ALTO

MUSIC, PASSION, DESIGN

User's Manual

APM120/APM160

POWERED MIXER

www.altoproaudio.com

Version 1.0 JUNE 2008

English

IMPORTANT SAFETY INSTRUCTION

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

TO REDUCE THE RISK OF ELECTRIC SHOCK PLEASE DO NOT REMOVE THE COVER OR THE BACK PANEL OF THIS EQUIPMENT. THERE ARE NO PARTS NEEDED BY USER INSIDE THE EQUIPMENT. FOR SERVICE, PLEASE CONTACT QUALIFIED SERVICE CENTERS.

This symbol, wherever used, alerts you to the presence of un-insulated and dangerous voltages within the product enclosure. These are voltages that may be sufficient to constitute the risk of electric shock or death.

This symbol, wherever used, alerts you to important operating and maintenance instructions. Please read.

⏚ Protective Ground Terminal
AC mains (Alternating Current)

ϟ Hazardous Live Terminal

ON: Denotes the product is turned on.

OFF: Denotes the product is turned off.

CAUTION

Describes precautions that should be observed to prevent damage to the product.

1. Read this Manual carefully before operation.
2. Keep this Manual in a safe place.
3. Be aware of all warnings reported with this symbol.
4. Keep this Equipment away from water and moisture.
5. Clean it only with dry cloth. Do not use solvent or other chemicals.
6. Do not damp or cover any cooling opening. Install the equipment only in accordance with the Manufacturer's instructions.
7. Power Cords are designed for your safety. Do not remove Ground connections! If the plug does not fit your AC outlet, seek advice from a qualified electrician. Protect the power cord and plug from any physical stress to avoid risk of electric shock. Do not place heavy objects on the power cord. This could cause electric shock or fire.
8. Unplug this equipment when unused for long periods of time or during a storm.
9. Refer all service to qualified service personnel only. Do not perform any servicing other than those instructions contained within the User's Manual.
10. To prevent fire and damage to the product, use only the recommended fuse type as indicated in this manual. Do not short-circuit the fuse holder. Before replacing the fuse, make sure that the product is OFF and disconnected from the AC outlet.

WARNING

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

Dispose of this product should not be placed in municipal waste and should be separate collection.

11. Move this Equipment only with a cart, stand, tripod, or bracket, specified by the manufacturer, or sold with the Equipment. When a cart is used, use caution when moving the cart / equipment combination to avoid possible injury from tip-over.

12. Permanent hearing loss may be caused by exposure to \ extremely high noise levels. The US. Government's Occupational Safety and Health Administration (OSHA) has specified the permissible exposure to noise level.
These are shown in the following chart:

HOURS X DAY	SPL	EXAMPLE
8	90	Small gig
6	92	train
4	95	Subway train
3	97	High level desktop monitors
2	100	Classic music concert
1,5	102	
1	105	
0,5	110	
0,25 or less	115	Rock concert

According to OSHA, an exposure to high SPL in excess of these limits may result in the loss of heat. To avoid the potential damage of heat, it is recommended that Personnel exposed to equipment capable of generating high SPL use hearing protection while such equipment is under operation.

The apparatus shall be connected to a mains socket outlet with a protective earthing connection.

The mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.

IN THIS MANUAL:

1. INTRODUCTION

Thank you for your purchasing of the ▲LTO APM120 12-channel (16-channel for APM 160) power mixer with 24-bit digital multi-effect built-in. It is just one of the many ▲LTO products that a talented, multinational Team of Audio Engineers and Musicians have developed with their great passion for music. Your APM is a remarkable compact powered mixer that doesn't find many equals in the market today. With 8 microphone (12 microphone for APM160) and 2 stereo Line-level inputs for serious live performances, your APM Series also includes a 24-bit digital multi-effect with 16 Factory Presets and 16 variations for every preset, for a total of 256 different digital effects. There is a three bands EQ on mono input channels, four bands EQ on stereo input channels. Use it for small Gigs, for Church applications and for Conference.
Enjoy your APM Series and make sure to read this Manual carefully before operation!

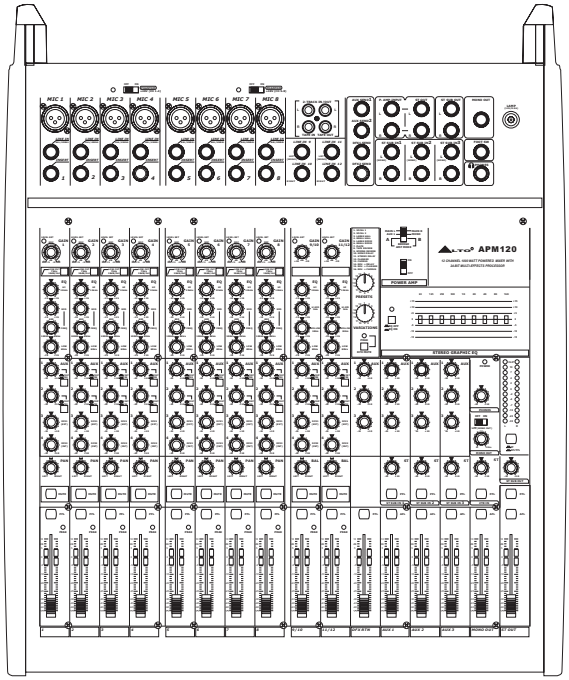
2. FEATURES

- ▲ 8 MONO (APM120)/12 MONO (APM160) inputs with gold plated XLR and balanced TRS jack.
- ▲ 2 Stereo input channels with balanced TRS jacks.
- ▲ GAIN and +48 V Phantom power for mono/MIC inputs.
- ▲ Peak LED in each channel.
- ▲ 3-band EQ with sweepable MID on mono inputs.
- ▲ 4-band EQ on stereo inputs.
- ▲ 24-bit internal DSP with 256 effects, 16 presets by 16 variations with DSP mute switch and peak LED.
- ▲ 9-band graphic EQ.
- ▲ BNC socket for connecting gooseneck lamps.
- ▲ Low cut filters 75 Hz, 18 dB/Oct. on mono inputs.
- ▲ Low pass filter on mono outputs (80~120 Hz).
- ▲ High accurate 12-segment Bar graph Meters.

