ALESIS
X2

Reference Manual

Introduction

Thank you for purchasing the Alesis X2 24-channel, 8-group output, in-line monitor professional mixing console. To take full advantage of the X2's functions, and to enjoy long and trouble-free use, please read this user's manual carefully.

How To Use This Manual

This manual is divided into the following sections describing the various modules and functions of the X2. Though we recommend you take time to read through the entire manual once carefully, those having general knowledge about mixers should use the table of contents and index to reference specific functions while using the console.

Chapter 1: Introduction. Describes the various capabilities of the X2 and explains the basic principles of mixing and recording.

Chapter 2: Guided Tour. This section provides a brief tour of the X2, and shows you how particular features interact.

Chapter 3: Connections. Details rear panel connections (inputs, outputs, ADAT sync and audio interfaces, etc.), and their proper hook-up procedures.

Chapter 4: Applications. Covers the various uses for the X2 in different scenarios, with step-by-step instructions on setting up and mixing techniques.

Chapter 5: Mute Automation. Explains how to automate channel mutes using either the X2's built-in sequencer or with an external MIDI sequencer.

Chapter 6: Description of Controls. A "dictionary" of each control.

Chapter 7: Trouble-shooting. A guide to trouble-free operation, maintenance and service information.

We have also included a block diagram, MIDI Implementation Chart and an Index.

Conventions

The buttons, knobs, and rear panel connectors are referred to in this manual just as their names appear on the X2, using all capital letters (*Example:* EQ IN switch, PAN knob, PHONES jack, etc.).

When something important appears in the manual, an icon (like the one on the left) will appear in the left margin. This symbol indicates that this information is vital when operating the X2.

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CHAPTER 1

INTRODUCTION

About the X2

The X2 is an extremely flexible, 24-channel, 8-group output, in-line monitor professional mixing console. The monitor path of each channel has its own 45mm linear fader, automated mute, and access to EQ and Aux sends, so you can mix or monitor one input while the main path mixes another. This flexible design allows full mix control of 48 sources, plus 16 aux returns, for a total of 64 sources at mixdown. For this reason, the X2 is perfectly suited for professional project studios with a large number of MIDI sequencer-controlled sources that are synchronized with 24 tracks of ADAT.

Each channel features a high-quality 4-band equalizer with two midrange bands that are fully parametric, not just sweep EQ. The midrange Q (bandwidth) can be set as narrow as 1/6th of an octave, or as wide as several octaves, for boosting or cutting any frequency range desired. The two shelving bands may be split from the main channel path and switched into the monitor path. An EQ IN/OUT switch permits the entire EQ circuit to be bypassed when desired, maintaining the minimum signal path. A switchable high-pass filter removes low frequency rumble and noise. The EQ section uses film capacitors in a gyrator filter design, with plenty of headroom available so that boosting a band doesn't cause distortion.

The X2 uses fully balanced +4 dBu inputs and outputs on 1/4" jacks, plus three 56-pin ELCO® multipin connectors for quick, reliable +4 dBu balanced connection direct to the ELCO connector on each ADAT. The X2 may also be interfaced with -10 dBV level unbalanced equipment. A DIRECT switch on each channel connects the Direct Out (instead of the corresponding Group Out) to the channel's Tape Out jack, so that simultaneous 24-track recording is possible without repatching.

All 24 channels have a high-quality, low noise balanced microphone preamp with individually switchable 48 V phantom power for condenser microphones. Each input channel is individually modular, using glass epoxy circuit boards. The 24/8/2 meter bridge is integral, not an optional add-on. It provides peak metering on each channel, group and the stereo master outputs.

Effects and headphone mixes are handled by 8 Aux sends. Aux 1–2 is a pre-fader, pre-mute, stereo send that can be used to provide a cue mix from either the main or monitor path; Auxes 3–8 are post-fader intended for effects sends. Eight Stereo Aux Returns are provided, each with its own 2-band EQ, Stereo Separation control, Solo switch, and automated Mute. Returns may be routed to the stereo mix, the groups, and the cue mix, so that effects can be added to the final mix, printed to multitrack, monitored on headphones, or any combination desired. The X2 provides insert points on each channel, each group, and the stereo master for use with compressors and graphic equalizers.

Alesis Dynamic Mute Automation™ is built-in, providing control of 72 mute points

in the console (each channel, monitor, effect return, aux send, and group output). It features its own ADAT Synchronization Interface jack, plus MIDI in/out jacks, so that its built-in 10,000-event sequencer can be synchronized directly to the ADAT system or to a MIDI system. The mutes may be externally controlled by a MIDI sequencer, or, in live applications, by using 100 sets of four mute groups.

Control room monitoring is made simpler by stereo-in-place Solo on each main channel, monitor channel, and aux return. Each aux master and group may be previewed in the control room while leaving the rest of the signal path undisturbed. Studio outputs, a built-in talkback mic and three-frequency oscillator provide the necessary facilities for complete communication between engineer and artist.

Basic Principles of Mixing & Multitrack Recording

The function of the X2 Mixer, or any recording console for that matter, is to provide control of volume, tone and spatial positioning of signals from microphones, electronic instruments, and tape machines, and then to route these signals to a monitor system and tape recorder so they can be recorded and heard. Before the introduction of multitrack tape recorders, these signals had to be mixed together as a live performance. If the desired performance wasn't correct because of a musical mistake or mixing problem, the performance had to be recorded again and again until the performance was deemed satisfactory.

The introduction of multitrack tape machines has changed this recording method forever. Most recording today has evolved into a multi-step process, including:

Recording/Tracking

Instead of needing an entire musical group to come together in order to capture a live performance, recordings can be made one instrument at a time and pieced together in a building block fashion. With the advent of drum machines and sequencers (such as the Alesis HR-16, HR-16:B, SR-16 and MMT-8), it is possible to build an entire song using "virtual" tracks before ever having to record onto tape.

Using this method of recording an instrument at a time allows for fixing mistakes (normally called "punching in") of an incorrectly played part. By "punching in," or replacing, the misplayed part, you can record a performance over and over again until it's perfect.

Monitoring

In order to properly record a performance, both the engineer, producer and all of the players must be able to hear the performance. When listening to the speakers in a control room (where the mixer is), this is called monitoring; when the musicians are listening to headphones while overdubbing, this is called cueing. Adjustments to monitor or cue mixes should not affect the mix going to the recorder, so that recording levels remain at the optimum, even if the performer requires less of a particular instrument in the headphones.

Monitoring is a more complex operation than it might seem at first, since there are many mixes that occur simultaneously. Often there are 3 separate mixes (sometimes

more) happening simultaneously in order to complete the task of overdubbing. The comprehensive systems and logical layout of the X2 Mixer will make it relatively easy for you to accommodate even the most complex monitoring requirements. The following are a few of the typical mixes that may occur during a session:

- **Multitrack Mix:** The first mix would be the mix that is being recorded onto tape. This mix is derived from the Channel Faders and the Tape Outs or the Group Outs. These levels are nominally adjusted so that the optimum signal level reaches tape in order to ensure the least amount of noise or distortion. This level averages about 0 VU on the meters of an analog multitrack tape machine, or -15 dB on the inserts of a digital multitrack tape machine, such as the Alesis ADAT. However, the transient peaks of instruments such as percussion may exceed this average level by 10 to 15 dB. One of the key factors in setting the proper mix for the recorder is being aware of the headroom available on the tape, and making sure it isn't exceeded.

- **Monitor Speaker (Control Room) Mix:** If you were to listen only to the multitrack mix, you would probably find that it would be terribly out of balance since the optimum recording level (the primary concern of a multitrack mix) is not necessarily the best listening level. Therefore, a second mix is required called the monitor mix, which provides the engineer with a useful instrument balance and enables him or her to make changes and adjustments to the mix (such as muting or soloing channels) without disturbing the signals being recorded on tape.

- **Cue Mix:** Many times a third separate mix is required which is sent to the musicians' headphones for overdubbing. This is called the cue mix. This mix can be radically different from what the engineer is listening to (the monitor mix), since the musicians may need certain instruments either played louder or removed from the mix in order to hear their cues (hence the name "cue mix"). This mix is derived from the *Pre-Fader Sends*, so that the headphone mix will not change if the engineer makes fader adjustments to the monitor mix. Since the X2 Mixer has two Pre-Fader Aux Sends (Aux 1-2), either 2 separate mono cue mixes or 1 stereo cue mix may be created.

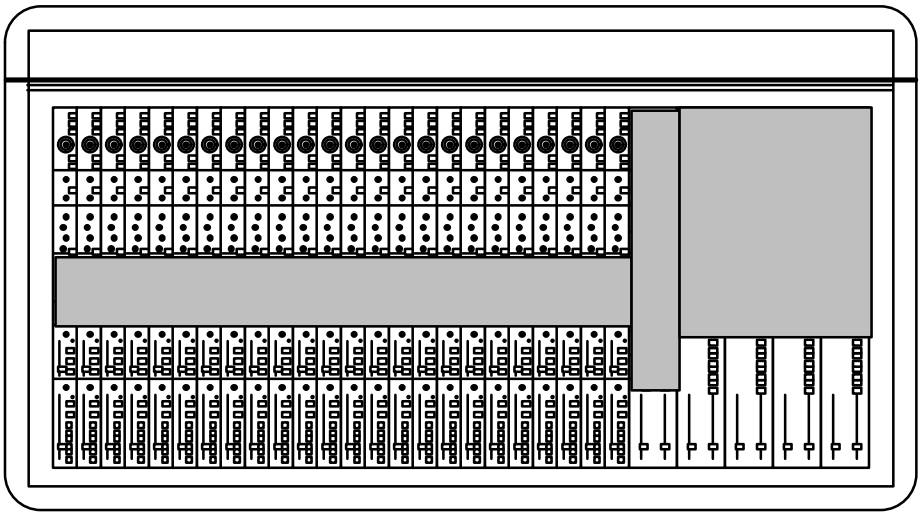
Mixdown

After all the desired musical parts have been performed and recorded satisfactorily, the mixdown stage takes place. During this stage, the musical parts are blended together, tonally enhanced with EQ and effects, positioned in the desired stereo spectrum with the PAN controls, and finally recorded onto a mixdown tape deck (such as a DAT machine, 2-Track reel-to-reel or cassette recorder, or 2 tracks of an ADAT). During mixdown, the engineer should be hearing the exact same mix the recorder is receiving. For this purpose, the Control Room section of the X2 provides two independent pairs of stereo External Inputs for listening to the playback from the mixdown tape deck.

CHAPTER 2:

GUIDED TOUR

Recorder/Mix Systems



The X2 is designed to be extremely flexible, as evidenced by the channel module design. This is where signals are mixed, EQ'd and routed to the Aux sends, Groups and Left and Right Master outs. Each channel provides a Tape In connector, where signals return from the multitrack recorder. These can be routed to either the main or monitor section of the channel. This allows you to mix a signal and monitor a tape signal simultaneously. If you also count the Aux returns, you have a total of 64 inputs. These can all be mixed down to a master tape deck via the L-R Master outs.

Let's trace the signal flow from beginning to end. Note that the controls from top to bottom of each channel are not placed in the same order as they appear in the signal flow. To see the paths of the signal flow, refer to the block diagram accompanying this manual.

Each input module has three possible sources (line, mic and tape in) and two paths (the main channel and the monitor). First, the signal arrives at either the line or mic input of a channel; you choose one of these using the MIC/LINE switch. If using the mic input with a condenser microphone, the +48 V switch should be turned on to provide phantom power. If necessary, the Ø (phase) switch can be used to invert the signal's phase. Next we come to the MIC/LINE GAIN knob, which is used to set the initial level of the signal. It is important to set this level properly, since high levels could lead to distortion and too low levels will cause noise (see *Setting Levels*).

Each channel features an in-line monitor which sends either the tape return or the input source to the L-R Master mix for monitoring. If we want to swap the inputs between the main channel and the monitor, we just press the CHAN/MON REVERSE button; now the tape returns are on the main channel while the normal

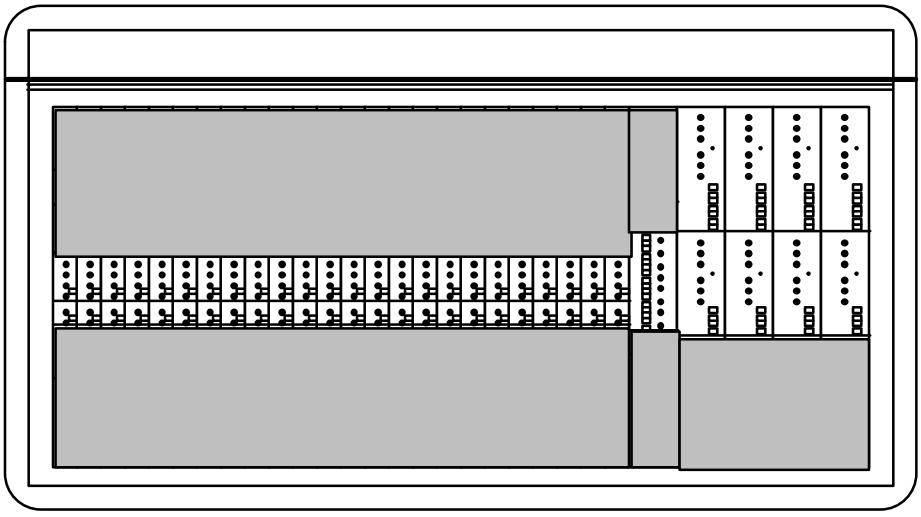
input appears at the monitor controls. This is the position normally used for mixdown (with the main channel assigned to L-R) or for bouncing tracks (with the main channel assigned to the appropriate Group or Groups). To avoid low-end rumble and noise, turn on the HPF (high-pass filter), which removes frequencies below 75 Hz.

Next we have the EQ section, which is broken into two groups: the Hi & Lo EQ, and the Hi Mid & Lo Mid EQ. The Hi & Lo EQ are shelf types, nested at 12 kHz and 80 Hz, respectively, with an adjustable gain of ±15 dB. These act much like the bass and treble knobs found on a typical amplifier. They can be assigned to the monitor path by pressing the TO MON switch located between the two knobs. The Hi Mid & Lo Mid EQ are true parametric types, with a sweepable bandwidth of 650 Hz to 15 kHz and 45 Hz to 950 Hz, respectively, with an adjustable gain of ±15 dB. The Q control adjusts how wide an area around the selected frequency should be cut or boosted, allowing you to be extremely specific about how you tailor your sound.

We'll get back to the Aux Sends in a moment. Now let's jump down to the Monitor section. Normally, this is where you can mix your tape returns. Here you have a PAN knob, SOLO and MUTE buttons, and a fader for controlling the monitor level. The PEAK LED will light momentarily whenever the monitor's signal gets too hot. The L-R button lets you assign the monitor signal to the Master outputs. If you're not using the monitor, leave this button turned off.

Finally, at the bottom of each channel we find the channel's fader, PAN knob, SOLO and MUTE buttons, PEAK LED, and a set of buttons that let you determine the routing of the channel's signal, and what signal the TAPE OUT jacks of the channel will receive. DIR selects the source of the TAPE OUT jacks of the channel strip: either the direct output of the channel itself (for recording a single source to a track) or the Group that is normally connected to that TAPE OUT (Group 1 in channels 1, 9, 17; Group 2 in channels 2, 10, 18; etc.). The assignment switches below DIR can route the channel's signal to any of the eight Groups and to the L-R Master.
Once signals are routed to the Group section, you can use the Group faders to determine the total volume of all channels assigned there. Each Group module has its own set of SOLO and MUTE buttons. In the studio, the Group output usually is connected to the inputs of a multitrack recorder, such as the Alesis ADAT via the TAPE OUT jacks. During mixdown, the Groups may be "subgrouped" or assigned to the L-R Master mix, so that the Group modules can be used to adjust the master volume of like signals, such as multiple channels of drums or vocals. Using the ASSIGN L and ASSIGN R buttons, the Group signal can be routed back to the Master outputs. In live performance applications, the Group Out jacks may be used to feed other amplifiers, broadcast feeds or recorders where multiple mixers are required.

Aux Send/Return Systems

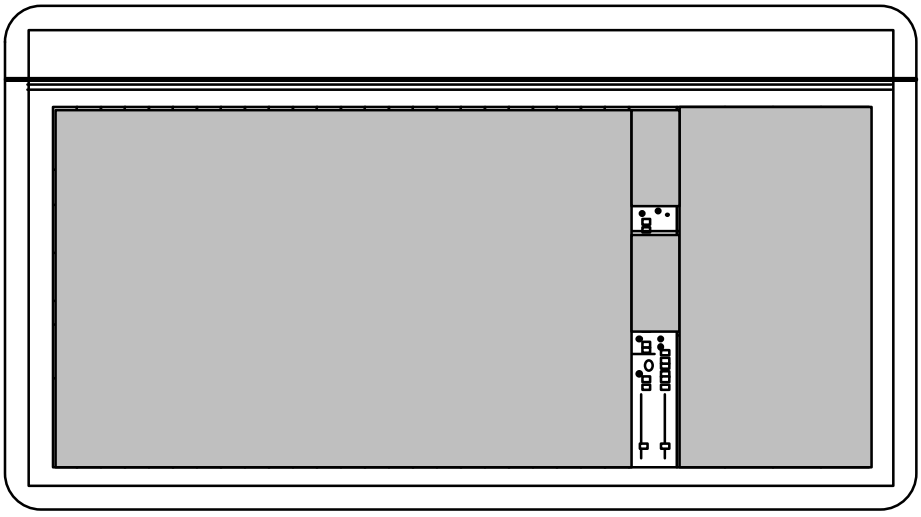


In the center of each channel module is the Aux Sends section, which allows the signal to be routed to outboard signal processing equipment or to feed a headphone amplifier. The first two sends (Aux 1-2) are Pre-Fader, meaning that the signal level is independent of the channel's fader. These are ideal for headphone mixing of tape tracks for the musicians in the studio. Aux 3 through 8 are post fader, ideal for routing signals to reverb and other effects devices. Aux Sends 3-4 and 5-6 can be reassigned to Aux 7-8, using the 7/8 switch between either pair of knobs. You can route either the Channel's signal or the Monitor's signal to Aux Sends 1 through 4, by using the AUX SOURCE switch. In the Master module you'll find master level controls for all 8 Aux Sends, along with individual SOLO and MUTE buttons.

The Aux Returns, found at the top of the Group section, are designed for routing the signals back from signal processing equipment. Aux Returns can be thought of as input channels without microphone inputs. They have most of the same routing capabilities of a channel. Each of the four Group modules provides two stereo returns with PEAK LEDs and controls for Hi & Lo EQ, Stereo Separation and Balance, SOLO and MUTE buttons, and output routing. Additionally, you can route each return to Aux 1-2 if you want your headphone mix to include the effects returns.

