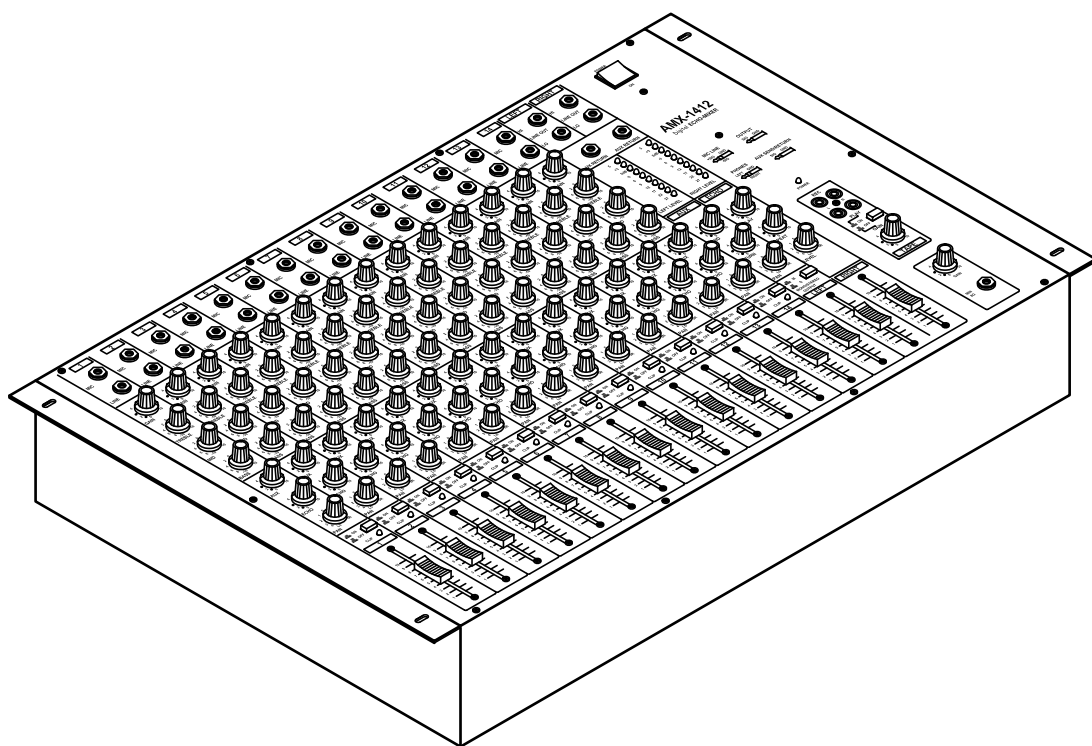


PA AUDIO MIXER

AMX-1412



Please read this manual thoroughly before making connections and turning on the power. Following the instructions in this manual will enable you to obtain optimum performance from your new PA Audio Mixer.

Please retain this manual for future reference.

• **Safety Instructions**

Read the Instructions: Please read all the instructions in this section carefully before installation or use of the product. All the safety instructions must be followed.

Retain the Instructions: Please retain this Instruction Manual for future reference.



This symbol, wherever it appears, alerts you to the presence of uninsulated hazardous voltage that may be sufficient to constitute a risk of electric shock. External wiring to any terminal marked with this symbol must be done by a trained and instructed person only.



This symbol, wherever it appears adjacent to a component, alerts you that the concerned component can only be replaced by another of the exact same specifications.

WARNING

- To reduce the risk of electric shock, do not remove the top cover. No user serviceable parts inside. Refer all servicing to qualified personnel only.

CAUTIONS

Water & Moisture: To reduce the risk of fire or electrical shock, do not expose this set to rain or moisture. Do not use this set near water or in a wet location. Do not keep any object filled with liquid, such as a vase, on top of this set. Do not insert or remove the AC mains plug with wet hands.

Power Source: The voltage & frequency of the AC mains supply, and the voltage of the external battery, (if applicable) to which this set can be connected, is marked on the rear panel of the set. Do not connect this set to any power source other than those specified on the rear panel.

Power Cord Protection: Do not cut, kink, damage or modify the AC power cord supplied with this set. Keep the AC power cord away from heaters and harmful chemicals. Do not keep any heavy object on the power cord.

Operation on Generator: When operating this set on a generator, make sure the set is switched off till the generator voltage has stabilized.

Ventilation: This set should be situated so that its location or position does not interfere with its proper ventilation. Do not cover the ventilation holes / slots. Do not insert or drop anything into the ventilation holes / slots.

Stability: This set must be kept in a stable and flat horizontal position, and never in a tilted position. Do not place this set on an unstable stand, tripod, bracket or mount. Do not use attachments which are not supplied or explicitly recommended by the manufacturer.

Earthing: This set must be earthed properly before use. A wire from the Earth terminal on the rear panel must be connected to electrical earth.

Cleaning: Disconnect this equipment from the AC mains and external battery before cleaning. Clean with a damp cloth, but do not allow any liquid to enter the set. Do not clean with liquids or aerosols.

