BMX II

PACIFIC RECORDERS & ENGINEERING CORPORATION



SYSTEMS INTEGRATORS FOR THE BROADCAST INDUSTRY.

Pacific Recorders & Engineering Corporation was founded in 1969 to serve Southern California's professional recording and broadcast industries with audio product design/manufacturing and facility development.

Today, operating from a 55,000 square foot facility in Carlsbad, California, PR&E has grown to become one of the world's leading manufacturers of broadcast consoles, cart machines and related peripherals and is recognized for its expertise as a broadcast and production systems integrator.

PR&E has designed and fabricated more than 1500 custom control, studio, newsroom and master control systems, and is setting the standards for exciting new products, for innovative solutions to complex facility design, and for maximum performance from both.



FEATURES

- Two main stereo mix buses, each capable of +28 dBm output
- 30 dB of headroom on all inputs
- In-phase, equal level insert/processing patch points on all input and output modules
- Full and independent remote control logic for ON, OFF, COUGH and TALKBACK on each input of microphone modules
- Full remote control of START, STOP, AUDIO, RESET, ON, OFF, CUE and TIMER RESET on line input modules
- Cue system with console headphone switching
- Sophisticated control room and studio monitor systems with programmable muting
- Monaural output module with independent metering
- Two telephone mix-minus feeds plus telephone monitor mix
- Fully regulated and independent supplies for audio, logic and phantom power
- On-board power supply decoupling to provide in-use serviceability
- Universal mainframe accepts any module in any position
- Low-noise 12 volt CMOS logic for stable operation in adverse RFI environments
- Mainframes available for 10, 14, 18, 22 and 26 input positions
- Function labeled, independent connectors for each input, output and logic function
- Each console supplied with connector kit, tools and spare parts kit

BMX SERIES II ON-AIR CONSOLES

Tried and True

Time is the test of technology. The wealth of promotional support from a product's manufacturer should not be as convincing to a prospective buyer as are a few words of praise (or scorn) from a friend who has owned the product for years.

The BMX Series II Console is widely recognized as one of the finest on-air boards available today. Its success has been shared by so many friends that well over 1000 BMX's are now installed. They rarely show up on the used market, usually when the station is building new facilities with new BMX's, but rather are passed along to new friends where they continue to function quietly year after year.

As you look through this brochure, note the attention to detail and the thorough consideration of broadcaster needs that have given the BMX Series II its deserved reputation for service and reliability.

PR&E's design engineers will tell you that the track record of the BMX Series II is no accident. First quality components, the basis for high performance equipment, are used throughout. Advanced discrete and integrated circuitry yields very low noise and distortion, and provides excellent frequency response and headroom/overload capability. At least 30 dB of input headroom is maintained to provide that extra margin for "hot" levels and operator error. Mixers are full-travel Penny & Giles type 1900 faders, far more reliable than the lower cost series designed for semi-professional or light-duty applications. Module control button switches are by Honeywell, which have proven themselves for 15 years in all our custom broadcast console designs. The microphone input transformers are designed and supplied by Deane Jensen; again, more expensive than commercial off-the-shelf parts, but important to the way your air talent sounds. The VU meters fully conform to American National Standard C16.5-1954 and are driven by balanced isolation buffer amplifiers. You can even get Peak Program Meters (PPM) conforming to British Standard 4297:1969.

The sophisticated control logic of the BMX II utilizes CMOS integrated circuits. Operating on 12 volt, low current power, CMOS based logic is immune to electrical noise and strong RF fields. Unlike low-cost, 5 volt high-current TTL logic, CMOS logic circuits generate very little electrical noise, so you won't hear "chirps or clicks" in the audio as the logic operates. Outputs, such as control pulses and tally lights, are delivered by short-circuit-proof driver circuitry to prevent a problem in the console should an external connection fail. The CMOS control circuitry communicates with external equipment through simple logic interfaces which provide both a common control format for different brands and models, and complete electrical isolation between the various pieces of equipment.

The BMX II is a low profile design, so you have plenty of room to arrange the peripheral equipment. Careful attention has been paid to ergonomics in the placement of switches and controls. All active electronics, except the meter buffer amplifiers, are accessible from the face of the console. Panel modules simply unplug from the mainframe, and may be removed and reinstalled with the power on - a real plus in the event of an emergency.

All input, output and logic wiring is accomplished with individual easy-to-use connectors. The use of individual connectors for each function provides more flexibility in configuration and future reassignment than multi-pin connectors. Input assignments can be changed in the future with ease by just moving the appropriate connector plugs. The connector pinouts are standardized and the console's connector panel labeled with descriptive text designations for ease of configuration. The console comes complete with connectors, pins, tools and full wiring information. By prewiring the studio connectors, a BMX console can be installed and on the air in a few hours.

The BMX II comes in 10, 14, 18, 22 and 26 input module configurations. You may order a BMX II with just the modules you need today, and expand the system as your needs increase. Universal layout enables any input position to accept any input module, so adding extra modules later is quick and simple. Every BMX II mainframe is factory wired and tested. Just connect your peripheral gear and your BMX II is air-ready.

PR&E uses aerospace materials and modern methods, creating a tough reliable housing that won't twist or flex to cause degradation of card edge contacts and straining of circuit traces. The mother board, used for both power distribution and the summing buses, is equipped with a full ground plane shield and a very low impedance "audio common" bus to keep current-induced cross-talk to uncommonly low levels. This type of mother board is considerably more expensive than a simple ribbon wire busing system; however, it is the best method for providing both the ground plane shield and a heavy common bus.

The console modules are all constructed on double sided printed circuit boards. These are more expensive than single sided construction but allow us to optimize shielding of both the analog and logic control circuitry. All components are clearly identified with silk-screened legends. All circuit card fingers and mating edge connectors are gold plated.



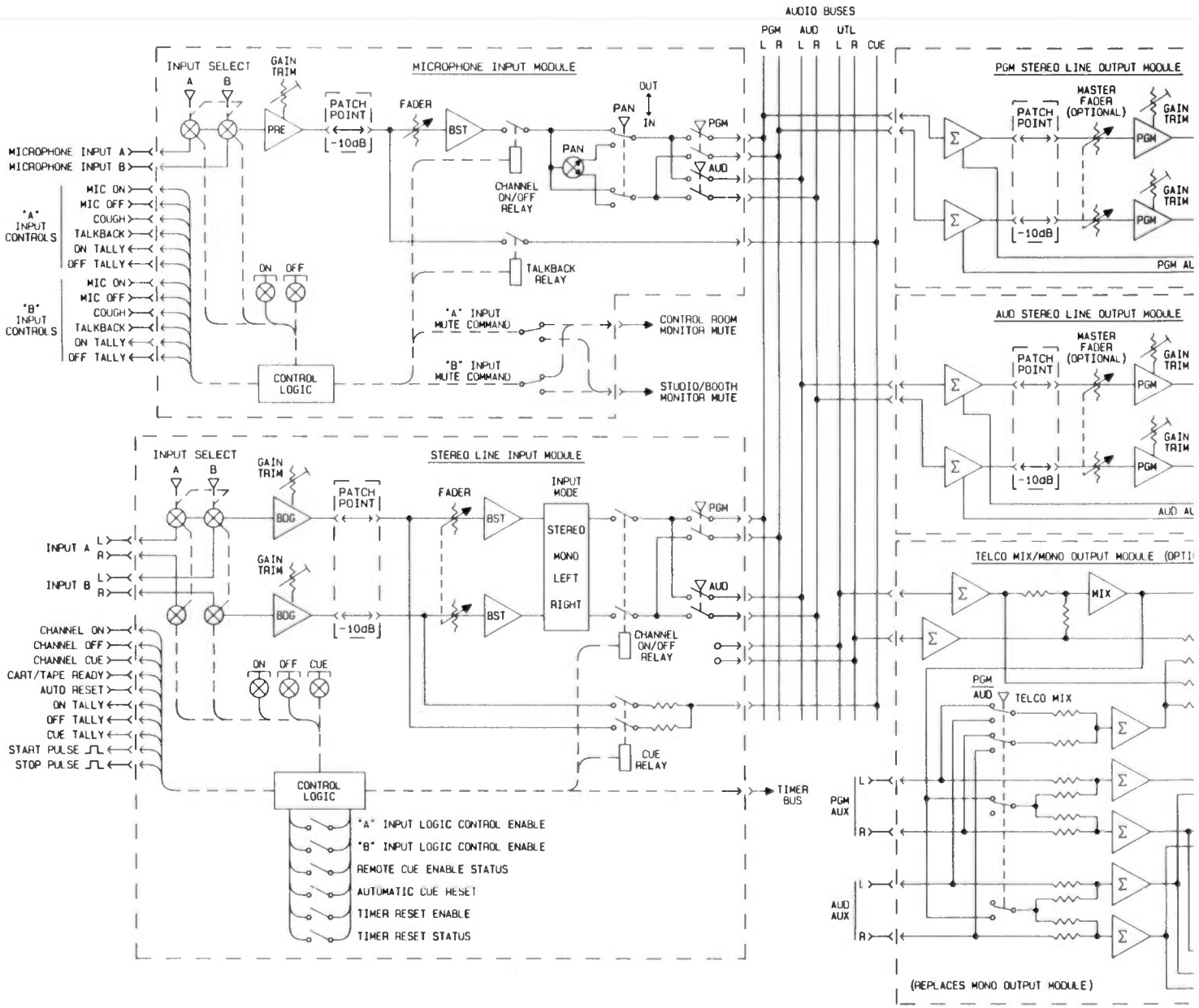


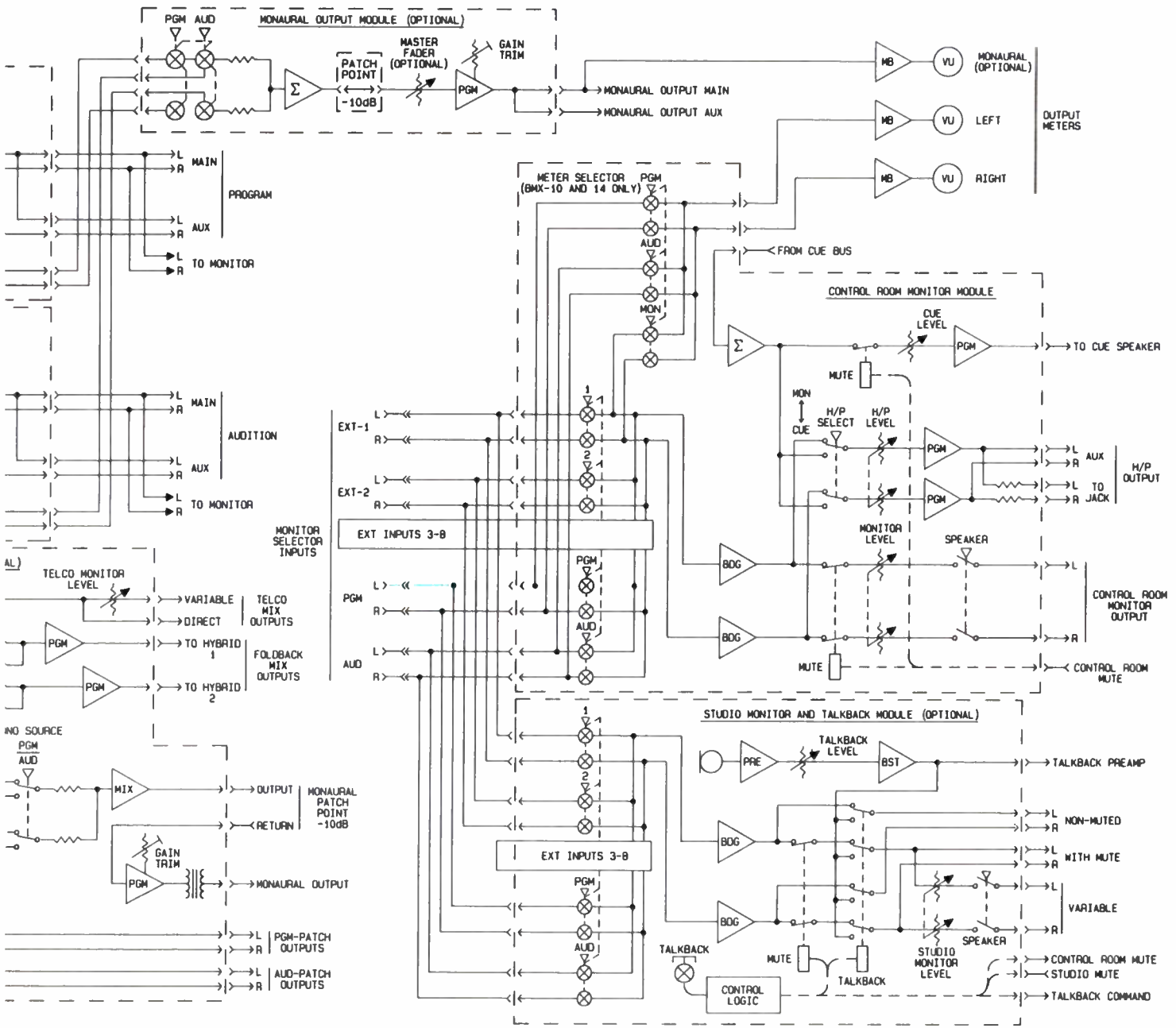
The rack mount power supply is constructed in a rugged steel chassis and features massive regulator heat sinks to provide very efficient convection cooling. The audio, logic and phantom supply voltages are individually switched by magnetic circuit breakers and are provided with front panel test jacks on standard ½ inch centers. A coupler unit with power fail detection and tally is available for configuring redundant power supply systems.

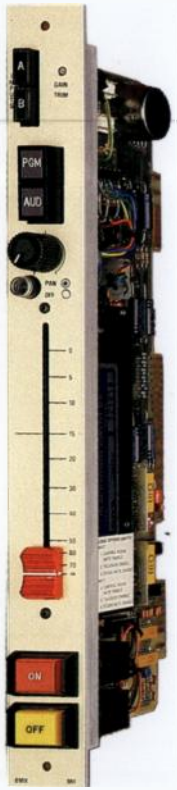
PR&E's proven understanding of user needs, and a design philosophy that combines leading edge technology with ultra-rugged construction, makes the BMX II a benchmark of excellence in the broadcast industry.

BMX II...easy to buy, easy to install and easy to service ...with reliability and performance that has become the hallmark of PR&E products.

Functional Block Diagram




MONAURAL OUTPUT MODULE (OPTIONAL)
PGM AUD
PATCH POINT
-10dB
MASTER FADER (OPTIONAL)
GAIN TRIM
PGM
MONAURAL OUTPUT MAIN
MONAURAL OUTPUT AUX
MB
VU
MONAURAL (OPTIONAL)
LEFT
RIGHT
OUTPUT METERS
METER SELECTOR PGM (BMX-10 AND 14 ONLY)
AUD
MON
FROM CUE BUS
CONTROL ROOM MONITOR MODULE
CUE LEVEL
TO CUE SPEAKER
MUTE
MON
CUE
H/P SELECT
H/P LEVEL
AUX
TO JACK
H/P OUTPUT
MONITOR LEVEL
SPEAKER
CONTROL ROOM MONITOR OUTPUT
CONTROL ROOM MUTE
L
R
MAIN
AUX
PROGRAM
TO MONITOR
AUDITION
EXT-1
EXT-2
EXT INPUTS 3-8
MONITOR SELECTOR INPUTS
PGM
AUD
BOG
TELCO MONITOR LEVEL
VARIABLE
DIRECT
TELCO MIX OUTPUTS
TO HYBRID 1
TO HYBRID 2
FOLDBACK MIX OUTPUTS
STUDIO MONITOR AND TALKBACK MODULE (OPTIONAL)
PRE
TALKBACK LEVEL
BST
TALKBACK PREAMP
NON-MUTED
WITH MUTE
VARIABLE
STUDIO MONITOR LEVEL
CONTROL ROOM MUTE
STUDIO MUTE
TALKBACK COMMAND
TALKBACK
CONTROL LOGIC
NO SOURCE
MIX
OUTPUT
RETURN
MONAURAL PATCH POINT -10dB
GAIN TRIM
MONAURAL OUTPUT
PGM-PATCH OUTPUTS
AUD-PATCH OUTPUTS







MICROPHONE INPUT MODULE

The Microphone Input Module allows you to use any contemporary microphone. The Jensen transformer coupled mic preamp is adjustable to handle nominal inputs ranging from -60 dBu to -35 dBu. The A/B input selector gives you two mic inputs per module with programmable mute of control room and/or studio monitors. Monitor mute circuitry incorporates an automatic 40 mSec delay before the mic is turned on, permitting "room reverb" to decay off-mic. Pan, with ON/OFF switch lets you position signals in the stereo image. You may remotely control ON, OFF, COUGH and TALKBACK. Alternate action PROGRAM and AUDITION buttons give you the ability to assign the module to either or both stereo output buses. Phantom power for condenser mics is individually assignable to the A and B inputs.

LINE INPUT MODULE

The Line Input Module handles nominal input levels from -12 dBu to +8 dBu. The transformerless balanced inputs are instrumentation amplifiers offering extraordinary performance in terms of audio quality, plus the most important virtue of input transformers: very high common-mode input headroom which lower-cost, single operational amplifier differential input circuits cannot deliver.

The A/B input switch selects two stereo inputs. Module control logic may be programmed to control source equipment connected to the A or B input. The INPUT MODE switch sends the STEREO, MONO, RIGHT or LEFT SOURCE, to the output assignment switches. PROGRAM AND AUDITION buttons assign the module to either or both stereo output buses. The ON, OFF and CUE buttons illuminate to indicate status, and may also be remote controlled.

Every Line Input Module is equipped with logic for the remote START and STOP control of source equipment. The module OFF button may be illuminated to tally source "ready" status, such as a cart in place. When you reach a cart's "end of message" or the tape machine signals "end of tape," module audio is automatically reset to off. The Timer Reset system zeros and restarts the optional digital timer, giving you an elapsed time countup.

CONTROL ROOM MONITOR MODULE

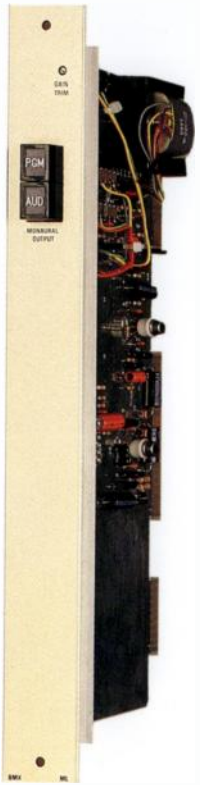
The interlocking MONITOR selector allows you to monitor Program, Audition and eight stereo line inputs. The input is balanced, transformer isolated and bridging to minimize source loading. The CUE controls the cue speaker level; the cue amplifier output and speaker input is also available on the console's connector panel.

On the 10 and 14 input models, the METER switch selects Program, Audition or Monitor for display on the pair of output meters. The Headphone level control and source selector give you headphone monitor and cue. The headphone amplifier output is also available on the connector panel should you desire an external headphone amp. The Monitor level and Speaker ON/OFF switch controls output to the control room monitor amp.



STUDIO MONITOR AND TALKBACK MODULE

If you have a separate voice/announce booth or conference studio, this module is designed just for you. The Monitor and Control Room selectors have the same sources. An electret condenser mic and talkback circuit lets the operator talk into the Studio monitor system. The Studio monitor has three separate pairs of outputs for use with monitor amps, remote level control and studio headphones.



MONAURAL OUTPUT MODULE

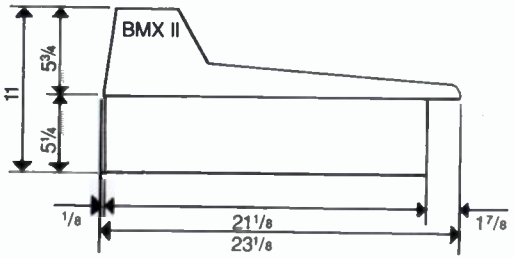
This module gives you mono line output of either the Program or Audition stereo line amp modules, and is identical in specifications and performance to the Main Stereo Output Amplifiers.

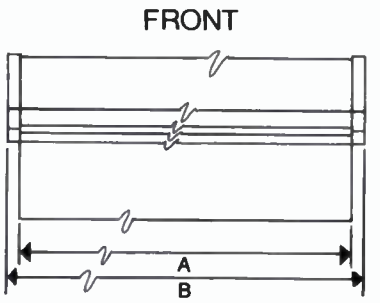


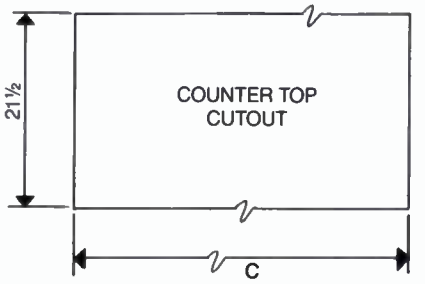
TELCO MIX/MONO OUTPUT MODULE

The Telco Mix section of this module gives you three unique and separate "MIX-MINUS" mixes. Two mixes are used for feedback to the callers, while the third is a mix of just the callers which may be fed to a "telco monitor" speaker and/or headphone system. This module derives specially mixed outputs of the Program or Audition bus, as selected by the TELCO MIX buttons, with the telephone callers mixed selectively.

The Mono Output section of this module provides exactly the same features as a standard Monaural Output Module.







	A	B	C
BMXII-10	26½	28	26¾
14	32½	34	32¾
18	38½	40	38¾
22	44½	46	44¾
26	50½	52	50½

BMX SPECIFICATIONS

MICROPHONE INPUT:

Source Impedance	150 ohms
Input Impedance	1000 ohms minimum, balanced
Input Level Range	Adjustable from -60 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input level

HIGH LEVEL INPUTS:

Source Impedance	600 ohms
Input Impedance	Transformer, 10K ohms, balanced Transformerless, 40K ohms, balanced
Input Level:	Adjustable from -12 dBu to +8 dBu
Input Headroom	Greater than 30 dB above nominal input level

PROGRAM, AUDITION, MONAURAL OUTPUTS:

Load Impedance	600 ohms
Source Impedance	Less than 95 ohms
Nominal Output Level	+8 dBm, adjustable
Maximum Output Level	+28 dBm, 600 ohm load
Output Headroom, above +8 dBm	Greater than 20 dB

MONITOR OUTPUTS:

Main Outputs:	
Output Impedance	600 ohms, unbalanced
Load Impedance	5K ohms or greater
Output Level	0 dBm nominal, +20 dBm maximum
Headphone Outputs:	
Output Impedance	75 ohms, resistor feed
Load Impedance	8 ohms or greater
Output Level	0 dBu nominal, +20 dBu maximum (Reference 0.775V)

CUE OUTPUT:

Output Impedance	10 ohms
Load Impedance	45 ohms or greater
Output Level	0 dBu nominal, +20 dBu maximum

FREQUENCY RESPONSE:

Mic Input (150 ohm) to Program Output	+0 , -0.9 dB, 20 Hz to 20 kHz
Line Input (600 ohm) to Program Output	+0, -0.8 dB, 20 Hz to 20 kHz

NOISE:

Microphone Input Amplifier	-127 dBu RMS equivalent input noise, 150 ohm source, 20 kHz bandwidth
High Level Input Amplifier	-88 dBu RMS, equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output Noise with 1 microphone channel ON, fader at -15 dB attenuation, input sensitivity at -50 dBu	-75 dB below output, reference +8 dBm, 150 ohm source, 20 kHz bandwidth
Output Noise with one line channel ON, fader at -15 dB attenuation, input sensitivity at +8 dBu	-82 dB below output, reference +8 dBm, 600 ohm source, 20 kHz bandwidth
Output Noise with no input channels ON	-84 dB below output, reference +8 dBm, 20 kHz bandwidth

DISTORTION, T.H.D.:

Mic Input to Program Output	Less than 0.025% at 1 kHz, less than 0.3% at +28 dBm, 30 Hz to 20 kHz
Line Input to Program Output	Less than 0.015% at 1 kHz, less than 0.3% at +28 dBm, 30 Hz to 20 kHz

DISTORTION, I.M. (SMPTE):

Mic Input to Program Output (+8 dBm)	Less than 0.02%
Line Input to Program Output (+8 dBm)	Less than 0.01%

CROSSTALK:

Adjacent buses, all bus assignments on, all inputs on	Less than -85 dB at 1 kHz Less than -75 dB at 20 kHz

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NOTES:

1) These specifications are for the basic signal paths, per channel, with either or both channels of a stereo pair operating and with 600 ohm loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

Features and specifications subject to change without notice.

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STEREO MADE EASY.

Introducing STX from Pacific Recorders & Engineering Corporation.

Designed by the same team which developed the legendary BMX, AMX, and ABX series of consoles for major market and network radio broadcasters, STX represents the application of PR&E's acclaimed audio and control logic technology to stereo television.

The new STX combines unequalled sonics with the operational flexibility PR&E is famous for. The console's size, layout and features were defined by watching live operations, counting hand motions and keystrokes, measuring length of reach to controls and peripheral equipment, noting operator errors and witnessing frustration.

Question and answer sessions with board operators refined and sharpened the observations, eliminating unnecessary features and establishing physical layout priorities. The resulting design is a fast, efficient, easy to use stereo audio console in a price and size to fit both budget and control room.

Will it hold up under the strain of your environment? Absolutely. Nothing you do would pose more of a physical threat to the console than the activities of a high-powered disc jockey in a typical radio control room. And that's exactly where Pacific Recorders has made its reputation for leadership – a reputation not easily earned, and one which we guard very carefully.

STX.



Here is a partial list of STX features:

- Three main stereo Program buses, each equipped with built-in distribution amplifiers providing three outputs for each bus, and each capable of +28 dBm.
- Greater than 30 dB of input headroom, providing that extra margin for "hot" levels and/or operator error.
- Up to four stereo Submaster Modules, which can be used for presetting several different mixes or creating multitrack production feeds. These modules are also full function output amplifiers providing both stereo and monaural outputs.
- Eight independent mix-minus buses, each with a master level control and Solo, ideal for creating IFB feeds, auxiliary cue mixes or other ancillary feeds.
- Four Send buses with independent masters, each with Solo, for effects applications.
- Monaural Input Modules with three microphone and three line inputs. Microphone input sensitivity is adjustable from −60 dBu to −15 dBu, permitting the use of all contemporary microphones. Line input sensitivity is adjustable from −12 dBu to +8 dBu.
- Stereo Line Input Modules with three selectable inputs, accommodating nominal input levels from −12 dBu to +8 dBu. Gain switches allow on-the-fly boosting of low level inputs.
- A separate patch point for each input, submaster, and output, for use with external processing devices.
- Extensive built-in module and machine control logic, allowing complete internal and external control over microphone inputs and line sources. Logic circuits are 12 volt CMOS, and are immune to electrical noise and RFI.
- A balanced stereo Return, assignable to the submaster and stereo program buses, for mixing in effects.
- Up to two monaural output amplifier modules, selecting from Program 1, 2 or 3, or any combination, providing two outputs each.
- Differential bus summing amplifiers for very low mix bus noise and immunity to EMI fields.
- DC servo amplifiers employed at critical gain stages in the console circuitry, resulting in a dramatic improvement in low-frequency performance.
- Metered Stereo Cueing for checking pre-fader input levels, and metered stereo-in-place Solo monitoring for checking individual post-fader levels of inputs, sends, mix-minus outputs, submasters and returns.
- Up to two independent studio monitor systems.
- Full output metering with ASA specification VU meters and/or optional PPM meters.
- Fully regulated, independent power supplies for audio, logic, and phantom microphone powering.
- Mainframes available in 26, 34 and 42 input module sizes with no minimum configuration, wired for full complement of modules, so you can fill out the console as your needs dictate.
- Input section accommodates free-form arrangement of input and submaster modules.

As with all PR&E consoles, the STX comes supplied with installation connectors and tools, service tool kit, spare parts kit, and complete technical documentation.

The STX is extremely versatile, but a look at its specifications starts to reveal its most important family trait – the exceptional audio quality built into every one of our products.

To find out more, please call 619-438-3911 and ask for your Regional Sales Manager. Find out why Pacific Recorders & Engineering Corporation is still the number one *choice* for more #1 stations.



STX SPECIFICATIONS:

MICROPHONE INPUTS

Source Impedance	150 ohms.
Input Impedance	1000 ohms minimum, balanced.
Input Level Range	Adjustable from −60 dBu to −15 dBu.
Input Headroom	Greater than 30 dB above nominal input.

HIGH LEVEL INPUTS

Source Impedance	600 ohms.
Input Impedance	Greater than 40K ohms, balanced.
Input Level Range:	
Line Input	Adjustable from −12 dBu to +8 dBu.
Reverb Return	Adjustable from −15 dBu to +8 dBu.
Monitor Input	Nominal +4 dBu/+8 dBu.
Input Headroom	Greater than 30 dB above nominal input.

MAIN OUTPUTS

Load Impedance	600 ohms.
Source Impedance	30 ohms.
Nominal Output Level:	
Program and Sub-Masters	+8 dBm, adjustable to +4 dBm.
Send/Mix-Minus	0 dBm.
Maximum Output Level:	
Program Amplifiers	+28 dBm, 600 ohm load.
Sub-Master Module	+26 dBm, 600 ohm load.
Send/Mix-Minus Module	+26 dBm, 600 ohm load.

MONITOR OUTPUTS

Main Outputs:	
Load Impedance	600 ohms, or greater.
Source Impedance	30 ohms, unbalanced.
Output Level	0 dBu nominal, +20 dBu maximum.
Headphone Outputs:	
Load Impedance	45 ohms, or greater.
Source Impedance	Less than 4 ohms.
Output Level	0 dBu nominal, +20 dBu maximum.

PATCH SENDS AND RETURNS

Patch Send Outputs	Nominal −10 dBu; unbalanced.
Patch Return Inputs	Nominal −10 dBu; 40K ohm balanced and bridging.

FREQUENCY RESPONSE

Microphone Input to Program Output	+0 dB, −0.9 dB, 20 Hz to 20 kHz.
Line Input to Program Output	+0 dB, −0.8 dB, 20 Hz to 20 kHz.

NOISE

Microphone Input Amplifier	−127 dBu equivalent input noise, 150 ohm source, 20 kHz bandwidth.
Line Input Amplifier	−88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth.
Output Noise with one microphone channel ON, fader at −15 dB, input sensitivity at −50 dBu	75 dB below output, referenced +8 dBm, 150 ohm source, 20 kHz bandwidth.
Output Noise with one line channel ON, fader at −15 dB, input sensitivity at −50 dBu	80 dB below output, referenced +8 dBm, 600 ohm source, 20 kHz bandwidth.
Output Noise with no input channels ON	82 dB below output, referenced +8 dBm, 20 kHz bandwidth.

DISTORTION, T.H.D.

Mic Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, −50 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output.
Line Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, +8 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output.

DISTORTION, I.M.D.

Mic Input to Program Output	Less than 0.008%, −50 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load.
Line Input to Program Output	Less than 0.005%, +8 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load.

CROSSTALK

Interchannel crosstalk	Less than −80 dB at 1 kHz; Less than −70 dB at 20 kHz.

STEREO SEPARATION

Submaster and Program Outputs	Less than −60 dB at 1 kHz.

POWER REQUIREMENTS

Fully Configured STX-34	1,000 Watts at 117 VAC, ±10%, 60 Hz.

