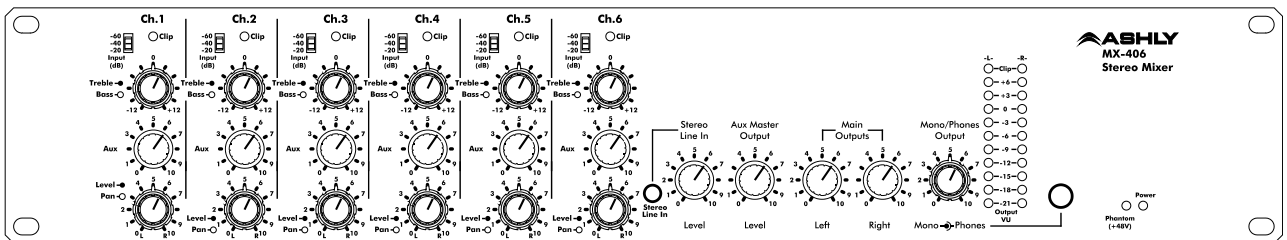




MX-406 Stereo Microphone/Line Mixer

Operating Manual



ASHLY AUDIO INC.

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Important Safety Instructions

Consignes de sécurité à lire attentivement



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 instructions in the literature accompanying the device.

Le symbole de la foudre dans un triangle équilatéral symbolisant la foudre est prévu pour sensibiliser l'utilisateur à la présence de tension de voltage non isolée à l'intérieur de l'appareil. Elle pourrait constituer un danger de risque de décharge électrique pour les utilisateurs. Le point d'exclamation dans le triangle équilatérale alerte l'utilisateur de la présence de consignes qu'il doit d'abord consulter avant d'utiliser l'appareil.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
6. Do not use this apparatus near water.
7. Clean only with dry cloth.
8. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
9. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus.
10. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
11. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
12. Only use attachments/accessories specified by the manufacturer.
13. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
14. Unplug this apparatus during lightning storms or when unused for long periods of time.
15. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

1. Lisez ces instructions.
2. Conservez ces instructions.
3. Observez les avertissements.
4. Suivez ces instructions.
5. Pour réduire le risque de feu ou la décharge électrique, ne pas exposer cet appareil pour pleuvoir ou l'humidité.
6. Ne pas utiliser l'appareil près de l'eau.
7. Le nettoyer à l'aide d'un tissu sec.
8. Ne pas bloquer les ouvertures de ventilation, installer selon les consignes du fabricant.
9. Eloigner des sources de chaleur tel: radiateurs, fourneaux ou autres appareils qui produisent de la chaleur.
10. Ne pas modifier ou amputer le système de la mise à terre. Une prise avec mise à terre comprend deux lames dont une plus large ainsi qu'une mise à terre: ne pas la couper ou la modifier. Si la prise murale n'accepte pas la fiche, consulter un électricien pour qu'il remplace la prise désuète.
11. Protéger le cordon de secteur contre tous bris ou pincement qui pourraient l'endommager, soit à la fiche murale ou à l'appareil.
12. N'employer que les accessoires recommandés par le fabricant.
13. N'utiliser qu'avec les systèmes de fixation, chariots, trépid ou autres, approuvés par le fabricant ou vendus avec l'appareil.
14. Débrancher l'appareil lors des orages électriques ou si inutilisé pendant une longue période de temps.
15. Un entretien effectué par un centre de service accrédité est exigé si l'appareil a été endommagé de quelque façon: si il a été exposé à la pluie,, l'humidité ou s'il ne fonctionne pas normalement ou qu'il a été échappé.

FCC Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in both a commercial and residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help..

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1. INTRODUCTION

Congratulations on your purchase of an Ashly MX-406 stereo mic/line mixer, a professional, studio quality solution to everyday mixing needs. MX-406 features include six channels of mic or line inputs with mic input pad, TRS insert points, and +48V phantom power. Each channel has up to 60dB input gain, separate treble and bass controls, an aux send control, level, and a stereo pan control. A stereo line input is provided for a stereo program source such as tape, CD, or MP3 player. Outputs include aux master, stereo line out (pre-master), stereo left and right, transformer balanced mono out, and stereo headphones. A full 11 segment LED array indicates stereo output level.

Stereo main outputs use 1/4" jacks, stereo line input and line out use RCA connectors, and there is an additional 3.5mm jack on the front panel for stereo line in. A transformer isolated 600 ohm mono output uses an XLR connector. Ashly mixers still use professional quality 16mm metal shaft potentiometers for greater accuracy and long life and of course, Ashly products come with a worry-free five year warranty.

