X-MIXER

Digital Broadcast Console

Technical Manual

July 1, 2008

X-mixer-14-14
X-mixer-14-22

ARRAKIS
advancedradio

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Hazard / Warning Label Identification

C A U T I O N
RISK OF ELECTRIC SHOCK DO NOT OPEN

WARNING: SHOCK HAZARD - DO NOT OPEN
AVIS: RISQUE DE CHOC ELECTRIQUE - NE PAS OUVRIR

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE ANY COVER OR PANEL. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THE CONSOLE TO RAIN OR MOISTURE.

The **Exclamation Point symbol**, within an equilateral triangle, alerts the user to the presence of important operating and maintenance (servicing) instructions in product literature and instruction manuals.

The **Lightning Flash With Arrowhead symbol**, within an equilateral triangle, alerts the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

WARNING—This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions in this manual it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device (pursuant to Subpart J of Part 15 FCC Rules), which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equip-ment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take what-ever measures may be required to correct the interference.

Manufacturer

This console was designed and manufactured by Arrakis Systems inc. All rights reserved.

Safety Instructions

1. **Read All Instructions**. All safety and operating instructions must be read before operating the product.
2. **Retain All Instructions.** All safety and operating instructions must be retained for future reference.
3. **Heed All Warnings.** All warnings on the product and those listed in the operating instructions must be adhered to.
4. **Follow All Instructions**. All operating and product usage instructions must be followed.
5. **Heat**. This product must be situated away from any heat sources such as radiators, heat registers, stoves, or other products (including power amplifiers) that produce heat.
6. **Ventilation.** Slots and openings in the product are provided for ventilation. They ensure reliable operation of the product, keeping it from overheating. These openings must not be blocked nor covered during operation. This product should not be placed into a rack unless proper ventilation is provided through following the manufacturer's recommended installation procedures.
7. **Water and Moisture.** Do not use this product near water—for example; near a bath tub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool or the like.
8. **Attachments**. Do not use any attachments not recommended by the product manufacturer as they may cause hazards.
9. **Power Sources.** This product must be operated from the type of power source indicated on the marking label and in the installation instructions. If you are not sure of the type of power supplied to your facility, consult your local power company.
10. **Grounding and Polarization**. This product is equipped with a polarized AC plug with integral safety ground pin. Do not defeat the safety ground in any manner.
11. **Power Cord Protection.** Power supply cords must be routed so that they are not likely to be walked on nor pinched by items placed upon or against them. Pay particular attention to the cords at AC wall plugs and convenience receptacles, and at the point where the cord plugs into the product.
12. **Lightning.** For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the AC wall outlet. This will prevent damage to the product due to lightning and power line surges.
13. **Overloading**. Do not overload AC wall outlets, extension cords, or integral convenience outlets as this can result in a fire or electric shock hazard.
14. **Object and Liquid Entry.** Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
15. **Accessories.** Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious damage to a child or adult, and serious damage to the product. Any mounting of the product needs to follow manufacturer's installation instructions.
16. **A Product and Cart Combination** should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and the cart combination to overturn.
17. **Servicing.** Refer all servicing to qualified servicing personnel.
18. **Damage Requiring Service.** Unplug this product from the wall AC outlet and refer servicing to qualified service personnel under the following conditions:
a. When the AC cord or plug is damaged.
b. If liquid has been spilled or objects have fallen into the product.
c. If the product has been exposed to rain or water.
d. If the product does not operate normally (following operating instructions).
e. If the product has been dropped or damaged in any way.
f. When the product exhibits a distinct change in performance. This indicates a need for service.
19. **Replacement Parts.** When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock, or other hazards.
20. **Safety Check.** Upon completion of any repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
21. **Cleaning.** Do not use liquid cleaners or aerosol cleaners. Use only a damp cloth for cleaning.

General Information

The X-mixer is a sophisticated console with a wide range of features held in a compact design. To obtain maximum benefit from the console, please read through this manual prior to product installation.

CONSOLE OVERVIEW

The X-mixer has the following features:

... Two microphone inputs
... Ten stereo analog inputs
... Two digital AES3 inputs
... an option board that adds 8 AES3 digital inputs (used on X-MIX-14-22)
... 3 output buses: Program, Audition, & Mono
... Analog & digital program outputs
... Control Room monitoring
... 6 x 2 analog remote line selector
... Production Timer with manual & automatic control
... Welded aluminum chassis for strength and RFI immunity
... Countertop installation
... Easy-access for installation under VU housing

Feature Descriptions

Input Sources

The X-MIX-14-14 supports 14 audio source inputs: 2 mic, 10 stereo analog line, 2 AES3. nput Sources. The X-MIX-14-22 supports 22 audio source inputs: 2 mic, 10 stereo analog line, 10 AES3. For maximum user flexibility, any of these source inputs to the console can be assigned to any input fader channel. The X-MIX-14-22 also has 2 extra mic preamps for converting 2 line channels to mic level.

Input Fader Channels

The console is available in two models. Both are 14 channels. The X-MIX-14-14 has the base 14 inputs. The X-MIX-14-22 has 22 inputs (includes the option board). Any of the 14 or 22 source inputs can be assigned to any of the 14 input fader channels

Every channel has a single input, channel on/off control (with built-in logic interface), fader level control and assignment selectors (to Cue, and three output buses). Analog line input channels can be set for -10 dBu to +4 dBu via dip switches or PC setup software.

Each input has its own individual connector with both audio and logic signals for ease of cabling. Source control logic can be selected to be momentary or sustained for flexibility.

Telco Functionality

The console can be configured in setup to support one hybrid for a single caller. The Telco functionality can be assigned to any of the 10 analog source inputs.

If an input is assigned Telco functionality, then the front panel fader channel controls automatically change to support that mode.

Outputs

The console features 3 output buses (Program, Audition, and Mono). Each of the stereo audio buses (Program and Audition) has its own AES-3 digital output as well as a stereo analog output. The Mono output bus has an analog output only. Each analog output signal is +4 dBu balanced.

The console also has an "Assignable Output" which is setup as either a Record output following the telephone system or as a cue output for an external cue amp and speaker.

Monitoring

Powerful monitoring and communication controls for a Control Room (CR) are provided. Separate volume controls, with speaker muting logic for the CR are provided for the CR headphone, monitors, and Cue signal. A CR warning logic output is also provided.

The console contains a flexible Talkback sys-tem. The front panel talkback button activates an output from the CR mic with logic to feed another studio. An audio input into the cue system with logic provides an input and control for talkback from one or more other studios.

Timer

The digital timer is located in the meter panel. The timer is controlled automatically by the channel logic or manually though the control surface's Start, Stop, Hold, and Reset buttons.

Remote Line Selector (RLS)

The console features a 6x2 routing switcher for remote input selection. Each of the 6 inputs can be setup in the software to accept any combination of the console inputs including mics. Only the Telco functionality can not be assigned to the remote line selector.

Power Supply

The power supply is an external module to reduce power supply related hum and noise in the console. It is a "line lump" type with a 6 foot AC cord and a 6 foot DC power cord. The power supply has outputs at (+)(-) 12VDC and (+)5VDC. It is an international series supporting AC line voltages from 100-240VAC and 50/60Hz.

The X-mixer Console, Overview of Main Components
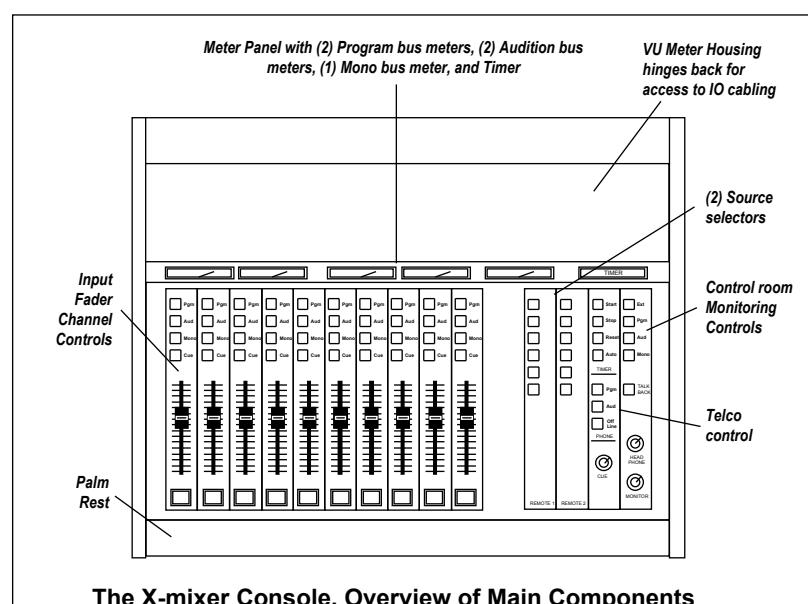
Specifications

Test Conditions:

Specifications are per channel.

0 dBu corresponds to 0.775 volts RMS regardless of circuit impedance. This equals 0 dBm into a 600 ohm circuit for convenient level measurements using meters calibrated for 600 ohm circuits.

Noise specs based on 20 kHz bandwidth. Noise increases about 1.7 dB if a meter with a 30 kHz bandwidth is used.

FSD = Full Scale Digital, +24 dBu

Microphone Preamplifiers

Source Impedance: 150 ohms
Input Impedance: 2 k ohms min. balanced
Input Level Range: Adj. -65 to -30 dBu
Input Headroom: 20 dB above nom.in.

Analog Inputs

Source Impedance: 600 ohms or less
Input Impedance: >20 k W, balanced
Input Level Range: Adj. -20 to +4 dBu
Input Headroom: 20 dB above nom.

Analog Main Outputs

Output Source Impedance: 100 ohms bal.
Output Load Impedance: 600 ohms min.
Nominal Output Levels:
      Program Outputs: adj. +4 dBu
      Telco Mix-Minus: set at +4 dBu
Maximum Output Levels:
      Program and Monaural: +24 dBu
      Telco Mix-Minus: +24 dBu

Digital Inputs & Outputs

Reference: +4 dBu = -20 dB FSD
Signal Format: AES-3, S/PDIF on input only
AES-3 Input Compliance: 24-bit
AES-3 Output Compliance: 24-bit
Digital Reference Frequency: Internal crystal
Internal Sample Rate: 48 kHz
Processing Resolution: 32-bit fixed with ext. precision accumulators
Conversions: A/D 24-bit Delta-Sigma, Sample rate conversion on all digital inputs;
D/A 24-bit, using 1-bit conversion.
Latency: <1.3 ms,

Monitor Outputs

Output Impedance: 100 ohms, Z-balanced
Output Load: 600 ohms or greater
Output Level: 4 dBu nominal, +20 dBu max.

External Headphone Amp Output:

Source Impedance: 100 ohms
Load Impedance: >600 ohms
Output Level: +4 dBu nominal, 24 dBu max.

Frequency Response

Mic or Line Input to Program Output:
+0 dB/-0.5 dB, 20 Hz to 20 kHz

Equivalent Input Noise

Microphone Preamp: -127 dBu, 150 ohm source

Dynamic Range

Analog Input to Analog Output: 98 dB "A" weighted (both ref. to FSD)
Digital Input to Analog Output: 100 dB "A" weighted (both ref. to FSD)

Total Harmonic Distortion + Noise

Mic Pre Input to Analog Output: <0.015%, 20 Hz to 20 kHz, -38 dBu input, +18 dBu output, 600 ohm load, 20 kHz filter bandwidth.

Analog Input to Analog Output: <0.01% at 1 kHz, +18 dBu input, +18 dBu output, 600 ohm load, 20 kHz filter bandwidth. <0.05%, 20 Hz to 20 kHz, +18 dBu input, +18 dBu output, 1 k ohm load, 22 kHz filter bandwidth.