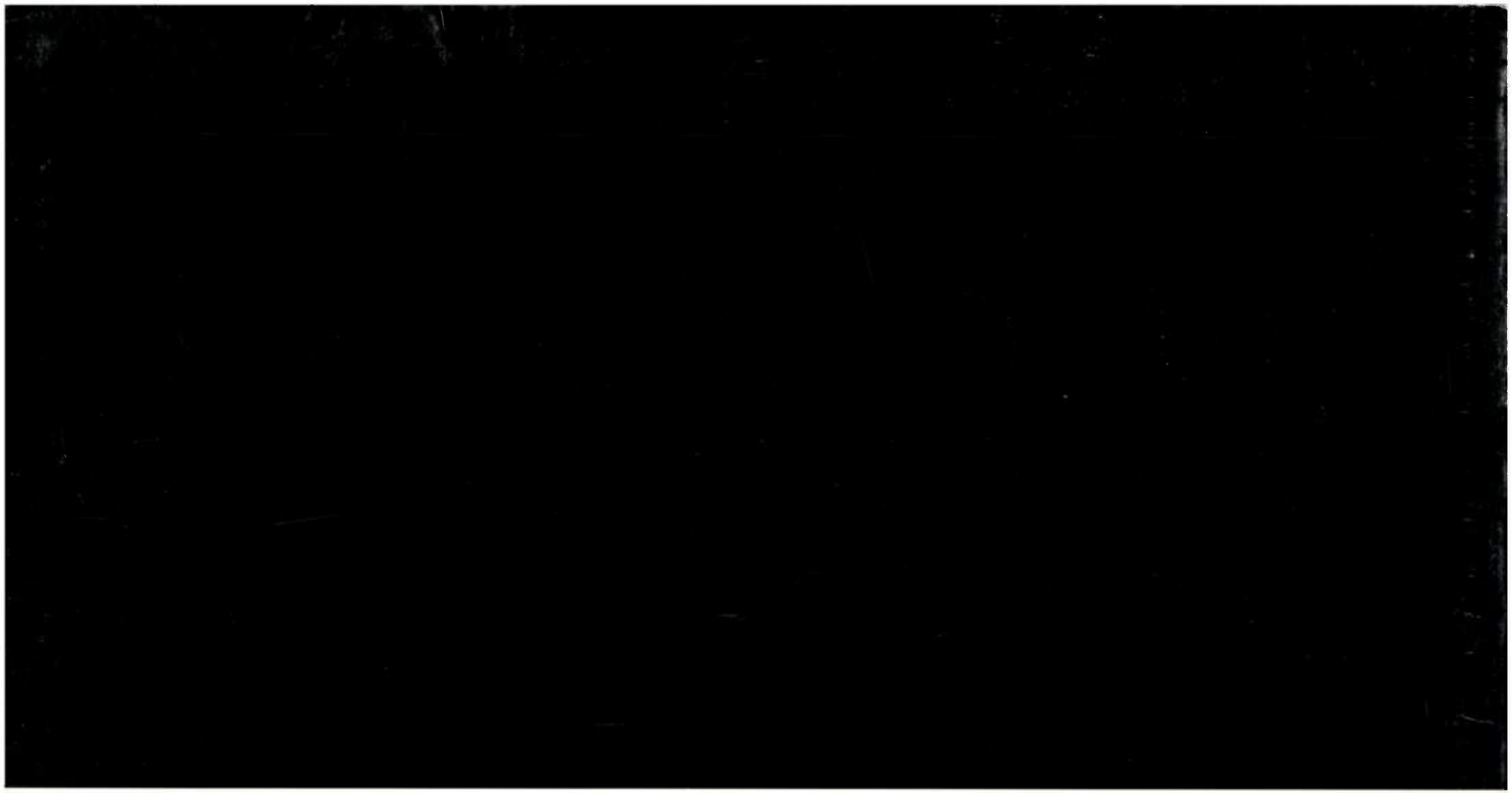
NOTES

A) These specifications are for the basic signal paths, per channel, with either or both channels of a stereo pair operating and with 600 ohm loads connected to the program outputs.

B) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

C) Noise specifications are for a 26-input console; larger consoles will have slightly reduced signal to noise ratios due to increased summing amplifier gain. Noise specifications are based upon a 20 kHz measurement bandwidth; the use of a meters with 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Pacific Recorders & Engineering Corporation reserves the right to change specifications without notice or obligation.



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AMX SERIES


DIGICLOCK TD-2
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AMX-14
PACIFIC RECORDERS & ENGINEERING CORPORATION
AUXILIARY
LEFT
RIGHT
STEREO EQUALIZER
RECORD
ON

SOPHISTICATED ON-AIR & STEREO PRODUCTION: YOU HAVE BOTH WITH THE AMX OPERATIONS CONSOLE.



Pacific Recorders & Engineering Corporation

The AMX operations console is a comprehensive stereo production console as well as an advanced on-air control center. Because we designed the AMX with the flexibility to handle both assignments, you can be on-air one minute and in the next, all the features you need for efficient stereo production are at your fingertips. Although many stations with tight quarters and even tighter budgets will appreciate this dual-mode versatility, it doesn't mean that our high performance standards for either task have been compromised in any way.

The AMX was designed with the capacity to handle a talk show with four independent telephone input mixes, the capability to equalize and/or process all its inputs, send and mix effects, record a stereo feed for later broadcast, and work with two separate studios and a remote — all at the same time.

When you examine the AMX, you'll note that directly above the mic and line input modules there's ample space for signal processing on every input. Choose from our Stereo Equalizer, Mono Equalizer/ Filter, or our exclusive Voice Processor modules (more on these later, see Optional Signal Processing Modules). This same console section supports the Monaural Output Amplifier, Telco Mix-Minus, Meter Switcher, Line Output Switcher, Output Line Switcher, and up to four Remote Line Selector modules.

The AMX console mainframe comes with a Control Room Monitor, three Stereo Output Distribution Amplifiers, Effects/Foldback Send & Return module and Automatic Meter Switcher. Simply add the desired complement of input, processing and accessory modules to configure an AMX to meet your particular requirements. Accessory modules include the Two-Studio Monitor, Slate/Talkback/Test Oscillator, Monaural Output Amplifier and Telco Mix modules. Even with a fully complemented AMX, there's still accessory panel spaces for the installation of optional timer, delay and full function machine remote controls.

There isn't a "combo" board around that offers so much, yet is so easy to get to know. This outstanding capacity has not been gained at the expense of simplicity. The AMX retains the clean, uncluttered design so important for operator understanding and efficient operation, just like our BMX Series of on-air consoles. If you're already familiar with the BMX, you'll appreciate just how easy it will be to "learn the ropes" with an AMX.

As you read through this brochure, you will discover a new generation console which will bring a whole new outlook to your station's operations. You'll see that the latest in technology, important new innovations and useful features have one essential purpose: to make your facility run smoother.

In addition to the AMX, our console line includes the BMX Series II and III on-air consoles, the ABX multitrack production and operations console and Newsmixer, the unique mixing, routing and monitoring system for news.



WYAY, Atlanta, depends on both the on-air and stereo production capabilities of an AMX. They're also equipped with our BMX Series III and ABX consoles, as well as Tomcat cart machines.


SONY

TODAY'S COMPLICATED RADIO PROGRAMMING AND PRODUCTION NEEDS MORE FLEXIBILITY: THE AMX ACHIEVES THIS GOAL WITHOUT SACRIFICING SIMPLICITY OF OPERATION.

The AMX on-air console was designed with the capacity to handle a talk show with four separate telephone mixes, record a stereo feed for later broadcast, plus the capability to work and communicate with two studios and a remote, all at the same time. In addition, the AMX is equipped with two effect/foldback sends and a stereo effects return, all with extensive remote control logic.

We believe this brochure will answer most of your questions. Should you have specific questions regarding your installation or planned use of an AMX, please call us: we're here to assist you in every way possible.

WDBO, Orlando, Florida. A top-market AM/FM station, WDBO has three AMX consoles for AM, FM and News Production. In addition, they're on-air with four BMX consoles, and the newsroom is equipped with three Newsmixers. Pictured here, the News Production Studio with an AMX-18.

WHEN WE SAY AN "OPERATIONS" CONSOLE, WE MEAN IT.

AMX FEATURES — AT A GLANCE.

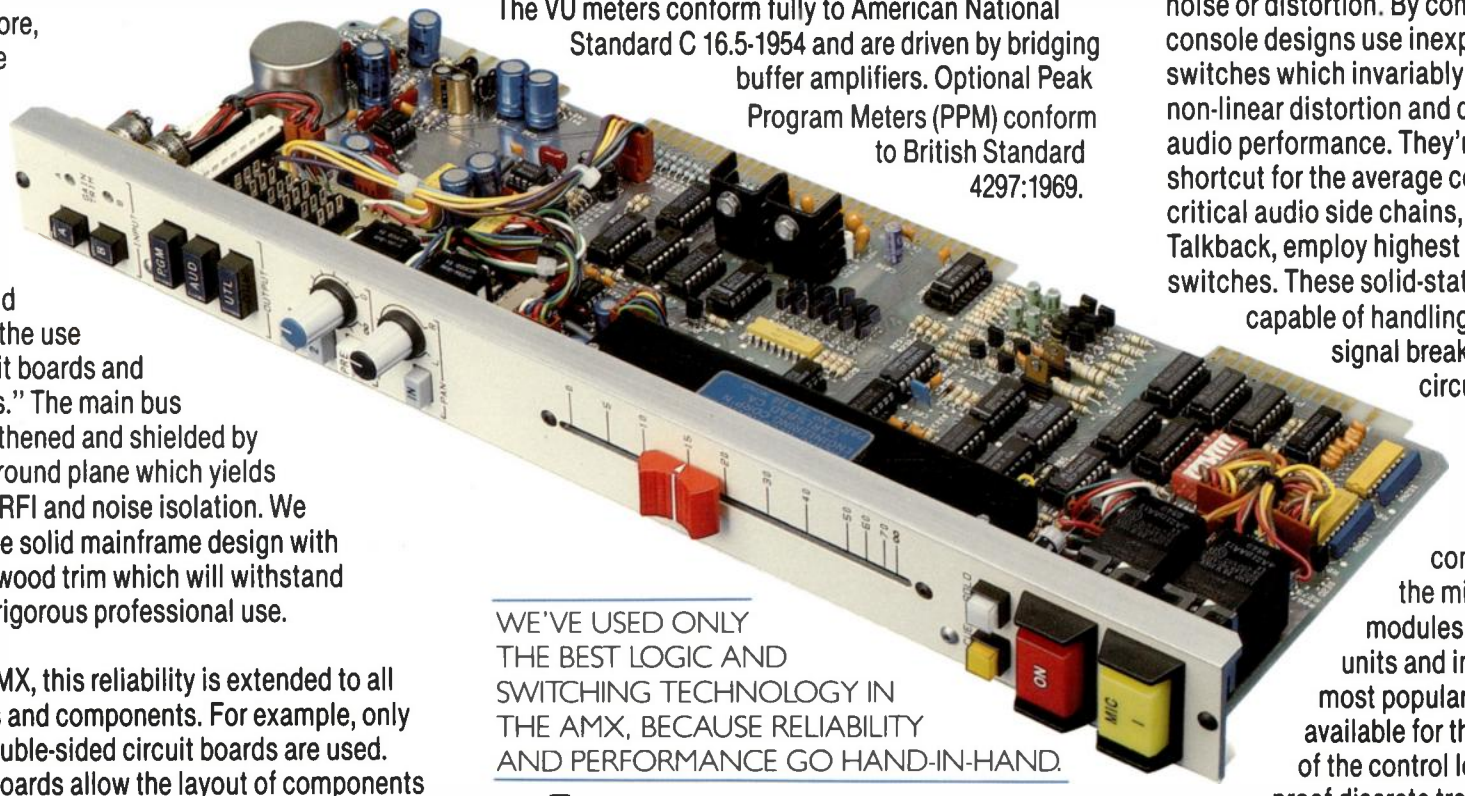
- Three main stereo mix busses.
- Distribution amplifiers on each main output.
- Two effect/foldback send mix busses, with remote control logic.
- Stereo effects return, with remote control logic.
- Stereo cue system with automatic console headphone monitor switching.
- Stereo solo-in-place system for all inputs, sends and returns.
- Multi-function metering with automatic cue and solo level display.
- Monaural and stereo equalizer/filter modules.
- Voice Processor modules with equalizer, gate, compressor and de-esser.
- Monitor system provides independent and unique outputs for console, co-host, and guest headphone feeds.
- Monitor and headphone facilities for two separate studios.
- Multi-way talkback system, including producer and external feeds.
- Multi-frequency low-distortion test oscillator.
- Voice slating system with identification tone.
- Four telephone mix-minus feeds plus telephone monitor-mix.
- Full and independent remote control logic on each input of microphone and line modules.
- Fully regulated and independent power supplies for audio, logic and phantom power.
- Additional on-board audio power supply regulation on each module.
- Connector panel silk screened with clear, functional designations.
- Audio and logic interconnection system is compatible with the BMX and ABX Series consoles.
- Mainframes for 10, 14, 18, 22, 26, 30 & 34 input positions.
- Every mainframe is factory prewired to accept a full complement of function modules including inputs, outputs, patch points and logic.
- Console supplied complete with installation connectors and tools, service tool kit and spare parts kit.

TODAY'S RADIO STATIONS NEED ROCK-SOLID RELIABILITY AND THE HIGHEST QUALITY TO INSURE PERFORMANCE WELL INTO TOMORROW.

With the AMX, reliability starts with a sturdy mainframe housing. Heavy gauge aluminum alloy end panels are made on CNC mills for the ultimate in dimensional accuracy. A precision fabricated and riveted sheet metal chassis assembly is then fastened to these end panels to form the mainframe housing. The resulting housing will not twist or flex and, therefore, will not degrade circuit card contacts or strain circuit traces. We minimize complicated and error-prone hand wiring through the use of plug-in circuit boards and "mother boards." The main bus board is strengthened and shielded by a continuous ground plane which yields the ultimate in RFI and noise isolation. We complement the solid mainframe design with attractive hardwood trim which will withstand many years of rigorous professional use.

With an AMX, this reliability is extended to all subassemblies and components. For example, only glass epoxy double-sided circuit boards are used. Double-sided boards allow the layout of components for optimum performance and support the use of ground plane shielding which further reduces the console's susceptibility to RFI, noise and crosstalk. For added service convenience, the components on each circuit board are identified with silk screened designations.

Throughout the AMX design, we use only first-quality components. Advanced discrete and integrated circuitry yields very low noise and distortion while providing excellent frequency response and signal headroom/overload performance. At least 30 dB of microphone and line input headroom is maintained to provide that extra margin for hot levels and "operator error." Mixers are full-travel Penny & Giles Series 4000 conductive plastic faders. Push buttons are Honeywell, EAO and Schadow, chosen for their extended life ratings and superior "feel." Audio transformers, where employed, are by Deane Jensen. The VU meters conform fully to American National Standard C 16.5-1954 and are driven by bridging buffer amplifiers. Optional Peak Program Meters (PPM) conform to British Standard 4297:1969.



WE'VE USED ONLY THE BEST LOGIC AND SWITCHING TECHNOLOGY IN THE AMX, BECAUSE RELIABILITY AND PERFORMANCE GO HAND-IN-HAND.

The sophisticated control logic of the AMX utilizes CMOS integrated circuits. CMOS devices are very efficient, operating on low current at 12 volt power. CMOS logic offers silent and flexible logic control because it is very immune to electrical noise and strong RFI fields. Thus, as the logic operates in an AMX, you won't hear "chirps" or "clicks." This 12 volt CMOS control logic is very easy to interface to a wide variety of external equipment and remote control panels.

We complement the superior performance characteristics of CMOS logic circuitry with miniature, dry nitrogen-sealed, gold-contact relays for all primary audio path switching. These special relays (much more costly than conventional TTL or FET design components) are extremely reliable and cannot degrade audio performance with unwanted noise or distortion. By comparison, many other console designs use inexpensive TTL or FET analog switches which invariably introduce some form of non-linear distortion and degrade an entire console's audio performance. They're an easy, inexpensive shortcut for the average console design. The less critical audio side chains, such as Cue, Solo and Talkback, employ highest quality CMOS analog switches. These solid-state, low power devices are capable of handling full level signals, without signal breakthrough, and operate in circuitry designed to minimize non-linear distortion.

The AMX has extensive and independent remote control logic for each input of the microphone and line input modules. Logic interface/translator units and interconnection cables for most popular broadcast equipment are available for the AMX. The voltage outputs of the control logic are buffered by short-proof discrete transistor circuitry.

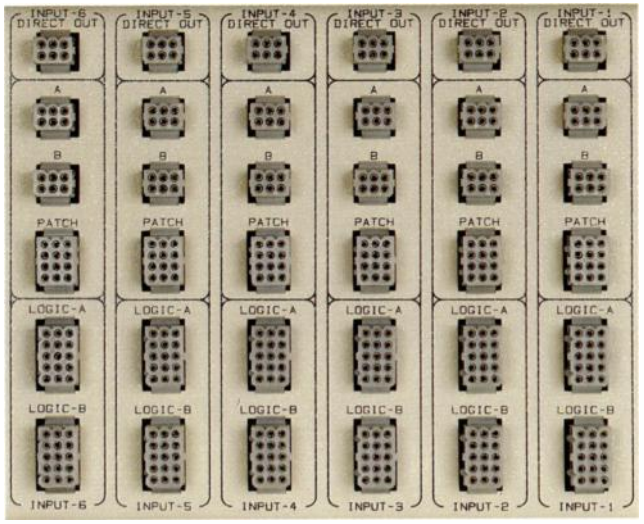
RELIABILITY AND PERFORMANCE ALSO MEANS SUPERIOR ERGONOMICS AND A CONSOLE THAT FITS INTO THE REAL WORLD.

For all of its capabilities, the AMX is a low-profile design, a real world benefit that should be immediately evident to any broadcaster. All module front panels are constructed from anodized aluminum extrusions which carry aluminum inlays coated with durable polyurethane paint and silk screened with clearly labeled nomenclature.

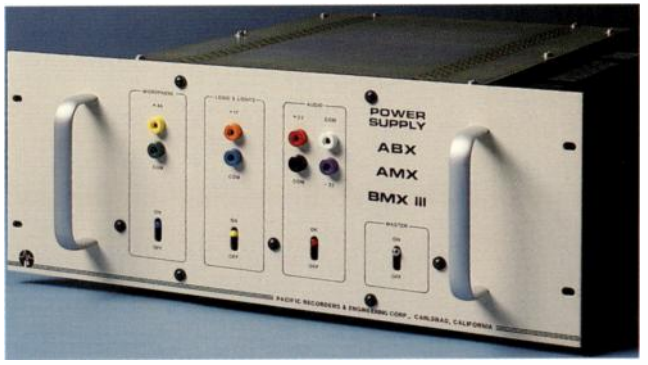
Every AMX mainframe leaves plenty of room for the broadcaster to arrange his peripheral equipment. All active electronics are immediately accessible from the top of the console: panel modules simply unplug from the mainframe housing. Perhaps the most important aspect of the AMX design is the careful attention that's been paid to the logical placement of panel controls. There isn't an easier board to get to know; more importantly, there isn't a board that's easier to operate.

The separate rack mounting power supply is constructed in a rugged steel chassis and features massive regulator heat sinks. The audio, logic and microphone phantom power supply voltages are individually regulated and switched with magnetic circuit breakers for maximum reliability.

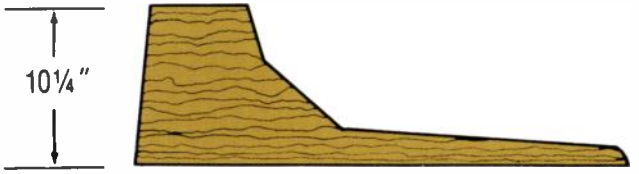
All audio input/output and logic wiring between the console and external equipment is accomplished with easy-to-use mating connectors. Time consuming hand wiring to barrier strips, terminal blocks or exotic miniature connectors is eliminated. Console mating connectors, pins and tools are supplied with the AMX. By prewiring the connector kit, an AMX console can be installed and on the air in a few hours.



Confusing and time-consuming wiring to terminal blocks, barrier strips or exotic multi-in connectors are eliminated with an AMX. All interconnections use proven, reliable, mating connectors, which are mounted on a clearly identified panel for rapid, easy installation.



Every AMX comes with a rugged power supply designed to comfortably handle the largest mainframe size with all accessories—reliably and cooly.



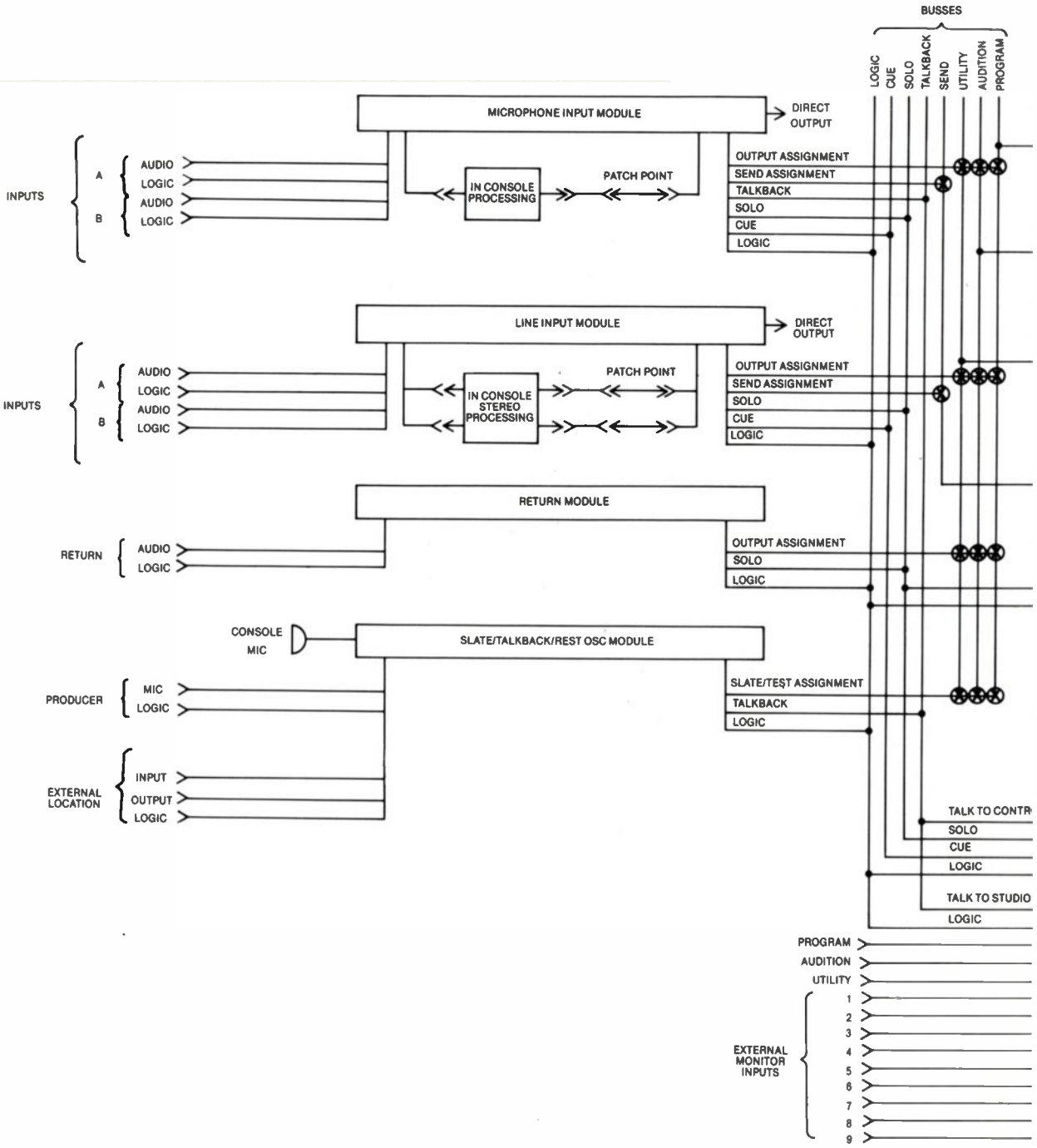
Regardless of mainframe size, the low profile design of AMX gives you plenty of viewing room to your studio—even when you add our optional copystand.

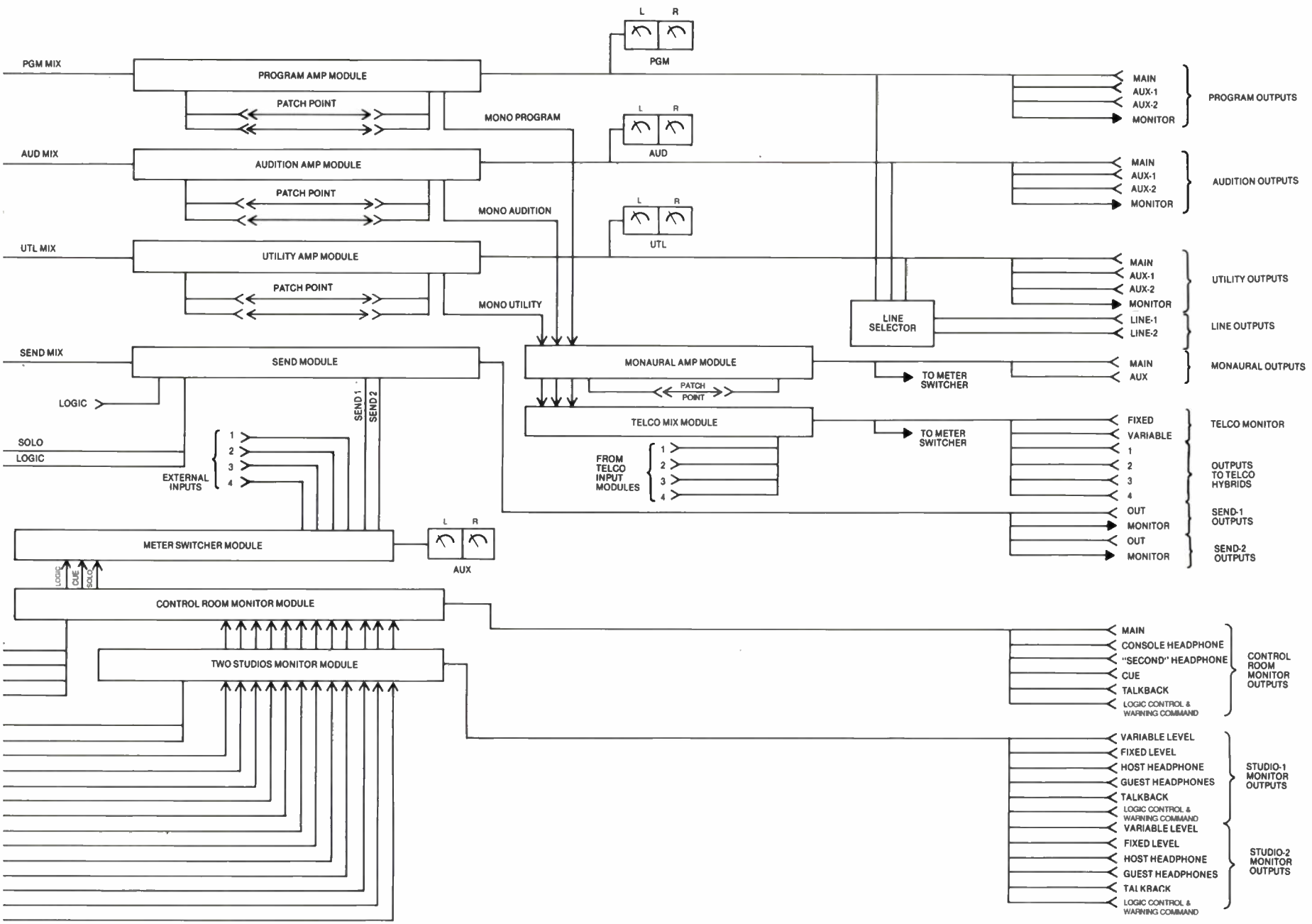
ONE LAST WORD BEFORE YOU LOOK INTO MORE DETAILS.

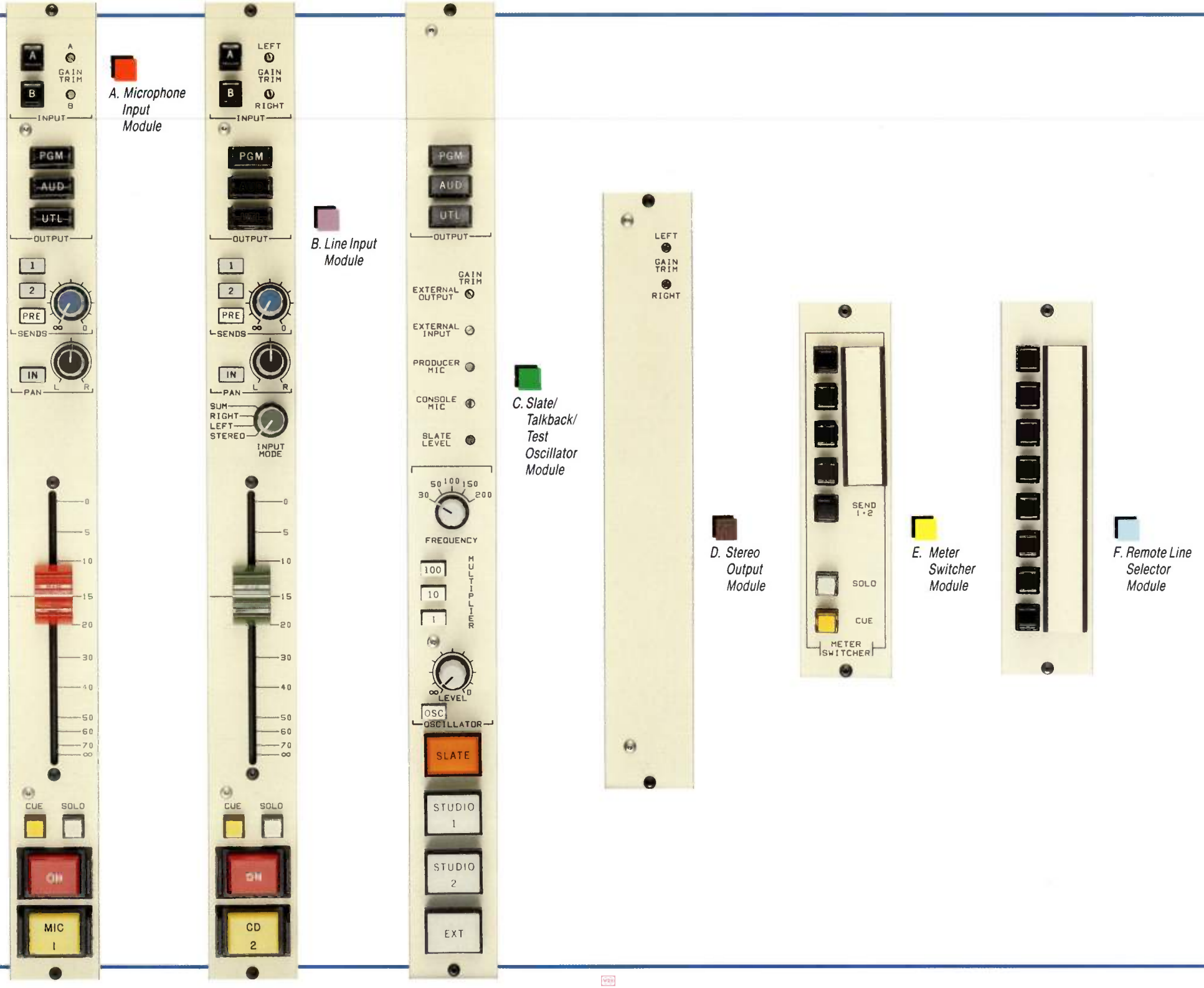
Our BMX, AMX and ABX consoles have become the standard by which many broadcasters evaluate other competitive offerings. Frankly, we're flattered by this, but not surprised. Because we've stayed in close touch with your needs, our family of consoles are an evolutionary design; the purpose of which is to continuously reach for and set the highest broadcast standards — in features, performance, reliability and that all too elusive factor, long-term quality.