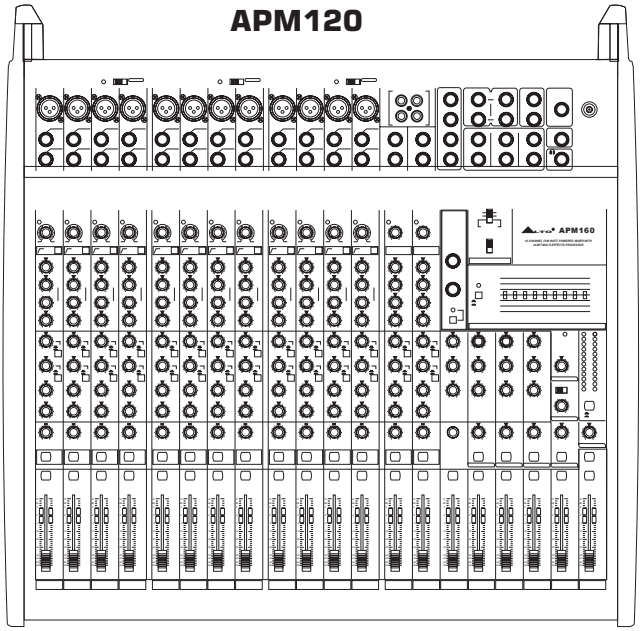
  Maximum Output Power(EIAJ):

  APM120: 500 W+500 W/4 Ohms (1000 W bridge/8 Ohms)

  APM160: 750 W+750 W/4 Ohms (1500 W bridge/8 Ohms)



APM120



APM160

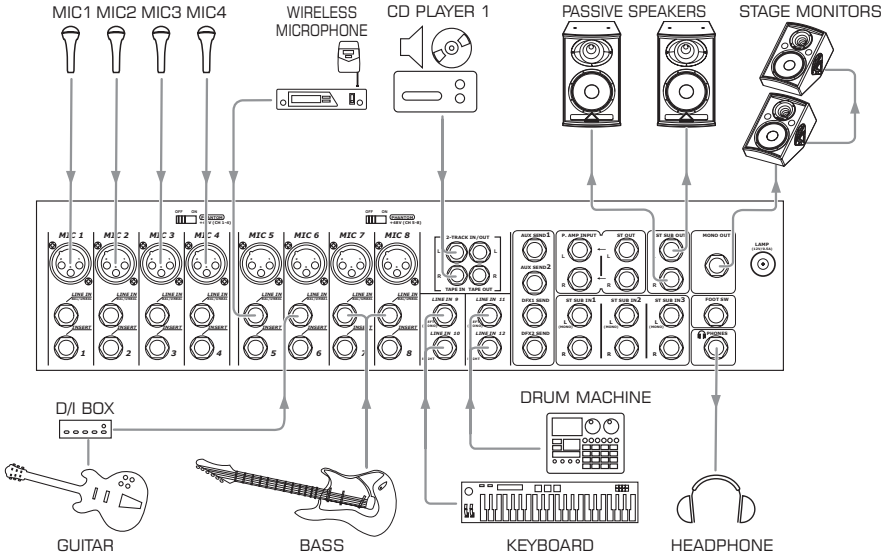
3. QUICK START

This is the fastest way to get something out from your APM Series, if you have a keyboard and a microphone.

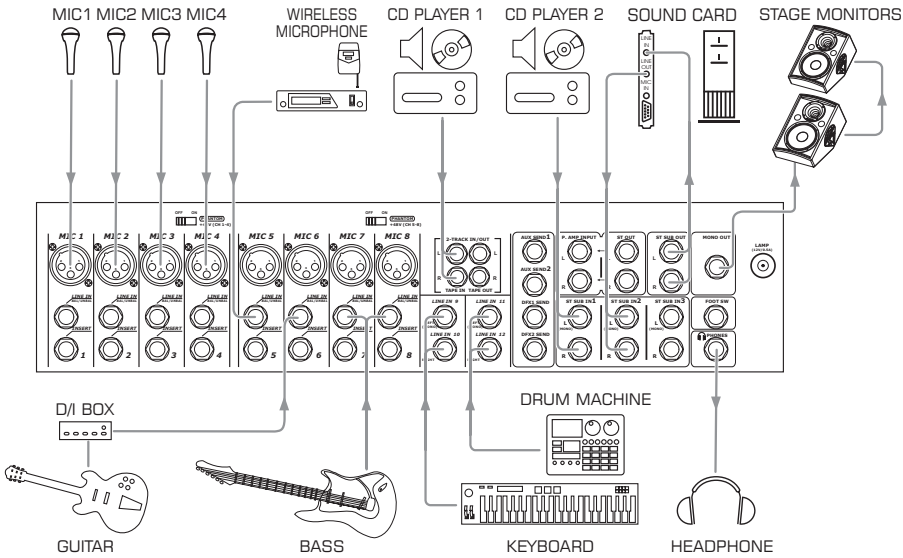
a. Plug the microphone into Channel 1 MIC IN.
b. Turn down AUX and LEVEL controls on the input channel.
c. Put the EQ controls on center position.
d. Connect 2 passive cabinets to the rear speaker cabinets.
e. Turn on your APM Series.
f. Sing or speak into the microphone with normal volume and adjust the channel LEVEL control of half.
g. If you like, you can adjust the EQ at this stage.
h. The LED on the Master LED meter should flash only occasionally, otherwise you will hear distortion. If this LED is not active and you still hear distortion, please turn down a little the input LEVEL control or reduce the output level of your source instrument.
i. Connect your stereo keyboard into channel 9/10 and repeat the sequence.(for APM120)
   Connect your stereo keyboard into channel 13/14 and repeat the sequence.(for APM160)

Here you are. It is your first gig with your APM Series.

SMALL GIG HOOKUP DIAGRAM



COMPUTER SET-UP DIAGRAM



4. CONTROL ELEMENTS

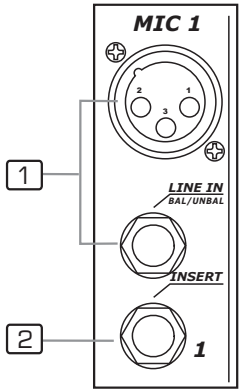
Mono and Stereo Input Channels

1 The MONO MIC/LINE Channels

Your APM120 is equipped with 8 (12 for APM160) low-noise microphone preamplifiers with optional phantom power, 45 dB of Gain and over 115 dB of S/N ratio. You can connect almost any type of microphone. Dynamic microphones do not need phantom power. Use phantom power only with condenser microphones but make sure that the phantom power button is disengaged before connecting the microphone. Phantom power will not damage your dynamic microphones, so make sure to read the microphone instructions manual before engaging phantom power. Use switch (4) to activate/deactivate phantom power. These channels are also equipped with 1/4" TRS balanced/unbalanced LINE-IN plugs to connect line-level instruments such as keyboards, drum machines and effect devices.

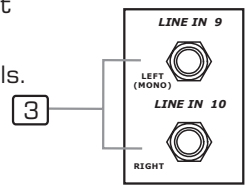
2 MONO Channel INSERT

This is where you connect external sound processors such as compressor-limiter, equalizers, etc. The insert point is available on the first 8 MIC (12 for APM120) channels only. For the other channels you can always insert the processor in between the sound source (such as keyboard or drum machine) and the APM input. The Insert sockets can be used as direct-outs to feed the input of a 4-track tape recorder.



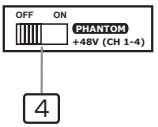
3 STEREO INPUTS

These are Channel 9/10 and 11/12 (Channel13/14 and 15/16 for APM160). They are organised in stereo pair and provided with 1/4" TRS phone sockets. If you connect only the left jack, the input will operate in mono mode, that is the mono signal will appear on both input channels. You can use these inputs with a stereo keyboard, drum machine, etc.