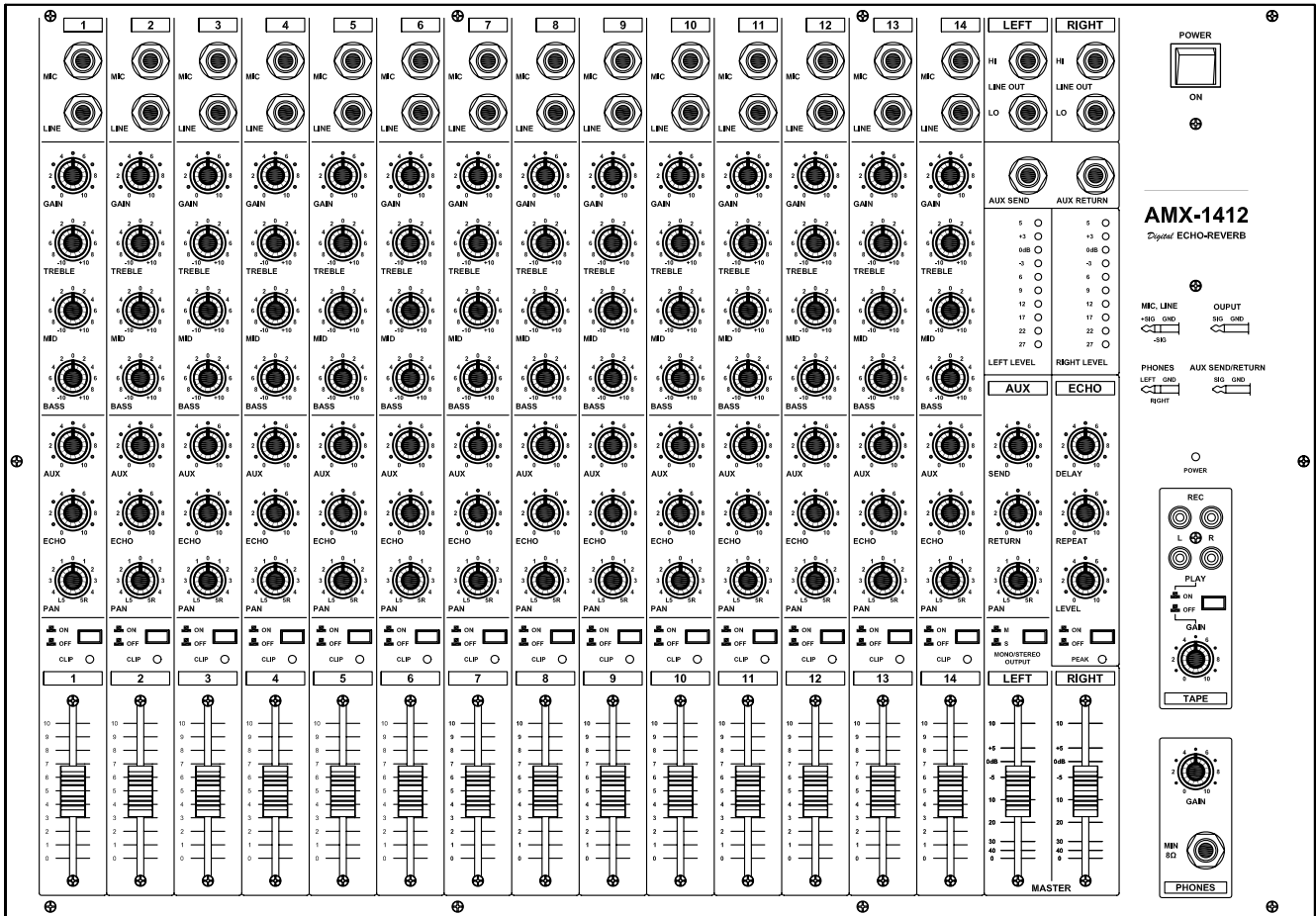
Contents	Page No.
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• **Features/General Description of Product**

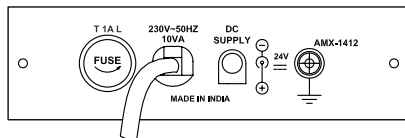
The **AMX-1412** is **14 CHANNEL** PA Mixer with Echo, Reverb & Chorus Effects. The **14 Inputs**, Mic / Line, have individual Gain controls, Bass, Mid & Treble controls, Aux Controls, Echo controls, Pan controls, Channel ON /OFF switches, Channel faders. It has a separate TAPE SECTION for Recording and Playback. With a Dual Gain control and ON / OFF switch for tape playback provided, effectively this Mixer has **16 INPUT CHANNELS**.

- 14 Mic inputs for balanced / unbalanced low impedance microphones.
- 14 Line inputs, balanced / unbalanced for connecting CD / Cassette Players, Keyboards etc.
- Gain control for each input channel .
- Bass, Mid & Treble controls for each input channel.
- Aux control for controlling the level of the channels in the final mix to Aux Send output.
- Echo mix level control for each input .
- Pan control for each input channel for adjusting the routing of the input channel signal to the Left or Right outputs.
- ON / OFF switch for each input channel.
- Fader control is provided for each input channel.
- Aux Send and Aux Return have been provided for sending the pre-fader output of input channels for monitoring or for adding a Special Effects Unit.
- **DIGITAL** signal processing used to process Echo, Reverb and Chorus effects.
- Echo section for Echo , Reverb and Chorus effects through Repeat, Delay and Level controls. Echo ON / OFF switch available.
- A separate Tape Section for connecting a Cassette Recorder for recording / playback
- Master Faders for Left and Right output .
- High and Low unbalanced Line Outputs provided for the Left and Right channels.
- Mono / Stereo output switch.
- 10 LED arrays for indicating output levels.
- Headphone stereo output with gain control.
- AC Mains / 24V DC Battery Operation.
- Ears for ease of carrying and customized rack mounting.

• Top and Rear Panel



TOP PANEL



REAR PANEL

• The Input Section

1. MIC INPUT

Input through balanced 1/4" phone jacks for accepting both balanced and unbalanced signals from low impedance microphones (200 ohms to 1Kohms), through phone plugs.

Wiring: Tip Hot (+ve phase)
 Ring Cold (-ve phase)
 Sleeve Ground

2. LINE INPUT

Input through balanced 1/4" phone jacks for accepting both balanced and unbalanced signals from sources such as Cassette Players, CD Players, Keyboards, Drum Machines etc., through phone plugs.

Wiring: Tip Hot (+ve phase)
 Ring Cold (-ve phase)
 Sleeve Ground

3. GAIN CONTROL

The gain control sets the signal level for the Mic and Line inputs. The Clip LED indicates the Max. level of gain control settings.

4. TREBLE CONTROL

The Treble control gives 12 dB of boost or cut at 10 kHz. High boost livens up a "dead" room acoustics imbalance.

5. MID CONTROL

The Mid control gives 12 dB of boost or cut at 2 kHz for enhancing the 'presence' effect.

6. BASS CONTROL

The Bass control gives 12 dB of boost or cut at 100Hz. Low cut avoids boominess in some rooms.

7. AUX CONTROL

The Aux control is for setting the pre-fader level of the channel to Aux Send Output. The pre-fade mixed signal can be used for 'monitoring' or for adding a Special Effects Units.

8. ECHO CONTROL

Echo level control is for deciding the level of that channel in the final Echo Mix. This is post-Equalizer (Bass, Mid & Treble) and post-Fader. Therefore, the level will be affected by the setting of the Fader.

9. PAN CONTROL

This control routes the channel to either Left or Right Output . Centering the control, positions the signal equally in both the outputs. This is usable when the mixer output is connected in the Stereo mode. In Mono mode, the setting of this control is ineffective.