2. UNPACKING

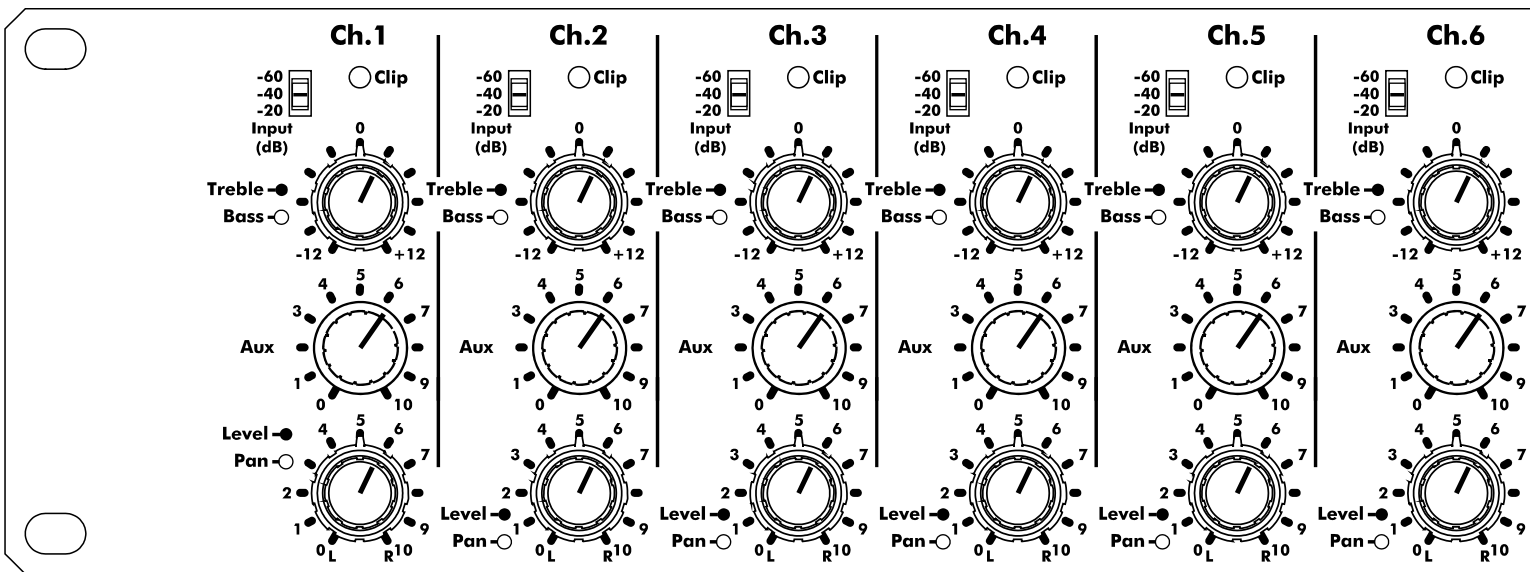
As a part of our system of quality control, every Ashly product is carefully inspected before leaving the factory to ensure flawless appearance. After unpacking, please inspect for any physical damage. Save the shipping carton and all packing materials, as they were carefully designed to reduce to minimum the possibility of transportation damage should the unit again require packing and shipping. In the event that damage has occurred, immediately notify your dealer so that a written claim to cover the damages can be initiated.

The right to any claim against a public carrier can be forfeited if the carrier is not notified promptly and if the shipping carton and packing materials are not available for inspection by the carrier. Save all packing materials until the claim has been settled.

3. AC POWER REQUIREMENTS

The MX-406 mixer will perform normally from 100 to 240 volts AC, 50-60Hz. Use only properly grounded AC receptacles. To reduce the risk of ground loop hum, use a central point for system AC power distribution. Power consumption is less than 30 watts.

WARNING:
THIS APPARATUS MUST BE EARTHED



4. FRONT PANEL CONTROLS

4.1 Input Gain

This three position switch sets the operating level of the microphone and line input preamp. The corresponding switch values -20dB, -40dB, and -60dB refer not to the actual gain, but rather to the expected nominal input signal strength.

Best signal to noise ratio is obtained with higher gain settings. It is therefore desirable to set the gain control as high as possible while still leaving 20dB of headroom for signal peaks. Line level inputs (1/4" jack) will likely use a setting of -20dB, while mic inputs generally require a setting of -40dB for close mic applications, and -60dB for quieter signals. If a channel's clip LED is blinking, first turn down that channel's level control. If the clip LED is still flashing, turn down the input gain.

4.2 Clip

Input Clip LEDs are peak sensitive and monitor all critical points within the input channel. The clip LED turns on whenever any portion of the audio path within the input channel reaches a level 3 dB below actual clipping. Clipping in the MX-406 occurs at +20dB.

4.3 Treble/Bass

This concentric knob is used for broad EQ changes to each input channel. Channel EQ consists of a high shelf control (treble) at 4KHz, and a 250Hz low shelf control (bass). EQ boost or cut is ± 12 dB.

4.4 Aux

The aux send is an additional level control used to send signal from each input channel to monitors, an effect unit, or another mix. The aux master output combines all six channel's aux level signals. The aux control is factory set to pre-fader, pre-EQ, but can be internally switched to post-fader, post EQ. To make this change, refer the following procedure to a qualified service technician:

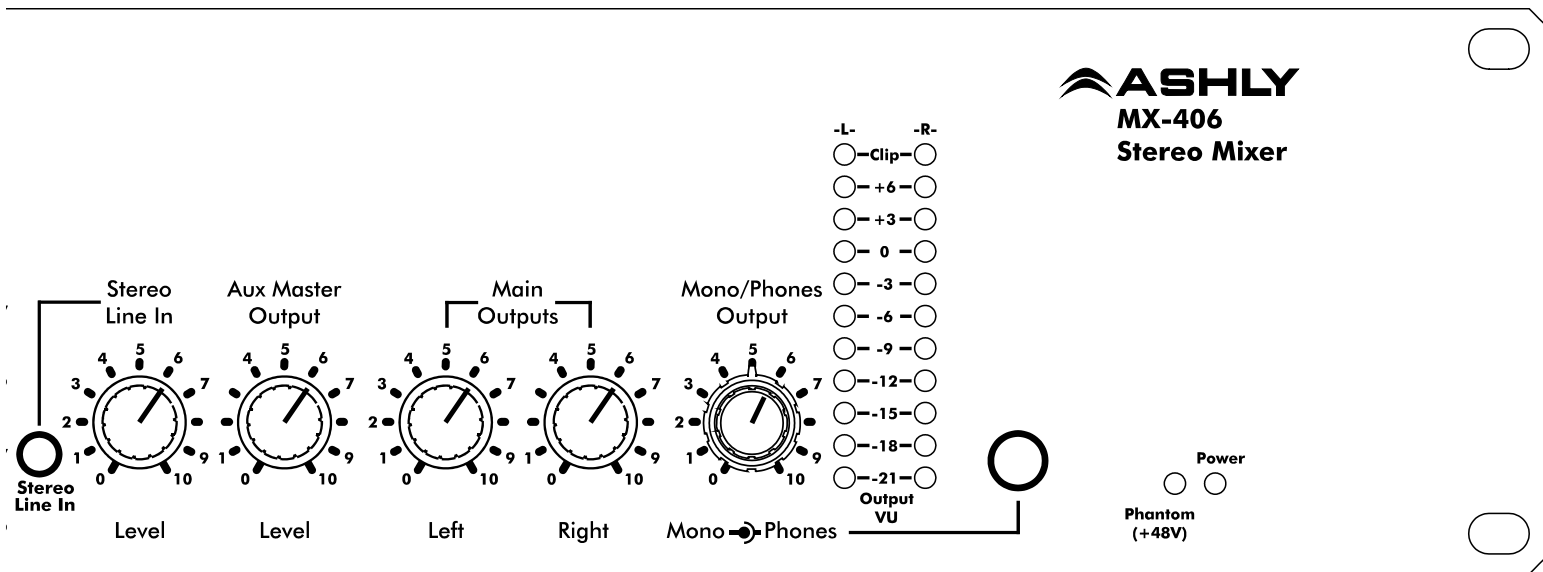
Unplug the unit's AC power cord from the outlet. Remove the bottom cover which is fastened by seven 6-32 screws. Locate the 3 pin header labeled AUX at the middle of the back edge of the front portion of the channel circuit board. Remove the shunt bar from the "Pre" position indicated on the circuit board legend and place the shunt on the "Post" position.

4.5 Level and Pan

This concentric knob adjusts the level and stereo position of each channel. If a channel's level control is always turned up to 9 or more, try increasing the gain first. Conversely, if the level control is consistently turned down to 1 or less, decrease the gain setting first. Remember that the gain setting should be set as high as possible while still allowing 20dB of headroom.

4.6 Stereo Line In

This control adjusts the level of the stereo line input RCA jack on the back panel, as well as the 3.5mm stereo line in jack on the front panel. They can be used for tape, CD/DVD, or MP3 player audio inputs, and can also be used for a stereo effect return. Both inputs can be used simultaneously, but there is only one level control. For expanding the channel



capacity of the MX-406, the stereo line input can be used as stacking inputs for supplementing the MX-406 with another mixer, such as an Ashly LX-308 stereo line level mixer.

4.7 Aux Master Output

This control adjust the level of the aux master 1/4" jack output, which gets it's signal from the six aux level controls on the input channels. It is used for an effects unit send, or can drive a power amplifier for monitors or an extra loudspeaker zone.

4.8 Main Outputs

These two controls determine the signal level to the 1/4" jack left and right outputs. They are used to drive power amplifiers for the main loudspeakers, or to connect to a stereo recording device.

4.9 Mono/Phones Output

Thinner concentric knob adjusts the level of the summed mono output. It is completely independent of the main left and right master controls. In other words, changes to either left or right output level will not affect the mono output level.

The outer concentric knob adjusts the level of the stereo signal to the headphone jack. Headphones should have an impedance of 600 ohms or greater, or signal distortion may result.

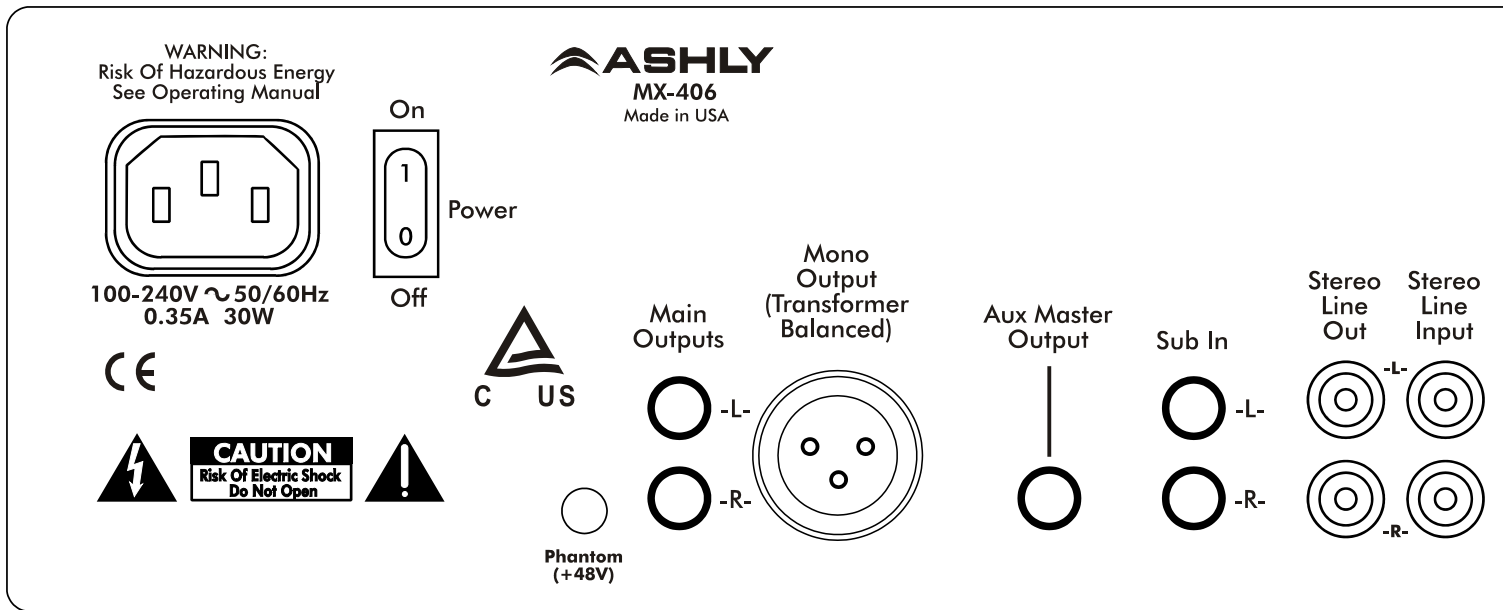
4.10 Output Meters

A pair of peak reading 10 segment LED meters are used to indicate stereo output level in VU. 0 VU is equivalent to +4 dBu (1.228Vrms).