If you believe that all these attributes have been attained in the exemplary design of the AMX, then we welcome you to a select user's group of professionals — broadcasters who have decided a Pacific Recorders & Engineering console is the best value that money can buy.

AMX FUNCTIONAL BLOCK DIAGRAM




PGM MIX
PROGRAM AMP MODULE
PATCH POINT
MONO PROGRAM
L R
PGM
AUD MIX
AUDITION AMP MODULE
PATCH POINT
MONO AUDITION
L R
AUD
UTL MIX
UTILITY AMP MODULE
PATCH POINT
MONO UTILITY
L R
UTL
SEND MIX
SEND MODULE
LOGIC
SOLO
LOGIC
EXTERNAL INPUTS
1
2
3
4
SEND 1
SEND 2
MONAURAL AMP MODULE
PATCH POINT
TELCO MIX MODULE
FROM TELCO INPUT MODULES
1
2
3
4
LINE SELECTOR
TO METER SWITCHER
TO METER SWITCHER
METER SWITCHER MODULE
L R
AUX
LOGIC
CUE
SOLO
CONTROL ROOM MONITOR MODULE
TWO STUDIOS MONITOR MODULE
MAIN
AUX-1
AUX-2
MONITOR
PROGRAM OUTPUTS
MAIN
AUX-1
AUX-2
MONITOR
AUDITION OUTPUTS
MAIN
AUX-1
AUX-2
MONITOR
UTILITY OUTPUTS
LINE-1
LINE-2
LINE OUTPUTS
MAIN
AUX
MONAURAL OUTPUTS
FIXED
VARIABLE
1
2
3
4
TELCO MONITOR
OUTPUTS TO TELCO HYBRIDS
OUT
MONITOR
SEND-1 OUTPUTS
OUT
MONITOR
SEND-2 OUTPUTS
MAIN
CONSOLE HEADPHONE
"SECOND" HEADPHONE
CUE
TALKBACK
LOGIC CONTROL & WARNING COMMAND
CONTROL ROOM MONITOR OUTPUTS
VARIABLE LEVEL
FIXED LEVEL
HOST HEADPHONE
GUEST HEADPHONES
TALKBACK
LOGIC CONTROL & WARNING COMMAND
STUDIO-1 MONITOR OUTPUTS
VARIABLE LEVEL
FIXED LEVEL
HOST HEADPHONE
GUEST HEADPHONES
TALKBACK
LOGIC CONTROL & WARNING COMMAND
STUDIO-2 MONITOR OUTPUTS



A. Microphone Input Module

B. Line Input Module

C. Slate/ Talkback/ Test Oscillator Module

D. Stereo Output Module

E. Meter Switcher Module

F. Remote Line Selector Module

MICROPHONE INPUT MODULE

The Microphone Input module accommodates a wide range of input levels to permit the use of all contemporary microphones. Input preamplifier gain is adjustable for each input over the nominal input range of −60 dBu to −35 dBu. The A/B input selector provides two microphone inputs per module, each with programmable monitor mute selection for control room or either of two studios. The mute circuitry incorporates an automatic 40 millisecond delay before the microphone is turned on to permit "room reverb" to decay off-mic. Each microphone input is provided with separate remote control capability for ON/OFF, COUGH, and multiple TALKBACK functions. The PAN control may be inserted with the IN button to provide positioning of the microphone signal in the stereo image. The module output may be assigned to any combination of PROGRAM, AUDITION AND UTILITY by the self-indicating OUTPUT buttons. The illuminated CUE button provides stereo pre-fader cue monitoring. The illuminated SOLO button provides monitoring of solo-in-place which is post-fader and pan. The channel ON and OFF buttons are illuminated to indicate the status of the channel. In addition, the ON button may be programmed so that momentary depression provides cough muting. Phantom power circuitry for condenser microphones is user assignable for both the A and B inputs.

The microphone module is equipped with a SEND control which may be assigned to either or both of two send busses and is provided with a PRE/post-fader source button switch. Stereo send is possible as a user option; assigning the send to either send bus results in a mono-mix signal to that bus, however, the send is stereo when both bus assignment buttons are engaged together.

LINE INPUT MODULE

The Stereo Line Input module will accommodate nominal input levels from −12 dBu to +8 dBu. The A/B INPUT switch selects either of two stereo inputs. Separate logic control is available on each input for the remote control of tape machines and/or other sources by the module. The PAN control may be used to balance a stereo signal source or to position a mono signal in the stereo image. An INPUT MODE switch allows input selection of stereo, left channel only, right channel only, or the sum of left and right channels. The module output may be assigned to any combination of PROGRAM, AUDITION and UTILITY by the self-indicating OUTPUT buttons. The illuminated CUE button provides stereo pre-fader cue monitoring. The illuminated SOLO button provides monitoring of solo-in-place which is post-fader and pan. The channel ON and OFF buttons are illuminated to indicate the status of the channel.

The line module is equipped with a SEND control which may be assigned to either or both of two send busses and is provided with a PRE/post-fader source button switch. The user option of stereo send is available as described for the Microphone Input module.

Each Line Input module is equipped with a comprehensive family of control logic capability which includes the remote control of module ON, OFF, CUE and SOLO functions with status tally lights. Also provided are ready status and start/stop command pulses for turntables, cartridges and reel-to-reel tape machines. The ready status illuminates the channel OFF button whenever a tape is threaded or cartridge is loaded and ready for play. The ON button starts the remote controlled equipment as well as turning the channel on. The module audio is automatically turned off upon the receipt of a cartridge fast wind or end of tape command. In addition, the module may be set to control the console mounted timer system for the automatic up-time of events.

SLATE/TALKBACK/TEST/ OSCILLATOR MODULE

The Slate/Talkback/Test/Oscillator module provides a test oscillator, a slate tone oscillator and talkback facilities for the AMX console. The test oscillator generates low-distortion, stable amplitude tones to allow system test and line-up with any 15 frequencies. The tones may be assigned to any combination of the PROGRAM, AUDITION and UTILITY mix busses.

SLATE commentary may be added to a tape recording by the console mounted electret microphone and/or from an external producer's microphone. A low-distortion spotter tone (nominal 30 Hz, adjustable) with carefully controlled envelope rise and fall times, may be recorded with the commentary for ease of fast-wind identification of the cuts on a track.

The console and producer microphones can talk to any two studios plus a remote or external location, such as a screener booth, 2-way, etc. The external location can also talk back to the studios as well as the control room. The frequency response of all the talkback microphone preamplifiers has been carefully shaped to favor speech communication.

STEREO OUTPUT MODULE

The Stereo Output module contains the mixing and distribution amplifiers for a console line output. The console is supplied with three of these modules, one each for the PROGRAM, AUDITION and UTILITY busses. Each module supplies four stereo distribution outputs with each output capable of supplying up to +28 dBm. Patch send and return points are available for the connection of external processing equipment and/or a patch field. The output is an active balanced design; output transformers are available as an option.

METER SWITCHER MODULE

The auxiliary meters in the AMX meter panel are driven by the Meter Switcher module. This module also provides switchable metering facilities for the AUDITION and UTILITY outputs in the smaller mainframe sizes. The unassigned inputs may be used to meter user determined external sources. The module automatically defaults from the selected status whenever a CUE or SOLO button is engaged on any module. The auxiliary meters will then display the nominal operating level at the CUE or SOLO point selected. This enables a quick input level check when displaying CUE, and very convenient level line-up when displaying SOLO. The SOLO metering function eliminates the need to use one of the main output busses for preview and level setting.

REMOTE LINE SELECTOR MODULE

The Remote Line Selector module provides a selection of eight stereo signals switched to one output. Up to four parallel-input selector modules may be installed in the AMX. The inputs and outputs for the modules are all brought out to the connector panel for ease of assignment. Typical applications include use as a line pre-selector ahead of input modules and tape recorders.

(MODULE DESCRIPTIONS CONTINUED—OVER)



G. Control Room Monitor Module



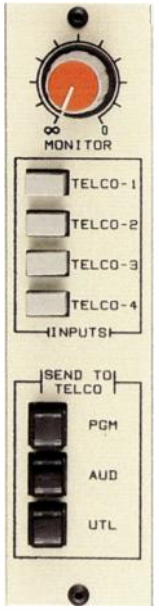
H. Studio Monitor Module



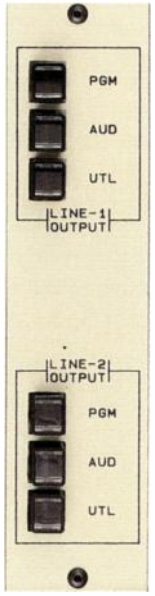
L. Send/Return Module



L. Monaural Output Module



M. Telco Mix Module



N. Line Output Switcher Module

CONTROL ROOM MONITOR MODULE

Monitoring of PROGRAM, AUDITION and UTILITY, or any of nine external signals is provided by the interlocking monitor selector. The MONITOR and HEADPHONE potentiometers are sealed long-life conductive plastic controls which were custom designed by Penny & Giles for the BMX-III, AMX and ABX consoles. The AUTO headphone monitoring facility has been derived from the ABX console and is unique in the industry. Whenever and input module CUE button is engaged, the console operator's headphones automatically switch from the normal stereo monitor mode to one of two user assignable states; these are stereo cue, or mono cue in one earphone and mono monitor in the other. The headphone feeds to a co-host and/or guest and are not interrupted by the cue or solo systems, while the co-host may optionally receive incoming talkback signals.

Level control is available for DIM, which provides an adjustable degree of monitor level reduction during talkback. The TALKBACK control adjusts the volume of incoming talk signals. Talkback may be monitored with an independent amplifier and loudspeaker, or through the stereo cue system. The CUE control adjusts the level of the cue system. Logic circuitry is provided for the remote control of monitor dim and mute.

STUDIO MONITOR MODULE

The Studio Monitor module is expressly designed for applications where separate voice/announce booths or conference studios are required. This module provides the monitor, headphone and talkback facilities for up to two studios. Monitoring of PROGRAM, AUDITION and UTILITY, or any of nine external signals is provided by an interlocking monitor selector. MONITOR, DIM and TALKBACK level controls are provided along with a TALK OVER MUTE button for each studio. The mute override button enables talkback to a studio even when the monitor speakers are muted by a "live" mic in the studio. This would normally be used as a production "effect" and/or when the talent chooses not to wear headphones.

The module has several outputs to meet most any combination of monitoring requirements. The main output is adjustable along with the degree of dimming during talkback. Fixed level outputs are available for those situations where the studio personnel are provided with their own monitor and headphone level controls. The output for talent headphones is provided with talkback and a preset dim; a second output is provided for guest headphones which contains neither talkback or dim. Logic circuitry is provided for the remote control DIM and MUTE for each of the studio monitor sections.

SEND & RETURN MODULE

The Send & Return module contains both the two send amplifiers and the stereo return circuits. The send portion of the module contains the mixing and output amplifiers for the two effects/foldback channels. Each of these has a variable LEVEL control with ON/OFF and SOLO facilities. The stereo effects return section of the module is equipped with a conductive plastic fader, MODE selector, PAN control, ON/OFF/SOLO buttons and output assignment buttons. Logic circuitry is provided for the remote ON/OFF control of both of the send circuits and the return channel.

MONAURAL OUTPUT MODULE

The Monaural Output module provides a selection of the three main outputs. The module may select or mix any combination of the PROGRAM, AUDITION and UTILITY signals to derive a monaural output. A patch send and return point is available for the connection of external processing equipment and/or a patch field. The output is an active balanced design; an output transformer is available as an option.

TELCO MIX MODULE

The Telco Mix module derives five unique mixes of the signals from up to four telephone callers and a selection of the PROGRAM, AUDITION and UTILITY busses.

The telephone signals for broadcast are selected and controlled by the input modules connected to each of the external hybrid systems. The Telco Mix module receives the audio from the selected input modules and sums them into a "monitor-mix." The telephone monitor-mix signal is very useful in applications where talk show talent and/or guests prefer to not use headphones to hear the callers.

The Telco Mix module provides for the selection of the output bus which will contain the "base-mix" to be fed back to all the callers. In addition, the module creates a unique mix for each caller which includes the selected bus plus all the other callers, except himself ("mix-minus"). Each mix-minus output may be band-pass limited for improved hybrid operation, with internally switchable filters.

The Telco Mix module may also be used for othr applications where it is desired to create one or more custom mix-minus foldback mixes or cue feeds, such as to remote pick-ups, sports booths, and two-way systems.

LINE OUTPUT SWITCHER MODULE

The output line switcher module selects an independent output from the PROGRAM, AUDITION Or UTILITY distribution amplifiers for each of two console output lines. The module may be used as a transmission line selector, a tape recorder input selector, etc.

REMOTE CONTROL PANELS

Tape deck remote control panels and cables are available for most professional reel-to-tape recorders. The engraved RWD, FWD, STOP, PLAY and RECord buttons are function color-coded to common industry practice and are supplied with tally lamps.

Cartidge deck remote control panels and cables are available for TOMCAT, MICROMAX and ITC cartridge recorders. Panels for other machines are available on request. Engraved buttons for TERtiary tone, SECondary tone, STOP, START and RECord are provided. The buttons are supplied with the appropriate voltage tally lamps.

The timer control panel provides illuminated START, STOP, RESET and HOLD buttons for the meter panel mounted DT-4 digital timer. The AUTO button couples the timer's reset and restart functions to the console timer reset command bus for the automatic up-time of events (start with module ON).

BUILD A AMX JUST THE WAY YOU WANT IT.

The AMX is available in several mainframe sizes to accommodate every broadcast requirement. Each AMX is factory wired and fully tested for an entire complement of modules. You may order the console with fewer than capacity and then add modules as needs arise. Simply plug in the extra modules. A universal layout enables any input position to accept any type of module. Simply select the microphone, line and optional modules your application requires. You build the console to fit your precise needs.

ACCESSORIES

Copystands are available for all AMX consoles. The sliding, free-standing copystand offers the advantage of positioning copy at an optimum reading distance for each operator.

The copystands are made of natural oak with a semi-transparent, smoke-bronze lucite copyboard.

The optional turret units are designed to provide an attractive and practical housing for talent control panels and display modules. Microphone buttons, monitor/headphone panels, clocks, and timers are some of the devices which may be installed. The turrets are finished in a durable laminate with solid oak end panels which match the profile of the oak panels on the AMX meter panel.

OPTIONAL SIGNAL PROCESSING MODULES



VOICE PROCESSOR

This module contains equalization, noise gating, compression and de-essing functions. A particularly useful module for tailoring individual talent "personality" parameters.



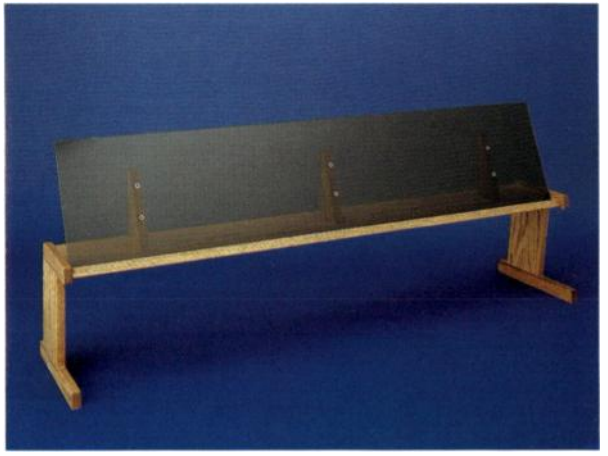
MONO EQUALIZER

This plug-in module contains independent three-band equalization control, with high and low frequency peaking and shelving modes, and tunable highpass and lowpass filters.

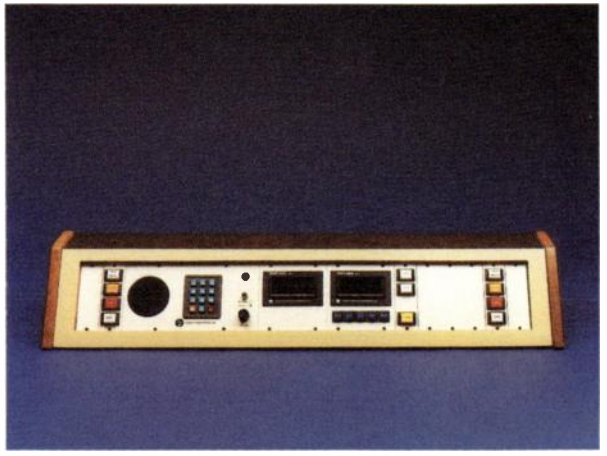


STEREO EQUALIZER

This module contains two stereo-tracking three-band equalizers with a flexible dual control mid-band section. Peaking and shelving modes on high and low frequency sections.

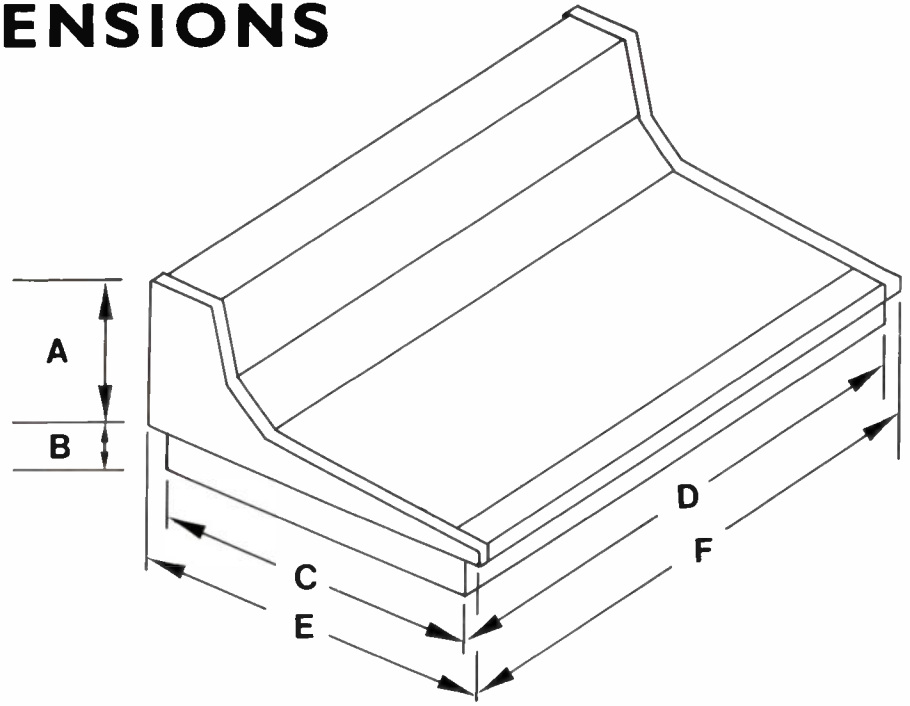


Sliding, free-standing copystands are available for all AMX consoles.



Optional control turrets give you extra space and they match perfectly with an AMX.

AMX MECHANICAL DIMENSIONS



CONSOLES	DIMENSIONS					
	A	B	C*	D*	E	F
AMX-10	10¼"	7"	29"	30½"	31"	32
AMX-14	10¼"	7"	29"	36½"	31"	38
AMX-18	10¼"	7"	29"	42½"	31"	44
AMX-22	10¼"	7"	29"	48½"	31"	50
AMX-26	10¼"	7"	29"	54½"	31"	56
AMX-30	10¼"	7"	29"	60½"	31"	62
AMX-34	10¼"	7"	29"	66½"	31"	68

*Please add ¼" for cabinet opening.

WNYC's futuristic reception lobby. Pacific Recorders & Engineering's consoles are used throughout the New York facility.



SOME FINAL CONSIDERATIONS

The AMX console is one of a complete family of compatible systems from PR&E. Many of the modules for the AMX may be utilized in either our new BMX Series III on-air board or the ABX multi-track production console.

In addition to this console family, we also make the Newsmixer, the Tomcat and Micromax cart machines, plus an extensive array of signal processing, amplification, routing, distribution and switching peripherals. Full technical and feature information on all products is available.

Many of our consoles have been designed into complete studio facilities packages. We offer not only superlative products but a complete systems engineering service which encompasses a broad range of technical expertise. If you are considering renovation or new construction you may want to contact us about these services and discuss putting our 17 years of systems design experience to work for you.

SPECIFICATIONS

MICROPHONE INPUT:

Source Impedance	150 ohms
Input Impedance	1000 ohms minimum, balanced
Input Level Range	Adjustable from −60 dBu to −35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS:

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range	
Line Input	Adjustable from −12 dBu to +8 dBu
Monitor Input	Nominal +4 dBu/+8 dBu
Patch Input	Nominal −10 dBu
Input Headroom	Greater than 30 dB above nominal input

MAIN OUTPUTS:

Load Impedance	600 ohms
Source Impedance	30 ohms
Nominal Output Level	+8 dBm, adjustable to +4 dBm
Maximum Output Level	
Line Amplifiers	+28 dBm, 600 ohm load
Send Module	+26 dBm, 600 ohm load

FREQUENCY RESPONSE:

Microphone Input to Program Output	+0 dB, −0.9 dB, 20 Hz to 20 kHz
Line Input to Program Output	+0 dB, −0.8 dB, 20 Hz to 20 kHz

MONITOR OUTPUTS:

MAIN OUTPUTS:	
Load Impedance	600 ohms or greater
Source Impedance	30 ohms, unbalanced
Output Level	0 dBu nominal, +20 dBu maximum
HEADPHONE OUTPUTS:	
Load Impedance	45 ohms or greater
Source Impedance	Less than 4 ohms
Output Level	0 dBu nominal, +20 dBu maximum

NOISE:

Microphone Input Amplifier	−127 dBu RMS equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	−88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output noise with one microphone channel ON, fader at −15 dB, input sensitivity at −50 dBu	76 dB below output, reference +8 dB 150 ohm source, 20 kHz bandwidth
Output noise with one line channel ON, fader at −15 dB, input sensitivity at +8 dBu.	80 dB below output, reference +8 dB 600 ohm source, 20 kHz bandwith
Output noise with no input channels ON	82 dB below output, reference +8 dB, 20 kHz bandwidth

DISTORTION, T.H.D.:

Microphone input to program output	Less than 0.02%, 20 Hz to 20 kHz, −50 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output
Line input to program output	Less than 0.008%, 20 Hz to 20 kHz, +8 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output

DISTORTION, I.M.:

Microphone input to program output	Less than 0.008%, -50 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load
Line input to program output	Less than 0.005%, +8 dBm input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load

CROSSTALK:

Interchannel crosstalk	Less than −85 dB at 1 kHz Less than −75 dB at 20 kHz

NOTES:

1) These specifications are for the basic signal paths, per channel, with either or both channels or a stereo pair operating and with 600 ohm loads connected to the program outputs.
2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the *same voltage value* as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohms circuits.
3) Noise specifications are for a 14-input console (AMX); larger consoles will have slightly reduced signal-to-noise ratios due to increased summing amplifier gain. Noise specifications are based upon a 20 kHz bandwidth: the use of a meter with a 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Pacific Recorders & Engineering Corporation reserves the right to change specifications without notice or obligation.

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Printed in U.S.A. 5M886

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ABX
PACIFIC RECORDERS & ENGINEERING CORPORATION
AUDITION
TELCO MIX
UTILITY

SYSTEMS INTEGRATORS FOR THE BROADCAST INDUSTRY.

Pacific Recorders & Engineering Corporation was founded in 1969 to serve Southern California's professional recording and broadcast industries with audio product design/manufacturing and facility development.

Today, operating from a 55,000 square foot facility in Carlsbad, California, PR&E has grown to become one of the world's leading manufacturers of broadcast consoles, cart machines and related peripherals and is recognized for its expertise as a broadcast and production systems integrator.

PR&E has designed and fabricated more than 1500 custom control, studio, newsroom and master control systems, and is setting the standards for exciting new products, for innovative solutions to complex facility design, and for maximum performance from both.



ABX FEATURES

- Three main stereo mix buses: Program, Audition & Utility
- Distribution amplifiers on main outputs, each capable of +28 dBm
- 2-Mix multitrack to stereo mixdown buses
- Eight multitrack mix buses
- Four effect/foldback send mix buses, each with remote control logic
- Four telephone mix-minus feeds plus telephone mix monitor
- Comprehensive module control logic, including multiway talkback facilities, for each input of microphone modules
- Extensive module and machine control logic for each input of line input modules
- Two stereo reverb/effects returns each with remote control logic
- Stereo cue system with automatic console headphone monitor switching
- Stereo solo monitoring system
- Multifunction metering with automatic cue (PFL) and solo (AFL) level display
- Monaural equalizers with filters
- Stereo tracking equalizers
- Voice Processors with equalizer, gate, compressor and de-esser
- Monitor system provides independent and unique outputs for console, host, co-host, and guest headphone feeds
- Two fully independent studio monitor systems
- Multi-way intercommunication system including producer and external site facilities
- Multi-frequency low distortion test oscillator
- Voice slate system with identification tone
- Fully regulated, independent supplies for audio, logic and phantom power
- On-board audio supply regulation on each module
- Console mainframe fully wired for all present and future inputs, outputs, patch points and logic
- Connector panel silkscreened with descriptive text designations
- Audio and logic interconnection system is compatible with BMX and AMX series consoles
- Mainframes for 18, 26, 34 input positions
- Console supplied with installation connectors and tools, service tool kit and spare parts kit

DOUBLE DUTY

The ABX is the most flexible and full-featured radio console available today. It has been designed from the group up to meet any production *or* on-air challenge.

Historically, radio broadcast consoles have been built to achieve a single operational need: on-air duty. When selecting a console for production, the choices were either another on-air console which was not equipped with full equalization, reverb, foldback, solo, multitrack and mixdown capabilities; or a recording studio console which did not have multiple stereo outputs, interactive machine control and sufficient stereo inputs. The ABX design provides the best features of both console types in a single, well integrated, audio board. Equally important, the controls and features of the ABX were designed specifically for radio operators - no need to learn how to use different types of consoles in the on-air and production studios. The meter panel provides extensive full-time metering of all broadcast and production outputs thus eliminating the confusion created by switched meter designs. The meters are logically and symetrically arranged with the broadcast outputs to the left of center and the production outputs to the right.

Because you need a rugged, reliable console that will operate at peak performance - day in and day out, PR&E uses only first-quality components. Advanced discrete and integrated circuitry yields very low noise and distortion, and provides excellent frequency response and headroom/overload capability (at least 30 dB of input headroom is maintained to provide that extra margin for "hot" levels and operator error). The main stereo outputs, Program, Audition and Utility, are equipped with built-in distribution amplifiers. Each amplifier drives four outputs with each output capable of delivering +28 dBm. The amplifiers are an active balanced design with more than enough power to drive double terminations on all outputs!

Mixers are full-travel Penny & Giles type 4000 faders, far more reliable than the lower cost series designed for semi-professional or light duty applications. Module control button switches are by Honeywell, which have proven themselves for over 15 years in custom console designs and in over 1000 BMX Series consoles. The microphone input transformers are designed and supplied by Deane Jensen; again, more expensive than commercial off-the-shelf parts, but very important to the

way your talent sounds. The VU meters fully conform to American National Standard C16.5-1954 and are driven by balanced isolation buffer amplifiers. The optional Peak Program meters (PPM) conform to British Standard 4297:1969.

The sophisticated control logic of the ABX utilizes CMOS integrated circuits. Operating on 12 volt, low current power, CMOS based logic is immune to electrical noise and strong RF fields. Unlike low-cost, 5 volt, high-current TTL logic, CMOS logic circuits generate very little electrical noise, so you won't hear "chirps or clicks" in the audio as the logic operates. Outputs, such as control pulses and tally lights, are delivered by short-circuit-proof driver circuitry to prevent any problem in the console should an external connection become compromised. The CMOS control circuitry is interfaced to external equipment through simple logic interfaces which provide both a common control format for different brands and models, and complete electrical isolation between the various pieces of equipment.

The ABX is a compact design for a console of its extensive sophistication. Careful attention has been paid to human engineering in the placement of switches and controls. All active electronics, except the meter buffer amplifiers, are accessible from the face of the console. Panel modules simply unplug from the mainframe and may be removed and reinstalled with the power applied! A real plus in the event of an emergency.

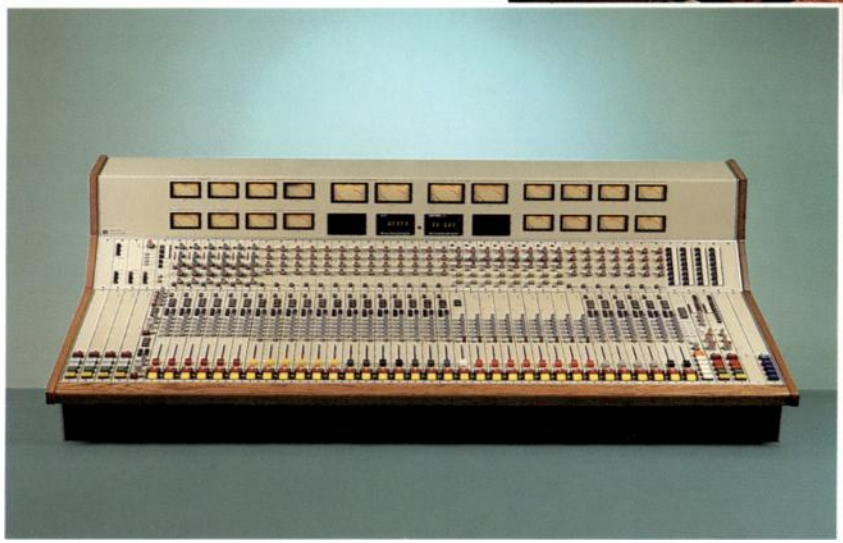
All input, output and logic wiring is accomplished with individual easy-to-use connectors. The use of individual connectors for each function provides more flexibility in configuration and future reassignment than multi-pin connectors. The connector pinouts are standardized and the console's connector panel labeled with descriptive text designations for ease of configuration. The console comes complete with connectors, pins, tools and full wiring information. By prewiring the studio connectors, an ABX console can be installed and in service in a few hours. Input assignments can be changed in the future with ease by just moving the appropriate connector plugs.

You may order an ABX with just the modules you need today, and expand the system as required in the future. ABX console mainframes are available for 18, 26 or 34 input modules and each mainframe is supplied completely wired for every input, output, patch point and option. Universal layout enables any input position to accept any type of input module, so adding extra modules later is quick and simple. Just connect the peripheral gear and the ABX is ready.