4 +48 Volt Phantom Power

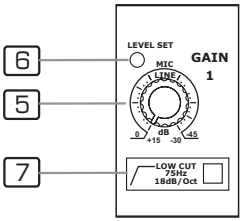
It is available only to the XLR MIC sockets. Never plug in a microphone when phantom power is already on. Before turning phantom power on, make sure that all faders are all the way down. In this way you will protect your stage monitors and main loudspeakers.



4. CONTROL ELEMENTS

5 MONO IN GAIN

This control is provided with 2 different indications: One is for the MIC and the other for LINE levels. When you use a microphone, you shall read the MIC ring (0~-45dB); when you use a line level instrument, you shall read the LINE ring (+15~-30dB). For optimum operation you shall set this control in a way that the PEAK LED(18) blinks only occasionally in order to avoid distortion on the input channel.

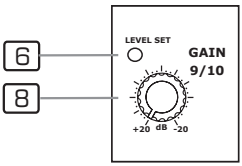


6 LEVEL SET LED

This LED will help you to detect the input level immediately. In this case the research of the fault will become much faster!

7 LOW-CUT Button

By pressing this button you will activate a 75 Hz low frequency filter with a slope of 18 dB per octave. You can use this facility to reduce the hum noise infected by the mains power supply, or the stage rumble while using a microphone.

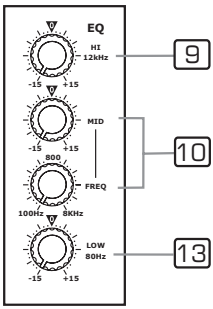


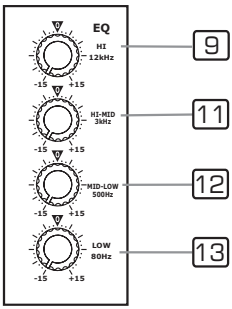
8 STEREO IN GAIN

When you use a line level instrument, you shall read the ring (+20~-20dB). For optimum operation you shall set this control in a way that the PEAK LED(18) blinks only occasionally in order to avoid distortion on the input channel.

EQUALISER

There are 3 bands EQ with sweepable MID on all mono input channel1-8 (channel1-12 for APM160): HI, MID and LOW band. There are 4 bands fixed frequency EQ on the stereo channel 9-12 (channel13-16 for APM160): HI, HI-MID, MID-LOW and LOW band. All bands provide up to 15 dB of boost or cut.





9 HI

If you turn this control up, you will boost all the frequencies above 12 kHz (shelving filter). You will add transparency to vocals and guitar and also make cymbals crispier. Turn the control down to cut all frequencies above 12 kHz. In such way you can reduce Sibilances of human voice or reduce the hiss of a Tape player.

10 MID

This is a peaking filter and it will boost/cut frequencies from 100 Hz to 8 kHz depending on the position of the MID freq control. This control will affect especially upper male and lower female vocal ranges and also the harmonics of most musical instruments.

11 HI-MID

This control gives you up to 15 dB boost/cut at 3 kHz. It is useful for controlling voice. It can accurately polish your performance via adjusting this knob.

12 MID-LOW

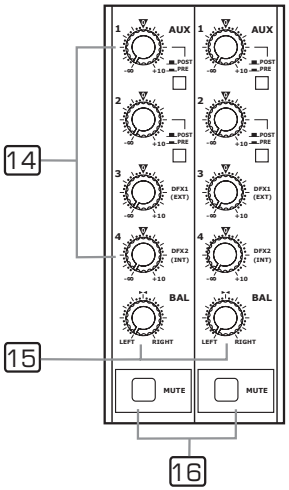
This control gives you up to 15dB boost or cut at 500Hz.

13 LOW

If you turn this control up, you will boost all frequencies below 80Hz. You will give more punch to bass drum and bass guitar and make the vocalist more "macho". Turn it down, you will cut all the frequencies below 80Hz. In this way you can avoid low-frequency vibrations and resonance thus preserving the life of your woofers.

14 AUX SENDS Level Control

These four controls are used to adjust the level of the respective signal sent to AUX bus, AUX1 and AUX2 can be switched to PRE/POST-FADER via the PRE/POST button, so, generally, they can be used for monitor application and effects & sound processors Input. AUX3 and AUX4 are configured as POST-Faders. In this typical compact unit, excluding sending out the signal directly to the external effect or processor equipment, AUX SEND4 can also be assigned to the internal onboard effect module.



15 PAN/BAL Control

Abbreviation of PANORAMA control for mono channels, or the stereo channels, always says, BALANCE control. Keep this control in center position, then the signal will be positioned in the middle of stage.

16 MUTE Switch

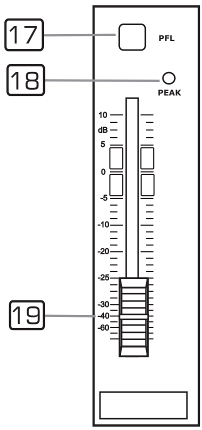
Each channel is equipped with the MUTE switch. Pressing this switch is equal to turning the fader down, which can mute the corresponding channel output except for the PRE AUX sends, channel INSERT send.

17 PFL (pre-fader listen) Switch

Each channel has a PFL switch which will send a signal from a post-EQ pre-fader location to the PHONES jack. Use this when you wish to use the headphones to monitor only a specific channel. Moreover, you can monitor a channel no matter the channel is lowered or the MUTE switch is on when this PFL switch is engaged. This will not affect the signals that are sent to the ST bus and AUX buses.

18 PEAK LED

Inside your APM Series the audio signal is monitored in several different stages and then sent to the PEAK LED. When the LED is red illuminated, it warns you that you are reaching signal saturation and possible distortion, then you should reduce the input level for avoiding distortion.



19 FADER

This fader will adjust the overall level of this channel and set the amount of signal sent to the main output.

Master Section

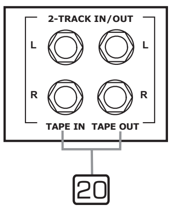
20 2-TRACK IN/OUT

- TAPE IN

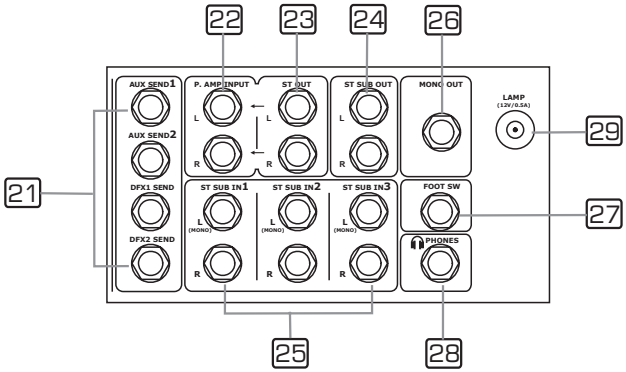
Use the Tape input if you wish to listen to your mix from a Tape Recorder or DAT.