If you are using a MIDI system with several keyboards, each with stereo signals, you can alternatively use the Aux Returns as additional line inputs. This is especially useful for keyboards that provide their own on-board signal processing, and therefore do not need to be routed to the other Aux Sends.

Control Room Systems



A three-frequency oscillator, with adjustable level, allows you to record test tones onto your tapes. Below the Aux Masters section, level controls are available for Studio outputs, Headphone outputs and the Control Room outputs. The Control Room can selectively monitor the Master outputs (L-R), AUX 1-2, or External inputs 1 and 2 (EXT IN 1/EXT IN 2); these last two inputs are useful for signals returning from mix-down tape decks. The STUDIO outputs may receive signal either from Aux 1-2, or the same signal the Control Room is listening to, plus the Talkback from the internal microphone. The DIM button takes down the Control Room level by a significant amount (in case the studio phone rings while listening to a mix). Press the MONO button when you want to hear how a mix will sound in a '57 Chevy. The built-in talkback mic has its own adjustable level and may be routed to the Group outs (for slating the tape) and/or the Studio outputs. Finally, the Master output faders, which set the overall level of the stereo mix, are found at the bottom of the module.

Muting Automation

The Master module comes complete with X2 Dynamic Mute Automation™. The display and accompanying controls let you record each individual press of a MUTE button anywhere on the console into the internal mute automation sequencer, synchronized to incoming ADAT Sync, MIDI Time Code or a MIDI Clock. Four Mute Groups, which allow you to mute as many channels as you want with a single button press, are available in each of the 100 sequencer memory locations. Alternatively, these mute groups or individual mutes can be triggered remotely via MIDI or recorded into a MIDI sequencer.

Meter Bridge

The meter bridge provides a total of thirty-four 15-segment LED peak meters for the 24 Channels, 8 Groups and the two Master Outs (L-R). The 24 Channel meters can monitor either the Tape Send levels or the Tape Returns levels. To select the meter bridge mode, hold the ALL (ALT) button and press DISPLAY (METER BRIDGE).

This toggles the meters between Tape Sends and Tape Returns. Two Mode LEDs on the meter bridge indicate which mode is selected.

CHAPTER 3:

CONNECTIONS

Unpacking and Inspection

Your X2 was packed carefully at the factory, and the container was designed to protect the unit during shipping. Please retain this container in the highly unlikely event that you need to return the X2 for servicing.

Upon receiving the X2, carefully examine the shipping carton and its contents for any sign of physical damage that may have occurred in transit. If you detect any damage, do not destroy any of the packing material or the carton, and immediately notify the carrier of a possible claim for damage. Damage claims must be made by you. Contact your Alesis dealer.

The shipping carton should contain the following items:

- This instruction manual
- Alesis X2 with the same serial number as shown on shipping carton
- X2 Power Supply unit
- AC Power Cable
- Alesis warranty card

It is important to register your purchase; if you have not already filled out your warranty card and mailed it back to Alesis, please take the time to do so now.

Power

Power Supply

The X2 external power supply works with any standard line voltage (100 to 240V, 50 to 60 Hz), and comes with a line cord suitable for the destination to which the mixing console is shipped.

The power supply should be placed within easy reach of the console, but not directly underneath it. However, do not mount it directly over unshielded audio equipment, to avoid electromagnetically inducing hum in such units.

The power supply comes with two cables. The first is a multi-pin adapter cable which connects between the power supply unit and the back panel of the X2. Do not use any multipin cable between the power supply unit and the X2 except that provided with the unit. Mount the power supply in an area with proper ventilation.

The second cable is a IEC-spec AC power cable (do not substitute any other AC cord), which is designed to be connected to an outlet that includes three pins, with the third, round pin connected to ground. The ground connection is an important safety feature designed to keep the chassis of electronic devices such as the X2 at ground potential. Unfortunately, the presence of a third pin does not always

indicate that an outlet is properly grounded. You may use an AC line tester to determine this. If the outlet is not grounded, consult with a licensed electrician. When AC currents are suspected of being highly unstable in VAC and Hz, a professional power conditioner should be used.

To connect the power supply to the X2:

1 Screw on one end of the multipin cable to the X2's POWER connector, and the other end to the same type connector on the back of the power supply unit. *You will find the X2's power supply connector on the left side of the rear panel.*

2 Attach the female end of the AC power cord to the power supply unit and the male end to a good quality, noise-free AC power source of the proper rating.

3 To apply power to the X2, switch on the POWER switch of the power supply unit, so that it is in the | (on) position.

Do not operate any electrical equipment with ungrounded outlets. Plugging the X2 into an ungrounded outlet, or "lifting" the unit off ground with a three-to-two wire adapter, can create a hazardous condition.

Alesis cannot be responsible for problems caused by using the X2 or any associated equipment with improper AC wiring.

Avoiding Ground Loops

In today's studio, where it seems every piece of equipment has its own computer chip inside, there are many opportunities for ground loop problems to occur. These show up as hums, buzzes or sometimes radio reception and can occur if a piece of equipment "sees" two or more different paths to ground. While there are methods to virtually eliminate ground loops and stray radio frequency interference, most of the professional methods are expensive and involve installing a separate power source just for the sound system. Alternatively, here are some easy helpful hints that a professional studio installer might use to keep those stray hums and buzzes to a minimum.

1 KEEP ALL ELECTRONICS OF THE SOUND SYSTEM ON THE SAME AC ELECTRICAL CIRCUIT. Most stray hums and buzzes happen as a result of different parts of the sound system being plugged into outlets of different AC circuits. If any noise generating devices such as air conditioners, refrigerators, neon lights, etc., are already plugged into one of these circuits, you then have a perfect condition for stray buzzes. Since most electronic devices of a sound system don't require a lot of current (except for power amplifiers), it's usually safe to run a multi-outlet box or two from a *SINGLE* wall outlet and plug in all of the components of your system there.

2 KEEP AUDIO WIRING AS FAR AWAY FROM AC WIRING AS POSSIBLE. Many hums come from audio cabling being too near AC wiring. If a hum occurs, try moving the audio wiring around to see if the hum ceases or diminishes. If it's not possible to separate the audio and AC wiring in some instances, make sure that the audio wires don't run parallel to any AC wire (they should only cross at right angles, if possible).

3 TO ELIMINATE HUM IF THE ABOVE HAS FAILED:

A) Disconnect the power from all outboard devices and tape machines except for the X2 mixer and control room monitor power amp.

B) Plug in each tape machine and outboard effects device one at a time. If possible, flip the polarity of the plug of each device (turn it around in the socket) until the quietest position is found.

C) Make sure that all of the audio cables are in good working order. Cables with a detached ground wire will cause a very loud hum!!

D) Keep all cables as short as possible, especially in unbalanced circuits.

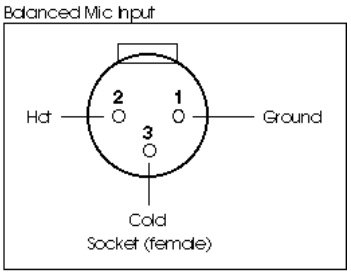
If the basic experiments don't uncover the source of the problem, consult your dealer or technician trained in proper studio grounding techniques. In some cases, a "star grounding" scheme must be used, with the X2 at the center of the star providing the shield ground on telescoping shields, which do NOT connect to the chassis ground of other equipment in the system.

Channel Inputs and Outputs

Each of the 24 channel modules on the X2 contains an XLR balanced MIC Input connector, a 1/4" TRS balanced LINE Input jack, a 1/4" TRS balanced TAPE IN jack with a +4/-10 level switch, an unbalanced 1/4" TAPE SEND jack, and a TRS 1/4" INSERT jack. Also included are three 56-pin ELCO connectors which provide eight channels each of BALANCED TAPE Ins and Outs. Here are more detailed descriptions of each of these, and what they should be connected to.

Balanced Mic Inputs

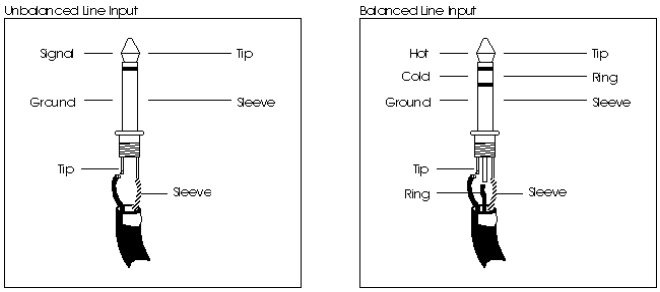
The MIC Input is a standard female XLR-3 connector and is available when the MIC/LINE switch is in the MIC (out) position (see section 6.0.2). The cable wiring is illustrated below



The MIC Input is designed to accept a wide range of balanced or unbalanced low impedance input signals. Each Mic input can provide the +48V necessary for phantom-powered microphones on pins 2 and 3; this may be turned on and off with the [+48V] switch (see section 6.0.1). The phase of pins 2 and 3 may be reversed using the [Ø] (phase) switch.

Unbalanced Line Inputs

The LINE Input is a 1/4" socket which will accept unbalanced or balanced line level sources when the MIC/LINE switch (see section 6.0.2) is in the LINE position.



Unlike the low impedance microphone input, this connection provides a high impedance (>10k) to the input signal, enabling many types of instruments to be plugged straight in without direct boxes or external preamplification. While the output of a standard synthesizer (or other equipment) can be plugged in using a 2-conductor 1/4" plug, balanced line sources may also be connected here using a “stereo” TRS plug as shown above.

Line inputs may also be used for connecting additional effects returns, where

additional post-effect equalization is required.

Tape Input

The Tape Input is a 1/4" balanced TRS connector which will accept either -10 dBV or +4 dBu, depending on the setting of the +4/-10 switch (see next section). The Tape Input is the normal source of the Monitor path. However, when the CHAN/MON REVERSE switch is pressed, the Tape Input is switched over to the Channel path (see section 6.0.5). Connect the outputs of your balanced or unbalanced multitrack tape machine here; however, this jack is normally intended for use with unbalanced inputs, since the ELCO-type connector provides an easier way of connecting balanced tape inputs and outputs.

If you don't use all the Tape Inputs, unused jacks may also be connected to the outputs of synthesizers or effects devices.

+4/-10 Switch

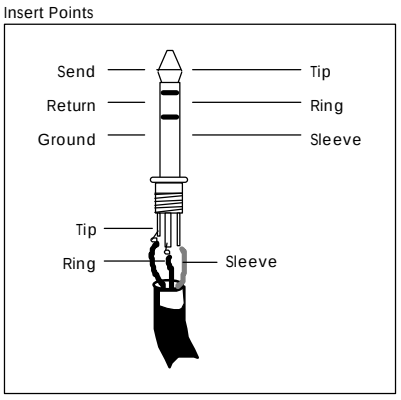
The +4/-10 switch adjusts the input level of the Tape In path. Its setting affects both the 1/4" jack and the ELCO balanced connector. When pressed in, the -10 setting is selected. When out, the +4 setting is selected. When using equipment with a high output, switch this to the +4 setting. When the source has a low signal, select the -10 setting.

Tape Send (Direct Output)

The Tape Send output is an unbalanced 1/4" connector which provides either a direct output of the post-fader channel signal or a Group Out signal, as set by the DIR switch on the top panel of each channel strip. It is set to give a -10 dBV output. Connect this to the track inputs of your multitrack tape recorder, if you aren't using the ELCO connectors for balanced operation.

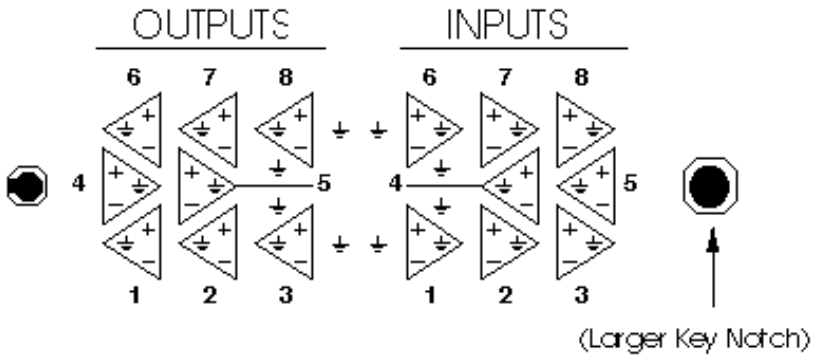
Insert

The INSERT connector is a TRS 1/4" jack which consists of an insert send (the tip of the TRS plug) and an insert return (the ring of a TRS plug), and is used to insert an outboard effects device (such as a compressor, EQ, or chorus) directly into the signal path of only the channel it is connected to. A special Y-cable consisting of a TRS 1/4" plug on one end and two mono 1/4" plugs on the other end is required.



Balanced Tape I/O

The BALANCED TAPE I/O is a 56 pin ELCO connector designed to deliver eight channels of balanced +4 dBu tape inputs and outputs, such as that on the Alesis ADAT Digital Multi Track Recorder. There are three BALANCED TAPE I/O connectors provided which, when connected to three ADATs, provide the tape sends and returns of 24 digital tape tracks. The unbalanced and balanced outputs are available simultaneously. The wiring scheme for this connector is as follows:



Note: The larger of the two key notches is on the right. When connecting to an ADAT, the cable should be wired pin-to-pin (not flipping inputs and outputs).

To connect an ELCO cable to the X2:

1 Place the male connector of the cable directly on any one of the ELCO-type connectors of the X2.
The cable will only fit on the connector one way. If you have trouble attaching the cable, rotate the cable's end around 180° and try again.

2 Push the cable into the connector slightly.

3 Tighten the screw in the center of the connector while pushing in.

4 After turning the screw a few times, push the connector itself in.

5 Tighten the screw repeatedly until the cable is tightly connected to the X2.

Stereo Returns and Groups

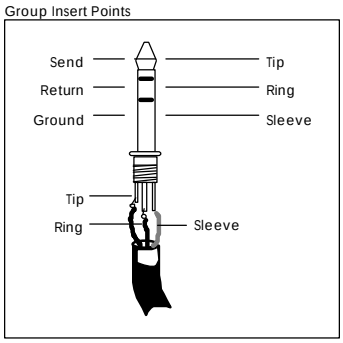
Each of the four Group modules contain two 1/4" GROUP OUT connectors (for a total of eight Group Outs), two TRS 1/4" GROUP INSERT connectors (for a total of eight Group Inserts), and four 1/4" RETURN connectors (for a total of eight Stereo Returns). Here are detailed descriptions of each.

Group Outputs

The GROUP Outputs are unbalanced 1/4" connectors which are available for connection to the inputs of a multitrack tape machine. Note, however, that in most applications it is more flexible to use the TAPE OUT jacks for this purpose, since they can receive either the Group Outputs or the direct output of each channel. In certain applications, such as video post-production, a pair of Group Outputs may be used to provide a different mix than the Main Outputs, such as a mix containing music and effects but minus the dialog.

Group Inserts

The GROUP Inserts are TRS 3-conductor 1/4" connectors which consist of an insert send (the tip of the TRS plug) and an insert return (the ring of a TRS plug). They are used to insert an outboard effects device (such as a compressor, EQ, or chorus) directly into the signal path of the corresponding Group. A Y-cable consisting of a stereo 1/4" plug on one end and two mono 1/4" plugs on the other end is required.



Aux A & B Returns

The STEREO AUX RETURNS are made up of sixteen 1/4" jacks especially dedicated to the stereo signals returning from up to 8 outboard effects. However, these may also be used as additional inputs for stereo sound modules, samplers or synthesizers, if desired.

Master Inputs and Outputs

The Master Module contains two balanced 1/4" MASTER OUT jacks, two TRS 1/4" MASTER INSERT jacks, two balanced 1/4" CONTROL ROOM output jacks, two 1/4" STUDIO jacks, and two pair of 1/4" jacks that serve as EXTERNAL 1 IN and EXTERNAL 2 IN. Additionally, a PHONES jack is found along the front end of the X2. Here are more detailed descriptions of each.

Master Outputs

The MASTER OUT consists of two balanced TRS 1/4" jacks which provide both the left and right signals, respectively. These may be connected to the inputs of a mixdown tape machine or a PA system amplifier.

Master Inserts

The MASTER INSERTS are two TRS 1/4" jacks, each of which consists of an insert send (the tip of the TRS plug) and an insert return (the ring of a TRS plug). They are used to insert an outboard effects device (such as a limiter, reverb or EQ) directly into the stereo signal path of only the left or right signal, depending on which it is connected to. A special Y-cable (stereo 1/4" plug to two mono 1/4" plugs) is required.

Control Room Outputs

The CONTROL ROOM Outputs consist of two balanced TRS 1/4" jacks which provide both the left and right signals, respectively. These may be connected to the inputs of an amplifier for control room monitor speakers. The signal level is controlled by the CONTROL ROOM knob.

Studio Outputs

The STUDIO Outputs consist of two unbalanced 1/4" jacks which provide both the left and right signals, respectively. These may be connected to the inputs of an amplifier for studio monitor speakers, or to a headphone amp. The signal level is controlled by the STUDIO knob.

External 1 & 2 Inputs

The EXT 1 IN and EXT 2 IN consist of two 1/4" jacks each for connection to the outputs of a mixdown tape machine. This allows you to playback your mix without repatching. The second input may be used for a CD player or VCR audio output.

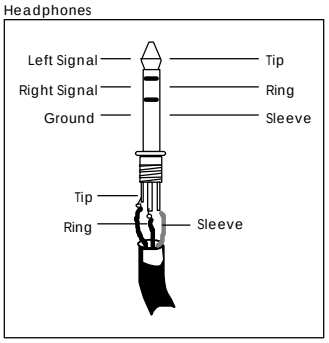
Aux Sends

The AUX SENDS are eight unbalanced 1/4" jacks which feed the signals from Aux 1 through 8. Aux Sends 1 and 2 are Pre-Fader, and are ideal for feeding a headphone amp for musicians in the studio to monitor themselves and other tracks already recorded onto tape. However, depending on your studio hookup, you may find it more flexible to connect the headphone amp to the STUDIO OUT jacks, which may be switched to receive the Aux 1-2 signals or the Control Room mix. Aux 3 - 8 are Post-Fader, and are normally connected to the inputs of outboard effects devices,

like reverbs and digital delays.

Headphones

The PHONES connector (found on the front end of the console, directly below the Master faders) is a stereo 1/4" jack which provides a substantial level to drive most headphones. The signal level is controlled by the PHONES knob. The wiring scheme is as follows.



ADAT Sync

The ADAT SYNC is a 9-pin, D connector which is designed to connect to an ADAT system. The X2 uses the proprietary timecode found on an ADAT formatted tape to synchronize its Dynamic Mute Automation system to tape. For more information, refer to Chapter 5.

