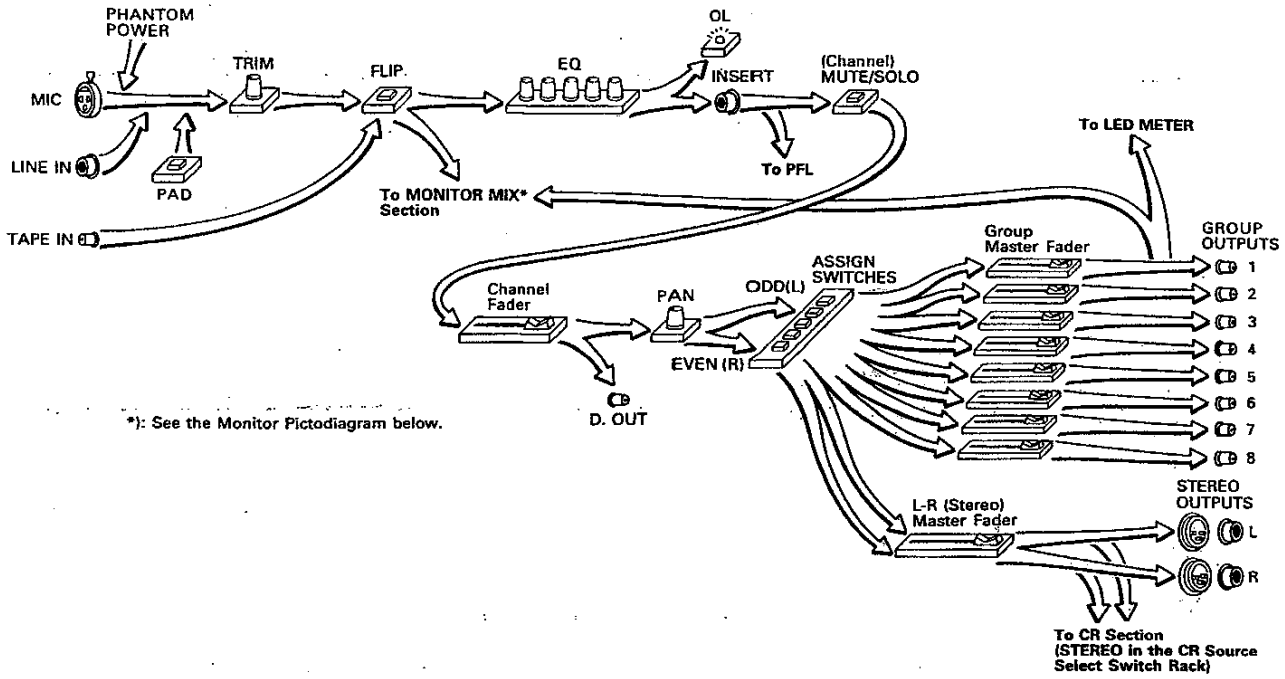


Control Room Subsystem: This selects and controls what you hear during the session. It gets signal from Stereo mix, Aux mix or two external stereo devices, and sends them to your control room speakers, studio monitors, and headphones.

Monitor Mix: This section gets its signal from the TAPE INputs, and sends them to Stereo output. This is typically used to monitor the tape signal during the session.

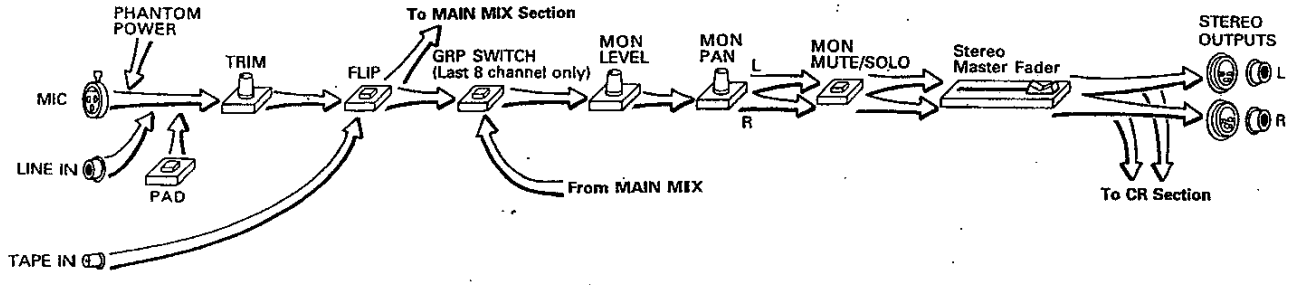
MAIN MIX: The primary system is the main mix. It receives signals from the input jacks, routes them through equalizers and faders, and sends them to any of the eight group outputs selected. Each group has its own master level control and is usually connected to a track of a multitrack recorder. The Main Mix can also send signals to the L-R (left-right) Stereo mix, for final mixdown or monitoring in the control room.

The EFFECT RETURNS are actually four specialized inputs to the Main Mix. They can be assigned to any the eight Groups and Stereo mix via ASSIGN switches, allowing you to record effects onto the multitrack recorder or the mixdown deck.



MONITOR MIX: Just above the main fader, pan, and assignment switches is the Monitor section, with its own level and pan controls. Usually, the monitor is "listening to" the outputs of the multitrack recorder (or tape returns), but it can also receive signals from the groups. The monitor is necessary for multitrack recording. It allows you to hear various signals (live, prerecorded or in combination) during the recording process so you can make critical artistic decisions. The monitor section always feeds the L-R Stereo mix.

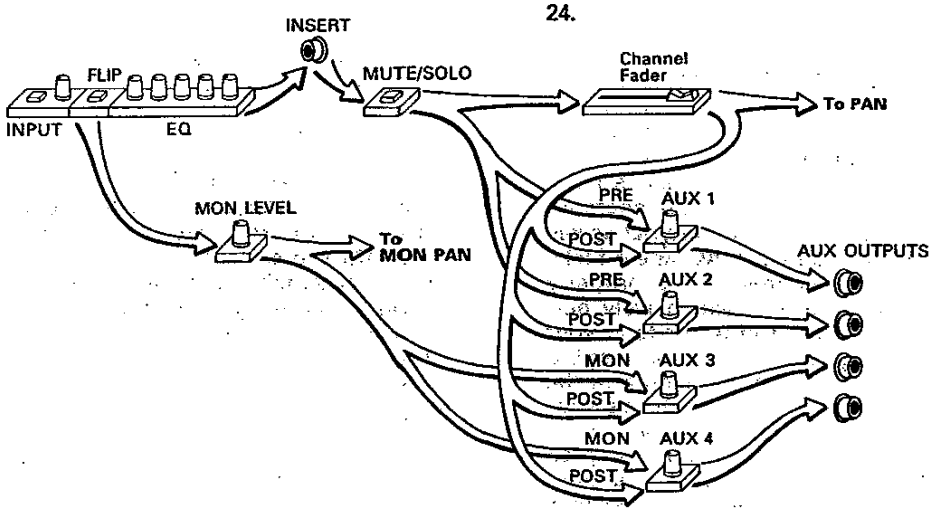
At mixdown, however, the monitor section can perform an additional function. The FLIP switch allows you to route extra inputs (such as effect returns or MIDI controlled instruments) into the stereo mix using the monitor section, doubling the number of sources if you wish. While this monitor path does not have EQ, it does have level, pan, and effect send capability.



AUX MIX: The AUX 1-4 submixer signals come from various points in the Main or Monitor signal paths. Let's assume that you have a digital delay, reverb, or another signal processor that you want to use on more than one input simultaneously. Your M-2516/2524 is able to send signals of any combination of input channels to the AUX OUTPUTS 1-4 jacks on the rear panel. These outputs can then be connected to your signal processor, and the processor's output(s) can be connected to the EFFECT RETURNS, or even back to another mixer input.

Aux 1-2 always gets its signal from the MAIN signal path, either before (PRE) or after (POST) the main fader. This allows it to be used as either an independent headphone feed (similar to the "monitor" or "foldback" controls on a PA board) or as an effect send from channels 1-16/1-24.

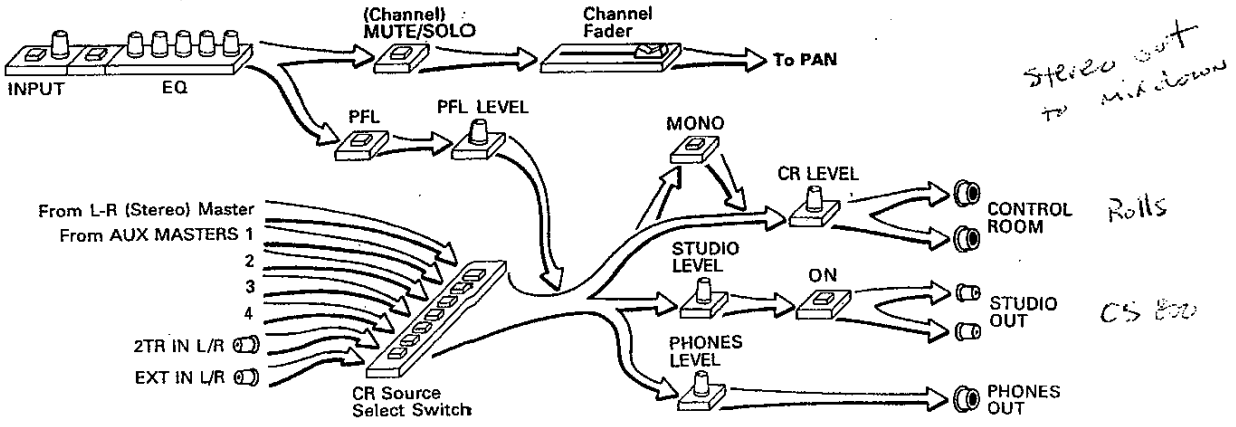
Aux 3-4 can get its signal either from the MAIN path (POST, same as Aux 1-2), or from the MONITOR path. This allows it to be used as a second effect send from main channels 1-16/1-24, or as the only effect send from monitor channels 1-16/1-24.



CONTROL ROOM SUBSYSTEM: With all these subsystems going to different places all at once, how can the engineer focus on one at a time? This is the task of the Control Room and PFL function. The Control Room stereo outputs are intended to be connected to an amplifier and monitor speakers in the control room facing the console. Seven input select switches allow you to hear any of the AUX outputs, two external stereo recorders, or the Stereo output of the M-2516/2524 (which is the usual position, so you can hear the monitor section in the control room).

Regardless of which source is selected by the Control Room switches, pressing any channel PFL switch automatically cuts off that source and sends the PFL mix to the control room monitors. PFL gets its signal from pre-fader, so you can hear a signal before bringing it up into the mix. The PFL system is used to adjust trim and tone in an individual channel or group of channels. It allows you to immediately hear only a few signals, and just as quickly return to hearing the entire mix.

There is a STUDIO OUTput and control, intended for a set of speakers in the studio for playback. This always receives the CONTROL ROOM output so the studio will follow the control room selection, including the PFL. The headphone jack of the M-2516/2524 also follows the C.ROOM mix.



Operations Guide: Connections

This section of the manual is designed to help you connect your M-2516/2524. The "Operations" section is based on these connection diagrams. However, these methods are not the only way to use the M-2516/2524. As you learn the features of the M-2516/2524, you will discover alternative ways of connection and operation which may better suit your needs.

When installing your system, make sure all devices are turned off and the level controls are turned down.

Power:
Connect the AC plug of the M-2516/2524 to an outlet. Try NOT to use outlets that are on the same circuit as air conditioners and old refrigerators. These things may introduce noise to the system. All elements of your system should connect to the same circuit if possible, but not to the same plug. There are several multiplug power conditioners on the market that do a good job of filtering out spikes and noise that come through the AC line. Make sure that the outlet you connect to is properly wired; AC outlet testers can be inexpensively purchased at electronics stores. If other units in your system have three-prong AC cables, it is possible they may introduce "ground loops" or hum in the system if the AC ground is not secure. If this happens, you may need to ground elements separately and "lift" the ground with a three-prong to two-prong adapter. Make sure you follow the manufacturer's recommendations before you do this, though.

Proper audio grounding and shielding is a study in itself. Your number one priority is the safety of the system, and second is getting low noise. Standard industry practice has become the "star ground", where all system elements are grounded at one place only: the console or patch bay. If you have problems with noise, or any "shocks", consult a professional in studio electrical system design.

Inputs:
In this example, we are going to assume you aren't using a patch bay. However, as your system grows, you may find it will make your life easier to acquire some TASCAM PB series patch bays.

THE APPLIANCE CONFORMS WITH EEC DIRECTIVE 87/308/EEC REGARDING INTERFERENCE SUPPRESSION

CONFORME AL D.M. 13 APRILE 1989
DIRETTIVA CEE/87/308

MICROPHONES, low impedance (200 to 600 ohm) can be connected to the MIC connectors. If they are phantom-powered type, set the PHANTOM POWER switch to the ON position for feeding DC+48V via all MIC inputs; otherwise leave it OFF. Line level XLR outputs may also be connected to the MIC connector, if you press the PAD switch, lower the TRIM level, and make sure PHANTOM POWER is OFF. Line inputs, such as synthesizers, guitars, and drum machines, may be connected to the 1/4" LINE IN jacks. Some guitars may sound better if they're run through a preamplifier or direct box first.

NOTE: DO NOT USE both the MIC and LINE INputs in the same channel at the same time. Disconnect one when the other is used.

TAPE RETURNS, the outputs of your multitrack tape recorder, should be connected to the TAPE IN jacks. They are designed for -10 dBV unbalanced tape returns. Use good quality shielded, low capacitance, high RF resistant cables such as the TASCAM Professional series. Cable lengths up to 20' are acceptable, but the shorter the better.
If you're not using all the tape returns, you can use your "spares" for other high-level line inputs if you wish--if you look at the block diagram you'll see the only difference between TAPE and LINE INs is that Line has an input trim and amplifier.

OUTPUTS to Multitrack:
1. Using good quality cables, connect the GROUP OUTPUTS jacks to the same numbered track of the multitrack recorder. Color-coded plugs help
2. In some cases, your 16- or 24-track recorder will "normal" the connections, so you only need to run eight cables to your recorder. For example, the TASCAM MSR-24 has an "Input Link" feature that patches the track one input to tracks 9 and 17 if desired.
3. If you need to record more than eight tracks at once, you will use the D OUT (Direct Out) jacks on certain channels. See p. 12, "Recording on more than 8 tracks".

"MICROPHONE CABLES AND MICROPHONES CONNECTION: TO PREVENT HAZARD OR DAMAGE, ENSURE THAT ONLY MICROPHONE CABLES AND MICROPHONES DESIGNED TO THE IEC268-15A STANDARD ARE CONNECTED."

"CONNEXIONS DES MICROPHONES ET DE LEURS CABLES: POUR EVITER TOUT ENDOMMAGEMENT, S'ASSURER DE BRANCHER UNIQUEMENT DES MICROPHONES ET DES CABLES DE MICROPHONES CONCUS SELON LA NORME IEC268-15A"

Control Room and Studio amplifiers:

1. Connect the CONTROL ROOM 1/4" phone jacks to the input of your main control room amplifier.
2. If you plan to have speakers in the studio, connect the STUDIO OUT L/R jacks to their separate amplifier.
3. If you need to hear only STEREO OUT and don't want to be disturbed by PFL or C.ROOM source selection, connect a studio amplifier to the STEREO OUT jacks.