10. ON / OFF SWITCH

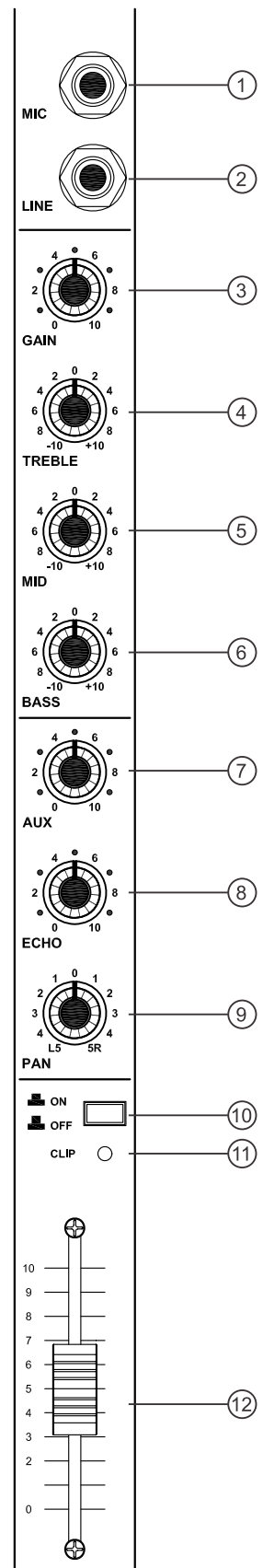
This switch is provided for switching OFF of the input channel without disturbing the control settings.

11. CLIP

The Clip LED lights up when the signal in the channel is approaching overload (clip) level. Setting this correctly ensures maximum "Signal to Noise ratio", that is the best signal level with the minimum amount of background noise. It should be set just before the overload level. Occasional flashing of the LED during loud sounds is OK.

12. CHANNEL FADER

The Fader 'slider' control determines the output level of the channel in the overall mix.



• The Output Section

1. LINE OUTPUT HI

Unbalanced High Line Outputs have been provided for the Left and Right channels through 1 / 4" phone jacks. These are for connecting to the LINE INPUT of the Power Amplifier. The Line Output levels (0mV to 775mV) can be adjusted by Master Faders.

Wiring: Tip Signal
 Sleeve Ground

2. LINE OUTPUT LO

Unbalanced Low Line Outputs have been provided for the Left and Right channels through 1 / 4" phone jacks. This output is for connecting to the AUX INPUT of a Monitor / Power Amplifier. The Preamplifier Output (0mV to 250mV) can be adjusted by Master Faders. This lower level signal output has been given in addition to the high level signal Line Output as many amplifiers have only one Aux Input. This can also be used for connecting to a monitor amplifier while the High Line Output is connected to the main power amplifier.

3. LED BARGRAPH

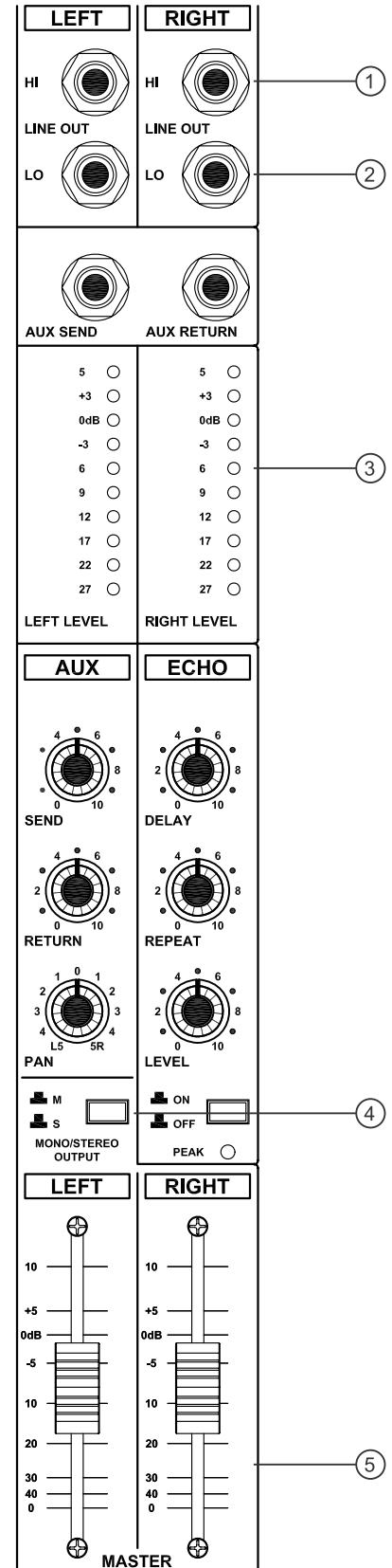
There are 2 colour, 10 segment LED Arrays which display the Left & Right output levels. The 0dB LEDs correspond to 250mV (LO Line output) and 775mV (HI Line output).

4. MONO / STEREO OUTPUT SWITCH

Mono or Stereo Output mode can be selected through this switch. In case of Mono, the same mixed mono output is available through any of the Left or Right output jacks. If the Left Output Jack is used, then the signal level can be set by the Left Master Fader. Similarly, the mono signal from the Right Output jack can be set by the Right Master Fader.

5. LEFT / RIGHT MASTER FADERS

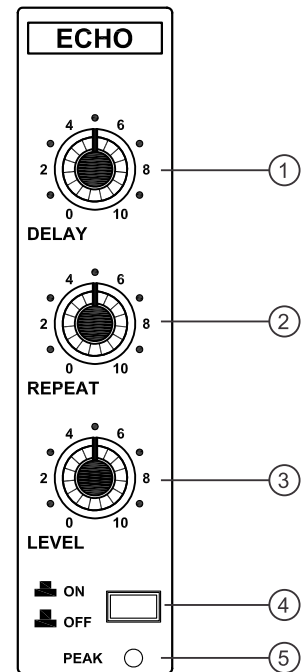
The Left & Right Faders are the master level controls. These determine the level of all the signals (mix) sent by the Channel Faders and Tape Playback, to the L / R Line Outputs (High and Low Output jacks).



• The Echo Section

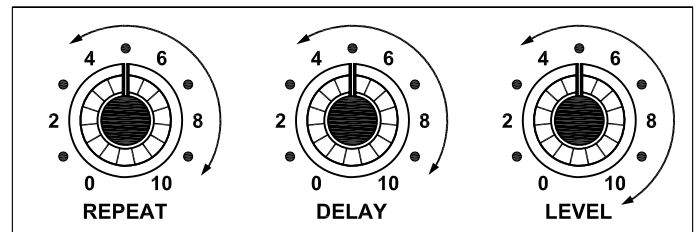
The ECHO section provides ECHO, REVERB and CHORUS effects to all the input channels. These Effects can be obtained by different settings of Delay Control, Repeat Control and Level Control. The Echo Section can be switched OFF through a ON / OFF switch.