Digital Input to Digital Output: <0.001%, 20 Hz to 20 kHz, +18 dBu input, +18 dBu output, 20 kHz filter bandwidth

Digital Input to Analog Output: <0.005% at 1 kHz, +18 dBu input, +18 dBu output, 600 ohm load, 22 kHz filter bandwidth. <0.05%, 20 Hz to 20 kHz, +18 dBu input, +18 dBu output, 600 ohm load, 22 kHz filter.

Crosstalk Isolation

Program-to-Program: >86 dB, 20 Hz - 20 kHz

Stereo Separation

Analog Program Outputs: >86 dB @ 1 kHz,

Power Requirements

Input AC voltage: 100-220 VAC, 50/60 Hz
X-mixer-14 current draw: 75 watts
AC Ground: Chassis grounded through AC cord

Arrakis Systems reserves the right to change specifications without notice or obligation.

Installation

The X-mixer console sits on top of the studio furniture countertop. A minimum of 13 inches of vertical clearance above the countertop is required to open the operator control surface to its service position.

The X-mixer console consists of:
... The 14-input mainframe
... Power supply
... Tool Kit
... Audio and Logic Connector Kit
... Spare Parts kit
... CDROM

Custom engraving on the channel On/Off button caps and colored fader knobs are available. See Accessories for details.

INSTALLATION NOTE: Do not set X-mixer near intense electromagnetic hum fields, such as those from power transformers and audio amplifiers using inexpensive power transformers operating in or near saturation, as this can impair console performance. Route audio cables to achieve maximum practical distance from all AC mains wiring.

CONSOLE CONFIGURATION

The X-mixer console is a compact yet feature packed design. The compact size gives the operator easy reach to peripheral equipment located to the sides of the console.

Channel Assignment

Any input can be assigned to any of the fader channels of the console. Basic assignment can be made using DIP switches on the motherboard. Advanced assignment can be made using PC setup software.

The Meter Panel

Five analog VU meters provide level monitoring for all three of the console output buses: Pgm, Aud, and Mono. An event timer is also located on this panel.

Connector Access

All audio and logic connectors are located on the motherboard underneath the VU meter housing along the rear of the console mainframe. Simply fold back the VU meter housing for fast and easy access to the connectors.

In most installations, the wiring is dropped into the cabinetry through access holes in the floor of the mainframe along the back of the console. Console and wiring access dimensions are shown below.

Internal Control Access

The console's trimpots and DIP switches are located below the VU meter housing and can be adjusted but raising the housing.

Power Supply

The console power supply is external to the console to reduce 60 cycle radiated hum. It is a design that is commonly referred to as a "line lump." This is a fully encapsulated, non-user serviceable module with a 6 foot AC power cord on one end and a DC power cord with connector on the other end. The DC power connector plugs into the console motherboard under the VU meter

AC GROUND NOTE: Do not defeat the AC safety ground in any way. Doing so may provide a potentially dangerous condition to the operator.

GROUNDING & SHIELDING

The broadcast facility's technical ground should only connect to the mainframe chassis ground stud located at the left rear of the console mainframe under the VU meter housing. Terminate the facility's technical ground wire in a crimped lug.

Connect the audio shields at both the console and the peripheral when all system components share a common ground potential and are using isolated-ground AC outlets individually tied back to the main technical ground.

If isolated-ground AC outlets are not available, connect the cable shields at the console end only. The shields should be floated (left unconnected) at the peripheral device. Ensure the peripheral devices connect to a clean ground through their power cords, or through separate ground wires to the facility's technical ground.

AUDIO GROUND NOISES: Buzz pickup is generally electrostatic-such as capacitive coupling between an audio line and a power line. Do not route audio lines in the same wireway as an AC power line.

CONSOLE SIDE VIEW
shown with control surface and VU meter housing set to its service position

Mainframe	E	F	G
X-mixer-14	7 5/8"	9 7/8"	12 3/4"

COUNTERTOP VIEW

Mainframe	A	B	C
X-mixer-14	32 1/2"	21 5/8"	27 5/8"

X-mixer Dimensions
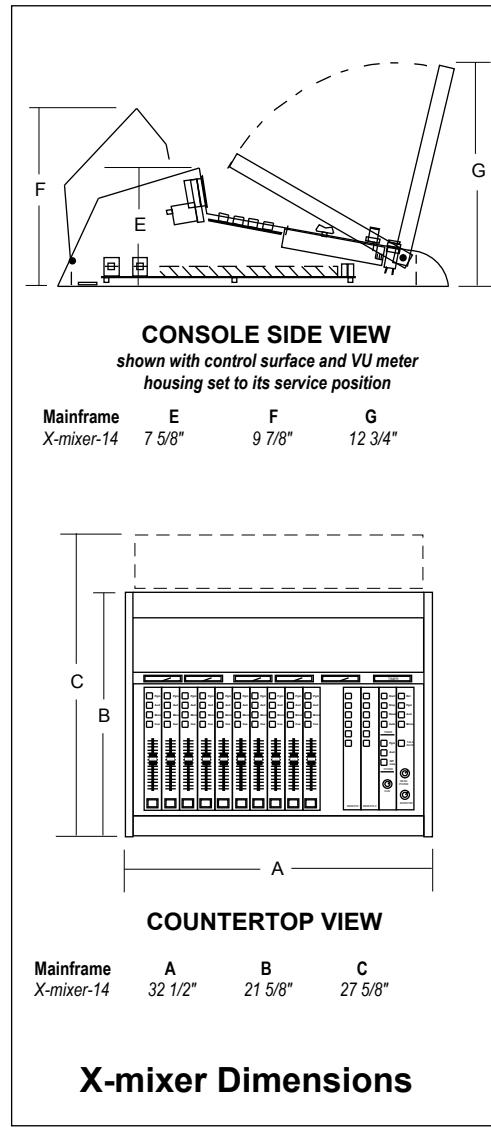
CABLING AND WIRING

To simplify console connection, draw up a facility wiring plan listing the console's audio and logic connections with peripheral devices. Identify and create tags for each cable and then list each connection in a master facility wiring logbook. This facilitates initial wiring installation and future system wiring changes, equipment updates or system troubleshooting.

Analog audio connections require two-conductor stranded, insulated, foil-shield cable containing a separate shield drain wire (equivalent to Belden 8451, 9451 or 8761).

AES/EBU connections require 110 ohm two-conductor stranded, insulated, foil-shield cable containing a separate shield drain wire (equivalent to Belden 1806).

S/PDIF connections, which are unbalanced use coaxial cable connected between the + and GND connects on the inputs.

Wire Preparation

All X-mixer audio and logic wiring terminates in AMP MR receptacle contacts. Stranded wire of 22 to 26 AWG, with insulation diameters of .040 to .060 inch, can be used with the AMP MR receptacle contacts.

Follow these steps for wire preparation:
1   Strip the cable insulation jacket back 1 1/2" [38.10 mm].
2   Remove the foil shield from audio cables.
3   Sleeve the audio drain wire with Teflon sleeving, leaving 9/64" [3.572 mm] of the drain wire exposed.
4   Use 3/4" [19.05 mm] of heat-shrink tubing to sleeve the end of the jacket, centered on the cut. Shrink the tubing to hold any drain wire sleeving in place.
5   Strip the insulation back from all signal wires 9/64" [3.572 mm].

Audio Cable Shield Note: To follow recommended grounding procedures, sleeve all drain wires with Teflon sleeving and put heat shrink tubing over all cable jacket cuts to insulate the shield wire.

Crimp Tool Operation

A hand crimper is included in the tool kit. The tool crimps the insulation and wire barrels on the AMP receptacle contacts in two crimp actions.

Follow these instructions for using the crimp tool: Crimping a wire with this hand tool is a two part process. The crimp tool has an A and B anvil. The smaller B anvil is used to crimp the wire. The larger A anvil is used to crimp the insulation. Hold the crimp tool with the printed side up. Insert the contact from the opposite side, with the barrel openings up. Insert the wire from the printed side until the uninsulated part of the wire reaches the barrel of the contact. Crimp the uninsulated wire first in the B anvil and then the insulation next in the A anvil. Close the tool only until the anvil holds the contact firmly in place. Do not crush the receptacle.
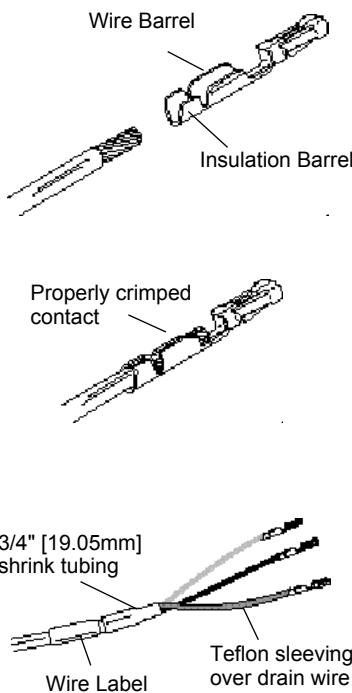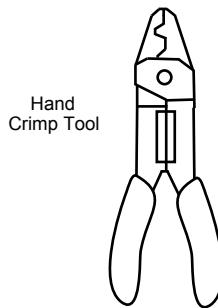
A properly crimped receptacle contact is inserted and locked into the appropriate connector housing following the pin-out diagrams. A light "click" will be felt as the contact's locking tab engages the locking tab slot.

For wiring changes, use a Contact Removal Tool to depress the locking tab while pulling the contact and wire out of the connector.

Prepped Wire Details
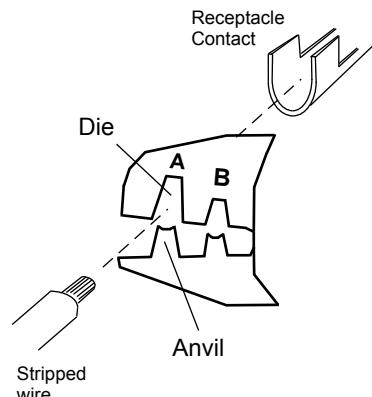
Crimp Tool Operation
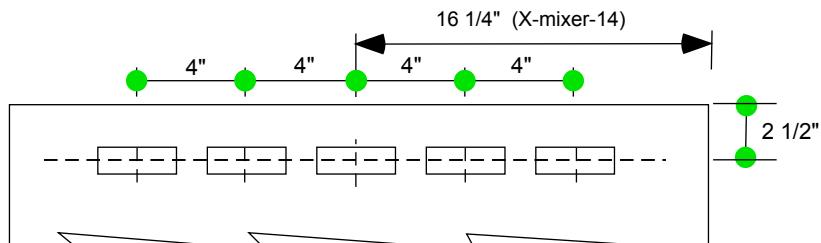
CABLE ACCESS HOLES IN BOTTOM OF MAINFRAME
All holes 1" X 3" rectangular

ANALOG AUDIO CONNECTIONS

There are no analog interstage patch points within the X-mixer channels or outputs. To use a patchbay, connect the line level outputs from the peripheral devices directly to the patch bay and then normal these to the appropriate Input channels. Likewise, X-mixer's outputs may also be routed through a patchbay normalled to standard peripherals such as On-Air processing gear, recorders, telephone hybrids, etc.

To use a mic input with a patch bay, use an external mic amplifier. Connect the line output of the mic amplifier to the patch bay and then normal it to a console line level input. Mic processors are connected in the same manner.

When processors requiring mic-level inputs are used, the microphone should connect to the mic processor directly, with the processor's line-level output directly connected to an Input channel.