PR&E uses aerospace materials and modern manufacturing technology to create a tough reliable housing that won't twist or flex causing degradation of card edge contacts and straining of circuit traces. The mother board, used for power distribution, audio summing buses, and logic buses, is equipped with a full ground plane shield and a very low impedance "audio common" bus to keep current-induced cross-talk to uncommonly low levels. This type of mother board is considerably more expensive than a simple ribbon wire busing system; however, it is the best method for providing both the ground plane shield and a heavy signal common bus.

The console modules are all constructed on double sided printed circuit boards. These are more expensive than single sided construction but allow us to optimize component placement and to provide extensive ground plane shielding of both the analog and logic control circuitry. All components are clearly identified with silk-screened legends. All circuit card fingers and mating edge connectors are gold plated.





The rack mount power supply is constructed in a rugged steel chassis and features massive regulator heat sinks to provide very efficient convection cooling. The audio, logic and phantom supply voltages are individually switched by magnetic circuit breakers and are provided with front panel test jacks on standard ¾" centers. A coupler unit with power fail detection and tally is available for configuring redundant power supply systems.

PR&E's design philosophy of combining state of the art technology, rugged physical construction, and sensitivity to user needs, make the ABX the standard for comparison in the broadcast industry.

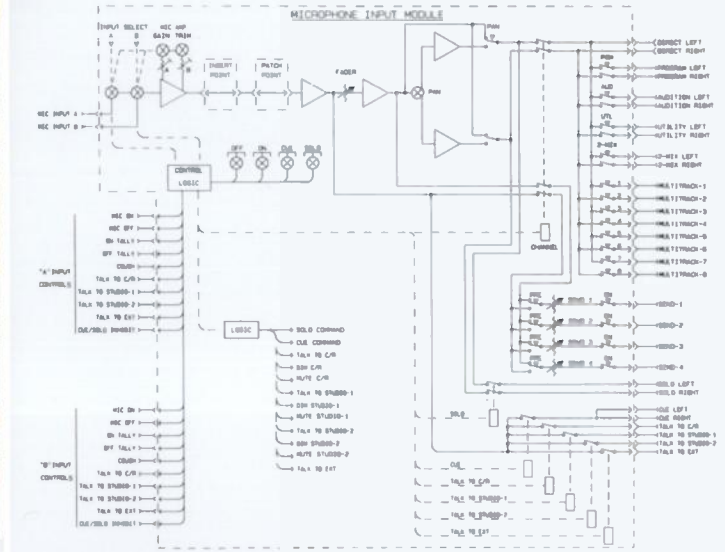
ABX...easy to buy, easy to install, easy to operate and easy to service, with reliability, performance, and above all, the value you've come to expect from PR&E.

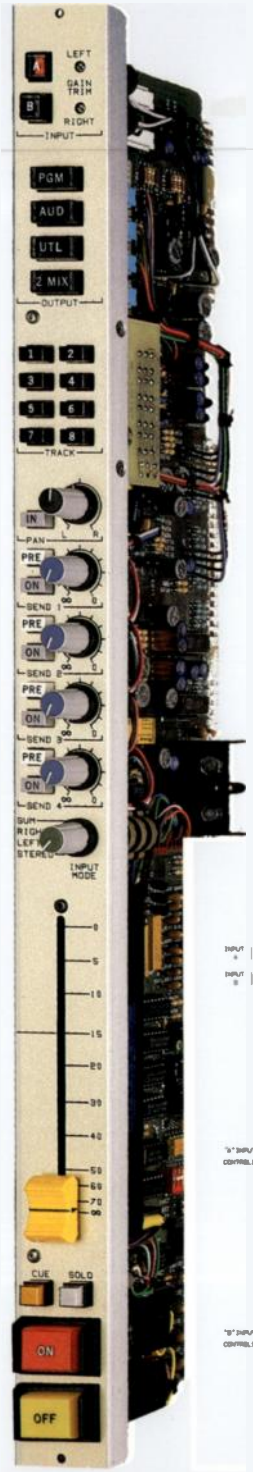


MICROPHONE INPUT MODULE

The Microphone Input Module accepts a wide range of input levels to accommodate all contemporary types of microphones. Each input, A and B, may be individually adjusted for nominal input levels from -60 dBu to -35 dBu. The A & B input selectors provide for two microphone inputs, each with individually programmable monitor muting which incorporates an automatic 40 millisecond delay to allow "room reverb" to decay off mic. Each mic input has independent remote control capability for ON, OFF, COUGH and multiple destination TALKBACK functions.

The module output is assignable to the PROGRAM, AUDITION, UTILITY, 2-MIX and the eight MULTITRACK mix buses. Each of the four effects/foldback SENDS has a level control, PRE/POST fader and ON/OFF switches. The PAN control, with insert switch, allows positioning of the microphone in the stereo image. The illuminated CUE button provides cue monitor pre-fader (PFL), while the SOLO button provides stereo monitor after fader and pan (AFL). The channel ON and OFF buttons are illuminated to indicate the status of the channel; the control logic may be programmed to provide momentary cough muting when the ON button is held depressed.

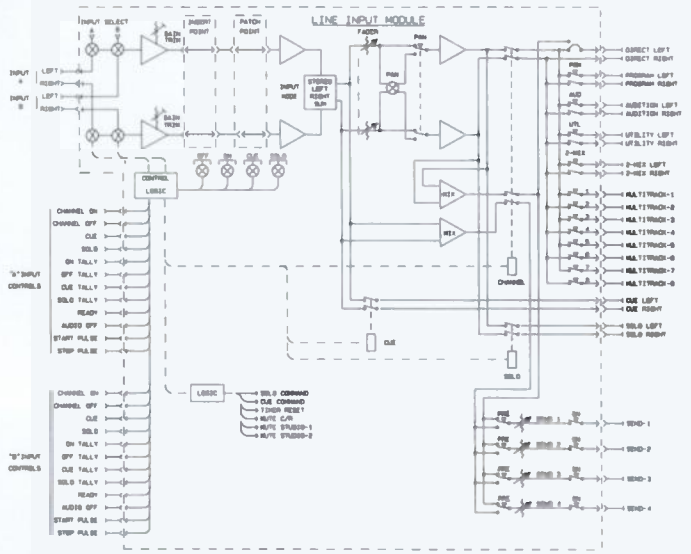




LINE INPUT MODULE

The stereo Line Input Module will accommodate nominal input levels from -12 dBu to +8 dBu. The A & B input switches select either of two stereo inputs with independent control logic provided for each input. An INPUT MODE switch allows source selection of stereo, left channel or a monaural sum of left and right channels. Module output is assignable to the PROGRAM, AUDITION, UTILITY, 2-MIX and the eight MULTITRACK mix buses. Each of the four effects/foldback SENDS has a level control, PRE fader and ON button switches. PAN is provided to balance a stereo signal source or to position a mono source in the stereo image. Both CUE and SOLO facilities are available, as in the microphone input modules.

Each input includes a comprehensive family of logic control input and output commands including remote control of the module's ON, OFF, CUE and SOLO functions complete with tally light voltages. Machine controls include start and stop command pulses for turntables, cartridge decks, CD players and open reel tape machines. The module also accommodates "audio reset" and "ready" status commands from the peripheral equipment. "Audio reset" turns off the module audio at end-of-message or end-of-event, without generating a machine stop command. "Ready" status is used to illuminate the module's OFF button when a cartridge is loaded, tape threaded, or a turntable or CD player cued. The control logic may also be programmed to reset and restart the console event timer providing an elapsed time countup for designated inputs.

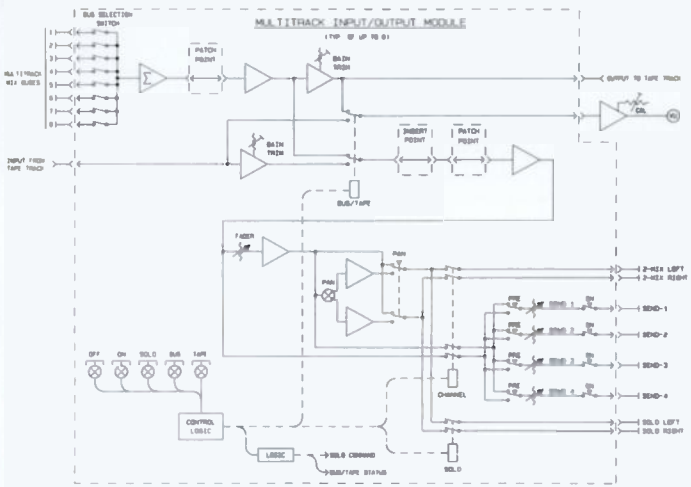


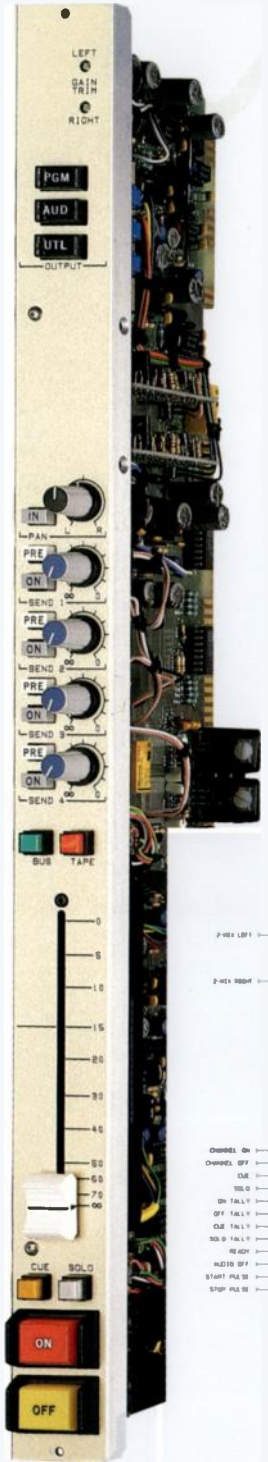


MULTITRACK MODULE

Each Multitrack Module is a combination input and output module for one track of a multitrack tape recorder. The module provides line output to the track as well as stereo mixdown facilities for bus (record) or tape (playback) signals. The BUS and TAPE buttons select the source to be mixed by the module and displayed on the track meter. The outputs of the multitrack modules are permanently assigned to the 2-Mix buses which are summed in the 2-Mix module and displayed on the 2-Mix meters.

Each of the four effects/foldback SENDS has a level control, PRE fader and ON button switches. The PAN control, with insert switch, allows positioning of the signal in the stereo image. The illuminated SOLO button provides stereo monitor after fader and pan (AFL). The channel ON and OFF buttons are illuminated to indicate the status of the channel.



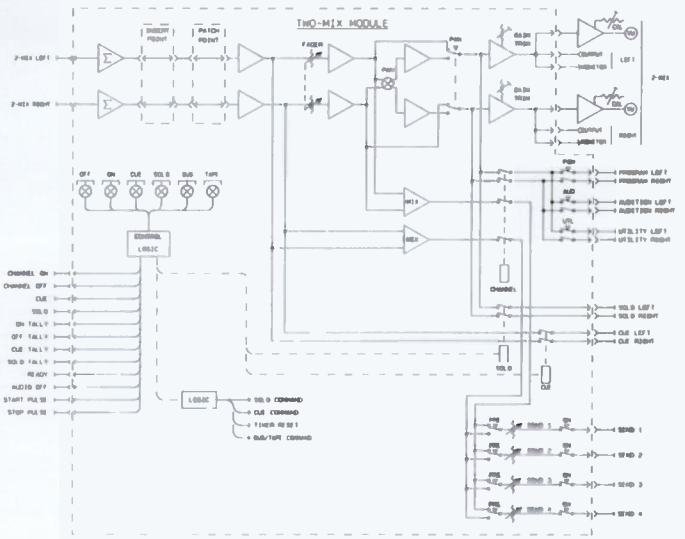


2-MIX MODULE

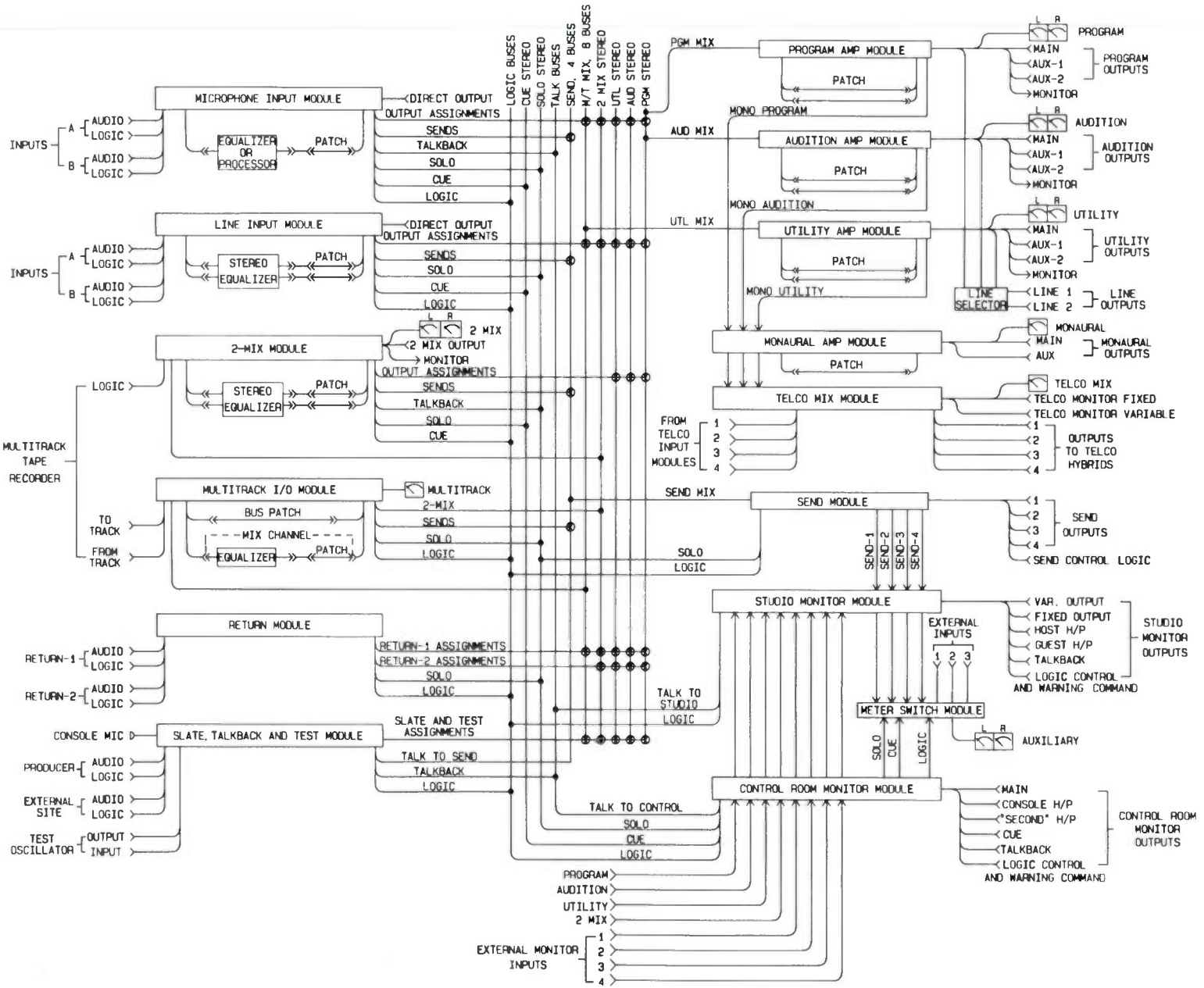
The 2-Mix Module is the mixing amplifier for the multitrack modules and, therefore, should be viewed as the master stereo "input" module for the multitrack tape machine. This module is equipped with the same audio and logic features as a stereo line input module, except that its inputs are the multitrack modules and any other modules assigned to the 2-Mix bus. The master BUS and TAPE buttons control the mixdown selection status of all the individual multitrack modules.

The stereo output of the module may be assigned to the PROGRAM, AUDITION and UTILITY buses. The full-time, line level outputs of the module are displayed by the 2-Mix meters. Each of the four effects/foldback SENDS has a level control, PRE fader and ON button switches. The PAN control, with insert switch, provides balancing of the stereo signal.

The channel ON and OFF buttons are illuminated to indicate the status of the channel. The illuminated CUE button provides cue monitor pre-fader (PFL), while the SOLO button provides stereo monitor after fader and pan (AFL). Tape machine controls include start and stop command pulses, "audio reset" and "ready" status. Automatic reset of the console event timer may also be programmed.



Functional Block Diagram



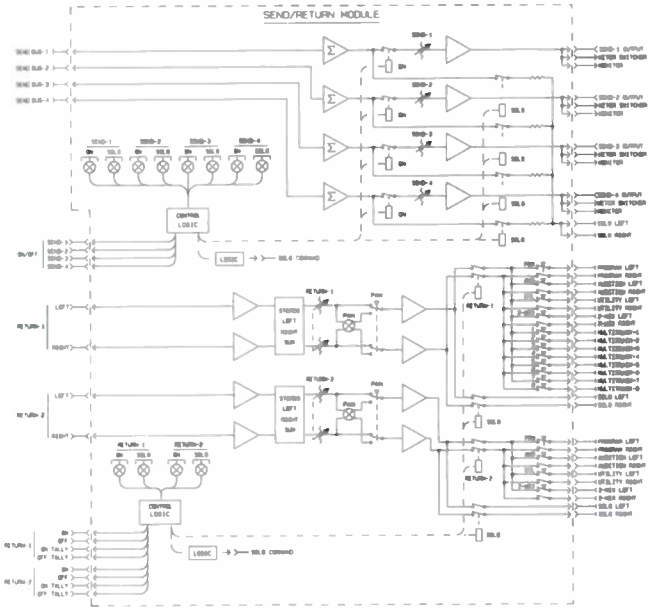


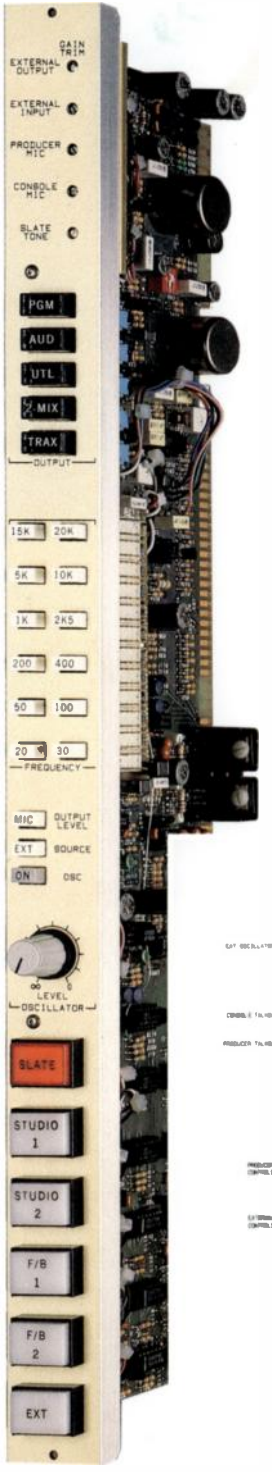
SEND & RETURN MODULE

The Send & Return Module contains both the SEND mixing and output line amplifiers and the reverb/effects RETURN input circuits.

The SEND portion of the module has the four sets of bus summing and output amplifiers for the effects/foldback send circuits. Each output is equipped with a master LEVEL control, logic controlled ON/OFF button and SOLO capability. The ON/OFF function can also be remote controlled; a typical application would be to provide an announcer with an echo send button, etc.

The RETURN section of the module contains two stereo effects input sections with ON/OFF, SOLO, input MODE and PAN/balance controls. Return-1 may be assigned to all four stereo mix and eight multitrack buses. Return-2 may only be assigned to the four stereo output buses. The returns are both equipped with external ON/OFF control logic with tally light voltages.





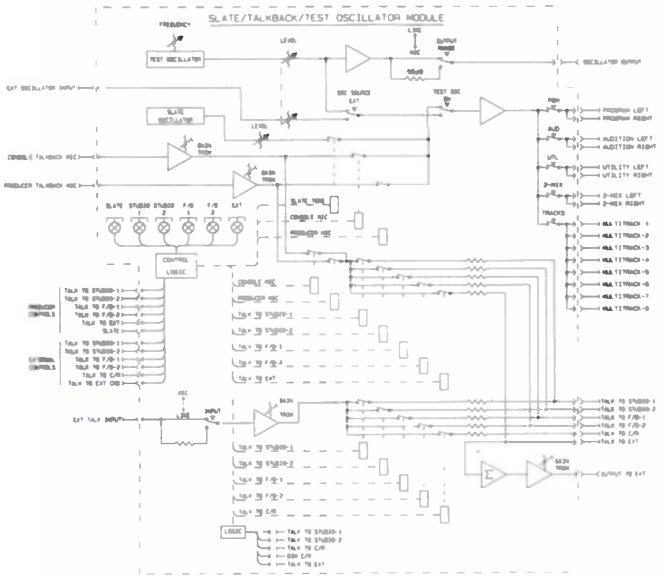
SLATE/TALKBACK/TEST MODULE

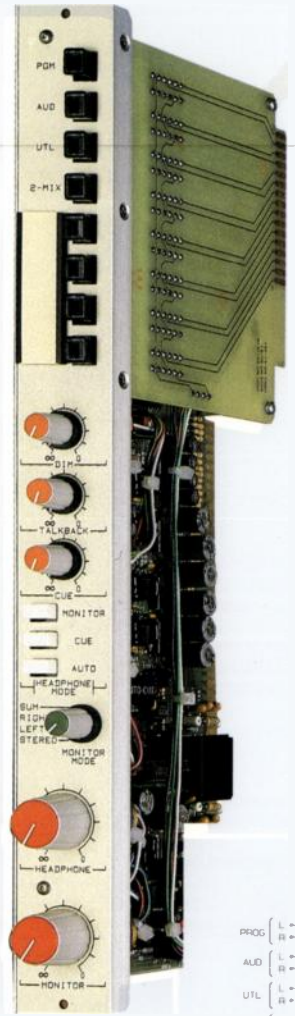
The Slate/Talkback/Test Module provides a test oscillator, slate system and communication capabilities for the ABX console.

The test tone oscillator generates 12 low-distortion audio tones for system testing and level alignment. The generator's output may be assigned to the PROGRAM, AUDITION, UTILITY, 2-MIX and all multitrack buses (TRAX) and is also available for external application at a connector on the rear of the console. The external output is balanced and may be switched between line or mic level. An external test signal may be selected in place of the internal generator with the EXT SOURCE button. Typical applications would be sweep tone, pink noise, and music tuning generators.

SLATE commentary may be added to a recording with the console's built-in electret microphone or from the producer's external microphone. A low-distortion slate identification tone (nominally 30Hz, adjustable) may also be recorded onto a tape for ease of track/cut identification.

The console and producer's talkback microphones may communicate with up to two studios, two of the foldback circuits and to an external location. The external location could be a call screener booth, 2-way radio, announce booth, etc. The frequency response of the talkback microphone preamplifiers has been carefully tailored to provide optimum speech communication.



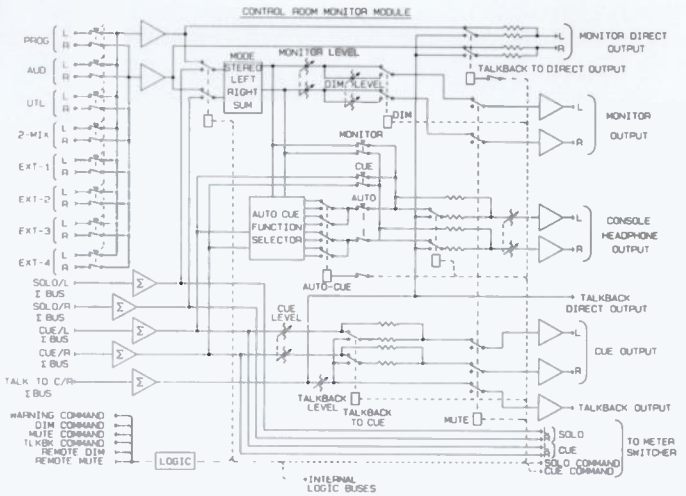


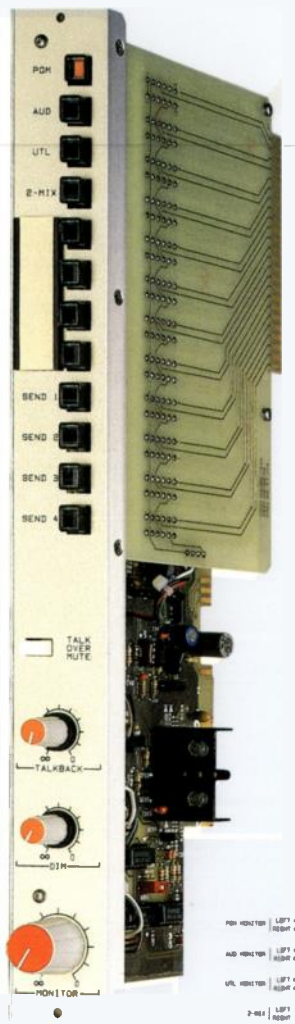
CONTROL ROOM MONITOR MODULE

Monitoring of PROGRAM, AUDITION, UTILITY, 2-MIX or any of four external signals is provided by the interlocking monitor selector. The DIM level control provides an adjustable amount of monitor level reduction while using the talkback facilities. The TALKBACK level control adjusts the volume of incoming communication.

The HEADPHONE MODE switch selects the source, MONITOR, CUE or the AUTOMATIC system for the console operator's headphone circuit. The automatic headphone system, unique to the ABX, AMX and BMX Series III family of broadcast consoles, senses whenever a cue button is pressed on an input module and switches the headphone circuit from monitor to one of two user assignable modes. These are stereo cue or mono cue in one earphone and mono monitor in the other. The headphone feeds to a co-host and/or guest are not interrupted.

The MONITOR MODE switch provides selection of monitoring stereo, left, right or sum sources. The HEADPHONE and MONITOR level controls are conductive plastic units custom manufactured by Penny & Giles.



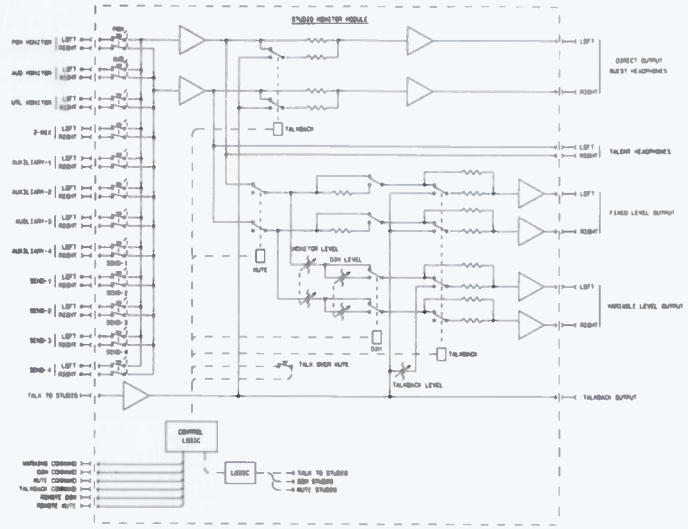


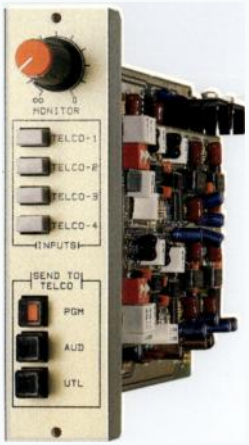
STUDIO MONITOR MODULE

The Studio Monitor is designed for applications where a separate voice/announce booth or conference studio is used. Monitor sources include: PROGRAM, AUDITION, UTILITY, 2-MIX, any of the four SEND buses and up to four external signals. Outputs provided are: variable level with talkback insert and adjustable DIM, fixed level with talkback insert and fixed dim, talent headphone feed with talkback insert and fixed dim, and guest headphone feed without talkback or dim.

The variable level output is usually used with a small voice booth or studio where it is not required nor desirable for talent to have volume control. The fixed level output is designed to feed a studio monitor control turret.

A muting override button is provided to enable TALKBACK to the studio even when the speakers are muted. This is normally used when doing off-air production voice work and the talent chooses not to use headphones. Up to two Studio Monitor Modules may be installed in the console.





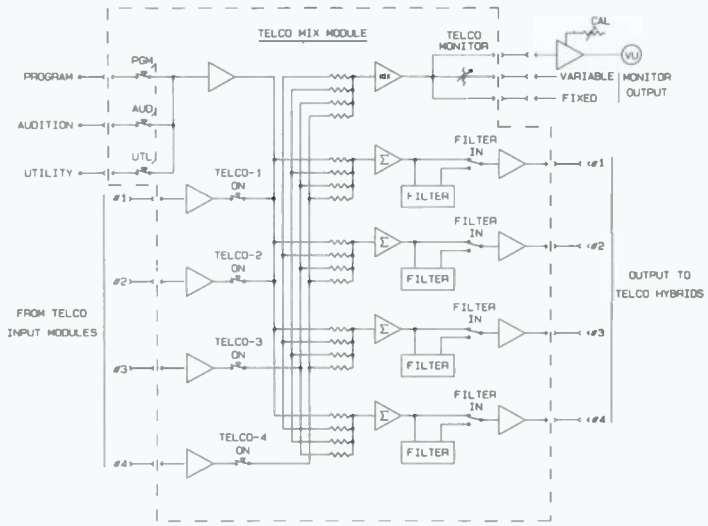
TELCO MIX MODULE

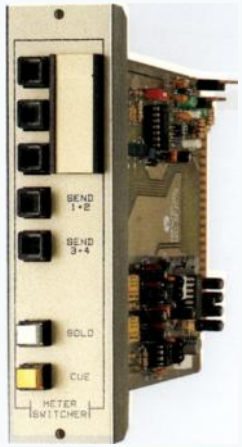
The Telco Mix Module derives five unique mixes of the signals from up to four telephone callers and a selection of the PROGRAM, AUDITION and UTILITY buses.

The telephone signals for broadcast are selected and controlled by the input modules connected to each of the external hybrid systems. The Telco Mix Module receives the audio from the selected input modules and sums them into a "monitor-mix". The telephone monitor-mix signal is very useful in applications where talk show talent and/or guests prefer to not use headphones to hear the callers.

The Telco Mix Module provides for the selection of the output bus which will contain the "base-mix" to be fed back to all the callers. In addition, the module creates a unique mix for each caller which includes the selected bus plus all the other callers, except himself ("mix-minus"). Each mix-minus output may be band-pass limited for improved hybrid operation, with internally switchable filters.

The Telco Mix Module may also be used for other applications where it is desired to create one or more custom mix-minus foldback mixes or cue feeds, such as to remote pick-ups, sports booths, and two-way systems.



