The Mark of the Professional. . .

USER'S MANUAL

JWD MODEL DMC-16

16 CHANNEL STEREO MIXER

090709144

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Congratulations! In purchasing the DMC-16 Mixer, you have acquired a product whose small size belies its exceptional versatility and outstanding audio performance as indicated by the following list of features.

FEATURES OF THE DMC-16 CHANNEL MIC/LINE MIXER

- 8 mono input channels with XLR and Line inputs
- Ultra-low noise discrete Mic pre-amps with +48 VDC phantom power
- 4 stereo input channels with balanced TRS jacks
- 2 additional multifunctional stereo line inputs
- Extremely high headroom - offering more dynamic range
- Balanced inputs for highest signal integrity
- Ultra-musical 3-band EQ on all channels
- Peak LEDs and switchable low-cut filter on all mono channels
- 2 Aux sends per channel for external effects and monitoring
- Separate master mix, control room and headphone outputs
- "2-Track" inputs assignable to master mix output
- Highly accurate 10 segment LED meters
- High-quality Panasonic 60 mm faders
- High-quality Panasonic sealed potentiometers
- Rugged design power supply ensures superior signal integrity
- Rack mounting hardware included

It is important that you observe the safety and operating warnings shown throughout this manual. Therefore, please carefully note the signs and explanations shown below before beginning to use your new mixer.

SAFETY INSTRUCTIONS

This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure - voltage that may be sufficient to constitute a risk of shock.

This symbol, wherever it appears, alerts you to the important operating and maintenance instructions in the accompanying literature. Read the manual.

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INTRODUCTION

First, be sure to read the **Warranty Agreement** on page 13, and return the Warranty Card within 10 days from the date of purchase. If you do not do this, you may forfeit your benefits stated in the Agreement.

Second, **examine the packaging**. The DMC-16 was carefully packed in the factory and the packaging was designed to protect the unit from rough handing. Nevertheless, we suggest that you carefully examine the packaging and its contents for any signs of physical damage which may have occurred in transit. It also is good practice to save you shipping carton and packing material.

> **If the unit is damaged, do not return it to J. W. Davis & Company. Notify the shipping company immediately; otherwise, claims for damage or replacement may not be granted. Shipping claims must be made by the consignee. If you need further assistance, call Customer Service, 800-527-5705.**

Third, read and observe the following safety and operating instructions:

To reduce the risk of electrical shock, do not remove the cover (or back). No user serviceable parts inside; refer servicing to qualified personnel.

To avoid overheating, be sure that there is enough space around the unit for cooling and that the DMC-16 is not placed on high temperature devices such as power amplifiers, etc.

To reduce the risk of fire or electrical shock, do not expose this equipment to rain or moisture.

When you shut down your equipment, always turn off your amplifiers first. When powering up, always turn on your amplifiers last.

Fourth, connect the **Power Supply (PSU)** as indicated. Any amplifier circuit is limited in its transient response by the available current. Every mixer has numerous line level operational amplifiers (op-amps) inside. When being driven hard, many mixers begin to show signs of stress due to power supply limitations. Not so with the DMC-16. The sound will always stay clean and crisp right up to the operating limits of the op-amps themselves, thanks to the generous 30 Watt external Power Supply Unit. Do not be concerned if parts of the mixer and the power supply unit become warm. This is normal during operation.

Connect only the provided DMC-16 power supply unit (PSU) to the DMC-16. Do not connect the PSU to the DMC-16 while the PSU is connected to 115VAC outlet. The correct starting sequence is: (1) connect mixer and PSU and then (2) connect the PSU to the 115VAC outlet.

Last, we recommend that you experiment with your mixer away from the pressures of a live program in order to get a feel for its operations. It is a musical instrument, and for best performance should be approached given this appreciation.

The **PRACTICE SETUP PROCEDURES** on pages 5 and 6 will assist you in becoming familiar with the multitude of variations possible with your new DMC-16, and make reading the balance of the User's Manual more readily understood. Optimum results always begin with good setup routines.