To synchronize the X2 to an ADAT system:

1. Connect one end of a male/male, D connector cable to the SYNC OUT connector of the last ADAT in your system.

2. Connect the other end of this cable to the ADAT SYNC connector on the back of the X2.

MIDI

The MIDI IN, OUT and THRU are standard 5 pin DIN connectors, and are provided for interfacing the Dynamic Mute Automation system with a MIDI sequencer or other MIDI devices. The MIDI IN connector is for connecting to the MIDI Out of a MIDI device, while the MIDI OUT connector is for connecting to the MIDI In of the device. The X2's MIDI THRU connector is provided for connecting other MIDI equipment that you wish to control from the MIDI device you have connected to the X2's MIDI IN and MIDI OUT connectors.

For more information see Chapter 5.

Examples of Connections

The X2 may be easily interfaced with most other professional recording and audio equipment. All inputs and outputs, with the exception of the microphone inputs, use 1/4" jacks. The microphone inputs are standard balanced XLR type jacks.

Input	Connector	Type
Mic Inputs	XLR	Balanced
Line Inputs	1/4" TRS	Unbalanced or Balanced
Tape Send (Direct)	1/4" Mono	Unbalanced
Tape In	1/4" TRS	Unbalanced or Balanced
Inserts	1/4" TRS	Unbalanced
Tape I/O	56 pin ELCO	Balanced
Aux Sends	1/4" Mono	Unbalanced
Aux Returns	1/4" Mono	Unbalanced
Group Outs	1/4" Mono	Unbalanced
Group Inserts	1/4" TRS	Unbalanced
Master Outs	1/4" TRS	Unbalanced or Balanced
Master Inserts	1/4" TRS	Unbalanced
Studio Outs	1/4" Mono	Unbalanced
Control Room Outs	1/4" TRS	Unbalanced or Balanced
Ext. In 1 and 2	1/4" Mono	Unbalanced
Headphone	1/4" TRS	Unbalanced
MIDI In, Out and Thru	5 pin DIN	N/A
ADAT Sync In	9 pin D	N/A

Interfacing to an Unbalanced -10 dBV Multitrack Recorder

Interfacing the X2 with a typical multitrack recorder using semiprofessional unbalanced phono or 1/4" phone jacks is a simple process. Alternatively, if you are using one or more ADATs, it is recommended to interface the balanced inputs and outputs using the ELCO-type connectors.

To interface with a typical unbalanced multitrack recorder:

1 Connect any microphones or instruments to be recorded into the MIC or LINE INPUTS of channels 1 through 24.

2 Connect the TAPE OUTs to the corresponding tape tracks by using either 1/4"-to-RCA cables (for connecting to a Tascam or Fostex recorder) or 1/4"-to-1/4" cables (for connecting to ADAT unbalanced inputs).

3 Set the +4/-10 switch on the rear panel to the “in” (-10 dBV) setting.

4 Connect the tape machine’s outputs to the TAPE IN jacks of the same-numbered channels of the X2. Whenever you want to hear the playback of the machine, track 1 will appear on the Monitor section of channel 1, track 2 will appear on the Monitor section of channel 2, and so on (see section 6.1, *Monitor Controls*).

In this case, note that the connection is taking place at -10 dBV, unbalanced. This method can yield good results, provided that the cables between the ADAT and the X2 are no more than 20 feet long.

Interfacing to a Professional +4 dBu Multitrack Recorder

Professional recorders typically feature 3-pin XLR connectors on their inputs and outputs. The nominal signal level of these units is +4 dBu (1.23 volts). Depending on the model of recorder, these inputs and outputs may be balanced, servo-balanced (which automatically compensate if one side of the input is grounded), or unbalanced. Check the manual of the recorder to find out the true specification for the inputs and outputs.

The best method for connecting this type of recorder is to purchase an ELCO-to-XLR multipair cable, available from many different cable manufacturers. This will connect from the ELCO-type connector on the X2 on one end, fanning out to sixteen XLRs (eight female, eight male) on the other end. This method assure full-balanced inputs and outputs, with no level compensation needed as long as the recorder itself is truly balanced.

Alternatively, in a short-term situation you may use the 1/4" TAPE IN and TAPE OUT jacks on each channel. In this case, you need:

- An XLR female to 1/4" TRS cable for each output of the tape recorder; and,
- An XLR male to 1/4" mono cable for each send to the tape recorder.

This arrangement will give you a balanced connection on the monitor, but an unbalanced send from the X2 to the deck. Depending on the characteristics of the deck, metering levels may not match between the deck and the X2, or on the X2 between Tape Send and Tape Return meter modes (to change the meter mode, see page 39).

You may need to increase the X2's fader level in order to get enough level on the multitrack's meters. Some multitracks have high/low level input switches; follow the manufacturer's instructions on settings these properly if you can't get enough output from the X2's 1/4" TAPE OUT jacks. If that is not possible, you will need to use the ELCO connectors instead of the 1/4" jacks.

Interfacing to a Multitrack Recorder via a Patchbay

It is also possible to access the multitrack tape recorder by the use of a patchbay, which is several rows of jacks that are permanently connected to both the inputs and the outputs of the X2, the multitrack tape machine, and all of the outboard equipment. This is much more convenient, but a more expensive method than described in the last section, and is not absolutely necessary for operation. In this case, the patching is the same as in the previous example except that it is now done on the patchbay instead of at the rear of the console and multitrack tape machine.

With a patchbay, it is also easier to make use of the AUX SENDS and RETURNS of the X2. Different effects may be repatched to receive signal from whatever Aux Send the session requires (see page 30 for more on effects).

Interfacing to ADAT Using ELCO Connectors

The X2's three built-in ELCO connectors makes it easy to connect up to three ADATs. Refer to section 3.1.7 for wiring information. Using a correctly-wired cable with two ELCO connectors, a single ADAT can be connected to channels 1 through 8 on the X2, a second ADAT to channels 9 through 16, and a third ADAT to channels 17 through 24. This connection is basically the equivalent of wiring both the TAPE SEND and TAPE IN of each channel to an ADAT track, but uses +4 dBu balanced levels, instead of -10 dBV unbalanced. Good quality cabled can provide excellent results even up to 100 feet from the console (although they should be as short as possible).
Note: +4/-10 switches should be set to +4 dBu when using balanced ELCO connectors.

Interfacing to the Mixdown Deck

The mixdown deck is where everything comes together: the final mix. This is your master recording of the finished project (or a rough mix of a work in progress).

To connect the mixdown deck to the X2:

Unbalanced connection:

1 Connect the X2's MASTER OUT Left and Right to the Inputs of the Mixdown Deck using 1/4"-to-phono cables.

2 Connect the Mixdown Deck's OUTPUTS to the X2's EXT IN 1 Left/Right Inputs.
Note that the nominal output of the Master in single-ended operation is -2 dBu, about 6 dB "hotter" than the nominal level of an unbalanced mixdown deck. Lower the input level controls of the mixdown deck to achieve the desired signal level, or run the master faders a little lower to compensate.

Balanced connection:

1 Connect a 1/4" TRS (3-conductor) -to-XLR cable from the MASTER OUT L-R jacks to the XLR inputs of the mixdown deck.

2 The EXT IN jacks of the X2 are not balanced.
- If the mixdown deck offers both XLR and phono jack outputs, connect

cables from the phono jack outputs to the 1/4" EXT IN jacks of the X2.
- If the mixdown deck has only XLR outputs, make or purchase an adapter from XLR-to-phone plug, with pin 1 connected to the sleeve and either pin 2 or 3 connected to the tip. Check with the manual of your mixdown deck to see if unbalanced operation is allowed, and if so, whether the other pin should be left disconnected or grounded.

Interfacing to the Control Room

The X2's CONTROL ROOM Outputs Left and Right are connected to the Inputs of the amplifier used for the control room monitor speakers. The CONTROL ROOM knob on the X2 controls the level of the control room monitor speakers.

Note: These jacks are also TRS balanced. You may use unbalanced 2-conductor cables if the power amp doesn't have balanced inputs. If the amp features XLR inputs, use a TRS 3-conductor-to-XLR-M cable.

Interfacing to the Studio

The X2's STUDIO Outputs Left and Right are connected to the inputs of the amplifier used for the studio monitor speakers (i.e. where the musicians are), or may be connected to their headphone amplifier. The STUDIO knob on the X2 controls the level of the studio monitor speakers. The CONTROL ROOM and AUX 1-2 buttons below the STUDIO knob determine what appears at the STUDIO Outputs; the same audio as the CONTROL ROOM Outputs, or the Aux Sends 1 & 2 Outputs (cue mix).

Alternatively, if you don't need a headphone mix, the STUDIO OUTS may be used for a second set of Control Room monitors.

Interfacing to the Headphone Amp

There are two different sets of Aux Sends on the X2. Aux 1 and 2, which are derived before the Channel FADER, are used primarily for setting up a separate cue mix for musicians to overdub to while listening to headphones. Connect the Aux 1 and 2 Outputs (AUX 1, AUX 2) to the Alesis Micro Cue Amp or other suitable headphone amplifier, if you are using the STUDIO OUTS for this purpose.

Interfacing Aux Sends and Returns to Outboard Effects

Aux Sends 3 through 8 are derived post-fader, which means that any changes in level in the fader will also cause a change in level at these Aux Sends as well. These Sends can be used as "Effects Sends" and connected to whatever outboard effects that are desired (reverbs, chorus, multi-effects processors, delays) to be blended into the mix.

Before you connect the Aux Sends, consider where you want the signals to come from:

- All Auxes can receive signal from the channel if desired.
- Alternatively, Auxes 3 and 4 can receive signal from the Monitor.
- Auxes 7 and 8 can receive signal from the Channel and Monitor

simultaneously, if desired.

Note: If you want to use a separate effect on each channel, use the INSERT jacks, not the Aux Sends (see next section).

To connect the Aux Sends and Stereo Aux Returns to outboard effects:

1 Connect the Aux Sends (AUX 3, AUX 4, AUX 5, AUX 6, AUX 7, AUX 8) to the input or inputs of your outboard effects devices (like the Alesis QuadraVerb 2 or Midiverb III).

2 Connect the Outputs of these effects devices back into the X2's dedicated inputs, called STEREO AUX RETURNS. There are 8 pairs of Stereo Aux Returns, enough for 8 stereo, 16 mono, or any combination of mono and stereo devices.

You can use any Aux Returns you wish; a typical scheme is to connect the outputs of the unit being fed by Aux Send 3 into Aux Return A of the Group 3-4 module, and plug the unit fed by Aux Send 4 into Aux Return B. The only difference between Returns A and B is that A can be sent to any of the eight Groups for recording onto any track, while B can be sent only to the Groups directly beneath it. All Aux Returns can be sent to the L-R Master mix, which is the most common assignment for effect returns.

If your effect unit has two inputs, in most cases you only need to connect from ONE Aux Send to the LEFT (mono) INPUT of the effect unit, but you will still connect both the LEFT and RIGHT OUTPUTS of the effect to the Stereo Aux Return.

You don't need to connect anything to the right input of the effect, since most effects units only use it when the effect is connected directly between an instrument and an amplifier. In most mixing applications, you will set the effect's wet/dry balance all the way to wet. The effect device will generate an artificial stereo output from the signal input. Check the manual for your effect device for more information.
On the other hand, true dual-channel effects processors (such as the Alesis QuadraVerb 2) should be connected to two different sends to take advantage of the dual processing capability.

Note that Aux Sends 1 and 2 can also be used as extra Effects Sends while mixing. Although Aux 1 and 2 are pre-fader, and normally used for monitoring while recording, they are perfectly suitable as effects sends, especially during mixdown, when you will want to maximize your ability to add effects to independent Channels. Just remember that when you move a FADER up or down you won't be changing the level going to the effect on these Sends, since they are independent of fader movement (the signal is not affected by the Channel's MUTE button, either). As you change fader levels, you will need to make corresponding adjustments to Aux 1 and 2 in order to maintain the desired balance between dry and effected signal.

The 8 pairs of Stereo Aux Returns also serve well as additional inputs, in case you run out of Channels. These are especially good for connecting to the outputs of stereo keyboards, many of which provide on-board signal processing and do not require much EQ'ing.

Interfacing the Inserts

Inserts are used to connect signal processing devices directly into the signal path of a Channel. Normally, the device connected would be one that shapes the dynamics or tone of a signal (such as a compressor, gate, or EQ), rather than an effects device (such as a reverb). It is also possible to insert one of these devices into the signal path of any of the GROUP OUTS or the MASTER OUTS, since they also have INSERT jacks available. This is desirable when either a group of instruments, or the entire mix, is to be processed. Connecting an outboard processor by way of an INSERT requires a TRS plug to operate correctly.

All INSERT jacks on the X2 are TRS jacks containing both an output (send) and an input (return). Refer to the wiring diagram on page 19. The *tip* of the plug is the *Send* and will be connected to the Input of the effects device or processor, and the *ring* of the plug is the *Return* and will be connected to the Output of the effects device or processor.

Interfacing with a MIDI Sequencer

The MIDI IN, OUT and THRU connectors on the X2 are provided for interfacing the Dynamic Mute Automation system with a MIDI sequencer or other MIDI devices. If you are using such a device, you can connect it to the X2 as follows.

To interface a MIDI sequencer with the X2:

1 Connect a MIDI cable between the MIDI OUT of the sequencer or other MIDI device, and the MIDI IN of the X2.

2 Connect another MIDI cable between the MIDI OUT of the X2 to the MIDI IN of the sequencer or other MIDI device.
This step is not necessary if you do not plan on recording mute events into the sequencer.

3 If the MIDI device has an “echo” or “thru” function, be sure that it is turned off. Otherwise, this will lead to a MIDI loop which can confuse the system, but not do any permanent damage.

4 If desired, connect another MIDI cable between the MIDI THRU of the X2 and the MIDI IN of an additional MIDI device, such as an effects device, that you wish to control from the main MIDI device you have connected to the X2’ MIDI IN and OUT connectors.

5 Assign the Mute Automation synchronization source to either MIDI Clock or MIDI Time Code, as described on page 49.
This must be done in order for the Mute Automation to enable the MIDI ports, allowing the X2 to communicate with an external MIDI sequencer, and other MIDI devices.

Note: If you are using ADAT sync, MIDI connections are not necessary unless you need to store MIDI System Exclusive files from the X2 for storage purposes.

CHAPTER 4:

APPLICATIONS

Recording

Setting Levels

In order to ensure the cleanest signal with the least amount of background noise (hiss or hum), it is extremely important that proper level settings be maintained not only within the X2 itself, but throughout the entire audio system. Therefore, it's best to observe the following guidelines when using the X2.

I. Maintain Proper Input Levels.

To set proper input levels on either a mic or line level signal:

1 With the mic or line level signal flowing through the Channel, depress the Channel's SOLO button.

2 Set the CHANNEL FADER to 0 (about 2/3 up).

3 Observe the SOLO level on the MASTER LED Meter. Adjust the MIC/LINE GAIN knob until the first red LED lights during the loudest peaks. If you ever see the CHANNEL PEAK LED (or, if the CHAN/MON REVERSE switch is down, the MONITOR PEAK LED) flash, you are within 3 dB of signal overload. Turn down the MIC/LINE GAIN knob until the PEAK LED stops flashing.

II. Maintain Proper Fader Levels.

Ideally, both the Channel, Group and Master FADERS should be run at about the "0" position (about 3/4 of the way up the fader travel) if possible. This position gives the greatest amount of headroom and lowest noise. It also allows for any additional increase or decrease in level that might be required during mixing. Ultimately, the fader levels are dependent on the requirements of the mix; the 3/4 level is only a starting point.

III. Maintain Proper System Levels.

As a good rule of thumb, it is always best to try to run most volume level controls of your other equipment at 3/4 or 75% of full, as well. This will decrease the possibility of overload distortion and keep the amount of background noise to a minimum.

If a large amount of EQ is used, it may become necessary to decrease either the MIC/LINE GAIN control, or the Channel FADER, or both. The EQ is capable of adding quite a bit of gain and is a frequent cause of overload distortion problems.

If several “hot” (loud) Channels are assigned to a Group, it is possible that the Group will overload. Since the internal electronics of the X2 have 18 dB above 0 VU of headroom, it is only possible to clip the Group if:

- the Group meter is hitting the top of its range with the GROUP MASTER FADER set to nominal level, or
- the GROUP MASTER FADER is set to -20 or lower, and the Group Meter is reading 0 or above.

Once again, it may be necessary to decrease either the MIC/LINE GAIN control, the Channel FADERS, or both, of each of the Channels assigned to the Group.

Recording a Single Source to One Track

When recording a single source appearing on one Channel onto a single tape track, it is usually best to use the TAPE OUT of the Channel. This provides the most direct connection between the X2 Mixer and the multitrack since the audio has a shorter path to go through before being recorded.

To record a single source to a single track:

1 With a microphone or instrument connected to the desired input channel, set the input level correctly (see page 31, *Setting Levels*). Make sure the CHAN/MON REVERSE switch is up.

2 Connect the channel’s TAPE SEND to the Input of the desired tape track (see pages 25 and 26, *Interfacing with a Multitrack Recorder*).

3 Press DIR. This selects the direct output of the channel as the source for the TAPE OUT jack. At this point, you may see the channel meter of the X2 respond to the microphone or instrument, if the meter is in the TAPE SEND mode (to change the meter bridge mode, see page 35).

4 To monitor (listen to) the signal through the multitrack tape machine, place the tape machine track you are recording on into the “source” or “input” mode (usually by arming the track for recording) and raise the Tape Monitor FADER in the same channel as the source being recorded.

Be sure the L-R buttons of the Channel being recorded are in the “Off” position (up). Otherwise, this will cause the monitoring to be false since the signal will be heard from two sources: the Channel (source) and the Tape Monitor (return).

NEVER press the CHAN/MON REVERSE switch when the tape recorder is in input or record mode and the DIR switch is down. This will cause feedback, since the tape will be trying to record its own output.

Recording Multiple Sources to One Track

When more than one Channel is to be recorded onto the same track of a multitrack tape machine, it is necessary to assign all desired Channels to a Group. When the DIR switch of a channel is up, the TAPE OUT jacks receive the signal from a corresponding Group. For example, use Group 1 if you want to record on tracks 1, 9, or 17. Group 8 is used to record on tracks 8, 16, or 24.

To record two or more sources to a single track:

1 With microphones or instruments connected to the desired input channels, set the input level correctly (see page 31 *Setting Levels*).

2 Assign each of the Channels you wish to record onto the same track to GROUPS 1 and 2 by pressing the 1-2 button situated next to the Channel FADER.
If you want to record effects or other devices from a Stereo Aux Return, you may also press the ASSIGN keys in the Stereo Aux Return section.

3 Use the PAN control on each of the assigned Channels to position the signals either fully to the left or fully to the right. If the panning is fully left, the Channel will be routed to Group 1. If the panning is fully right, the Channel will be routed to Group 2.