1. **DELAY Control**
For setting the time between ECHO repetitions.
2. **REPEAT Control**
This controls the number of repetitions of ECHO. The higher the setting, the more repetitions.
3. **LEVEL Control**
For setting the level of ECHO mix.
4. **ECHO ON / OFF Switch**
When this switch is in OFF position, AMX-1412 operates as Mixer only without Echo / Effects on all the inputs irrespective of the settings of the Echo controls of individual channels.
5. **PEAK LED**
The Echo Controls & Fader Controls of each channel and Level Control of ECHO Section should be set at a level just below the flickering level of this Peak LED. This LED is for optimizing the inputs and Echo levels. The settings of the Channel Faders & Master Faders have no effect on this LED.



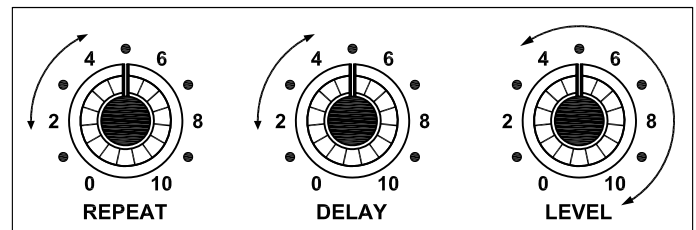
ECHO

Echo effect is used to repeat the original sound many times to give multiple voice effect and is used for vocals. The Control settings for Echo are as shown in the diagram.



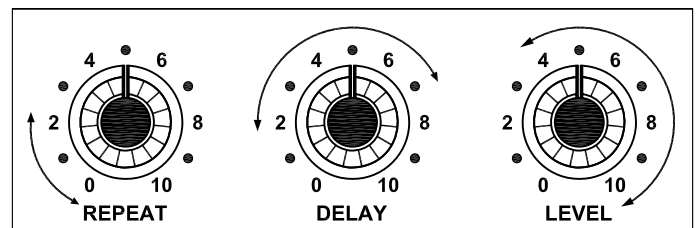
REVERB

Reverb is used for giving a hall effect to the original sound as repeated reflecting sound raises overall level of the signal. This is also used for Public announcements in stadia Open Air Performances. The Control settings for Reverb are shown in the diagram.



CHORUS

Chorus effect is used by a singer to create an effect as if a group is performing. The Control settings for Chorus are as shown in the diagram.



• The Tape Section

A 4 way RCA connector has been provided for connecting a Stereo Cassette Recorder to this audio mixer for Playback / Recording. Alternatively, a separate Stereo Cassette Recorder and a Stereo Cassette Player can be simultaneously connected for Recording and Playback respectively. This facility allows use of the other 14 input Channels for connecting input sources other than a Stereo Cassette Player.

1. RECORDING Outputs

The Left & Right RCA Sockets marked “REC” carry the stereo mix signal for connecting to the inputs of a stereo cassette recorder for Recording the program. These can also be connected to the Aux Input of an additional Monitor / Power Amplifier for driving them. The recording output level from AMX-1412 is affected by the settings of Master Faders.

2. PLAYBACK Inputs

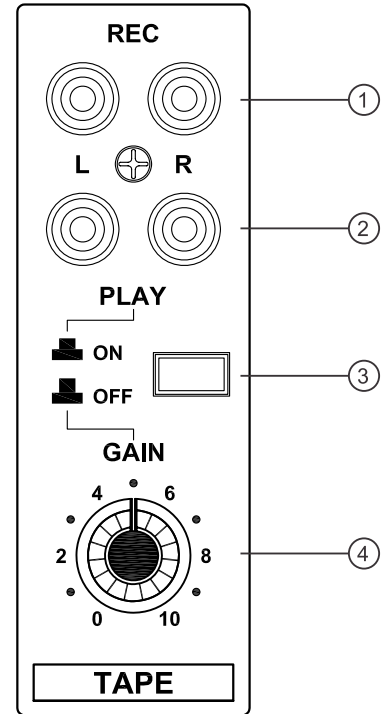
The Left & Right RCA Sockets marked “PLAY” are for connecting to the Play Output of a stereo cassette player or the same cassette recorder being used for recording. The playback signals are routed to the main stereo mix of which the level is set by the Master Faders. However, the level of the playback mix into the main mix is set by the Gain Control. The input sensitivity of the Playback Inputs is 250mV which can be adjusted by the Gain Control to accept input signal from other sources such as a **CD Player, Electronic Keyboard, Drum Machine, Electronic Guitars** etc., to this mixer.

3. PLAY ON/OFF Switch

A Switch has been provided for switching OFF the playback music source connected to the mixer.

4. PLAY GAIN Control

A Gain Control is provided to set the Level of playback program to the overall program mix.



THE HEADPHONE SECTION

A Stereo Headphone Output is available through a 1/4" stereo jack for program monitoring.

Wiring: Tip Left Signal
 Ring Right Signal
 Sleeve Ground

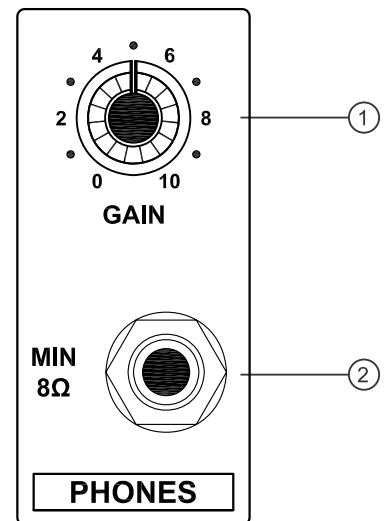
Do not use Headphones of less than 8 Ohms Impedance.

1. GAIN Control

A Dual Gain Control has been provided for setting the level of the Headphone Output.

2. HEADPHONE Output

An Output has been provided through a 1/4" stereo jack for connecting a Headphone for monitoring the overall program.



• Power Supply Section

1. AC FUSE 1 A, 250V

This protects the Mixer from damage in case of excessive current flow. In case the fuse blows, replace with another one of the same rating.

2. AC MAINS CORD

This is for connecting to AC mains supply. The Mixer is connected for 230V, 50Hz operation and will perform satisfactorily even when the AC Mains voltage drops to 200 V.