Green LED's are used below 0 VU, yellow above 0 VU and two red LED's indicate clipping. The clip LED's turn on 3dB below actual clipping, detecting excessive signal level on any critical audio path within the master section. If all outputs are turned down and there is still clipping, then one or more inputs must be turned down.

4.11 Phantom Power LED

The phantom power switch is on the back panel. When the switch is pressed in, the LED is lit and +48VDC is applied to all six mic inputs for use with condenser microphones. If there is a mix of both condenser and dynamic microphones, the phantom power will not affect the operation of the most dynamic mics.



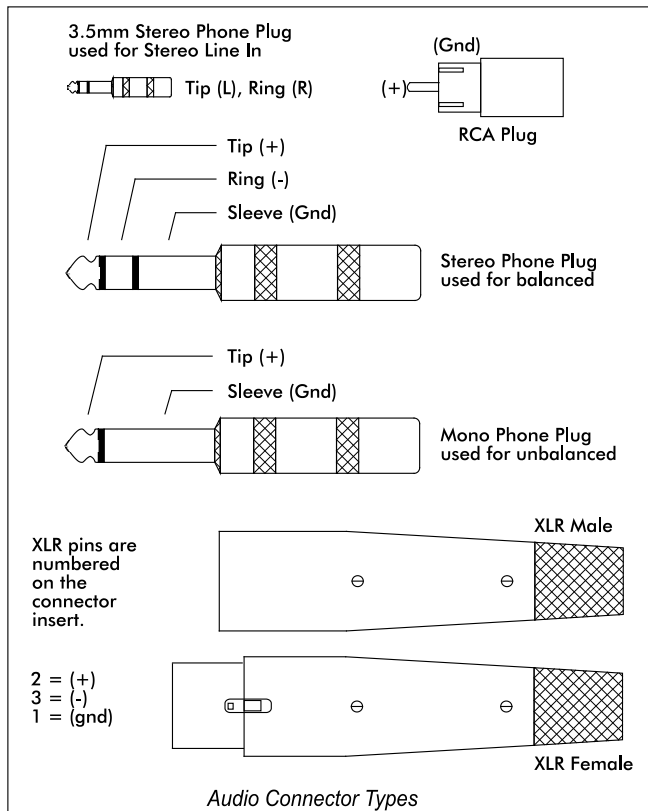
5. CONNECTORS AND CABLES

The MX-406 mixer is fitted with five types of audio connectors: 3-pin XLR type male (mono output), 3-pin XLR type female (mic inputs), 1/4" tip-ring-sleeve (TRS) phone jack, 3.5mm jack (stereo line in), and RCA jack. Certain 1/4" jack connections may use an unbalanced mono plug, which is also shown.

Two-conductor (twisted pair) shielded cable is best for all XLR type connections. Belden No. 8412 or its

equivalent is an excellent cable due to its heavy construction. This type of cable should be used for all portable applications. Snake cables containing multiple shielded pairs must be handled very carefully because the leads tend to be fragile, and a broken conductor is difficult to repair.

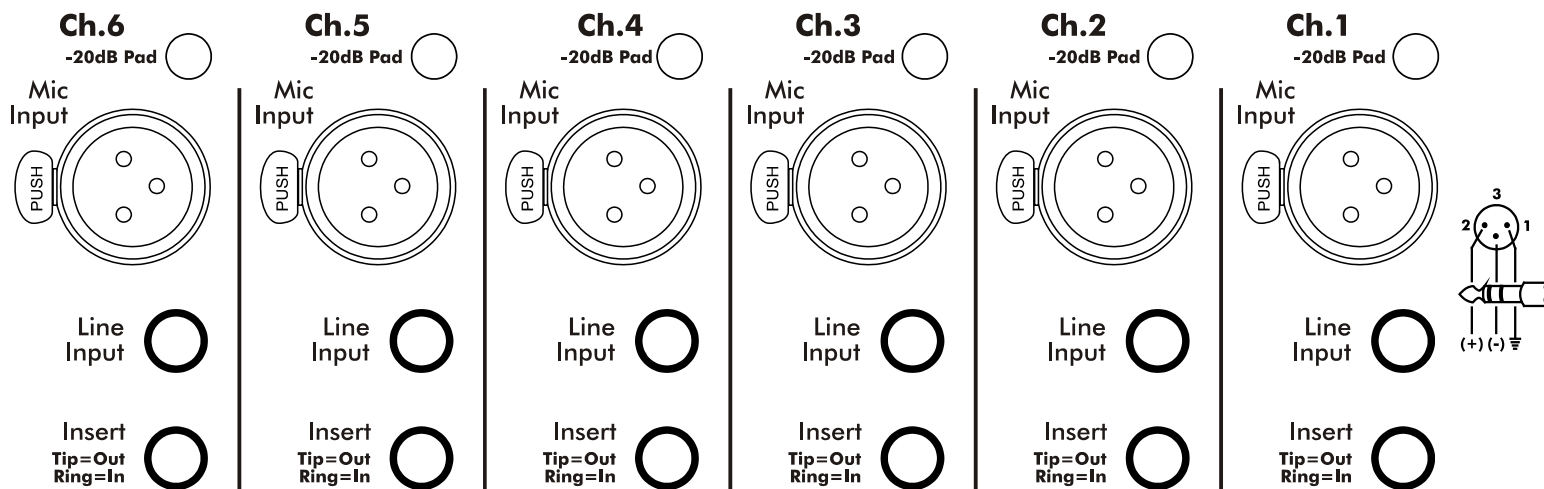
If low level and high level lines are run parallel for long distances, crosstalk may occur. In fact, the crosstalk (signal leakage between cables) can cause an electronic feedback loop, oscillation, and possibly damage to the equipment. To minimize crosstalk, physically separate low level (microphone) cables from speaker cables by the greatest feasible distance. At any point where cables meet, run low level cables perpendicular to high level or speaker cables. If low and high level or speaker cables must be run parallel and in close proximity to one another, they should be bundled separately. In a permanent installation, avoid running speaker cables and mic cable through the same conduit pipe.