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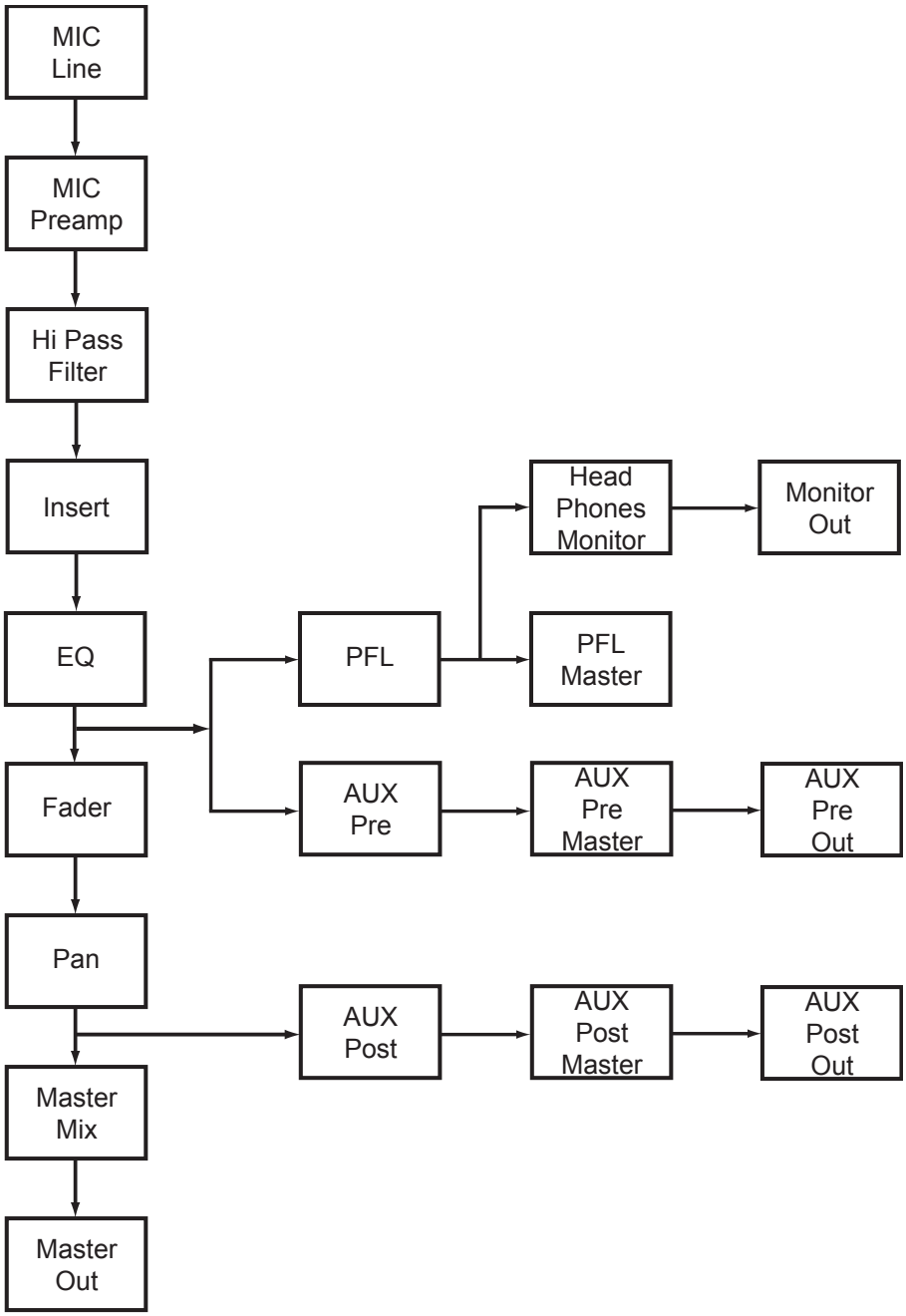
MODEL DMC-16 MIXER FLOW DIAGRAM

The following flow diagram shows the signal path through the console. It is a useful overview that provides a quick reference for determining the sequence of the mixer's components.

A block diagram is shown on page 15.



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PRACTICE SETUP PROCEDURE

This procedure is referenced to the front and back views of the mixer cabinet on page 5 with the bracketed numbers corresponding to similar bracketed numbers. The first column shown is a replica of the eight mono channels ("LINE 1" through "LINE 8"). The second column is a replica of the four stereo channels ("LINE 9-10" through "LINE 15-16"). The third column is a replica of the Master Control section. The bottom drawing is an abbreviated view of the back of the mixer.

Microphone Line Channels

1. Plug a microphone into channel **1 MIC** input.
2. Turn on the mixer **POWER** switch [34] located on the back pannel.
3. Slide the Channel Fader Control [13] to unity gain **0dB**.
4. Slide all other Channel Fader Controls down to the infinity "∞" position.
5. Set **TRIM** control [4] fully counter-clockwise.
6. Set the three **EQ** controls (**HIGH** [5], **MID** [6], **LOW** [7], at the center detent position (12 o'clock).
7. Bring **MASTER MIX** volume control [23] down to the infinity "∞" position.
8. Push in the **PFL** switch [12] for channel **1**.
9. Push in the **MASTER/PFL TO CONTROL ROOM** switch [17] in the output section. (The lower LED'S [22] should light.)
10. Generate a signal by speaking or singing into the microphone.
11. Adjust the **TRIM** control [4] so that the LED meter [22] indicates approximately **-4dB** with transient peaks not exceeding **0dB**.
12. If adjusting **EQ**, repeat step 11.
13. Press the **PFL** switch [12] for channel **1** to disengage the switch.
14. **Repeat the above steps for channels 2 through 8 on the console.**

Stereo Line Channels

15. Slide Channel Fader Control [13] for channels **9-10** [28] to the **0dB** mark.
16. Push in **PFL** switch [12] for channels **9-10** [28].
17. Generate a signal source by connecting a tape player, keyboard or similar equipment into channels **9-10** [28].
18. The LED meter should indicate approximately **-4dB** with transient peaks not exceeding **0dB**. The stereo inputs are fixed at the above setting. If source has output adjustment, adjust to achieve the above setting.
19. If adjusting **EQ**, repeat step 18.
20. Repeat steps 15 through 19 for channels **11-12**, **13-14** and **15-16**.
21. After all channels are set at unity gain (**0dB**), push in the **MASTER/PFL TO CONTROL ROOM** switch [17] to disengage the **MASTER/PFL TO CONTROL ROOM** switch.
22. Slide the **MASTER MIX** fader [23] to approximately **-20dB**, and you have set up your mixer.