4 Make sure the DIR switch is UP on the channel feeding the tape deck (channel 1 or 2, in this example).

5 The GROUP FADER will now control the level going to tape. As the instruments are played, the Group Meter will respond.

6 Be sure that the Group's ASSIGN LEFT and ASSIGN RIGHT buttons are in the "Off" position (up). Otherwise the signal will be assigned to the Master Output directly, instead of monitoring what's coming back from the multitrack on the small fader.

7 To monitor the track through the multitrack tape machine, place the tape machine track you are recording on into the "source" or "input" mode, and raise the Tape Monitor FADER the track's output is connected to.

Be sure the L-R buttons are in the "Off" position (up) for the Channels being recorded. Otherwise, this will cause the monitoring to be false since the signals will be heard from two sources: the Channels and the Tape Monitors.

Recording Multiple Sources to Two Tracks (Stereo)

Recording multiple sources onto two tape tracks can either be done as two separate Groups or as a stereo mix using two Groups. The former requires that you pan hard left all Channels going to the odd-number Group, and pan hard right all Channels going to the even-number Group. The latter requires that you pan each Channel to obtain the proper stereo positioning between left and right.

To record multiple sources to two tracks stereo:

1 With microphones or instruments connected to the desired input channels, set the input level correctly (see page 31, *Setting Levels*).

2 Assign each of the Channels or Aux Returns you wish to record onto the same track of tape to GROUPS 1 and 2 by pressing the 1-2 button situated next to the Channel FADER.

3 Use the PAN control on each of the assigned Channels to position the signals as desired between the left (Group 1) and right (Group 2).

4 Make sure the DIR switch is UP on channels 1 and 2.

5 The GROUP 1 and GROUP 2 FADERS will now control the levels going to tape.

6 Be sure that the Groups' ASSIGN LEFT and ASSIGN RIGHT buttons are in the "Off" position (up). Otherwise the signals will be assigned to the Master Output directly, instead of monitoring what's coming back from the multitrack on the small fader.

7 To monitor the tracks through the multitrack tape machine, place the tape machine tracks you are recording on into the "source" or "input" mode, and raise the Tape Monitor FADERS the tracks' outputs are connected to. Set the Monitor PAN control to Left and Right as desired.

Be sure the L-R buttons are in the "Off" position (up) for the Channels being recorded. Otherwise, this will cause the monitoring to be false since the signals will be heard from two sources: the Channels and the Tape Monitors.

Recording Tips

For the cleanest possible recording, the Group FADERS (or Channel FADERS if the TAPE SENDS are being used) should be adjusted so that the level going to tape averages 0 VU on the meters of a typical analog multitrack tape machine (or -15 dB on a digital multitrack machine, such as the Alesis ADAT).

About Metering

The meters of the X2 are the instantaneous peak reading type, which are preferred in digital recording where the "ideal" recording level comes close to, but never exceeds the 16 bit maximum threshold (called 0 dBfs, for full scale). Note that "0 dB" on the X2's meters is different from "0 dB" on a digital recorder like ADAT — it means the output of the X2 is at nominal level (either +4 dBu or -10 dBV, depending on the output jack). Peaks well above the "0 dB" level on the X2's meters should be common at normal operating levels for almost all types of tape deck. Analog tape decks typically have between 10 and 13 dB of headroom above the nominal level, depending on the tape type and any noise reduction being used.

Meters of the tape deck will not necessarily match those of the X2 on dynamic program material. With typical metering, analog VU meters may only read 0 dB, even though the X2's peak meters are between +5 and +10. However, a steady-state tone (such as that from the built-in oscillator) will read 0 dB on both the X2 and most VU meters. Readings on combined peak/VU meters, such as those found on semiprofessional multitracks, will vary. Take the time to learn the relationship between the X2's meters and your deck's meters, using both steady-state tones and dynamic material.

If signal peaks cause the record meter to vary by more than 10 dB, a limiter or compressor such as the Alesis 3630 Stereo Equalizer, may be used on that Channel to even out the peaks. In general, things will sound better if the meters remain at roughly the same level throughout the recording.

To select the meter bridge mode:

1 Hold the ALL (ALT) button.

2 Press the DISPLAY (METER BRIDGE) button.
This toggles the meters between Tape Send and Tape Return mode. Two Mode LEDs on the meter bridge indicate which mode is selected.

Overdubbing

Monitoring the Multitrack on the Monitor Faders

Once you have recorded onto the multitrack tape machine, you will want to listen back to those tracks, especially if you are overdubbing new tracks with musicians who need to hear the material already on tape (see next section, *Getting the Mix to Headphones*). The signals coming back from the multitrack tape machine connect to the TAPE IN connectors of each channel, and normally appear at the Monitor section within each of the Input modules.

To listen to tape tracks on the Monitor faders:

1 Place the tracks of the tape machine you wish to monitor into the "Tape" or "Playback" position. Make sure the CHAN/MON REVERSE switches are up.

2 Raise the Monitor FADERS being used for the tape tracks you wish to listen to.

3 Assign these Monitors to the Master Outputs by placing the L-R button in the "On" (down) position.

4 Raise the Master FADERS to where the peaks of the signal briefly light the red LEDs in the meters.

5 Select L-R as the Control Room Source and turn the CONTROL ROOM control up to the desired listening level.

Monitoring the Multitrack on the Channel Faders

Depending on how many inputs you are using at a time, you may want to use a different technique for monitoring. Monitoring on the Channel faders gives you a head start on your mixdown, and also allows you to start using the parametric EQ. Keep in mind, however, that you will not be able to record a Mic or Line source which is plugged into any channel being used to monitor a tape return.

To listen to tape tracks on the Channel faders:

1 On the multitrack, set the tracks you want to monitor into playback mode (Record switched OFF).

2 Make sure the DIR and Group Assign 1-8 switches of the tracks you want to hear are all UP (off).

3 Press the CHAN/MON REVERSE switch down in the channel you want to hear. This makes the tape return the source of the large Channel FADER, and simultaneously makes Mic or Line the source of the short Monitor FADER.

4 Assign the channels to L-R (the switch lowest on the channel strip).

5 Raise the Channel FADERS being used for the tape tracks you wish to listen to.

6 Raise the L-R MASTER FADERS and CONTROL ROOM settings, as in the

previous section.

Getting the Mix to the Headphones

Once you have the tape tracks returning to the mixer, it is simple to create a cue mix for the musicians to listen to over headphones while overdubbing. The cue mix is created using Aux Sends 1 and 2 on the X2, because the signals from these sends are derived Pre-Fader (before the Channel or Monitor FADER). Aux 1 and 2 or the Studio output jacks will have to be connected to a headphone amplifier, such as the Alesis Micro Cue Amp, before proceeding to the following steps (see page 29, *Interfacing to the Headphone Amp*).

To route the mix to a headphone amp:

1 If you are monitoring tape on the MONITOR FADER, press the AUX SOURCE switch to the down position (MON). This selects TAPE IN as the source for Aux 1-2 (and the post-monitor fader signal as the source for Aux 3-4).

- If you're monitoring tape on the CHANNEL FADER, set the AUX SOURCE switch to the up position (CHAN). This selects the TAPE IN as the source for Aux 1-2 (and the post-channel fader signal as the source for Aux 3-4).

2 While monitoring on headphones, turn up the AUX 1-2 control on the Channels the tape tracks are returning on. Adjust each AUX 1-2 control to a comfortable listening level, as desired by the musicians.

3 Adjust the PAN control, just below the AUX 1-2 control, to position each tape track between the left and right signal. For a mono mix, adjust the PAN control fully left; this will assign it to Aux 1 only.

4 Use the AUX MASTERS 1 and 2 to adjust the overall volume going to the headphones.

5 If using the STUDIO OUT jacks, raise the STUDIO LEVEL control, and press the STUDIO AUX 1-2 switch.

Monitoring MIDI Virtual Tracks

If you are using a MIDI sequencer, the tracks being played "live" from sound modules are effectively the same as additional tracks on tape — which is why they are called "virtual tracks." Synthesizers are normally plugged into the LINE IN jacks of the channels, and can be monitored on the Channel or Monitor FADERS, using the procedures above. Just remember that when tape is on the Monitor FADER, the Line In will be on the Channel FADER, and vice versa. Since the point of virtual tracks is not to use up a track of tape, just make sure that when the synthesizer is on the Channel FADER, that its Group Assign switches are OFF.

If you are using the Monitor and the Channel simultaneously for tape return and virtual track monitoring, the L-R mix should be used for the performers' headphone mix, not Aux 1-2. If you're using the STUDIO OUT jacks, press the CONTROL ROOM button and set the Control Room source to L-R.

Adding Effects

Effects such as reverb, chorus and delay are typically wired in a loop from an Auxiliary Send to a Stereo Aux Return (see Chapter 3, “Interfacing Aux Sends and Returns to Outboard Effects”). There are two basic stages to getting a low-noise, distortion-free signal flow from an effects device:

1 Adjust the send level from the X2 to the effect device using the channel Aux Sends, the Aux Master, and the input controls of the effect device itself. This level should be as strong as possible without clipping the effect device.

2 Assign the Stereo Aux Return to its destinations:
- Aux 1-2, if you want effects in the headphone mix,
- L-R, if you want to hear effects in the control room or record them onto the mixdown deck,
- A Group (1—8), if you want to record effects onto the multitrack tape deck.

Most complaints of “noisy effects” are due to send levels that are too low and return levels that are too high. You must structure the gain properly between the X2 and the signal processor.

Selecting an Aux Send:

First, you must decide which Auxiliary Sends to use. There are six post-fader sends from the X2.

- To send a signal to the effects device from the monitor section, press the AUX SOURCE button down. This selects the post-monitor fader signal as the source of the two AUX 3/7 and AUX 4/8 knobs directly above the switch. In a typical installation, Aux 3 and 4 are used for effect sends from the monitor.
- To send a signal to the effects device from the channel, use AUX 5/7 or AUX 6/8. The signal source for these two controls always comes from the channel fader. In a typical installation, Aux 5 and 6 are used for effect sends from the channel.
- To send signal from the monitor and the channel to the same effect device(s), press the AUX SOURCE button down and press both 7/8 switches. Use AUX 7 and 8 for a combined effect send.
- It is possible to send signal from the channel to six different Aux Sends (including Aux 1-2) simultaneously when the AUX SOURCE switch is in the up position.

To set the level going to the effects device:

1 Set the Aux Send(s) in the input module to about “2 o’clock.”

2 Start the signal source(s); i.e., play the tape or instrument at typical levels.

3 Raise the appropriate Aux Master to about “2 o’clock.”
Alternatively, you can press the AFL switch of the Aux Master you’re using, set the SOLO level to 0 (12 o’clock), and set the Aux Master to a setting that gives an average meter reading of “0 dB” on the L-R meter.

4 Raise the input control of the effects device until its meter or clip LED shows peak level, then lower the input control a bit. Consult the manual for the effect device for more information.
Some effect devices have level setting switches on the back; these should be set so that a peak level can be reached with reasonable settings (neither too high nor too low) of the input control.

In most cases, the output level of the effect device itself should be set relatively high, at nominal or maximum. Lower the output of the device only if the PEAK LED of the Stereo Aux Return lights, or if the effect levels are too loud even at low settings of the Stereo Aux Return LEVEL controls.

To hear effects in the monitors:

It's possible to put effects into the monitor or headphone mix without recording them.

1 Press the L-R switch of the Stereo Aux Return.
Make sure any other ASSIGN switches (if using the upper "A" Aux Return) or the GROUP MASTERS switch (if using the lower "B" Aux Return) are in the up position. Otherwise, the signal will be assigned to the group and effects may be sent to the multitrack recorder.

2 Raise the Stereo Aux Return's LEVEL control until you hear the desired volume of effect return.

3 In most cases, STEREO SEPARATION should be set to FULL (clockwise) and BALANCE should be set to center.

Remember that you can SOLO the Aux Return to make adjustments to the sound, if desired. You will be hearing the output of the effects device only, without any "dry" signal coming from the channel.

To hear effects in the headphone/cue mix:

Often while recording, musicians would like to hear some reverb or delay in their headphone mix. It is possible to meet this need without actually recording the effect. If the studio/cue source is Aux 1-2:

1 Select AUX 1-2 as the Control Room source so you can hear what the studio is hearing.

2 Raise the TO AUX 1-2 control of the Stereo Aux Return until the desired balance is heard.

To record effects onto the multitrack:

In most cases, effects are added at mixdown instead of during tracking and overdubbing. However, you can "record wet" (with effects) in order to use the same device for some other effect at mixdown, or because the effect is essential to the part. To do this, you simply assign the Stereo Aux Return to the Group that you're recording, by pressing one or more of the ASSIGN switches (for the upper "A" returns) or the GROUP MASTERS switch (for the lower "B" returns).

To make sure you're hearing what's actually going to tape, make sure the L-R switch is up, and follow the procedure earlier in this section under "Recording Multiple Sources." If the effect is stereo, it must be recorded onto two tracks. If you're recording onto one track only, try setting the STEREO SEPARATION control to MONO (counterclockwise).

To record effects onto the mixdown deck:

This procedure is the same as for hearing effects in the monitors, listed above.

Bouncing Tracks

Sometimes it is necessary to combine several tracks onto another track, particularly when you are running out of tape tracks. *Example:* Once you've recorded the vocal harmonies on four different tracks, why not bounce them all over to one track, or two tracks for a stereo mix, thereby freeing up the original four tracks.

When bouncing tracks, you will want to monitor the tape tracks being bounced on the Channel FADERS, instead of the short Monitor FADERS. That way, you can route the signal(s) to a Group which corresponds to the track(s) you wish to bounce to. *Example:* If we were bouncing those four vocal tracks to track 5, we would press the CHAN/MON REVERSE button for those channels, route them to Group 5, create a desirable mix, and place track 5 in record. Here's the recipe:

To bounce one or more tracks to another track (mono):

1 For each Channel (tape track) you wish to bounce, press the CHAN/MON REVERSE button so it is down.
This sends the tape tracks to the Channel (long) FADERS.

2 Assign the Channels to Group 5 by pressing the 5-6 button next to the long fader.
Make sure none of these channels is assigned to L-R. Also make sure that no unwanted channels are assigned to 5-6.

3 Turn each Channel's PAN knob hard left.
This routes the signals to Group 5 only.

4 Make sure Channel 5's DIR switch is in the UP position.

5 Place track 5 into record-ready, and adjust Group 5 FADER to achieve a desirable recording level.

6 Adjust each Channel FADER to achieve a desirable mix.
Hint: Press SOLO on channel 5's Monitor section to check the mix.

7 Rewind the tape, and record onto track 5 those portions you wish to bounce.

8 Tracks 1-4 are now available for recording new parts.

To bounce multiple tracks to two tracks (stereo):

1 For each Channel (tape track) you wish to bounce, press the CHAN/MON

REVERSE button so it is down.
This sends the tape tracks to the Channel (long) FADERS.

2 Assign the Channels to Groups 5 and 6 by pressing the 5-6 button next to the long fader.

3 Make sure Channel 5's DIR switch is in the UP position.

4 Place tracks 5 and 6 into record-ready, and adjust the Group 5 and 6 FADERs to achieve a desirable recording level.

5 Adjust each Channel's PAN knob and FADER to achieve a desirable mix.

6 Rewind the tape, and record onto tracks 5 and 6 those portions you wish to bounce.

7 Tracks 1-4 are now available for recording new parts onto.

Playback/Mix-Down

Mixdown Basics

Here is a simplified step-by-step way to establish a mix:

1 On the Channels where tape tracks are returning, press the CHAN/MON REVERSE button. This reverses the two inputs of the Channel (Mic/Line and Tape In). Now the microphone or line input will appear at the Monitor FADER, and the TAPE IN will appear at the Channel Input.

2 Raise the Channel FADERS being used as Tape Returns to the desired levels.

3 Add the amount of effects desired by adjusting the AUX levels of each Channel. If required, adjust the AUX MASTERS levels to eliminate overload to outboard effects.

4 Assign the Returns to L-R.

5 Raise the level of the STEREO AUX RETURNS and adjust the STEREO SEPARATION and BALANCE as desired.

6 Adjust the Master FADERS so that the desired level is sent to the mixdown tape machine.

7 Press EXT 1 as the source in the CONTROL ROOM section. This assures that you are hearing only what is actually reaching the mixdown deck, and that it is in RECORD mode when you want it to be.

Getting the Mix to the Tape Deck

Once you have established a satisfactory mix, it's time to get it over to the mixdown tape deck. This involves connecting the L-R MASTER OUT jacks to the mixdown

tape deck's left and right inputs. For more information on interfacing the X2 with a mixdown deck, see page 27.

Assign all Channels, Monitors, Stereo Aux Returns and Groups being used to the L-R MASTER FADERS, by making sure the L-R buttons for each is down. Then create a mix using the Faders for the selected channels.

If there are any channels, monitors or aux returns you are not using, make sure their L-R switches are up, to keep the noise floor to a minimum.

Creating a Dependable Mix

Creating a mix is easy; creating a great mix (one that jumps off the tape) is a lot harder. There are those engineers who are in demand just for mixing because of their sense of balance between instruments causes the mix to come alive with excitement. Although outboard effects and tonal adjustments are important, you'd be surprised at how good a dry (meaning no EQ or effects) mix can be if the balances between parts are right. When you add effects and EQ, it will sound that much better.

Since much of the art of mixing is totally subjective and up to the taste of the engineer, a basic balance between instruments is necessary first before any tonal or effect enhancements can really become effective. We've included a method to help you quickly create a "dependable" mix; one that sounds good no matter what speakers you mix or play back on. Although our example involves mixing the instruments found in popular music, this method can be applied to any type of music regardless of the instruments being used.

To create a dependable mix:

Note: This is only a reference or starting point. Each song is unique and calls for different balances.

1 Begin with all the Channel FADERS in the "- " (down) position. Set the Stereo Master FADERS to the "-10" point on their travel (about 75%).

2 Set the Meter Bridge to Tape Return mode by holding ALL / ALT and pressing DISPLAY. This way, when you roll tape, the meters will light up (for those tracks with audio) regardless of where the Channel Faders are.

3 Raise the Kick Drum Channel FADER until the LED meters read "-2."

4 Mute the Kick Drum Channel by switching the MUTE button to the "On" (down) position, so that the Kick can no longer be heard. DO NOT MOVE THE FADER! Just mute the Kick Channel.

5 Raise the Snare Drum Channel FADER until the LED meter reads "0." Mute the Snare Drum Channel, the same as the Kick.

6 Raise the Hi-Hat Channel FADER until it reads "-15" on the LED meter. If any cymbals (ride or crashes) occur in the song, set those Channels to "-15." Mute the Hi-hat and Cymbals Channels.