- TAPE OUT

These RCA jacks will route the main mix into a tape recorder.



4. CONTROL ELEMENTS



21 AUX/DFX SENDS Connectors

These 1/4" phone jacks are used to send out the signal from the AUX bus to external devices such as effect units and/or stage monitors.

22 P. AMP INPUT Jacks

These 1/4" phone jacks are used to input line level stereo signals to the built-in power amplifier.

23 ST OUT Jacks

These jacks are used to output the signal of the STEREO bus. The final output level from these jacks is adjusted by the ST OUT fader.

24 ST SUB OUT Jacks

These jacks are used to output the signal of the STEREO bus. Use the ST SUB OUT control to adjust the final output level at the ST SUB OUT jacks. Generally, it is available to connecting effects unit.

25 ST SUB IN 1-3 Jacks

These 1/4" jacks are used to connect stereo output of a sub mixer or external effect processor. The signal input can be routed to the AUX1-3 bus and STEREO bus.

26 MONO OUTPUT Jack

Use this balanced MONO jack to connect the input of an external amplifier or active monitor speaker.

27 FOOTSWITCH Jack

This 1/4" jack can be used to connect an external foot switch to turn on/off the onboard effect module.

4. CONTROL ELEMENTS

28 PHONES Jack

This jack will be used to send the signal to a headphone or to a pair of powered studio monitors.

29 LAMP

This lovable LAMP is very convenient for your operation, it is located in the top right corner of the front panel, and provides the 12V socket that can drive standard BNC-type lamp.

30 LED METER Display

The LED METER Display indicates the output signal level. By pressing the switch, you can choose the output signal source. When the switch is off, the stereo LED meter will indicate the signal level sent to ST OUT outputs. When the switch is on, the LED meter indicates the signal level sent to PHONES output.

31 ST SUB OUT Control

This knob adjusts the final level of the signal sent from the ST bus to the ST SUB OUT jacks.

32 AUX1-3 Controls

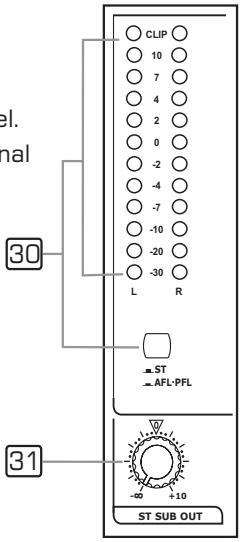
These knobs are used to adjust the amount of the signal sent from the ST SUB IN1-3 jacks to the AUX1, 2 and 3 buses.

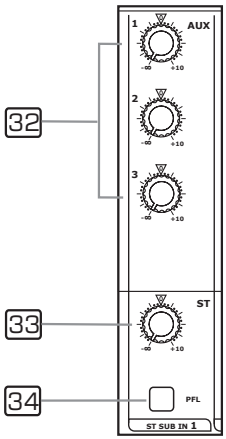
33 ST (stereo) Controls

The ST knob is used to adjust the amount of stereo signal sent from the ST SUB IN1-3 jacks to the STEREO bus.

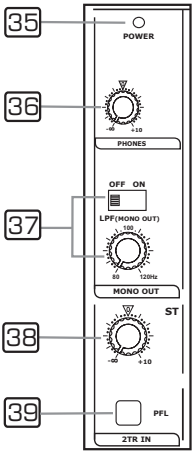
34 PFL (pre-fader listen) Switch

When this switch is engaged, the signal at the point before the ST control knob is sent to the PHONES jack.





4. CONTROL ELEMENTS



35 POWER LED

The LED indicates when the power is switched on.

36 PHONES Control

This control is used to adjust the level of PHONES output, which can be varied from -∞ to +10.

37 LPF (MONO OUT)

- LPF ON/OFF Switch

This switch applies a low-pass filter to the signal that is output from the STEREO bus.

- LPF Control

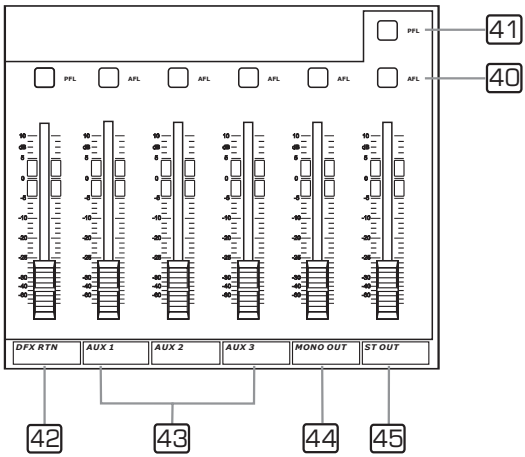
You can adjust the frequency to the desired position by using a screwdriver to turn the control. The output region will below the frequency (80-120 Hz) if you specify by the control. Use it when you are using a sub-woofer.

38 ST (stereo) Control

This knob is used to adjust the level of the signal sent from the 2TR IN jacks to the STEREO bus. The adjustable range goes from -∞ to +10dB.

39 PFL Switch

When this switch is engaged, the signal input from the 2TR IN jacks is routed at the point before the ST control to the PHONES jack.



4. CONTROL ELEMENTS

40 AFL Switch

When this switch is on, the output signal that passes through the corresponding fader is sent to the jack.

41 PFL Switch

When this switch is engaged, the signal at the point before the ST OUT control fader is sent to the PHONE jack.

42 DFX RTN Fader

This fader is used to adjust the level of the return signal which is sent from the built-in DSP to the STEREO bus.

43 AUX1-3 Fader

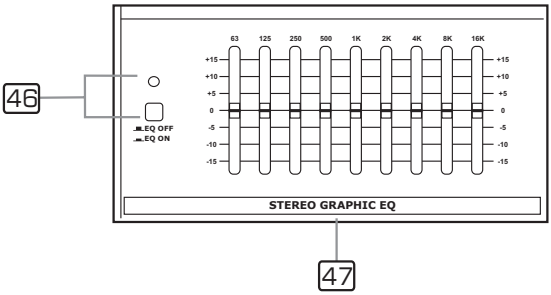
The AUX1-3 faders adjust the final level of the signal sent from the AUX1-3 bus to the AUX SEND1-3 jacks.

44 MONO OUT Fader

The MONO OUT fader adjusts the final level of the signal output from the STEREO bus to the MONO OUT jack.

45 ST OUT Fader

The ST OUT fader adjusts the final level of the signal sent from the STEREO bus to the ST OUT jacks.



46 EQ Switch

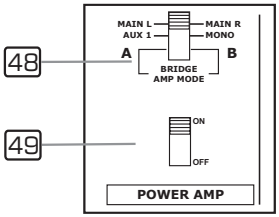
Engage this button to add the stereo graphic EQ into the main mix output circuit. It can be used to modify the frequency "contour" of a sound. If you release the button free, the stereo graphic EQ will be bypassed.