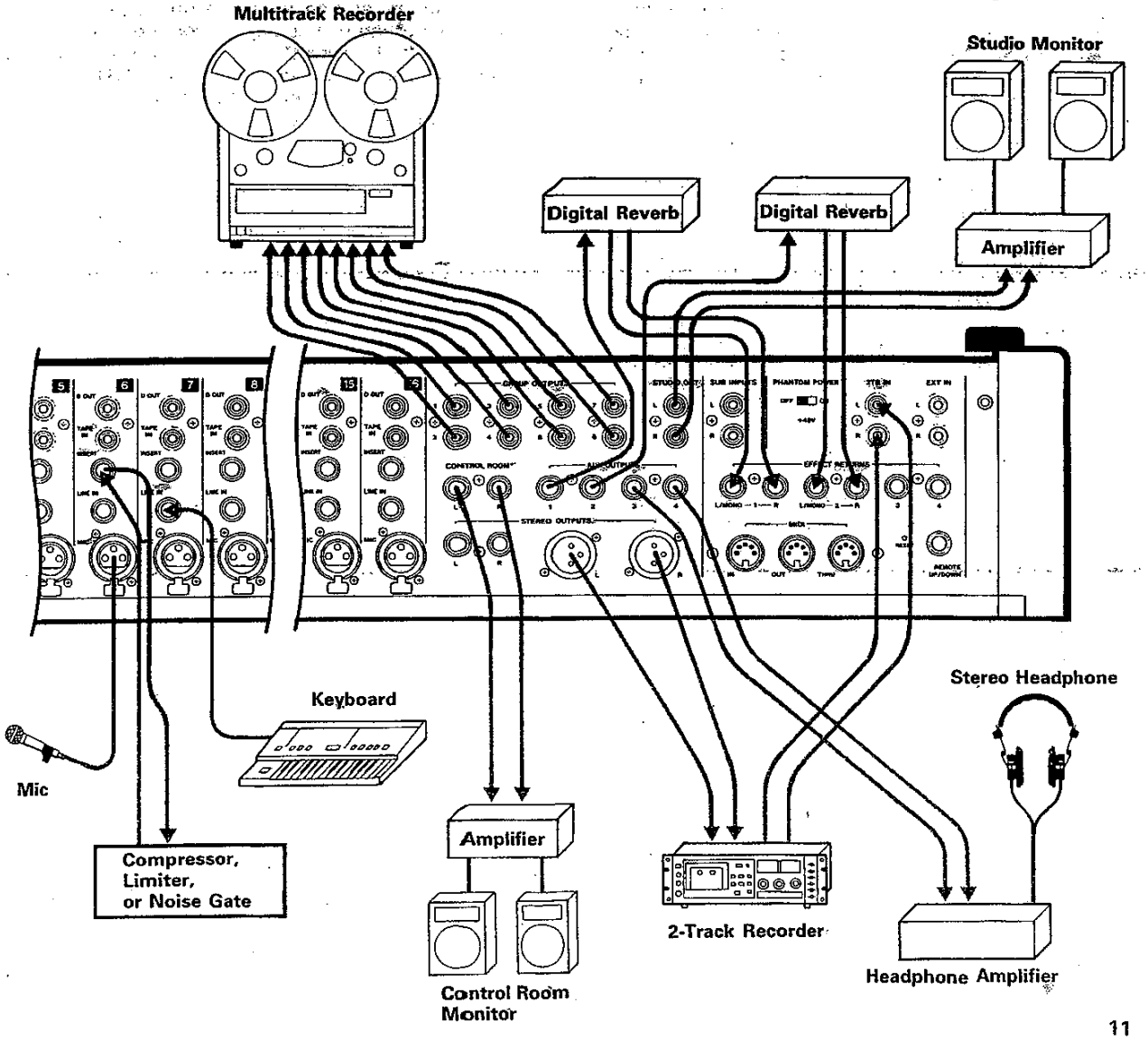
Mixdown deck:

1. Connect the STEREO OUT L/R jacks to the input of the stereo mixdown deck. There are two types of connector available; XLR type (Unbalanced) and 1/4" Phone jack. Both connectors may be used at once, feeding multiple mixdown decks (for example, a DAT and a standard stereo cassette).
2. Connect the outputs of the mixdown deck to the 2TR IN RCA jacks, or to the EXT IN RCA jacks next to them.

Effect devices and cue amplifiers:

1. You will have to decide how you want to use your auxiliaries. In this example we will connect AUX OUTPUTS 1 and 2 to two digital reverbs, AUX 3 and 4 to a stereo headphone amplifier. Note that in this case, the digital reverbs are not "true" stereo even though they have a left and right input, so we only connect to their MONO input.
2. Connect the outputs of the effect devices to the effect returns. In this case, we wanted to use the synthesized stereo outputs of the digital reverbs, so the AUX 1 and 2 units connect to EFFECT RETURNS 1 and 2.
3. If you have a compressor, limiter, or noise gate, it normally is connected to an INSERT point, using a PW-2Y (2m) or PW-4Y (4m) insert cable. Don't connect these yet, until you're up and running, because it's one more set of controls in the signal path that might cause confusion.

See p. 18, "Using Effects with the M-2516/2524" for more details on effect processing.



Operations Guide: Initial Checkout and Calibration

Preset the controls:
To avoid problems, begin with the power off. In each channel, "zero out" the controls as follows:
* Bring all the faders down.
* Set all TRIMs, AUX SEND MASTERS, CR, PFL and STUDIO levels to full counterclockwise (7 o'clock).
* Set all EQs, AUX and PAN controls to center (12 o'clock).
* Make sure all the switches (such as Channel Assign, MUTE/SOLO, PFL, FLIP, etc.) are up (or OFF), except for the PHANTOM POWER switch you need for phantom power microphones.

Meter calibration:
It is normal for slight variations both in the meters and in the fader readings. If a fader must be set a little above "0" to get 0 dB, it's nothing to be worried about. The meter settings of the M-2516/2524 are very stable, so recalibrating the meters of the mixer itself is not advised unless you have an extremely accurate voltmeter. If levels of your multitrack don't match those on the mixer, the multitrack may need calibration. If the tape meters don't play back at the same level you recorded, a complete alignment of the deck may be needed to bring everything back into "spec". Level differences of 1 dB or less may be due to other factors, and should not be of concern.

Set the 2-track level:
You can also set the input sensitivity of your 2-track mixdown recorder. Put an oscillator into STEREO SUB IN and adjust the STEREO MASTER faders until the M-2516/2524's L-R meters read 0 dB. Put your mixdown recorder into the INPUT or RECORD mode, and adjust its input control until it reads 0 dB on that unit (some digital recorders may use "-18" as their "0 dB" point). When you put a prerecorded tape on your two-track, you should be able to hear it in your monitors when you press the 2TR or EXT switch in the control room.

Set the control room amp level
If the CR level control is set relatively low (below 12 o'clock), and the monitors are very loud, it's a good idea to turn down the controls on the power amplifier itself. This is a safety precaution to avoid damage to your monitor system, and it also leads to quieter operation.

Set the input levels
At last you're ready for audio. Plug a microphone into a channel and turn the TRIM up to the 12 o'clock position. Press that channel's L-R ASSIGN switch. Slowly increase the channel fader to the 0 dB position while someone speaks into the mic. You should hear it faintly, if the L-R MASTER is still at its nominal position and the CR is set to hear STEREO. Slowly increase the TRIM until the stereo meters read 0 dB. (Watch out for feedback if the mic is in the control room.)

If you are using a LINE IN jack, instead of MIC connector, make sure that nothing is connected to MIC. For an electronic instrument, set the PAD switch OFF and the TRIM to fully to the left.

If the channel signal level is too high, the channel OL (overload) LED will light. If this indicator comes on, turn the TRIM control down.

Setting Effect Send levels
Getting the right levels to your effect devices is as important as setting levels to the recorder. Once you have a line or mic signal working at the proper gain, the "fully turned" position of the AUX control and the "2 o'clock" position of the AUX MASTER should make the meter of the effect device go to its "0 dB" indication, whatever it may be. Consult the manual for your effect device, and see p. 18, "Using Effects" for more information. At this point, just verify that you're getting signal to the device, and that it is returning to the console (either through the effect returns or the monitor spare inputs).

Operations Guide: Multitrack Recording and Monitoring

Multitrack recording is divided into three separate mixing tasks:

1. We must route the input signals to the desired tracks of the recorder at the proper level to achieve the best signal-to-noise ratio.
2. We need one or more cue mixes for the artists.
3. We must create a monitor mix in the control room for the engineer and/or producer.

To be most effective, these three mixes must be independent of each other.

Recorder mix

Routing the inputs to the multitrack is a simple task. Once you have set the input trims properly, press the channel assign button to send the signal to the correct output group. Remember that the MAIN PAN control must be set correctly-- the signal won' t make it to group 1 if the PAN is turned hard right.

As far as levels are concerned, if your equipment is properly calibrated the meters on the multitrack recorder will match the meter levels on the M-2516/2524 itself. "0 dB" is the typical ideal level for recording, though peaks to +8 and above can be tolerated on some types of program material. It would be presumptuous to suggest a "best" level setting. The actual final setting for a performance can only be judged and set by the operator, and we encourage you to try different methods and submit them to the ultimate judge--your ears. In most situations, the magnetic tape itself is the limiting factor. The M-2516/2524 outputs themselves do not distort until approximately +26 dB--long after the meters have pegged. The meters do not reflect mixer distortion, but distortion of a typical tape recorder. (Note, however, that it is possible to clip the input channel electronics by an improper TRIM setting, even though the following signal path is well within its limits. This is indicated by the channel OL lighting).

Recording more than 8 tracks simultaneously: If you need to record more than 8 tracks at once, you can use the D OUT (Direct Out) jacks of certain channels to feed the multitrack recorder, instead of the group outputs. In this case, there is only one input per track, and the record level is controlled by the channel fader only, and the Group Meters will not show the record level.

In most cases, you patch the direct outs of single channels (such as a lead vocal) to a track, saving groups outputs for instruments (such as multiple keyboards) that have to be combined.

Cue setting

In our example, AUX 3 and 4 are being used for headphone cue feeds to the studio. The basic decision for you to make is what the source of the signals should be: the multitrack tape recorder outputs, or a "tap" from some section of the mixer itself.

Tape cue: For the performers to hear the output of a tape track, turn the AUX 3-4 controls to left/MON (make sure that FLIP is UP). If there is signal on the tape and it is in PLAY-REPRO mode, they should hear it. There are several advantages to using tape as the cue source:

1. The cue level will be the same during recording and playback.
2. If the tape recorder has an INSERT (pre-roll sync) feature, it will be easy for the performer to hear when punch-in and out are made.

The disadvantages of using tape for cue, when you would want to monitor the mixer channel instead are:

1. Any changes the engineer makes to the main faders (in order to lower the record level, for example) will also be heard in the cue mix.
2. The performer may not be able to hear at certain times depending on the settings of the tape deck itself. For example, taking the track out of REC READY mode can cut the feed of the instrument to the cue.
3. When instruments that aren't going to be recorded to multitrack tape--for example, MIDI "virtual" tracks--must be heard, source cue is the only way to go.

Source cue: If you want to use the MAIN channel as the source for AUX 3-4, simply turn the AUX 3-4 controls to right/POST.

Tape/source mixed: Some artists need to hear both the pre-recorded track and their "live" instrument simultaneously when they are doing a punch-in to fix a section.
If you want a mix of the tape track and its source, make sure the source is in a different channel from the track. For example, while doing guitar overdubs onto track 7, the guitar can be patched into channel 16. To get a mix of both, turn the AUX 3-4 controls to left/MON in channel 7 (Aux 3-4 will hear tape track 7) and the AUX 3-4 controls to right/POST in channel 16 (Aux 3-4 will be a cue send of the guitar).

Group output cue: Another variation of "source cue" is to feed one of the eight group mixes to the headphones. This can be done on the highest 8 MONITOR channels on the console (9-16/17-24), the ones with GRP switches. Pressing GRP and turning the AUX 3-4 controls to left/MON will bring the mix of everything assigned to that group into the headphone cue mix. The advantages are when you have already done a complex mix (of percussion mics, for example) for recording and don't want to repeat the mix all over again on each individual AUX control.

Effects to Cue: Will returning effects make the cue mix more cluttered, or is it needed for artists to perform properly? If you decide you need effects in the cue mix, there are two ways to go:

1. Patch the output of the effects devices into a line input, instead of the Effect Return inputs of the console. As a line input, it can be monitored like any other source.

OR:

2. Leave the effects in the Effect Returns, but assign them to a group that is not going to be recorded. Then bring that group output into the cue mix (see "Group Output Cue", above).

Of course, if you are recording "wet" (effects to tape), using tape as the cue source brings the effect returns into the cue mix as well.

Other decisions you may have to make include: Should the AUX 3 and 4 mixes be stereo (1 feeds left, 2 feeds right) or two separate mono mixes (one for the drummer, one for the vocalist)? Should I make EQ settings while I'm recording? (AUX 3-4 is always post-EQ–the musicians will be able to hear EQ changes in the headphones).

Monitor mix

To create your control room monitor mix, you will usually rely on the STEREO switch in the Control Room section, and use the MONITOR channels. A lot of the same options available to the cue mix are available in the control room as well. There is one important note, however. In most cases, the engineer should be hearing tape, not source. This allows you to hear the signal as it's actually being recorded, and verify the signal continuity to and from the mixing console and the recorder.

To monitor tape: Make sure FLIP is UP.
To monitor group outputs: On the highest 8 channels of the console, press GRP.

Note that the "L-R" assign switch on the main channel will bring the output of the channel into the control room monitors. In some cases this may be desirable; in other cases it can mislead you. Make sure that no "L-R" assign switches are down if you want to make sure you're hearing what's on the tape and only what's going on the tape.

When the recording is complete, rewind the tape and play it back through the control room speakers. You don't have to change any control settings to do this, and should hear exactly the same mix as while you were recording. If playback is also desired on the STUDIO speaker system, press the studio ON switch and raise the studio fader. The studio will hear the same stereo mix you are hearing. Remember to turn the switch OFF before you cut more tracks from the studio.

Monitoring on the main faders: Depending on how many inputs you are recording, and how many tracks you have, you may want to monitor via the main mix. This "trick" is to leave your lower channels open, using the higher channels of the console for overdubs. Since the lower channels aren't needed during the overdubs, you start your mixdown "early" by pressing FLIP on those channels, and assigning their outputs to L-R only. You can start marking levels, using EQ, even adding effects this way.

Using PFL

In some situations, you may find PFL useful. If you want to solo a tape return, simply press FLIP and PFL down. Some engineers make a practice of playing back the newly recorded material after every pass. This will allow you to hear if any audio or acoustical problems are emerging, such as improper tuning, voicing timing errors, etc. If problems are found, correct the cause and re-record the track. While certain tonal characteristics can be equalized and adjusted later, many problems are impossible to "fix in the mix".

USING SOLO

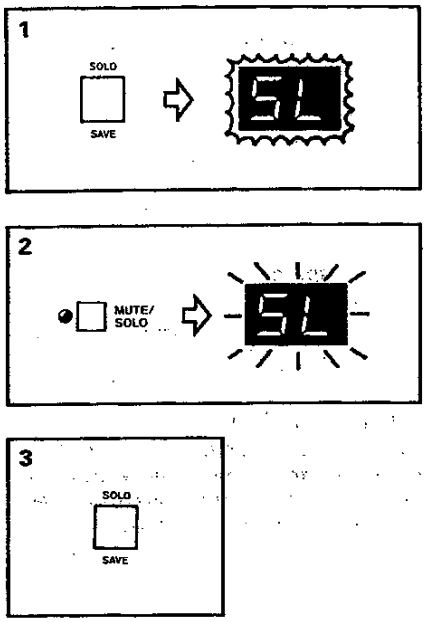
SOLO is another feature that allows you to concentrate on just one input at a time without changing any other mixer settings. The difference from PFL is that SOLO affects the STEREO OUTPUTs. It basically says, "mute everything except the channel push."

1. Press the SOLO/SAVE key. "SL" will flash in the number display showing the "solo ready" mode.

2. Press any MUTE/SOLO switch. All other channel mutes except that one will go on, and the "SL" will turn solid. In this mode, any channel's key will "solo" that channel.

3. To leave SOLO mode, press the SOLO key again. The mute settings will return to whatever scene you were in before soloing.

Note: If the M-2516/2524 is MIDI-controllable and receives any recognizable MIDI commands or messages, it will leave the SOLO mode and go directly to the scene commanded. (See p. 22)



Operations Guide: Mixdown

Once the multitrack master tape has been completed, the next step is to mix it down to a standard two track stereo format. The procedure is a reverse of the direction signals took during tracking: instead of going TO the multitrack, signals come FROM the multitrack. Typically, you want to bring signals through the main mixer channels so they can be EQ'd and processed. This is the job of the FLIP switch--press it to bring tape to the MAIN channel, and mic or line "flips" up to the MONITOR channel.

To mixdown to stereo:
1. Press FLIP on all the tape channels.
2. Assign all the MAIN channels to L-R.
3. Press MONITOR MUTE/SOLO switch to mute the MONITOR mix.
4. Press 2TR (EXT) in the Control Room section.

Note that the MONITOR controls are still feeding the stereo mix. Unless you are using them for MIDI instrument inputs or effect returns (see Double Inputs, below), make sure they are muted or they will add noise to the mix. In fact, any unused faders should be muted.