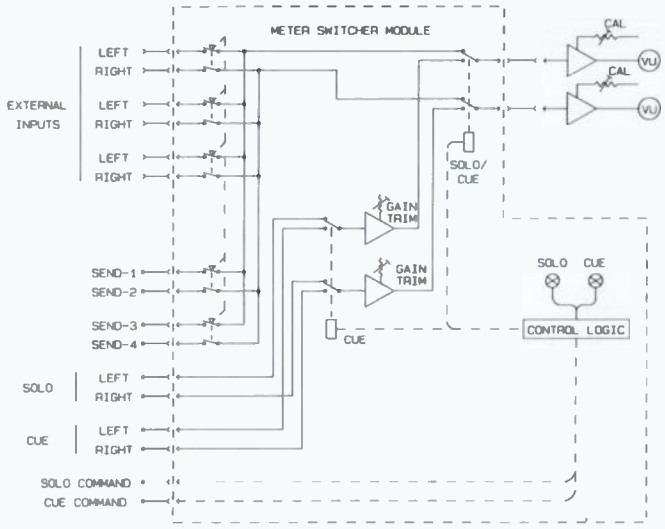


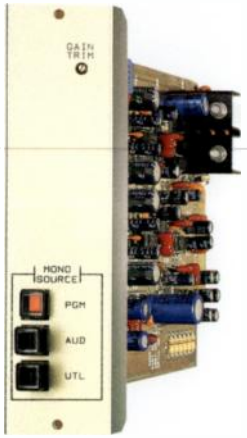
METER SWITCHER MODULE

The ABX Meter Panel displays the levels of the following console outputs: Program, Audition, Utility, 2-Mix, Multitrack, Monaural, Telco Mix and Auxiliary.

The Auxiliary meters are driven by the Meter Switcher Module which may select between three external signals and SEND 1 & 2 and SEND 3 & 4. These meters automatically default to either CUE or SOLO whenever either function is selected on a module. CUE metering provides rapid confirmation of module input levels, while SOLO metering eliminates the need to use a main output bus for preview and level setting.

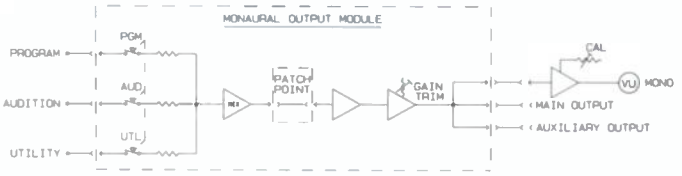
The smaller ABX-18 meter panel supports only four multitrack meters, and uses the Meter Switcher Module and Auxiliary meters to display Utility, Monaural and Telco Mix levels.

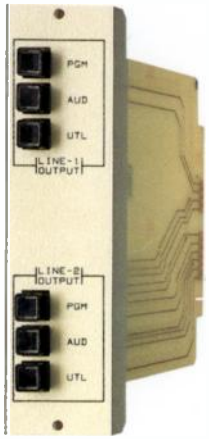




MONAURAL OUTPUT MODULE

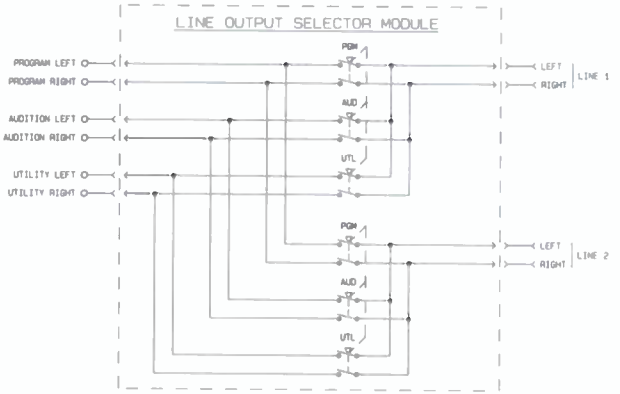
The Monaural Output Module provides a selection of the three main outputs, and may select or mix any combination of the PROGRAM, AUDITION and UTILITY signals to derive a monaural output. A patch send and return point is available for the connection of external processing equipment and/or a patch field. The output amplifier is an active balanced design identical to those used in the stereo line output modules.

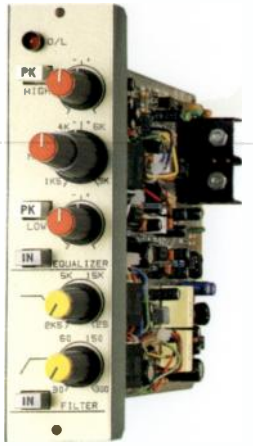




LINE OUTPUT SELECTOR MODULE

The Line Output Selector Module selects a distribution amplifier output of the PROGRAM, AUDITION or UTILITY buses for each of two separate output lines. Typical applications would include main and back-up transmitter lines or input selection for tape recorders.



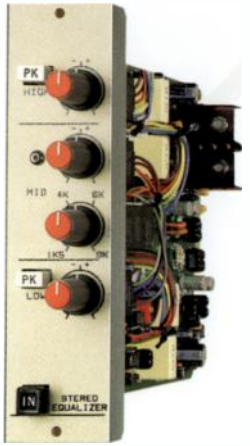


MONAURAL EQUALIZER/FILTER MODULE

The Monaural Equalizer Module provides both tunable highpass and lowpass filtering and a three-knob equalizer in one compact module. Each section may be individually switched in and out of the signal path. From the signal flow perspective, the highpass filter precedes the equalizer section, which is then followed by the lowpass filter. This configuration allows the highpass filter to protect the equalizer from heavy sub-sonic signals, and provides the possibility of lowpass filtering of some of the noise resulting from extreme high frequency equalization.

The equalizer section contains bass and treble equalizers; each is independently switchable from shelving to peaking modes. The midrange equalizer is tunable over a considerable range. The "Q" is very broad when using modest levels of boost or cut, and increases only as boost and cut increase. All have reciprocal boost and cut curves, although an internal option switch causes the bass equalizer always to remain in the more desirable shelving mode during attenuation.

The tunable high and lowpass filter sections are designed with an attenuation of 18 dB per octave.



STEREO EQUALIZER MODULE

The Stereo Equalizer Module is a stereo tracking version of the equalizer section of the three-band monaural equalizer module.

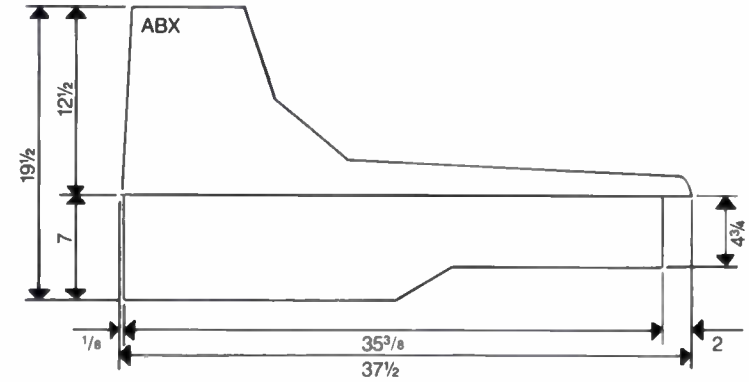


VOICE PROCESSOR MODULE

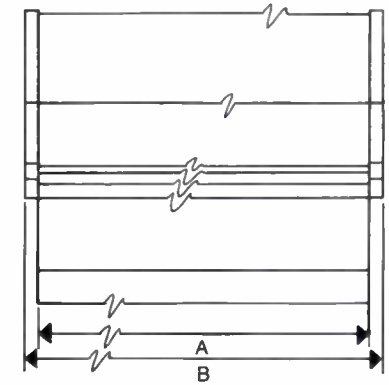
The Voice Processor Module is a combination module with the following functions and signal path: equalizer, gate, compressor and de-esser. The equalization and dynamics sections may be independently switched in and out of the signal path. This module is specifically designed for processing voice signals: DJ's, news presenters, talk show hosts and guests. The gate and de-esser features are particularly helpful with inexperienced talk show guests.

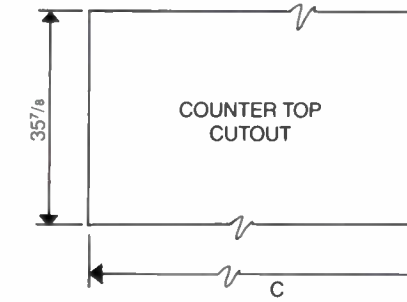
The equalizer section is a two-knob, two band design with a fixed low frequency and adjustable voice (mid to high) frequency equalizer controls. The low frequency equalizer provides a peaking response in the boost mode and a shelving response when attenuating.

The dynamics section is a high-performance compressor, containing a flexible expander and de-esser. The compressor is not intended to be a "gain-rider", but is designed to provide signal smoothness and increased density. The action of the expander/compressor is shown by a unique LED display, which indicates expansion with a moving dot and compression with a bar-graph. The de-esser section senses and operates only upon the sibilance region of the signal, with a separate LED indicating the degree of action.



FRONT





	A	B	C
ABX-18	42½	44	42¾
26	54½	56	54¾
34	66½	68	66¾

ABX SPECIFICATIONS

MICROPHONE INPUT:

Source Impedance	150 ohms
Input Impedance	1000 ohms minimum, balanced
Input Level Range	Adjustable from -60 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS:

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range:	
Line Input	Adjustable from -12 dBu to +8 dBu
Multitrack Input	Adjustable from -4 dBu to +8 dBu
Reverb Return	Adjustable from -15 dBu to +8 dBu
Monitor Input	Nominal +4 dBu/+8 dBu
Patch Input	Nominal -10 dBu
Input Headroom	Greater than 30 dB above nominal input

MAIN OUTPUTS:

Load Impedance	600 ohms
Source Impedance	30 ohms
Nominal Output Level	+8 dBm adjustable to +4 dBm
Maximum Output Level	
Line Amplifiers	+28 dBm, 600 ohm load
Two-Mix Module	+26 dBm, 600 ohm load
Multitrack Module	+26 dBm, 600 ohm load
Send Module	+26 dBm, 600 ohm load

MONITOR OUTPUTS:

Main Outputs:	
Load Impedance	600 ohms or greater
Source Impedance	30 ohms, unbalanced
Output Level	0 dBu nominal, +20 dBu maximum
Headphone Outputs:	
Load Impedance	45 ohms or greater
Source Impedance	Less than 4 ohms
Output Level	0 dBu nominal, +20 dBu maximum

FREQUENCY RESPONSE:

Mic Input to Program Output	+0 dB, -0.9 dB, 20 Hz to 20 kHz
Line Input to Program Output	+0 dB, -0.8 dB, 20 Hz to 20 kHz

NOISE:

Microphone Input Amplifier	-127 dBu RMS equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	-88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output Noise with 1 microphone channel ON, fader at -15 dB, input sensitivity at -50 dBu	75 dB below output, reference +8 dBm, 150 ohm source, 20 kHz bandwidth
Output Noise with one line channel ON, fader at -15 dB, input sensitivity at +8 dBu	80 dB below output, reference +8 dBm, 600 ohm source, 20 kHz bandwidth
Output Noise with no input channels ON	82 dB below output, reference +8 dBm, 20 kHz bandwidth

DISTORTION, T.H.D.:

Mic Input to Program Output	Less than 0.02%, 20 Hz to 20 kHz, -50 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output
Line Input to Program Output	Less than 0.008%, 20 Hz to 20 kHz, +8 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output

DISTORTION, I.M.D. (SMPTE):

Mic Input to Program Output	Less than 0.008%, -50 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load
Line Input to Program Output	Less than 0.005%, +8 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load

CROSSTALK:

Interchannel Crosstalk	Less than -85 dB at 1 kHz Less than -75 dB at 20 kHz

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NOTES:

1) These specifications are for the basic signal paths, per channel, with either or both channels of a stereo pair operating and with 600 ohm loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

3) Noise specifications are for for a 26-input console (ABX-26); larger consoles will have slightly reduced signal-to-noise ratios due to increased summing amplifier gain. Noise specifications are based upon a 20 kHz bandwidth; the use of a meter with a 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Features and specifications subject to change without notice.

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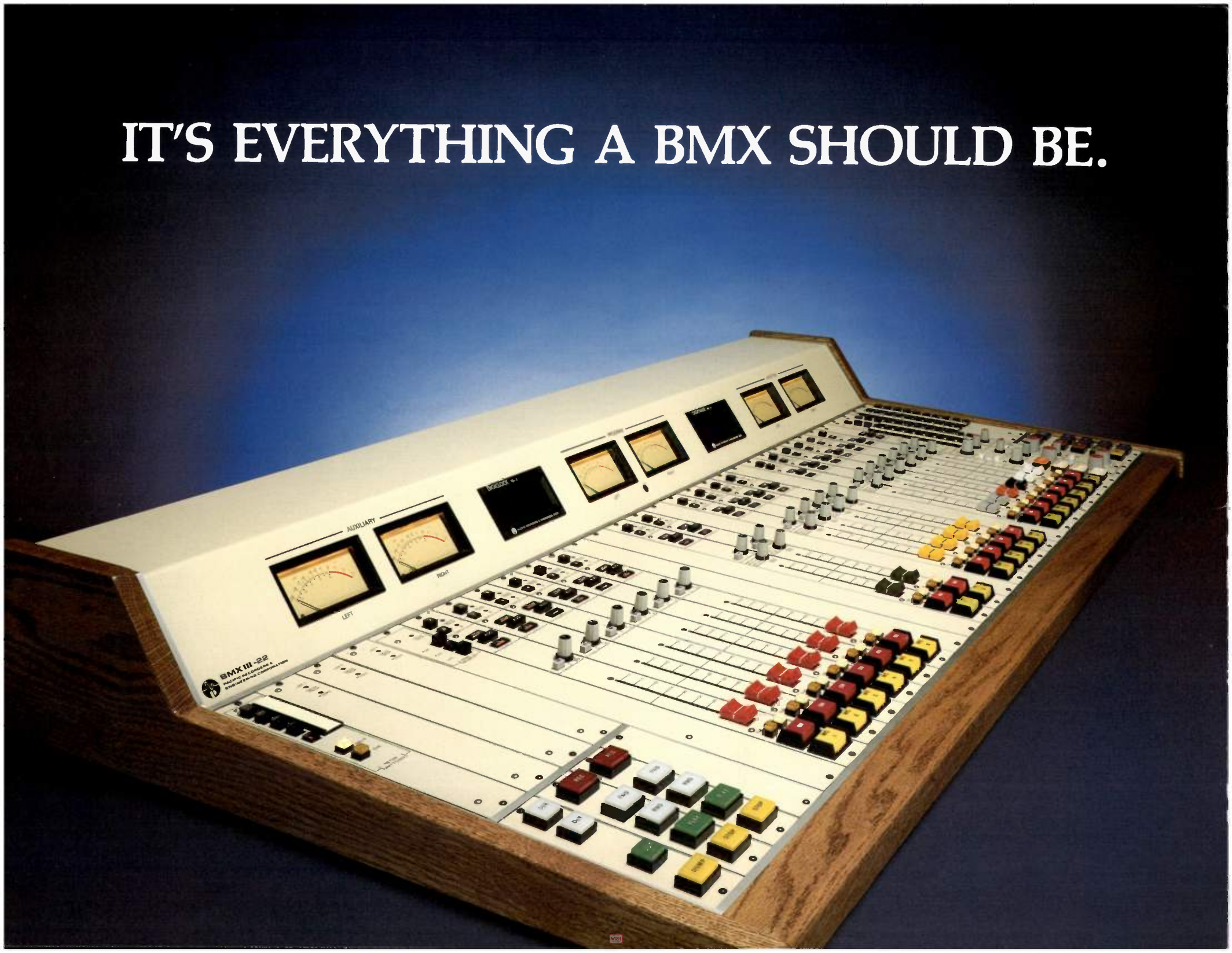
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BMX III

PACIFIC RECORDERS & ENGINEERING CORPORATION



IT'S EVERYTHING A BMX SHOULD BE.



With program origination, your choice of an on-air console is the most critical equipment decision you can make. You don't have to be an engineer to know that your "board" is the heart of the station's operations. If your console isn't in top condition, odds are your station's health isn't either. Unfortunately, gaining more flexibility and better performance from your console isn't a matter of giving it more exercise. It's usually a matter of retirement.

When you think about all that needless anxiety, the frustrating experiences you've had over the years attempting to make yesterday's "old dog" console sit-up and perform today's new programming tricks, there's no doubt you're going to feel genuinely excited after you read about our new BMX Series Three.

With our BMX III, you're going to examine a new on-air console design that brings a whole new outlook to your station's operations. With the Series III, we've retained the essential concepts developed for our legendary BMX Series I & II consoles and enhanced them with the latest features and facilities we've incorporated into our new ABX and AMX operations consoles.

You'll see that the latest technology, important innovations and new, useful features we designed into the BMX III have one essential purpose: to make your station run better. You'll also see that our dedication to quality hasn't changed either. Pacific Recorders & Engineering is a company that is zealously dedicated to the well-being of your business. You see, that's how we stay healthy.

Should you wish to see for yourself how dedicated we are, just check our references. With so many stations and networks across the country investing in a BMX console, there's undoubtedly someone in your own backyard who's already had the advantages of owning a BMX. You may already have discussed the merits of a BMX with someone who's been eager to share his experience and enthusiasm. Quite possibly, even a competitor.

Pacific Recorders & Engineering Corporation
The *choice* for more #1 stations.



While cosmetics are easily copied, the features, functions, and flexibility of BMX Series consoles are what have made BMX systems the outright leader in major market installations.



TODAY'S COMPLICATED RADIO PROGRAMMING AND PRODUCTION NEEDS MORE FLEXIBILITY: THE BMX III ACHIEVES THIS GOAL WITHOUT SACRIFICING SIMPLICITY OF OPERATION.

The BMX III on-air console was designed with the capacity to handle a talk show with two separate telephone mixes, record a stereo feed for later broadcast, plus the capability to work and communicate with two studios and a remote, all at the same time. In addition, the new BMX III may be optionally equipped with two effect/foldback sends and a stereo effects return, all with extensive remote control logic. This outstanding capacity has not been gained, however, at the expense of simplicity. The BMX III retains the clean, uncluttered design so important for operator understanding and simple operation.

Keep your crew cooking with a PR&E system that keeps delivering top performance no matter how complex or demanding your programming requirement.

TODAY'S ON-AIR STUDIOS NEED A CONSOLE THAT'S PACKED WITH PRACTICAL FEATURES.

THE BMX THREE — FEATURES AT A GLANCE

- Three main stereo mix buses.
- Distribution line amplifiers on each main output.
- Full and independent remote control logic on each input of microphone and line modules.
- Stereo cue system with automatic console headphone monitor switching.
- The monitor system provides independent and unique outputs for the console, host, co-host, and guest headphone feeds.
- Stereo solo-in-place monitoring system.
- Multi-function metering with automatic cue and solo level display.
- Monitor facilities for two studios.
- Multi-way intercommunication system, including producer and external feeds.
- Multi-frequency, low distortion test oscillator.
- Voice slate system with identification tone.
- Two telephone mix-minus feeds plus telephone monitor mix.
- Two optional effect/foldback send mix buses, each with remote control logic.
- Optional stereo effects/reverb return with remote control logic.
- Fully regulated, independent supplies for audio, logic and phantom power.
- On-board audio supply regulation on each module.
- Mainframe fully wired for all present and future inputs, outputs, patch points and logic.
- Connector panel silk screened with clear, functional designations.
- Audio and logic interconnection system is compatible with AMX and ABX series consoles.
- Mainframes for 10, 14, 18, 22, 26, 30, 34 input positions, larger frame sizes available.
- Console supplied with installation connectors and tools, service tool kit and spare parts kit.

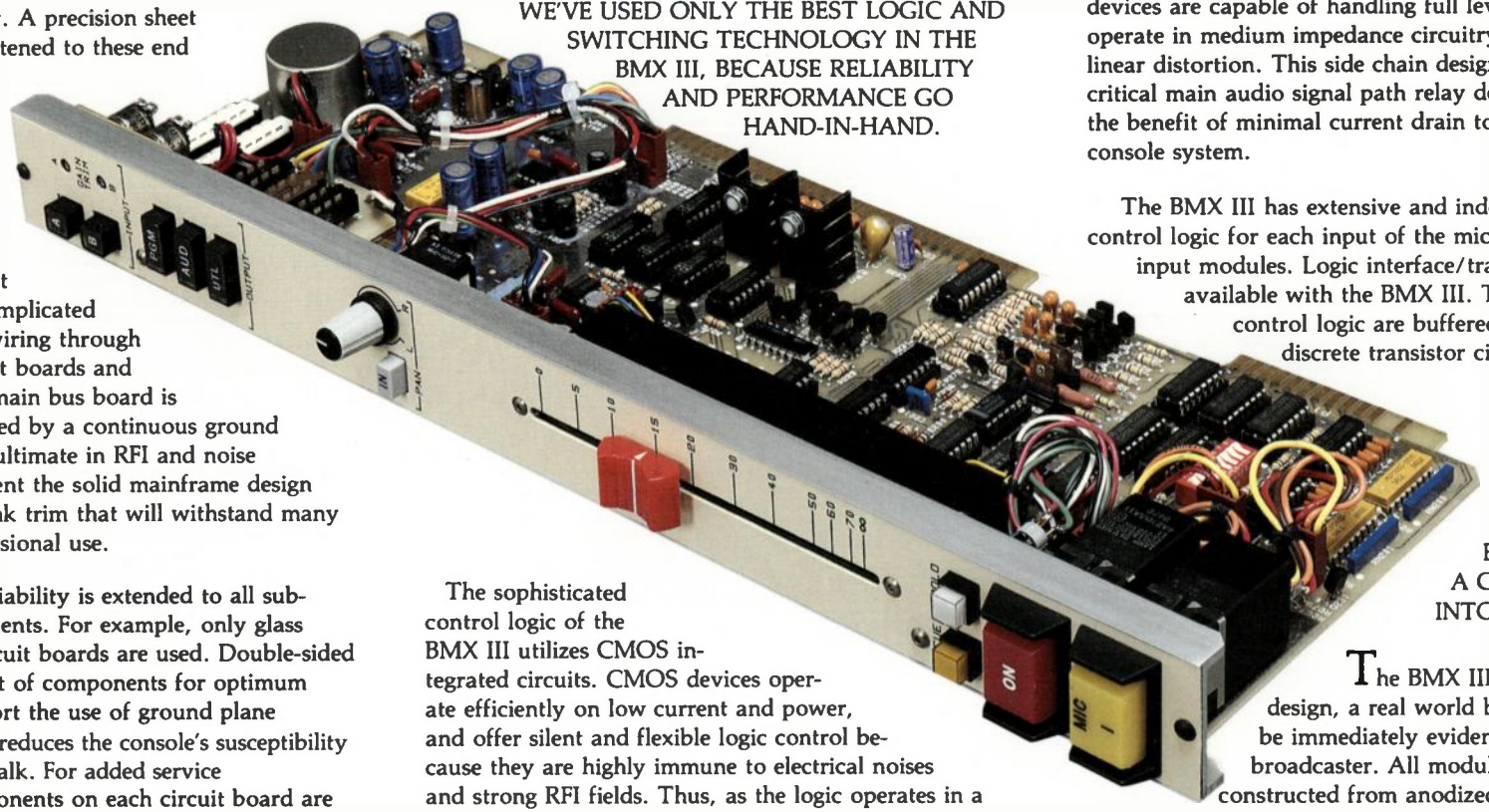
TODAY'S RADIO STATIONS STILL NEED ROCK-SOLID RELIABILITY AND THE HIGHEST QUALITY THAT INSURES PERFORMANCE WELL INTO TOMORROW.

With a BMX, the reliability starts with a sturdy housing. A BMX has always been fabricated with superior materials and methods. Heavy gauge aluminum alloy end panels are made on CNC mills for the ultimate in dimensional accuracy. A precision sheet metal chassis is then fastened to these end panels to form the mainframe housing. This BMX housing will not twist or flex and, therefore, will not degrade circuit card contacts or place strain on circuit traces. We minimize complicated and error-prone hand wiring through the use of plug-in circuit boards and "mother boards". The main bus board is strengthened and shielded by a continuous ground plane which yields the ultimate in RFI and noise isolation. We complement the solid mainframe design with attractive, solid oak trim that will withstand many years of rigorous professional use.

With a BMX, this reliability is extended to all sub-assemblies and components. For example, only glass epoxy double-sided circuit boards are used. Double-sided boards allow the layout of components for optimum performance and support the use of ground plane shielding which further reduces the console's susceptibility to RFI, noise and crosstalk. For added service convenience, the components on each circuit board are identified with silk screen designations. All card connecting fingers and their mating connectors are gold-plated for the highest reliability.

Throughout the BMX design, we use only first-quality components. Advanced discrete and integrated circuitry yields very low noise and distortion and provides excellent frequency response and headroom/overload performance. At least 30 dB of microphone and line input headroom is maintained to provide that extra margin for hot levels and "operator error". Mixers are full-travel Penny & Giles Series 4000 conductive plastic faders. Pushbuttons are Honeywell, EAO and Schadow, chosen for their extended life ratings and superior "feel". Audio transformers, where employed, are by Jensen. The VU meters conform fully to American National Standard C 16.5-1954 and are driven by bridging buffer amplifiers. Optional peak program meters (PPM) conform to British Standard 4297:1969.

WE'VE USED ONLY THE BEST LOGIC AND SWITCHING TECHNOLOGY IN THE BMX III, BECAUSE RELIABILITY AND PERFORMANCE GO HAND-IN-HAND.



The sophisticated control logic of the BMX III utilizes CMOS integrated circuits. CMOS devices operate efficiently on low current and power, and offer silent and flexible logic control because they are highly immune to electrical noises and strong RFI fields. Thus, as the logic operates in a BMX III, you won't hear "chirps" or "clicks". This 12 volt CMOS control logic is also easy to interface to external "outside" equipment like lamps and relays.

We complement the superior performance characteristics of CMOS logic circuitry with miniature, dry nitrogen-sealed, gold-contact relays for all primary path audio signal switching. These special relays (much more costly than conventional TTL or FET design components), are extremely reliable, and cannot degrade audio performance with unwanted noise or distortion. By comparison, other console designs typically use inexpensive TTL or FET analog switches which invariably introduce some form of non-linear distortion and degrade an entire audio console's performance; they're any easy, inexpensive shortcut for the average console design.

In a BMX III, less critical audio side chains (like Cue, Solo and Talkback) employ the highest quality, socketed CMOS analog switches. These solid-state, low power devices are capable of handling full level signals and operate in medium impedance circuitry to minimize non-linear distortion. This side chain design complements the critical main audio signal path relay design by offering the benefit of minimal current drain to the overall console system.

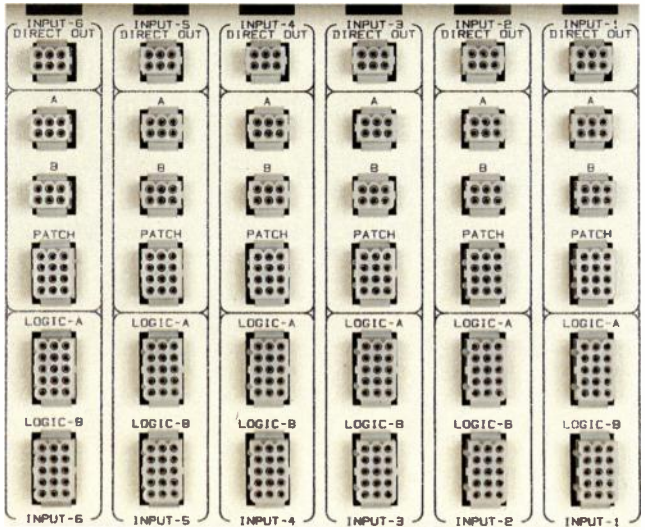
The BMX III has extensive and independent remote control logic for each input of the microphone and line input modules. Logic interface/translator units are available with the BMX III. The outputs of the control logic are buffered by short-proof discrete transistor circuitry.

RELIABILITY AND PERFORMANCE ALSO MEANS SUPERIOR ERGONOMICS AND A CONSOLE THAT FITS INTO THE REAL WORLD.

The BMX III is a low-profile design, a real world benefit that should be immediately evident to any broadcaster. All module front panels are constructed from anodized aluminum extrusions and carry aluminum inlays coated with durable polyurethane paint and silk screened with clearly labeled nomenclature.

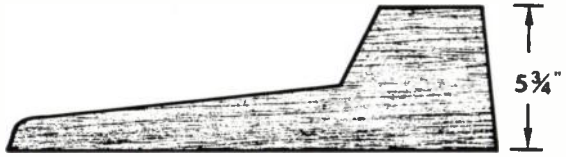
Every BMX mainframe leaves plenty of room for the broadcaster to arrange his peripheral equipment. All active electronics are immediately accessible from the top of the console: panel modules simply unplug from the mainframe housing. Perhaps the most important aspect to a BMX's engineering is the careful attention that's been

paid to the logical placement of switches and controls. There isn't an easier board to get to know. More importantly, there isn't a board that's easier to run. Just look around at a host of look-alike consoles that curiously resemble a BMX on the surface.

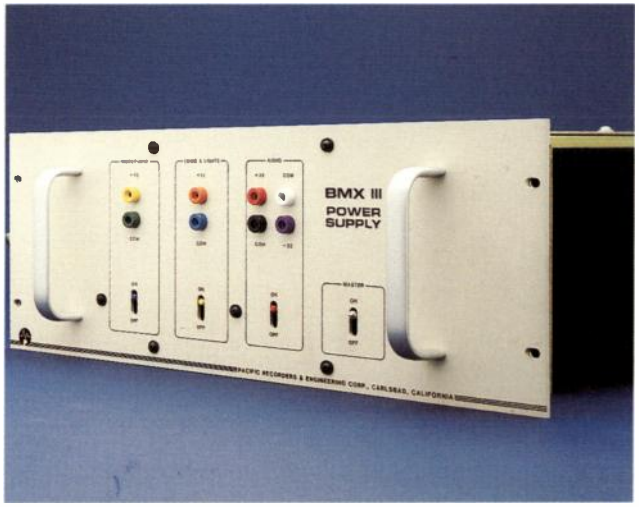


Time-consuming, hand wired terminal blocks are eliminated with a BMX III. All interconnections use proven, reliable, mating connectors for rapid, easy installation.

A BMX's separate rack mounting power supply is constructed in a rugged steel chassis and features massive regulator heat sinks. For convenience, it comes with a six foot interconnecting cable. The audio, logic and microphone phantom power supply voltages are individually regulated and switched with magnetic circuit breakers for maximum reliability.



Regardless of mainframe size, the low profile design of BMX-III gives you plenty of viewing room to your studio — even when you add our optional copy stand or equipment overbridge.



Every BMX III comes with a rugged power supply designed to comfortably handle the heaviest BMX use — reliably and cooly.