7 Raise the Toms Channel FADERS. Set them so that the LED meter indicates “0.” Mute the Toms Channels.

8 Bring up the Bass Guitar Channel FADER so that the LED meter reads “-6.” Mute the Bass Channel.

9 Raise the Channel FADERS with the rhythm guitar and / or keyboards so that the LED meters read “-10,” unless percussion instruments are involved (such as cowbell, triangle or shaker), in which case the meters should read “-15.” Mute these Channels.

10 Raise the Channel FADERS with the keyboard pads, strings and / or organ so that the LED meters read “-30.” Mute these Channels.

11 Raise the Channel FADERS with the melody and solo instruments (such as lead vocal, solo guitar, etc.) so that the LED meters read “-8.” Mute these Channels.

12 Raise the Channel FADERS with the background vocals and / or incidental instruments so that the LED meters read “10.”

13 Unmute all Channels and make balance adjustments as necessary.

The above process can be accomplished very quickly once you get the hang of it. Usually, it is done at least twice when “getting up” a mix. The first time is without effects or EQ to see what (if anything) the mix needs. The second time is after all the effects and EQ have been added.

Mute Automation

One of the most creative elements of mixing is the art of muting. By turning channels on and off, you can create a different performance of what is being fed to the channel. *Example:* A lead vocal track may have wound up with some unwanted sounds. By muting and unmuting the channel, you can omit the unwanted portions. Or, you can use muting to change the rhythm of a drum part; or to remove a previously unnoticed mistake on one of the other tracks. While this is a powerful technique, without a mute automation system it can be difficult to keep track of which channels to mute, when and for how long. Obviously, mute automation is the only reliable way of applying the technique of muting during mix-down on a large console like the X2.

You can automate the muting and unmuting of any channel either by recording these “mute events” into the X2’s Dynamic Mute Automation sequencer, or by using an external MIDI sequencer. When using the built-in sequencer, a synchronization source is required to drive it. If you are using one or more ADATs, the best way to use the X2 is by synchronizing its built-in Mute Automation sequencer to the ADAT’s time code reference. This provides an extremely accurate method of managing the many tracks that are used in post-production applications, where muting and unmuting tracks is frequent and the timing crucial.

If you don’t use ADAT, you can synchronize the X2’s sequencer to MIDI Time Code

or MIDI Clock. This can either come from a synchronization processor (one that can translate SMPTE or VITC timecode into MTC) or from a MIDI sequencer. Alternatively, you can also use the MIDI sequencer to record mutes from the X2's console, thereby bypassing the X2's built-in sequencer.

If you plan to use an external sequencer for automating mutes, there are several things to consider. Not only must you choose a MIDI channel for the X2 to receive and transmit on, you must also choose a MIDI Map which defines how the mutes will be controlled. Because there are many sequencers available, each with its own characteristics, the X2 provides a MIDI Map for virtually every possible situation.

Refer to the Chapter 5 for more information about Dynamic Mute Automation.

Live Performance

Creating a Monitor Mix

Most sound reinforcement applications work best in mono, since so few members of the audience are seated in the ideal spot to hear the balance of a stereo sound system effectively. Also, a stereo sound system can be much more difficult to mix.

To configure the X2 mixer in order to achieve a mono mix:

1 Pan all of the Channels fully left (or fully right).

2 A mono mix will now be present at the Master L FADER (or the Master R FADER, if all Channels were panned to the right).

Using Group Faders as Subgroups

The Groups are extremely useful in sound reinforcement work. A Group can be used to control the overall level of several Channels with the movement of only one fader. Here are two examples:

To control all the vocal mics from the Group 1 FADER:

1 Raise the selected Channel FADERS to the desired levels.

2 Unassign each of the selected Channels from the Master Faders by switching their respective L-R buttons to the “Off” (up) position.

3 Now assign each of the selected Channels to Group 1 by switching the 1-2 button to its “On” (down) position.

4 Adjust the PAN control of each of the selected Channels so that it is fully Left.

5 Assign the Group to the Master FADERS by switching the ASSIGN LEFT and ASSIGN RIGHT buttons to their “On” (down) position. The Group 1 FADER will now control the selected Channels, and the combined signal will appear at the Master FADERS along with the other Channels/Groups.

To control a stereo sub-mix of all the vocal mics from the Group 1 and 2 FADERS:

1 Raise the selected Channel FADERS to the desired levels and adjust the PAN control to place the signal in a desirable position within the left-right panorama.

2 Unassign each of the selected Channels from the Master Faders by switching their respective L-R buttons to the “Off” (up) position.

3 Now assign each of the selected Channels to Group 1 and 2 by switching the 1-2 button to its “On” (down) position.

4 Assign Group 1 to the Left Master FADER by switching the ASSIGN LEFT to its

"On" (down) position, and assign Group 2 to the Right Master FADER by switching the ASSIGN RIGHT to its "On" (down) position. The Group 1 and 2 FADERS will now control the selected Channels, and the combined signal will appear at the Master FADERS along with the other Channels / Groups.

Stage Monitor Mix

It is possible to create two separate stage monitor mixes by using the Pre-Fader Sends (Aux Sends 1 and 2). For example, the lead singer may wish to hear more drums and vocals in their monitor, while the lead guitarist wants more bass. Although it is possible to use the Post-Fader sends as well (Aux Send 3 though 8), the Pre-Fader Sends are better suited for this application since any movement of the Channel FADERS will not affect the Pre-Fader Send levels.

To create two different stage monitor mixes:

1 On the Channel modules that you wish to be part of the stage monitor mix, turn up the AUX 1-2 control until the desired balance is obtained. Also, make sure the CHAN / MON REVERSE switch is in the UP position.

2 To send a Channel only to Aux 1, adjust the PAN control (just below the AUX 1-2 control) fully left (AUX 1). To send a Channel only to Aux 2, adjust the PAN control fully right (AUX 2).

3 Use AUX MASTERS 1 and 2 knobs to increase or decrease the overall volume going to the AUX SEND jacks.

4 Route the AUX SEND 1 and 2 jacks to the input of a stereo power amplifier. *Usually, a 1/3 octave graphic equalizer is patched into the line to notch out feedback frequencies. The Alesis M-EQ 230 is a perfect unit for this application.*

5 Route the two speaker outputs of the amplifier to two different sets of stage monitors.

Video Post-Production

The X2 lends itself extremely well to post-production applications where a soundtrack is being developed for video or film. In most situations, a synchronization system is being used, which ties together all of the time-based equipment including one or more video tape recorders (VTRs), a multitrack tape recorder, and in many cases a computer running MIDI software. The software usually performs as a sequencer for adding virtual tracks (sequenced parts not recorded to tape), recalling effects programs on MIDI-compatible outboard effects devices, or for recording mute events for the X2.

CHAPTER 5:

MUTE AUTOMATION

Overview

Because muting channels can be as much a part of the creative aspect of music as composing the song itself, the X2 comes with a built-in sequencer that lets you automate this task. The Mute Automation section of the Master Module lets you record the muting and unmuting of any Channel, Monitor, Group, Aux Send or Return. When automating, each time a MUTE button is pressed it is recorded as an *event* that occurred at a particular time reference. The built-in sequencer then plays back these events at the exact same moments they were recorded. You can keep adding mute events as you please; and you can edit your sequence using built-in editing tools.

The sequencer can synchronize to any of three sources: ADAT timecode (coming from an ADAT Multitrack Tape Recorder), MIDI Clock or MIDI Time Code (coming from a MIDI sequencer, synchronizer or some other source). Each event is time-stamped in reference to the synchronization source. Once you choose a synchronization source, the ONLINE button tells the X2's sequencer to lock to the incoming sync source. Once locked, the UPDATE button engages the recording of mute events. When you're not recording mute events, turn off the UPDATE button to disengage recording; the sequencer will continue to play the events that were recorded as long as the ONLINE button is on and the X2 is receiving a time reference.

After recording the mute events for a particular Channel, Monitor, Group, Aux Send or Return, you can copy all of its events for a particular song to any other Channel, Monitor, Group, Aux Send or Returns. This can be helpful when you move an input to another location.

There are 100 songs in the Mute Automation's memory. Each song shares a total memory of about 10,000 events, which is dynamically allocated. This means you could use a single song to record up to about 10,000 mute events, or you could use 100 songs, with 100 events recorded in each, or any combination in between. At any time you can request a reading of how much memory is available. Songs can be copied to other songs, making it easy to create different versions of the same recording , each using the same basic mute information of the original take.

Each of the 100 songs has four Mute Groups. A Mute Group is sort of like a macro key on a computer. It mutes and unmutes multiple Channels, Monitors, Groups, Aux sends and Returns with the press of a single button. This provides an easy way of recalling their mute status at a later time. If the sequencer is online, you can record multiple mute events by using the Mute groups. The OVERLAY button lets you recall more than one Mute Group at a time, allowing them to "overlap" one another.

You can also use an outboard MIDI sequencer to record mute events from the X2

and have them playback. This is done by choosing one of the many built-in MIDI maps the X2 provides, which determines how the mute events will be transmitted (using note-on messages, controller data or as System Exclusive).

The entire memory of the Mute Automation (100 songs, 400 Mute Groups and up to 10,000 mute events) can be downloaded to an external MIDI device (such as an Alesis DataDisk, MIDI sequencer, bulk librarian, or some other MIDI device). This can be done by transmitting the data via MIDI System Exclusive messages. This data can then be retrieved to the same or another X2, instantly recalling all mute sequences from the original session.

Destructive Solo

The Mute Automation system also has a Solo mode, not to be confused with the SOLO buttons. Solo mode lets the MUTE buttons act as *solo* buttons (as far as the Mute Automation is concerned), allowing you to perform destructive soloing. In Solo mode, the logic of the Mute Automation is reversed: press a MUTE and that channel will continue to be heard, while all other channels will be muted. Unlike the SOLO buttons which affect only the Control Room mix, destructive soloing affects the mix which is going to tape.

When should you use destructive solo via the mute automation system, instead of the control room's solo-in-place system? One application of destructive solo is to create an abrupt cut from an ensemble to a single instrument or voice during a mix. Another common application involves destructive solo and effect sends / returns. The normal SOLO buttons do not cut the effect sends of other channels, so if you solo one channel and one Aux Return, you will still hear the echo of any other instruments that are feeding that effect device. Destructive solo, however, since it mutes all other channels (and hence their post-fader Aux Sends), allows you to hear only one channel if you wish. Simply enter destructive solo mode, and press the MUTE buttons of the channel and the aux return. If you don't want to hear the "dry" signal (which is necessary when setting up certain effects), de-assign the channel signal from L-R or any Groups. It will still send to the effect device, but you will only hear the Aux Return -- all other channels are muted.

To enable destructive solo mode:

1 Hold the ALL / ALT button.

2 Press the ONLINE / SOLO button.

3 Select a channel to solo by pressing any MUTE button on the console.
All other channels MUTE LEDs will flash. To unsolo a channel, press its MUTE button again.

4 To disable, hold the ALL / ALT button and press the ONLINE / SOLO button.

Mute Groups

Mute Groups allow you to mute as many channels as you want with a single button press. Each of the 100 songs contains 4 Mute Groups. Mute Groups are ideal when you want to mute a group of channels that relate together. For example: The various individual drum tracks (snare, kick, percussion, etc.) that make up the drum section. Mute Groups can be recalled by simply pressing one of the MUTE GROUP buttons (1—4). You can easily mute all channels by pressing the ALL button.

Defining Mute Groups

The DEFINE buttons allows you to define a Mute Group of channels. Defined Mute Groups are stored into the currently selected song. Make sure you have the desired song selected before defining a Mute Group.

There are two ways to set the mute status of all channels when defining a Mute Group. You can either mute channels one at a time, or you can mute all channels with the touch of the ALL button. The latter is useful when creating a Mute Group that mutes all channels, or for one that has all but a few channels muted.

To define Mute Groups:

1 Make sure the ONLINE button is turned off (LED should be OFF).

2 Select a Song (00-99) by pressing the DISPLAY button until the SONG LED above it is lit, and then using the INC / DEC buttons to change the Song number.

3 Press the DEFINE button.
The DEFINE button's LED will flash, indicating that a Mute Group is now being defined.

4a Mute any channel by pressing any MUTE button on the console.
Muted channels will have their MUTE LEDs flashing. To unmute a channel, press its MUTE button again; the MUTE LED will turn off.

— OR —

4 b Press the ALL button to mute all channels.
All channels' MUTE LEDs will flash. If you want to unmute a certain channel(s), press its MUTE button and its LED will turn off.

5 Press one of the four Mute Group buttons (1—4) to define the current mute status of the entire console as that Group number.
The Mute Group button's LED will light and then turn off. Simultaneously, all channels return to their previous mute status.

- To cancel the operation without defining a Mute Group, press the DEFINE button before pressing a Mute Group button (1—4).

Defining a Mute Group does not change the current mute status of the console. The X2 will resume its previous mute status when you are finished defining a Mute Group.

Tip: By using more than one Song , you can create as many Mute Groups as you need — up to 400 (remember, there are 100 Songs in memory, each with 4 Mute Groups).

Recalling Mute Groups

To recall a Mute Group:

1 Select a Song (00—99) by pressing the DISPLAY button until the SONG LED above it is lit, and then using the INC / DEC buttons to change the Song number.

2 Press one of the MUTE GROUP buttons (1—4).
The MUTE GROUP button's LED will light and the Mute Group will be recalled.

3 At any time, you can press any other MUTE GROUP button to recall its defined Mute Group.
The four MUTE GROUP buttons act as radio buttons, i.e., pressing one of them will turn off the previously selected Mute Group button, as long as OVERLAY is off (see below).

To return the console to its previous mute status:

1 Press the last selected MUTE GROUP button again.
The MUTE GROUP LED will turn off.

OVERLAY Button

The OVERLAY button changes the function of the MUTE GROUP buttons. While OVERLAY is enabled, more than one Mute Group can be recalled at the same time. In fact, you could have all four Mute Groups recalled. If the same channel is muted in more than one recalled Mute Group, it does not get canceled out; the recalled Mute Groups will "blanket" each other. In other words, if a channel is muted in any of the recalled Mute Groups, it will be muted no matter how many Mute Groups it belongs to.

To recall more than one Mute Group simultaneously:

1 Press the OVERLAY button.
Its LED will light.

2 Press one of the MUTE GROUP buttons (1—4).
The MUTE GROUP LED will light and the Mute Group will be recalled.

3 Press any other MUTE GROUP button to recall and combine its defined Mute Group with the first recalled Mute Group.
Recalled MUTE GROUP's LEDs will be lit.

4 To release a recalled Mute Group, press one of the MUTE GROUP buttons (1—4).

To return the console to its previous mute status:

1 Press all MUTE GROUP buttons that are lit.
The MUTE GROUP buttons' LEDs will turn off, and all Mute Groups will be released.

Display Mode

The two-digit LED display has four modes: Song, Sync, Channel, and Map. The mode is selected by pressing the DISPLAY button. Each time DISPLAY is pressed, the X2 will cycle through the four modes, as indicated by the four LEDs directly above the display.

Once a mode is selected, the displayed parameter may be adjusted by using the INC & DEC buttons, directly below the display. Holding down either button will cause the value in the display to scroll at an increasing speed.

When selecting a song (00—99) or a MIDI Channel (00—16), the INC/DEC buttons have a special feature. If DEC is held and then INC is pressed, the value immediately goes to 00. Likewise, if INC is held and DEC is pressed, the value will immediately go to its highest possible setting (if editing Channel, the value would go to 16; if selecting a Song, the value would jump to 99).

Synchronization

Selecting a Sync Source

The Sync Source is the first thing you must decide on and set before beginning to use the Mute Automation's sequencer for recording and playing back mute events. The sequencer has no internal clock reference, and therefore requires an external reference. After selecting the Sync Source, make sure that the actual source itself is correctly connected to the X2 (refer to Chapter 3 for more details on connections).

The on-board sequencer can synchronize to either ADAT Time Code, MIDI Time Code or MIDI Clock.

To select the Sync Source:

1 Press DISPLAY until the SYNC LED is lit.
The display is now in Sync Source mode.

2 Use the INC/DEC buttons to select a Sync Source.
*The display will change to show the currently selected Sync Source. "*Ad*" means ADAT Time Code, "*tc*" is MIDI Time Code, "*CL*" is MIDI Clock.*

Getting On-line/Locking

The Mute Automation sequencer must be on-line (connected) in order to function (that is, to playback or record mute events). Once you have selected a Sync Source and made the proper connections (see above), press the ONLINE button. The ONLINE button's LED will either flash (to indicate it is waiting for sync information) or will remain lit (to indicate it is currently locked to a sync reference).

As long as the ONLINE LED is lit solid, you can be sure that you are online and any recorded mute events in the currently selected Song will be played back at the appropriate times. While online, the UPDATE button is used for recording mute

events into the current Song. The ONLINE button must be turned on in order for the UPDATE button to function.

Mute Events

Recording and Playing Back Mute Events

The UPDATE button should be thought of as a mute record button. When turned on and the X2 is locked to a sync source (see previous section), any mutes or unmutes are recorded into the currently selected song. Mute events can be recorded by pressing any MUTE button on the console, or by pressing a MUTE GROUP button (1—4). Before recording or playing back mute events, be sure the desired Song is selected.

To record mute events into a song:

1 Press the ONLINE button.
The ONLINE button will flash.

2 Press Play on your tape machine or sequencer (the one providing a sync source).
The ONLINE button will stop flashing and remain lit to indicate it is locked.

3 Press the UPDATE button.
The UPDATE button will light (if the tape is stopped, the X2 will no longer be locked and the ONLINE and UPDATE LEDs will flash).

4 Press any MUTE button to mute or unmute its channel, or press any of the MUTE GROUP buttons to recall a Mute group.

5 When finished, press UPDATE.
The UPDATE LED will turn off.

Be sure to turn UPDATE off when done, to avoid recording unwanted mute events.

To playback mute events:

1 Press the ONLINE button.
The ONLINE button will flash.

2 Rewind the tape back to the beginning and press Play.
The ONLINE button will light solid to indicate it is locked and the mute events you recorded will occur at the same position as originally pressed.

Undoing Mute Events

At any time, you can use the UNDO button to delete the most recent mute event. This is very handy when you've just made a mistake (i.e., pressed the wrong MUTE button). The UNDO button will always delete the last recorded mute event, and can be used repeatedly in order to back up either a small or great distance, even back to the very beginning (thereby erasing the entire sequence of mute events).

Overdubbing

Anytime you wish to add more mute events to a Song, simply select the song, put the X2 Online, play the tape and press UPDATE. New mute events will be added to the original ones. Be sure to turn UPDATE off when you're done, to avoid recording unwanted mute events.