6. REAR PANEL FEATURES

6.1 Microphone Input

The MX-406 microphone input is an active balanced type with a nominal impedance of 1200 ohms. Its noise performance is best with a 200 ohm microphone. The Mic input connector is a standard 3-pin XLR female with the shield on pin 1, the (+) in-phase connection on pin 2, and the (-) out-of-phase connection on pin 3.



6.2 Input Pad

The input pad is a 20dB attenuation switch on the rear panel for use with the XLR microphone inputs. It should normally be left in the "out" position for best signal to noise ratio and should only be used when the input is being overdriven with the gain control at its minimum setting.

6.3 Line Input

The line input is a standard 1/4" TRS active balanced type found in the same "combo jack" connector as the mic input. The line input balanced impedance is 20KΩ. It will accommodate a wide range of input levels.

6.4 Channel TRS Insert

A channel TRS insert patch point allows a device such as a remote level controller, graphic equalizer, noise gate, compressor/limiter, or direct out recording device to be used with one or more input channels.

The MX-406 TRS insert jacks use the tip for output and ring for the returning input. These signals will be unbalanced, so cable length should be at a minimum to maintain low noise.

To use the TRS insert as a Direct Line Output (pre EQ) for recording, you must make a special cable with tip and ring connected at the MX-406 end and a tip-sleeve mono plug at the other end. Connecting tip and ring at the mixer insert jack is necessary for uninterrupted signal within the mixer when using direct line outputs.

6.5 Stereo Line Input

The stereo line RCA inputs, and the front panel stereo line in 3.5mm jack, have a nominal operating level of -10dBu to match most consumer audio sources. This signal is controlled by the Stereo Line Input dial on the front panel. This input is also used as a stereo effects return, or as a stacking input for adding additional mixers.

6.6 Stereo Line Out

The stereo line outputs are nominal -10dBu "pre-master", so they are not affected by the settings of the main Left/Right output controls. These outputs would be used for making a pre-output fader recording off of the stereo mix, or for stacking the MX-406 stereo output into another mixer.

6.7 Aux Master Output

The 1/4" jack aux master output is used to drive a monitor or zone amplifier, effects processor, recording device, or any function which requires level control independent from the main stereo mix. It is pseudo-balanced, which means that while it is a single ended signal, it has balanced impedance for low noise when driving an active balanced input circuit over a long distance.

6.8 Mono Output

The XLR mono output combines the left and right stereo signals (pre output fader), and uses an isolation transformer capable of driving 600 ohm lines. Pin 1 is ground, pin 2 is (+), and pin 3 is (-). This signal is determined by the mono output level control, with a nominal operating level of +4dBu.

(Mono Output, cont.)

Note: The mono transformer-balanced output is designed to drive up to +24dBu into 600 ohm loads. Because of the nature of an output transformer, the output level increases as the impedance of the terminating load becomes higher than 600 ohms. Whereas a "direct-coupled" output stage like that of the right and left outputs will not change as the load changes, any transformer used in an audio path is affected by its termination impedance. Since line level inputs on audio devices are typically 10KΩ or higher, expect a slight increase (2.5dB) in output level when driving conventional active 10KΩ inputs with the transformer outputs.

6.9 Stereo Outputs

The 1/4" jack stereo right and left outputs are controlled by the left and right master. They are pseudo-balanced TRS jacks with a nominal operating level of +4dBu into any load, and are capable of driving long lines.