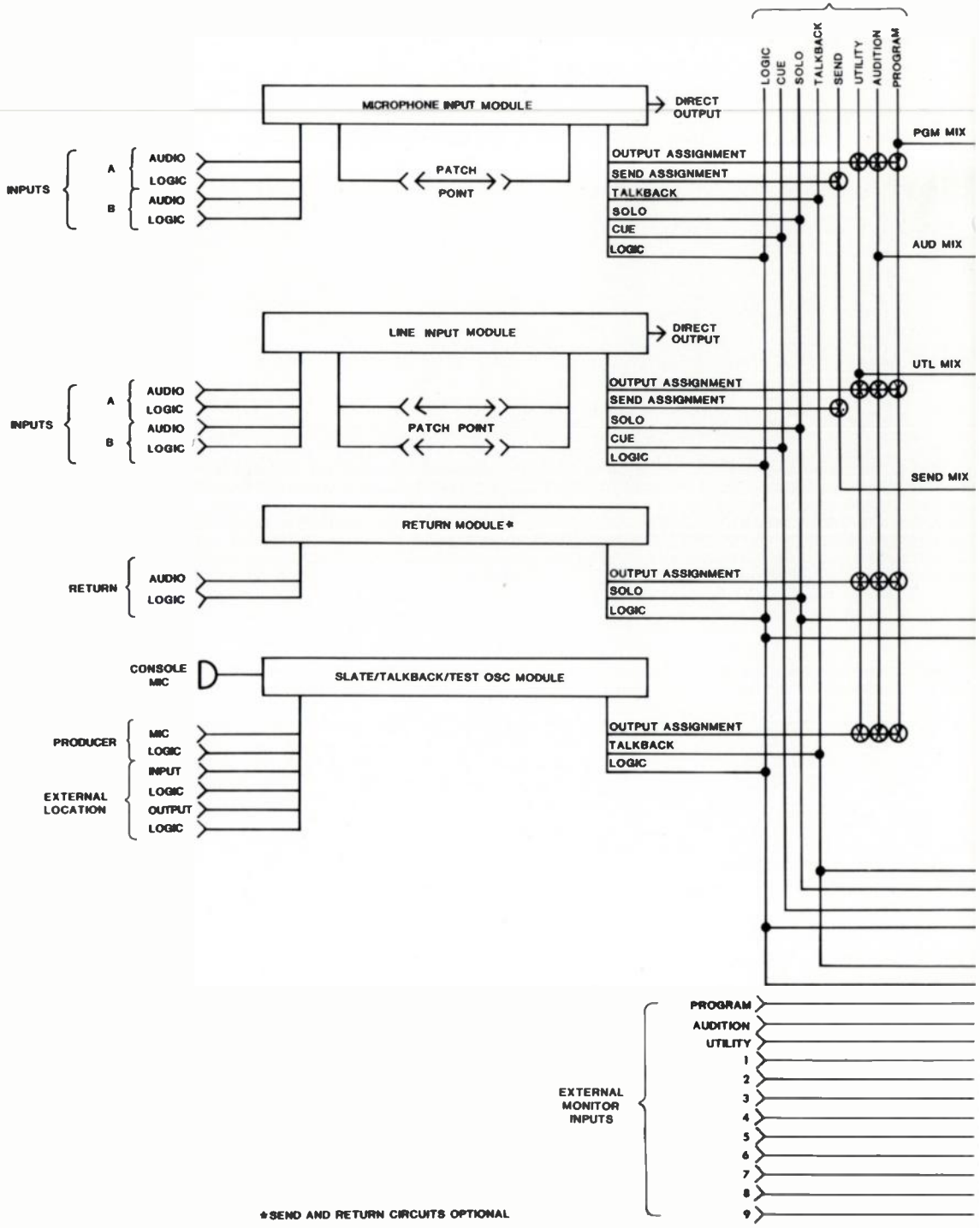
All audio input/output and logic wiring between the console and external equipment is accomplished with easy-to-use mating connectors. Time-consuming hand wiring to terminal blocks is eliminated. Console mating connectors, pins and tools are supplied with the BMX III. By prewiring the studio connectors, a BMX III console can be installed and on the air in a few hours.

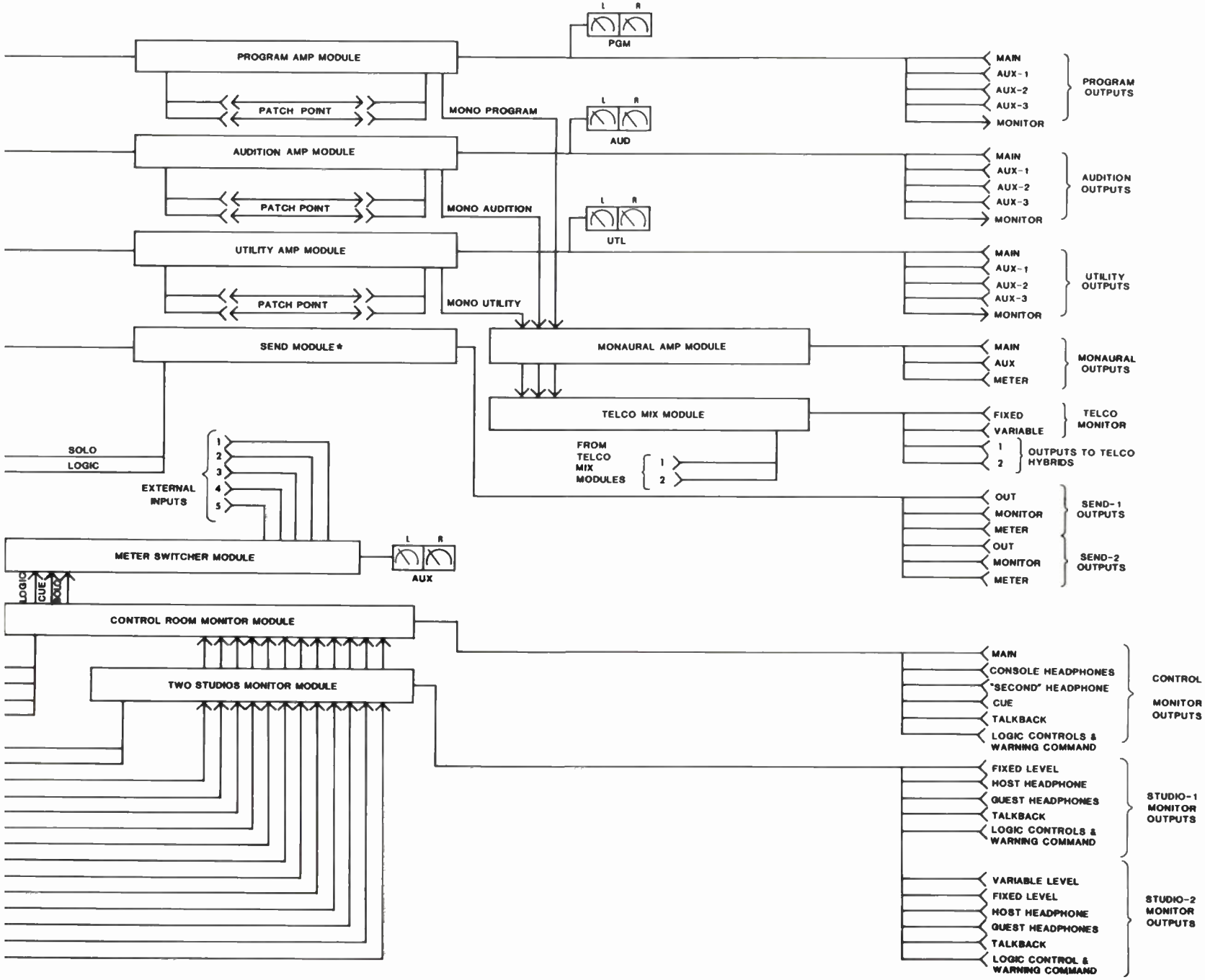
ONE LAST WORD BEFORE YOU LOOK INTO MORE DETAILS.

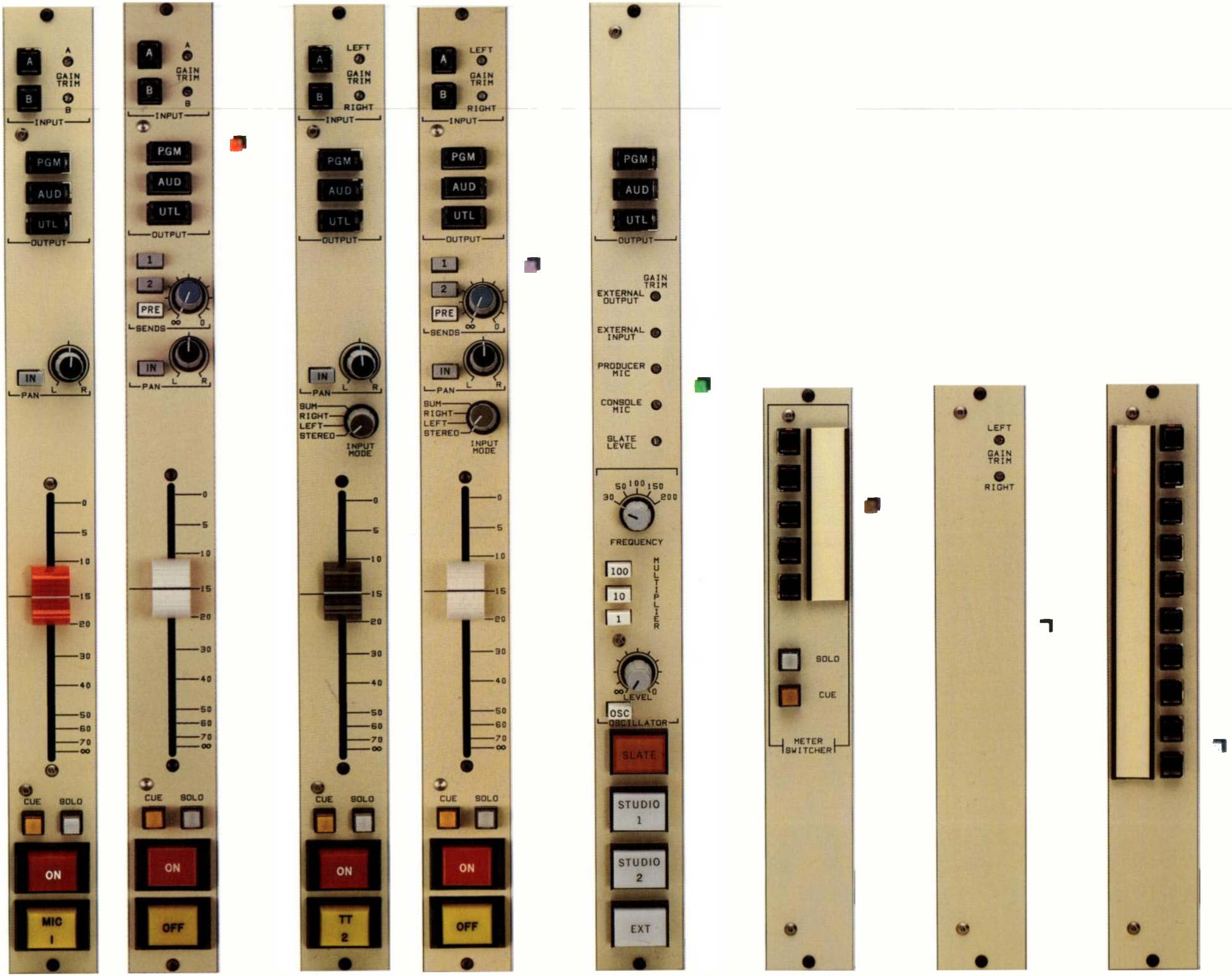
Our BMX consoles have become the standard by which many broadcasters evaluate other competitive offerings. Frankly, we're flattered by this, but not surprised. Because we've stayed in close touch with your needs, the BMX has become an evolutionary design; the purpose of which is to continuously reach for and set the highest radio broadcast standards — in features, performance, reliability and that all-too-elusive factor, quality.

If you believe that all these attributes have been attained in the exemplary console design of the BMX III, then we welcome you to a select user's group of professionals — broadcasters who have decided a Pacific Recorders & Engineering console is the best value that money can buy.

BMX III FUNCTIONAL BLOCK DIAGRAM




PROGRAM AMP MODULE
PATCH POINT
MONO PROGRAM
PGM
L
R
MAIN
AUX-1
AUX-2
AUX-3
MONITOR
PROGRAM OUTPUTS
AUDITION AMP MODULE
PATCH POINT
MONO AUDITION
AUD
AUDITION OUTPUTS
UTILITY AMP MODULE
PATCH POINT
MONO UTILITY
UTL
UTILITY OUTPUTS
SEND MODULE*
MONAURAL AMP MODULE
MAIN
AUX
METER
MONAURAL OUTPUTS
TELCO MIX MODULE
FIXED
VARIABLE
TELCO MONITOR
1
2
OUTPUTS TO TELCO HYBRIDS
FROM TELCO MIX MODULES
SOLO
LOGIC
EXTERNAL INPUTS
1
2
3
4
5
OUT
MONITOR
METER
SEND-1 OUTPUTS
SEND-2 OUTPUTS
METER SWITCHER MODULE
AUX
LOGIC
CUE
SOLO
CONTROL ROOM MONITOR MODULE
TWO STUDIOS MONITOR MODULE
MAIN
CONSOLE HEADPHONES
"SECOND" HEADPHONE
CUE
TALKBACK
LOGIC CONTROLS & WARNING COMMAND
CONTROL MONITOR OUTPUTS
FIXED LEVEL
HOST HEADPHONE
GUEST HEADPHONES
TALKBACK
LOGIC CONTROLS & WARNING COMMAND
STUDIO-1 MONITOR OUTPUTS
VARIABLE LEVEL
FIXED LEVEL
HOST HEADPHONE
GUEST HEADPHONES
TALKBACK
LOGIC CONTROL & WARNING COMMAND
STUDIO-2 MONITOR OUTPUTS


A
B
GAIN TRIM
INPUT
PGM
AUD
UTL
OUTPUT
1
2
PRE
SENDS
IN
PAN
L
R
SUM
RIGHT
LEFT
STEREO
INPUT MODE
0
5
10
15
20
30
40
50
60
70
∞
CUE
SOLO
ON
MIC 1
OFF
TT 2
EXT
EXTERNAL OUTPUT
EXTERNAL INPUT
PRODUCER MIC
CONSOLE MIC
SLATE LEVEL
FREQUENCY
MULTIPLIER
100
10
1
LEVEL
OSC
OSCILLATOR
SLATE
STUDIO 1
STUDIO 2
METER SWITCHER

MICROPHONE INPUT MODULE

The Microphone Input module accommodates a wide range of input levels to permit use of all contemporary microphones. Input preamplifier gain is adjustable for nominal inputs of -60 dBu to -35 dBu. The A/B input selector provides two microphone inputs per module, each with programmable monitor mute selection for control room or either of two studios. The mute circuitry incorporates an automatic 40 millisecond delay before the microphone is turned on to permit "room reverb" to decay off-mic. Each microphone input is provided with separate remote control capability for ON/OFF, COUGH and multiple TALKBACK functions. The PAN control may be inserted with the IN button to provide positioning of the microphone signal in the stereo image. The module output may be assigned to any combination of PROGRAM, AUDITION and UTILITY by the self-indicating OUTPUT buttons. The illuminated CUE button provides stereo pre-fader cue monitoring. The illuminated SOLO button provides monitoring of solo-in-place which is post-fader and pan. The channel ON/OFF buttons are illuminated to indicate the status of the channel. In addition, the ON button may be programmed so that momentary depression provides cough muting. Phantom power circuitry for condenser microphones is user assignable for both the A and B inputs.

The microphone module may be equipped with an optional SEND control which can be assigned to either or both of two send buses and is provided with a PRE/post-fader button switch. Stereo send is possible as a user option; assigning the send to either send bus results in a mono-mix signal to that bus, however, the send will be stereo when both bus assignment buttons are engaged.

LINE INPUT MODULE

The Stereo Line Input module will accommodate nominal input levels from -12 dBu to +8 dBu. The A/B input switch selects either of two stereo inputs. Separate logic control is available on each input for the remote control of tape machines and/or other sources by the module. The PAN control may be used to balance a stereo signal source or to position a mono signal in the stereo image. An INPUT MODE switch allows input selection of stereo, left channel only, right channel only or the sum of left and right channels. The module output may be assigned to any combination of PROGRAM, AUDITION and UTILITY by the self-indicating OUTPUT buttons. The illuminated CUE button provides stereo pre-fader cue monitoring. The illuminated SOLO button provides monitoring of solo-in-place which is post-fader and pan. The channel ON/OFF buttons are illuminated to indicate the status of the channel.

The line module may be equipped with an optional SEND control which is provided with a PRE/post-fader switch and can assign a mono-mix of the signal to either or both of two send buses. The user option for stereo send is available as described for the Microphone Input module.

Each Line Input module is equipped with a comprehensive family of control logic capability which includes the remote control of module ON, OFF, CUE and SOLO functions with status tally lights. Also provided are ready status and start/stop command pulses for turntables, cartridges and reel-to-reel tape machines. The ready status illuminates the channel OFF button whenever a tape is threaded or cartridge is loaded and ready for play. The ON button starts the remote controlled equipment as well as turning the channel on. The module audio is automatically turned off upon the receipt of a cartridge fast wind or end of tape command. In addition, the module may be set to control the console mounted timer system for the automatic up-time of events.

SLATE/TALKBACK/TEST/OSCILLATOR MODULE

The Slate/Talkback/Test/Oscillator module provides a test oscillator, a slate tone oscillator and talkback facilities for the BMX III console. The test oscillator generates low-distortion, stable amplitude tones to allow system test and line-up with any of 15 frequencies. The tones may be assigned to any combination of the PROGRAM, AUDITION and UTILITY mix buses.

SLATE commentary may be added to a tape recording by the console mounted electret microphone and/or from an external producer's microphone. A low distortion spotter tone (nominally 30 Hz, adjustable) with carefully controlled envelope rise and fall times, may be recorded with the commentary for ease of fast-wind identification of the cuts on a track.

The console and producer microphones can talk to any of two studios plus a remote or external location, such as a screener booth, 2-way, etc. The external location can also talk back to the studios as well as the control room. The frequency response of all the talk microphone preamplifiers has been carefully shaped to favor speech communication.

METER SWITCHER MODULE

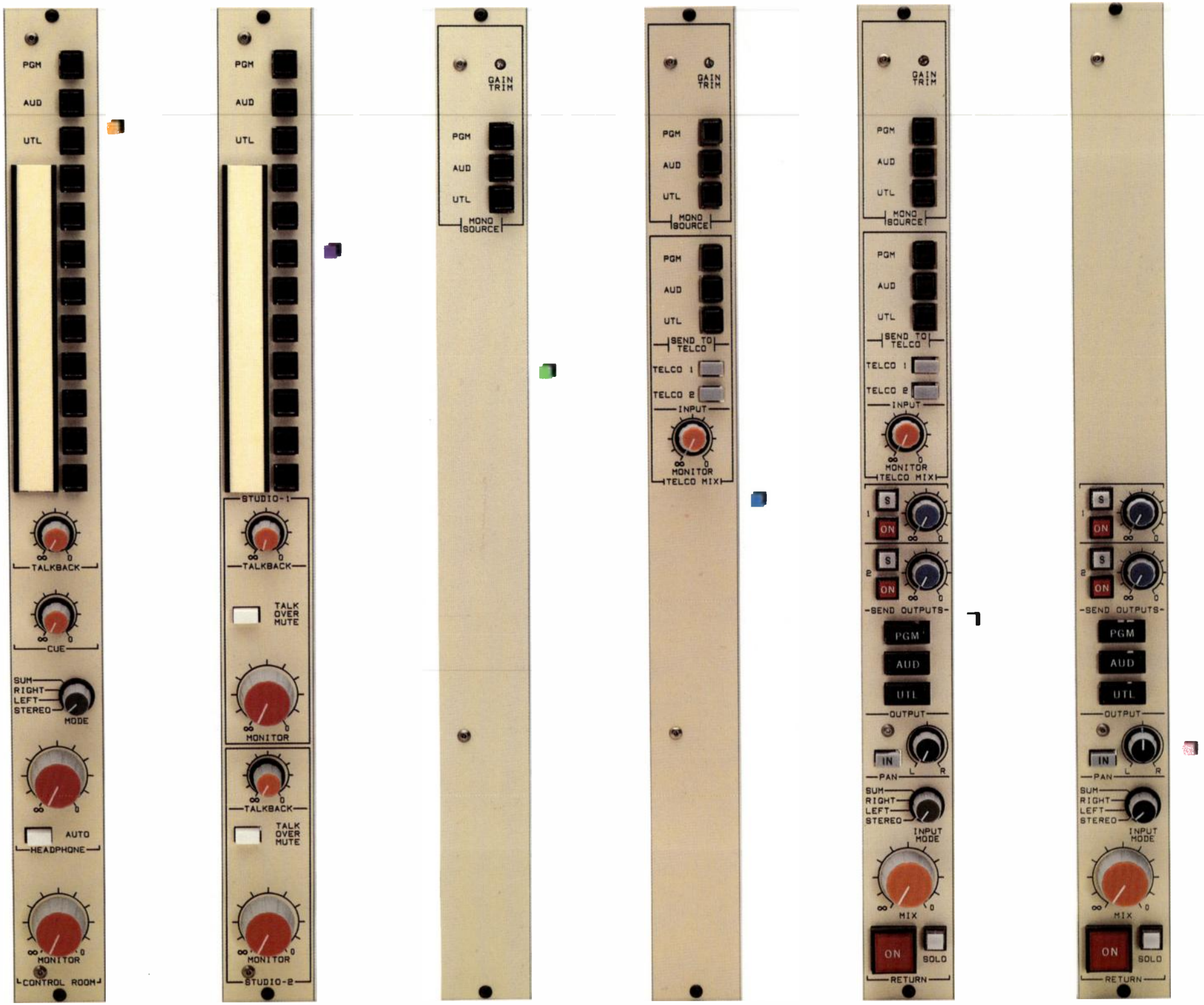
The auxilliary meters in the BMX III meter panel are driven by the Meter Switcher module. This module provides switchable metering facilities for the AUDITION and UTILITY outputs in the smaller mainframe sizes. The unassigned inputs may be used to meter user determined external sources. The module automatically defaults from the selected status whenever a CUE or SOLO button is engaged on any module. The auxilliary meters will then display the nominal operating level at the CUE or SOLO point selected. This enables a quick input level check when displaying CUE, and very convenient level line-up when displaying SOLO. The SOLO metering function eliminates the need to use a console output bus for preview and level setting.

STEREO OUTPUT MODULE

The Stereo Output module contains the mixing and distribution amplifiers for a console line output. The console is supplied with three of these modules, one each for the PROGRAM, AUDITION and UTILITY buses. Each module supplies four stereo distribution outputs; each output is capable of supplying up to +28 dBm. Patch send and return points are available for the connection of external processing equipment and/or a patch field. The output is an active balanced design; output transformers are available as an option.

REMOTE LINE SELECTOR MODULE

The Remote Line Selector module provides a selection of 10 stereo signals switched to one output. Up to two parallel-input selector modules may be installed in the BMX III. The inputs and outputs for the modules are all brought out to the connector panel for ease of assignment. Typical applications include use as a line pre-selector ahead of input modules and tape recorders.


PGM
AUD
UTL
TALKBACK
CUE
SUM
RIGHT
LEFT
STEREO
MODE
AUTO
HEADPHONE
MONITOR
CONTROL ROOM
STUDIO-1
TALK OVER MUTE
STUDIO-2
GAIN TRIM
MONO SOURCE
SEND TO TELCO
TELCO 1
TELCO 2
INPUT
TELCO MIX
S
ON
SEND OUTPUTS
OUTPUT
IN
PAN
L
R
INPUT MODE
MIX
SOLO
RETURN

CONTROL ROOM MONITOR MODULE

Monitoring of PROGRAM, AUDITION and UTILITY or any of nine external signals is provided by the interlocking monitor selector. The MONITOR and HEADPHONE potentiometers are sealed long-life conductive-plastic controls which were custom designed by Penny & Giles for the BMX III, AMX and ABX consoles. The AUTO headphone monitoring facility has been derived from the ABX console and is unique in the industry. Whenever an input module CUE button is engaged, the console operator's headphones automatically switch from the normal stereo monitor mode to one of two user assignable states; these are stereo cue, or mono cue in one earphone and mono monitor in the other. The headphone feeds to a co-host and/or guests are not affected.

adjustable degree of monitor level reduction during talkback. The TALKBACK control adjusts the volume of incoming talk signals. Talkback may be monitored with an independent amplifier and loudspeaker, or through the stereo cue system. The CUE control adjusts the level of the cue system. Logic circuitry is provided for the remote control of monitor dim and mute.

STUDIO MONITOR MODULE

The Studio Monitor module is expressly designed for applications where separate voice/announce booths or conference studios are required. This module provides the monitor, headphone and talkback facilities for up to two studios. Monitoring or PROGRAM, AUDITION and UTILITY or any of nine external signals is provided by an interlocking monitor selector. MONITOR, DIM and TALKBACK level controls are provided along with a TALK OVER MUTE button for each studio. The mute override button enables talkback to a studio even when the monitor speakers are muted. This would normally be used when doing off-air production work and/or when the talent chooses not to wear headphones.

The module has several outputs to meet most any combination of monitoring requirements. The main output is adjustable along with the degree of dimming during talkback. Fixed level outputs are available for those situations where the studio personnel are provided their own monitor and headphone level controls. The output for talent headphones is provided with talkback and a preset dim, a second output is provided for guest headphones which contains neither talkback or dim. Logic circuitry is provided for the remote control DIM and MUTE for each of the studio monitor sections.

MONAURAL OUTPUT MODULE

The Monaural Output module provides a selection of the three main outputs. The module may select the PROGRAM, AUDITION and UTILITY signals to derive a monaural output. The output is an active balanced design; an output transformer is available as an option.

MONAURAL OUTPUT/TELCO MIX MODULE

This combination module provides the features of the Monaural Output module plus the facilities for deriving mix-minus feeds for telephone hybrids. The telco mix section derives three unique mixes of the signals from two telephone callers and a selection of the PROGRAM, AUDITION and UTILITY buses.

The telephone signals which are to be broadcast, are selected and controlled by the input modules connected to the external hybrid systems. The Telco Mix module receives the audio from the input modules and sums them. This sum signal is routed to the meter selector and to the mix-monitor output. This telephone mix-monitor output is very useful when talk show talent and/or guests prefer not to use headphones.

The module provides for the selection of the output bus which is to contain the "base-mix" to be fed back to all the callers so that they may hear what is transpiring, even before air time. The signal fed back to a given caller includes the selected bus plus all the other callers, except himself (mix-minus). The signals fed back to the callers, may be passed through the on-board telephone bandpass filters for improved hybrid operation.

SEND & RETURN/MONAURAL/TELCO MIX MODULE

This module combines the Monaural Output/Telco Mix module with the facilities of the Send & Return module. This module is installed to support the use of the send circuits in the input modules and to provide return mix and assign circuitry for effects such as reverb. The Send & Return sections of this module operate identically to the dedicated Send & Return module described below.

SEND/RETURN MODULE

The optional Send/Return module contains both the send amplifiers and the stereo return circuits. The send portion of the module contains the mixing and output amplifiers for the two effects/foldback channels. Each of these has a variable LEVEL control with ON/OFF and SOLO facilities. The stereo effects return section of the module is equipped with a conductive plastic fader, MODE selector, PAN control, ON/OFF/SOLO buttons and output assignment buttons. Logic circuitry is provided for the remote ON/OFF control of both of the send circuits and the return channel.

REMOTE CONTROL PANELS

Tape deck remote control panels are available for most professional reel-to-tape recorders. The engraved RWD, FWD, STOP, PLAY and RECord buttons are function color-coded to common industry practice and are supplied with tally lamps.

Cartridge deck remote control panels are available for TOMCAT, MICROMAX and ITC cartridge recorders. Panels for other machines are available by request. Engraved buttons for TERtiary tone, SECondary tone, STOP, START and RECord are provided. The buttons are supplied with the appropriate voltage tally lamps.

The timer control panel provides illuminated START, STOP, RESET and HOLD buttons for the meter panel mounted DT-4 digital timer. An AUTO button couples the timer's reset and restart functions to the console timer reset command bus for the automatic up-time of events, (start with module on).

BUILD A BMX III JUST THE WAY YOU WANT IT.

The BMX III is available in several mainframe sizes to accommodate every broadcast requirement. Each BMX III is factory wired and fully tested for an entire complement of modules. You may order the console with fewer than capacity and then add modules as needs arise. Simply plug in the extra modules. A universal layout enables any input position to accept any type of module. Simply select the microphone, line and optional modules your application requires. You build the console to fit your precise needs.

ACCESSORIES FOR THE BMX III.

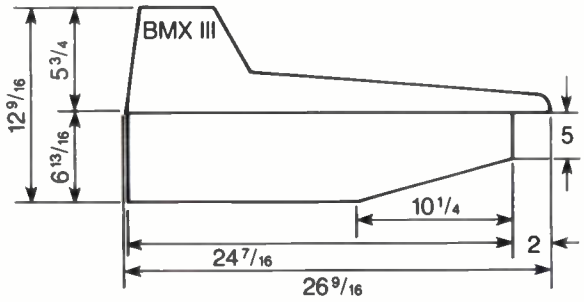
Copystands are available for all BMX consoles. There are two styles; the first is designed to be permanently attached to the top of the console, the second, a free-standing version which offers the advantage of positioning copy at an optimum reading distance for each operator.

The copystands are made of natural oak with a semi-transparent, smoke-bronze lucite copyboard.

The BMX III console may be ordered with an overbridge option which spans the top of the standard meter panel. This option provides additional mounting space for peripheral equipment such as routing switchers, remote controls, intercom, status alarm lamps and controls, remote readout displays, etc. The overbridge may be fitted at initial order or may be added to an existing BMX Series console in the field.

The optional turret units are designed to provide an attractive and practical housing for talent control panels and display modules. Microphone buttons, monitor/headphone panels, clocks, and timers are some of the devices which may be installed. The turrets are finished in a durable laminate with solid oak end panels which match the profile of the oak panels on the BMX III meter panel.

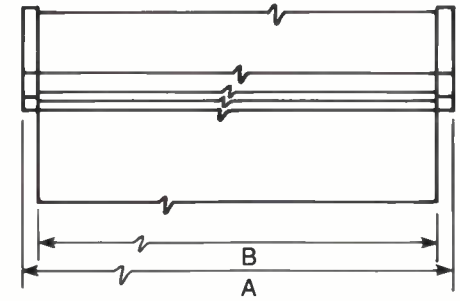
BMX III MECHANICAL DIMENSIONS



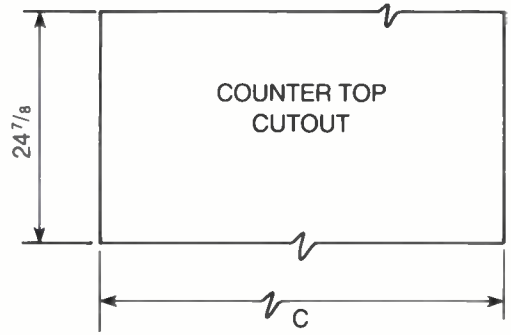
SIDE VIEW

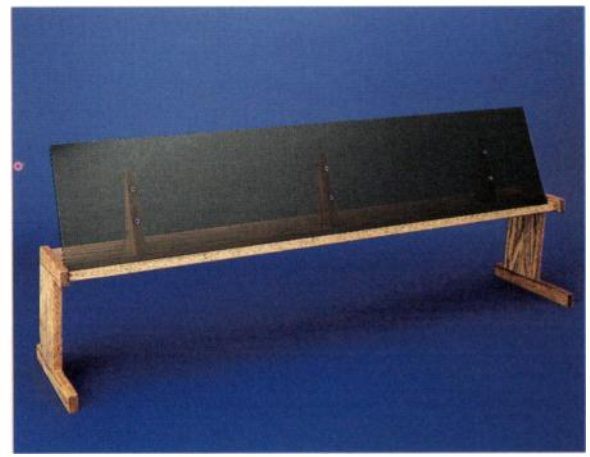
CONSOLE	A	B	C
BMX III-10	32	30½	30¾
BMX III-14	38	36½	36¾
BMX III-18	44	42½	42¾
BMX III-22	50	48½	48¾
BMX III-26	56	54½	54¾
BMX III-30	62	60½	60¾
BMX III-34	68	66½	66¾

NOTE: All Dimensions are in Inches

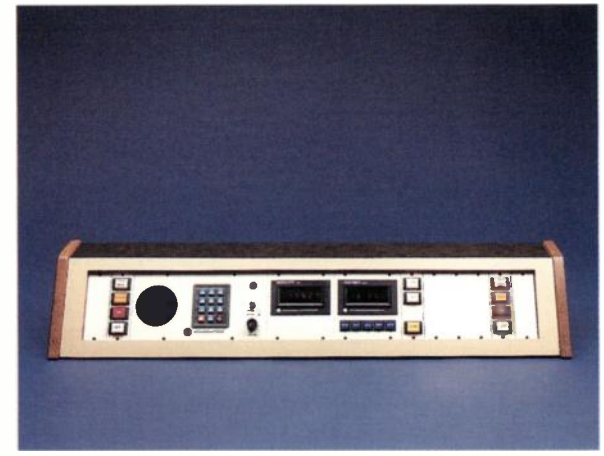


FRONT VIEW





Copy stands are available in fixed or free-standing formats for all BMX consoles.