During mixdown, press 2TR (or EXT) in the Control Room source select switches. This allows you to verify that signal is indeed reaching the recorder. You may have to place the deck in REC READY, REC PAUSE, or INPUT to hear it. If you have the inputs of the two-track calibrated properly, the meters of the deck and the L-R meters of the M-2516/2524 will track properly. If you press the METER SELECT switch down/CR, and 2TR is the control room source, the L-R meters will reflect the output level of your two-track.

Note that if you "PFL" channels during a mixdown, this will NOT affect the stereo output to the two track. PFL is useful during mixdown to get a cue from a track before you bring it in. For example, PFL a muted vocal track, and UN-mute it after the singer clears her throat before an entrance. SOLO is useful for checking the mix, though it will affect the stereo output, for example, soloing two guitars to see if they balance each other in the stereo image.

Mixdown with double inputs:
If you have a large number of MIDI virtual tracks and effect returns, or other sources in addition to tape tracks at mixdown, you can use the MONitor Level controls as additional inputs.

FLIP brings the tape return to the MAIN fader, and either the MIC or LINE input (whichever is connected) to the MONitor control. To use AUX 1-4 as effect sends, disconnect the headphone amp from AUX 1-2 jack and repatch those outputs to an effects device instead. The Aux 1-2 will act as an effect send from the MAIN fader.

Subgrouping
Typically, the groups have no use in a mixdown. However, you can use them to subgroup when you have a large number of input channels which must be controlled through one fader as a group at mixdown. This subgroup gets to the stereo mix via the MONITOR channel's GRP source capability.

1. Assign the MAIN channels you want to a group, and NOT to L-R directly. For example, if tracks 1-10 are all drum tracks, assign channels 1-10 to Group 1-2.
2. On the first two MONITOR of the highest 8 channels (9-10/17-18), press GRP as the monitor source.
3. Turn the first GRP monitor PAN hard left, and the second GRP monitor PAN hard right.
4. Bring the two MONitor controls to the "2 o'clock" position.
5. Bring the Group 1 and 2 Master Faders to their nominal "0" positions.
6. Play tape, set the MAIN channel PANs 1-10 to the desired positions, and get the mix you want on the channel faders.

When you want to change the level of the entire drum group, you can move either the group master faders (which we recommend, because they're easier to adjust), or the MONitor controls. To mute the entire drum group, press the MONITOR MUTE/SOLO switch above the master fader.

General Procedures: Using the Equalizer

EQ can be used to change the tonality or timbre of a signal in an individual channel of your mixer. There is no specific control setting we can advise--the subjective art of applying EQ must remain the responsibility of the person performing the mix

There are 3 bands of equalization in the M-2516/2524 and the EQ points were chosen for the most musical sound and are useful on a wide variety of signals.

The top control **(HIGH)** is a "shelving" type of control. This means there is a gradual increase or decrease from approximately 2.5 kHz to 10 kHz, and frequencies above that point are all boost or cut by the same amount. This affects the relative brilliance or brightness of the signal, similar to a "treble" control.

The next band **(MID)** is a peak-and-dip type with a variable frequency, sometimes called a semi-parametric or sweep-type. There are two controls. One determines the center frequency of the affected band while the second determines the amount of boost or cut applied to the band. It can boost or cut by 15 dB. The center frequency can vary from 420 Hz to 13 kHz. The "Q" or bandwidth varies depending upon the amount of boost or cut.

The next band **(LOW)** is similar to MID, except it covers the frequency band centers from 42 Hz (actually low bass) to 1.3 kHz.

If EQ is desired, begin by determining which band requires alteration. Keep in mind that there are two ways to alter the tonality of a signal using EQ. One is to boost what you want to hear, the other is to cut what you don't. These two opposite approaches can both be effective depending on the situation, and sometimes can be combined. For example, if a vocal signal is a little too heavy, you could either reduce the low frequency content, or increase the amount of mid or high frequency signal.

The technique of using the sweep EQ is simple. Adjust the GAIN control of the band so there is an exaggerated amount of boost or cut, then slowly sweep the FREQUENCY control through its entire range. As the control is turned, you will hear the change in the signal's content. When the desired frequency is isolated, set the GAIN to the desired level. A few trials with different signals will give you a feel for the M-2516/2524s capabilities.

The EQ bands perform in an interactive way. It is possible to raise the 10 kHz treble shelving control, and then cut the MID at a certain point to remove an undesirable overtone. Remember, though, that you can't put back what isn't there in the first place. Boosting the treble on a synthesizer that has no signal above 7 kHz only boosts the noise of the synth. Not amount of tonal change can correct instruments which are out of tune or signals which are distorted.

Proper EQ can lower noise in a mix. Improper EQ can cause distortion. Note that the OL light is post-EQ; if a TRIM is set high, increasing EQ can make the light go on because it is adding gain to the signal. If this happens, simply lower the trim (or be more reasonable with your EQ setting).

Of course, sometimes the best EQ is no EQ. If it's not needed, bypass the unused electronics by setting all controls to the "12 o'clock" position.

In some cases, even more control is needed. Octave equalizers, 1/3 octave equalizers, notch filters, and full parametric EQs (such as the TASCAM PE-40) can be inserted into the signal path via the INSERT jack, when the on-board EQ of the M-2516/2524 needs to be supplemented. Usually this is in cases when a signal has particular noise bands (such as a 60 Hz hum) that need to be filtered out.

General Procedures: Using Effects

Effects and signal processing allow you to develop your own unique recording style. But because there are so many possibilities, it can also be confusing. There are many different effect units on the market, all with different controls, types of inputs and outputs, and other characteristics. Read the manuals of your signal processors, and the following section to get the complete story of what's possible in your own studio.

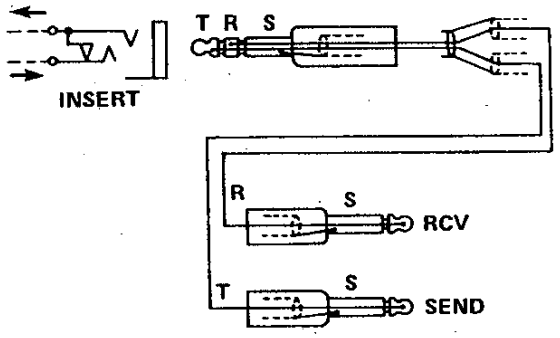
In-line processing

The processing that's easiest to deal with happens before a signal ever enters the M-2516/2524. If a musician plugs his instrument directly into an effect device, and you plug the output of it into the console, the whole signal gets processed and only one instrument can use that processor. This is the typical use of effect pedals for guitars.

Insert processing

This is closely related to the above method, and is typically used for compressors, limiters, and equalizers. Each channel, the output groups, and the stereo sends have special two-way send/receive jacks called INSERT jacks. Each has the effect of inserting a signal processor into the signal path. In the channels, it is post-EQ, pre fader; on the group and stereo outputs it is post-fader, just before the output jack. Whatever signal is travelling down that path gets diverted out of the insert jack, sent to its own individual signal processor, and returned to the path it was on. This requires a special Y-cable with a stereo 3-conductor TRS (Tip-Ring- Sleeve) phone plug on one end, split to two cables with mono plugs, one for the input (send) to the device and one for the output (return). The TASCAM PW-2Y and PW-4Y can be used for this purpose. Using INSERT for processing has the limitation that only one signal can use a processor at a time. The advantages are:

1. The signal at the jack has already been preamplified and equalized. This means you can put a microphone signal through a line level processor (most processors can't preamplify microphones by themselves).
2. It's easy to move a processor from one channel to another, just by moving the insert cable from one jack to another. It's also easy to disconnect the effect by simply unplugging the insert cable.
3. Certain devices, notably graphic equalizers and compressor/limiters, are designed for in-line or insert use, dedicated to one instrument at a time. If a signal is compressed, ALL of it must be compressed (unlike reverb, where a mix of reverb and original signal is usually needed).
4. It's possible to have as many different effect devices going as you have channels--there is no limitation due to the number of auxiliary sends on a console. For example, if there is a reverb setting only designed for a snare drum and not intended for anything else on the console, the insert jack may be the place for it.



T — Tip, send signal

R — Ring, receive signal

S — Sleeve, ground

Send/return auxiliary mix processing

This is the most common method of effect processing, especially for reverb and delay. It allows a number of different channels to use the same effect, while allowing you to control how much effect is mixed with each channel. All input channels have access to four Auxiliary sends that can be used as effect sends. The Aux outputs can be connected to four different effect devices. The processed signals from the devices can come back into the mix via the EFFECT RETURNs, or a regular line input. In either case, they can only be heard or recorded if the processed signal is assigned to L-R or an output group.

This whole path--from the auxes to the processor and back into the console--is called an effects loop. The Aux system controls how much signal goes to the processor, and the effect returns control how much comes from it. See p. 9, "Auxiliary mix" to see a diagram of the signal flow through the Aux system.

Setting Effect Send Levels
The goal is not to distort the device, while staying above the noise that effect units often generate. To get the best signal-to-noise from most signal processors, you should send it as strong a signal as it is designed for. With a properly set input signal (reading 0 dB on the meter when faders are set to nominal), the AUX will send the same level (nominal, 0 dBu) to an AUX OUTPUT when the channel AUX is fully turned and the AUX MASTER is set to approximately 2 o'clock.

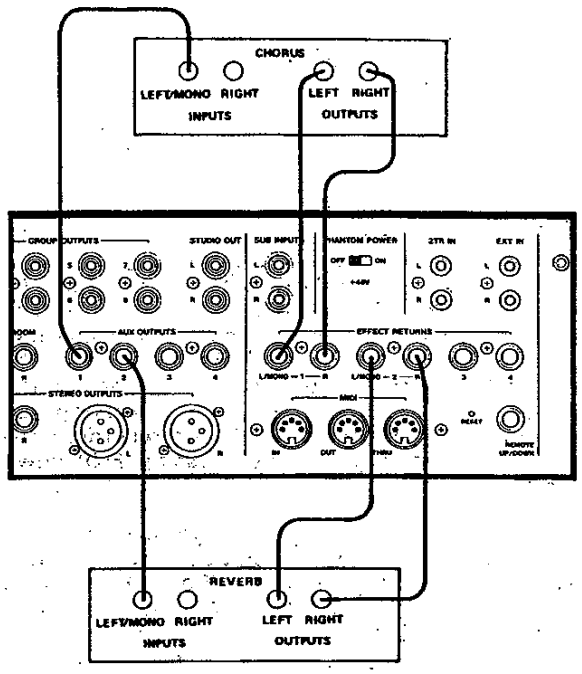
If your effects device has an input level control of its own, it should be set so the meter or signal light of the effects device is just under the overload point when the M-2516/2524 is sending its peak signals. When you want to hear or record less effect overall, make it a rule to reach for the EFFECT RETURN first, not the AUX MASTER. When you reduce the effect return, you are also reducing whatever noise that effect device contributes to the mix. If you cut down the Aux send, you are reducing the signal-to-noise ratio through that device.

Setting the output level of effect devices
If the effect send level has been set properly, in most cases the output level of the signal processor should be set to its nominal (unity gain) setting, or alternatively set it as high as possible without clipping the Effect Return of the M-2516/2524 while keeping a reasonable range of control on the fader. If you can get the effect sound you want with the Effect Return (or other fader) set near 0 dB, that's ideal. On the other hand, if your mix is drowning in effects even when the Effect Returns are in the low part of their range, turn down the output level of your effect device.

Some effect units have rear panel switches setting input and output level ranges between "+4" and "-20 dB". In this case, try setting the input to -20 (high sensitivity) and the output to +4 (full output level) to start.

Setting the mix/balance control on effect devices
If a device is being used in a send-return auxiliary mix, set its mix/balance control all the way to "wet", or full processing with no direct original signal. In send/receive processing, the "dry" (original unprocessed) signal goes down the channel path to be mixed with the effect return signal on a group or stereo master. Therefore, you don't need any dry signal coming to the effects return. The mix balance control is set toward "dry" only when you're using the effects device at the INSERT jack or as an in-line processor.

How to connect effects devices
There is no absolute "right" or "wrong" way to do this--there are several ways, each with its own consequences.



This is the most common method. AUX 1 feeds a reverb unit, which has a synthesized stereo output patched into EFFECT RETURNS 1. It would be used for effects off the monitor. AUX 2 feeds a chorus device with a stereo output patched into EFFECT RETURNS 2.

To record effect onto a track: Simply assign the EFFECT RETURN to the group of the track being recorded and adjust the controls for the sound you want.

To hear effect in the control room but not record it: Assign the effect return to L-R only.

To put effect into the Aux for performer cue: Assign the effect return to an unused group, (for example, Group 8), press GRP 8 as the MONitor source, and turn the corresponding AUX 3-4 to left/MON. Remember, the AUX 3 and 4 gets signal from the post-fader point, as you turn the Group 8 Monitor control for your own needs, it will affect the send to AUX 3-4 headphones as well. See p. 14, "Cue setting: Group Output Cue" for more information.

Stereo from Mono sends: Please note that while many effects units have stereo outputs and inputs, in most cases they are not "true" stereo with separate processing on each side. The stereo inputs are designed to preserve stereo on the dry signal only on such units. In fact, the stereo inputs are typically mixed to mono, then run through a digital unit that creates a synthetic stereo reverb image. So there is no need to use two auxiliaries to feed such a unit--a single mono send will be converted by the unit into a stereo image. You do need to patch the outputs to separate effect returns, however, and pan them to opposite sides of the mix to get the stereo effect.

Using line or tape inputs for effect returns: If the four effect returns aren't enough, you can patch the output of effects devices either into an unused tape return or a line input. If you patch to a tape return, you will be able to monitor the effect return on the MONITOR control when FLIP is up, or send it through the main channel for monitoring (by assigning the channel to L-R) or recording (by assigning it to a group) by pressing FLIP down again.

If you patch to a Line input, you have the added feature of a TRIM control so you don't have to reach back to the output level of the effect device. Also, depending on the position of FLIP, you can add EQ to the effect return.

In either case, be cautious of one thing: Make sure the AUX pots of the channel you're returning to are set to the center "off" position, if that aux is feeding the same effect device. Otherwise, you will be sending the output of the effect device back to itself, which is a kind of feedback. If the effect device is a digital delay, this feedback has the same effect as a regeneration (number of echoes) control; in other cases it can cause real feedback.

Alternative Methods

In addition to the standard methods earlier in the manual, here are some other ideas you may want to try:

Mixdown to Control Room outputs: If for some reason you need a lot of PFL in a mix, repatch so the CONTROL ROOM stereo output is feeding the two-track instead, and connect the control room amplifier to the outputs of the two-track. This way, PFL will affect the mix.

Use in PA applications: It's much easier to use a recording console for PA than it is to make a PA console work for recording. Since there are no tape returns, the Monitor section becomes either extra inputs, or an independent stage PA feed (again, by wiring the on-stage mix to the STEREO outputs, and the house PA being fed by two output groups.) It's a simple matter of substituting stage monitor amps for headphone amps, and giving the operator a headphone amplifier fed by the CONTROL ROOM output, so he/she can use the PFL facility that's so necessary when mixing "live". The XLR outputs of the console are set to 0 dBu (.775 volts), the nominal input needed for most power amplifiers.

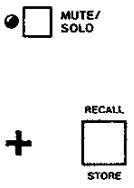
Using the Scene

The M-2516/2524 has a feature usually found only on much more expensive consoles: Mute Automation. This allows you to turn many different channels on and off simultaneously at the touch of one button.

For example, you may have a rack of synthesizers that isn't used on one particular song, just an acoustic piano. You can set up a SCENE, a "snapshot" setting which mutes all the synthesizers, leaving only the piano mic on. This way, the hiss and output noise of the synthesizers doesn't get in the way, but you leave the volume settings alone. What's more, you can go from scene to scene by external MIDI Program Change commands.

There are 99 scenes in the M-2516/2524, each of which can hold a "snapshot" of the mute switches. Other settings (volume, effects send, EQ) are not automated, and aren't reset when you change scenes.

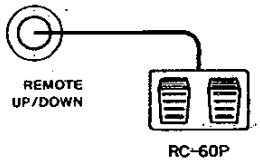
Storing a Scene in Memory



1. First, find an "empty" scene, one that has no mutes stored in it by pressing UP/DOWN or the numeric keypads then RECALL/STORE.
2. Press the MUTE/SOLO switches you want. The scene number will start to flash, showing that the mute settings are different from what's in the original scene.
3. Hold SHIFT and press RECALL/STORE. The scene number will light solid, and you have now written the mute settings into the M-2516/2524's permanent memory.