47 STEREO GRAPHIC EQ

Each one of these faders will boost or attenuate (+/-15dB) the selected frequency at a preset bandwidth. When all the faders are in the centre position, the output of the equalizer is flat response.

48 POWER AMP. MODE Switch

This switch provides three modes: MAIN L/MAIN R; AUX1/MONO; BRIDGE. Select any one of these modes to specify the signals to be routed to the corresponding jacks according to the speaker connection at speaker jacks on the rear panel. The details refer to later content.



49 POWER AMP Switch

This switch is used to control the amplifier input signal.

DSP SECTION

There is a powerful 24-bit/256 presets digital multi-effects included in your APM Series Effects include reverbs, chorus, flanger, delay and combinations of the above.

50 PRESETS Control

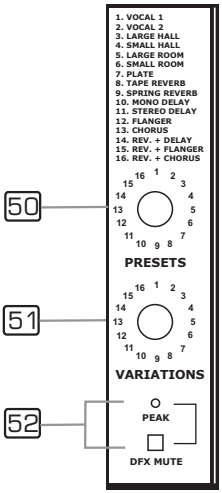
Adjust this knob to select the right effect you wish to perform. There are total 16 options for you: several kinds of reverb, mono and stereo delay, effects with modulation, and versatile two-effect combination.

52 VARIATIONS Control

Since you have selected the preferable effect, the next step, please go with the fine consideration, there are also total 16 variations for each preset, and each variation may be managed by several different factors.

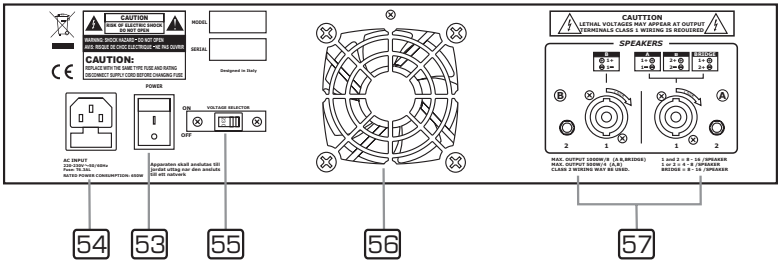
53 DFX MUTE Switch & PEAK LED

This switch is used to activate/deactivate the effect facility. This LED lights up when the input signal is too strong. In case of the digital effect module being muted, this LED also lights up.



4. CONTROL ELEMENTS

REAR PANEL



53 POWER ON/OFF Switch

This switch is used to turn the main power ON and OFF.

54 AC Inlet with FUSE Holder

Use it to connect your APM Series to the main AC with the supplied AC cord. Please check the voltage available in your country and how the voltage for your APM Series is configured before attempting to connect your APM Series to the main AC.

55 VOLTAGE Selector

There are two kinds of voltages for your operation. From this switch you can select the voltage at 100~120VAC or 220~240VAC.

56 VENTS

These vents are used for ventilation and heat dissipation.

57 SPEAKERS Jacks

These jacks are used to connect speakers. They are configured with 4-way speakon connectors and 1/4" phone jacks. You can determine the signal that is output to these jacks according to the setting of the AMPLIFIER MODE select switch.

※Note: In order to avoid damage to the built-in amplifier, please pay attention to the allowed impedance of the speaker. Very low load impedances may damage the amplifier.

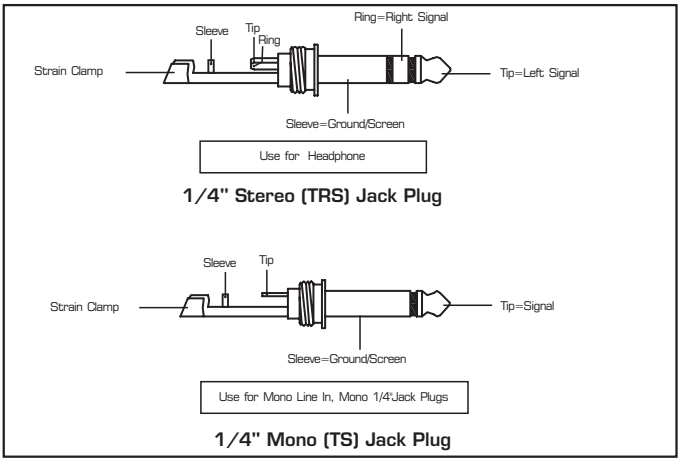
5. INSTALLATION AND CONNECTION

Ok, you have got to this point and you are now in the position to successfully operate your APM Series. However, we advise you to read the following section carefully to be the real master of your own mix. Not paying enough attention to the input signal level, the routing of the signal and the assignment of the signal will result in unwanted distortion, a corrupted signal or no sound at all. So you should follow this procedure for every single channel:

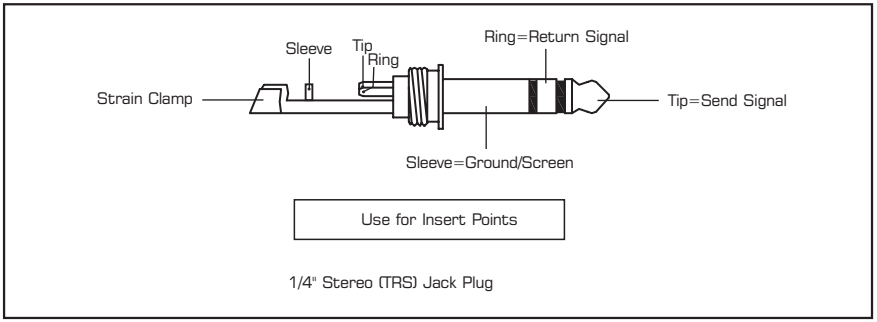
1. Turn down all Input and output gain controls.
2. Connect phantom powered microphones before switching on the +48 Volt phantom power switch.
3. Set the output level of your APM Series or the connected power amplifier at no more than 75%.
4. Position EQ controls on middle position.
5. Position panoramic (PAN) control on center position.
6. Increase the input gain properly for maintaining the good headroom and ideal dynamic range.
7. Depending on the actual application, turn slowly the input and output level controls for obtaining the maximum gain before distortion.
8. Now repeat the same sequence for all input channels. The main LED meter could move up into the red section. In this case you can adjust the overall output level through the main mix control.

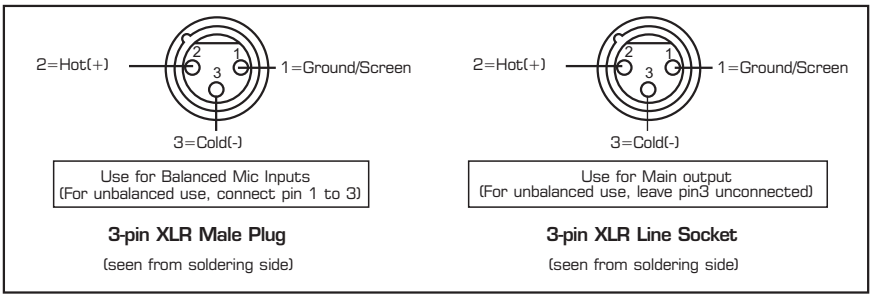
Audio Connections

You can connect unbalanced equipment to balanced inputs and outputs. Simply follow these schematics.