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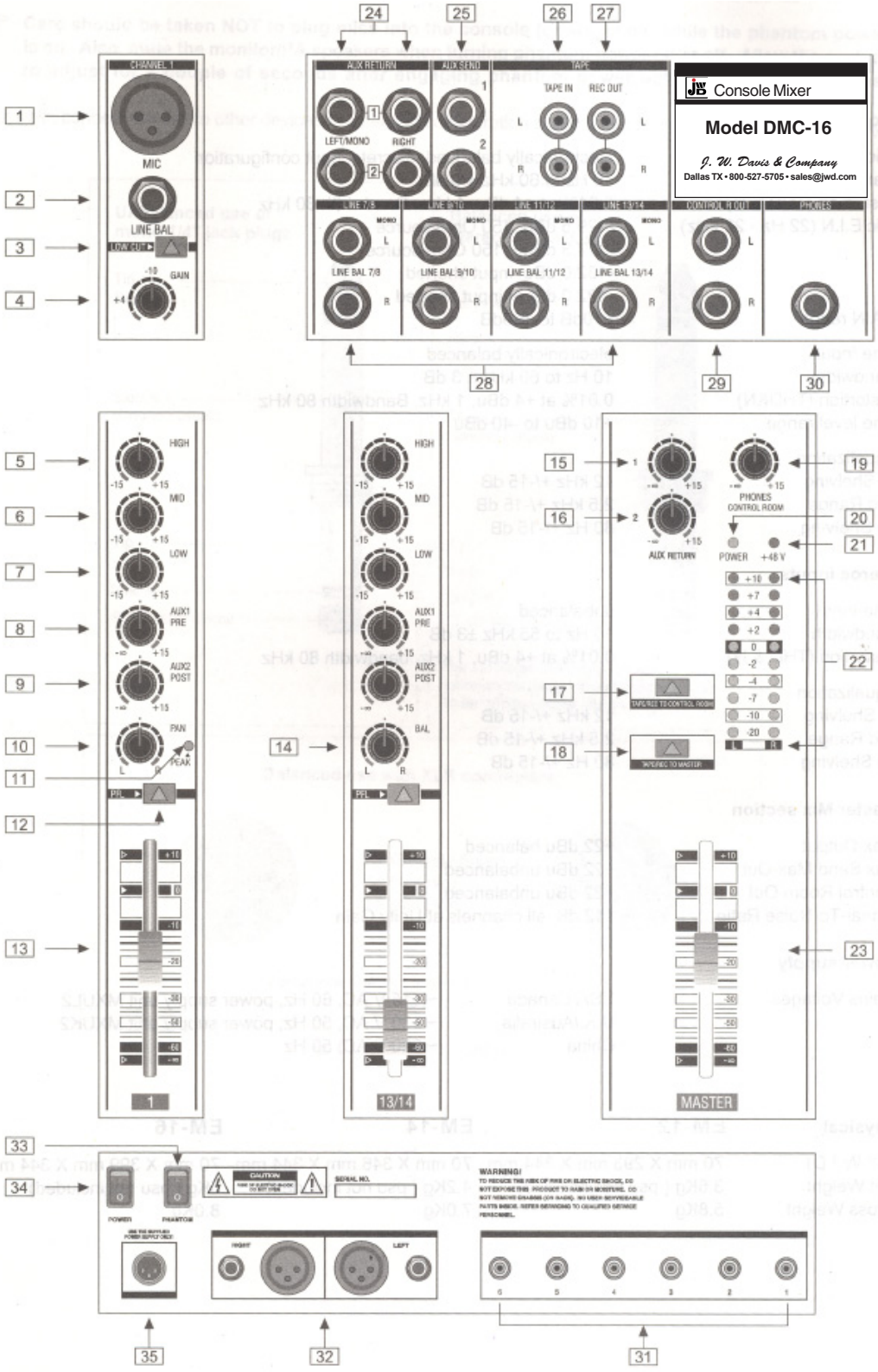
Front and Back Views of DMC-16 Mixer



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1. ARCHITECTURE

Mono Input Channels: Channels 1 to 8 are mono, with a choice of balanced Mic or Line inputs. A large external power supply ensures low noise and superior transient response at all times.

Stereo Input Channels: A further 8 Line inputs are configured as 4 stereo input channels. These are ideal for accepting outputs from MIDI and other electronic instruments.

Channel Outputs: A high-quality true logarithmic 60 mm fader feeds the MASTER MIX bus via the channel fader.

Aux Sends: There are two AUX SEND [25] busses on the DMC-16. Aux 1 is pre-fader. Aux 2 is post-fader.

Stereo Line Inputs: There are two line-level Stereo Aux Returns [24] at the top of the output section. They can be used to return stereo effects or MIDI instruments etc. The AUX RETURNS have thier own volume controls [15] [16] .

In addition, a stereo Tape [26] input is provided, which may also be routed to the MASTER MIX, giving the DMC-16 a total of 14 possible inputs during mixing. Channels 1-8 on the DMC-16 have PEAK LED's, while the MASTER MIX output has 10-segment bargraph meters. The L/R meters double up as mono PFL (Pre Fade Listen) meters.