6.10 +48V Phantom Power Switch

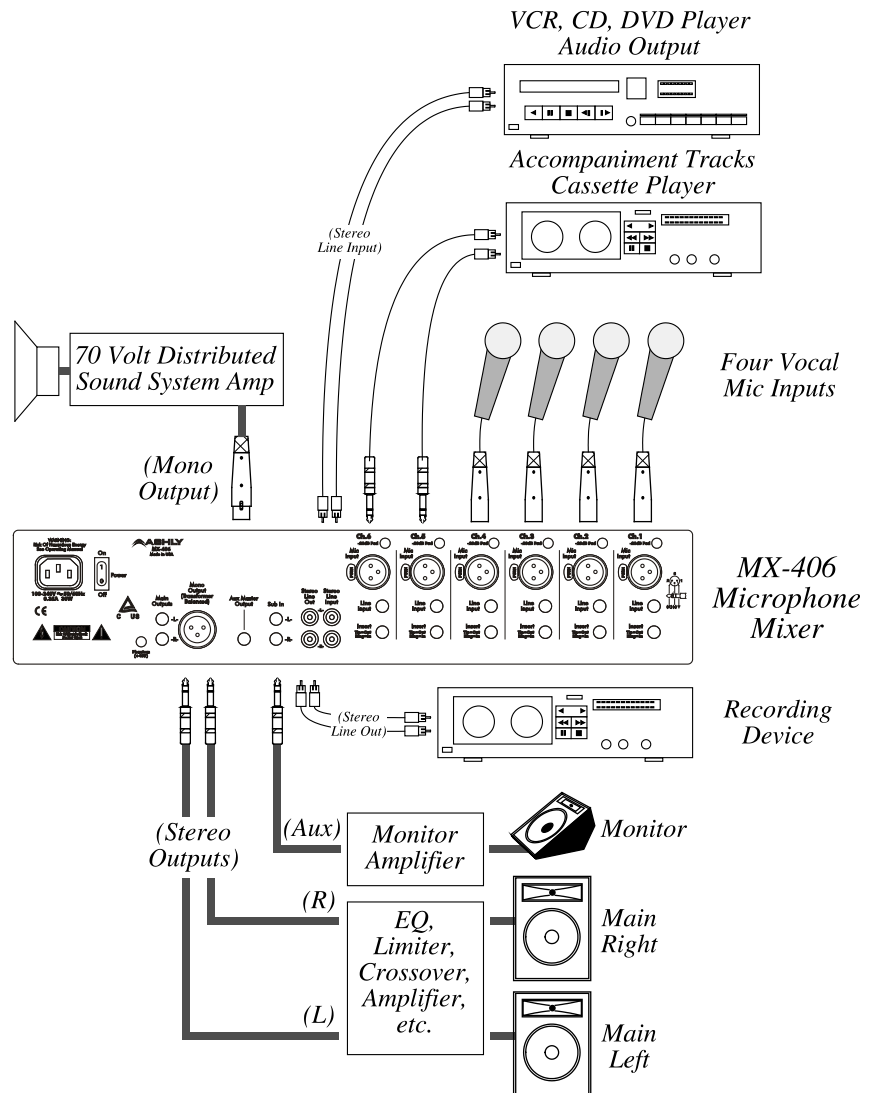
This switch applies +48VDC to all six XLR mic inputs to power condenser microphones. Phantom power will not affect most dynamic mics, which may be used along with condenser mics.

7. TYPICAL APPLICATIONS:

7.1 Small Sound Reinforcement System:

In the setup shown here, the MX-406 is used to mix typical sound sources that might be found in a church, small club, school theater or similar environment. Four of the input channels are used for vocal microphones, while the remaining two channels are used for stereo accompaniment tracks. The stereo line input is used for additional pre-recorded music such as that of a movie soundtrack, CD player, or MP3 player. Stereo line output RCA jacks are used to record the event to a cassette, video camera, or even a PC with recording capabilities.

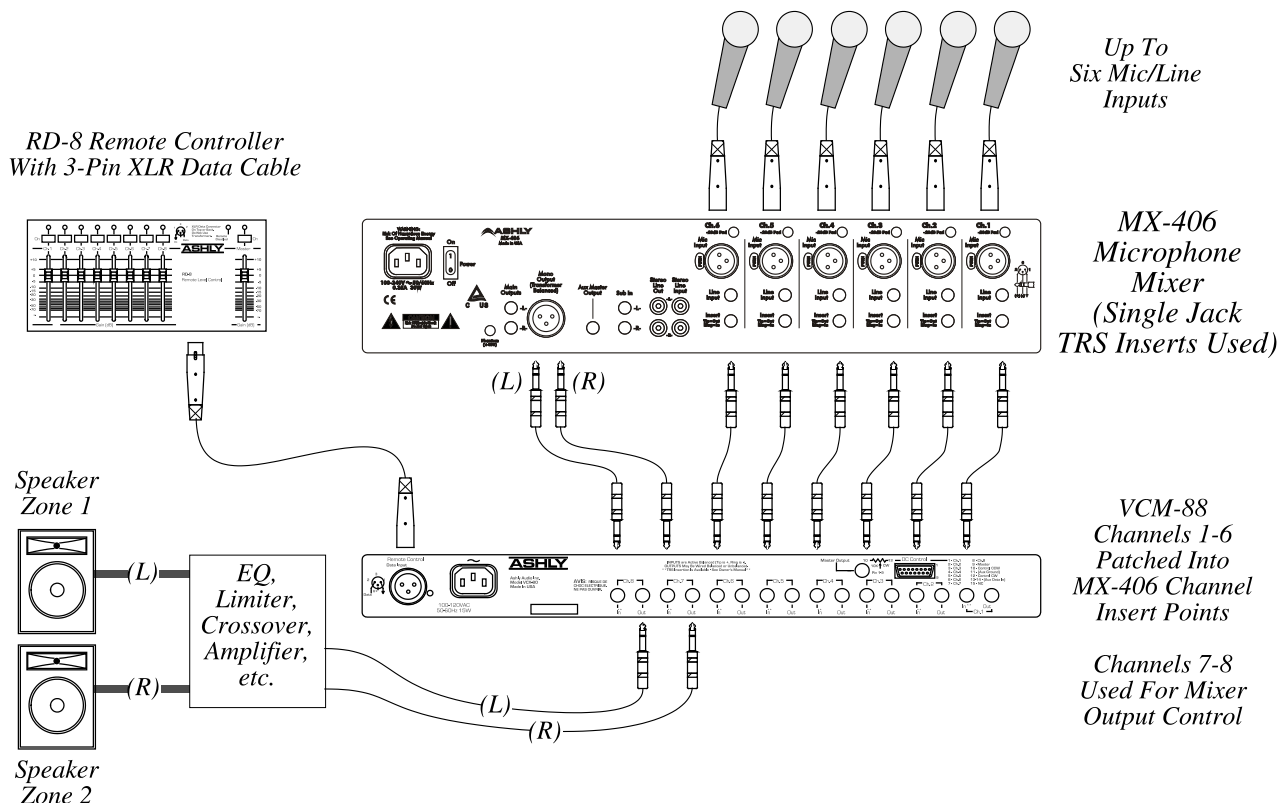
Stage monitors are fed using the aux mix to the master aux output, and left and right outputs drive the main speakers. The mono output drives a 70 Volt distributed sound system amplifier, used for plenum (ceiling) speaker installations.