Unbalanced Analog Connections

Even though all analog inputs and outputs are active and balanced, unbalanced consumer or "semipro" equipment can be connected to the console For best results use an IHF-PRO match box. If a match box is not available, unbalanced analog devices can connect per the following illustration. Keep unbalanced cable lengths as short as possible.

When an unbalanced device must be connected to a console analog balanced output, and an IHF-PRO match box is not available, do not tie the low (-) and shield pins together to "unbalance" the signal. The low pin must always be left "floating," as shown below.

Connectors

Pin numbering is always shown from the wire entry end into contact

The X-mixer uses AMP MR series connectors for ease of installation and servicing. The connectors are polarized so that they can not be inserted backwards.

Connecting Balanced Devices to X-mixer Analog Inputs

Analog Inputs *(stereo line)*
(9-pin connector signals)

Pin	Signal Description
1	High (+), left channel
2	Low (-), left channel
3	High (+), right channel
4	High (-), right channel
5	Audio & Logic ground
6	Shield Ground
7	Source Start output logic
8	Source Stop output logic
9	Channel On-off control logic

Shields

Connecting Unbalanced Devices to X-mixer Analog Inputs

Analog Inputs *(stereo line)*
(9-pin connector signals)

Pin	Signal Description
1	High (+), left channel
2	Low (-), left channel
3	High (+), right channel
4	High (-), right channel
5	Audio & Logic ground
6	Shield Ground
7	Source Start output logic
8	Source Stop output logic
9	Channel On-off control logic

Shields

Connecting Balanced Devices to X-mixer Analog Outputs

Analog Outputs *(stereo line)*
(6-pin connector signals)
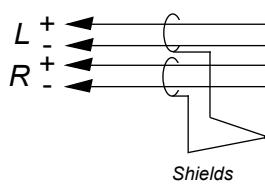
Pin	Signal Description
1	High (+), left channel
2	Low (-), left channel
3	High (+), right channel
4	High (-), right channel
5	Audio & Logic ground
6	Shield Ground

Shields

Connecting Unbalanced Devices to X-mixer Analog Outputs
(nominal output level is -2 dBu)
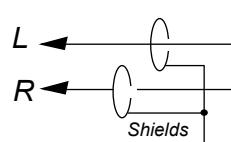
Analog Outputs *(stereo line)*
(6-pin connector signals)

Pin	Signal Description
1	High (+), left channel
2	Low (-), left channel
3	High (+), right channel
4	High (-), right channel
5	Audio & Logic ground
6	Shield Ground

Shields

(make no connections to pins 2 and 4)

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DIGITAL AUDIO CONNECTIONS

Digital Connections

All digital inputs use nine-pin AMP MR connectors. These connections input AES-3 (AES/EBU) compatible signals.

All digital outputs use six-pin AMP MR connectors. These connections output AES-3 (AES/EBU) compatible signals.

S/PDIF Signals

To connect a S/PDIF digital device to an X-mixer digital input, use a 249 ohm resistor to properly terminate the S/PDIF cable. Install the resistor onto the connector per the following illustration. Alternately, an unbalanced-to-balanced line transformer may be used.

Digital Connection Notes: AES/EBU outputs cannot connect directly to S/PDIF inputs, a signal conversion interface must be used. Some S/PDIF devices may not work with the X-mixer's digital inputs, even with the additional load resistor, due to nonstandard signal levels or protocols in the S/PDIF device.

Digital Audio Serial Interfaces

DESCRIPTION	AES3	AES3id	S/PDIF
Interface	Balanced	Unbal	Unbal
Connector	XLR-3	BNC	RCA
Impedance	110 ohm	75 ohm	75 ohm
Output Level	2-7 Vpp	1.0 Vpp	0.5 Vpp
Max Output	7 Vpp	1.2 Vpp	0.6 Vpp
Max Current	64 mA	1.6 mA	8 mA
Min Input	0.2 V	0.32 V	0.2 V
Cable	twisted pair	Coax	Coax
Max Distance	100 m	1000 m	10 m

TYPES OF DIGITAL AUDIO SERIAL INTERFACES: Two types of digital audio serial interfaces are in wide use today (1) AES3 (formerly AES/EBU) and (2) S/PDIF. The AES3 format has two varieties (AES3 & AES3id) designed for different cables and maximum cable lengths. The S/PDIF format is designed for short cable lengths and inexpensive cables. The differences between the standards is outlined in the chart above.

AES3 & S/PDIF COMPATIBILITY: AES3 and S/PDIF are not the same. The data formats themselves are the same but the data in the packets are different between the two formats. An identifier bit tells the decoder whether the stream is AES3 or S/PDIF. Because of this identifier bit, you can not always convert between AES3 and S/PDIF with a signal conversion interface.

### Connecting SPDIF Devices to X-mixer AES-3 Inputs
(impedance matching)

The S/PDIF output signal is lower than the AES3 output signal but is sufficient for the AES3 input. The resistor is used to reduce the 110 ohm input impedance of the AES3 input to the 75 ohms of the S/PDIF driver and cable. This circuit does not provide the ground isolation of the transformer converter circuit.
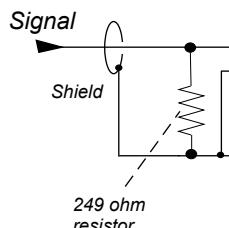
Signal

Shield

249 ohm resistor

Digital Inputs 13 - 14
balanced, AES-3 compliant
(9-pin connector signals)

Pin	Signal Description
1	High (+), digital input
2	Low (-), digital input
3	not assigned
4	not assigned
5	Audio & Logic ground
6	Shield Ground
7	Source Start output logic
8	Source Stop output logic
9	Channel On-off control logic

Connecting SPDIF Devices to X-mixer AES-3 Inputs
(transformer isolation and impedance matching)

The S/PDIF output signal is lower than the AES3 output signal but is sufficient for the AES3 input. The transformer is used to match impedance between the 75 ohm S/PDIF output and 110 ohm AES3 input and to provide ground isolation.
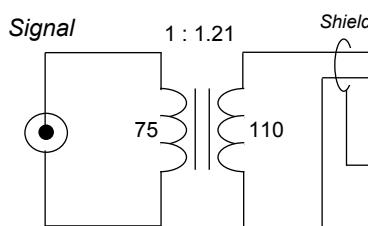
Signal

1 : 1.21

Shield

75

110

Digital Inputs 13 - 14
balanced, AES-3 compliant
(9-pin connector signals)

| Pin	Signal Description
1	High (+), digital input
2	Low (-), digital input
3	not assigned
4	not assigned
5	Audio & Logic ground
6	Shield Ground
7	Source Start output logic
8	Source Stop output logic
9	Channel On-off control logic

PERIPHERAL DEVICE LOGIC CONNECTIONS

Starting and Stopping Peripherals

All logic outputs for the console are high current open collector logic sinks to ground. The open collector logic in the console can sink up to 50 milliamps and 12 VDC into ground.

This type of open collector logic output can directly connect to many peripheral devices without an interface. Because this direct logic connection requires the grounds between the console and the peripheral to be connected, then a potential of a ground loop is created. If the cable is short and the studio has a good ground system, then the noise can be inaudible.

If the peripheral device logic requires higher voltages or currents than the console open collector logic is rated ...OR... if it is important to not have a ground reference through the control logic, then an interface circuit is required. Examples of isolated interfaces would be a powered mechanical relay, solid state relay, or optoisolator.

The circuit on this page illustrates how to use the console logic output to drive an external relay. Because an independent power source is used and the dry relay contacts are the only logic connections to the peripheral device, there is no current path between the console and the peripheral. That means there is no connection through the logic that can create half of a ground loop.

Peripheral Device Logic Interface
(example: starting or stopping a source)

to Peripheral Logic Input

+12VDC

Logic Output
(maximum 12VDC, 50mA)

+5 VDC Relay

Ground

+5 VDC Power Supply

Analog Inputs *(stereo line)*
(9-pin connector signals)

Pin	Signal Description
1	High (+), left channel
2	Low (-), left channel
3	High (+), right channel
4	High (-), right channel
5	Audio & Logic ground
6	Shield Ground
7	Source Start output logic
8	Source Stop output logic
9	Channel On-off control logic

NOTE: about Ground Loops

A ground loop is created when more than one ground path exists between two pieces of electronic audio equipment in a signal chain. This creates an efficient low frequency loop antenna which receives energy from stray 60 cycle power fields. The 60 cycle current induced in the antenna creates a voltage difference between the two pieces of equipment due to the finite impedance of the ground loop. This 60 cycle voltage is then added to the audio signal as a low frequency hum. The only way to eliminate the possibility of a ground loop is to design the system in such a way that there is only ONE ground path between the two pieces of audio equipment.

The most common ground loop is created with the AC power ground as one half of the loop and the audio ground in the shield wire as the second half of the loop. Because AC power ground is almost always connected between two pieces of equipment, the audio shield ...OR... a ground through the console logic interface can easily provide the second half of a ground loop.

It is interesting to note that consumer stereo systems are designed with an AC power/audio shield wire ground loop built in, and yet they can be extremely high performance. This demonstrates that studio systems with short cable lengths and very low resistance grounds can perform very well without any audible hum.

TYPICAL GROUND LOOP

GROUND PATH #1
SHIELD

GROUND PATH #2
THROUGH AC GROUND

EARTH GROUND

CHASSIS GROUND	EARTH GROUND	SIGNA;L GROUND
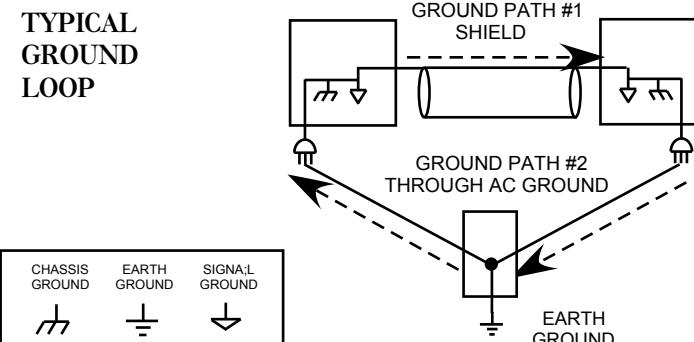
MISCELLANEOUS
LOGIC CONNECTIONS

Warning Lamp

All logic outputs for the console are high current open collector logic sinks to ground. This type of logic output can directly connect to many peripheral devices without an interface. The open collector logic can sink up to 50 milliamps and a maximum of 12 VDC.

If the warning light control logic requires higher voltages or currents than the console open collector logic is rated, an interface circuit is required. Examples would be a powered mechanical relay, solid state relay, or optoisolator. The circuit on this page illustrates how to use the console logic output to drive an external relay.

NOTE: do NOT use the console muting logic to directly switch the AC line voltage to the lamp.

Warning Lamp Interface Connections

Control Room
Warning Lamp

+12VDC

Logic
Output
*(maximum
12VDC, 50mA)*

+5
VDC
Relay

+5
VDC
Power
Supply
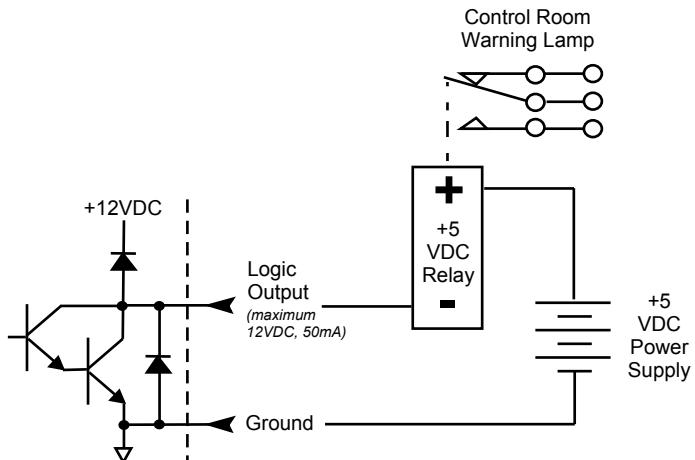
Ground

Note: *Do not use the console muting logic to directly switch the AC line voltage to the lamp*

Miscellaneous Logic Output
open collector darlington to ground
(9-pin connector signals)

Pin	Signal Description
1	Out #1, 500mA ground sink
2	Out #2, 500mA ground sink
3	Out #3, 500mA ground sink
4	Out #4, 500mA ground sink
5	Audio & Logic ground
6	Shield Ground
7	Out #5, 500mA ground sink
8	Out #6, 500mA ground sink
9	CR Mute, 500mA ground sink

MISCELLANEOUS CONSOLE SYSTEMS

Talkback

All digital inputs use nine-pin AMP MR connectors. These connections input AES-3 (AES/EBU) compatible signals.