2. MONO INPUT CHANNEL

Each mono channel comes with an XLR Mic input [1] and a balanced Line input on ¼" jack [2]. Phantom Power is switchable from the rear panel [33]. The TRIM [4] circuit has a wide range from +10 dB to +60 dB, eliminating the need for midline switching. The crucial operating input level +4 dBu and -10 dBV are clearly and accurately marked.

2.1 Input level setting

MIC/LINE Channel input level is determined by adjusting the TRIM control [4]. In addition to Master Mix metering, a channel PEAK LED [11] illuminates when a channel is going into overload. These LEDs take their cue from post-EQ. This level sampling is particularly useful when using extreme EQ settings.

2.2 Equalizer

All mono input channels are fitted with three-band EQ, plus a switchable High Pass Filter ("LOW CUT") [3] filter for eliminating unwanted subsonics. The upper [5] and lower [7] shelving controls have their frequencies fixed at 12 kHz and 80 Hz, respectively. The Mid Range control [6] has a peaking response, with Q fixed at 2 octaves and frequency at 2.5 kHz. All three bands have up to 15 dB of cut and boost, with a center detent for "off". The Low Cut filters [3] slope at 18 dB/octive, -3 dB at 75Hz, are ideally suited for reducing floor rumble, breathing noises, popping, mushy low end, etc.

2.3 Aux Sends

AUX send volume controls (PRE [8], POST [9]) are mono and post-EQ. AUX 1 [8] is set PRE-fader, while Aux 2 [9] is POST-fader.

2.4 Fading (Volume up or down) and panning (Signal right or left)

Gain to the Master Mix [23] bus is ultimately determined by the Channel Fader control [13]. Channel Pan [10] positions the output of the channel in the stereo field. Its constant-power design ensures there are no level discrepancies whether a signal is hard-panned, center-stage or somewhere in between. Such pinpoint accuracy will be a revelation if you have been working on consoles with lower quality circuits.

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2.5 PFL (Pre Fade Listen)

Depressing the PFL switch [12], & the MASTER/PFL TO CONTROL ROOM switch [17], allows the signal to be viewed at LED [22] as a MONO signal for TRIM adjustment. This function will also allow you to check the paticular channel for activity prior to sending to MASTER MIX. During a live performance, keep in mind the channel's fader must be first set in the **"∞"** (infinity) position, then brought up to unity gain (0 dB). This function is also helpful to monitor a channel.

3. STEREO INPUT CHANNEL

Each stereo channel comes with two balanced line level inputs on ¼" TRS jacks [28] for left and right signals. When only the left input is connected, the channel operates in mono.

3.1 Input level setting

The Stereo inputs are designed for any line level signal. Most line level sources such as MIDI instruments and FX units will have their own output level control. Those that do not (such as consumer CD players), all have an output level within the scope of the DMC-16. When the PFL switch & MASTER/PFL switch are engaged the LED meters should read between -4 and 0 dB. Note that there is a 15 dB gain on fixed outputs via the channel fader as well as master fader.

3.2 Equalizer

There are no Low Cut filters on stereo channels; otherwise, the EQ is in principle identical to that on MONO Channels (see 2.2). The EQ is stereo.

A stereo equalizer is generally preferable to using two mono equalizers when EQ-ing a stereo signal since discrepancies can often occur between left and right settings.

3.3 Aux Sends

It is the same as for mono Channels [25] (see 2.3). **Note that a mono sum is taken from the stereo input.**

3.4 Volume control and panning/balancing

The only difference to the mono Channel, described in (2.4), is the implementation of the Balance control [14]. When a channel is run in stereo, this control determines the relative balance of the Left and Right Channel signals being sent to the left and right MASTER MIX busses. For example, with the Balance control turned fully clockwise, only the right portion of the channel's stereo signal will be added to the MASTER MIX.

If a Stereo Channel is run in mono (only the left input connected), the Balance control acts as a pan in the normal way.

4. MASTER SECTION

4.1 Aux Sends

AUX SENDS are provided on balanced ¼" TRS jacks [25]. **Adjust the input level control of your effects unit to match the output level of the Mixer.** This can be done when typical signals are run through the DMC-16 and the AUX SENDS [8] [9] are set to center (0 dB). If your effects unit does not have an input gain and the effects levels seems too low, every channel's AUX SEND [8] [9] has up to 15 dB gain which should be more than enough to drive any effects unit.

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4.2 Stereo Aux-Returns

There are two additional stereo inputs (Stereo AUX RETURN 1 and 2 [24]) on the DMC-16. Their level is adjusted with [15] and [16]. The Stereo AUX RETURN's [24] are permanently assigned to the MASTER MIX [23]. If a jack is connected only to the left socket, the Stereo AUX RETURN operates in mono. This enables you to provide a "wet cue mix" (signal with effect such as reverb) for the headphones or foldback speakers.

Sometimes an engineer wants to narrow the stereo width of a reverb field. To do this you will have to come back on two mono channels to get independent Pan for the left and right signals.

4.3 Metering

MASTER MIX [23] level is displayed on a pair of accurate 10-segment bargraph peak meters [22]. Two further LEDs indicate POWER on [20] and +48 VDC Phantom Power on [21].