Editing Songs

Erasing

The X2's Mute Automation provides several editing tools. The ERASE FWD button lets you remove all mute events on any channel from a particular time event to the end of the Song. This requires that you first locate your tape machine providing the sync source to the X2, so that the tape's position is exactly at the location you wish to begin deleting mute events from.

The following erase commands are not undo-able. Once something is erased, it's really gone. So… be careful when using these functions.

Tip: Every so often, copy your song to another song location in memory. This way, if you erase something accidentally, you have a back-up copy to refer to. Keep notes about each Song in memory that you use. If you run out of Songs, use the Sys Ex function to store them in a MIDI storage device (i.e., a librarian, sequencer, etc.). Refer to page 56 for more information.

To erase all events AFTER a particular point in the Song on one or more channels:

1 While the X2 is online, locate your tape source (the one that provides the sync source for the X2) to the location where you wish to begin erasing.
Be sure to stop the tape machine or sequencer from PLAY, so the X2 has received the current time location.

2 Press the ERASE FWD button. *The ERASE FWD LED will flash.*

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3 Select channels to erase by pressing a MUTE or MUTE GROUP button.
The selected MUTE and/or MUTE GROUP buttons' LEDs will flash.

Tip: To select all channels, press the ALL button; then, use the MUTE buttons to de-select channels you don't want to erase.

4 Press UPDATE to execute the erase, or press UNDO to abort erase mode.
All mute events on this channel from the current tape position to the end of the song (the last mute event recorded) will be deleted.

To erase all events BEFORE a particular point in the Song on one or more channels:

1 While the X2 is online, locate your tape source (the one that provides the sync source for the X2) to the location where you wish to begin erasing.
Be sure to stop the tape machine or sequencer from PLAY, so the X2 has received the current time location.

2 Press the ERASE BWD button. *The ERASE BWD LED will flash.*

3 Select channels to erase by pressing any MUTE or MUTE GROUP button.
The selected MUTE and/or MUTE GROUP buttons' LEDs will flash.

4 Press UPDATE to execute the erase, or press UNDO to abort erase mode.
All mute events on this channel from the current tape position to the beginning of the song (the first mute event recorded) will be deleted.

To erase all events on one or more channels:

1 Press the ERASE FWD button.
The ERASE FWD LED will flash.

2 Press the ERASE BWD button.
The ERASE BWD LED will flash.

3 Select the channels to be erased by pressing any MUTE button.
The MUTE button LEDs for selected channels will flash.

4 Press the UPDATE button to execute the erase.

To erase all events on all channels:

1 Press the ERASE FWD button.
The ERASE FWD LED will flash.

2 Press the ERASE BWD button.
The ERASE BWD LED will flash.

3 Press the ALL button.
The MUTE button LEDs for all channels will flash.

4 Press the UPDATE button to execute the erase.

To erase a Song (including its mute events and 4 Mute Groups):

1 Select a Song (00—99) that has no mute events recorded into it and has its four Mute Groups undefined.

2 Hold the ALL / ALT button and press the COPY button.

3 Use the INC / DEC buttons to select the Song (00—99) you wish to erase.

4 Press the UPDATE button to execute the copy.

Erase All Memory

To erase all memory (100 Songs, including their mute events and Mute Groups):

1 Hold the ALL / ALT button.

2 Hold the ERASE FWD button.

3 Press the DEC button.

The display will temporarily read "rS" (reset).

4 Release all three buttons.

Copying

Copy Mute Events

The X2 allows you to copy all mute events for a single channel within a Song to any other channel. This copy function merges copied data with whatever events were already on the destination channel. To replace a channel's mute events you must first erase the mute events on that channel before copying (see previous section).

To copy mute events from one channel to another:

1 Press the COPY button.
Its LED will flash.

2 Select the *source* channel (the channel whose mute events are to be copied) by pressing its MUTE button. Pressing the same button again de-selects that channel, so you can select a different source.
The channel's MUTE button LED will flash.

3 Select the *destination* channel(s) (the channel or channels where the mute events are to be copied to) by pressing its respective MUTE button.
Selected channels' MUTE LEDs will be flashing half as fast as the source channel.

4 Press UPDATE to execute the copy function.

Copy Song

Copying Songs to other locations in memory makes it possible to make back-ups or different versions of Song projects. For example, if you just recorded the mute events into a song, you may want to copy it into a different song location before adding more mute events to it. Sometimes, instead of trying to delete a series of unwanted mute events, it is faster and easier to go back to an older version of the Song that was copied somewhere else in memory.

To copy a Song to another location:

1 Select a song (00—99) by pressing the DISPLAY button until the SONG LED is lit and using the INC / DEC buttons to change the value in the display.

2 Hold the ALL / ALT button and press the COPY button.

3 Use the INC / DEC buttons to select a Song (00—99) to be the copy destination.

4 Press the UPDATE button to execute the copy.

MIDI

When you want to use an external MIDI sequencer to provide mute automation, instead of the X2's internal sequencer, you must select a MIDI channel and choose a MIDI Map. There are several different sequencers to choose from, although we recommend using a sequencer that provides "event chasing," so that you can locate to any location on your sequencer and be confident that it will update the mixer with its correct mute status for that particular section of the song.

MIDI Channel

The MIDI Channel value determines which MIDI channel the X2 will transmit and receive mute events on as MIDI messages for recording and playing back on an external MIDI sequencer. The messages that are sent representing the mute events are determined by the currently selected MIDI Map (see next section). You can transmit and receive on any one channel, from 1 to 16, or you can choose all 16 channels simultaneously; this is called omni mode. Use omni mode only when you are using the MIDI sequencer exclusively for recording and playing back mute events.

*The MIDI Channel and Map displays are disabled if the Sync Source is set to "*Ad*" (ADAT sync).*

To set the MIDI channel:

1 Press the DISPLAY button until the CHANNEL LED is lit.

2 Use INC / DEC to change the value.
Choose 01—16 for MIDI channel 1 through 16, or 00 for omni mode (all 16).

It is recommended that you use a MIDI channel that is not being used by another device (synth, sampler, drum machine) connected to the same source as the X2.

Selecting Songs via MIDI

Using MIDI program change messages, you can select any of the 100 Songs. These messages can be sent by a MIDI sequencer or some type of MIDI controller (particularly useful in live performance applications). The X2 responds to MIDI program change numbers 000—099 to recall Songs 00—99, respectively. This means every time you send a program change message, you can call up four entirely different Mute Groups, thus giving you instant remote access to all 400 Mute Groups.

Once you have selected a Song using program change messages. you can select any mute on the console or Mute Group by sending the appropriate MIDI message. The type of MIDI message that each Mute and Mute Group responds to depends on the currently selected MIDI Map.

MIDI Map

The MIDI Map determines what MIDI messages will be used for each Mute and Mute Group when using an external MIDI sequencer to automate the X2. There are several maps to choose from, each designed for use with specific sequencers. In general, you will probably pick one Map to use on all occasions, based on what type of sequencer you are using.

You must be offline for the MIDI maps to be active. If you are online, the X2's internal sequencer is active.

MIDI Map 1.1 assigns each Mute and Mute Group to a different MIDI note number. Whenever a channel is muted, its respective note number message is sent as a short note (a note-on followed by a note-off) with a high velocity value. When that channel is unmuted, the same note number is sent, this time with a velocity value of 0. This map can be used by almost any sequencer. However, if your sequencer has the ability to "chase events," you will probably want to use a different map that works better. The X2 is designed to ignore the common ALL NOTES OFF message that most sequencers transmit when playback is stopped. This is important as it could potentially change the mute status in an undesirable fashion.

Map 1.2 is a variation of 1.1. The note number assignments are the same for all channels. However, when a channel is muted, a note-on message is sent; when the channel is unmuted, a note-off of the same note number is sent. Thus, sequencers that can chase note events will allow you to locate anywhere in the sequence and update the console's mute status.

Map 1.3 is the opposite of Map 1.2. When a channel is muted, a note-off is sent; when unmuted, a note-on is sent. This is useful when using a sequencer that doesn't like to record very long notes (if you have some channels muted most of the time while using Map 1.2, some sequencers may "bail out" of record and create a note-off for that channel, assuming that the note is stuck).

Map 1.4 uses MIDI controllers to control the Mutes. When a channel is muted, a value of 127 is sent for the corresponding controller number; when unmuted, a value of 0 is sent. MIDI provides 128 possible controllers. However, certain controllers are not used, due to the fact that some sequencers reset them whenever playback is stopped. This is useful on keyboards (turning off a sustain pedal, etc.), but is not desirable on a mixing console.

Maps 2.0 through 2.9 send out bursts of System Exclusive messages, sort of like a camera with automatic film-advance. The difference in the Maps is how often a snapshot is sent. Map 2.0 sends a snapshot every 250 ms, whereas Map 2.9 sends a snapshot out every 8 seconds. This means if the mixer just sent out a snapshot before you pressed a MUTE, you'll have to wait anywhere from 250 ms to 8 seconds before the change in mute status is transmitted. These maps are useful when using a sequencer that does not provide event chasing. Use the higher-numbered maps to minimize MIDI information when accurate timing is not essential.

Memory Backup

All contents of the Mute Automation's memory (including 100 Songs, all mute events and 400 Mute Groups) can be transmitted (or dumped) to an external MIDI storage device by using System Exclusive messages. In order for this to work correctly, you'll need to use a device capable of storing such information (like an Alesis DataDisk, System Exclusive librarian or sequencing software). The device should be connected using two MIDI cables. For more information see page 30.

Transmitting System Exclusive

To dump all memory out the MIDI OUT port as System Exclusive information:

1 Make sure the X2 is offline and not set in ADAT SYNC mode (the ONLINE button should not be lit).

2 Set the device receiving the dump to its receiving or recording mode.

3 Hold the ALL / ALT button.

4 Press the UPDATE / SYS EX button.
The display will temporarily read "du" indicating that a dump has been executed.

Receiving System Exclusive

Receiving either a single Song or an entire memory dump into the X2 is very easy: simply transmit the data from the storage device (by whatever means possible) into the X2's MIDI IN. The X2 is always prepared to immediately recognize received MIDI System Exclusive information. The moment it is recognized, the X2 automatically goes into receive mode and loads the incoming data into memory; the display will temporarily read "rc" while the X2 is receiving the dump.

Receiving a System Exclusive dump replaces the memory contents of the X2. This is destructive; i.e. the memory's previous contents will be erased and irretrievable. Always make sure to back-up your data before attempting to replace it via Sys Ex.

Remaining Memory

You can find out how much memory of the X2's internal sequencer remains at any time by simultaneously holding the ALT button and pressing the DEFINE button. The value shown reflects the percentage of available memory, from 00—99%.

CHAPTER 6:

DESCRIPTION OF CONTROLS

Input Channel Controls

+48 V Switch

When pressed, the +48 V switch applies phantom power to the XLR microphone jack for that channel. 48 volts DC appears equally on pins 2 and 3 to be used by condenser-type microphones requiring external power. Since this potential is equal, it is "invisible" to standard balanced dynamic microphones, hence the name, "phantom power." Check the manual for the mics you plan on using to make sure that this phantom method is correct before you apply power.

The +48 V switch must be turned off if any electronically balanced line input (such as the balanced output of a tape recorder or CD player) is connected to the MIC IN jack; it could damage the output circuitry of such units.

Note: Make sure the Mic/Line Gain knob is set to its minimum before switching the +48V switch in or out.

Mic/Line Switch

This switches between MIC (up) and LINE (down) as the input source for the channel. The input routing after this switch to the short Monitor FADER or large Channel FADER is determined by the CHAN/MON REVERSE switch (see below).

PHASE (Ø) Switch

When turned on (down), the Ø (Phase) switch reverses the phase of the input. It affects both the Mic and Line inputs.

Mic/Line Gain

The MIC/LINE GAIN knob adjusts the sensitivity of both Mic and Line inputs. Proper setting of this control is essential for low-noise, distortion-free operation. In most cases, microphones require 30 to 60 dB of preamplification, while line sources need much less or none at all. If the Channel PEAK LED lights when the CHAN/MON REVERSE switch is up, or the Monitor PEAK LED lights when it is down, lower the MIC/LINE GAIN control.

Chan/Mon Reverse

Press the CHAN/MON REVERSE switch to select TAPE IN as the source of the Channel, and at the same time send Mic or Line (whichever is chosen by the MIC/LINE switch) to the Monitor FADER. *Example:* If all the console's MIC/LINE and CHAN/MON REVERSE switches are down, all the main Channel FADERS will be getting signal from their respective Tape Returns, and all the short Monitor FADERS will be getting signal from the Line input jacks. This would be a typical mixdown patch. By releasing the CHAN/MON REVERSE switch, the large Channel

FADERS will get signal from the Line inputs, and the short Monitor FADERS will get the Tape Returns, the typical patch for recording & overdubbing.

HPF Switch

When the HPF (High Pass Filter) switch is pressed (down), a filter is inserted into the signal path which rolls off (attenuates) frequencies below 75 Hz at a rate of 18 dB per octave. A 19 Hz signal will be attenuated 36 dB when this is turned on. It is used to filter out subsonic frequencies which may be present in the signal. It is independent of the EQ IN switch (see below).

Hi and Lo EQ

These provide standard shelving controls. The HI knob range is +/- 15 dB at a fixed frequency of 12 kHz. This means that frequencies above 12 kHz will be boosted or cut by the same amount , and frequency response between 1 kHz and 12 kHz will gradually rise or fall to the shelving point. The LO knob range is +/- 15 dB at a fixed frequency of 80 Hz. This means that frequencies below 80 Hz will be boosted or cut by the same amount, and frequency response will gradually rise or fall from 80 Hz to about 1 kHz.

This section of the EQ can be inserted into the Monitor path, instead of the Channel path (see next section). When inserted into the Channel path, the Hi and Lo EQ are affected by the EQ IN switch (see below).

TO MON Switch

The TO MON switch inserts the Hi and Lo EQ into the Monitor (short fader path). When the EQ is in the monitor, it is not affected by the EQ IN switch.

Hi Mid and Lo Mid EQ

Combined with the Hi and Lo EQ section, these make up a 4-band parametric equalizer. The Hi Mid controls and Lo Mid controls consist of three knobs each: FREQuency, GAIN and Q (bandwidth). In both cases, the FREQ and GAIN are on a concentric knob with GAIN on top and FREQ on the bottom, while the Q is a separate knob.

The FREQ knob changes the center frequency of the EQ. Hi Mid FREQ range is sweepable between 650 Hz to 15 kHz; Lo Mid FREQ range: 45 Hz to 950 Hz.

The GAIN controls how much boost or cut is applied to the band chosen. At the center detent position, there is no effect (flat response). Turning to the right amplifies the band, to a maximum of 15 dB. Turning to the left cuts the band, to a maximum cut of -15 dB.

The Q, or bandwidth, can be adjusted to select the range of frequencies around the center frequency that will be most affected by the boost or cut. It can be set to as little as 1/6th of an octave when turned completely left, or to almost 2 octaves when turned completely clockwise.

EQ IN Switch

This inserts the equalizer controls into the channel signal path. When down, the EQ is in the signal path. This switch has no effect on the HPF control (see above), or on the HI and LO EQ if the TO MON switch is down.

AUX 1–2, AUX 1–2 PAN

The AUX 1-2 knob controls how much signal will be sent to either AUX SEND 1 or AUX SEND 2, as set by the PAN knob directly below this knob. This is a pre-fader, pre-mute, post-EQ stereo send typically used for performer monitors and headphone feeds. By turning the PAN fully left, the signal is routed only to AUX 1. When turned fully right, the signal is routed only to Aux 2. Its input can be derived from either the Channel or Monitor, as determined by the AUX SOURCE switch (see below). Its unity gain position is approximately “2 o’clock.”

AUX 3/7 and AUX 4/8

These are both mono post-fader sends typically used for effect sends. The AUX 3/7 knob controls how much signal will be sent to either AUX SEND 3 or AUX SEND 7, as set by the 7/8 switch below it. The AUX 4/8 knob controls how much signal will be sent to either AUX SEND 4 or AUX SEND 8, as set by the 7/8 switch directly above it. Their input can be derived from either the Channel or Monitor, as determined by the AUX SOURCE switch (see below)

7/8 Switch (Aux 3/4)

The 7/8 switch, found between the 3/7 and 4/8 knob, is an auxiliary assignment switch. When up, the AUX 3/7 knob sends signal to Aux Send 3, and the 4/8 knob sends signal to Aux Send 4. When this switch is down, the AUX 3/7 knob sends signal to Aux Send 7, and the 4/8 knob sends signal to Aux Send 8. The reason for this switch is to allow you to use the Aux controls for different purposes on different channels (*example:* two different types of effects). Another reason is to allow the monitor and the channel to send signal to the same effect device simultaneously (when the AUX SOURCE switch and both 7/8 switches are down).

AUX SOURCE Switch

The AUX SOURCE switch selects the input for Aux Sends 1—4 above it. When up, they get signal from the Channel path. When down, they get signal from the Monitor path. If using the Aux Sends for a headphone mix and you are monitoring tape on the short faders, press the AUX SOURCE switch down to allow the performers to listen to what is already on tape.

AUX 5/7 and AUX 6/8

These are both mono post-fader sends. Their signals are derived from the Channel only (not the Monitor). The AUX 5/7 knob controls how much of the Channel’s signal will be sent to either AUX SEND 5 or AUX SEND 7, as set by the 7/8 switch below it. The AUX 6/8 knob controls how much of the Channel’s signal will be sent to either AUX SEND 6 or AUX SEND 8, as set by the 7/8 switch directly above it.

7/8 Switch (Aux 5/6)

This switch functions identically as the 7/8 switch found between Aux 3/7 and 4/8, but is used to assign the AUX 5/7 and 6/8 knobs (refer to previous section).

Monitor PAN

The PAN control sends the output of the Monitor in continuously variable degrees to either side of the stereo mix (if the Monitor's L-R switch is pressed -- see below).

Monitor PEAK LED

The PEAK LED will flash when the Monitor's signal level (post-EQ, pre-fader) is about 15 dB over nominal level. This is 3 dB before the channel electronics will distort (clip). If it flashes, reduce the gain in the circuit (by adjusting the MIC/LINE GAIN control if the monitor source is Mic/Line, or lowering the recording level if the monitor source is Tape) until it stops flashing.

Monitor SOLO Button

The SOLO button sends the Monitor's pre-fader signal(and only that Monitor's signal, if no other SOLO buttons are pressed) directly to the Control Room monitors, cutting off any other signals to the Control Room. It allows the engineer to hear the signal before bringing it into the mix, for cueing purposes. When SOLO is pressed, its LED will light. The master SOLO LED will light in the Master module section, to alert you that Solo is active. You can adjust the output level of the signal(s) being soloed by turning the SOLO knob in the Master module section.