All digital outputs use six-pin AMP MR connectors. These connections outpu

Talkback Simplified Connections

Talkback
balanced, analog
(9-pin connector signals)

| Pin	Signal Description
1	High (+), Talk output
2	Low (-), Talk output
3	High (+), Talk input
4	High (-), Talk input
5	Audio & Logic ground
6	Shield Ground
7	not assigned
8	Talk out logic (3)
9	Talk in logic (2)
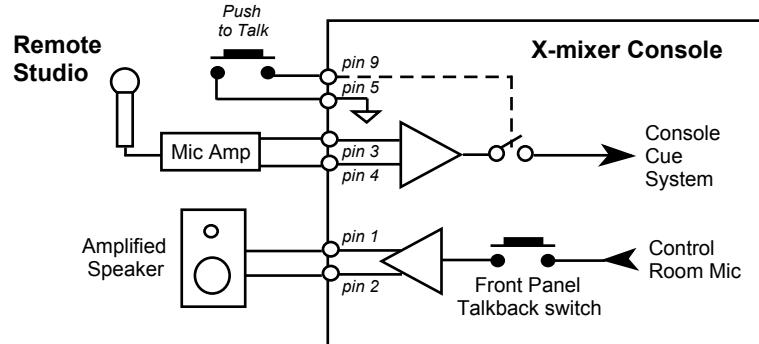
Basic Telco System

A basic telco block diagram is illustrated at the right.

The output of the phone hybrid is brought to a console line level analog input. That fader channel is assigned as a Phone channel so that it will configure the console mix minus and other phone functions automatically.

The mix minus output of the console is connected to the telephone hybrid input. The mix minus has all of the console audio MINUS the caller's voice so that there is not any feedback.

The console Telco channel logic can be used to pick up or disconnect the phone line automatically as the channel is turned on and off.

If it desirable to record the caller, the "Assignable Audio Output" (assignable as a cue or record output) may be set up as a record output. In that case it is connected to an audio recorder as shown.

11
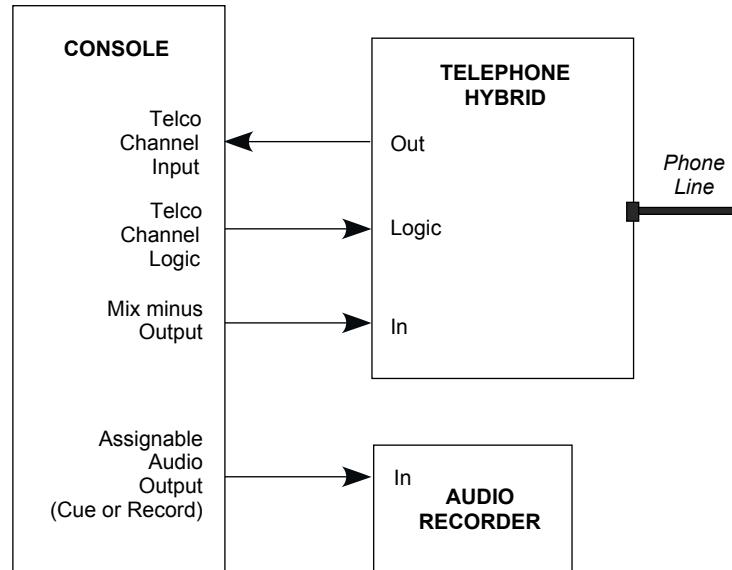
DIP SWITCH SETTINGS

Two DIP switches for basic console setup are located at the left rear of the main console motherboard as shown in the illustration on this page.

DIP Switch or Advanced PC Setup

For most station applications, a PC is not required to set up the console. The 16 DIP switches on the console can perform the basic setup.

... To use the DIP switches and NOT the PC,

         set SWITCH BANK 2, SWITCH 1 to OFF

... To use the PC and NOT the DIP switches,

         set SWITCH BANK 2, SWITCH 1 to ON

DIP Switches Active

The setting for each of the DIP switches are listed in the illustration on this page.

Notes on DIP switch Settings

(a) Autocue is the feature where cue audio is heard in the monitor speakers instead of in a second set of cue speakers. The monitor signal is still present but dimmed behind the cue audio. If autocue is not enabled, a second set of powered cue speakers must be connected to the system's cue output. Note that there are some options that disable the cue output and require cue by Autocue.

(b) Tallys are the logic associated with each input source. This is a global setting as ALL momentary or all sustained.

(c) Manual faders are the physical console faders. Use the Virtual fader setting when controlling the console remotely from a PC running virtual console software.

(d) The "In hand setting" is the 0VU position (2/3rds) on the channel slide faders.

(e) -10dB is the level used by consumer sources such as consumer CD players.

(f) Phone channel Setup:

Assign phone to channel based on 3 DIP switches setup as below:

Channel	Setup 1	Setup 2	Setup 3
3	Off	Off	Off
4	On	Off	Off
5	Off	On	Off
6	On	On	Off
7	Off	Off	On
8	On	Off	On
9	Off	On	On
10	On	On	On

(g) If channels one or two are set as mics, then those channels will mute the control room monitor, cue output, and trigger the muting logic output when they are on.

(h) selecting channel 11 or 12 as the line input for channel 1 or 2 mics allows an external mic processor to be used with the main control room mic(s).
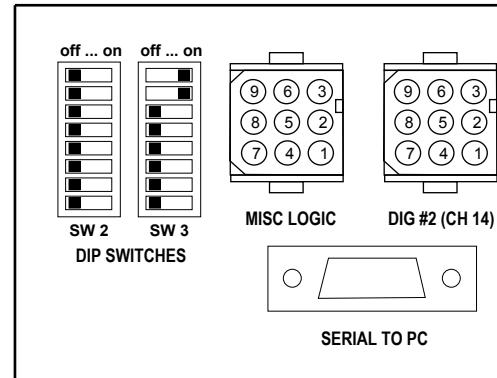
SW 2

1	OFF - use dip switch
	ON - ignore dip switch, use computer setup
2	OFF - autocue enabled
	ON - autocue disabled
3	OFF - tallies pulsed
	ON - tallies continuous
4	OFF - use manual faders
	ON - use virtual PC faders, ignore manual faders
5	OFF - In Hand Setting +4 dB
	ON - In Hand Setting 0 dB
6	OFF Channel 3 not -10 db input
	ON - Channel 3 is -10dB input, boost by +12dB
7	OFF Channel 4 not -10 db input
	ON - Channel 4 is -10dB input, boost by +12dB
8	OFF Channel 9 not -10 db input
	ON - Channel 9 is -10dB input, boost by +12dB

SW 3

1	Phone Setup 1
2	Phone Setup 2
3	Phone Setup 3
4	OFF- Cue,
	ON- Mix minus Record out
5	OFF - chan 1 is a mic
	ON - chan 1 not a mic
6	OFF - chan 2 is mic
	ON - chan 2 not a mic
7	OFF - chan 1 uses internal mic preamp
	ON - chan 1 uses chan 11 line input
8	OFF - chan 2 uses internal mic preamp
	ON - chan 2 uses chan 12 line input

TRIM POT ADJUSTMENTS

All trim pots are located on the main motherboard which is accessable by lifting and hinging back the VU meter housing

VU Meter Bus Level Adjustments

The Program, Audition, and Mono VU meters have trimpot adjust for setting the console to station level. As shipped from the factory, the VU meters are calibrated for +4dBu on the console outputs. Some stations may us 0dBu or +8dBu for their console outputs. These trimpots enable the setting of the console to your specific station level. To set the trim:

(a) Apply a signal to a console input.

(b) Connect a piece of test equipment to the console output you are adjusting.

(c) Raise the signal level (or fader) until the test equipment reads the desired console output level.

(d) Adjust the trimpot for the corresponding output until it reads zero on the VU meer.

(e) Repeat this procedure for all console outputs and associated VU meters.

Mic Gain Adjustments

The X-mixer console comes with two professional quality mic amplifiers. They are labeled MIC 1 and MIC 2. Each has a level adjust trimpot located on the main motherboard as displayed on this page.

Analog Stereo Line Level Input Adjustment

The console is calibrated at the factory for +4dBu analog source levels. To change channel gain for (-)10dBu consumer sources or other levels, you must connect a PC to the serial connector on the main motherboard and run the Setup software on the CDROM provided with the console. With this software, digital gain can be all inputs can be set for :

(a) +4dBu

(b) (-)10dBu

(c) incremental adjustment from (-)20 - +8dBu

Digital Source Input Level Adjustment

Digital level adjustment is accomplished with the PC setup software provided on CDROM with the console.
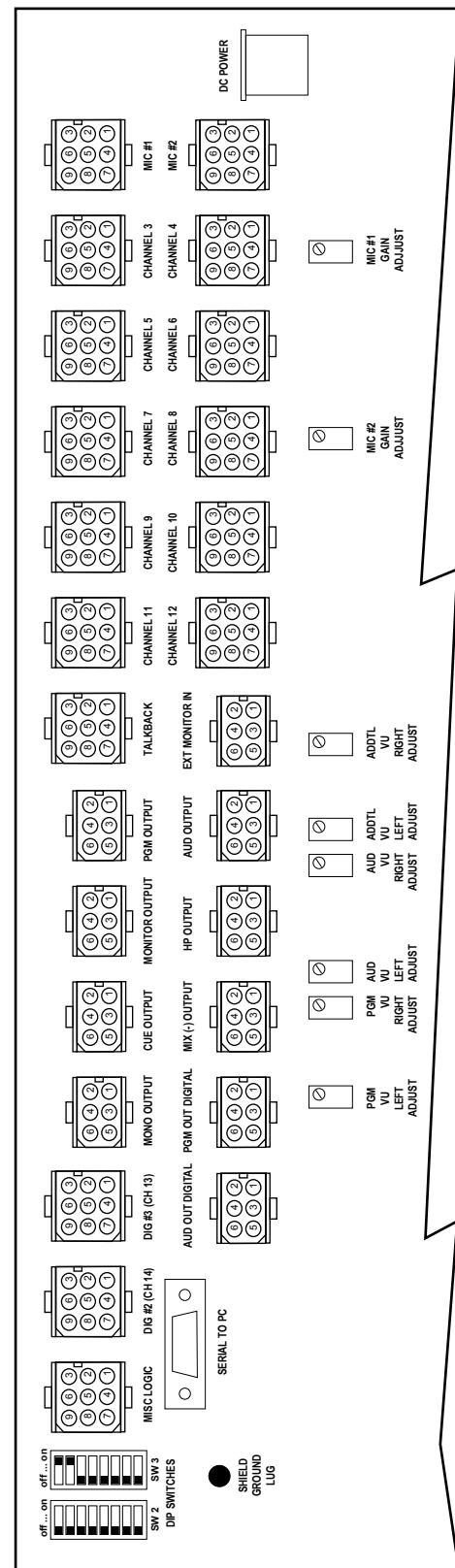
X-MIXER CONNECTION SUMMARY