Optional overbridge or turrets give you extra space and they match perfectly with a BMX.

SPECIFICATIONS

MICROPHONE INPUT :

Source Impedance	150 ohms
Input Impedance	1000 ohms minimum, balanced
Input Level Range	Adjustable from -60 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS :

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range	
Line Input	Adjustable from -12 dBu to +8 dBu
Monitor Input	Nominal +4 dBu/+8 dBu
Patch Input	Nominal -10 dBu
Input Headroom	Greater than 30 dB above nominal input levels

MAIN OUTPUTS :

Load Impedance	600 ohms
Source Impedance	30 ohms
Nominal Output Level	+8 dBm, adjustable to +4 dBm
Maximum Output Level	
Line Amplifiers	+28 dBm, 600 ohm load
Send Module	+26 dBm, 600 ohm load

MONITOR OUTPUTS :

MAIN OUTPUTS:

Load Impedance	600 ohms or greater
Source Impedance	30 ohms, unbalanced
Output Level	0 dBu nominal, ±20 dBu maximum

HEADPHONE OUTPUTS:

Load Impedance	45 ohms or greater
Source Impedance	Less than 4 ohms
Output Level	0 dBu nominal, +29 dBu maximum

FREQUENCY RESPONSE :

Microphone Input to Program Output	+0 dB, -0.9 dB, 20 Hz to 20 kHz
Line Input to Program Output	+0 dB, -0.8 dB, 20 Hz to 20 kHz

NOISE :

Microphone Input Amplifier	-127 dBu RMS equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	-88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output noise with one microphone channel ON, fader at -15 dB, input sensitivity at -50 dBu	76 dB below output, reference +8 dB 150 ohm source, 20 kHz bandwidth
Output noise with one line channel ON, fader at -15 dB, input sensitivity at +8 dBu.	80 dB below output, reference +8 dB 600 ohm source, 20 kHz bandwidth
Output noise with no input channels ON	82 dB below output, reference +8 dB, 20 kHz bandwidth

DISTORTION , T.H.D. :

Microphone input to program output	Less than 0.02%, 20 Hz to 20 kHz, -50 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output
Line input to program output	Less than 0.008%, 20 Hz to 20 kHz, +8 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output

DISTORTION, I.M. :

Microphone input to program output	Less than 0.008%, -50 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load
Line input to program output	Less than 0.005%, +8 dBm input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load

CROSSTALK :

Interchannel crosstalk	Less than -85 dB at 1 kHz Less than -75 dB at 20 kHz

NOTES:

1) These specifications are for the basic signal paths, per channel, with either or both channels of a stereo pair operating and with 600 ohm loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the *same voltage value* as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

3) Noise specifications are for a 14-input console (BMX-14) larger consoles will have slightly reduced signal-to-noise ratios due to increased summing amplifier gain. Noise specifications are based upon a 20 kHz bandwidth: the use of a meter with a 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Pacific Recorders & Engineering Corp. reserves the right to change specifications without notice or obligation.



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Printed in U.S.A.
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PACIFIC RECORDERS
& ENGINEERING CORPORATION

990.09

PERIPHERAL EQUIPMENT

SDA-8A: STEREO DISTRIBUTION AMPLIFIER



Rear Panel View



The new SDA-8A is a high quality stereo distribution amplifier designed for general purpose use in all professional audio applications. Drawing from our experience in custom system engineering, we have incorporated several new and unique features into the new SDA-8A, the successor to our very popular SDA-8. Although primarily a stereo amplifier with excellent cross-talk isolation between the stereo channels, the SDA-8A is also an ideal distribution amplifier for two monaural signals.

The inputs are balanced and bridging, with a 40K ohm input impedance which may be switched to a 600 ohm termination. The gain of each input amplifier is adjustable and is designed for nominal input levels ranging from −30 dBu to +9 dBu. The gain controls are in the feedback loop of the input stages to maintain optimum noise and headroom performance for any gain setting. The input headroom remains at a constant 20 dB above the nominal input sensitivity.

The output of each input amplifier is routed through a rear panel patch connector for connection to an external patch field or signal processing equipment (such as an equalizer or AGC amplifier). The level at the patch point is −10 dBu which is compatible with the majority of processing equipment and the patch point levels of most modern consoles. The patch return input to the distribution amplifier is balanced to eliminate any common mode noise induced into the outboard wiring.

The unique input mode switch permits the amplifier to operate with STEREO inputs to eight stereo outputs, or three monaural modes: LEFT, RIGHT or SUM L+R to all sixteen outputs.

The miniature VU meters fully conform to ANSI specifications and are switchable between the inputs and outputs of the amplifier. The meters are driven by bridging buffer amplifiers to isolate the distortion by-products of the meter movement rectifiers. These buffer amps allow a "0" VU calibration trim range of +4 dBm to +8 dBm.

The output amplifiers are differential, balanced to ground and designed to drive 600 ohm, or higher, bridging loads. Each output is capable of simultaneous level in excess of +26 dBm (600 ohms) and +27 dBu into bridging loads. The gain of each output amplifier may be internally calibrated for +4 dBm or +8 dBm nominal operating level.

The fully-regulated power supply features a toroidal power transformer. This transformer is compact, efficient and has very low electromagnetic field radiation.

The amplifier and power supply design are a combination of discrete and integrated circuitry. All components are conservatively rated for high performance and long-life operation. The amplifier is constructed on a double-sided circuit board which makes use of a ground plane and other decoupling and bypass techniques to insure amplifier stability and performance in high RF environments.

FEATURES:

- Stereo Input to Eight Stereo Outputs
- Bridging/Terminating Input Selection
- Wide Gain Range
- Interstage Patch Connector
- Very high common mode rejection ratio and headroom.
- Input Mode Selection of Stereo Left Source, Right Source, and Sum
- VU Meters to ANSI Specification
- High Output Level Capability
- Very Low Noise and Distortion
- Switchable Input/Output Metering
- Front Panel Stereo Headphone Monitor Jack
- Transparent Security Cover for Control Protection

SPECIFICATIONS:

INPUTS:	Source Impedance	600 Ω or less
	Input Impedance	40 kΩ balanced, 600 Ω switchable option
	Input Level Range:	
	Main Input	Adjustable from −30 dBu to +9 dBu
	Patch Return Input	Nominal −10 dBu
	Input Headroom	>20 dB above nominal input
	Input CMRR:	
	Main Input	>80 dB below 1 kHz, >60 dB from 20 Hz to 20 kHz
	Patch Return Input	>40 dB at 1 kHz
OUTPUTS:	Output Source Impedance	80 Ω
	Output Level:	
	Main Output	Adjustable from +4 dBm to +8 dBm
	Patch Send Output	Nominal −10 dBu
	Headphone Output	Same as Main Output Level
	Maximum Output Level (Main)	+26 dBm into 600 Ω loads; +27 dBu into bridging loads
FREQUENCY RESPONSE		+0 dB, −.6 dB, from 20 Hz to 20 kHz
NOISE		80 dB below output, reference +8 dBu, 600 Ω source, 20 kHz bandwidth
DISTORTION, T.H.D.		<0.008%, +26 dBu input, +26 dBm output into 600 Ω load, 80 kHz meter bandwidth
DISTORTION, I.M.D.		<0.008%, +24 dBu input, +24 dBm output into 600Ω load, SMPTE test method
CROSSTALK		< −80 dB, 1 kHz
POWER REQUIREMENTS		10 watts @ 117 VAC, ± 10%, 60 Hz

NOTES: 1) These specifications are for the basic signal paths, per channel, with 600 Ω loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 0 dBm measured in a 600 Ω circuit. This enables convenient level measurement with meters calibrated for 600 Ω circuits.

3) Noise specifications are based upon a 20 kHz measurement bandwidth; the use of a meter with 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Pacific Recorders & Engineering Corporation reserves the right to change specifications without notice or obligation.

TX-990: STEREO PHONOGRAPH PREAMPLIFIER





Rear Panel View

FEATURES:

- JE-990 Input Amplifier
- Dual-Stage RIAA Equalization
- Switch-Selectable Cartridge Loading
- High & Low Frequency Response Trim Equalizers
- Switchable 16 Hz, 18 dB/octave Low-Cut Filter
- Balanced, Line Level Outputs
- Unbalanced, "Hi-Fi" Outputs
- Very Low Noise & Distortion
- Transparent Security Cover for Control Protection

The TX-990 Phonograph Preamplifier was designed for professional audio applications where high performance and the utmost reliability are mandatory. Every aspect of preamplifier design was carefully reviewed and then optimized in the final design of the TX-990. Extensive computer modeling and network analysis was used to determine the basic RIAA equalization and the trim equalizer and subsonic filter response characteristics. The adjustable input loading networks offer the precision of switch-selectable termination resistors and capacitors to accommodate a very wide range of cartridge types.

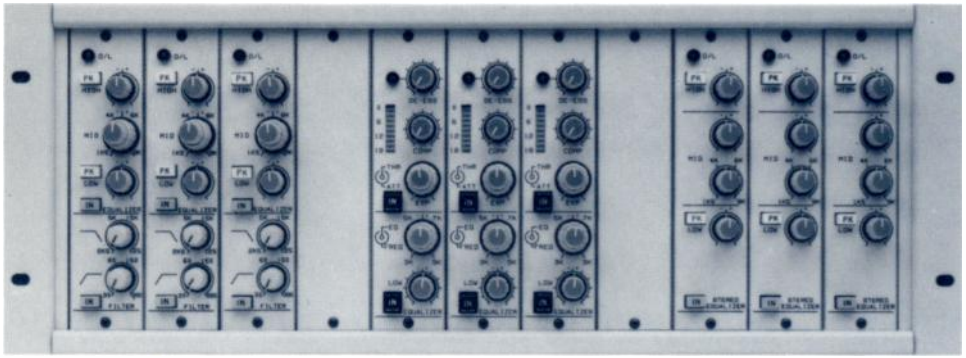
The extreme amplitude response range required for RIAA equalization is divided between the input amplifier and the following stage to optimize both the accuracy of the equalization curve and the performance of the individual amplifiers. Each of the equalized amplifiers is equipped with a DC servo feedback system which provides an ultra-low frequency response corner. The input amplifiers are JE-990 modules which offer a very low input noise figure and remarkable dynamic performance (these plug-in modules are the same types used for bus summing applications in our ABX, AMX and BMX Series III consoles). The balance of the preamplifier's stages are a combination of integrated and discrete designs. The trim equalizer allows tailoring the preamplifier to accommodate minor errors in cartridge response by providing limited range, band-edge equalization in the 20-40 Hz and 10-20 kHz regions. The line output amplifiers are transformerless, balanced to ground designs, capable of providing standard operating line levels of +4 dBm to +8 dBm, with a maximum level of +26 dBm (600 ohms). The unbalanced outputs are terminated in gold-plated phono connectors with an output 14 dB below the balanced output level.

The fully-regulated power supply features a toroidal power transformer. This transformer is compact, efficient and has very low electromagnetic field radiation.

All components in the TX-990 are conservatively rated for high performance and long-life operation. The preamplifier is constructed on double-sided circuit boards which use ground plane shielding in addition to decoupling and bypass techniques to insure preamplifier performance in high RF environments.

SPECIFICATIONS:

Frequency Response	RIAA playback curve ±0.5 dB, 20 Hz to 20 kHz
Signal to Noise Ratio	Greater than 74 dB, re: +8 dBu output, 1 kHz input @ 5 mV, 600 Ω source impedance, 20 Hz to 20 kHz meter bandwidth; 76 dB with shorted input.
Harmonic Distortion	Less than 0.005% at any frequency, 20 Hz to 20 kHz, with input level below input stage clipping point and gain control set below output-stage clipping point, 80 kHz meter bandwidth.
IMD	Less than 0.002% using SMPTE standard, pre-emphasized per RIAA curve, below clipping points as described above.
Risetime	10 microseconds
Square Wave Response	No overshoot or ringing
Input Level	Nominal: 5 mV RMS at 1 kHz Maximum: 1 volt RMS at 1 kHz; maximum allowable input at lower frequencies follows the RIAA equalization curve.
Input Impedance	Internal 6-station DIP switches allow stable and repeatable setting of the input terminations as follows: **Resistive:** From approximately 1.6 Ω to 100 kΩ **Capacitive:** From approximately 10 pF to 640 pF.
Highpass Filter	Third-order, 16 Hz Butterworth, switch defeatable.
Response Trimming	Limited range (±7 dB) band-edge (20-40 Hz and 10-20 kHz) shelving type response trimmers, front panel adjustable
Output Level	Nominal: +8 dBu Maximum: +26 dBm into 600 Ω load. Output level controls are front panel adjustable.
Input Connectors	Gold-plated RCA-type phono connectors
Output Connectors	Gold-plated RCA-type phono connectors for unbalanced applications and 6-pin Molex connector for balanced applications.
Power Supply	Toroidal power transformer for minimum radiated hum field; fully electronically regulated bipolar supplies.
Power Requirements	120 VAC, 50/60 Hz, 10 watts



EXP-11: THE EXP SERIES

SIGNAL PROCESSING EQUIPMENT



Rear Panel View of EXP-11 Powered Rack Frame for EXP Series Signal Processing Modules; a total of 11 pre-wired positions with all connectors.

The EXP Series of Signal Processing Equipment consists of the model EXP-11 powered rack frame, and three plug-in modules: a Voice Processor, a Monaural Equalizer and a Stereo Equalizer.

The EXP-11 powered rack frame occupies only 7" of rack space, contains a regulated power supply with toroidal power transformer and will accommodate any combination of up to eleven plug-in Voice Processor or Equalizer modules. Blank module front panels are used to fill unused slots in the EXP-11 frame. The rear panel features prewired PR&E standard Molex connectors for all 11 module positions and comes with mating connectors for customer wiring terminations.

The EXP Series Signal Processing Modules presently available are the identical components which we supply with our AMX and ABX consoles.

The Voice Processor Module

The Voice Processor module combines four separate functions including an equalizer, noise gate/expander, compressor and de-esser. The functions have been specifically optimized to provide tonal and level control for voice information.

The processor contains two major function sections. The first section is a switch-insertable equalizer which covers the frequency range normally required for speech correction and/or enhancement. The second section contains the expander (gate), compressor and de-esser system. The expander threshold and attenuation controls are used to achieve noise-reduction during pauses in speech while the compressor provides "smoothing and density" of the signal. The de-esser senses and operates only on the treble region which provides excellent control over excessive sibilance without undesirable broadband side effects.

The Monaural & Stereo Equalizer Modules

The Monaural Equalizer Module contains both a three-band equalizer and a separate, tunable high and low pass filter into one compact module. The equalizer section (which may be switched in and out independently from the filter section), contains bass and treble equalization sections which are independently switchable from peaking to shelving modes. The mid-range equalization is tunable over a considerable mid-band frequency range. All three equalization sections have reciprocal boost and cut curves, although an internal switch will permit the bass equalization section to remain in the shelving mode during cut.

The Stereo Equalizer Module contains two separate, but coupled, three-band equalizers. The high and low frequency equalization is switchable between peaking or shelving modes. The mid-range equalizer has the same broad range of control provided in the mono version.

DELAY CONTROLLER

The Delay Controller is an interface unit designed to work with the Eventide Model BD-955 series of digital delay systems. The controller is a dual channel unit which may be used for either MONO or STEREO delay systems.

The following facilities are provided:

DIRECT/DELAY

Upon entering the DELAY mode, the controller initiates a DUMP command pulse to the delay system(s).

DUMP

The DUMP function sends a delay DUMP command to the delay system(s).

CUT

The CUT function switches the output of the delay system(s) to a monitor output connector and disconnects the main output (air feed) from the delay. The CUT function additionally provides the capability to insert "silence" or an internally-generated "Censor" tone.

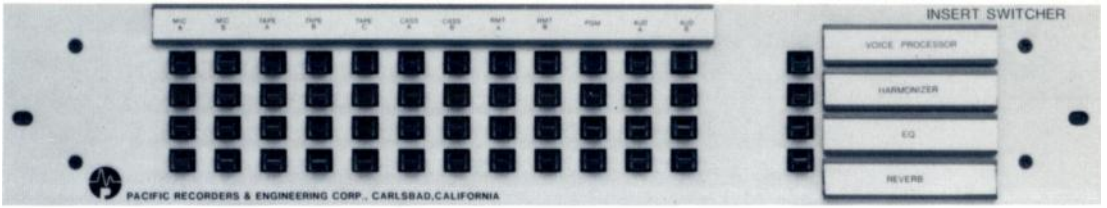
The Delay Controller has inputs for up to three sets of full-function remote controls. Prefabricated remote panels are available for all PR&E consoles, turrets, and Producer's desks.

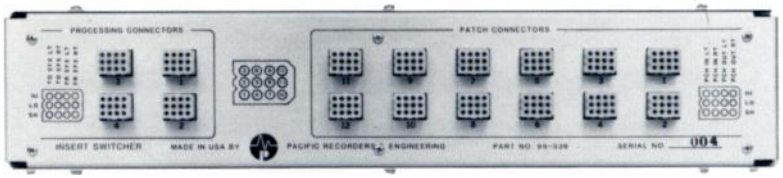




Rear Panel View

IS-12: INSERT SWITCHER





Rear Panel View

The IS-12 Insert Switcher offers a simpler and faster method for the patch point insertion of audio processing equipment than the traditional patch field array. Although the unit was designed for use with PR&E consoles, it will work with other consoles which offer patch points with low source impedance and bridging load impedance. The IS-12 will accommodate up to four stereo processing devices which can be assigned into any one of twelve patch points.

The IS-12 Switcher is designed to handle both balanced and unbalanced console patch circuits (the installer should verify that the inputs and outputs of the intended processing equipment is compatible with a particular console's patch insertion scheme).

The Switcher is organized into four rows of insertion selection switches. Each row also provides an independent bypass/insert switch. The switch rows (top through bottom) are wired in series to offer the flexibility of cascading up to four processors into any one particular patch point. A typical application for this feature would be to insert the following equipment into a microphone input channel: a filter followed by an equalizer, then a compressor and, finally, a de-esser.

Connection to the Switcher is achieved with 12-pin Molex connectors located on the rear panel. This style of connector is utilized for both processing equipment and connections to the console patch points. The wiring schedule follows the pin-out sequence of all PR&E products. Connection to a PR&E console is easily accomplished with simple cable harnesses which are wired pin-for-pin. Mating connectors and pins for all connections are supplied.

UTILITY SWITCH UNITS

The LS-4 and LS-10 rack mount switch units are simple and easy-to-install stereo audio selectors for general purpose use in a broadcast facility. Connection to the switchers is accomplished with Molex style connectors; mating connectors, pins and instructions are supplied with each unit.



LS-4 Line Selector has four groups of four-station stereo push-button selectors mounted in a 1.75-inch rack mount chassis. Each of the four switch assemblies has independent input and output Molex connectors on the rear panel. This design provides maximum configuration flexibility in connecting the switchers for various applications which may include tape recorder input selection, cross-connection for tape dubbing, line input selection for news work stations, and console output assignment.



LS-10 Line Selector has two ten-station stereo push-button switches mounted in a 1.75-inch rack mount chassis. The ten inputs of the two switches are wired in parallel, with each input and output appearing on a 6-pin Molex connector. Applications for this switcher may include: remote line selection for a console or news edit station, and monitor selectors for master control or terminal room.

Pacific Recorders & Engineering Corporation reserves the right to change specifications without notice or obligation.

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LOGIC AND REMOTE CONTROL SYSTEMS

The logic and remote control system elements listed in this brochure provide input module logic remote control of most cartridge, cassette, and reel tape machines, compact disc players and turntables by Pacific Recorders audio control consoles.

The logic interfaces provide total electrical isolation between the console and the connected peripheral equipment. This isolation precludes the possibility of ground loops via the control circuitry and machine-generated electrical interference to the console logic and/or audio. In addition, the interfaces perform a logic adaptation of the various peripheral equipment remote control schemes into a uniform control format acceptable to the control console. The interfaces also utilize status signals from the peripheral equipment to perform functions at the console, such as source "Ready", muting the module audio during cartridge fast forward, and logic "Reset" at cartridge recue.

Manual remote control panels are designed for installation in the BMX Series III, AMX and ABX consoles and provide full-function remote control, as available, of cartridge, cassette and reel tape recorders.

Prefabricated logic and remote control cable assemblies are available for use with all logic interfaces and remote control panels.

BLOCK DIAGRAM OF A TYPICAL LOGIC CONTROL SYSTEM



LOGIC INTERFACE UNITS

A variety of interfaces is available to meet the different electrical and control requirements of various brands and models of peripheral equipment. Each interface is provided with a set of mating Molex connectors and pins.

#99-110 TT-3 Turntable Interface for the console logic control of two Technics SP-10 or SP-15 turntables. Includes two modification kits and instructions for adapting the turntables for remote ready status and start/stop control.

#99-111 TI-2 Tape Interface for the console logic control of a reel tape recorder. Includes optional logic circuitry for audio lock-out during the record mode to prevent "round robbin" feedback via the tape.

#99-125-0 CI-2 Cart Interface for the console logic control of any combination of three cartridge recorders and/or reproducers, compact disc players, or similar equipment. This interface is designed for connection to equipment with tally lamp outputs of 121-24 VDC.

#99-125-1 CI-2 Interface, as above, but designed for equipment with 5 VDC lamp outputs, such as the ITC Delta series of cart machines.

#99-165 TCI-2A Cart Interface for the console logic control of three TOMCAT or MICROMAX cartridge recorders and/or reproducers.

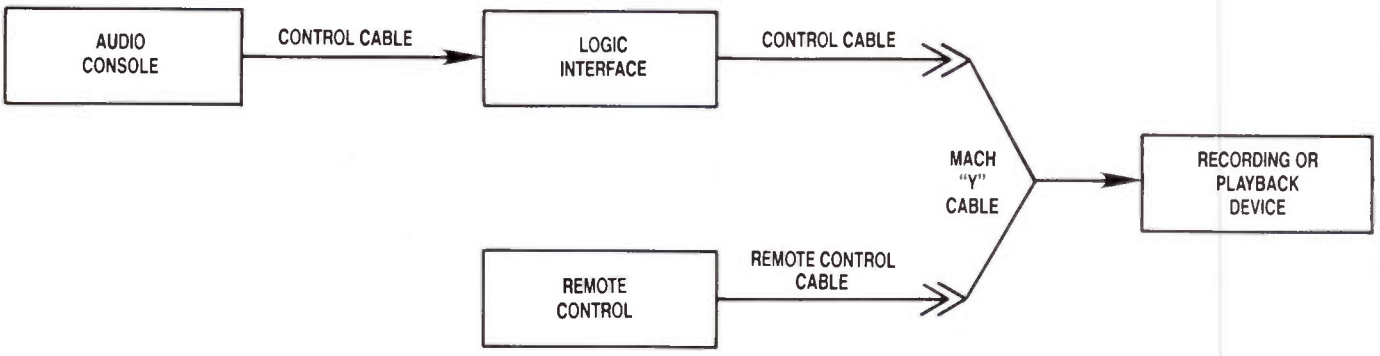
#99-143 WL-2 Warning Light Interface for the console logic control of separate warning lights for a Control Room and Studio. Contains two solid-state relays, each rated at 5A/250 VAC maximum, with 12 VDC input control signal.

#99-419 Dual Relay Interface. May be used for the muting of telephones, buzzers, intercoms, etc. Unit contains two four-pole, form-C, gold-plated contact relays terminated in barrier strips. The 12 VDC control voltage is obtained from the console warning tally output.

#99-409 Timer Reset Interface translates the play lamp voltages of up to three cartridge machines into timer reset and restart pulses for the DT-3 and DT-4 series of digital timers. The unit is powered by the timer power supply and accommodates machine tally input voltages of 5-24 VDC.

#99-410 Cassette Skimmer Interface translates the ON/OFF tally status of up to four microphone input modules into Record/Pause pulses for a skimming function by up to two remote-control cassette recorders.

BLOCK DIAGRAM OF A TYPICAL LOGIC CONTROL SYSTEM WITH FULL-FUNCTION REMOTE CONTROL PANEL



MACHINE REMOTE CONTROL PANELS

The six-inch remote control panels listed below are designed to be installed in the ABX, AMX and BMX III series of consoles. Each panel is prewired with a 9-inch cable and 24-pin female Molex connector for connection to the existing wiring harnesses in these consoles. Consult the factory for information regarding complete logic wiring utilizing console logic interfaces and control cables.

#99-240-X Control panel with five buttons for the control of tape cartridge machines. Control functions include: STOP, PLAY, RECORD, SECONDARY and TERTIARY switch enclosures and lamps wired to the Molex connector.

#99-221-X Control panel with five buttons for the control of reel-to-reel or cassette tape recorders. Control functions include: STOP, PLAY, REWIND, FAST FORWARD and RECORD switch closures and lamps wired to the Molex connector.

#99-400-X Control panel with seven buttons for the control of reel-to-reel tape recorders with timer locate functions. The primary controls are the same #99-221 above, with two added switch closures and lamps for locate functions RESET and SEARCH ZERO. All switches and lamps are wired to the Molex connector.

#99-406 Control panel with seven buttons for the control of Studer A-810 Tape Deck. The primary controls are the same as the #99-221 above, with the addition of the TRANSFER and LOCATE 1 functions. All of the switches and 28 volt tally lamps are wired to the Molex connector.

NOTE: The lamp voltages must be specified for all of the remote control panels listed, except the 99-406, by replacing the "X" with one of the following suffixes:

- -0 no lamps supplied
- -1 5 volt lamps supplied
- -2 14 volt lamps supplied
- -3 28 volt lamps supplied
- -4 5 volt LED indicator in RECORD switch (for #99-221 panel only)

PREFABRICATED CABLES

Pacific Recorders offers a wide range of prefabricated cable assemblies for use with logic interfaces, remote control panels and the more popular models of peripheral equipment.

All control cables are provided with male Molex connectors at each end while extension cables have a male Molex connector at one end and a female connector at the other. Machine control cables are supplied with a male Molex for the interface connection and the appropriate machine connector.

Whenever the console logic is used in conjunction with a manual remote control panel, a machine "Y" cable is required to join the control signals. A cable system designed for the console logic control of a recording device should include a machine "Y" cable as this will permit the easy future addition of a manual control panel. Machine "Y" cables are provided with the appropriate machine connector and two female Molex connectors for interface to the control cables. Please refer to our price list "Logic & Remote Control Systems" for a complete listing.

Pacific Recorders also offers a variety of "standard" control cables, male Molex to male Molex with from 2 to 24 conductors. Please contact the factory for details.

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ABX



PACIFIC RECORDERS & ENGINEERING CORPORATION

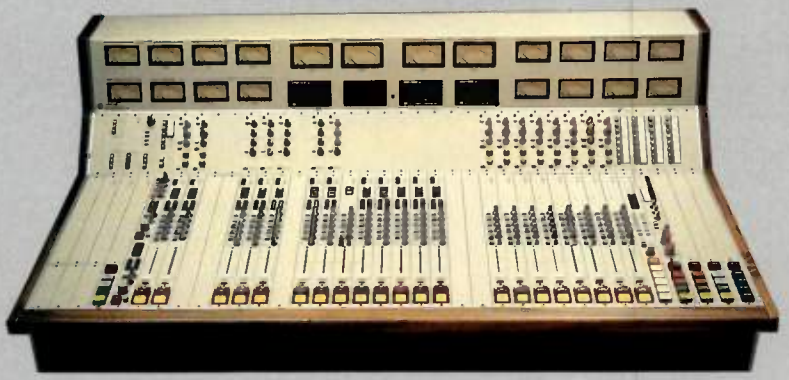
ABX

THE USER FRIENDLY CONSOLE

ABX-18



ABX-26



ABX-34



ABX FEATURES . . .

- Three main stereo mix buses
- Distribution line amplifiers on each main output
- 2-Mix stereo mixdown buses
- Up to eight multitrack mix buses
- Four effect/foldback send mix buses, each with remote control logic
- Stereo cue system with automatic console headphone monitor switching
- Stereo solo-in-place monitoring system
- Multifunction metering with automatic cue and solo level display
- Two stereo reverb/effects returns each with remote control logic
- Monaural equalizer with filters
- Monaural equalizers with gate, compressor and de-esser
- Stereo tracking equalizers
- Monitor system provides independent and unique outputs for console, host, co-host, and guest headphone feeds
- Two independent studio monitor systems available
- Multi-way intercommunication system including producer and external feeds
- Multi-frequency low distortion test oscillator
- Voice slate system with identification tone
- Four telephone mix-minus feeds plus telephone monitor mix
- Full and independent remote control logic on each input of microphone and line modules
- Fully regulated, independent supplies for audio, logic and phantom power
- On-board audio supply regulation on each module
- Mainframe fully wired for all present and future inputs, outputs, patch points and logic
- Connector panel silkscreened with clear, functional designations
- Audio logic interconnection system is compatible with BMX and AMX series consoles
- Mainframes for 18, 26, 34 input positions, larger frames sizes available upon request
- Console supplied with installation connectors and tools, service tool kit and spare parts kit

WRH

The ABX is a complete broadcast operations console . . . designed for all contemporary broadcast operations. ABX was designed from the ground up to provide the modern broadcaster with a console which does not compromise either production or on-air capabilities.