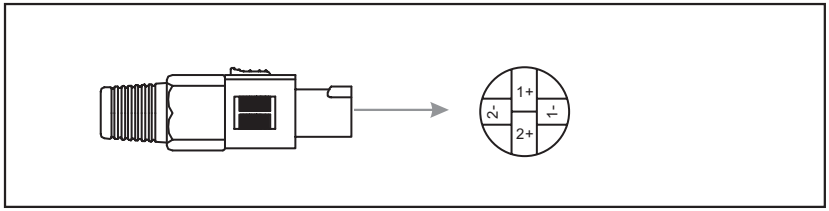
5. INSTALLATION AND CONNECTION





MAIN SPEAKERS CONNECTION

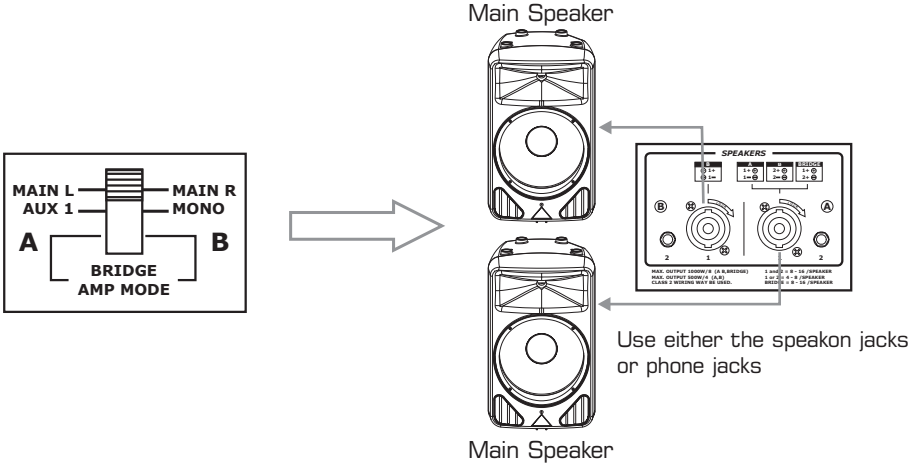
Please use only the power connectors to make connections with other signal source equipment for the passive speaker cabinets. The power connector has four terminals: 1+, 1-, 2+, 2-.



Speakon connector

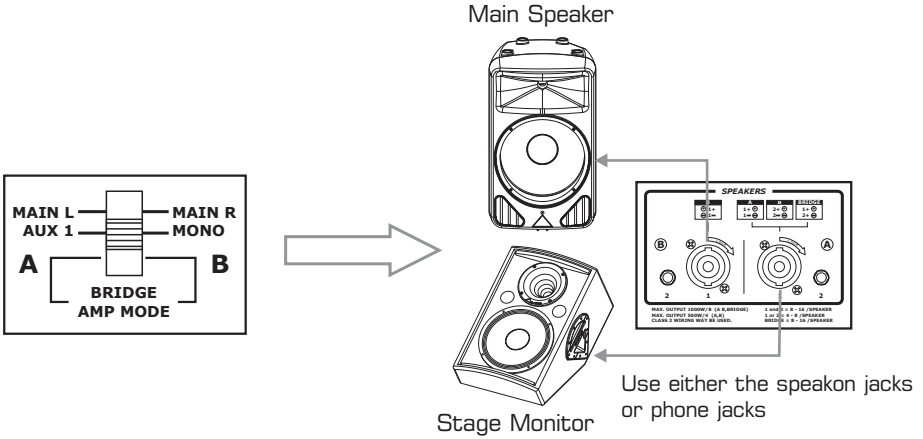
5. INSTALLATION AND CONNECTION

And now some tips how to use the AMPLIFIER MODE switch



MAIN L + MAIN R Mode

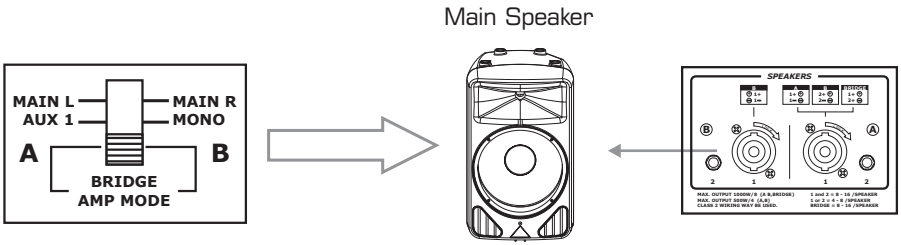
This is the most common application. The built-in amplifier drives two main speaker cabinets Left and Right. The AMPLIFIER MODE is on MAIN L+MAIN R position.



AUX1 + MONO Mode

With the AMPLIFIER MODE in AUX1+MONO position, channel1 drives a Main speaker cabinet while channel2 drives a stage monitor.