The MASTER MIX bargraph meters should average close to 0db during loud passages. If they read persistently high, or are peaking above +7 dB (top segment of the display), reduce either the Channel fader or the MASTER MIX volume slider, or (as a last resort) the channel's input trim or instrument unit output level.

4.4 TAPE / REC ("2-Track") to MASTER

Input (TAPE IN)

A "2-Track" input on RCA phono jacks TAPE IN [26], provides easy connection to DAT and other professional and semiprofessional audio equipment. The "2-Track" input is primarily for auditioning mix playback from tape. However, it can also be routed to the MASTER MIX via switch [18] TAPE/REC TO MASTER. With [18] depressed you have another stereo line input available to the mix.

The "2-Track" input also can be used as another stereo line input, allowing you to monitor/mix extra sources such as cassette, CD, etc.

4.5 MASTER / PFL TO CONTROL ROOM

The MASTER MIX [23] can be sent by switch [17] MASTER/PFL TO CONTROL ROOM into the HEADPHONE/CONTROL ROOM LEVEL [19], to control the CTRL R OUT [29] & PHONE [30] jacks.

Output (REC OUT)

RCA phono jack outputs (REC OUT [27]) are provided for easy connection to DAT, cassette desk etc. A single pair (L/R) of unbalanced ¼" jacks and balanced XLR connectors [32] deliver the MASTER MIX [23] output to the PA system, or "2-Track" recorder.

Level is ultimately determined by the precision MASTER MIX volume control [23].

4.6 Monitoring

The DMC-16 has a separate headphone output (PHONES [30]). The PHONE's signal follows the CONTROL ROOM OUTPUT [29]. A single volume control [19] adjusts the level of the headphones and master monitors.

The L/R meters [22] follow the MASTER MIX [23].

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5. SETTING UP

Experience indicates that cables in a studio environment get tangled very quickly (inviting mistakes). A patchfield will significantly facilitate patching and repatching.

5.1 Mixer normalization

All board settings should be set to the normal default condition before or after every session. Usually, faders are set to zero **"∞"**(infinity), EQs set flat, and AUX (1 & 2) turned fully counter-clockwise etc.

5.2 Selecting inputs

1) Mono Channels accept Mic or Line inputs. If you are using the Mic input, make sure nothing is connected to the Line input (and vice-versa).

The Mic inputs are more sensitive than the Line inputs. Do not connect mics with PHANTOM [33] Power switched on. Never use unbalanced mic cables with Phantom Power switched on! Shorting the +48 V to earth can cause serious damage.

2) Stereo Channels accept any line-level signals. Any stereo channel can be run in mono simply by connecting into the left jack socket only. These channels are suitable for a variety of line-level sources including MIDI instruments and Tape Returns from multi-track.

3) STEREO AUX RETURNS [24] are primarily designed for returning effects units, however, these also may be utilized for tape returns or MIDI instrument outputs.

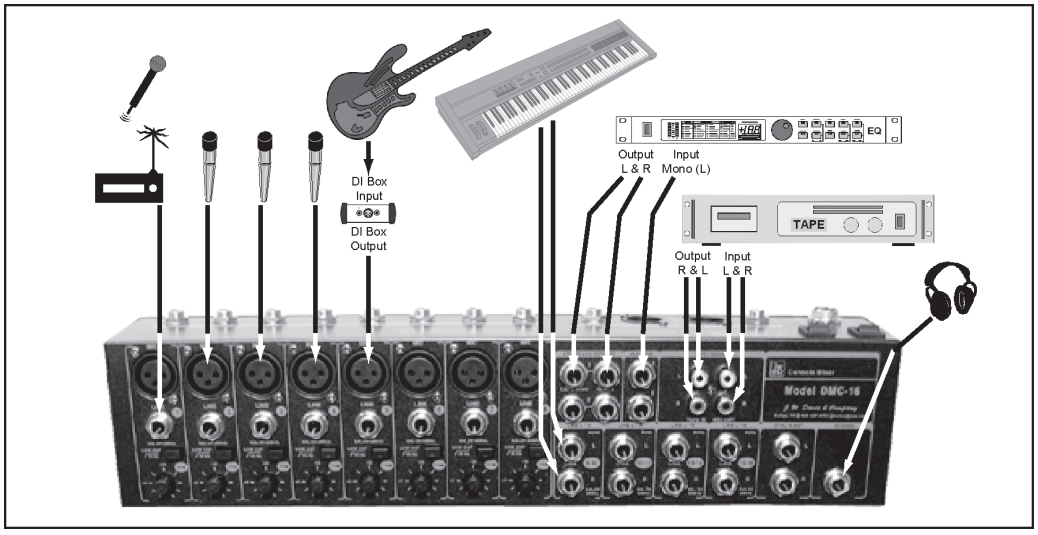


Fig 5.1: Setup Example

5.3 Initializing channels for unity gain ("0dB")

1) Set TRIM to minimum and all AUX controls (1 & 2) to off (fully counter-clockwise).
2) Set EQ to flat (all knobs at 12 O'clock).
3) Where applicable, engage the LOW CUT switch [3] for most mics, except for signals with desired low frequency content.