See p. 35, "RECALL/STORE" and "SCENE/SCENE OFF" for more details on features of these keys.

Recalling Scenes



RC-60P

Using the front panel controls:

1. Using the numeric keypads to enter a 2-digit scene number to recall. Or you can use the UP or DOWN key. The scene number will flash, showing you that the scene hasn't been recalled yet.
2. When you find the number you want, press RECALL/STORE. The mutes will instantly change to the settings of that scene.

Using the REMOTE UP/DOWN footswitch:

The optional RC-60P footswitch can be connected to the REMOTE UP/DOWN jack on the rear panel. When pressed, it has the same effect as pressing UP or DOWN and then RECALL. The RC-30P footswitch can send only the UP and RECALL commands at a time.

MIDI Features:

Any method of recalling a scene memory will also send a MIDI Program Change command to the M-2516/2524's MIDI OUT jack, if the MIDI PGM CHANGE channel number is not set to "off". For more information, see p. 22, "Sending MIDI Program Change Commands".

To Clear a Scene: If you want to clear all mute settings from a scene, recall the scene, then hold SHIFT and press CLEAR/SCENE CLR.

To copy a scene from one number to another:

Especially if you are using MIDI patch change commands, you may want to have a series of scenes that have the same settings.

1. Go to the scene you want to copy, and press RECALL/STORE.
2. Then go to the scene number you want to replace. The scene number will flash.
3. Hold SHIFT and press RECALL/STORE. The scene number will light solid.

At any time during this operation, you can press CLEAR to return to the original scene unless you have actually copied the scene.

Using the MIDI Features of the M-2516/2524

There are a number of ways to use MIDI with the M-2516/2524. You don't have to use any of them, if you don't want to. But you should be aware of the possibilities. You can:

* Use an "UP/DOWN" footswitch to issue Program Change Commands to your MIDI instruments from the M-2516/2524.
* Send Program Change commands from a MIDI keyboard or other controller to change scene numbers of the M-2516/2524.
* Use either Note messages or Control Change commands from a keyboard or sequencer to individually mute and unmute the channels of the M-2516/2524.
* Set the MIDI channel of each MIDI command and message so M-2516/2524 will send and receive commands/messages on any MIDI channel.

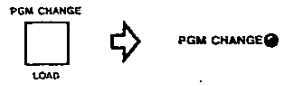
Transmitting MIDI Program Change commands from the M-2516/2524

Hookup

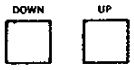
1. Connect a MIDI cable from the MIDI OUT of the M-2516/2524 to the MIDI IN of the instrument.

2. (Optional) Connect the RC-60P or RC-30P footswitch to the REMOTE UP/DOWN jack of the M-2516/2524 (Otherwise, you may use the UP and DOWN or the numeric keypads then RECALL on the M-2516/2524 directly).

Setting the MIDI Channel of the Program Change commands



3. Press the PGM CHANGE/LOAD key. The SCENE LED will turn off and PGM CHANGE LED will turn on. Now you're in MIDI Program Change channel setting mode, and the number display will show the current MIDI channel of the Program Change commands: (omni) on, 1-16, or off.



4. Find out what MIDI channel your instrument is sending/receiving on (the default setting is usually channel 1). Check the owner's manual of your instrument if you don't know how.

5. Using the UP and DOWN keys, set the MIDI channel of the M-2516/2524 to the channel of your instrument.

   NOTE: In this procedure, you're setting both the send channel and the receive channel at the same time.

   a) When you set it to (omni) on, the M-2516/2524 transmits the Program Change commands on channel 1 and recognizes the commands on all sixteen channels.

   b) When you set it to any of 1-16, the M-2516/2524 transmits and recognizes the commands only on the channel you've set.

   c) When you set it to off, the M-2516/2524 does not transmit and recognize the Program Change commands on any channel at all.

6. When you finish, press the SCENE/SCENE OFF key. The number display will go back to showing the scene number, and if you set the MIDI Channel to on or any of 1-16, the PGM CHANGE LED will stay on solid.

Check Operation

7. Press the UP and DOWN keys then RECALL, or the footswitch. Your instrument should change programs at the same time the M-2516/2524 changes scenes.

Note about Program Numbers

The MIDI spec calls for 128 different program change commands, 00 through 127. The M-2516/2524 can transmit and receive 00 through 99. Each instrument interprets the Program Change command in its own way; for example, a Roland synthesizer receiving an "00" command may go to its patch "A-1"; a Yamaha synthesizer receiving a "33" command may go to its patch "Cartridge 01". Many synthesizers have only 64 patches; they may ignore patch commands above 64. Experiment with your setup and read your owner's manuals to take best advantage of the patch change feature.

Changing scenes via external MIDI commands

Just as we used the M-2516/2524 to send commands to the synthesizer, a synthesizer can send commands to the M-2516/2524 to recall scenes.

Hookup

1. Connect a MIDI cable from the MIDI OUT of the instrument to the MIDI IN of the M-2516/2524.

Setting the MIDI Channel

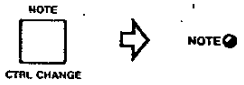
2. If you're using the same equipment as in "Transmitting MIDI Program Change commands from the M-2516/2524", there's no need to set the MIDI Channel for receiving Program Change commands.
   If not, proceed as in the previous procedure. Remember, on the M-2516/2524 setting the MIDI channel affects both transmitting and receiving.

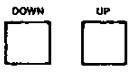
Check Operation

3. Press the program change key on your instrument. The M-2516/2524 should change scenes at the same time your instrument changes programs.

MIDI PGM No.	M-2516/2524
00	Scene 01
01	02
02	03
:	:
:	:
96	97
97	98
98	99
99 ~ 127	Ignored

Controlling mutes with MIDI Note messages





In addition to changing from scene to scene, the M-2516/2524 makes it possible to mute individual input channels with MIDI Note messages. To experiment with this, you must have a velocity-sensitive keyboard capable of sending notes #36-51 and #60-64. (for the M-2524, this will be #36 through #64. See table on page 25.)

Hookup

1. Go through the "Changing scenes via external MIDI commands" procedure above for hookup.

Setting the MIDI Channel of the Note messages

2. Press the NOTE/CTRL CHANGE key. The SCENE LED will turn off and NOTE LED will turn on. The number display will show the current MIDI channel of the Note messages: (omni) on, 1-16, or off.

3. Find out what MIDI channel your instrument is sending/receiving on (the default setting is usually channel 1). Check the owner's manual of your instrument if you don't know how.

4. Using the UP AND DOWN keys, set the MIDI channel of the M-2516/2524 to the channel of your instrument.

   NOTE: In this procedure, you're setting both the send channel and the receive channel at one time.

   a) When you set it to (omni) on, the M-2516/2524 transmits the Note messages on channel 1 and recognizes the Notes on all sixteen channels.

   b) When you set it to any of 1-16, the M-2516/2524 transmits and recognizes the messages only on the channel you've set.

   c) When you set it to off, the M-2516/2524 does not transmit and recognize the Note messages on any channel at all.

5. When you finish, press the SCENE/OFF key. The number display will go back to showing the scene number, and if you set the MIDI Channel to on or any of 1-16, the NOTE LED will stay on solid.

Check Operation

6. On the keyboard, hit C2(#36) harder. The M-2516/2524 channel 1 mute should go on.

7. Press C2(#36) softly, and the mute should go off. This procedure should work for each note going up the scale (C#2, #37, will turn on/off mute channel 2, etc.)

In most applications, you will not directly address the M-2516/2524 this way. Instead, a sequencer will issue the note messages of different velocities to change the mute settings. Also, the M-2516/2524 issues its own note commands, so you can write a sequence by "playing" the mutes of the M-2516/2524 into the sequencer. The Note On message is followed very quickly by a Note Off message; if you hook the MIDI OUT of the M-2516/2524 to a keyboard, you may be able to hear the short notes that result when you press a MUTE/SOLO switch.

To turn Note Muting feature off: Go through steps 2-5 above, leaving the display in the "oF" position.

MIDI Note # (key)	MUTE/SOLO	
36 (C2)	Input Channel	1
37 (C#2)		2
38 (D2)		3
39 (D#2)		4
40 (E2)		5
41 (F2)		6
42 (F#2)		7
43 (G2)		8
44 (G#2)		9
45 (A2)		10
46 (A#2)		11
47 (B2)		12
48 (C3)		13
49 (C#3)		14
50 (D3)		15
51 (D#3)		16

MIDI Note # (key)	MUTE/SOLO	
52 (E3)	Input Channel	17
53 (F3)		18
54 (F#3)		19
55 (G3)		20
56 (G#3)		21
57 (A3)		22
58 (A#3)		23
59 (B3)		24
60 (C4)	EFFECT RETURN	1
61 (C#4)		2
62 (D4)		3
63 (D#4)		4
64 (E4)	MONITOR MASTER	

M-2524 Only

Transmit

MUTE OFF ----> Note On Velocity 32
MUTE ON ----> Note On Velocity 96

Receive

Note On Velocity 01 ~ 63 -----> MUTE OFF
Note On Velocity 64 ~ 127 -----> MUTE ON
Note On Velocity 00 -----> Ignored

Controlling mutes with MIDI Control Change commands

For advanced operation, the M-2516/2524 also accepts MIDI Control Change commands to mute individual input channels. If you don't have a velocity-sensitive keyboard, this might help.

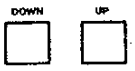
NOTE: When you control mutes with external MIDI devices, the M-2516/2524 accepts either Note messages or Control Change commands. Setting MIDI channel to (omni) "on" or any of 1-16 activates the corresponding feature and automatically turns off the other.

Hookup

1. Go through the "Changing scenes via external MIDI commands" procedure above for hookup.

Setting the MIDI Channel of the Control Change commands

2. Hold the SHIFT and press the NOTE/CTRL CHANGE key. The SCENE LED will turn off and CTRL CHANGE LED will turn on. The number display will show the current MIDI channel of the Control Change commands: (omni) on, 1-16, or off.



3. Find out what MIDI channel your instrument is sending/receiving on (the default setting is usually channel 1). Check the owner's manual of your instrument if you don't know how.

4. Using the UP and DOWN keys, set the MIDI channel of the M-2516/2524 to the channel of your instrument.

NOTE: In this procedure, you're setting both the send channel and the receive channel at one time.

a) When you set it to (omni) on, the M-2516/2524 transmits the Control Change commands on channel 1 and recognizes the commands on all sixteen channels.

b) When you set it to any of 1-16, the M-2516/2524 transmits and recognizes the commands only on the channel you've set.

c) When you set it to off, the M-2516/2524 does not transmit and recognize the Control change commands on any channel at all.

5. When you finish, press the SCENE/SCENE OFF key. The number display will go back to showing the scene number, and if you set the MIDI Channel to on or 1-16, the CTRL CHANGE LED will stay on solid.

NOTE about Control Change commands

Most MIDI keyboards transmit/receive Control Change commands in their own ways. Check the owner's manual of your instruments.

As we said in the Note muting procedure, in most applications, you will not directly address the M-2516/2524 this way, either. Instead, a sequencer will issue the Control Change commands, so you can write a Control Change sequence by "playing" the mutes of the M-2516/2524 into the sequencer. Make sure that no instruments get the M-2516/2524 Control Change commands. Because the Control Change commands are usually used for controlling the tone setting in the instruments, it may have unexpected effects on your instruments.

To turn the Control Change Muting feature off: Go through steps 2-5 above, leaving the display in the "oF" position.

MIDI CTRL No. (hex)	MUTE/SOLO	
00 (00H)	Input Channel	1
01 (01H)		2
02 (02H)		3
03 (03H)		4
04 (04H)		5
05 (05H)		6
06 (06H)		7
07 (07H)		8
08 (08H)		9
09 (09H)		10
10 (0AH)		11
11 (0BH)		12
12 (0CH)		13
13 (0DH)		14
14 (0EH)		15
15 (0FH)		16

MIDI CTRL No. (hex)	MUTE/SOLO	
16 (10H)	Input Channel	17
17 (11H)		18
18 (12H)		19
19 (13H)		20
20 (14H)		21
21 (15H)		22
22 (16H)		23
23 (17H)		24

M-2524 Only

80 (50H)	EFFECT RETURN	1
81 (51H)		2
82 (52H)		3
83 (53H)		4
88 (58H)	MONITOR MASTER	

Transmit

MUTE OFF ----> Control Data 00 (00H)
MUTE ON ----> Control Data 127 (7FH)

Receive

Control Data 00 (00H) ~ 63 (3FH) ----> MUTE OFF
Control Data 64 (40H) ~ 127 (7FH) ----> MUTE ON

MIDI Mute Automation

Mute automation means that you can turn the mutes of the M-2516/2524 on and off automatically at certain points in a sequence or recording. With it, you can make sharp cut-offs or drop-ins of any signals going through the mixer. You can lower the overall output noise of a mix by muting channels that aren't being used during particular passages. This is done by connecting a MIDI sequencer to the MIDI input of the M-2516/2524, and issuing MIDI instructions from the sequencer that tell the M-2516/2524 to turn channels on or off at certain points in the song.

Two Ways to Automatically Mute

When you want to use the mute automation features of the M-2516/2524 to decide which of two methods (or combination of methods) you're going to use for the M-2516/2524 to receive instructions from the sequencer.

Program Change Mutes is similar to the method you use when you press the numeric keypads or UP and DOWN then RECALL on the faceplate of the M-2516/2524, or press the UP/DOWN footswitch. You set up a series of scenes, each one with the mute setup you want. These scenes can be recalled via a MIDI Program Change command, the same command that tells a synthesizer to change from one "patch" or voice setting to another. Like 10-key entry, MIDI commands are numbered, so you can change the setting of the M-2516/2524 from any scene to another (for example, from 04 to 27) directly. By inserting Program Change messages into your sequence that are on the same MIDI channel as the M-2516/2524, the sequencer will control the scenes, recalling them as a series of "snapshots".

Dynamic Automation doesn't use scenes. Instead, it is possible to turn channels of the M-2516/2524 on and off individually via MIDI Note On/Off messages (or MIDI Control Change commands). Instead of moving from "patch to patch", it's as if you were playing the MUTE/SOLO switches like the keys of a synthesizer--individually.

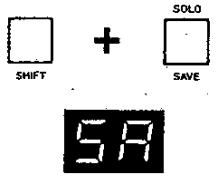
The Steps to MIDI Automation

To use MIDI automation, there are a few things you have to do first.

1. Set the MIDI channels the M-2516/2524's corresponding feature will send and receive on. These must be different from any other instruments on the system. You set both send and receive channels at one time.
2. If you are using SCENE automation, you need to set up the scenes according to your plan and make a list of which scenes mute which inputs.
3. You must "record" the sequence that will control the M-2516/2524. You may be able to enter commands one by one, or you can transmit MIDI commands and messages into the sequencer by "playing" the mutes and scene changes.
4. The final stage is playing back the MIDI information into the M-2516/2524, from the sequencer.

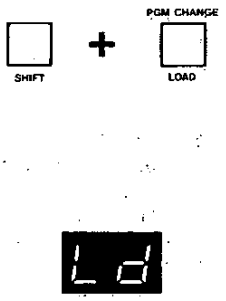
Transferring All Scenes

Saving All Scenes to MIDI Data Filer or Suitably Equipped MIDI device



1. Connect the M-2516/2524's MIDI OUT to your MIDI filer's MIDI IN.
2. Hold SHIFT and press the SOLO/SAVE key. "SA" will appear in the number display as the scene data is sent out (as MIDI exclusive messages) to the MIDI filer.
3. When saving is through, "SA" will switch back to the scene number. Operate the filer to save the received data as per instructions in the manual of your filer.