5. INSTALLATION AND CONNECTION



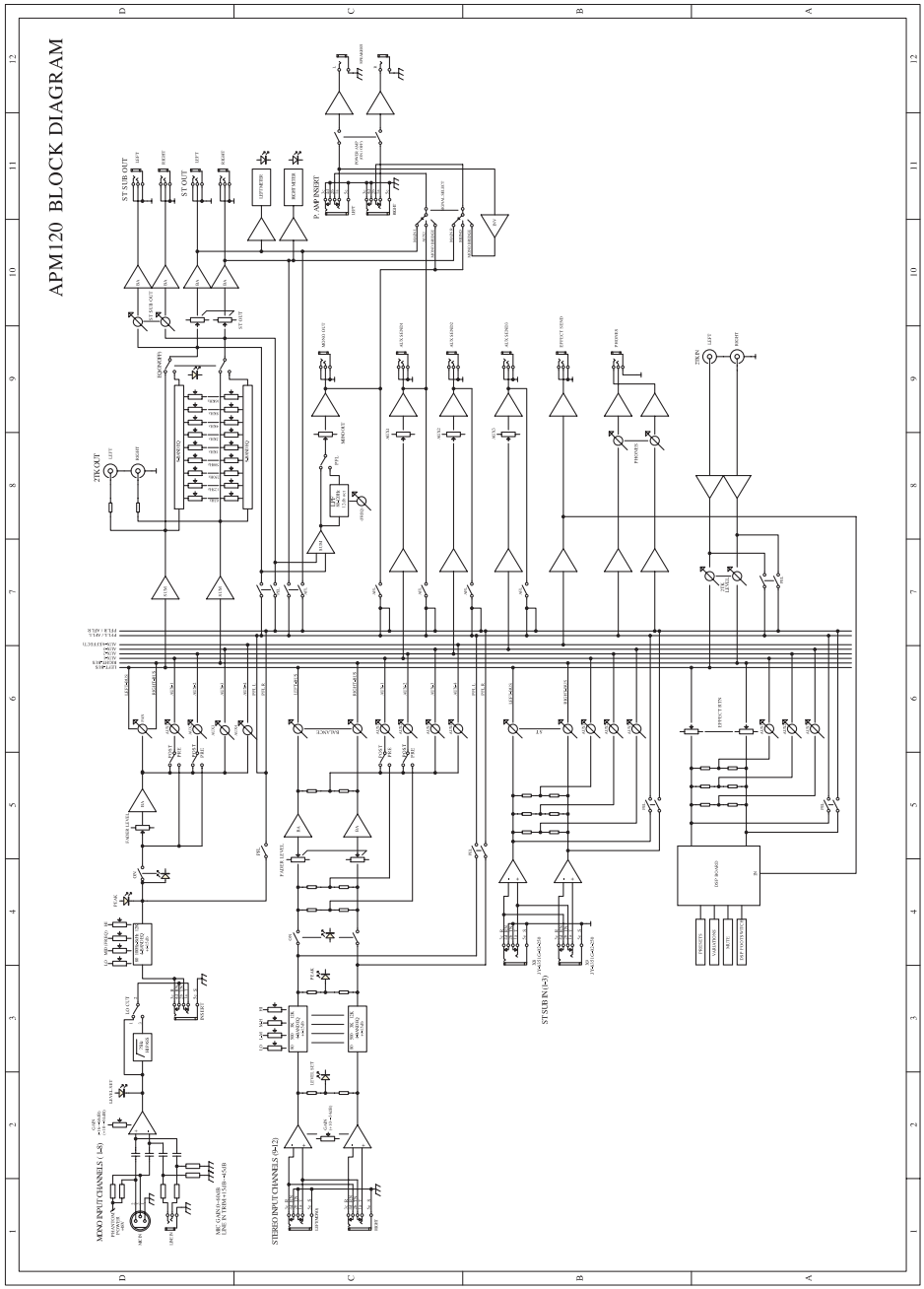
Bridge Mode

With the AMPLIFIER MODE switch in BRIDGE position the two power amplifiers in your APM Series drive together a single speaker cabinet with the sum of the power of the 2 amps. Usually this solution is used to drive a single subwoofer and the main out output on the front panel are used to feed a pair of powered speakers as mid-high units.