5.4 Auditioning a signal and setting up a channel

1) Bring up channel volume to unity gain (13 to "0dB"). All the other channel volume controls should be brouht down to **"∞"** (infinity) position. Set TRIM control 4 fully counter-clockwise. Set the EQ controls (HIGH 5 , MID 6 , LOW 7) to the center detent position(12 o'clock). The MASTER MIX 23 volume control should brought down to "minus infinity".
2) Depress PFL switch 12 for channel being setup. Depress MASTER/PFL TO CONTROL ROOM switch 17 . Generate a signal; i.e., a voice through a microphone. There should now be some activity at the LED meters 22 .
3) For MIC/LINE Channels adjust the TRIM control 4 until transient peaks are regularly hitting -4 dB. Continuous signals should not exceed 0 dB.
4) For stereo LINE inputs, use the output volume of the source or instrument to control the gain adjustment until transient peaks are regularly hitting -4 dB. Continous signals should not exceed 0 dB.
5) Altering EQ (HIGH 5 , MID 6 , LOW 7) will affect a channel's input level. If EQ is adjusted at any time, repeat steps 3 and 4.
6) Bring down the channel's volume control 13 to the **"∞"** (infinity) position. Move onto next channel and repeat steps 1 thru 5.
7) Once all channel inputs have been set for unity gain (0dB), slide all active channel fader controls back to 0 dB. You are now ready to start mixing.

5.5 Recording levels

When recording to digital, keep the recorder's peak meters below 0 dB. Most (not all, especially samplers) read 0 dB with some headroom left. This is because, unlike with analog, the onset of digital distortion is sudden. To take the recording level to the limit (and fully exploit 16-bit digital's 96 dB dynamic range, for example) calibrations are necessary. One method is to run a tone at 0 dB from the mixer and use that as the DAT or ADAT reference. If the DAT or ADAT is well under its maximum input limit, a better method to calibrate the recorder is to incrementally increase the record level until the onset of digital distortion, then subtract 5 or 10 dB, and never exceed that level. **Engage "peak hold" on the recorder before recording to confirm that the level will not be exceeded.** Peak meters read more-or-less independent of frequency. **Aim for 0 dB recording level for all signals.**

5.6 Inserts

INSERTS 31 are useful for adding dynamic processing or broader EQ to a channel. Unlike reverberation, processors, etc., which are usually added to the "dry" signal, dynamic processing is normally applied across an entire signal. Here an AUX SEND function would not be appropiate. Instead the signal is intercepted somewhere along the channel, fed through the dynamics processor &/or EQ, then returned to the console at the same point where it left. The INSERTS will interrupt a channel's signal only when a jack is plugged into it.

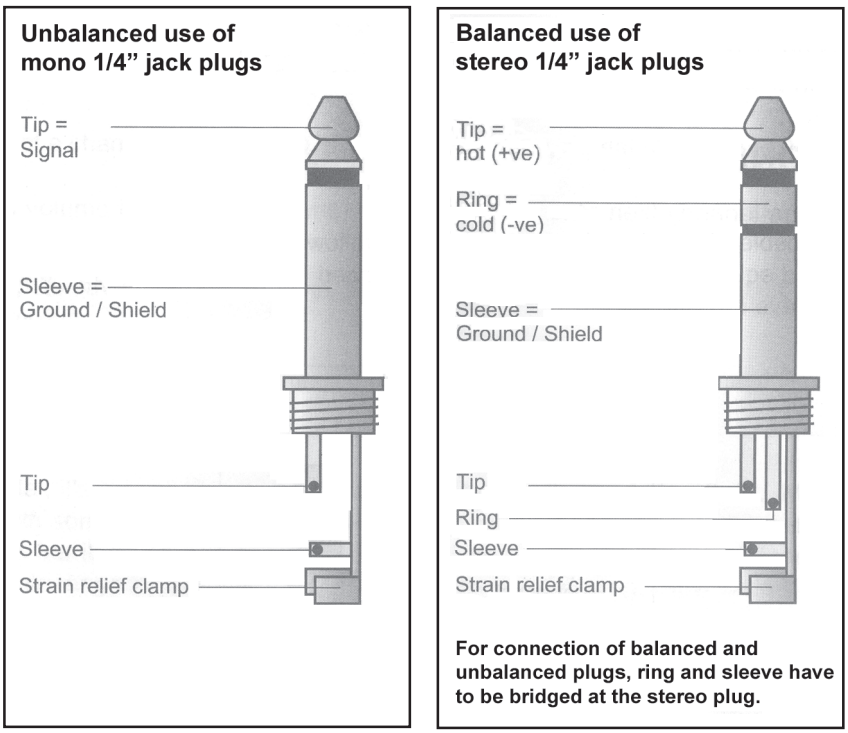
6. CONNECTIONS

You will need a lot of cables for different purposes - see the following figures to make sure you have the right ones. Unbalanced equipment may be connected to balanced inputs/outputs. Either use mono ¼" jacks or connect the ring and the sleeve of TRS jacks.