Loading All Scene Data from MIDI Filer

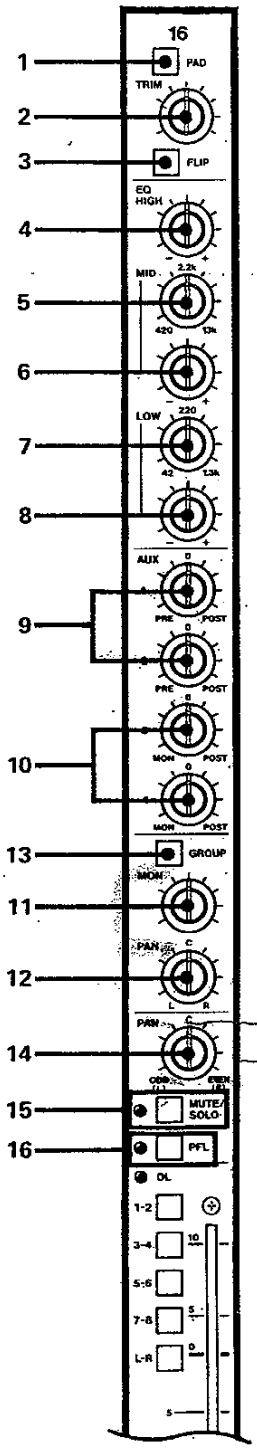


1. Connect the M-2516/2524's MIDI IN to the MIDI filer's MIDI OUT.
2. Hold the SHIFT and press the PGM CHANGE/LOAD key. "Ld" will appear in the number display and the M-2516/2524 waits for the MIDI exclusive message.
3. Have the filter start sending out the scene data. Or, If your MIDI data filer recognizes the MIDI Dump Request command, press the RECALL/STORE key on the M-2516/2524. When the MIDI filer receives the Dump Request command, it starts sending Exclusive messages automatically.
4. When loading is through, "Ld" will switch back to the scene number. If there's any error in the received messages, "Er" will appear in the display, instead of the scene number.

Clearing the Scene memory

CAUTION: If you have customized any scenes, 01 thru 99, they will all be erased by the following procedures. If you want, save them first on tape or MIDI filer as per instructions above.

If you want to clear all the scenes in memory, press the RESET switch in the rear panel, using a toothpick, etc. This will reset all settings you made back to default, including the MIDI channel.



Input channels

1. **PAD:** This inserts a 30 dB pad (which greatly reduces the volume) in the MIC and LINE signal paths, so that these inputs can be used for unusually high-level signals. For example, with PAD on and the TRIM (#2) at minimum, the MIC connector can be used for balanced line-level signals (nominal input level +4 dBm or 1.23 volt).

2. **TRIM:** This sets how much preamplification there is on the MIC/LINE inputs of the channel. It should be set high enough to amplify the source above the noise floor of the electronics, but not so high that it distorts them (indicated by the OL LED in the channel). The gain range of the TRIM is 41 dB: when the TRIM is set all the way to the left, the maximum input level is -26 dBm/MIC (0.05 V) and -9 dBV/LINE (0.355 V). When the TRIM is turned full clockwise it can amplify signals as low as -67 dBm/MIC (0.35 mV) and -50 dBV/LINE (3.16 mV) to nominal level.

3. **FLIP:** This selects TAPE IN as the source of the MAIN channel. However, at the same time, it sends MIC or LINE IN (whichever is connected) to the MONitor control. For example, if all the console's FLIP switches are pressed and all the LINE IN jacks are connected, all the main channel faders will be getting signal from their respective tape returns, and all the MONitor controls will be getting signal from the LINE INput jacks. This would be a typical mixdown patch. By releasing FLIP on all channels, the Main faders would be getting signal from the LINE INputs, and the MONitor controls would be getting tape returns, the typical patch for overdubbing. So by pressing FLIP, you are simply flipping the inputs from one path to another, which allows you to use the monitor section for extra inputs at any time, doubling the total inputs to the stereo mix.

EQUALIZER: The following controls allow you to adjust the tonality of the signal going through the main channel only. They get their signal after the FLIP (#3) and send it on to the INSERT jack (#54) and Main channel fader (#20). For more information, see p. 17, "Using the Equalizer".

4. **HIGH:** This is a high-frequency equalizer, shelving type, with a hinge point of 10 kHz.

5. **MID Frequency:** This changes the center frequency of the MID control, from a low of 420 Hz to a high of 13 kHz. The "Q" or bandwidth of the MID section is approximately 1.7, but varies according to the amount of cut or boost applied.

6. **MID Amount:** This controls how much cut or boost is applied to the band chosen by the MID Frequency control. At center, there is no effect (flat response). Turning to the right amplifies the band, to a maximum of 15 dB. Turning to the left cuts the band, to a maximum cut of -15 dB.

7. **LOW Frequency:** This changes the center frequency of the LOW control, from a low of 42 Hz to a high of 1.3 kHz. The "Q" or bandwidth of the LOW section is approximately 1.7, but varies according to the amount of cut or boost applied.

8. **LOW Amount:** This controls how much cut or boost is applied to the band chosen by the LOW Frequency control. At center, there is no effect (flat response). Turning to the right amplifies the band, to a maximum of 15 dB. Turning to the left cuts the band, to a maximum cut of -15 dB.

9. **AUX 1 and 2 controls:** These control how much signal will be sent to Auxiliary buss 1 and 2. They get their signal from a point just before (PRE) or after (POST) the Main channel fader (#20).

   Unlike most "effects" sends, the OFF positions of the AUX 1 and 2 knobs are the center detent (12 o'clock). Turn to the right of center to send signal to AUX 1/2 from the POST-fader point, or to the left of center to send signal to AUX 1/2 from the PRE-fader point. The farther you turn them either way, the louder it will be--if it is turned all the way to the left, it's at full volume.

10. **AUX 3 and 4 controls:** They are similar in operation to AUX 1 and 2, except they get signal from MONitor controls (#11) or Main channel fader (#20) and send signal to Auxiliary buss 3 and 4.

    Similar to AUX 1 and 2, the OFF position of the AUX 3 and 4 knobs are the center detent (12 o'clock). Turn to the right of center to send signal to AUX 3/4 from the POST-fader point of the Main channels, or to the left of center to send signal to AUX 3/4 from the POST-fader point of the Monitor channels. The farther you turn them either way, the louder it will be.

11. **Monitor control:** The input to this control is determined by the FLIP switch (#3); MIC/LINE or TAPE return. Regardless of source, it always feeds the STEREO L-R mix, where it can be used as a control room monitor or as additional inputs to the final stereo mix.

12. **PAN (Monitor):** This allows you to create STEREO L-R mixes by sending the monitor signal in continuously variable degrees anywhere to the left or right of the STEREO mix.

13. **GRP (last 8 channels only):** This selects the corresponding Group Output (post-master fader) as the source for the monitor. This is used when you need to monitor a group mix before it is sent to the tape recorder. It can also be used to make mixdown easier by subgrouping many channels onto one fader (see p. 16, "Subgrouping").

14. **PAN (Main):** This sends the output of the Main channel in continuously variable degrees to either side of the stereo mix (if L-R is pressed), or to odd-even sides of the Group Assignment switches (pan left for groups 1, 3, 5, and 7, pan right for groups 2, 4, 6, and 8). A PAN control is a combination "where to/how much" control, in that it controls both the level and direction of a signal.

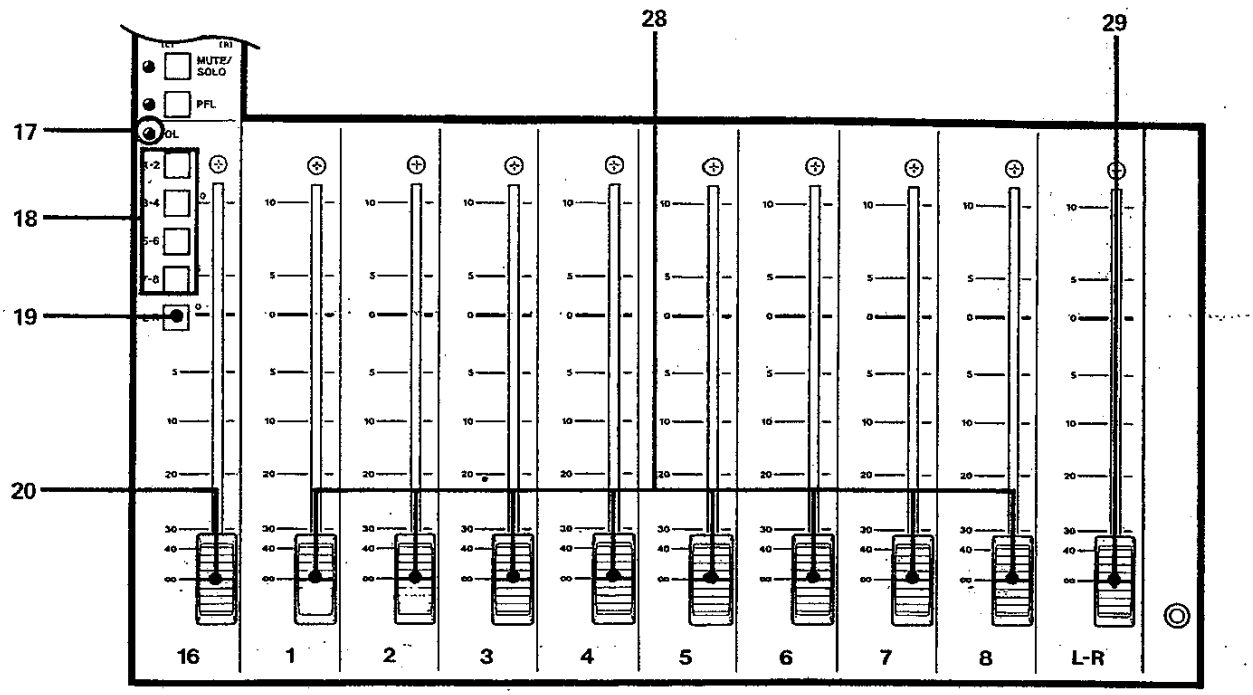
15. **MUTE/SOLO switch and LED:** This switch is an electronic on/off control. The red indicator lights when a channel is muted (turned off). The switch comes before the Main channel fader (#20) and turns off signal to the D.OUT, the AUX sends, and the Group/Stereo master. In the mute mode, press this switch to turn any channel off; press again to turn it back on.

    When the SOLO/SAVE key is pressed on (shown by "SL" in the number display), pressing any MUTE/SOLO switch "solos" that channel by automatically muting all the channels except the one you pressed.

    MUTE is typically used when you want to silence a channel without disturbing its volume setting. All electronic instruments have hiss and noise to some degree, and if you're not using certain inputs for a while, using MUTE will make your sound cleaner. SOLO is typically used when you want to concentrate on one instrument--for example, you have 5 synthesizers mixed together for a sound, but want to hear just one of them so you can adjust it. Solo is also useful if you've lost track of what instrument is plugged into which channel of the M-2516/2524.

    MUTEs can be stored in presets called "scenes", so if there's a particular group of inputs you want to mute all at once, you can simply RECALL a scene, and do not have to push each MUTE individually. See p. 20, "Using the scene" p. 22 "Using the MIDI feature", and p. 15, "Using Solo".

16. **PFL switch and LED:** PFL stands for "Pre-Fader Listen" and only the signal corresponding to the channel for which this switch is pressed can be monitored through the control room output. In this case, the signal before level adjustment using input fader (#10) can be monitored. This function is valid during the mute operation.



17. **OL (Overload) indicator:** This LED will flash when the signal level in the channel (post-EQ, pre-insert, pre-fader) is 25 dB over nominal (-10 dBV) level. This is 1 dB before the channel electronics will distort. If it flashes, reduce the TRIM (#2) until it stops flashing.

18. **Group Assignment switches:** These assign the output of the Main channel fader to any of the eight output group busses. Each switch is an odd-even pair, and the amount of signal sent to odd or even numbered groups is determined by the Main PAN control. They may be used in any combination. Note that even if "1-2" is pressed, no signal will go from the channel to Group 1 if the PAN (#14) is turned hard right/EVEN.

19. **L-R Stereo Assignment switch:** This sends the output of the Main channel directly to the stereo busses, depending on the setting of the Main channel PAN (#14). This is normally pressed for final mixdown, or if the entire channel is being used for monitoring (see p. 15, "Multitrack Recording and Monitoring").

20. **Main channel fader:** This linear slide fader varies the level feeding the Main channel PAN control (#14) and Group/L-R Assignment switches (#18-19), and Aux 1-4 if they are in the post-channel position (right of center). The fader is set for unity gain (level in = level out) when it is set at the "0 dB" level. When the fader is raised to its maximum, 10 dB of gain is applied to the signal.

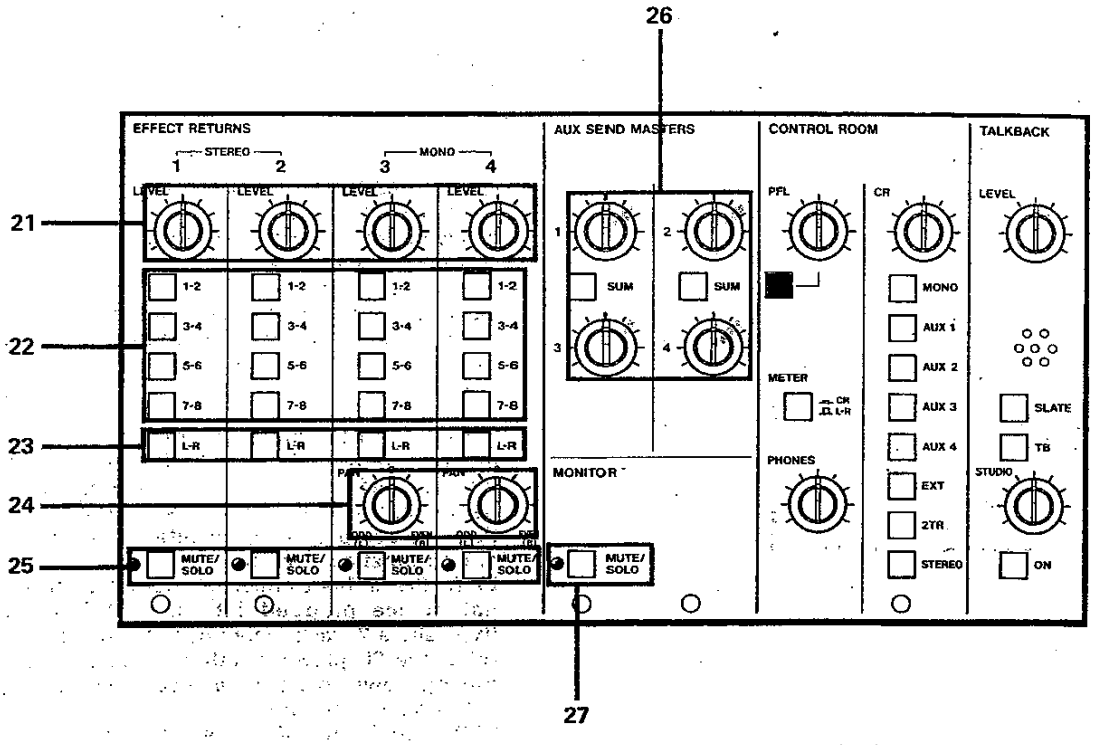
MASTER Section

21. **EFFECT RETURNS LEVEL 1-4:** These control how much signal from the effect return inputs will be applied to the EFFECT ASSIGN switches (#22-23) via the EFFECT PAN control (3 and 4 only, #24). EFFECT RETURN 1 and 2 are stereo modules, so the LEVELs control both L and R input levels at one time.

22. **EFFECT RETURNS Group Assignment switches:** These assign the effect returns to any of the eight output group busses. They work in the same way as the Main Channel Group Assignment switches (#18). Press these switches if you want to record an effect onto the multitrack. Remember that the EFFECT PAN (#24) has an effect on the assignment (only on 3 and 4).

23. **EFFECT RETURNS L-R Stereo Assignment switches:** These send the effect return inputs directly to the stereo busses, depending on the setting of the EFFECT PAN (3 and 4 only, #24). This is normally pressed for final mixdown. It can also be pressed during recording to bring effects into the control room monitor mix without printing them to tape ("monitor wet, print dry").

24. **EFFECT RETURNS PAN (3 and 4 only):** This sends the output of the channel in continuously variable degrees to either side of the stereo mix (if L-R is pressed), or to odd-even sides of



the Group Assignment switches (pan left for groups 1, 3, 5, and 7, pan right for groups 2, 4, 6, and 8). Note that EFFECT RETURNS 3 and 4 are MONO; but they may both be combined to make an additional stereo return by turning 3's PAN left and 4's PAN right.

25. **EFFECT RETURNS MUTE/SOLO switch and LED:** These work the same as the Main channel MUTE/SOLOs (#15).