Monitor MUTE Button

The MUTE button disconnects the Monitor's signal from the Master outputs and any post Aux Sends. When pressed, the MUTE button's LED will light. This button is also controlled by the Dynamic Mute Automation system.

Monitor L-R Button

The L-R button routes the monitor's signal to the Master L-R FADERS, depending on the setting of the Channel PAN knob. If you are sending the Monitor signal to Aux 1 and 2 — with the AUX SOURCE switch set to MON (down) — but don't want that signal on the Master L-R FADERS, turn the L-R switch off (up). If monitors are not being used during mixdown, turn the L-R switches off for the best signal-to-noise ratio.

Monitor Fader

This linear 45mm slide fader varies the level feeding the Monitor PAN control (and Aux 3/7 and Aux 4/8, if the AUX SOURCE switch is down). The input to this fader depends on the CHAN/MON REVERSE switch and MIC/LINE switch settings. If the CHAN/MON REVERSE button is up, the Monitor FADER receives the TAPE IN signal. If the CHAN/MON REVERSE switch is down, then the input can be either the Mic or Line, as determined by the MIC/LINE switch.

Channel PAN

The PAN sends the output of the Channel in continuously variable degrees to either side of the stereo mix (if L-R switch is pressed -- see below), or to odd-even sides of the Group Assignment switches (pan left for Groups 1, 3, 5 and 7; pan right for Groups 2, 4, 6 and 8). The PAN control is a combination "where to/how much" control, in that it controls both the level and direction of a signal.

Channel PEAK LED

The PEAK LED will flash when the Channel's signal level (post-EQ, pre-insert, pre-fader) is 15 dB over nominal level. This is 3 dB before the channel electronics will distort. If it flashes, reduce the MIC/LINE GAIN knob (or the gain of any device at the INSERT jack) until it stops flashing.

Channel SOLO Button

The SOLO button sends the Channel's pre-fader signal (and only that Channel's signal, if no other SOLO buttons are pressed) directly to the Control Room monitors, cutting off any other signals to the Control Room. It allows the engineer to hear the signal before bringing it into the mix, for cueing purposes. When SOLO is pressed, its LED will light. The master SOLO LED will light in the Master module section, to alert you that Solo is active. You can adjust the output level of the signal(s) being soloed by turning the SOLO knob in the Master module section.

Channel MUTE Button

The MUTE button disconnects the Channel's signal from the Master outputs, the Group outputs, and any post Aux Sends. When pressed, the MUTE button's LED will light. This can be controlled via the Dynamic Mute Automation system, which gives it other functions as well (see Chapter 5).

DIR Switch

The DIR switch determines what signal appears at the TAPE OUT jacks (both ELCO balanced and 1/4" unbalanced). When the DIR switch is up, the TAPE OUT signal will be the corresponding Group signal (Group 1 on Channels 1, 9, and 17; Group 2 on Channels 2, 10 and 18; etc.). When this switch is down, the TAPE OUT signal will be the direct output of the selected channel (post-fader).

Be very careful when both the DIR switch and CHAN/MON REVERSE switches are down. If you arm the tape track on that channel for recording, (or do anything else where the tape machine monitors its input) feedback will occur.

Group Assign Switches (1–2, 3–4, 5–6, 7–8)

The Group Assign switches (1-2, 3-4, 5-6, and 7-8) assign the output of the Channel (large fader) to any of the eight Group output busses. Each Group Assign switch is an odd-even pair, and the amount of signal sent to odd or even numbered groups is determined by the Channel PAN knob. These may be used in any combination.

Note that even if the 1-2 button is pressed, no signal will go from the channel to Group 1 if the Channel PAN knob is turned hard right.

Channel L-R Button

The L-R button routes the channel's signal to the Master L-R FADERS, depending on the setting of the Channel PAN knob. This switch is normally pressed for final mixdown, or if the entire channel is being used for monitoring.

Channel Fader

This linear 100mm slide fader varies the level feeding the Channel PAN control and Group Assign switches, Aux Sends 5/7 and 6/8, and Aux 3-4 if they are in the post-channel position (AUX SOURCE switch up). The fader is set for unity gain (level in = level out) when it is set at the "0 dB" level. When the fader is raised to its maximum, there is 10 dB of gain added to the signal.

Aux Master Controls

Aux Send Levels

The eight knobs in the Aux Masters section provide the last overall level control for the Aux Send mixes. They get their signal from the individual Aux Send level controls in the console. The signal then goes to the respective AUX SEND jacks on the back panel (Aux 1 and 2 are also routed to the AUX 1-2 switch as in the Control Room and Studio sections beneath). Adjust the Aux Masters for the correct level feeding your external effects device or cue amplifier. The nominal (unity gain) setting for these controls is approximately "2 o'clock."

AFL (After-Fader-Listen) Buttons

The eight AFL buttons next to each Aux Master knobs let you solo any of the Aux Sends' mixes in the Control Room. The master SOLO LED will light in the Master module section, to alert you that Solo is active. You can adjust the output level of the signal(s) being soloed by turning the SOLO knob in the Master module section.

MUTE Buttons

The MUTE button completely disconnects the Aux Master's signal from the Aux Send's output. When pressed, the MUTE button's LED will light. This can be controlled via the Dynamic Mute Automation system, which gives it other functions as well (see Chapter 5).

Stereo Aux Return Controls

Level

The Aux Return LEVEL knob controls how much signal from the stereo Aux Return

inputs will be applied to the Aux Return ASSIGN switches and the STEREO SEPARATION and BALANCE controls see below).

Hi and Lo EQ

These provide standard shelving controls. The HI knob range is +/- 15 dB at a fixed frequency of 12 kHz. This means that frequencies above 12 kHz will be boosted or cut by the same amount , and frequency response between 1 kHz and 12 kHz will gradually rise or fall to the shelving point. The LO knob range is +/- 15 dB at a fixed frequency of 80 Hz. This means that frequencies below 80 Hz will be boosted or cut by the same amount, and frequency response will gradually rise or fall from 80 Hz to about 1 kHz.

PEAK LED

The PEAK LED will flash when the Aux Return's level (post-EQ, pre-fader) is 15 dB over nominal level. This is 3 dB before the channel electronics will distort. If it flashes, reduce the level of the incoming signal until it stops flashing.

Stereo Separation

The STEREO SEPARATION knob allows continually variable control over the "width" of the stereo image from MONO (hard left) to FULL (hard right).

Balance

The BALANCE knob controls the level of the signal being fed to the ASSIGN switches (see below). In the center position, the Balance is at unity gain. Turning BALANCE hard right increases the right signal, and totally removes the signal from the left side. Turning the knob hard left has the opposite effect. Balance left routes the signal to odd numbered Groups, balance right to even Groups. If the STEREO SEPARATION control is in the MONO position, BALANCE functions similarly to a pan control.

TO AUX 1–2 Level

The TO AUX 1-2 knob controls how much of the Aux Return's signal will be sent to both AUX SEND 1 and 2. This is a pre-fader, post-EQ stereo send typically used for performer monitors and headphone feeds. Signals from the left input will go to Aux 1, and signals from the right input will go to Aux 2. The Aux 1-2 signal will not be affected by the STEREO SEPARATION, BALANCE, or MUTE controls.

AUX A ASSIGN Switches (Aux A Only)

The Aux Return ASSIGN switches (1-2, 3-4, 5-6, 7-8) route the Aux Return to any of the eight Group outputs. They work in the same way as the CHANNEL ASSIGN switches (see page 63). Press these switches if you want to record an effect onto the multitrack. Remember that the STEREO SEPARATION and BALANCE knobs have an effect on the assignment.

GROUP MASTERS Switch (Aux B Only)

The GROUP MASTERS switch routes the Aux Return's signal to the pair of Group FADERS directly below the Aux Return (*example:* pressing the GROUP MASTERS switch on Aux B of the first Group module would route that signal to Groups 1 and 2.). Remember that the STEREO SEPARATION and BALANCE knobs have an effect on the assignment.

L-R Button

The L-R button routes the Aux Return's signal to the Master L-R FADERS, depending on the settings of the STEREO SEPARATION and BALANCE knobs.

SOLO Button

The SOLO sends the Aux Return's post-fader signal (and only that Monitor's signal, if no other SOLO buttons are pressed) directly to the Control Room monitors, cutting off any other signals to the Control Room. It allows the engineer to hear the signal before bringing it into the mix, for cueing purposes. When SOLO is pressed, its LED will light. The master SOLO LED will light in the Master module section, to alert you that Solo is active. You can adjust the output level of the signal(s) being soloed by turning the SOLO knob in the Master module section.

MUTE Button

The MUTE button completely disconnects the Aux Return's signal from the Master outputs and Groups. When pressed, the MUTE button's LED will light. When pressed, the MUTE button's LED will light. This can be controlled via the Dynamic Mute Automation system, which gives it other functions as well (see Chapter 5).

Group Master Controls

ASSIGN LEFT

The ASSIGN LEFT button sends the Group's signal to the left side only of the Master L-R mix. This is useful when sub-grouping in a final mix, or for live sound reinforcement applications.

ASSIGN RIGHT

The ASSIGN RIGHT button sends the Group's signal to the right side only of the Master L-R mix. If using an odd / even pair of Groups to create a stereo sub-mix, assign the odd-numbered Group left, and the even-numbered Group right.

PFL (Pre-Fader-Listen) Button

The PFL button sends the Group Master's pre-fader signal (and only that Group Master's signal, if no other SOLO buttons are pressed) directly to the Control Room monitors, cutting off any other signals to the Control Room. It allows the engineer to hear the signal before bringing it into the mix, for cueing purposes. When PFL is pressed, its LED will light. The master SOLO LED will light in the Master module section, to alert you that Solo is active. You can adjust the output level of the signal(s) being soloed by turning the SOLO knob in the Master module section.

MUTE Buttons

The MUTE buttons disconnects the Group's signal from the Master outputs, the GROUP OUT jacks and the TAPE OUT jacks. When pressed, the MUTE button's LED will light. This can be controlled via the Dynamic Mute Automation system, which gives it other functions as well (see Chapter 5).

Group 1—8 Master Faders

The 8 Group Master FADERS adjust the total output level of all signals assigned to the Group. They get their signal from the ASSIGN switches in the Channels and the Stereo Aux Returns. They send signal to the 8 GROUP output jacks and the ASSIGN LEFT and ASSIGN RIGHT buttons.. They also send to the equivalent numbered Channels' TAPE OUT jack (Group 1 to Channels 1, 9, and 17; Group 2 to Channels 2, 10, and 18; etc.). The FADER is at unity gain when all the way up.

Master Controls

Oscillator Frequency and Level

The built-in Oscillator provides reference tone with a variable output level. The two switches are used together to determine the Oscillator's frequency between 10 kHz, 1 kHz, 100 Hz and OFF.

		Top Switch	
		Up	Down
Bottom Switch	Up	OFF	1 kHz
	Down	10 kHz	100 Hz

10 kHz tone is used to lay tones on a tape so it can be adjusted for azimuth and frequency response at another studio. 1 kHz is the industry standard level reference tone. 100 Hz can be used to check low frequency response.

Use the knob above the OSCILLATOR switches to adjust the oscillator's level.

SOLO LED and Level

If any SOLO, AFL or PFL button is pressed anywhere on the console, the SOLO LED will light indicating that the Control Room is receiving signal from the Solo buss instead of the Control Room Source switch (see below). Please note that if SOLO is engaged on a Channel that has no signal in it, you will hear nothing in the Control Room until SOLO is turned off on that Channel.

The SOLO knob sets the level you will hear in the Control Room when SOLO is pressed. Typically it is set a little above unity gain (about 2 o'clock), so that a single instrument will sound about as loud in the Control Room as the entire mix does, allowing you to focus. The SOLO signal from the channels and Aux Returns are stereo, coming from post-fader, post-pan. The PFL signals from the Groups and the AFL signals from the Aux Masters are mono.

Studio Level and Assignment

The STUDIO knob sets the overall level of the STUDIO outputs. Note that it does not affect the level of Talkback to the Studio or Groups, which is set by the Talkback Mic Level control alone (see below).

The Studio Assignment consists of two switches: CONTROL ROOM and AUX 1-2. When CONTROL ROOM is down, the Studio is sent the same signal appearing at the Control Room outputs. When the AUX 1-2 switch is down, the Studio is sent the signal at the AUX SEND 1 and 2 outputs.

Talkback Level and Assignment

The Talkback Level knob sets the output level of the built-in Talkback mic. Two assignment switches are located directly beneath it: SLATE and STUDIO. When SLATE is down, the Talkback mic is routed to the Group outputs, so you can record an announcement on the multitrack. *Note:* To record an announcement onto the mixdown tape deck, you must also assign the Group to either Left or Right (or

both). If the STUDIO switch is down, the Talkback signal is routed to the Studio outputs.

Phones

This controls the output level of the Headphone output (located at the front end of the console). This headphone mix follows whatever is chosen as the Control Room source (see below).

Control Room Level and Source

The CONTROL ROOM knob sets the overall Control Room level. Ideally the amplifier input controls should be set so that full rotation of this control does not exceed the maximum level you want in the control room.

The Control Room Source switches select the source of the Control Room mix (provided that no SOLO source is turned on to override them). Normally, the L-R will be selected, providing the Master L-R mix. Press AUX 1-2 when you wish to route the headphone mix (Aux Send 1 and 2 output) to the Control Room. EXT 1 and EXT 2 correspond to the EXT IN 1 and EXT IN 2 input jacks on the rear of the X2. These can be used to listen to the output of a mixdown tape recorder, or CD player.

DIM

The DIM button dramatically lowers the output level of the Control Room. Make sure this button isn't down when you begin to crank up the CONTROL ROOM Level knob to compensate.

MONO

The MONO button, when pressed down, sums the Control Room mix to the left and right sides of the selected output. By using MONO mode, you can check for phase cancellation and mono capability. This is good to use when you want to hear how your mix will sound on AM radio or television.

Master Faders

The Master L-R FADERS adjust the total output level of the stereo signal. It gets its signal from the stereo busses, which are fed by the Channels, Monitors, Groups and Aux Returns which have their L-R switch down. They send signal to the MASTER OUT L and R switch, and the CONTROL ROOM L and R switch. Unity gain is achieved when the fader is all the way up.

Meter Bridge

The Meter Bridge has two modes that determine what signal the 24 channel meters will display: Tape Send or Tape In. When set to Tape Send, the 24 meters monitor the signals going out the 24 TAPE SEND jacks. When set to Tape Return, they monitor the signal coming from the 24 TAPE IN jacks.

To select the meter bridge mode, hold the ALL (ALT) button and press the DISPLAY (METER BRIDGE) button. This toggles the meters between Tape Send

and Tape Return mode. Two Mode LEDs on the meter bridge indicate which mode is selected.

Mute Automation Controls

DISPLAY

The DISPLAY button is used to cycle the 2-digit LED display through a cycle of four display modes: Song, Sync, Channel and Map. Each time the DISPLAY button is pressed, the display will advance to the next display mode.

The Display Mode is indicated by four LEDs (Song, Sync, Channel and Map). They are located directly above the LED display and the DISPLAY button.

INC & DEC

The INC / DEC buttons are to edit a value in the display. Press INC to raise the value, or press DEC to lower it. Holding either INC or DEC will cause the value in the display to scroll at a gradually increasing speed.

When the display is in SONG mode (SONG LED is lit) or CHANNEL mode (CHANNEL LED lit), you can get back to 00 quickly by pressing both INC and DEC buttons simultaneously.

SONG

The SONG LED indicates that the display is in Song mode. Use the INC / DEC buttons to select a Song from 00—99. Each Song contains four Mute Groups plus mute event information. Before recording new mute events or defining Mute Groups, be sure you have selected the desired Song already.

SYNC

The SYNC LED indicates that the display is in Sync mode. Use the INC / DEC buttons to select a Sync Source (ADAT Time Code, MIDI Time Code or MIDI Clock). You must select a sync source and be online (connected) with the sync source in order to use the Mute Automation's on-board sequencer. For more information about sync sources and hook-up descriptions, refer to pages 23 and 49.

CHANNEL

The CHANNEL LED indicates that the display is in MIDI Channel mode. Use the INC / DEC buttons to select a MIDI channel from 01 to 16, or select 00 for Omni mode (all channels). This MIDI channel is used for transmitting and receiving mute events via MIDI using an external sequencer.

MAP

The MAP LED indicates that the display is in MIDI Map mode. Use the INC / DEC buttons to select one of the internal MIDI maps (1.1—1.4, 2.0—2.9). This determines how the console's MUTES will be controlled via MIDI.

MUTE GROUPS (1—4)

The MUTE GROUPS buttons (1—4) are used to recall a group of mutes on various channels at the touch of a button. Four Mute Groups are available in each Song, giving you 400 Mute Groups altogether. To create a Mute Group, you must use the DEFINE button (see below). The MUTE GROUPS buttons are effected by the OVERLAY button (see below).

Mute Group, like any other mute, can be recorded into a Song using the Mute Automation sequencer. However, only the Mute Group button that is pressed is recorded, not the individual channels that are a part of the Mute Group. This means that if the Mute Group's definition changes, the recorded Mute Group events will recall the new Mute Group definition.

DEFINE

The DEFINE button lets you create Mute Groups. To store a Mute Group, press DEFINE (its LED will flash), press all the MUTE buttons you wish, then press one of the MUTE GROUP buttons (1—4). The mute status of the entire console is stored.

ALL/ALT

The ALL button selects (mutes) all channels on the console (72 in all) when defining a mute. Unless DEFINE is pressed first, the ALL button does nothing when pressed momentarily. If DEFINE is pressed (its LED flashing), pressing ALL will mute all channels. At this point you can store the current mute status of the console as a Mute Group, or you can unmute particular channels before storing.

When the ALL button is held (without DEFINE being pressed), it becomes an ALT button, allowing you to access other features using existing buttons. The following buttons have secondary features which are accessed while holding ALT:

Button	w/o ALT	w/ ALT
DISPLAY	Advance Display Mode	Meter Bridge mode
COPY	Copy Mute Events	Copy Song
DEFINE	Define Mute Group	Memory Remaining
ONLINE	Locks sequencer to external sync source	Mute Solo mode
UPDATE	Places on-board sequencer in record	Dump System Exclusive
UNDO	Deletes the last mute recorded	Erase Song
OVERLAY	"Layers" multiple Mute Groups	Software Version
ERASE FWD	Erases mutes in forward direction	Clear All Memory
DEC	Decrements value in display	

OVERLAY

The OVERLAY button determines how the MUTE GROUPS buttons (1—4) will function when recalling Mute Groups. When OVERLAY is turned off, the GROUP MUTES buttons function like radio buttons. Each button by itself toggles its Mute Group on and off. However, while a Mute Group is recalled, pressing any other MUTE GROUPS button will recall that Mute Group and disable the previously selected one.