MX-406 Small Sound Reinforcement System

7.2 Meeting Room, Board Room, or Church Mixer Using Remote Control:

In this illustration, the MX-406 is interfaced with an Ashly VCM-88 eight channel remote level controller, allowing the mixer to be operated from a distance by a non-technical person. Remote control of the VCM-88 is achieved through the use of Ashly's RD-8 desk-top remote controller, RW-8 wall-plate version, or PC control using Protea System Software. The RD-8 and RW-8 use a single mic cable for control data, while PC control uses RS-232 serial communications. Remote control can be located up to 1,300 feet from the main audio equipment rack.



Typical Application of MX-406 with VCM-88/RD-8 Remote Control

8. TROUBLESHOOTING TIPS

8.1 No Sound

Check the AC power. Is the power switch on? Check the level meters. If they are operating, the problem is between the mixer and the later components in the system. If there is no meter activity, check to see that you really have an input signal and that it is on the desired channel.

8.2 Distorted Sound

Something is being overdriven in the signal path. If the clip indicators are active, reduce the channel gain and/or press in the pad switch on the rear panel. There are many gain adjustments in the mixer itself and probably several others in other system components which makes it possible to overdrive an input section and then incorrectly try to reduce the gain of the output section. The best way to approach setting gains is to establish the operating level of input stages first by setting their gain as high as possible but leaving about 20dB of headroom for loud peaks, then move on to set the master gain to produce a good meter reading. Proceed to set the gain of equalizers, limiters, crossovers, and amplifiers following the mixer in the same manner, always working toward the later stages of the system.

8.3 Excessive Noise

If the noise is in the form of hiss, the problem is usually due to an input stage set for insufficient gain and then compensating for it by increasing the level. Try increasing gain and reducing level. Also, check that the -20dB rear panel pad switch is not unnecessarily enabled.

8.4 Excessive hum

This is usually caused by "ground loops" in the system wiring. A complex sound system with many sources separated by significant distance and using several power outlets has many opportunities for this problem to occur. If possible, feed everything in the system from one power source with a common ground. Use balanced input and output connections between widely separated components.

If you need help, get in touch with your Ashly dealer or call an Ashly technical service representative.

9. SPECIFICATIONS

INPUT IMPEDANCE

Mic input (balanced) 1.2k Ohm
Line input (balanced)..... 20k Ohm

DISTORTION

THD at +4dBu output, 20Hz-20KHz <0.05%
THD at +12dBu output, 30Hz-10KHz <0.05%
IMD (SMPTE) at +12dBu output <0.05%

HUM & NOISE (20Hz-20KHz at max preamp gain)

equivalent input hum and noise <-128dBu
residual output noise
all levels at minimum <-100dBu
master levels at nominal
all channel levels at minimum <-90dBu
aux master at nominal
all channel aux at minimum <-90dBu
master levels and one
channel level at nominal <-68dBu

MAXIMUM VOLTAGE GAIN (±2dB)

MASTER
Mic/Line Input to Master Outputs +84dB
Mic/Line Input to Mono Output, 600 ohm load +84dB
AUX SENDS
Mic Input to Aux Master Output, pre ch. level 84dB
Mic Input to Aux Master Output, post ch. level 97dB
Stereo Line In to Master Output 27dB

FREQUENCY RESPONSE

20Hz-20KHz +0.5/-1.0dB

MAXIMUM INPUT LEVEL

Mic input (with pad) +22.3dBu
Line input +23dBu

MAXIMUM OUTPUT LEVEL

Transformer output ... +24.2dBu @600 Ohm (+26.7dBu no load)
Line output +23dBu, RCA +13.5dBu

EQUALIZATION

Bass ±12dB at 70Hz, shelving
Treble ±12dB at 8KHz, shelving

CROSSTALK

adjacent inputs, 20Hz-20KHz <-65dB

VU METERS

Stereo outputs -21 to +6 VU
0VU = +4dBu

PEAK INDICATORS

Peak Clip indicator on each input channel and left and right outputs, illuminates 3dB below clipping

PHANTOM POWER

+48 VDC applied to all Mic Inputs, switchable on rear panel. Maximum total current draw = 80mA. Maximum single channel current draw = 14mA. Gradual power-up and down to eliminate "pops".