    Note that if you solo a channel, you will hear it "dry"; and by soloing the Effect Return in addition, you will be able to hear just one instrument and its effect. But if you solo a Effect Return, you will hear an effect only when the AUX sends get their signal from the MONitor channel, because all the Main channels' AUX sends are muted.

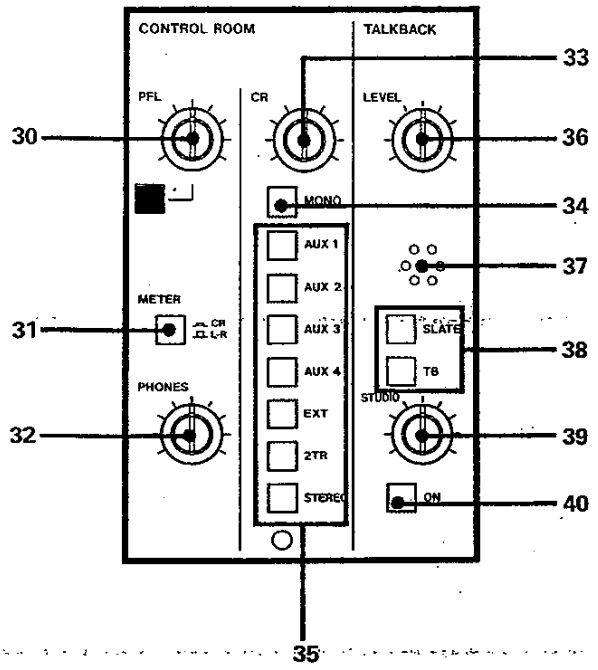
26. **AUX SEND MASTERS 1-4:** These are the last overall level controls for the Aux mixes. They get their signal from the AUX Level controls in the channels. The signal then goes to the respective AUX OUTPUTS jacks on the rear panel, and the AUX switches in the CONTROL ROOM section beneath. Adjust these AUX SEND MASTERS for the correct level feeding your external effects device. The nominal (unity gain) setting for these controls is approximately "2 o'clock".

    SUM switches: These SUMs or combines the signal from the AUX 1 buss with the signal from the AUX 3 buss, and AUX 2 buss with the AUX 4 buss. These main applications are when you want to send signal from both MAIN and MONITOR channels to the same effect unit. The SUMs take place before (pre) the AUX MASTER controls.

27. **MONITOR MUTE/SOLO switch:** Similar to the Main channel MUTE/SOLOs (#15), this switch mutes or solos the mixed signal from all the MONitor channel controls at once.

28. **Group 1-8 Master faders:** These adjust the total output level of all signals assigned to a group. They get their signal from the Group ASSIGN switches (#18) in the channels. They send signal to the 8 GROUP OUT jacks on the rear panel. They also send signal to the GRP switches (#13) of the highest 8 MONitor channels. There is 10 dB of gain available on each Group when the Master Fader is full up.

29. **L-R Stereo Master fader:** This fader adjusts the total output level of the stereo signal. It gets signal from the Stereo busses, which are always fed by the MONitor controls (#11), and by any Main channel faders (#20) whose L-R ASSIGN switch (#19) is down.
    They send signal to the STEREO OUTPUTS L-R jacks (both the unbalanced phone jacks and XLRs), the Control Room STEREO switch and to the METER SELECT switch (#31). They are set for unity gain at the "0 dB" mark, and at full up apply 10 dB of gain to the signal.



CONTROL ROOM and TALKBACK Section

30. **PFL level control and indicator :** This sets the level you will hear in the control room when PFL (#16) is pressed; the indicator will light while in the PFL mode. Typically it is set a little lower, since PFL signals are often much hotter than Solo signals because they do not pass through the Channel Faders. Note that the PFL signal comes from a channel just after the EQ and Insert points, and is mono.

31. **METER select switch:** The L-R meters above can be switched between CR (Control Room) and L-R (Stereo) outputs.

    CR: This is the most useful position, since it allows you to read the level of any of the Auxiliary mix outputs, either of the External 2-track inputs, or the Stereo Output, depending on the setting of the Control Room source selection switch. Meter readings will be unaffected by the CR level control. Also, if the PFL level control is set to nominal, pressing any PFL switch will show that Main channel's input level on the meters.

    L-R: The meters will read the level appearing at the Stereo Output jacks.

32. **PHONES Level:** This controls the output level of the headphones built into the M-2516/2524 itself. This headphone mix follows whatever is chosen as the Control Room source.

33. **CR--Control Room Level:** This sets the overall Control Room level, for CONTROL ROOM outputs. Ideally the amplifier input controls should be set so that full rotation of this control does not exceed the maximum level you want in the control room.

34. **MONO:** This makes the stereo monitor mix into a mono mix. It is typically used in final mixdown so the engineer can check how the mix will sound when played back on a mono system, such as a car radio.

35. **Control Room source select switches :** These select the source of the Control Room mix (provided that no PFL source is on to override them).

    AUX 1-4: These allow you to hear the mix being sent to the AUX OUTPUTS jacks. Typically they're used when you want to check the mix being sent to the performers' headphones, or the mix being sent to an effect device. They are automatically mono.
    EXT: Press this to hear the output of an external device plugged into the EXT IN jacks (typically a 2-track recorder, but also possibly a reference CD player or other device). If you are mixing down to an unbalanced recorder, you will probably monitor it here during mixdown.
    2TR: Similar to EXT, press to hear the external device plugged into the 2TR IN jacks.
    STEREO: This is the typical monitoring position since the MONITOR controls feed the stereo mix. It connects the output of the Stereo (L-R) master to the control room outputs.

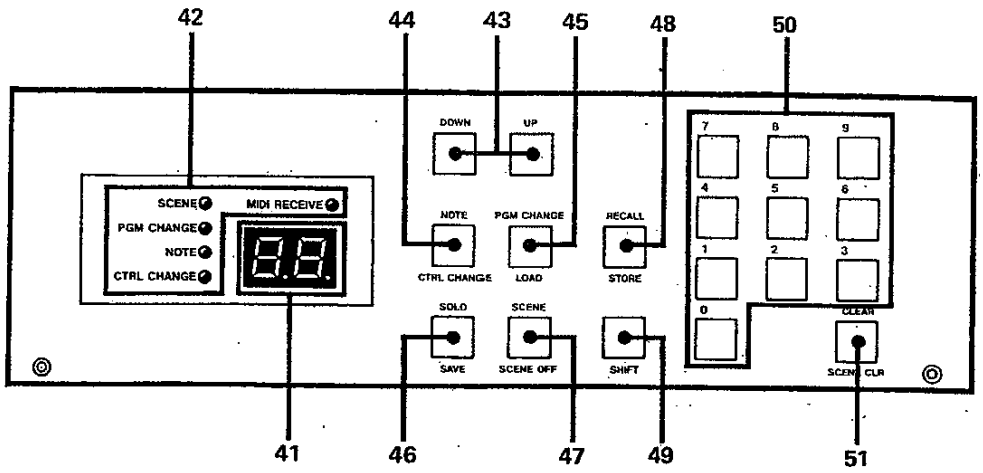
36. **TALKBACK LEVEL control:** This sets the output level of the built-in Talkback microphone (#37).

37. **MIC:** This is a built-in talkback microphone for communication.

38. **TALKBACK Assign switches:** These assign the output of the built-in Talkback mic to two different outputs:
    SLATE sends the mic to all of the Group Busses (1-8) at once, so you can record an announcement on the multitrack recorder ("Take 3", etc.).
    TB sends the mic to the Studio amplifier, even if the Studio switch is off or the Studio Level is down.

39. **STUDIO Level:** This sets the overall level of the Studio outputs. The signal sent to the Studio depends on the setting of the Control Room source select switches (#35). Note that it does not affect the level of Talkback to the studio, which is set by the TALKBACK LEVEL alone.

40. **STUDIO ON/OFF switch:** This turns on the send to the Studio amplifier. Even if it is off, it is still possible to use the Talkback system to communicate with the studio.



Scene Controls

41. **Scene number display:** 2-digit LED display which shows the scene number or mode such as SOLO.

42. **Function LEDs:** Five LEDs which show the settings and operating state of the scene controls.

    * **SCENE:** Lights in the scene mode. While this LED is lit, scene control and MIDI control are possible.

    * **PGM CHANGE:** Lights when it is possible to control scenes using the MIDI program change.

    * **NOTE:** Lights when it is possible to control mutes using the MIDI note messages.

    * **CTRL CHANGE:** Lights when it is possible to control mutes using the MIDI control change commands.

    * **MIDI RECEIVE:** Lights momentarily when a receivable MIDI commands/messages is received.

43. **UP and DOWN keys:** Increment or decrement scene numbers in the scene mode. These keys are also used when setting the send/receive channel of each MIDI messages and commands.

44. **NOTE/CTRL CHANGE key:** Sets the MIDI channel of the MIDI note information to be sent and received. If this key is pressed together with the SHIFT key (#49), the mode in which the MIDI channel of the MIDI control change information to be sent/received is set is entered.

45. **PGM CHANGE/LOAD key:** Sets the MIDI channel of the MIDI program change information to be sent and received. If this key is pressed together with the SHIFT key (#49), the data load mode in which the scene settings of the M-2516/2524 stored in the external module as MIDI exclusive information are fetched is entered.I

46. **SOLO/SAVE key:** The key to enter the SOLO mode which permits independent monitoring of each channel of the mixer and effect return signal. If this key is pressed together with the SHIFT key (#49), the data save mode in which the scene settings of the M-2516/2524 are sent to the external module as MIDI exclusive information is entered.

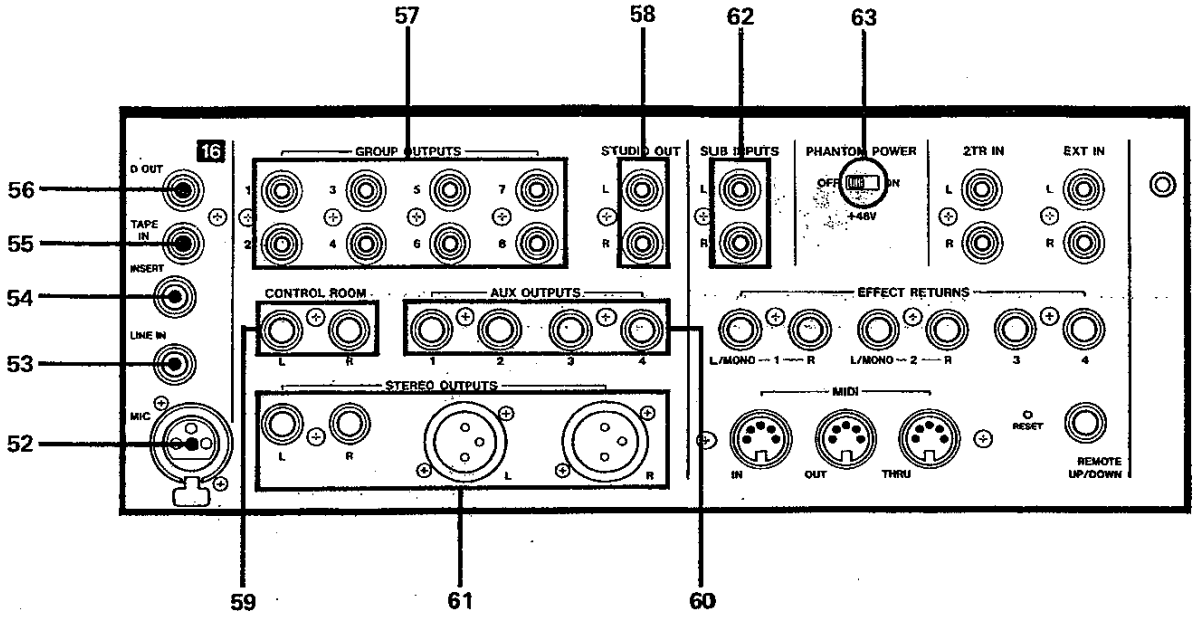
47. **SCENE/SCENE OFF key:** Key to switch the display mode over to the scene mode. If this key is pressed together with the SHIFT key (#49), the manual mode is entered in which the scene store/recall or control using the MIDI will be defeated. The solo function operates in the same way.

48. **RECALL/STORE key:** Key to recall the scene settings in the scene mode. If this key is pressed together with the SHIFT key (#49), the current muting state will be saved in the memory as a scene.

49. **SHIFT key:** Key used to access the secondary function (labeled below) of each control key. Press this key together with the control keys.

50. **Numeric keypads:** Used to enter numbers corresponding to scene numbers in the scene mode. Be sure to enter a 2-digit number.

51. **CLEAR/SCENE CLR key:** If, during the scene mode, the actual muting state differs from the memory contents of the indicated scene number (scene number flashes), pressing this key allows the mute setting to return to the last recalled scene. If this key is pressed together with the SHIFT key (#49), the contents of the scene currently recalled will be cleared (erased).



Input channel connectors

52. **MIC:** These XLR electronically balanced connectors are intended for connection of low-impedance microphones. However, they can also be used for line-level sources up to +4 dBm nominal level if the PAD and TRIM controls are set to minimum. Signals go from this jack to the PAD, TRIM, and proceed down the channel path.

    The PHANTOM POWER switch (#63) applies 48 volt phantom power to pins 2 and 3 of all MIC connectors. Make sure the switch is OFF if any source except a phantom-powered microphone is connected. The pin assignment is: Pin 3 high, Pin 2 low, Pin 1 shield (ground).

53. **LINE IN :** These jacks are intended for unbalanced line level inputs (nominal signal level -10 dBV or 0.3 volts) such as synthesizers and other audio equipment. Signal goes from this input to the PAD and the TRIM control, and may be sent down the channel if the nothing is connected into MIC. It will accept a minimum input level of -50 dBV when the trim is at maximum gain. The maximum input level, when the trim is at minimum, exceeds any practical line level input. Balanced signals may be connected to this jack using the 1/4" TRS Phone Jack, or if the source device can safely be unbalanced by an adapter (see diagram below). Check the manual of the device to see if this can be done.

    NOTE: DO NOT USE both the MIC and LINE INputs in the same channel at one time. Disconnect one when the other is used.

+4 dB to –10 dBV Conversion Cable

1/4" PHONE PLUG

54. **INSERT:** The INSERT jack of each channel allows you to insert an external signal processor (typically a compressor or equalizer) into the Main channel path of the mixer, between the EQ section and the channel fader. If nothing is plugged into this jack it has no effect, but with the proper cable (a 1/4" TRS "stereo" to two 1/4" "mono" phone splitter cable, such as the TASCAM PW- 2Y or PW-4Y Insertion Cable) you can send signal to and from the external device from the channel. Note that the channel OL (overload) light is just before the insert jack; if the external device applies gain it is possible to clip the input electronics without the overload light flashing. For more information, see p. 18, "Using Effects".

55. **TAPE IN:** Every channel has an input jack designated for Tape Input (also called Tape Return). This signal normally goes to the MONitor channel path, so that tape may be monitored in the control room. When FLIP is pressed, the tape signal is sent through the main channel path (EQ, main fader, assignment switches) instead, for mixdown. This jack is designed for unbalanced -10 dBV inputs.

56. **D.OUT (Direct Out) jack:** This allows you to connect the post-fader signal of a Main channel path directly to a recorder track or other device, without passing through a group output. It is used whenever more than eight outputs are needed simultaneously (see p. 13, "Recording More than 8 tracks"). This output can also be patched into an outboard mixer for an additional post-fader mix.

Input and Output Connectors

57. **GROUP OUTPUTS jacks:** These jacks are the outputs of the eight output groups, receiving signals from channels assigned to the groups via each GROUP MASTER FADER. The GROUP OUT jacks typically connect to the unbalanced inputs of an multitrack recorder whose nominal input level is -10 dBV (0.316 V). The GROUP OUTS have an output impedance of 100 ohms, and a maximum output level of +15 dBV (5.62 V), so they may be connected in parallel to 3 or more tape recorder inputs without signal degradation. They may also be connected to power amplifier inputs for multichannel (matrix) PA applications.

58. **STUDIO OUT:** Connect these unbalanced RCA jacks to the inputs of an amplifier powering speakers in a separate studio. Signal selected by the Control Room select switches comes here from the STUDIO LEVEL and ON/OFF switch, and whenever the TB (Talkback) switch is pressed.

59. **CONTROL ROOM jacks:** These 0 dBu unbalanced Phone jacks are typically connected to an amplifier powering the main reference loudspeakers.