When OVERLAY is turned on (its LED lit), Mute Groups can be recalled "on top of one another" instead of canceling each other out. This is handy when you want to independently yet simultaneously control the enabling of multiple groups of channel mutes.

When the Mute Automation is recording Group Mute events, they are treated as single events. instead of many mute events. If OVERLAY was on when you recorded Mute Group events, make sure it is on whenever you are ONLINE (see below).

ONLINE

The term "on-line" means that the Dynamic Mute Automation system is active and ready to control the X2. The type of reference is determine by the SYNC parameter (see above).

Once a Sync Source has been determined and the proper connections have been made, the ONLINE button tells the X2 to synchronize its sequencer with the incoming sync source signal. If this is ADAT sync, the ONLINE button's LED will flash while waiting for sync reference. When the ADAT is put into play, the sync information arrives at the X2 and the ONLINE button stops flashing and remains lit.

Once you are online, the Mute Automation sequencer will play back any stored mute events in the currently selected Song, once valid time code or clock is received.

UPDATE

While online (the ONLINE button on and its LED lit, not flashing), the UPDATE button puts the Mute Automation sequencer into "record." When the UPDATE button is pressed, its LED will either flash (along with the ONLINE button's LED indicating that no sync source is present) or will remain lit.

On order to record mute events, both the ONLINE and UPDATE buttons must be pressed and a sync source must be present, as indicated by the fact that both the ONLINE and UPDATE buttons' LEDs are lit but not flashing.

In Update mode, the automation will play back any mute events previously recorded. Presses of any MUTE buttons will be recorded in memory.

UNDO

The UNDO button is used to erase the last mute event recorded. However, repeatedly pressing UNDO keeps "backspacing" through the mute events in the order they were recorded. Therefore, if you accidentally recorded the mutes of five channels because you didn't realize the UPDATE button was on, simply stop the tape (the one providing the sync source) and press UNDO five times.

The UNDO button does not double as a "Redo" button. Whenever the UNDO button is used, its effect cannot be undone.

COPY

The COPY button makes it possible to copy the mute events recorded for one channel and have them affect any number of other channels. *Example:* If you had four channels of vocals that you wanted to mute simultaneously, you could record the mute events for one of the channels and then copy those events to the remaining channels (another way of doing this is to create a Mute Group for those channels and record the Mute Group events to do the same thing).

The Copy function works by pressing COPY, then selecting the *source* channel (the one to be copied), and then selecting the *destination* channel(s). The *source* channel's MUTE button will be flashing quickly, while the *destination* channels MUTE buttons will be flashing in half-time. To execute the copy, press UPDATE.

Copy Song

Holding the ALT (ALL) button down and pressing COPY accesses the Copy Song function, which allows you to copy the currently selected Song to another location in memory (00—99).

ERASE FWD and ERASE BWD Buttons

The ERASE FWD and ERASE BWD buttons are used for editing Songs after recording mute events. Each of the ERASE buttons can be used on one or more channels. Both also require that you locate you tape machine (the one providing a sync source to the X2 Mute Automation) to the position that you wish to erase from (the ONLINE button must be turned on so the X2 can locate to the sync source's position).

The ERASE FWD button lets you erase from that point until the end of the Song, while the ERASE BWD button erases mute events from the beginning of the song to the current position.

To erase events on one or more channels, first press either ERASE FWD or ERASE BWD. The button's LED will begin flashing. Now you can press any MUTE button on the console to select the channels you want to erase. To execute the erasure, press the UPDATE button. These functions are not reversible.

ERASE SONG

Holding the ALT (ALL) button down and pressing UNDO selects the Erase Song function, which deletes all data in a single Song including all mute events and the 4 Mute Groups. This function is not reversible.

Memory Remaining

To check the remaining amount of internal memory, hold ALT (ALL) and press DEFINE. The display will momentarily read a number from 00—99, which represents the percentage of available memory. This is the amount of total memory for recording mute events into the Songs.

Erasing Memory

To erase all memory including the mute events in all 100 Songs and their 400 Mute Groups, hold ALT (ALL) and press ERASE FWD and DEC simultaneously. This function is not reversible.

SYS EX

By holding ALT and pressing UPDATE (SYS EX), all memory is dumped out the MIDI OUT port. This information can be recorded into a MIDI sequencer, or librarian program, or stored to a System Exclusive data storage device, such as the Alesis DataDisk.

When sending this System Exclusive information back into the X2 (or into another X2, for that matter), the information is automatically detected when it reaches the X2's MIDI IN port, and replaces whatever was previously in memory.

This function is not reversible: Make sure you have saved all data before sending a Sys Ex dump to the X2.

Mute Solo

The X2 provides a special Solo mode. Instead of the typical way of soloing using the SOLO buttons, this mode lets you use the MUTE buttons to solo individual channels. The main advantage is that by soloing a channel via the Mutes, you are also affecting the Master L-R outputs and Group outputs as well. This is otherwise known as "destructive" soloing, since normal soloing does not interfere with these other outputs; only the Control Room outputs.

Mute Solo mode is accessed by holding ALT and pressing ONLINE (SOLO). The ONLINE button's LED will flash quickly. At this point, you can press any MUTE button on the console and that channel's mute will be off while all other mutes will be on, thus being soloed. By pressing another MUTE button, that channel is now unmuted. To exit Mute Solo mode, press ONLINE (SOLO) again; its LED will turn off and the console will return to its previous mute status.

CHAPTER 7:

TROUBLE-SHOOTING

Trouble-Shooting Index

If you are experience problems while operating the X2, please use the following table to locate possible causes and solutions before contacting Alesis customer service for assistance.

Symptom	Cause	Solution
The display does not light when the ON / OFF switch is turned on.	No power.	Check that the power cable is plugged in properly.
DEFINE and DISPLAY buttons don't work.	ONLINE switch is turned on.	Turn off ONLINE switch.

Checking the Software Version

To check the current operating system software version number, hold the ALL / ALT button and press the OVERLAY button. The installed version number will appear in the display.

Re-initializing

If the Mute Automation software behaves erratically or "freezes", the first step is to disconnect any incoming MIDI cable. Second, try powering down the mixer momentarily. If these steps fail, you must re-initialize the software.

To re-initialize the X2 Mute Automation software:

1 Press the ERASE FWD button.
The ERASE FWD LED will flash.

2 Press the ERASE BWD button.
The ERASE BWD LED will flash.

3 Press the ALL button.
The MUTE button LEDs for all channels will flash.

4 Press the UPDATE button to execute the erase.

***WARNING!!** This will erase all memory, including all 100 Songs, all mute events and all 400 Mute Groups.*

Maintenance/Service

Cleaning and Maintenance

Disconnect the AC cord, then use a damp cloth to clean the console's metal and plastic surfaces. For heavy dirt, use a non-abrasive household cleaner such as Formula 409 or Fantastik. DO NOT SPRAY THE CLEANER DIRECTLY ONTO THE FRONT OF THE UNIT AS IT MAY DESTROY THE LUBRICANTS USED IN THE SWITCHES AND CONTROLS! Spray onto a cloth, then use the cloth to clean the unit.

Here are some tips for preventive maintenance:

- Periodically check the AC cord for signs of fraying or damage.
- Unplug the X2's power supply when not in use for extended periods of time.
- Place a dust cover over the console when it is not in use.
- Vacuum around the faders to keep dust from falling into them.

Warranty Information

This product is warranted by Alesis to the original purchaser against defects in material and workmanship for a period of 1 year for parts and 90 days for labor from the date of purchase. Complete terms of the Limited Warranty are stated on the Warranty Card packed with the product. Please retain a copy of your dated sales receipt for proof of warranty status should repairs be necessary.

Refer All Servicing to Alesis

We believe that the X2 is one of the most reliable mixing consoles that can be made using current technology, and should provide years of trouble-free use. However, should problems occur, DO NOT attempt to service the unit yourself. Service on this product should be performed only by qualified technicians. THERE ARE NO USER-SERVICEABLE PARTS INSIDE.

Obtaining Repair Service

Before contacting Alesis, check over all your connections, and make sure you've read the manual. Your Alesis dealer may be able to offer further assistance.

Customers in the USA:
If the problem persists, call Alesis USA at 1-800-5-ALESIS and request the customer service department. Talk the problem over with one of our technicians; if necessary, you will be given a return authorization (RA) number and instructions on how to return the unit. All units must be shipped prepaid and COD shipments will not be accepted.

For prompt service, indicate the RA number on the shipping label. If you do not have the original packing, ship the X2 in a sturdy carton or road case, with shock-absorbing materials such as foam or "bubble-pack" surrounding the unit. Shipping

damage caused by inadequate packing is not covered by the Alesis warranty.

Tape a note to the top of the unit describing the problem, include your name and a phone number where Alesis can contact you if necessary, as well as instructions on where you want the product returned. Alesis will pay for standard one-way shipping back to you on any repair covered under the terms of this warranty.

Field repairs are not normally authorized during the warranty period, and repair attempts by unqualified personnel may invalidate the warranty.

If the problem is with an individual module, you may be able to arrange for repair or replacement of the module by Alesis or an authorized service center.

Service address for customers in the USA:

Alesis Customer Service
3630 Holdrege Avenue
Los Angeles, CA 90016

Customers outside the USA:
Contact your local Alesis dealer for warranty assistance. Do not return products to the factory unless you have been given specific instructions to do so.

MIDI MAPS INDEX

Maps 1.1—1.3

These maps are very similar in that they all use MIDI note numbers to transmit and recognize mute events. In the case of map 1.1, a high-velocity note-on message is sent when a channel is muted, and a low-velocity note-on message is sent when unmuted. With map 1.2, a note-on message is sent when a channel is muted, and a note-off message is sent when unmuted. With map 1.3, a note-off message is sent when a channel is muted, and a note-on message is sent when unmuted. In all three maps, the note numbers used for each channel are the same.

Mute	MIDI Note Number
Channel 1 Monitor	28
Channel 1 Fader	29
Channel 2 Monitor	30
Channel 2 Fader	31
…	…
Channel 24 Monitor	74
Channel 24 Fader	75
Return 1	76
Return 2	77
Sub 1	78
Sub 2	79
Return 3	80
Return 4	81
Sub 3	82
Sub 4	83
Return 5	84
Return 6	85
Sub 5	86
Sub 6	87
Return 7	88
Return 8	89
Sub 7	90
Sub 8	91
Aux Send 1	92
Aux Send 2	93
…	…
Aux Send 7	98
Aux Send 8	99
Group 1	100
Group 2	101
…	…
Group 7	106
Group 8	107

Map 1.4

This map uses controllers, instead of note numbers, to transmit and recognize mute events.

Mute	MIDI Controller Number
Channel 1 Monitor	2
Channel 1 Fader	3
Channel 2 Monitor	4
Channel 2 Fader	5
…	…
Channel 24 Monitor	48
Channel 24 Fader	49
Return 1	65
Return 2	66
Sub 1	67
Sub 2	68
Return 3	69
Return 4	70
Sub 3	71
Sub 4	72
Return 5	73
Return 6	74
Sub 5	75
Sub 6	76
Return 7	77
Return 8	78
Sub 7	79
Sub 8	80
Aux Send 1	81
Aux Send 2	82
…	…
Aux Send 7	87
Aux Send 8	88
Group 1	89
Group 2	90
…	…
Group 7	95
Group 8	96

Maps 2.0—2.9

These maps are virtually identical in that they transmit “snapshots” of the mute status of the entire console. Each mute event is represented by a different System-Exclusive message. The only difference between these maps is how often the “snapshots” are transmitted. By choosing one of these maps, you can select how frequently the X2 sends these messages.

Map Number	Interval
2.0	250 milliseconds
2.1	500 milliseconds
2.2	1 second
2.3	2 seconds
2.4	3 seconds
2.5	4 seconds
2.6	5 seconds
2.7	6 seconds
2.8	7 seconds
2.9	8 seconds

MIDI IMPLEMENTATION CHART

Function		Transmitted	Recognized	Remarks
Basic Channel	Default	1 — 16	1 — 16	
	Changed	* * * * * * * *		
Mode	Default	Mode 1, Mode 3	Mode 1, Mode 3	
	Messages	X	X	
	Altered	* * * * * * * *		
Note Number		0 — 127	0 — 127	
	True Voice	* * * * * * * *	0 — 127	
Velocity	Note On	X[1]	X[1]	Using Map 1.1
	Note Off	X	X	
After Touch	Key's	X	X	
	Ch's	X	X	
Pitch Bender		X	X	
Control Change	2 — 49	O	O	Using Map 1.4
	65 — 96			
Prog Change		X	O 0 — 99	
	True #	* * * * * * * *	0 — 99	
System Exclusive		O	O	
System Common	Song Pos	X	O	When SYNC is set to CL
	Song Sel	X	X	
	Tune	X	X	
System Realtime	Clock	X	X[1]	When SYNC is set to CL
	Commands	X	X	
Aux Messages	Local On / Off	X	X	
	All Notes Off	X	X	
	Active Sense	X	X	
	Reset	X	X	
Notes				

[1] O, X is selectable

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

O : Yes
X : No

SPECIFICATIONS

All measurements taken with an Audio Precision System One. All noise measurements taken with trim at minimum and faders at unity gain with 22 Hz to 22 kHz bandwidth unless otherwise specified. All Tape In & Out measurements made on balanced +4 dBu connectors. (+4 dBu into a line input with minimum trim & faders at unity "0" will yield +4 dBu at any balanced output.)

Frequency Response:	10 Hz – 75 kHz ± 1 dB (any input to any output @ nominal operating levels)
Noise:	
MIC/LINE to Tape Out	-85 dBu
MIC/LINE to L/R Master Out	-85 dBu
MIC/LINE to Tape Out via Group	-81 dBu
Tape In to Tape Out	-85 dBu
Tape In to L/R Master Out	-87 dBu
Tape In to Tape Out via Group	-82 dBu
Mix Output Noise:	
24 Tape Inputs assigned to L/R Master Out	-74 dBu
Signal to Noise:	
MIC/LINE to L/R Master Out	89 dB
Dynamic Range:	
MIC/LINE to L/R Master Out	113 dB
Headroom:	
Internal to Console	24 dB
External above +4 dBu Balanced Outputs	24 dB
Maximum Output Level:	
Balanced Outputs into 10k ohm Load	+28 dBu
Balanced Outputs into 600 ohm Load	+26 dBu
THD + Noise @ 1 kHz (+20 dBu Input - Unity Gain):	
MIC/LINE to Tape Out	<0.005%, 0.003% typical
MIC/LINE to L/R Master Out	<0.005%, 0.003% typical
Tape In to L/R Master Out	<0.004%, 0.002% typical
Attenuation (1 kHz):	
CHANNEL fader	>83dB, 88 dB typical
CHANNEL MUTE AUTOMATION	>95 dB, 100 dB typical
BUSS ASSIGN ISOLATION	>100 dB, 103 dB typical
CROSSTALK	70 dB typical
Equivalent Input Noise (22 Hz to 22 kHz):	
MIC w/ 150 ohm termination	-128 dBu
Input Levels:	

MIC Nominal Input Level	-56 dBu to -8 dBu
LINE Nominal Input Level	-44 dBu to +4 dBu
TAPE Nominal Input Level	+4 dBu / -10 dBV Switchable

Maximum Gain:

MIC to L/R Master Out	70 dB
MIC to L/R Group Out	70 dB
MIC to Aux Sends	68 dB

Power Supply:

X2 Maximum Power	210 Watts
U.L. Rating	300 Watts

Input Module (24):

Phantom Power	Aux Source Selector
Mic/Line Selector	Monitor Pan
Phase (Ø) Reverse	Monitor Peak LED Indicator
Mic/Line Gain	Monitor Solo
Channel/Monitor Reverse	Monitor Mute
High-Pass Filter	Monitor L/R Assign
Hi EQ	45mm Monitor Fader
EQ to Monitor Selector	Channel Pan
Low EQ	Channel Peak LED Indicator
Hi Mid Gain	Channel Solo
Hi Mid Frequency	Channel Mute
Hi Mid Bandwidth (Q)	Direct Source Selector
Lo Mid Gain	Channel L/R Assign
Lo Mid Frequency	Group Assign Selectors (1–8)
Lo Mid Bandwidth (Q)	Aux 1-2, 3-4, 5-6, 7-8
Aux Source Selector	Aux 1-2 Pan

Group Module (4):

Aux Level (A/B)	Solo (A/B)
Hi EQ (A/B)	Mute (A/B)
Lo EQ (A/B)	Group Assign Left
Stereo Separation (A/B)	Group Assign Right
Balance (A/B)	Pre-Fade-Listen
Aux 1-2 Send (A/B)	Mute
Assign Switches 1–8 and L/R Mix (A)	100mm Group Master Faders
Group Master Assign (B)	

Master Module:

Dynamic Mute Automation Controls	CR Source Selectors (L/R, Aux 1-2,
Solo Mute	Ext. 1, Ext. 2)
3-Frequency Oscillator	Phones Level
Solo Master Level	Dim Switch
Aux Masters (8)	Mono Switch
Aux Masters AFL (8)	Talkback Mic
Aux Masters Mute (8)	Mic Level
Studio Level	Slate Switch
Studio CR/Aux 1-2 Selector	Studio Talkback Switch
Control Room Level	100mm L/R Master Faders

Rear Panel:

Balanced I/O	56-pin (3)
Mic Inputs	XLR (24)
Balanced Line Inputs	1/4" TRS (24)
Mono Aux Sends	1/4" (8)
Channel Inserts	1/4" TRS (24)
Mono Tape Outs	1/4" (24)
Balanced Tape Inputs	1/4" TRS (24)
Balanced L/R Outputs	1/4" TRS (2)
L/R Inserts	1/4" TRS (2)
Mono Group Outs	1/4" (8)
Group Out Inserts	1/4" TRS (8)
Balanced Control Room Outputs	1/4" TRS (2)
Balanced Studio Outputs	1/4" (2)
MIDI	In, Out, Thru
ADAT Synchronization Interface Input	9-pin
Mono Aux Returns	1/4" (16)
External 2-Track Inputs	1/4" (2 pairs)

Front Panel:

Headphone Jack	1/4" TRS

Dimensions:

X2 Console	(WxHxD) 49" x 12" x 37" (124.5cm x 30.5cm x 94cm)
Power Supply	(WxHxD) 10" x 5.25" x 7.75" (25.4cm x 13cm x 19.8cm)

Weight:

X2 Console	135 lbs. (61.25 kg)
Power Supply	9.75 lbs. (4.4 kg)

Total Shipping Weight: Approximately 225 lbs. (102 kg)

Dimensional Drawings:

INTERNAL CONNECTOR PINOUTS

BLOCK DIAGRAM

Note: An 11"x17" version of this drawing is included with the manual.

Master Module

Group Master Module

Channel Module

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