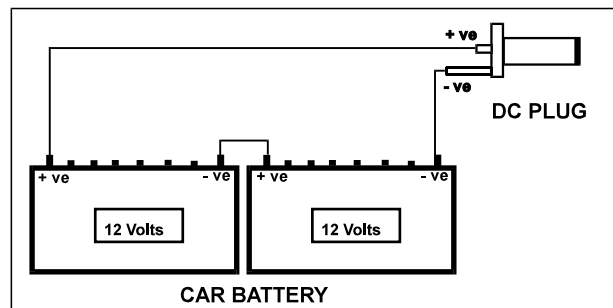
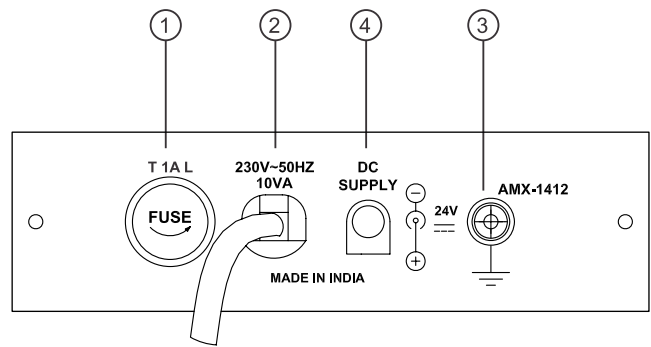
3. EARTH TERMINAL

Before operating, the Mixer should be grounded by connecting a wire from this Earth Terminal to a water pipe or an electrical earth.

4. STANDBY 24V CAR BATTERY OPERATION

2 x 12V Car Batteries can be connected through the DC Plug (supplied as an accessory) to the DC Socket as shown in the diagram. In case of power failure, the Mixer continues to operate uninterrupted through the standby 24V DC Supply. Make sure the battery polarity is connected correctly.

- Use 2x12V car batteries exclusively for this equipment and do not connect any other equipment to these car batteries.
- Connect car batteries only through pre wired DC plug supplied with this equipment.
- Do not connect negative of car battery to earth terminal.
- This equipment operates on floating 24V DC.



1. AUX SEND & RETURN

Aux Send and Aux Return are through 1 /4" phone jacks. These are for connecting an External Effects Processor or a Monitor Amplifier to the Mixer. The signal is sent from Aux Send jack. It is received back to the Mixer through the Aux Return jack after being processed by the External Effects Processor Unit.

2. AUX SEND Control

This controls the overall mixed level of the Aux Send signal to the External Effects Processor Unit or to Monitor Amplifier.

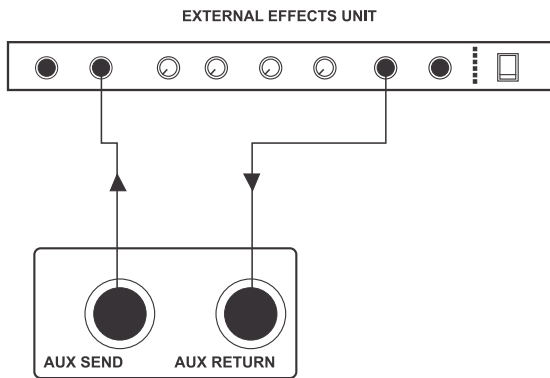
3. AUX RETURN Control

This controls the level of the Aux Return signal received from the External Effects Unit.

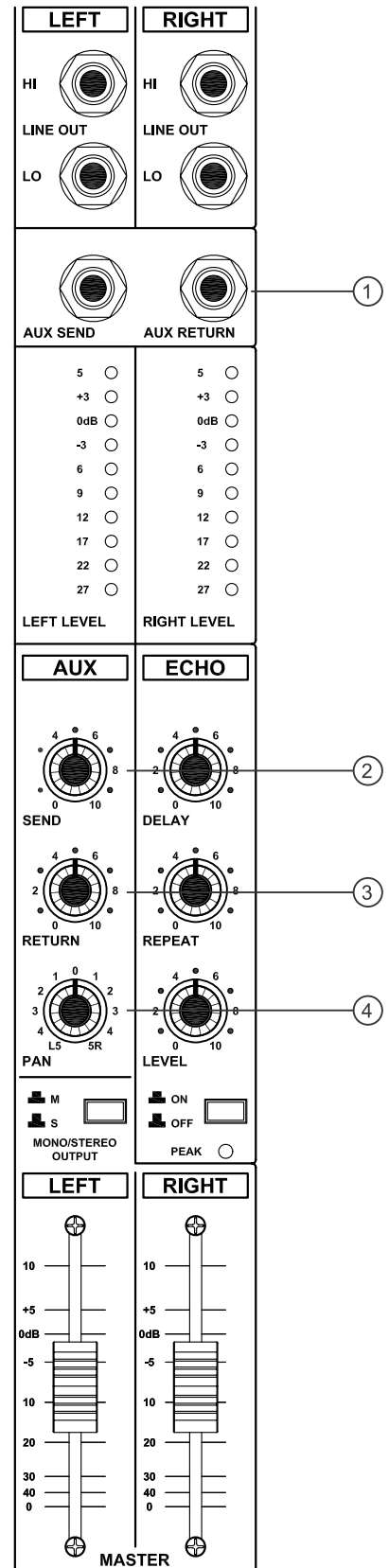
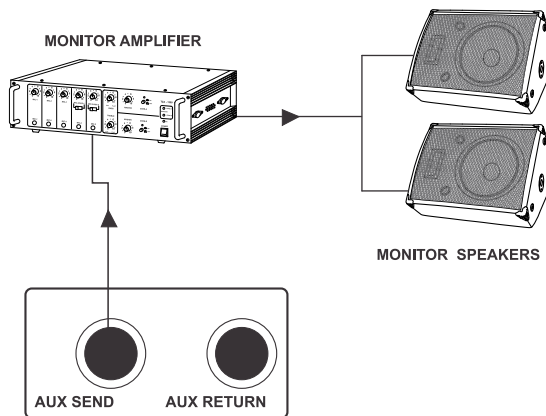
4. PAN Control

This control routes the Aux Return signal from the External Effects Processor Unit to either Left or Right Output. Centering the control, positions the signal equally in both the Outputs.