WEIGHT

Unit weight 11 lbs. (5.0kg)
Shipping weight 13.3 lbs. (6.1kg)

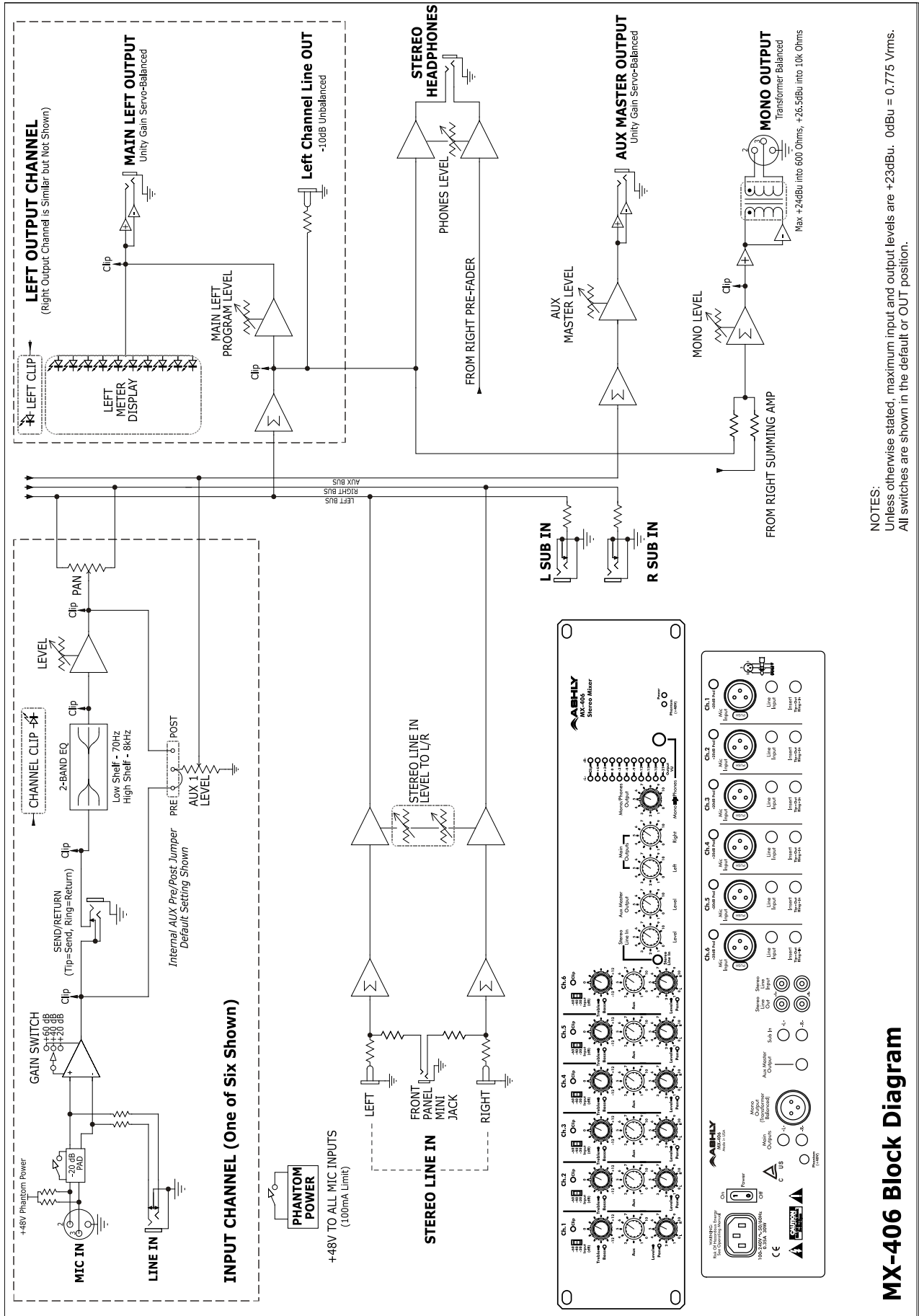
DIMENSIONS

19" x 3.5" x 9.4" (483mm x 89mm x 239mm)

POWER REQUIREMENTS

100-240 VAC, 50-60 Hz, 30 watt

**unless otherwise stated, specification conditions are: 150Ω source, maximum preamp gain, all other controls set at nominal, XLR output into 600Ω or greater.*



MX-406 Block Diagram

10. Ashly Audio Inc. LIMITED WARRANTY (USA ONLY)

(Other countries please contact your respective distributor or dealer.)

For units purchased in the USA, warranty service for this unit shall be provided by ASHLY AUDIO, INC. in accordance with the following warranty statement.

ASHLY AUDIO, INC. warrants to the owner of this product that it will be free from defects in workmanship and materials for a period of FIVE years from the original-date-of-purchase. ASHLY AUDIO INC. will without charge, repair or replace at its discretion, any defective product or component parts upon prepaid delivery of the product to the ASHLY AUDIO, INC. factory service department, accompanied with a proof of original-date-of-purchase in the form of a valid sales receipt. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

EXCLUSIONS: This warranty does not apply in the event of misuse, neglect, or as a result of unauthorized alterations or repairs made to the product. This warranty is void if the serial number is altered, defaced, or removed. ASHLY AUDIO, INC. reserves the right to make changes in design, or make additions to, or improvements upon, this product without any obligation to install the same on products previously manufactured.

Any implied warranties, which may arise under the operation of state law, shall be effective only for FIVE years from the original-date-of-purchase of the product. ASHLY AUDIO, INC. shall be obligated to only correct defects in the product itself. ASHLY AUDIO, INC. is not liable for any damage or injury, which may result from, or be incidental to, or a consequence of, such defects. Some states do not allow limitations on how long an implied warranty lasts, or the exclusion, or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

OBTAINING WARRANTY SERVICE:

For warranty service in the United States, please follow this procedure:

1) Return the product to ASHLY AUDIO, INC. freight prepaid, with a written statement describing the defect and application that the product is used in. ASHLY AUDIO, INC. will examine the product and perform any necessary service, including replacement of defective parts, at no further cost to you.

2) Ship your product to:

ASHLY AUDIO, INC.

Attention: Service Department

847 Holt Road

Webster, NY 14580-9103



ASHLY AUDIO INC. 847 Holt Road Webster, NY 14580-9103, USA

Phone: (585) 872-0010 Fax: (585) 872-0739

Toll Free (800) 828-6308 ashly.com

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