Mic #1 & Mic #2
balanced, mono, mic level
(9-pin connector signals)

Pin	Signal Description
1	High (+)
2	Low (-)
3	not assigned
4	not assigned
5	Audio & Logic ground
6	Shield Ground
7	Channel On tally logic
8	Channel Off tally logic
9	Channel On-off control logic

Analog Inputs 3 - 12
balanced, stereo line
(9-pin connector signals)

Pin	Signal Description
1	High (+), left channel
2	Low (-), left channel
3	High (+), right channel
4	High (-), right channel
5	Audio & Logic ground
6	Shield Ground
7	Source Start output logic
8	Source Stop output logic
9	Channel On-off control logic

Talkback
balanced, analog
(9-pin connector signals)

Pin	Signal Description
1	High (+), Talk output
2	Low (-), Talk output
3	High (+), Talk input
4	High (-), Talk input
5	Audio & Logic ground
6	Shield Ground
7	not assigned
8	Talk out logic (3)
9	Talk in logic (2)

External Monitor Input
balanced, stereo line
(9-pin connector signals)

Pin	Signal Description
1	High (+), left channel
2	Low (-), left channel
3	High (+), right channel
4	High (-), right channel
5	Audio & Logic ground
6	Shield Ground

Analog PGM & AUD Outputs
balanced, stereo line
(6-pin connector signals)

Pin	Signal Description
1	High (+), left channel
2	Low (-), left channel
3	High (+), right channel
4	High (-), right channel
5	Audio & Logic ground
6	Shield Ground

Analog MIX (-) & MONO Outputs
balanced, line level
(6-pin connector signals)

Pin	Signal Description
1	High (+) analog output
2	Low (-) analog output
3	not assigned
4	not assigned
5	Audio & Logic ground
6	Shield Ground

Digital PGM & AUD Outputs
balanced, AES-3 compliant
(6-pin connector signals)

Pin	Signal Description
1	High (+) digital output
2	Low (-) digital output
3	not assigned
4	not assigned
5	Audio & Logic ground
6	Shield Ground

Digital Inputs 13 - 14
balanced, AES-3 compliant
(9-pin connector signals)

Pin	Signal Description
1	High (+), digital input
2	Low (-), digital input
3	not assigned
4	not assigned
5	Audio & Logic ground
6	Shield Ground
7	Source Start output logic
8	Source Stop output logic
9	Channel On-off control logic

Miscellaneous Logic Output
open collector darlington to ground
(9-pin connector signals)

Pin	Signal Description
1	RLS #1, binary 0
2	RLS #1, binary 1
3	RLS #1, binary 2
4	RLS #2, binary 0
5	Audio & Logic ground
6	Shield Ground
7	RLS #2, binary 1
8	RLS #2, binary 2
9	CR Mute, 500mA ground sink

NOTE: the Cue output connector is an "Assignable Output". It can be setup as either a cue output for an external cue amp and speaker or as a Record output following the Telco system.
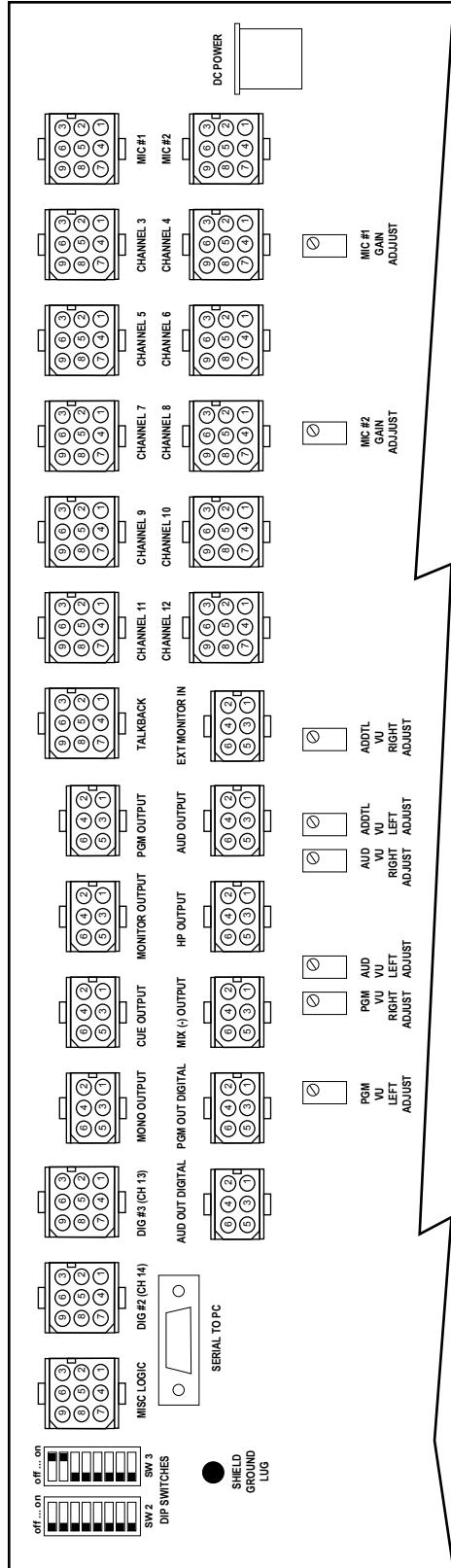
14

PC Setup Software

Setup software for a Windows compatible PC computer is supplied with the console. The software has integrated Help. Refer to the integrated Help for detailed instruction on use of the software.

The PC is connected to the console through an RS232 serial connection. Computers without RS232 connections built-in may use an external USB to RS232 device.

Position Setup Page

The Position Setup page is displayed below. The software will display 14 fader channels.

This page selects for each fader channel:

(1) Source input	[mic, analog line, digital, remote],
(2) Fader trim calibration	[channel gain],
(3) Source logic	[pulsed or sustained],
(4) Misc setup	[specific to the type of source input selected],
(5) Off-line mix	[bus assignment],
(6) Reset Timer	[auto reset timer to 0 when channel on]

NOTE: this software may be updated from time to time due to new features. Refer to the integrated Help supplied with your console for a current description of this software.
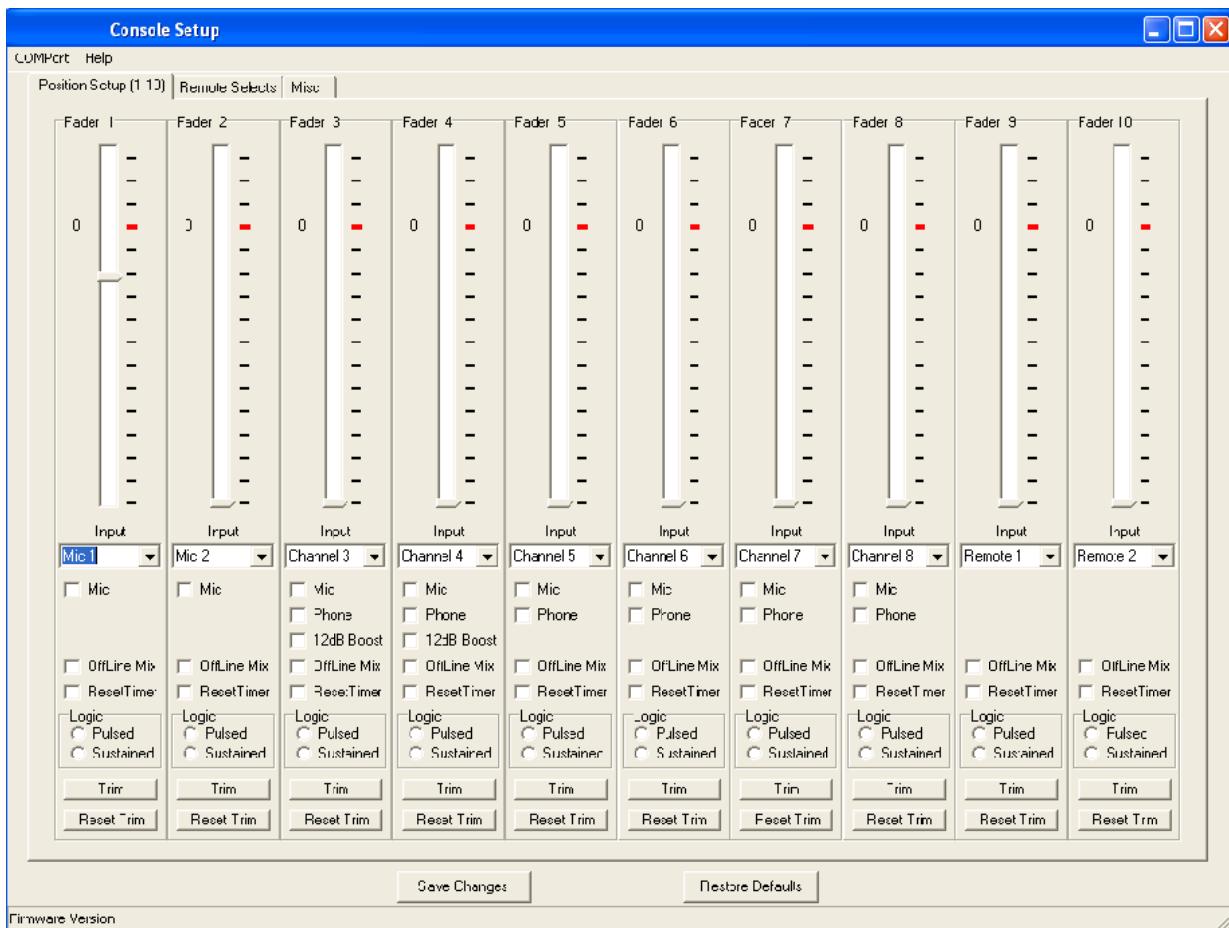
PC Setup Software

Setup software for a Windows compatible PC computer is supplied with the console. The software has integrated Help. Refer to the integrated Help for detailed instruction on use of the software.

The PC is connected to the console through an RS232 serial connection. Computers without RS232 connections built-in may use an external USB to RS232 device.

Remote Selects Setup Page

The Remote Selects Setup page is displayed below. If clicked on with the mouse, each input will display a drop down box listing all of the input sources (mics, analog line, AES3 digital). Simply click on the selection for each button. The same source can be selected as many times as desired. Once your selections have been made, remember to click on the SAVE CHANGES button at the bottom of the page or your changes will be lost.