Connections for External Effects Unit

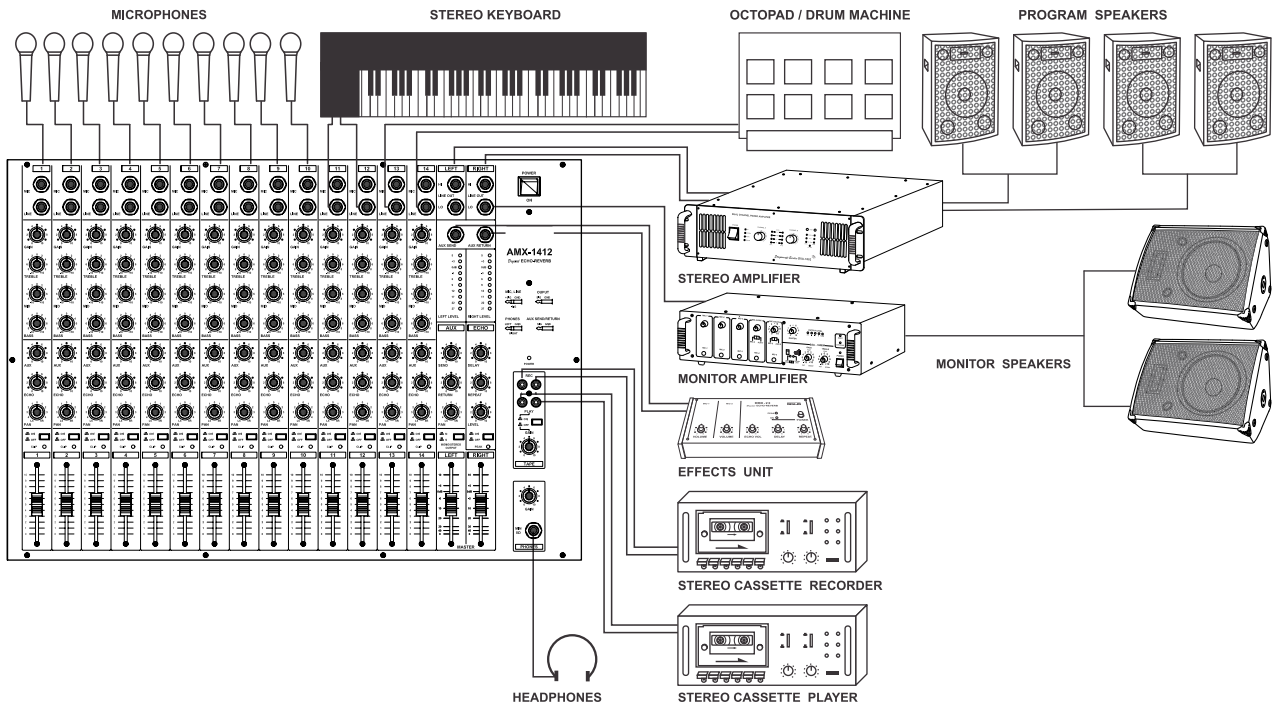


Connections for Monitor Amplifier

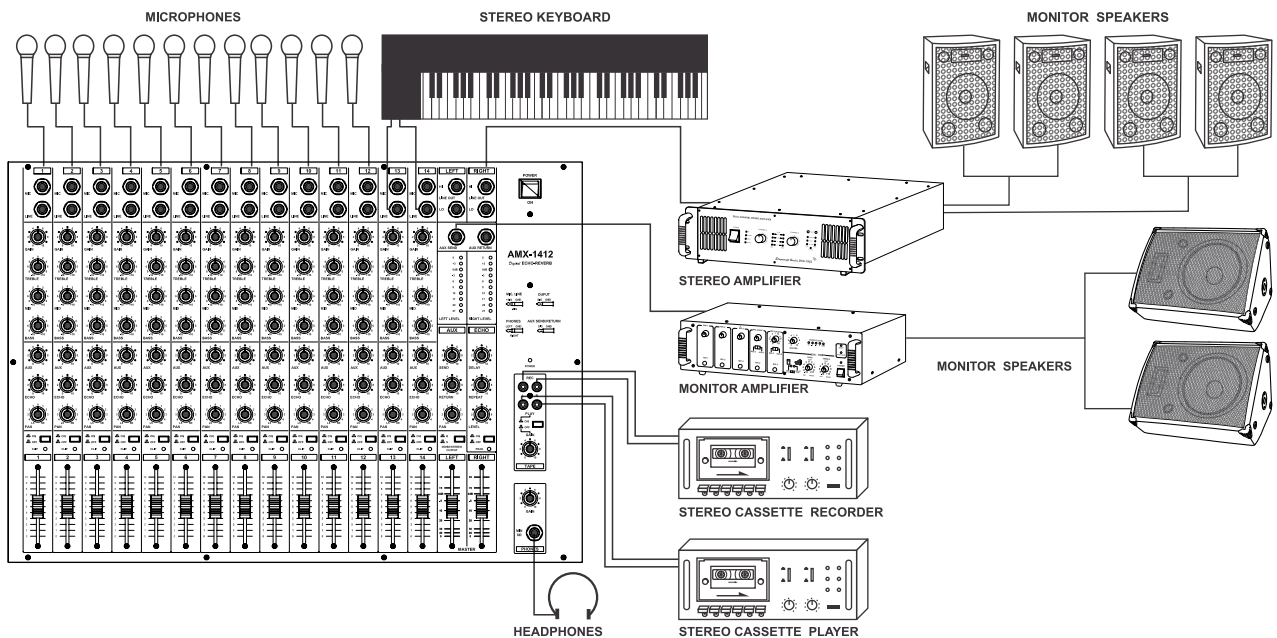


• Applications