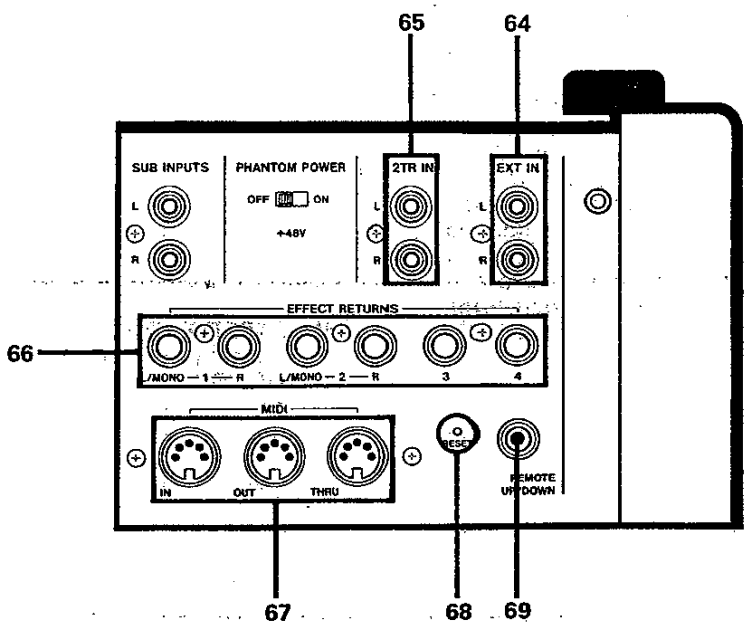
60. **AUX OUTPUTS 1-4 jacks:** These are the output connectors for the six Auxiliary mix outputs of the M-2516/2524. Signal comes here directly from the AUX SEND MASTERS controls. They are typically connected to the inputs of external devices such as reverbs, digital delays, etc. Auxes may also be used to feed a separate headphone (cue) mix. Their nominal output level is 0 dBu (0.775 V).

61. **STEREO OUTPUT jacks:** These jacks are typically connected to a mixdown deck with -10 dBV nominal input level. Both the Phone and XLR jacks are unbalanced and they can be used simultaneously.

62. **SUB INPUTS jacks:** These jacks connect directly to the stereo buss. Signal goes from these jacks directly to the L-R Stereo Master fader. They are like the "SUB IN" on many consoles, and allow you to connect an external mixer's output directly to the stereo buss of the M-2516/2524 so that you can "cascade" the submixer without using any of the input channel.

63. **PHANTOM POWER switch :** Setting this switch ON applies phantom power to all XLR microphone jacks. 48 volts DC appears equally at pins 2 and 3 (per DIN standard # 45 596) to be used by condenser-type microphones requiring external power. Since this potential is equal, it is "invisible" to standard balanced dynamic microphones, hence "phantom power". Check the manual for the mics you plan on using to make sure that this phantom method is correct before you apply power. While this 48 volt duplex phantom power is correct for most microphones, it will not operate "T power" or "AB power" mics such as the Sennheiser 405, 406 or 416.

    Warning: This PHANTOM POWER switch must be off if any electronically balanced line input (such as the balanced output of a tape recorder or CD player) is connected to the MIC jack; it could damage the output circuitry of such units. Imbalances in the cabling leading to microphones (such as an intermittent connection on one pin) can lead to voltage offset in the dynamic mic that can cause damage to the sound or to the mic itself.



64. **EXT IN jacks:** These provide a route from an external source (typically a -10 dBV level mastering recorder) directly to the Control Room Select EXT switch. It may also be used for any source you want to hear in isolation in the control room, such as a CD player. Note that since the EXT IN source can only feed the Control Room (not the Groups or Stereo busses), it is not used for any source you wish to mix together with other signals.

65. **2TR IN jacks:** Like EXT IN, these jacks connect directly to the Control Room Select 2TR switch. Connect the outputs of a two-track mastering recorder, so playback can be heard in the control room without disturbing any settings or risking feedback by bringing the two-track returns into a channel.

66. **EFFECT RETURNS jacks:** These jacks send signal directly to the corresponding EFFECT RETURNS LEVEL controls. Connect the outputs of your effect devices to these jacks, although you can connect any other line input if desired. Each EFFECT RETURN is normally independent and may be assigned to any of the Groups or to Stereo via the EFFECT ASSIGN switches. The input level expected by these jacks is -10 dBV (0.316 V), although higher levels can be accommodated.

67. **MIDI jacks:** These jacks are for the connection of MIDI devices, typically master keyboards and synthesizers during live performance, or sequencers during recording. The applications of MIDI in the M-2516/2524 are:
    * To transmit program changes to MIDI instruments, particularly with the UP/DOWN footswitch in performance
    * To receive program changes from MIDI instruments, so different mute scenes can be recalled according to a particular "patch"
    * To send and receive "Note" or "Control Change" commands which can turn individual mutes on and off, depending on the key/control number and velocity/value sent.

    MIDI IN: This jack typically accepts the MIDI OUTPUT of a master keyboard or sequencer. Any input here will be "echoed" out the THRU jack. MIDI Program Change messages received at the MIDI IN jack will change the scenes of the M-2516/2524, if they are on the same MIDI channel the M-2516/2524 is set to receive on. See p. 23, "Changing Scenes via External MIDI Commands." MIDI Note messages of the proper note number and velocity will turn individual channel mutes on and off. You can use Control Change commands for individual Mute control, instead of Note messages. For details, see p. 24, "Controlling Mutes with Note Messages".

MIDI OUT: This jack transmits the only MIDI messages that the M-2516/2524 can generate: Program Change, and a limited number of NOTE ON/NOTE OFF messages. When the UP or DOWN keys are followed by RECALL, or the optional REMOTE UP/DOWN footswitch is pressed, the M-2516/2524 generates a MIDI Program Change commands No. 00-98 in sequence. If you connect this jack to the MIDI IN of a unit that can respond to Program Change commands (such as a keyboard), the keyboard will change programs (or "patches") as you press UP or DOWN. When you press a channel MUTE/SOLO switch in scene mode, a very short note message will be sent out, depending on which is ready. Each MUTE/SOLO switch is assigned a different MIDI note. The velocity when you turn the mute on is 96; when you turn it off it is 32. The gate time of these commands is so short that you can barely hear them if they're connected to a keyboard. The M-2516/2524 can transmit Control Change commands by individual muting control, instead of Note messages. For more information, see p. 28, "MIDI Mute Automation Features."

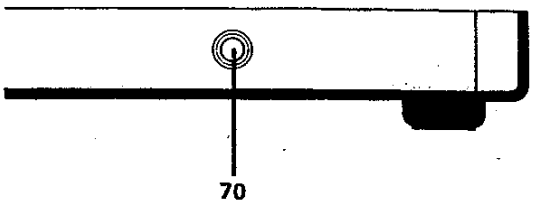
MIDI THRU: This jack passes along an exact copy of information received at the IN jack, so that (for example) the MIDI OUT of a master keyboard, which you are using to control the M-2516/2524's scenes, can be passed along to a synth module.

68. **RESET switch:** Resets the contents of the scene memory and MIDI channel settings to the factory-preset settings.

69. **REMOTE UP/DOWN jack:** Connect the optional RC-60P footswitch here for remote control of the scenes, UP or DOWN then RECALL. The TASCAM RC-30P footswitch may also be connected to this jack, but will transmit only the UP and RECALL commands. REMOTE UP/DOWN will also cause the M-2516/2524 to transmit MIDI Program Change commands from its MIDI OUT jack. See p. 22, "Transmitting MIDI Program Change Commands"

Front panel

70. **Headphone jack:** This built-in headphone amplifier gets signal from the CR source select switches. The headphone amplifier is rated at 100 mW per channel into an 8 ohms load.



■ The mains POWER switch is located on the back.

Technical Information

The SHIFT key of the M-2516/2524 is generally used for access to the secondary functions of each control key, printed below the key. However, under certain conditions, pressing certain keys in addition to those below which there is printing accesses various functions as described below.

*** Changing the numeric key mode (SHIFT+1)**

With the M-2516/2524, numeric entry after RECALL clears the 10's digit. If "1" of the numeric keypad is pressed together with the SHIFT key, it is possible to hold the 10's digit only in the first numeric entry after RECALL. (This mode setting will be backed up by battery.)

*** Defeating the SOLO function**

TYPE 1 (SHIFT+2)
It is possible to defeat the SOLO function of all EFFECT RETURNS (1-4) and MONITOR Master. Every time "2" of the numeric keypad is pressed together with the SHIFT key, this defeat mode is switched on and off. When the mode is on, the MIDI RECEIVE LED lights momentarily. If set to the defeat mode, the indication in the SOLO mode will be "Sd". (This mode setting will be backed up by battery.)

TYPE 2 (SHIFT+required MUTE/SOLO switch)
It is possible to defeat the SOLO function of any required EFFECT RETURNS and MONITOR Master. (This does not operate on the input channels.) In the SOLO mode, press the required MUTE/SOLO switch together with the SHIFT key. The indication will change to "Sd". To switch back to the normal SOLO mode, operate the SHIFT+CLR keys while "Sd" is displayed. (This mode setting will be backed up by battery.)

*** Recalling scenes**

Comparing scenes (SHIFT+0)
Pressing "0" of the numeric keypad together with the SHIFT key in the scene mode alternately recalls the current scene and last recalled scene.

Empty scene (SHIFT+3)
The lowest scene number not in memory is recalled from among scene numbers larger than the scene number currently indicated. If there is none, scene 01 will be recalled.

Stored scene (SHIFT+6)
The highest scene number stored in memory will be recalled from among scene number currently indicated. If there is none, scene 01 will be recalled.

Recalling scenes using the MUTE/SOLO switch (SHIFT+required MUTE/SOLO switch)
In the scene mode, if the MUTE/SOLO switch of any required input channel is pressed together with the SHIFT key, it is possible to recall a scene with the same number as that of the channel number.

*** Mute on/off of more than one module (SHIFT+4)**

If the SHIFT+4 keys are pressed while a certain scene number is being displayed, it is possible to simultaneously switch on or off the muting of more than one particular channel.

Number indication	MUTE/SOLO switch
04	Input channels 1 to 4
08	5 to 8
12	9 to 12
16	13 to 16
20	17 to 20
24	21 to 24
48	1 to 8
56	9 to 16
64	17 to 24
88	1 to 24
96	All

*** Clearing scenes (SHIFT+CLEAR)**

While "_0" or "00" is flashing in the scene number display, if the CLEAR key is pressed together with the SHIFT key, all the scenes stored in memory will be cleared.

Specifications

ELECTRONICS

MIC IN (XLR Type Connector, Balanced)	
Input Impedance :	2.2 kohms
Input Level :	–67 dBm (0.35 mV, TRIM Max.) ~ +4 dBm (1.23 V, TRIM Min. with PAD)
Trim Range :	41 dB
Pad Sense :	30 dB
LINE IN (1/4" Phone Jack, Balanced/Unbalanced)	
Input Impedance :	10 kohms
Input Level :	–50 dBV (3.16 mV, TRIM Max.) ~ +20 dBV (10.0 V, TRIM Min. with PAD)
Trim Range :	41 dB
Pad Sense :	30 dB
TAPE IN (1/4" Phone Jack, Unbalanced)	
Input Impedance :	20 kohms
Nominal Input Level :	–10 dBV (0.316 V)
Maximum Input Level :	+15 dBV (5.62 V)
Channel INSERT (TRS 1/4" Phone Jack, Unbalanced)	
Output Impedance :	100 ohms
Nominal Output Level :	–10 dBV (0.316 V) ± 1 dB
Maximum Output Level :	+15 dBV (5.62 V)
Input Impedance :	6 kohms
Nominal Input Level :	–10 dBV (0.316 V)
Maximum Input Level :	+15 dBV (5.62 V)
DIRECT OUT (1/4" Phone Jack, Unbalanced)	
Output Impedance :	100 ohms
Nominal Output Level :	–10 dBV (0.316 V) ± 1 dB
Maximum Output Level :	+15 dBV (5.62V)
EFFECT RETURN (1/4" Phone Jack, Unbalanced)	
Input Impedance :	20 kohms
Nominal Input Level :	10 dBV (0.316 V)
Minimum Input Level :	–20 dBV (0.1 V)
2TR IN (1/4" Phone Jack, Unbalanced)	
Input Impedance :	22 kohms
Nominal Input Level :	–10 dBV (0.316 V)
Minimum Input Level :	–20 dBV (0.1 V)
EXT IN (1/4" Phone Jack, Unbalanced)	
Input Impedance :	22 kohms
Nominal Input Level :	–10 dBV (0.316 V)
Minimum Input Level :	–20 dBV (0.1 V)
SUB INPUT (1/4" Phone Jack, Unbalanced)	
Input Impedance :	22 kohms
Nominal Input Level :	–10 dBV (0.316 V)
Minimum Input Level :	–20 dBV (0.1 V)
GROUP OUTPUTS (RCA Pin Jack, Unbalanced)	
Output Impedance :	100 ohms
Nominal Output Level :	–10 dBV (0.316 V)
Maximum Output Level :	+15 dBV (5.62 V)
AUX OUTPUTS (1/4" Phone Jack, Unbalanced)	
Output Impedance :	100 ohms
Nominal Output Level :	0dBu (0.775 V)
Maximum Output Level :	+17 dBu (5.5 V)

CONTROL ROOM (1/4" Phone Jack, Unbalanced)

Output Impedance :	100 ohms
Nominal Output Level :	0dBu (0.775 V)
Maximum Output Level :	+17 dBu (5.5 V)

STEREO OUT (XLR Type and 1/4" Phone Jack, Unbalanced)

Output Impedance :	100 ohms
Nominal Output Level :	0dBu (0.775 V)
Maximum Output Level :	+17 dBu (5.5 V)

STUDIO OUT (RCA Pin Jack, Unbalanced)

Output Impedance :	100 ohms
Nominal Output Level :	0dBu (0.775 V)
Maximum Output Level :	+17 dBu (5.5 V)

HEADPHONE OUT
(TRS 1/4" Phone Jack x1)

Nominal Load Impedance:	8 ohms
Maximum Output Level :	100 mW + 100 mW

EQUALIZER

Type :	3 band/2 sweep
Frequency:	
HI	10 kHz, ±12dB (Shelving)
MID	420 Hz ~ 13 kHz
LOW	42 Hz ~ 1.3 kHz
Boost/Cut :	15dB

OL(OverLoad) Indicator

Flashing Level:	25 dB over nominal level

METER

Type :	10-dot LED meter

FADER ATTENUATION :	more than 80dB (1kHz)

POWER REQUIREMENTS

USA/CANADA :	120V AC, 60Hz
EUROPE :	220V AC, 50Hz
U.K./AUSTRALIA :	240V AC, 50Hz
GENERAL EXPORT :	100/120/220/240V AC, 50/60Hz

POWER CONSUMPTION

M-2516 :	42 W
M-2524 :	54 W

TYPICAL PERFORMANCES

Equivalent Mic Input Noise : **(DIN AUDIO/IHF "A"[150ohms source])**	–129dB/–130dB

Signal-To-Noise Ratio (DIN AUDIO/IHF "A")