NOTE: this software may be updated from time to time due to new features. Refer to the integrated Help supplied with your console for a current description of this software.
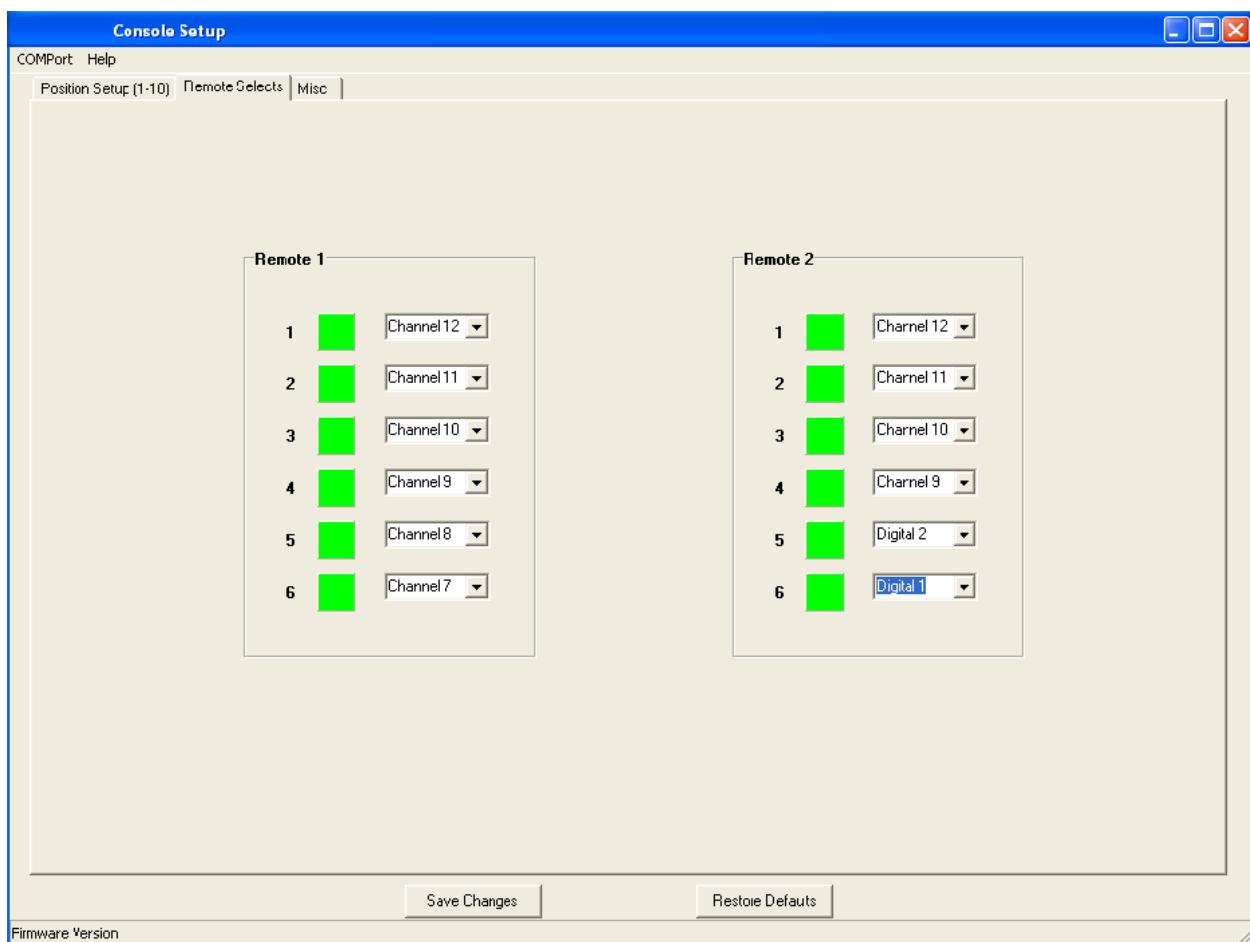
PC Setup Software

Setup software for a Windows compatible PC computer is supplied with the console. The software has integrated Help. Refer to the integrated Help for detailed instruction on use of the software.

The PC is connected to the console through an RS232 serial connection. Computers without RS232 connections built-in may use an external USB to RS232 device.

Miscellaneous Setup Page

The Miscellaneous Setup page is displayed below.

(1) Autocue	[enable or disable]
(2) Autocue Attenuation	[dB ducking of CR monitor signal below cue]
(3) In-hand setting	[prefader level for Cue and Off-line mix]

Factory Service Use only: do NOT use without contacting the customer service dept.

(1) Command Line Terminal	[RS232 terminal window for hand entered commands]
(2) Firmware Update	[update software on the motherboard]
(3) Sine Wave Output	[test sine wave output]

NOTE: this software may be updated from time to time due to new features. Refer to the integrated Help supplied with your console for a current description of this software.
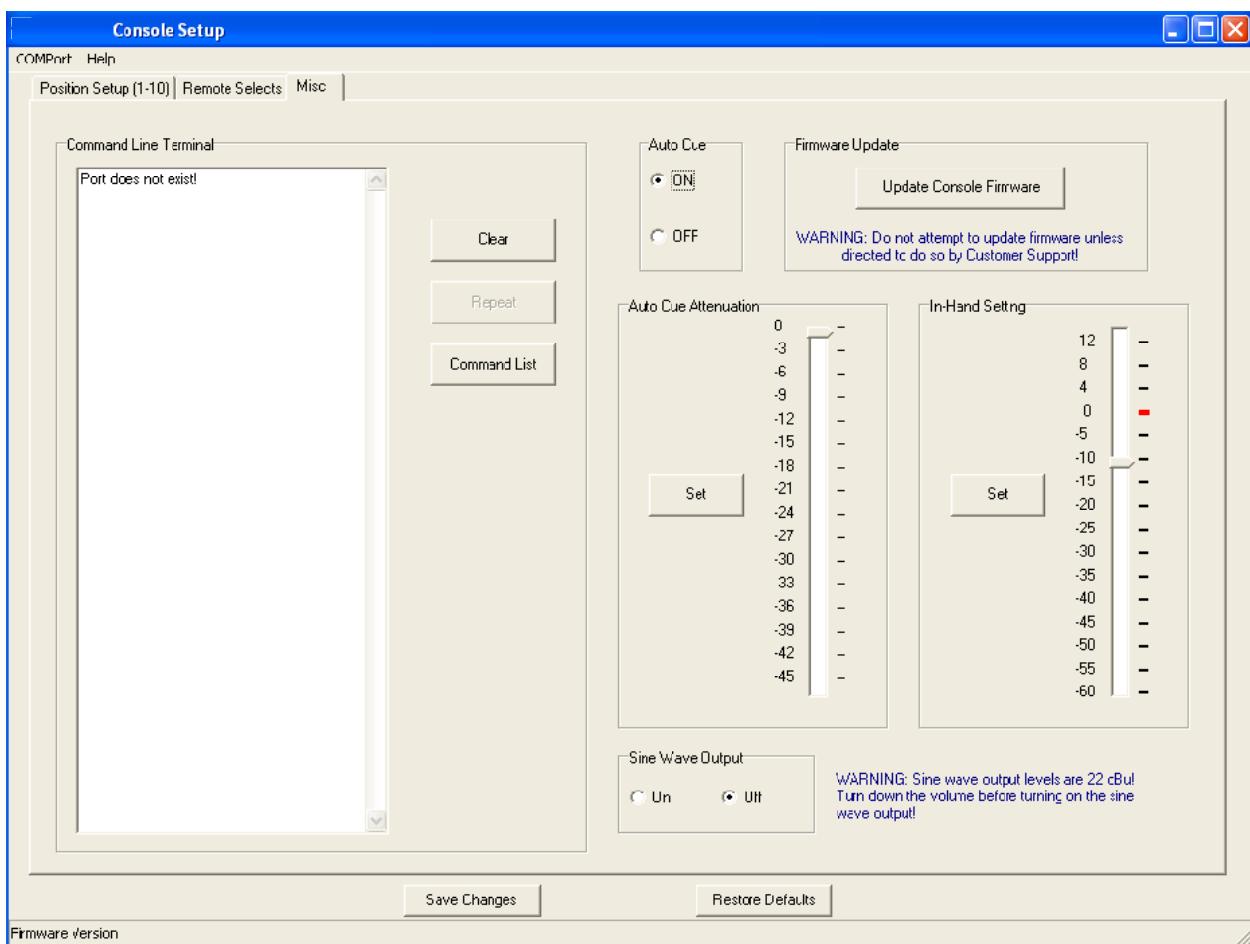
Operation

The X-mixer console is designed for extreme ease of use.

INPUT SOURCES

The X-MIX-14-14 console has 14 source inputs :2 mic, 10 analog stereo line, 2 digital AES3.

The X-MIX-14-22 console has 22 source inputs :2 mic, 10 analog stereo line, 10 digital AES3.

INPUT CHANNELS

The X-mixer-14 has fourteen fader channels Through the PC setup software, any fader channel can be assigned any of the input sources.

TELCO CHANNEL

The console has a single Telco mix minus bus that is extremely powerful and user friendly. Any of the fader channels can be selected as the Telco channel.

MONITOR SYSTEM

The console features a complete monitoring system with control room monitor, headphones, cue, and talkback to a second studio.

Mono Mic Channels

Channel Input the console features single input per channel for ease of use.

Pgm, Aud, Mono assigns the channel to any combination of these three buses.

Cue sends the prefader output of the microphone to the Telco mix minus bus to talk to the caller. The button is lit when cue is active

Fader set the fader to the reference line (-12dB0 to achieve 0 VU on the program output meters with a nominal +4dBu analog input signal. This position provides unity gain on the digital inputs.

On-off button Turns the channel on or off adding or removing the channel from all of the program buses. Also initiates the console tally logic.

Pgm	Pgm
Aud	Aud
Mono	Mono
Cue	Cue
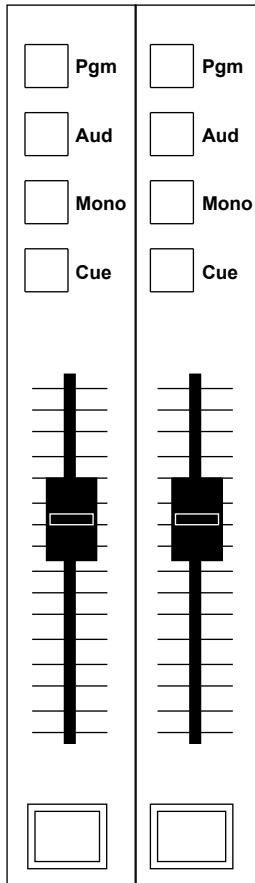
Stereo Line Channels

Channel Input the console features single input per channel for ease of use.

Pgm, Aud, Mono assigns the channel to any combination of these three buses.

Cue sends the prefader audio to the Cue system and to the operators headphones. The button is lit when cue is active

Fader set the fader to the reference line (-12dB0 to achieve 0 VU on the program output meters with a nominal +4dBu analog input signal. This position provides unity gain on the digital inputs.

On-off button Turns the channel on or off adding or removing the channel from all of the program buses. Also initiates the console logic to start source, and stop source.

Pgm	Pgm
Aud	Aud
Mono	Mono
Cue	Cue
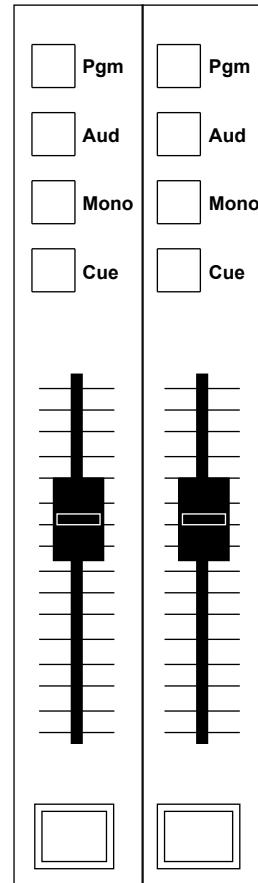
TELCO OPERATION

The X-mixer has an easy to use and yet powerful Telco system. It supports a single mix minus bus for a single phone hybrid. Any of the 10 line level source inputs can be assigned in the PC setup software utility as a Telco channel.

Talking to the Caller

To simply speak directly to the caller, activate the CUE button on the local mic channel. Any other audio that the caller may be hearing will be dimmed and the mic will be heard. To listen directly to the caller, activate the CUE button on the Telco channel. The caller audio will be audible in the cue system as if you were cueing any other source.

Bus Assignments

The caller can be assigned to any ONE of the 3 main buses (Pgm, Aud, or Mono). More than one bus can not be selected because the caller's mix minus bus must follow that bus assignment.