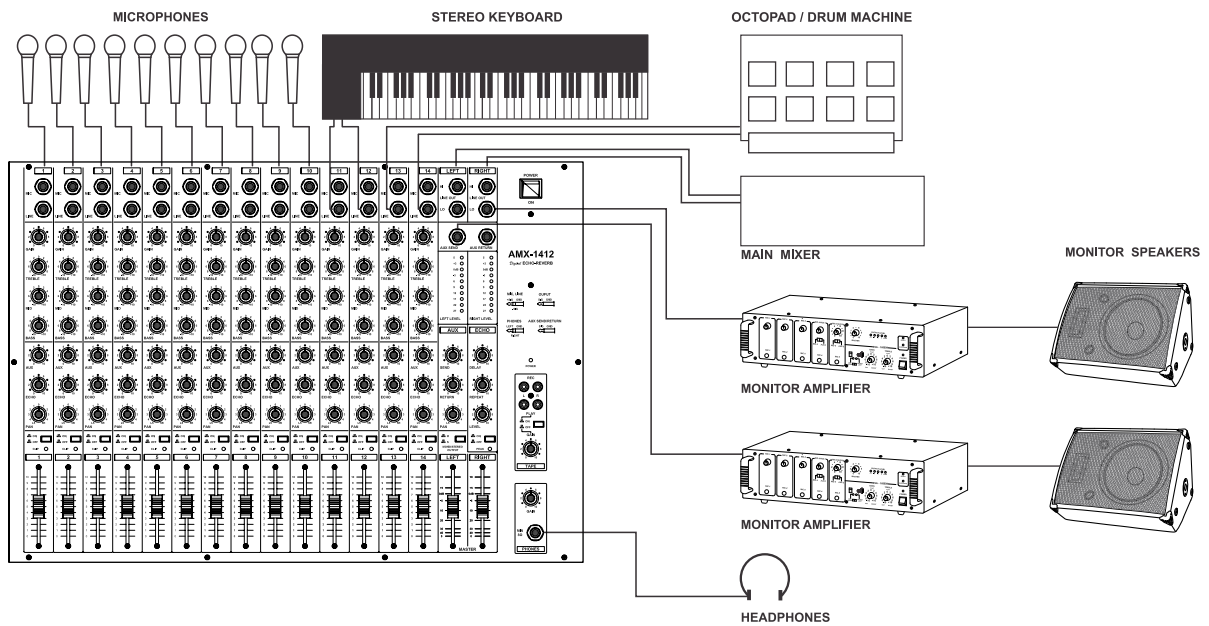
TYPICAL LIVE PERFORMANCE (STEREO MODE)



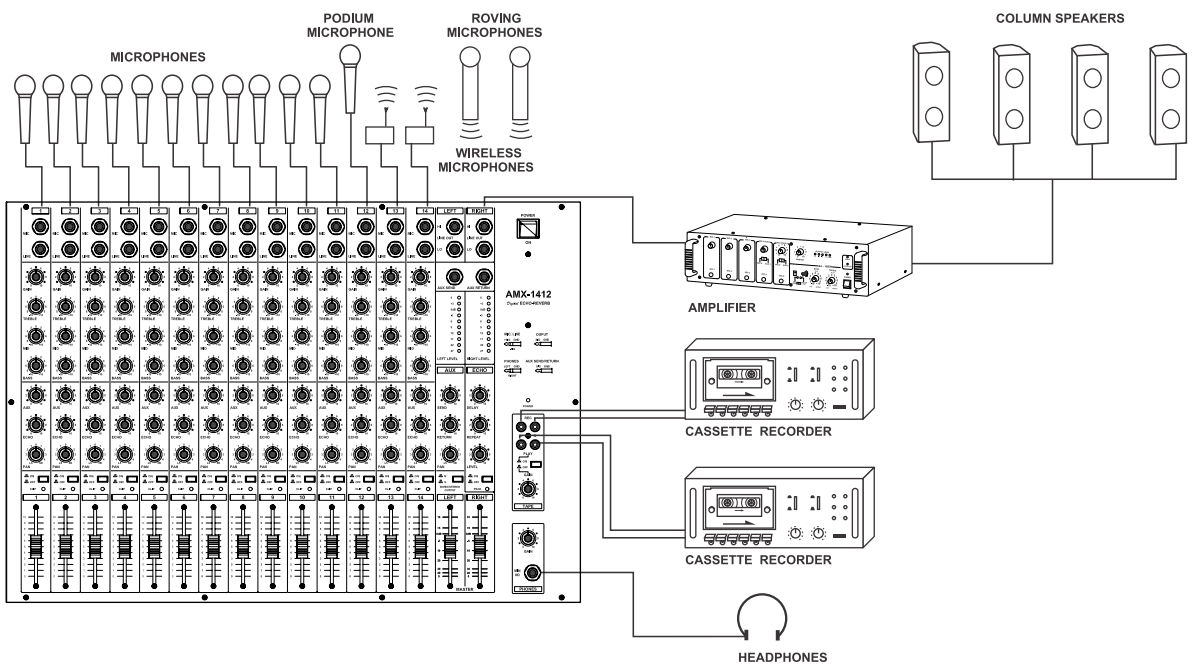
TYPICAL LIVE PERFORMANCE (MONO MODE)