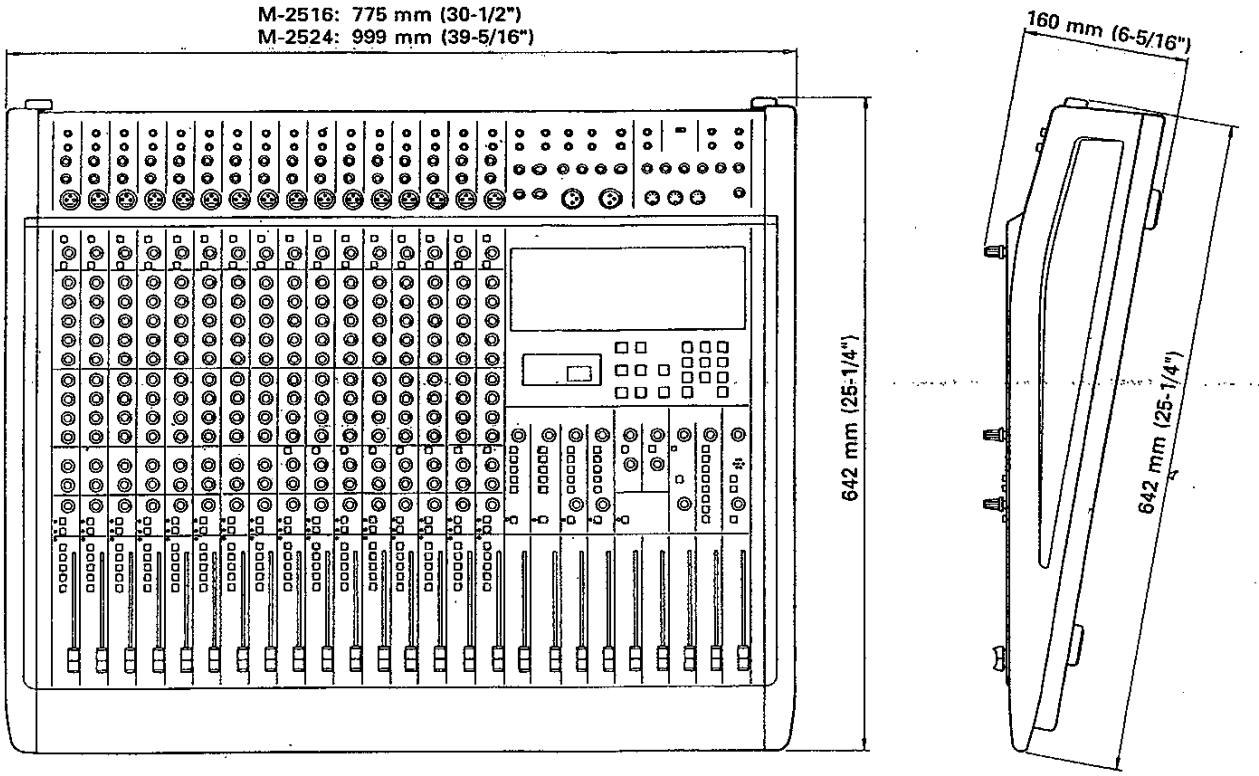
16 MIC INs to GRP OUT (150 ohms source):	54 dB/57 dB
24 MIC INs to GRP OUT (150 ohms source):	51 dB/54 dB
1 LINE IN to GRP OUT:	79 dB/81 dB
16 LINE INs to GRP OUT:	65 dB/68 dB
24 LINE INs to GRP OUT:	63 dB/66 dB
1 LINE IN to AUX OUT:	70 dB/73 dB
1 LINE IN to CR OUT:	77 dB/79 dB (MONI MUTE ON)
16 LINE INs (MONI) to STEREO OUT:	65 dB/68 dB
24 LINE INs (MONI) to STEREO OUT:	63 dB/66 dB
Headphones:	70dB/73dB (HP VR min.)

Total Harmonic Distortion (THD)	
1 MIC IN to GRP OUT:	Less than 0.025% (1 kHz)
1 LINE IN to GRP OUT:	Less than 0.025% (1 kHz)
Frequency Response (at nominal level)	
MIC IN to GRP OUT:	20 Hz to 20 kHz, +0.5dB/–2dB
LINE IN to GRP OUT:	20 Hz to 20 kHz, +0.5dB/–2dB
Crosstalk	
GRP OUT:	Better than 65dB (1kHz)
STEREO OUT:	Better than 65dB (1kHz)
Other Outputs:	Better than 60dB (1kHz)
Click Noise:	Less than –35dB

OTHERS

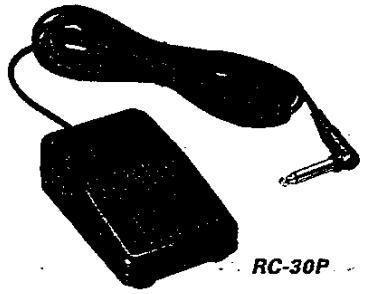
Dimensions (W x H x D)	
M-2516:	775 x 160 x 642 mm (30-1/2" x 6-5/16" x 25-1/4")
M-2524:	999 x 160 x 642 mm (39-5/16" x 6-5/16" x 25-1/4")
Weight	
M-2516:	20 kg (44-1/16 lbs)
M-2524:	26 kg (57-5/16 lbs)

Dimensions



Optional Accessories

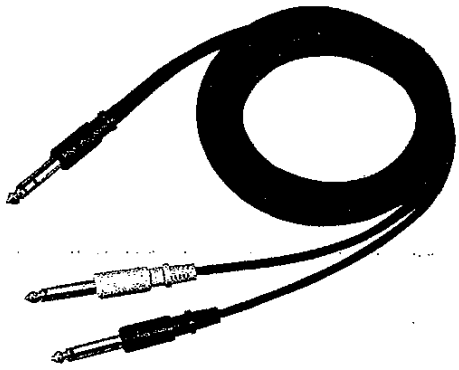
RC-60P/RC-30P Remote Footswitch



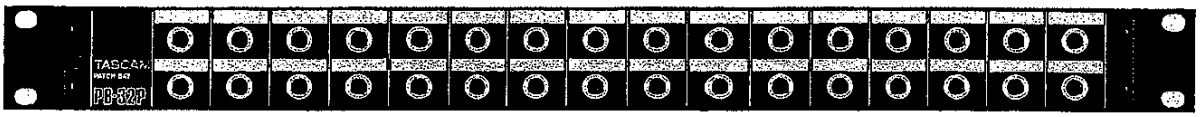
RC-30P

The RC-60P controls the UP or DOWN then RECALL functions of the M-2516/2524 with two pedals. With RC-30P, one-pedal footswitch, you can control only UP/RECALL.

PW-2Y (2m)/PW-4Y (4m) Insertion Cable



TASCAM PB-32 Series Patch Bays



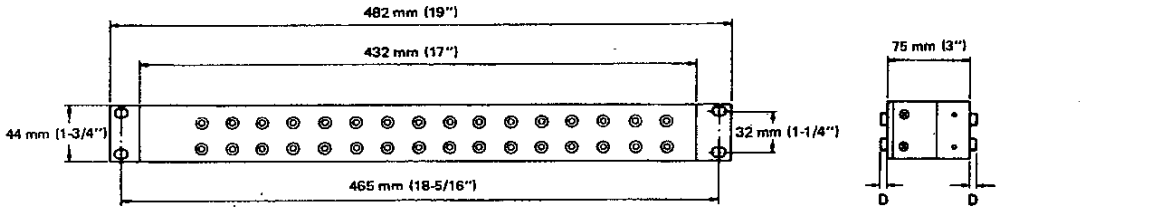
(Model PB-32P)

The PB-32 Series Patch Bays are ideal for any application in multitrack recording process. They are available in four basic configurations, and can be mounted in 19" EIA rack. They also feature "normalled" connections to provide the maximum in patching convenience without the need to patch through unused circuits.

Specifications

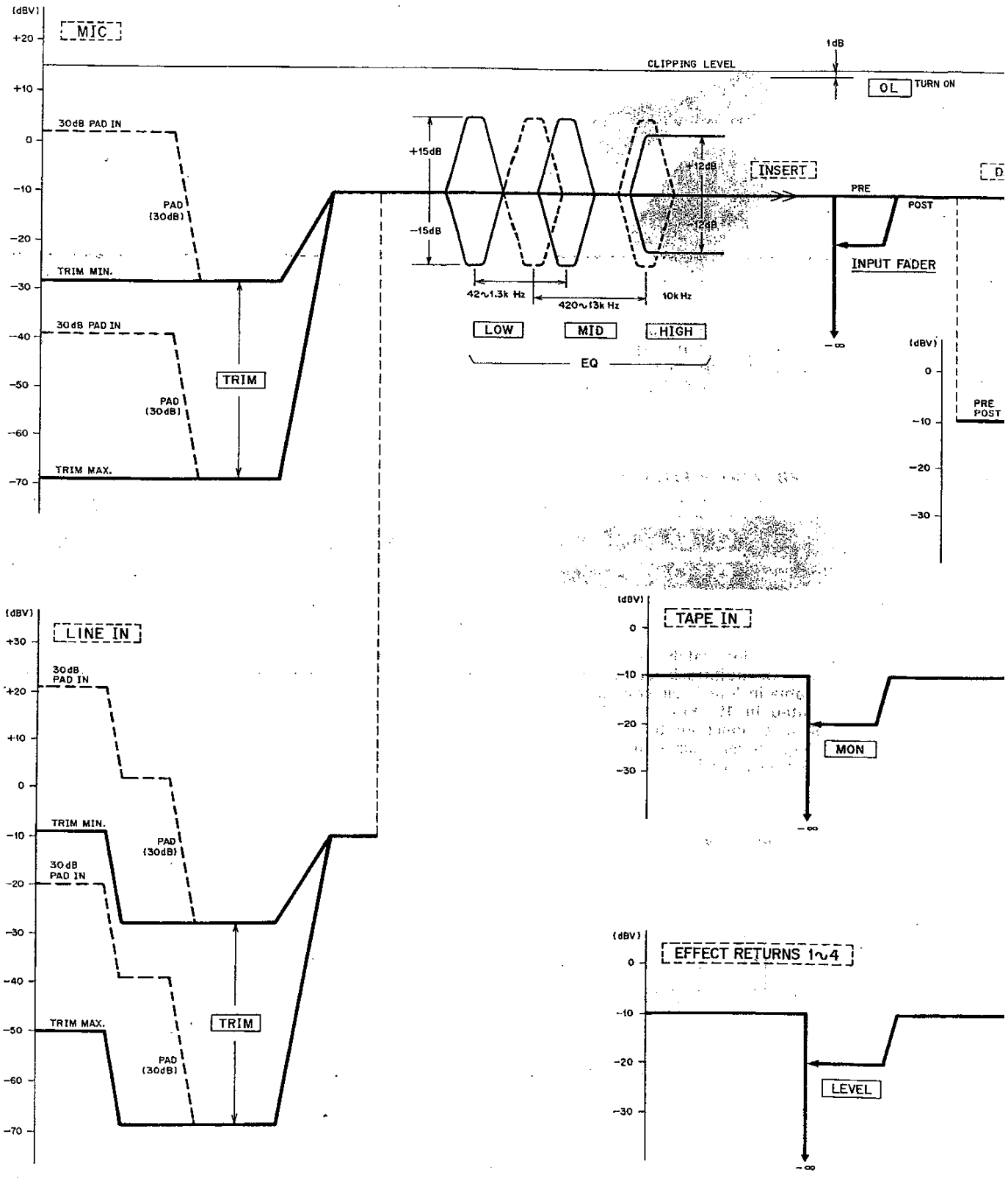
Number of circuits:	16
Type of jacks:	RCA and/or 1/4" phone Front jacks with switch (white) Rear jacks without switch (red)
Dimensions: (W x H x D)	482 x 44 x 75 mm (19" x 1-3/4" x 3")
Weight:	1.3 kg (2-14/16 lbs.)

External Dimensions



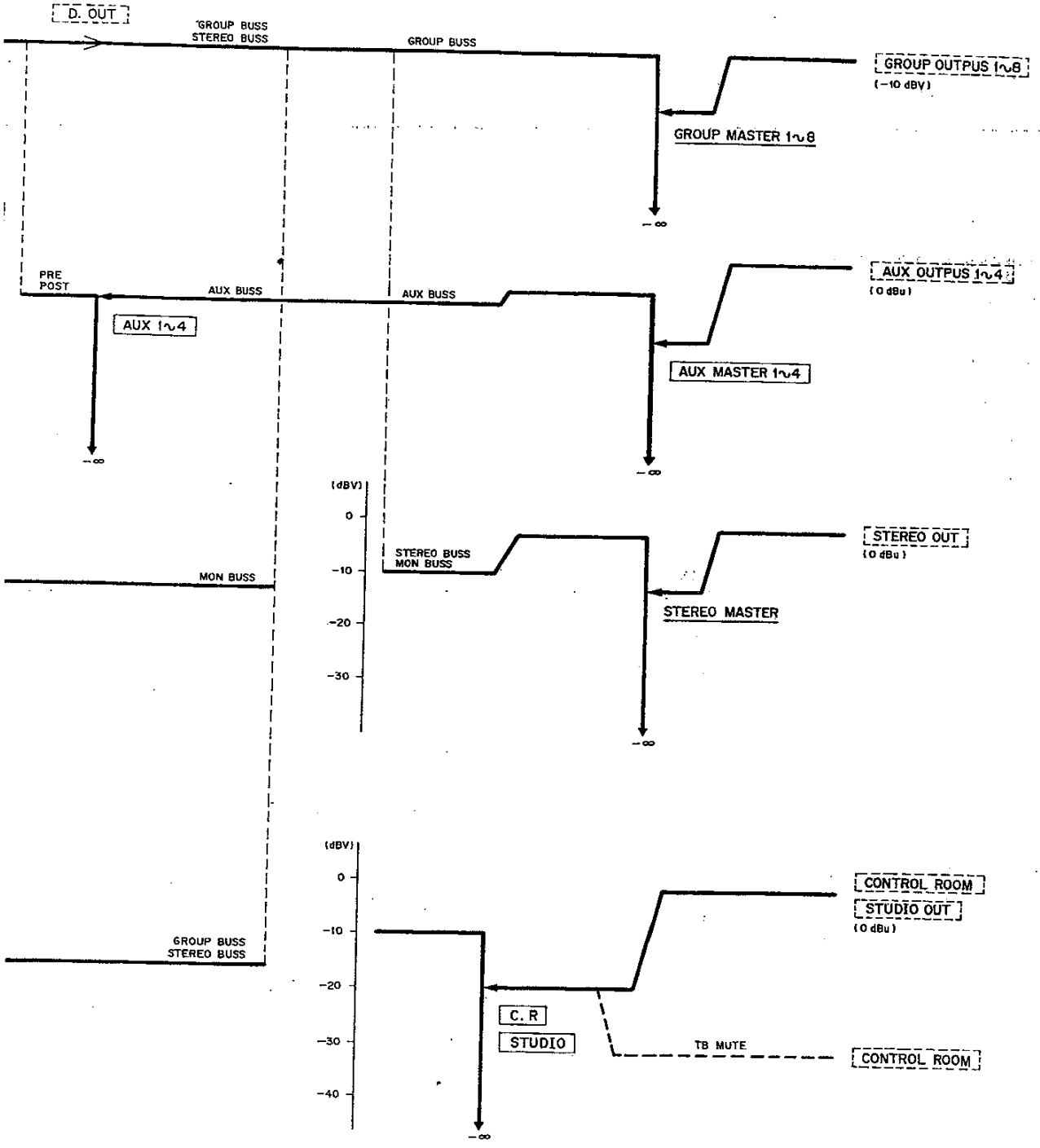
D : 2 mm (1/16") (1/4" phone jacks)
7 mm (1/4") (RCA jacks)

Level Diagram



ON

NOTE
0 dBV = 1.0 V
0 dBu = 0.775 V



MIDI Implementation Chart

Model M-2516/M-2524

Date: 90. 08. 27
Version: 1.00

Function...		Transmitted	Recognized	Remarks
Basic	Default	1—16	1—16	MEMORIZED
Channel	Changed	1—16	1—16	
Mode	Default	×	×	ENABLE ON/OFF
	Messages	×	×	MEMORIZED
	Altered	**********	×	OMNI ON/OFF
Note Number:	True voice	36—64 **********	36—64 ×	ENABLE ON/OFF MEMORIZED * NOTE No. 52-59 are only for M-2524
Velocity	Note ON	○ 9nH, V = 32, 96	○ V = 00 ~ 127	
	Note OFF	○ 9nH, V = 00		
After Touch	Key's	×	×	
	Ch's	×	×	
Pitch Bend		×	×	
Control Change		○ BnH C = 00 ~ 23 80 ~ 83 88 V = 00 ~ 127	○ BnH C = 00 ~ 23 80 ~ 83 88 V = 00 ~ 127	ENABLE ON/OFF MEMORIZED * CTRL CHG No. 16-23 are only for M-2524
Prog Change:	True #	○ **********	○ 00 ~ 98	Scene No = 1 ~ 99 (PGM No = 0 ~ 98)
System Exclusive		○	○	Scene Data
Common	: Song Position	×	×	
	: Song Select	×	×	
	: Tune	×	×	
System Real Time	: Clock	×	×	
	: Commands	×	×	
Aux Mes-sages	: Local ON/OFF	×	×	
	: All Notes OFF	×	×	
	: Active Sense	×	×	
	: Reset	×	×	
Notes				

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO

○: Yes
×: No

TASCAM

TEAC Professional Division

M-2516/M-2524

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