Phone Section of Operator Panel

The interlocked bus selector buttons (Pgm, Aud, & Off-line) select what the caller will hear when the Telco channel is off or no buses are assigned on the Telco channel. The channels assigned to the Off-line mix bus are selected with the PC setup software utility.

Channel On/off Button

The button is push once for On and push again for Off. When turned on, the source control logic will pick up the caller's line. When turned off, the source logic will release the caller's line.

When the channel is Off, the caller's mix minus bus will be fed by the selection from the Phone section of the operators panel (Pgm, Aud, or Off-line).

When the channel is On and no bus is assigned in the Telco channel, then the caller's mix minus bus will also be fed by the selection from the Phone section of the operators panel. If the channel is On and a bus is assigned in the Telco channel, then the caller's mix minus bus is fed from the selected Telco bus (Pgm, Aud, Mono).

Telco Record Output

The console has an "Assignable Output" that can be setup as either a special Cue output or as a Record output that follows the Mix minus bus assignment.

CR Mic   Telco channel   Phone
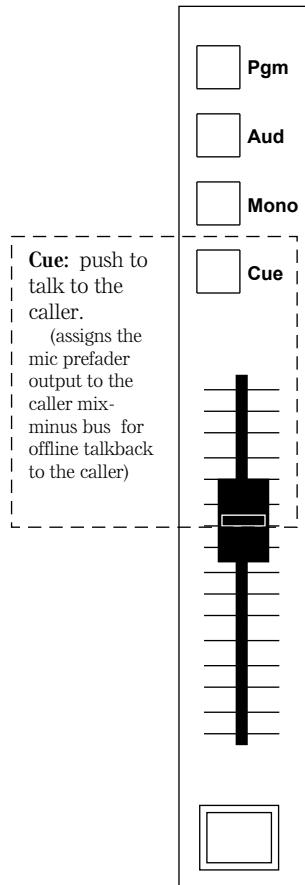
Pgm: push for live On Air operation

Aud: push for Off air operation

Mono: push for Off air operation

(momentary push-push & interlocking switches. Assigns the Telco channel to any ONE (or none) of these three buses and feeds that bus (minus the caller) to the caller mix-minus feed. Only one bus can be active because only one bus can be sent to the caller. NOTE: all 3 buses can be deselected, in which case the bus selected in the PHONE section [Pgm, Aud, Off-line] is fed to the caller mix minus bus)

Cue: push to hear the caller in the cue system

(sends the prefader audio (Caller) to the Cue system and to the operators headphones. The button is lit when cue s active)

Cue: push to talk to the caller.

(assigns the mic prefader output to the caller mix-minus bus for offline talkback to the caller)

Pgm
Aud
Mono
Cue

Start
Stop
Reset
Auto
TIMER

Pgm
Aud
Off Line
PHONE

Phone section
these 3 buttons are interlocked. They select the mix minus feed to the caller when (1) theTelco channel is On, and (2) the Telco channel bus assigns are off.

CUE

On-off button: Turns the channel on or off, adding or removing the channel from the program bus.

(Also initiates the console logic to pick up (On) or hang up (0ff) the phone line)
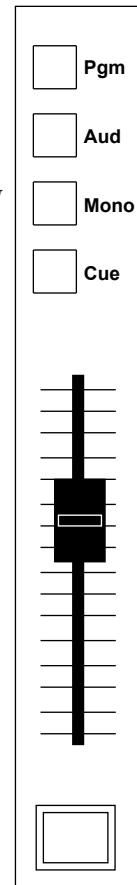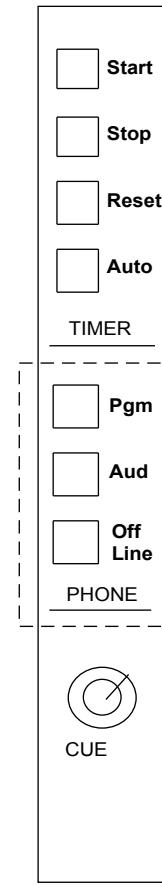
CONTROL ROOM MONITOR & TIMER

The console has a full featured broadcast monitoring system. It includes a control room monitor, headphones, cue, talkback, & uptimer system.

The control room monitor can select between an external (usually off air) input, Program bus, Audition bus, and Mono bus. The monitor output has an individual level control.

The headphones follow the monitor select switch and have an individual level control. There is no headphone jack in the console chassis. The headphones have an audio output which connects to an external audio amplifier. The headphone jack is typically embedded into the studio furniture.

The cue system features Autocue and a separate "Assignable Output" that can be setup as a cue output for an external amp and speaker (or Record output for the Telco system). Whenever a fader channel is placed into cue, the monitor audio is dimmed by an amount set in the PC setup utility, and the cue audio is played over top. Autocue also operates into the Headphones. If an external cue amp and speaker are used then the autocue feature can be defeated in the console setup.

Whenever a local microphone is turned on, the console muting system is activated. This results in the monitor and cue outputs being muted to avoid feedback. A logic out-put is also activated to drive an appropriate On Air Warning light.

The timer features manual and automatic control. When the Auto button is active on the operator control panel, the timer is reset to zero whenever certain console channels are turned on. The channels that will reset the timer are selected in the PC software setup utility. The operator panel has switch-es for manually starting, stopping, and reset-ting the timer.

Operation of the control room monitor sys-tem is displayed and explained below.

Timer control

Timer control

Auto: if the auto button is active then the timer will be reset to 0 whenever an input channel (with its reset setup on) is turned on.

Manual: (Auto is off)
The front panel buttons will Start, Stop, or Reset (to 0) the timer.

Phone section these 3 buttons are interlocked. They select the mix minus feed to the caller when (1) theTelco channel is On, and (2) the Telco channel bus assigns are off.

Cue Volume controls the level of the cue output.

Autocue no front panel control. Setup by DIP switch or PC. When a channel is placed into cue, the moni-tor audio dims and Cue audio is heard in the Monitor speakers.

Control Room Monitor
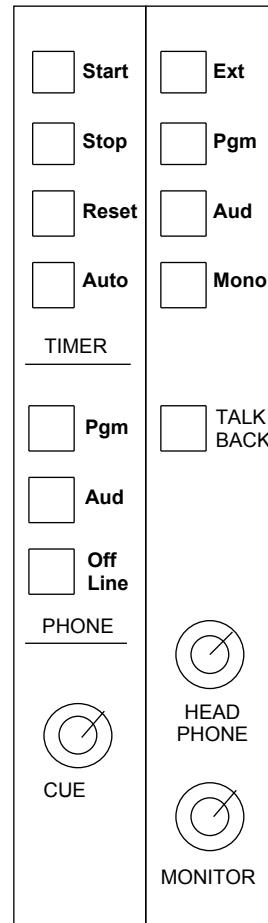
Monitor Selector the monitor (with headphone following) can select an external (usually off-air) feed, Program bus, Audition bus, or the Mono bus

Talkback push to send an audio feed of the Control room mic plus logic to an external studio for inter-com purposes.

Headphone Volume controls the level of the headphone output. The headphone output drives an external headphone amplifier and headphone jack. There is no headphone jack in the console mainframe.

Monitor Volume controls the level of the monitor output.

Start	Ext
Stop	Pgm
Reset	Aud
Auto	Mono
TIMER	
Pgm	TALK BACK
Aud	
Off Line	
PHONE	
CUE	HEAD PHONE
	MONITOR

REMOTE LINE SELECTORS (RLS)

The remote selector has two 6 position banks of switches.

X-mixer-14 model
    For remarkable flexibility, each switch may be assigned to any of the 14 (or 22) source inputs in the console: mic, analog line, AES digital. The only limitation is that a Telco input may not be assigned to a remote selector.
    One powerful feature of the remote selectors is that source logic is supported if a source is assigned to the remote switch.
   Source assignment is performed in the PC setup software utility.

Binary Logic for External switcher control
    The RLS switch banks also provides 3 bit binary logic outputs for interfacing to an external routing switcher (not supplied).

REMOTE 1 | REMOTE 2
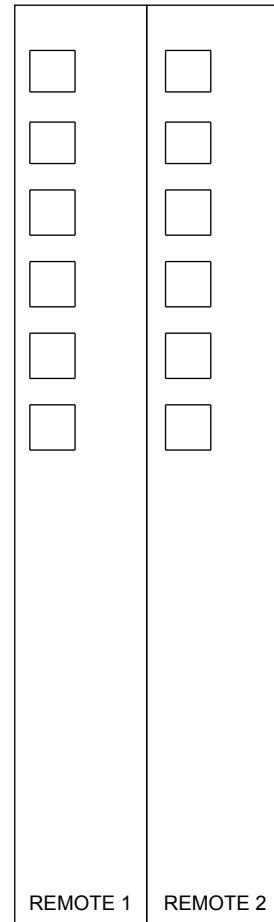
VU METER HOUSING

Program   Audition   Mono   TIMER

The VU Meter housing has 5 analog VU meters and the count up timer. There are no operator adjustable controls on the VU meter housing. Timer controls are located on the operator panel below the housing. Auto reset of the timer when an input fader channel is turned on is set up in the PC Setup software utility.

Equipment Description

SIMPLICITY

The X-mixer console is designed for ease of installation, ease of service, and ease of use. The basic console has 3 metal panels, 4-5 PC boards, and an external modular power supply. Most ICs are socketed for ease of board level repair. The bare minimum of surface mount parts are used. All parts are professional quality for high performance and long life.

CHASSIS.

The mainframe consists of a welded aluminum bottom chassis with an aluminum operator panel and VU meter housing. The operator panel is hinged to provide access to the main motherboard for servicing. The VU meter panel is hinged for access to all connectors and adjustments for installation.

To ensure high RF shielding, all audio wiring shields are grounded directly to the chassis through each connector. A ground screw at the left rear of the chassis provides a connection point to tie the chassis to the studio technical ground reference.

MOTHERBOARD

All analog and digital audio processing is accomplished on a single motherboard. A physical layout of the board and block diagram are provided on a following pages.

OPTION BOARD

The standard X-MIX-14-14 console comes with 2 mic sources, 10 stereo analog line sources, and two AES3 digital audio sources. The X-MIX-14-22 adds an additional board to the console to add 8 AES3 digital inputs and 2 mic

preamps.

POWER SUPPLY

The supply is external to the console mainframe to reduce hum and noise. It is what is commonly called a "line lump" configuration. It is a compact module with a 6 foot AC power cable and a 6 foot DC cable that connects to the right rear of the console motherboard.

The power supply has DC outputs of:
(+) 5 volts, 4 amps
(+) 12 volts, 2 amps
(-) 12 volts, 0.5 amps

Physical size: 3" x 1 3/4" x 6"
Input: 100-240VAC, 50-60Hz, 1.6A

VU METER HOUSING

The VU meter housing hinges back to provide access to the motherboard connectors and trim pots. The housing itself contains 5 VU meters and a timer. The VU meters are analog and are driven from the motherboard with associated trimpots for level adjust.

The timer is a custom up timer with minutes and seconds. The timer chassis and board are attached to the VU meter housing with two screws from behind the face. A single cable attaches the timer to the console motherboard through a multipin connector.

FRONT PANEL

The front panel has three motherboards. The first 2 boards have the switches for the channel assignments. The second board has the switches for the control room monitor and remote selector switches. Associated electronics on the boards drives the

switch LEDs. The monitor, headphone, and cue pots have cables and are plugged into the motherboard. Use of plugs (not direct soldered) simplifies servicing of the console.