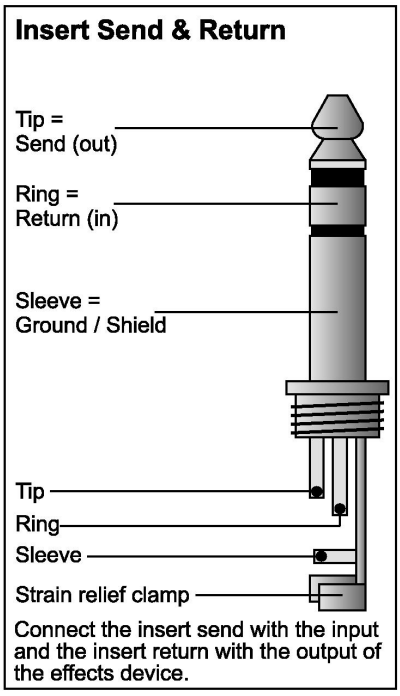
Phantom power (+48 V DC) is provided, and can be turned on or off by the +48 V PHANTOM switch 33. The +48VDC phantom power effects all eight MIC channels.

Care should be taken NOT to plug mics into the console (or stagebox) while the phantom power is on. Also, mute the monitor PA speakers when turning phantom power on or off. Allow the system to adjust for at least 3 seconds after engaging phantom power setting input gains.

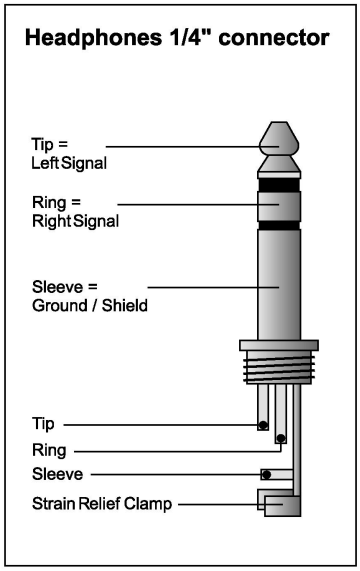
It is recommended to connect the DMC-16 Mixer with other devices in a balanced configuration to allow for maximum interference immunity.



6.1: Different plug types.



6.2: INSERT Send & Return



6.3: Headphone connection

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OWNER'S WARRANTY

J.W. DAVIS & COMPANY electronic products are carefully inspected and tested at the factory prior to packaging and shipment to provide lasting service, given proper installation and use. J.W. DAVIS & COMPANY agrees to correct every defect due to imperfect material or workmanship which may develop through ordinary and proper use for a period of one year from the date of purchase or, at J.W. DAVIS & COMPANY'S option, replace the product, making no charge for correction or replacement. Any repair of any defect under this warranty shall only be made by J.W. DAVIS & COMPANY, or one its authorized service agents. J.W. DAVIS & COMPANY will not be responsible for any expenses incurred by the purchaser for repairs other than repairs made by J.W. DAVIS & COMPANY or its authorized agents.

THIS WARRANTY IS CONDITIONED ON RECEIPT BY J.W. DAVIS & COMPANY OF A PROPERLY COMPLETED REGISTRATION CARD WITHIN TEN (10) DAYS FROM THE DATE OF PURCHASE. This warranty is further conditioned on the electronic product being found on inspection not to have been subjected to abuse, misuse, negligence, or accident, nor to have been installed, altered, or repaired contrary to factory designated procedures without the prior written consent of J.W. DAVIS & COMPANY authorized personnel.

Defective products must have a RETURN AUTHORIZATION NUMBER provided by J.W. DAVIS & COMPANY and be returned properly packaged, freight prepaid to J.W. DAVIS & COMPANY, 3030 Canton Street, Dallas, Texas 75226, insured for full value, as a condition of this warranty. Attempted deliveries of unauthorized packages are refused.

Exclusion of Expressed and Implied Warranty. J.W. DAVIS & COMPANY has made no affirmation of fact and has made no promise relating to the product being sold which has become any basis of the bargain made or has created or amounted to any express warranty that the product would conform to any such affirmation or promise other than those contained in this warranty. This express warranty excludes and is in lieu of all implied warranties.

Limitation of Damages. If J.W. DAVIS & COMPANY breaches any warranty, J.W. DAVIS & COMPANY'S liability is limited to repairing or replacing a nonconforming product. J.W. DAVIS & COMPANY is not liable for any other direct or consequential damages.

Since many troubles encountered in sound installations are external to the electronic product, customers are requested to call a J.W. DAVIS & COMPANY electronic technician for assistance prior to sending back the product for repair in order to avoid unnecessary returns. Products repaired under warranty by J.W. DAVIS & COMPANY will be returned to the sender freight prepaid.

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7. APPENDIX

7.1 Specifications

Mono Inputs

Mic Input. . . . . Electronically balanced, discrete input configuration
Bandwidth. . . . . 10 Hz to 60 kHz ± 3 dB
Distortion (THD & N). . . . . 0.01% at +4 dBu, 1 kHz, Bandwidth 80 kHz
Mic E.I.N (22 Hz - 22 kHz). . . . . -129.5 dBu, 150 Ohm source
-117.3 dBqp, 150 Ohm source
-132.0 dBu, input shorted
-122.0 dBqp, input shorted
GAIN(TRIM) range. . . . . +10 dB to +60 dB
Line Input. . . . . Electronically balanced
Bandwidth. . . . . 10 Hz to 60 kHz ± 3 dB
Distortion (THD & N). . . . . 0.01% at +4 dBu, 1 kHz, Bandwidth 80 kHz
Line Level range. . . . . +10 dBu to +40 dBu
Equalization
Hi Shelving . . . . . 12 kHz ±15 dB
Mid Range. . . . . 2.5 kHz ±15 dB
Lo Shelving. . . . . 80 Hz ±15 dB