TYPICAL SUBMIXING SETUP



TYPICAL CONFERENCE / CONVENTION SETUP



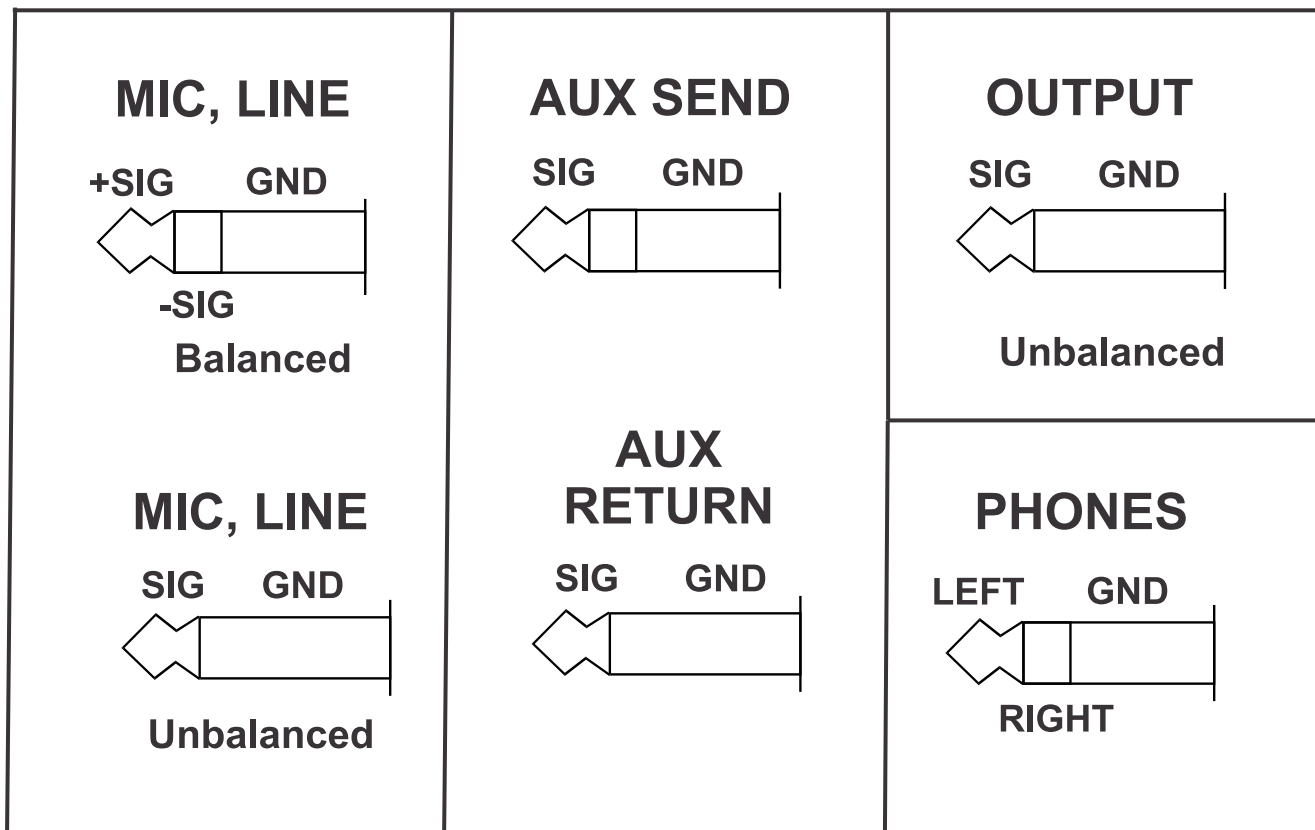
• Operation

1. Connect the microphones or line input sources like a CD player or Keyboard to the input jacks. Do not connect both Mic and Line to any one channel simultaneously. Connect the output jacks to the desired equipment. Refer APPLICATIONS Section, page #9, 10.
2. Keep all the rotary control settings of the mixer at '0' position.
3. Keep all the Channel Faders at '0' position and the Left/Right Master Faders at minimum position.
4. Keep all the channel ON/OFF switches, Echo switch and Tape Play switch at OFF position. Keep the Mono / Stereo Switch in the desired position.
5. Connect the AC Lead of the mixer to the nearest mains socket and connect the battery lead to car battery for interruption free operation. Refer Power Supply Section, page # 7.
6. Now switch 'On' the Mixer and the Input Sources.
7. Switch 'On' **Channel-1 only**, through its Channel On/Off Switch.
8. Connect the Headphones and position the Headphone Gain Control for a comfortable audible level.
9. Increase the Gain Control of **Channel-1 only** till the Clip LED lights up. Now decrease the gain control so that the Clip LED just flickers. This is the ideal setting of the gain control.
10. Set the Bass, Mid & Treble Controls to the desired levels. Changing the settings of the Bass, Mid & Treble Controls may affect the overall gain. Therefore the Gain Control should be subsequently adjusted to bring the Clip LED to the correct level.
11. Now slide the Channel Fader control of **Channel-1 only** to position '7'.
12. In case **Echo Effect** is desired on **Channel-1** move the Echo Control of **Channel-1** to position '7'.
13. Switch 'On' the Echo Section and set the Echo Section (Delay, Repeat & Level Controls) for the desired effects. Refer to the Echo Section for the settings of the Delay, Repeat & Level Controls, page # 5.
14. Adjust the **Pan Control** to set the level of the signal in the Left & Right Outputs. Turning the control fully anti-clockwise will send the signal only to the Left Output of the mixer, and turning it clockwise will send it to the Right Output.
15. In case the channel is to be monitored separately, make connections as shown in Applications Section, page # .9,10 and Aux Section, page # 8. Adjust the level of Aux Control to the desired level. Adjust the level of Aux Send to desired position. Refer Aux Section page #8.
16. In case external effects are desired on the channel an External Effects Unit can be connected, refer page # 9, 10. Adjust the level of Aux Control and also of Aux Send and Aux Return Controls. Refer Aux Section page #8.
17. Once **Channel-1** is set, do not disturb the control settings of this channel. Then switch 'OFF' this channel through the Channel ON / OFF Switch.
18. Repeat the above procedure for setting the remaining 13 channels.
19. After all the input channels have been set and switched 'On', the Peak LED of the Echo Section may start glowing continuously. Reduce the Echo Control level of individual channels and Echo Section simultaneously so that the Peak LED of the Echo Section goes below the flickering level.
20. After all the channels are set adjust the individual Channel Faders to obtain the desired MIX at the outputs.

21. Now adjust the Master Faders for desired output levels. However take care that the red LEDs of the LED Bargraph Array do not glow continuously. Refer Output Section, page # 4.
22. For Recording and Playback refer to the Tape Section, page # 6.

PLUGS WIRING

The wiring for various jacks (Input & Output Devices) is as shown below:



• **Technical Specifications**

MIC INPUT		
Impedance / Gain	:	2K ohms / 62 dB
LINE INPUT		
Impedance / Gain	:	20K ohms Balanced / 42 dB 10K ohms Unbalanced / 42 dB
THD	:	< 0.08 %
FREQUENCY RESPONSE		
L/R Line Output High	:	30 Hz - 20 KHz (+0, -1 dB)
L/R Line Output Low	:	30 Hz - 20 KHz (+0, -1 dB)
EQUALIZATION		
Bass / Mid / Treble	:	± 12 dB at 100 Hz / 2KHz / 10KHz
CLIP LED INDICATION	:	4 dB prior to true clip
OUTPUTS		
Line Output LO L / R		
Nominal/Max. Level	:	-10 dBm / +2 dBm (200mV / 1 V)
Line Output HI L / R		
Nominal/Max. Level	:	0 dBm / +17 dBm (775mV / 5.5 V)
LO / HI Impedance	:	600 ohms
MAXIMUM GAIN		
Mic input to Line Outputs	:	76 dB
Line input to Line Outputs	:	55 dB
Aux Send	:	300mV / 1K ohms
Aux Return	:	100mV / 10K ohms
TAPE		
Record Output	:	250mV RMS / 600 ohms
Playback Input	:	250mV / 1K ohms, variable thru' GAIN control
HEADPHONE		
Output	:	150 mV at 8 ohms, THD < 1%
ECHO		
Distortion	:	< 1%
Echo System	:	Digital Signal Processing
Delay Time	:	20 ms to 600 ms
S / N RATIO		
Line Output Level	:	>70 dB (0dBm, 0.775V)
POWER SUPPLY	:	AC: 230V, 50Hz DC: 24V
PROTECTION	:	AC: 1Amp. 250V (T 1A L)
DIMENSIONS	:	W633 x H93 x D420 mm
WEIGHT	:	9.4 kg approx.