X-mixer Layout
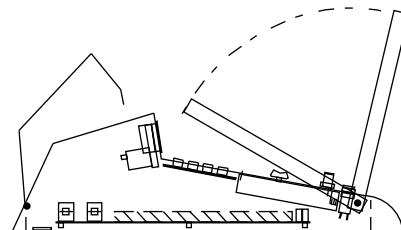
CONSOLE SIDE VIEW
shown with control surface and VU meter housing set to its service position
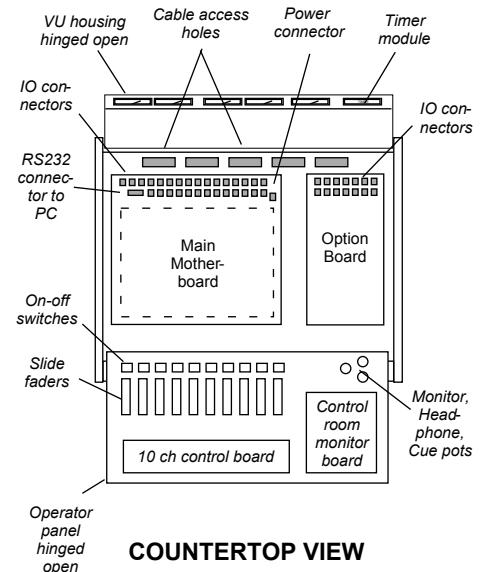
COUNTERTOP VIEW

POWER SUPPLY

# Motherboard Layout

Logic for all Source Inputs
(ground source and sink)
(9-pin connector signals)

Pin	Signal Description
1	----------
2	----------
3	----------
4	----------
5	Audio & Logic ground
6	Shield Ground
7	Source Start output logic
8	Source Stop output logic
9	Channel On-off control logic
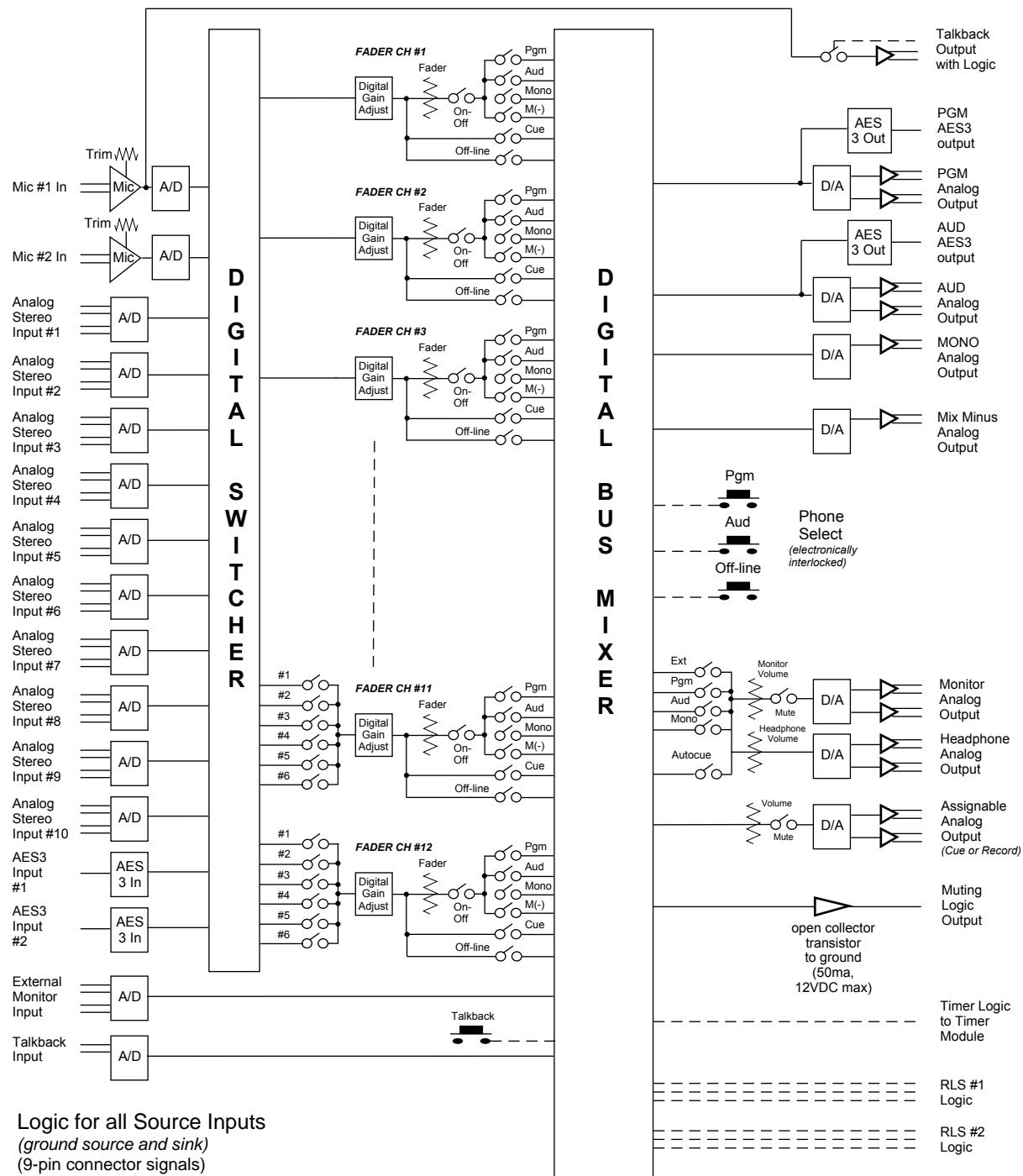
NOTES: (1) All logic outputs are open collector transister logic to ground (50ma, 12VDC max)
(2) To activate any logic input, connect it to ground through a dry contact closure
(3) All analog inputs are active balanced.
(4) All analog outputs are active balanced
(5) All mixing is digital with 32 bit accumulators
(6) This diagram represents a model X-mixer-10 only with the TRS switchers assigned to channels 9 & 10.

Parts & Repair Services

FIELD REPAIR

All of the switches, button caps and faders on X-mixer are easily field replaceable.

Although schematics are available in the X-mixer Technical CD-ROM , it is recommended that circuit boards be returned to the factory for component servicing of any non-socketed parts.

PARTS & REPAIR INFORMATION

Spare parts and accessories are available from the Arrakis customer service department. Most repair parts are shipped within 24 hours, but circuit boards and other assemblies may have lead times exceeding two weeks, so order spare parts accordingly.

Parts returned for service, exchange or credit must have a Return Material Authori-zation (RMA) tracking number assigned to them by Customer Service Items returned without an RMA number written on the outside of the pack-aging are subject to customer return or to additional handling fees.

To order parts or request an RMA, contact Customer Service by phone, fax, e-mail or post.

All items are shipped FOB Loveland, Colorado, using ground service, unless otherwise specified at time of order. Overnight or Next Day A.M. de-livery is also available for most items.

SPARE & REPLACEMENT PARTS INFORMATION

Part #,   Description or Use

Part #	Description
1030-605	VU METER- AL29 REAR ADJ., PRO R
1030-610	VU METER- AL29 REAR ADJ., PRO L
1030-625	VU METER- AL29 REAR ADJ., AUD R
1030-630	VU METER- AL29 REAR ADJ., AUD L
1030-631	VU METER- AL29 REAR ADJUST - MONO
6000-115	CABLE INTERCONNECTION.- A-
6000-120	CABLE -INTERCONNECTION. -B-
6000-125	CABLE - GROUND WIRE-
6000-145	10 CH MASTER HARNESS
6000-149	STUFFED TIMER BD.
6000-170	CABLE - SLIDE FADER
6000-175	ON/OFF SWITCH -
6000-180	MOD POT (HDPH)(MONITOR)(CUE)
6000-185	CABLE -C.R.MON. INTERCONNECT
6000-199	STUFFED C.R.MONITOR BOARD
6000-209	STUFFED DIGITAL MAIN BD
6000-224	STUFFED 10 CH. BD.
6000-235	SPARES & INSTALL KIT 10CH

X-mixer-14 model only

Part #	Description
6000-146	14CH MASTER HARNESS
6000-236	SPARES & INSTALL KIT 14CH
6000-239	4 CH BOARD

INSTALLATION KIT PARTS

The Tool and Connector kits supplied with each console contain these parts:

QTY	PART #	DESCRIPTION
10	1005-451	HOUSING - 6 POSITION - MINI
16	1005-452	HOUSING - 9 POSITION - MINI
204	1005-461	TERMINAL- AMP-MINI 26-18 awg
4	1020-050	IC- DUAL OP AMP, AUDIO, 8 PIN
1	1030-389	POWER SUPPLY EXTERNAL
1	1030-715	TOOL- CRIMP
1	1200-130	OPS MANUAL
1		X-mixer CD

MAINTENANCE AND SERVICE

Maintenance

The X-mixer console requires no periodic maintenance with the exception of occasional cleaning.

Cleaning Switches

All switches are sealed and require no cleaning.

Cleaning Slide Faders

The slide faders are high quality conductive plastic. The slide faders may be cleaned using warm water. They do not require disassembly. Remove the fader's knob by pulling up on it. Remove the fader from the console by removing the two mounting screws, clipping any cable ties if used, and then carefully unplug the connector from the PC board.

To clean, simply hold the fader under a stream of warm tap water and operate the fader back and forth for 50-100 times. For extremely dirty faders, a mild soap solution may be used. Allow the fader to dry totally before using. This may take as much as 10 hours.

IMPORTANT- do not use solvents, cleansers or sprays on the faders. The warm water with mild soap technique is recommended by the manufacturer.

Replacing Rotary Faders

All rotary faders are sealed conductive plastic units with stainless steel shafts. They require no periodic maintenance and can not be cleaned.

To replace a pot you must first remove the knob. To remove the knob, pry the knob cover off the top of the knob to reveal a collet nut. Loosen the nut to release the knob. Lift the knob off the shaft. Next remove the nut on the threaded shaft of the pot. The pot is then removed from the back of the panel.

Cleaning Console surfaces

Use mild soap and warm water only. Abrasive cleaners and solvents will ruin the console paint and plastic surfaces.

Routine Parts Replacement

Typical control part life specifications are listed below. Abuse can reduce the life or destroy a control.

On Off switches	4,000,000 operations
Momentary switches	10,000,000 operations
Faders	20,000 operations (for 10% resistance change)
Fader lamps (LED)	no routine replacement

Accessories

Button Engraving

Input channels come standard without engraving.

Custom engraving on the button caps can be ordered at the time of purchase or engraved replacement button caps can be ordered once the input sources have been determined. Each button cap can have one or two lines of engraving with up to four alphanumeric charac-ters and a ½ character punctuation divid-er (space, period, hyphen, slash, backslash, etc.) on each line. Custom engraving can be specified when a blank button cap is ordered.

Fader Knobs

Input channels come standard with black fader knobs. Various other colored fader knobs are available. The table identifies the part numbers by knob color and typical source.

Available Colors: black
red
yellow
green
blue
white
gray
orange

Technical Services CDROM

RELEASE 1.0

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Part # X-mix-CD-2005

System Requirements

• PC using Pentium or greater processor

• Microsoft® Windows 98SE or higher

• Minimum of 64 MB of RAM

• CD-ROM drive

• RS232 serial port (for advanced setup of the console)

• 40 MB of available hard-disk space (for complete installation of all files)

CD-ROM Contents

• Read-me Install Information (text file)

• X-mixer Installation & Operation Manual (PDF file)

• X-mixer Setup software for Windows PC computer

• X-mixer Schematic Diagrams and Board Physical Layouts

       Console Motherboard

       10 channel Control board

       4 channel Control board (X-mixer -14 only)

       Control Room Monitor Control board

• X-mixer Motherboard firmware update software

The X-mixer Technical Service CD-ROM is supplied with the console installation kit.

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