Stereo Inputs

Line Input. . . . . Unbalanced
Bandwidth. . . . . 10 Hz to 55 kHz ± 3 dB
Distortion (THD & N). . . . . 0.01% at +4 dBu, 1 kHz, Bandwidth 80 kHz
Equalization
Hi Shelving. . . . . 12 kHz ±15 dB
Mid Range. . . . . 2.5 kHz ±15 dB
Lo Shelving. . . . . 80 Hz ±15 dB

Master Mix Section

Max Output. . . . . +28 dBu, balanced XLR
+22 dBu, unbalanced ¼" phone jack
Aux Send Max Out. . . . . +22 dBu unbalanced
Control Room Out. . . . . +22 dBu unbalanced
Signal-To-Noise Ration. . . . . 112 dB, all channels assigned & at Unity Gain (0 dB)

Power Supply

Main Voltage. . . . . IN ~115 V AC, 60 Hz, 0.4A, power supply unit (PSU)
OUT ~18V AC, 700mA

Physical

(H * W * D). . . . . 2 ¾" x 15 ¾" x 13 ½"
Physical. . . . . 11 lbs. (psu not included)
Shipping Weight. . . . . 16 lbs. (rack mount hardware included)

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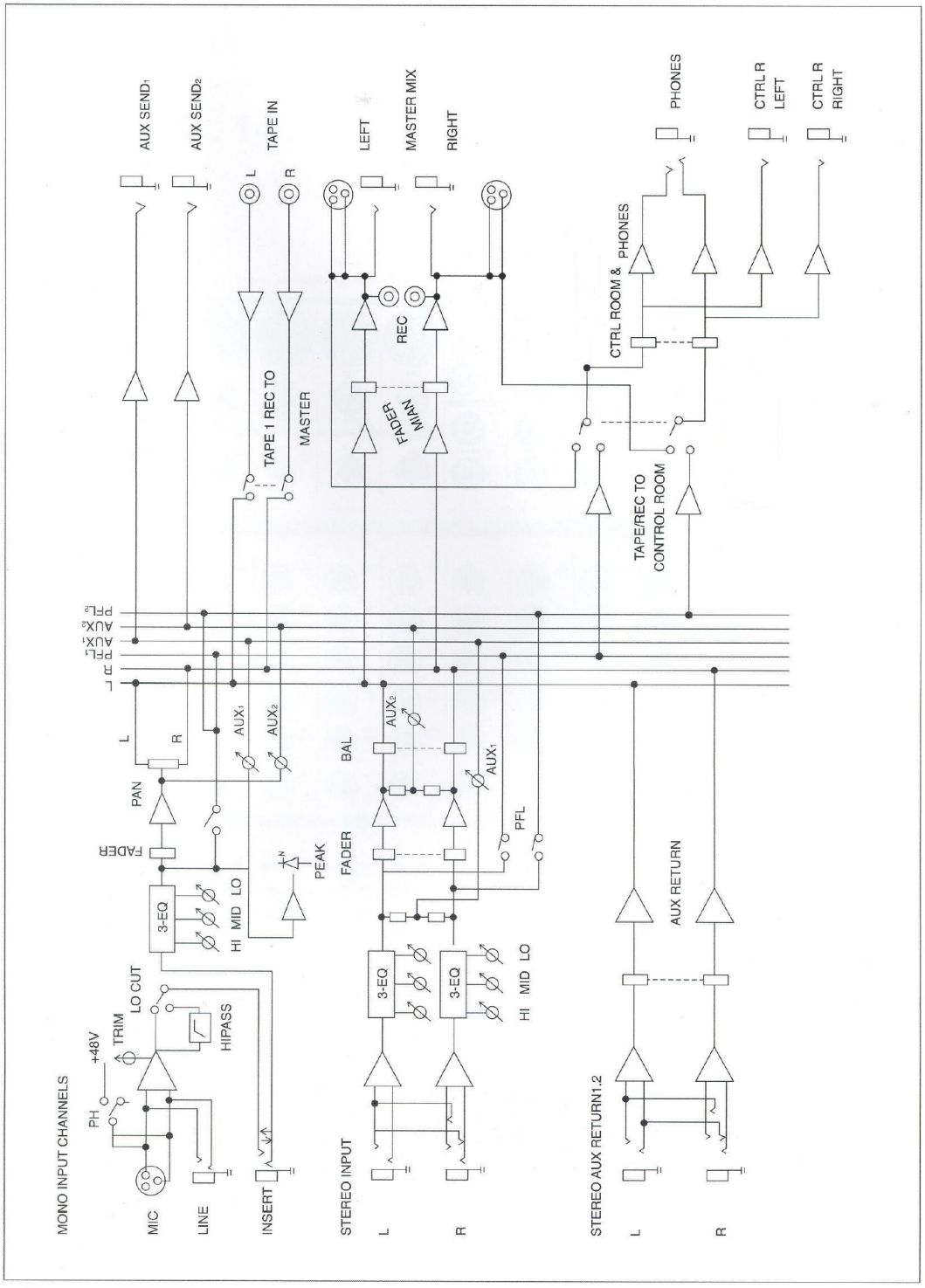
Block Diagram of the DMC-16 Mixer



7.2 Block diagram

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