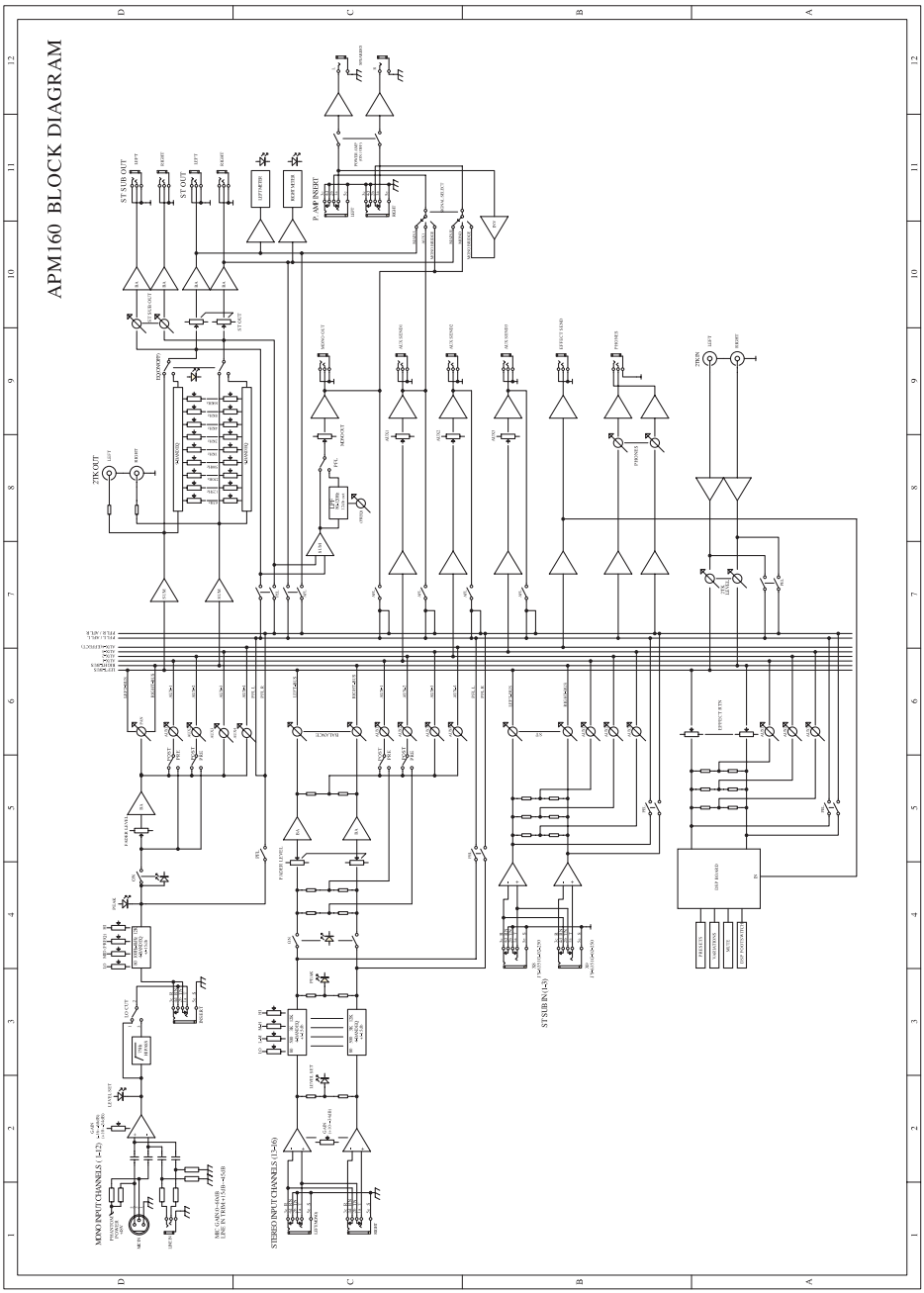
6. PRESET LIST

NO.	Preset	Description	Controllable Parameter	
			Parameter	Variable range
1	VOCAL1	Simulate a room with small delay time.	Decay time Pre-delay	0.8~1.1s 0~79ms
2	VOCAL2	Simulate a small space with slight decay time	Decay time Pre-delay	0.8~2.5s 0~79ms
3	LARGE HALL	Simulate a large acoustic space of the sound.	Decay time Pre-delay	3.6~5.4s 23~55ms
4	SMALL HALL	Simulate a stage space of the sound.	Decay time Pre-delay	1.0~2.9s 20~45ms
5	LARGE ROOM	Simulate a studio room with many early reflections	Decay time Pre-delay	2.9~4.5s 23~55ms
6	SMALL ROOM	Simulate a bright studio room.	Decay time Pre-delay	0.7~2.1s 20~45ms
7	PLATE	Simulate the transducers sound like classic bright vocal plate.	Decay time Pre-delay	0.6~6.1s 10ms
8	TAPE REVERB	Simulate a record head and multiple playback heads at intervals along the tape.	Decay time Pre-delay	1.3~5.4s 0~84ms
9	SPRING REVERB	Simulate the analog transducers' springs lightly stretched sound.	Decay time Pre-delay	1.3~5.4s 0~35ms
10	MONO DELAY	Reproduce the sound input on the output after a lapse of time.	Period	60~650ms
11	STEREO DELAY	Recreate the input sound on the stereo output with different time.	Period Feedback	210~400ms 37~73%
12	FLANGER	Simulate to play with another person carrying out same the notes on the same instrument	Rate	0.16~2.79Hz
13	CHORUS	Recreate the illusion of more than one instrument from a single instrument sound	Rate	0.5~5Hz
14	REV.+DELAY	Delay with room effect	Decay period Rev.decay time	211~375ms 1.0~2.9s
15	REV.+FLANGER	Stereo flanger and large room reverb	Flanger Rate Rev.decay time	0.16~2.52Hz
16	REV.+CHORUS	Stereo chorus and large room reverb	Chorus rate Rev.decay time	0.5~4.74Hz 1.5~2.9s

7. BLOCK DIAGRAM



7. BLOCK DIAGRAM



8. TECHNICAL SPECIFICATION

Mono input channels		
Microphone input	electronically balanced, discrete input configuration	
Frequency response	10 Hz to 55 kHz, +/ 3 dB	
Distortion (THD & N)	0.005% at +4 dBu, 1 kHz	
Gain	0 dB to 45 dB (MIC)	
SNR (Signal to Noise Ratio)	115 dB	
Line input	electronically balanced	
Frequency response	10 Hz to 55 kHz, +/ 3 dB	
Distortion (THD & N)	0.005% at +4 dBu, 1 kHz	
Gain	-15 dBu to 30 dBu	
Stereo input channels		
Line input	Unbalanced	
Frequency response	10 Hz to 55 kHz, +/ 3 dB	
Distortion (THD & N)	0.005% at +4 dBu, 1 kHz	
Impedances		
Microphone input	1.4 kOhm	
Channel Insert return	2.5 kOhm	
All other inputs	10 kOhm or greater	
Tape out	1 kOhm	
All other output	120 Ohm	
Mono Equalization		
Hi-shelving	+/ 15 dB @12 kHz	
Mid-peak/dip	+/ 15 dB -frequency range 100~8kHz	
Low-shelving	+/ 15 dB @ 80 Hz	
Stereo Equalization		
Hi-shelving	+/ 15 dB @12 kHz	
Mid-peak/dip	+/ 15 dB @3 kHz	
Mid Low-peak/dip	+/ 15 dB @ 500 Hz	
Low shelving	+/ 15 dB @ 80 Hz	
DSP Section		
A/D and D/A converters	24-bit	
DSP resolution	24-bit	
Type of effects	Hall, Room, Vocal & Plate REVERBS	
	Mono & Stereo DELAY (max DELAY TIME 650ms)	
	Chorus, Flanger & Reverb MODULATIONS	
	REVERB+DELAY, REVERB+CHORUS,	
	REVERB+FLANGER combinations	
Presets	256	
Controls	16-position PRESET Selector	
	16-position VARIATION selector	
	CLIP LED	
	MUTE SWITCH with LED indicator	
Main Mix Section		
Noise (bus noise)	Fader 0dB, all input channels assigned and set to	
	UNITY gain: 100 dBr (ref.:+4 dBu)	
Max output	+22 dBu balanced ,	
AUX Sends max out	+22 dBu	
ST SUB OUT	+22 dBu	
Power Supply		
Main voltage	100 VAC ~ 60 Hz	230 VAC ~ 50 Hz
	120 VAC ~ 60 Hz	240 VAC ~ 50 Hz
Power Consumption		
APM120	Stereo mode: 2 x 500 W @ 4 Ohm(EIAJ)	2 x 340 W @ 4 Ohm(RMS)
	Bridge mode: 1000 W @ 8 Ohm(EIAJ)	
APM160	Stereo mode: 2 x 750 W @ 4 Ohm(EIAJ)	2 x 520 W @ 4 Ohm(RMS)
	Bridge mode: 1500 W @ 8 Ohm(EIAJ)	

Fuse	APM120	100 ~ 120 V : 10 A
		210 ~ 240 V : 6.3 A
	APM160	100 ~ 120 V : 12 A
		210 ~ 240 V : 6.3 A
Physical		
Dimension (WxDxH)	APM120	565x450x145 mm
	APM160	565x555x145 mm
Weight	APM120	(Net) : 10.68 kg (23.5 lb)
		(Gross) : 15.2 kg (33.5 lb)
	APM160	(Net) : 12.5 kg (27.6 lb)
		(Gross) : 17.4 kg (38.4 lb)

9. WARRANTY

1. WARRANTY REGISTRATION CARD

To obtain Warranty Service, the buyer should first fill out and return the enclosed Warranty Registration Card within 10 days of the Purchase Date.

All the information presented in this Warranty Registration Card gives the manufacturer a better understanding of the sales status, so as to provide a more effective and efficient after-sales warranty service. Please fill out all the information carefully and genuinely, miswriting or absence of this card will void your warranty service.

2. RETURN NOTICE

2.1 In case of return for any warranty service, please make sure that the product is well packed in its original shipping carton, and it can protect your unit from any other extra damage.

2.2 Please provide a copy of your sales receipt or other proof of purchase with the returned machine, and give detail information about your return address and contact telephone number.

2.3 A brief description of the defect will be appreciated.

2.4 Please prepay all the costs involved in the return shipping, handling and insurance.

3. TERMS AND CONDITIONS

3.1 ▲LTO warrants that this product will be free from any defects in materials and/or workmanship for a period of 1 year from the purchase date if you have completed the Warranty Registration Card in time.

3.2 The warranty service is only available to the original consumer, who purchased this product directly from the retail dealer, and it can not be transferred.

3.3 During the warranty service, ▲LTO may repair or replace this product at its own option at no charge to you for parts or for labor in accordance with the right side of this limited warranty.

3.4 This warranty does not apply to the damages to this product that occurred as the following conditions:

- Instead of operating in accordance with the user's manual thoroughly, any abuse or misuse of this product.
- Normal tear and wear.
- The product has been altered or modified in any way.
- Damage which may have been caused either directly or indirectly by another product / force / etc.
- Abnormal service or repairing by anyone other than the qualified personnel or technician.

And in such cases, all the expenses will be charged to the buyer.

3.5 In no event shall ▲LTO be liable for any incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you.

3.6 This warranty gives you the specific rights, and these rights are compatible with the state laws, you may also have other statutory rights that may vary from state to state.

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