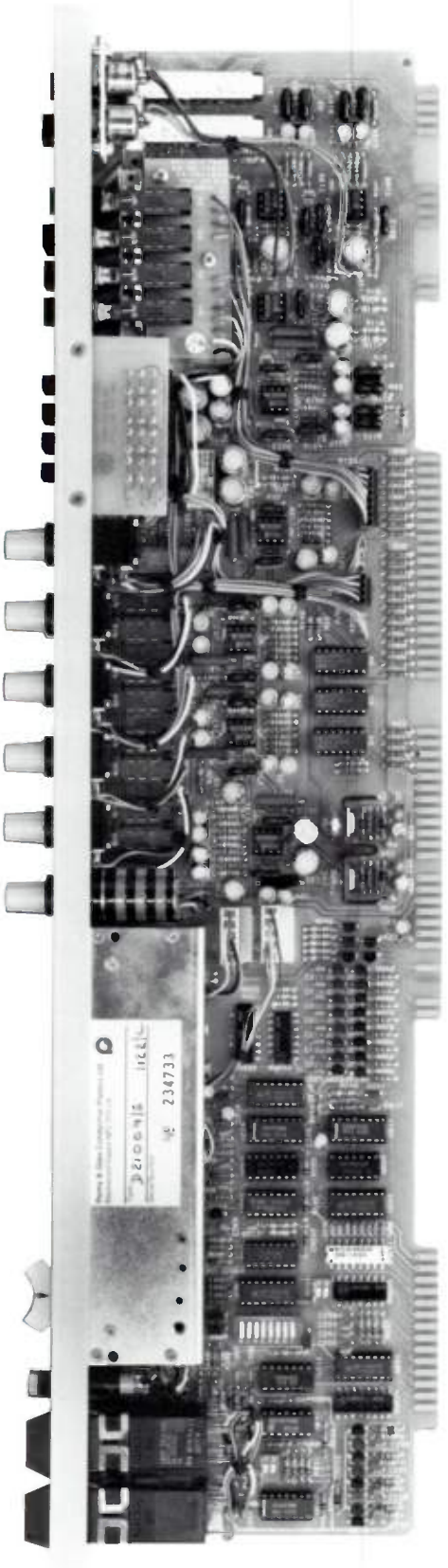
Until now, broadcasters have been forced to choose either on-air consoles that do not provide full equalization, reverb, foldback, solo, multitrack and mixdown; or recording consoles that do not give multiple stereo broadcast outputs, interactive machine control and sufficient stereo source inputs. The ABX provides all of these in a console suited for telephone talk, all news, multitrack production and all music formats.

As you look through this brochure, note the attention to detail, the thoughtful selection of components and most importantly, the thorough consideration of broadcaster needs that will give ABX a reputation for service and reliability equal to its sister console, the BMX.

First-quality components, the basis for a high performance product, are featured throughout the ABX. Advanced discrete and integrated circuitry yields low noise and distortion and provides excellent frequency response and headroom/overload capability. At least 30 dB of microphone and line input headroom is maintained to provide that extra margin for "hot" levels and operator error. Mixers are full travel Penny & Giles conductive plastic faders. Their conductive plastic elements and precious metal wipers are extremely linear and are impervious to the environment. The faders' mechanical components are non-corrodible nylon and stainless steel. All push buttons are Honeywell, EAO and Schadow, chosen for their extended life ratings. Audio transformers, where used, are designed by Deane Jensen. The VU meters conform to American National Standard C16.5-1954 and are driven by isolation bridging buffer amplifiers. Optional Peak Program Meters (PPM) conform to British Standard 4297:1969.

The sophisticated control logic of the ABX utilizes CMOS integrated circuits. CMOS provides silent and flexible control. Operating on 12 volt low current power, CMOS is very immune to electrical noise and strong RF fields. CMOS circuits generate little electrical noise, so you won't hear "chirps" or "clicks" in the audio as the logic operates. FET switches invariably introduce some form of non-linear distortion, even if slight, and the ABX is so clean that you might hear the difference. We therefore go a step further and use miniature, sealed gold-contact relays for all logic controlled audio switching outside of the side chains. The relays are quiet, reliable and cannot degrade audio performance. CMOS control logic is also easy to interface to external equipment. Logic interface/translator units are available with the ABX from Pacific Recorders & Engineering. The outputs of the control logic to external equipment are buffered by short-proof, discrete transistor circuitry.

The ABX is a low profile design. Plenty of room is available for the broadcaster to arrange his peripheral equipment. Careful attention has been paid to human engineering needs in the logical placement of switches and controls. All active electronics are accessible from the face of the console. Panel modules simply unplug from the housing. The separate power supply is rack mountable and comes supplied with a six-foot interconnecting cable. All audio, input/output and logic wiring between the console and studio equipment is done with easy-to-use connectors. Time consuming hand-wiring to terminal blocks is eliminated. Supplied with the ABX are mating connectors, pins, pin crimp tool and full wiring information. By pre-wiring the studio connectors, an ABX console can be installed and on the air in a few hours. Input assignments can be changed in the future with ease by simply moving the connector plugs.



The ABX is available in three mainframe sizes, to accommodate 18, 26 or 34 input modules. Every ABX mainframe is factory wired and tested for the full compliment of modules. You may order the console with fewer than capacity and expand the system at any time by simply plugging in the extra modules. Universal layout enables any input position to accept any input module. Simply select from microphone, line and multitrack modules to configure the console as you wish.

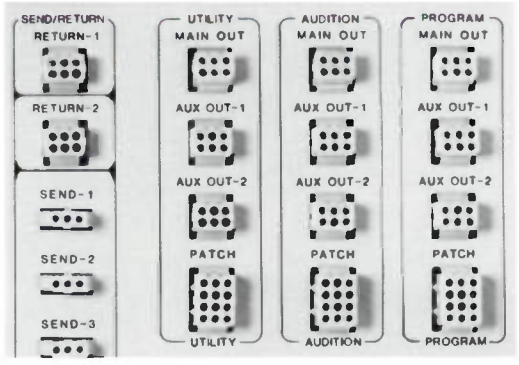
By plug-in connection of microphones, turntables, cartridge and reel-to-reel tape units and other inputs and outputs, the console is air-ready.

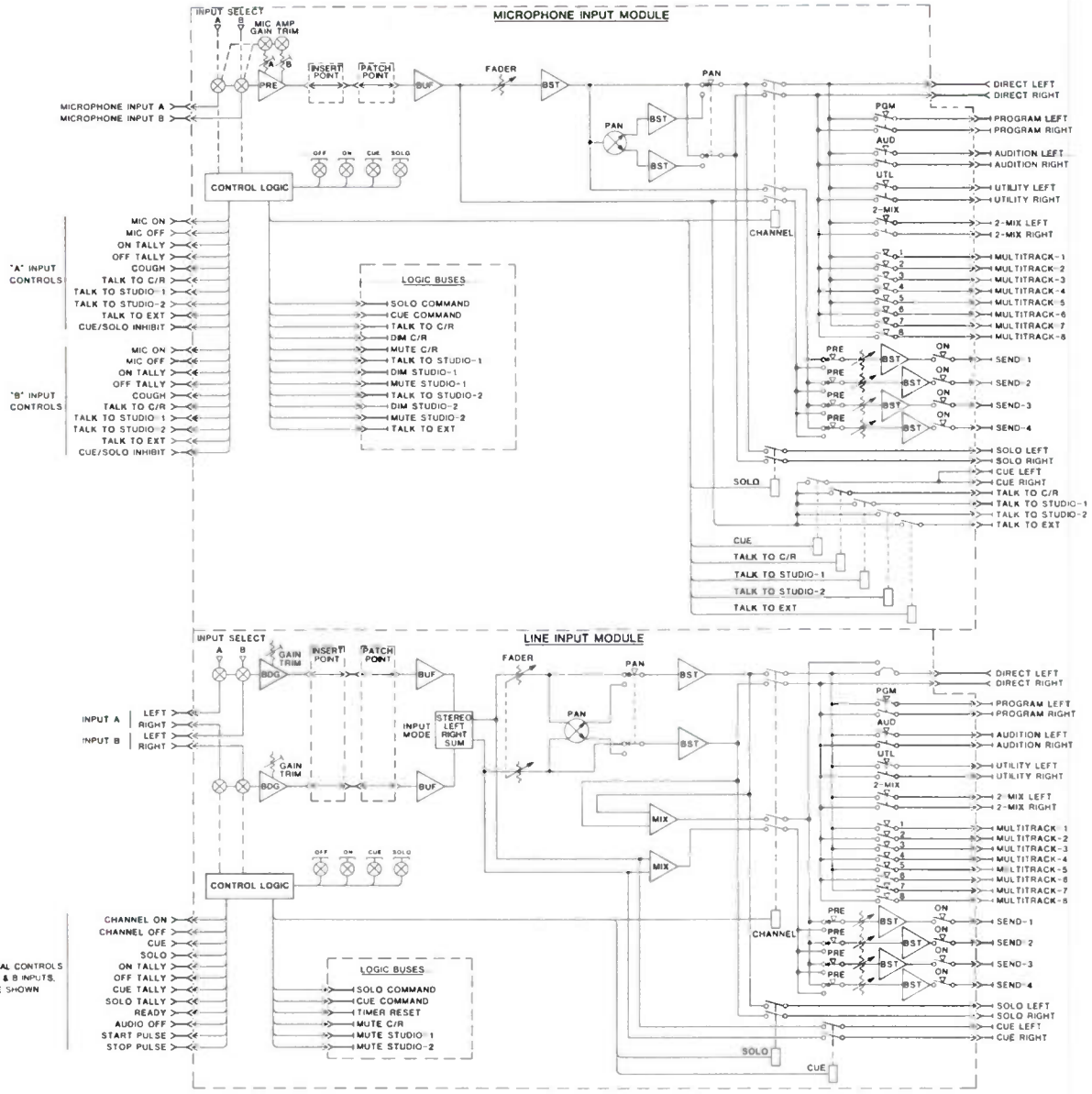
Reliability starts with a tough housing. The ABX is fabricated from aerospace materials and methods. Heavy gauge aluminum alloy end panels are fabricated on CNC mills for the ultimate in dimensional accuracy. Shaped, formed and riveted sheet metal frames are then fastened to these precision panels providing "skin tensioning" for even more stiffness. This housing does not twist or flex and therefore will not degrade card edge contacts or strain circuit traces. Hand wiring is minimized by the use of plug in circuit boards and a "mother board." This large interconnecting printed circuit board is strengthened and shielded by being fully enclosed by a continuous ground plane for the ultimate in RF and noise isolation. Only glass epoxy double-sided circuit boards are used. They allow the layout of components for optimum performance. Double-sided boards also support the use of ground plane shielding technology originally developed in the BMX console, which further reduces susceptibility to RF interference, noise and cross-talk. For added service convenience the components on each board are identified with silk screened designations. All circuit card fingers and mating edge connectors are gold plated. Front panels are constructed on anodized aluminum extrusions with aluminum inlays coated with durable polyurethane paint and epoxy silk screened with clearly labeled nomenclature.

The ABX is complimented in other design features by the solid oak trim panels that provide an attractive appearance that will also withstand the rigors of continuous professional use. The power supply is constructed in a rugged steel chassis and features massive regulator heat sinks. The audio, logic and phantom supply voltages are individually switched by magnetic circuit breakers.

From a careful design philosophy, utilizing state of the art technology, rugged physical construction techniques, and a sensitivity to the needs of the user, the ABX approaches perfection. It is a human-engineered console that broadcasters may run through the paces and come to universally accept as the standard of comparison.

ABX . . . easy to buy, easy to install and easy to service, with reliability and performance that has become a Pacific Recorders & Engineering trademark.




MICROPHONE INPUT MODULE
INPUT SELECT
A
B
MIC AMP GAIN TRIM
PRE
INSERT POINT
PATCH POINT
BUF
FADER
BST
PAN
MICROPHONE INPUT A
MICROPHONE INPUT B
OFF
ON
CUE
SOLO
CONTROL LOGIC
"A" INPUT CONTROLS
MIC ON
MIC OFF
ON TALLY
OFF TALLY
COUGH
TALK TO C/R
TALK TO STUDIO-1
TALK TO STUDIO-2
TALK TO EXT
CUE/SOLO INHIBIT
"B" INPUT CONTROLS
LOGIC BUSES
SOLO COMMAND
CUE COMMAND
TALK TO C/R
DIM C/R
MUTE C/R
TALK TO STUDIO-1
DIM STUDIO-1
MUTE STUDIO-1
TALK TO STUDIO-2
DIM STUDIO-2
MUTE STUDIO-2
TALK TO EXT
CHANNEL
DIRECT LEFT
DIRECT RIGHT
PGM
PROGRAM LEFT
PROGRAM RIGHT
AUD
AUDITION LEFT
AUDITION RIGHT
UTL
UTILITY LEFT
UTILITY RIGHT
2-MIX
2-MIX LEFT
2-MIX RIGHT
MULTITRACK-1
MULTITRACK-2
MULTITRACK-3
MULTITRACK-4
MULTITRACK-5
MULTITRACK-6
MULTITRACK-7
MULTITRACK-8
PRE
ON
SEND-1
SEND-2
SEND-3
SEND-4
SOLO LEFT
SOLO RIGHT
CUE LEFT
CUE RIGHT
SOLO
CUE
TALK TO C/R
TALK TO STUDIO-1
TALK TO STUDIO-2
TALK TO EXT
LINE INPUT MODULE
GAIN TRIM
BDG
INPUT A
INPUT B
LEFT
RIGHT
INPUT MODE
STEREO LEFT RIGHT SUM
MIX
CHANNEL ON
CHANNEL OFF
CUE
SOLO
ON TALLY
OFF TALLY
CUE TALLY
SOLO TALLY
READY
AUDIO OFF
START PULSE
STOP PULSE
INDIVIDUAL CONTROLS FOR A & B INPUTS, ONE SHOWN
TIMER RESET
MUTE C/R
MUTE STUDIO-1
MUTE STUDIO-2

MICROPHONE INPUT MODULE

The Microphone Input Module accommodates a wide range of input levels to permit use of all contemporary microphones. Input preamplifier gain is adjustable for nominal inputs of –60 dBu to –35 dBu. The A/B input selector provides two microphone inputs per module, each with individually programmable monitor muting which incorporates an automatic 40 millisecond delay before the microphone audio is turned on to permit "room reverb" to decay off mic. Each microphone input provides separate remote control capability to ON/OFF, COUGH and multiple TALKBACK functions. The module output is assignable to PROGRAM, AUDITION, UTILITY, MULTITRACK and 2-MIX buses. The four effects/foldbacks SENDS have individual level controls which can be source selected PRE- or post-fader. A PAN control, with insert switch, allows positioning of the microphone in the stereo image. The illuminated CUE button provides stereo cue monitoring which is pre-fader. Additionally, a similar style button allows monitoring of SOLO-in-place which is post-fader and pan. The channel ON and OFF buttons are illuminated to indicate the status of the channel. For further operator convenience, the control logic may be optionally set so that depression of the ON button provides momentary cough muting.

LINE INPUT MODULE

The stereo Line Input Module will accommodate nominal input levels from –12 dBu to +8 dBu. The A/B input switch selects either of two stereo inputs. Separate control logic is available on each input for the remote control of tape machines or other sources by the module. Four stereo outputs are assignable, including PROGRAM, AUDITION, UTILITY and 2-MIX. In addition, the module may be assigned to any combination of tracks for multitrack recording. The PAN control may be used to balance a stereo signal source or to position a mono source in the stereo image. Effect/foldback SENDS are provided, each with PRE-/post-fader and ON/OFF switches. An INPUT MODE switch allows input selection of stereo, left channel only, right channel only or the sum of right and left channel. Both CUE and SOLO facilities are also available as in the microphone input modules.

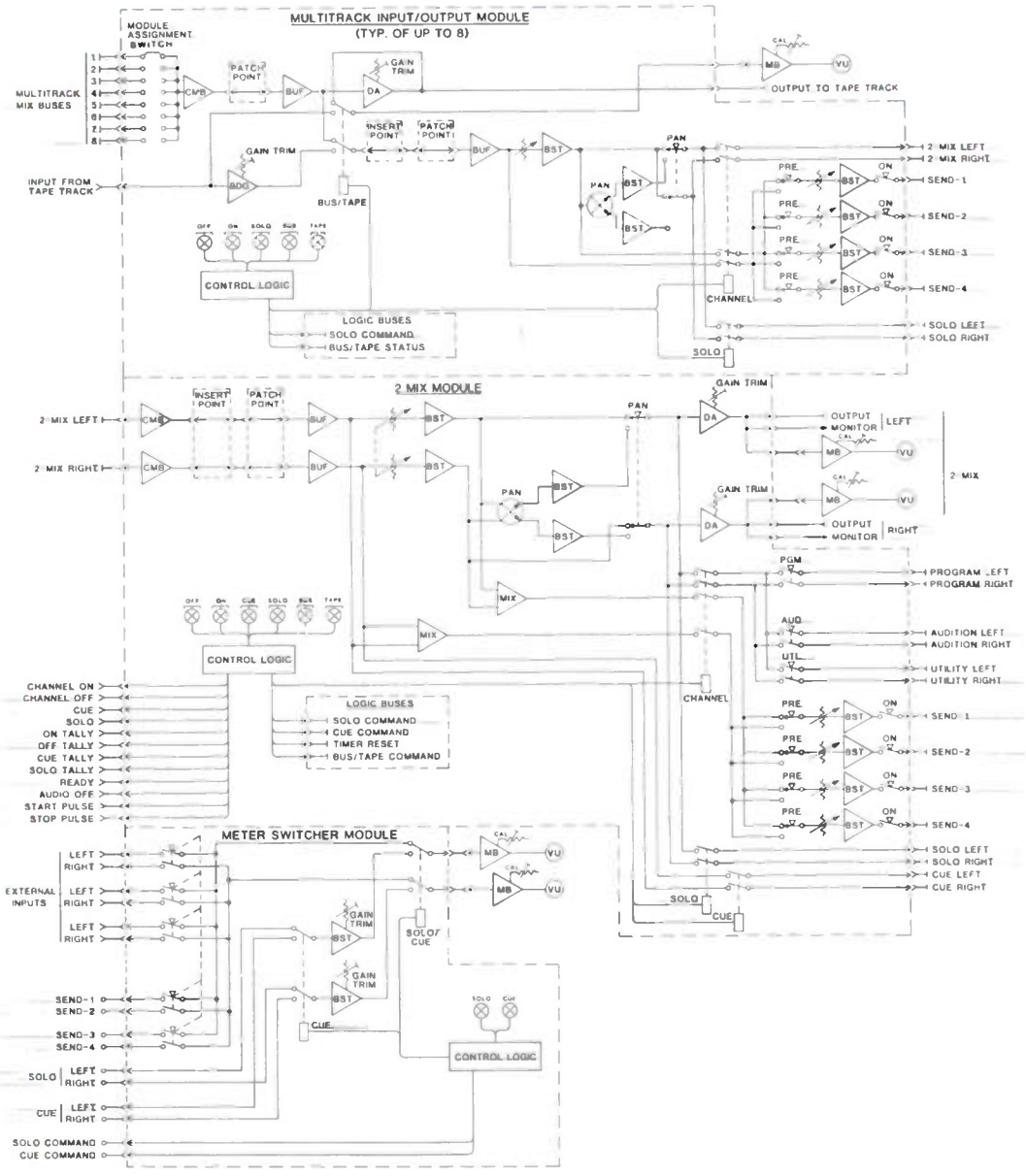
Every Line Input Module includes a comprehensive family of control logic input and output commands which include remote control of module ON/OFF, CUE and SOLO functions with tally lights. Provided are start/stop command pulses for turntables, cartridges and reel-to-reel tape machines, the ready, start and stop commands for tape cartridge machines, with the cart ready status illuminating the channel OFF button. The ON button starts the cartridge as well as turns on the module. Upon receipt of the end of message or the end tape signal from the cartridge machine, the module is automatically turned off. The ready tally, start/stop for open real tape machines is also available with functions similar to the foregoing cartridge machine functions. In addition, the module may be programmed to reset and restart the console timer to provide an elapsed time countup for user designated inputs, i.e., turntables, tape cartridges, etc.



Microphone Input Module



Line Input Module


MULTITRACK INPUT/OUTPUT MODULE
(TYP. OF UP TO 8)
MODULE ASSIGNMENT SWITCH
MULTITRACK MIX BUSES
INPUT FROM TAPE TRACK
PATCH POINT
INSERT POINT
GAIN TRIM
BUS/TAPE
CONTROL LOGIC
LOGIC BUSES
SOLO COMMAND
BUS/TAPE STATUS
OUTPUT TO TAPE TRACK
2 MIX LEFT
2 MIX RIGHT
SEND-1
SEND-2
SEND-3
SEND-4
CHANNEL
SOLO LEFT
SOLO RIGHT
SOLO
2 MIX MODULE
OUTPUT MONITOR
LEFT
RIGHT
2 MIX
PROGRAM LEFT
PROGRAM RIGHT
AUDITION LEFT
AUDITION RIGHT
UTILITY LEFT
UTILITY RIGHT
CHANNEL ON
CHANNEL OFF
CUE
SOLO
ON TALLY
OFF TALLY
CUE TALLY
SOLO TALLY
READY
AUDIO OFF
START PULSE
STOP PULSE
CUE COMMAND
TIMER RESET
BUS/TAPE COMMAND
METER SWITCHER MODULE
EXTERNAL INPUTS
CUE LEFT
CUE RIGHT
CUE

MULTITRACK MODULE

The Multitrack Module is a combination input and output module to be used with each track of a multitrack tape recorder. It provides the line output to the track as well as the stereo mixdown facilities for the bus or tape signals. The BUS and TAPE buttons select the source to be mixed and metered. Each mixdown channel is equipped with ON, OFF and SOLO buttons, four effects/foldback SEND controls and a PAN potentiometer.

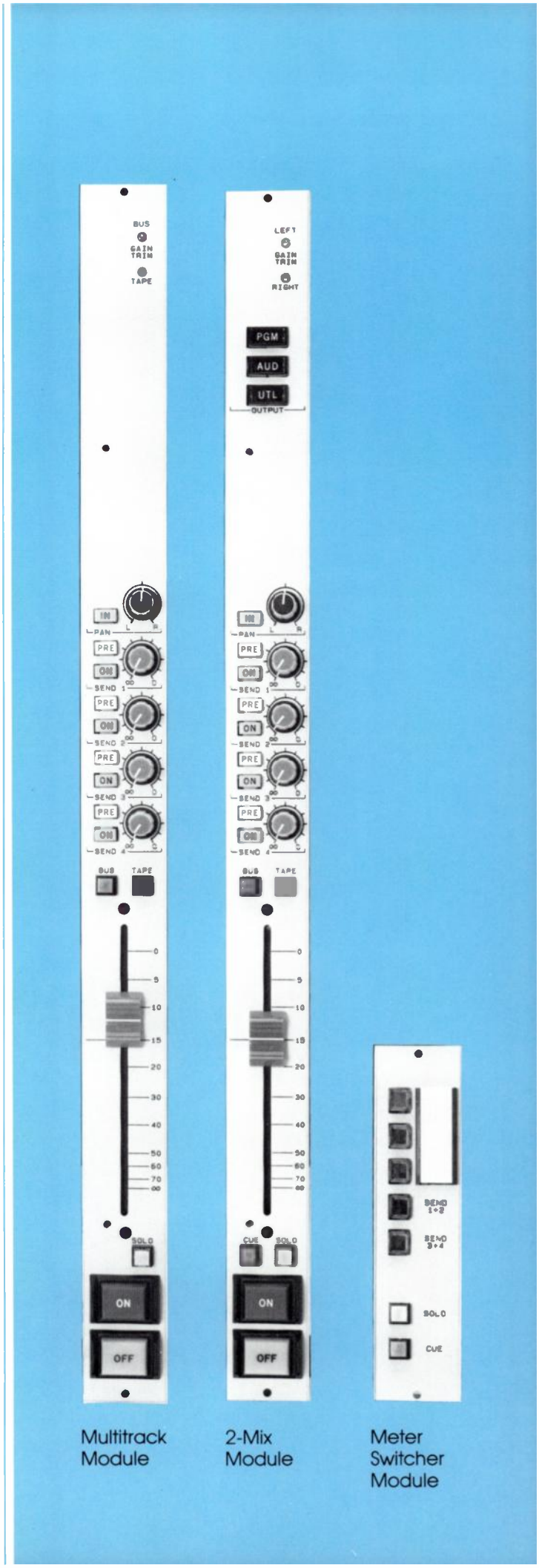
2-MIX MODULE

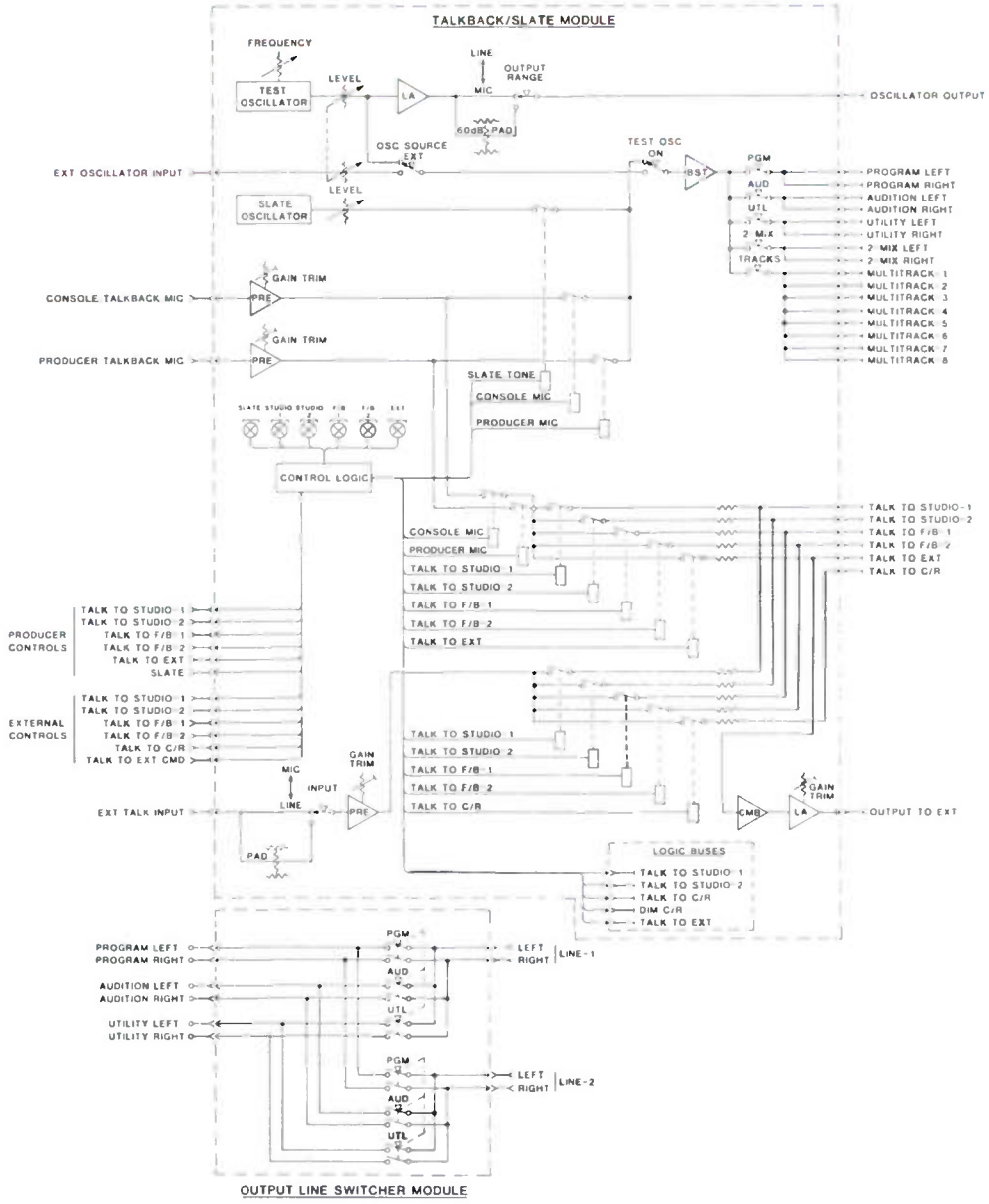
The 2-Mix Module is the mixing amplifier for the multitrack modules and, therefore, should be viewed as the stereo "input" module from the multitrack tape machine. This module provides the same audio and logic features as a stereo line input module except that its input is composed of the multitrack modules, plus other sources which have been assigned to the 2-Mix bus. The master BUS and TAPE buttons control the mixdown status of all the individual multitrack modules. The 2-Mix Module also contains the line amplifiers for the 2-Mix output channel.

METERING

The ABX Meter Panel provides meters to display the levels of the following console outputs: Stereo PROGRAM, stereo AUDITION, stereo UTILITY (ABX 26 & 34), stereo 2-MIX (optional), 4 or 8 MULTITRACK (optional), MONAURAL (optional), TELCO (optional) and AUXILIARY (two meters).

The AUXILIARY meters are driven by the Meter Switcher Module which may select from three external signals, SEND 1 & 2 and SEND 3 & 4. The Auxiliary meters automatically default to either CUE or SOLO whenever either is selected on any module. This provides rapid confirmation and line-up levels. The SOLO metering function eliminates the need to use a console output bus for preview and level setting.




TALKBACK/SLATE MODULE
FREQUENCY
TEST OSCILLATOR
LEVEL
LA
LINE
MIC
OUTPUT RANGE
OSCILLATOR OUTPUT
60dB PAD
OSC SOURCE
EXT
INT
EXT OSCILLATOR INPUT
LEVEL
SLATE OSCILLATOR
TEST OSC ON
BST
PGM
AUD
UTL
2 MIX
TRACKS
PROGRAM LEFT
PROGRAM RIGHT
AUDITION LEFT
AUDITION RIGHT
UTILITY LEFT
UTILITY RIGHT
2 MIX LEFT
2 MIX RIGHT
MULTITRACK 1
MULTITRACK 2
MULTITRACK 3
MULTITRACK 4
MULTITRACK 5
MULTITRACK 6
MULTITRACK 7
MULTITRACK 8
GAIN TRIM
PRE
CONSOLE TALKBACK MIC
PRODUCER TALKBACK MIC
SLATE TONE
CONSOLE MIC
PRODUCER MIC
SLATE STUDIO 1 STUDIO 2 F/B 1 F/B 2 EXT
CONTROL LOGIC
TALK TO STUDIO 1
TALK TO STUDIO 2
TALK TO F/B 1
TALK TO F/B 2
TALK TO EXT
TALK TO C/R
PRODUCER CONTROLS
SLATE
EXTERNAL CONTROLS
TALK TO EXT CMD
MIC
LINE
INPUT
EXT TALK INPUT
PAD
CMB
OUTPUT TO EXT
LOGIC BUSES
DIM C/R
PROGRAM LEFT
PROGRAM RIGHT
AUDITION LEFT
AUDITION RIGHT
UTILITY LEFT
UTILITY RIGHT
LEFT
RIGHT
LINE-1
LINE-2
OUTPUT LINE SWITCHER MODULE

SLATE/TALKBACK/TEST MODULE

The Slate/Talkback/Test Module provides a test oscillator, a Slate oscillator and Talkback facilities for the ABX console.

A test tone oscillator generates a low-distortion and stable-amplitude audio tone to allow system testing with any of 12 frequencies in the audio range.

Its output can be directed to the PROGRAM, AUDITION, UTILITY, 2-MIX and MULTITRACK buses. In addition, its output is available at the Oscillator Output terminals on the rear of the console. This output can be switched between either line or microphone level for the test and alignment of external equipment.

SLATE commentary may be added to the tape by the electret-microphone built into the console meter panel or from a producer's external microphone.

A low-distortion slate identification tone (nominally 30 Hz, adjustable) with carefully controlled envelope rise and fall times may be recorded onto a tape for ease of identification of the cuts on a track. The slate tone may be switched on from either of two locations, (e.g., producer and operator) and may be routed to any of the same buses as the test tone.

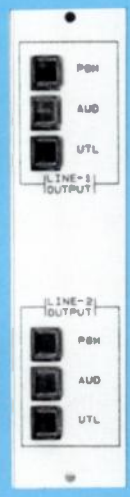
The producer and console microphones can talk back to any of two studios, two of the foldback lines or to an external location, such as a screener booth, 2-way, etc. The frequency responses of the talkback microphone-preamplifiers have been carefully shaped to favor speech frequencies.

OUTPUT LINE SWITCHER MODULE

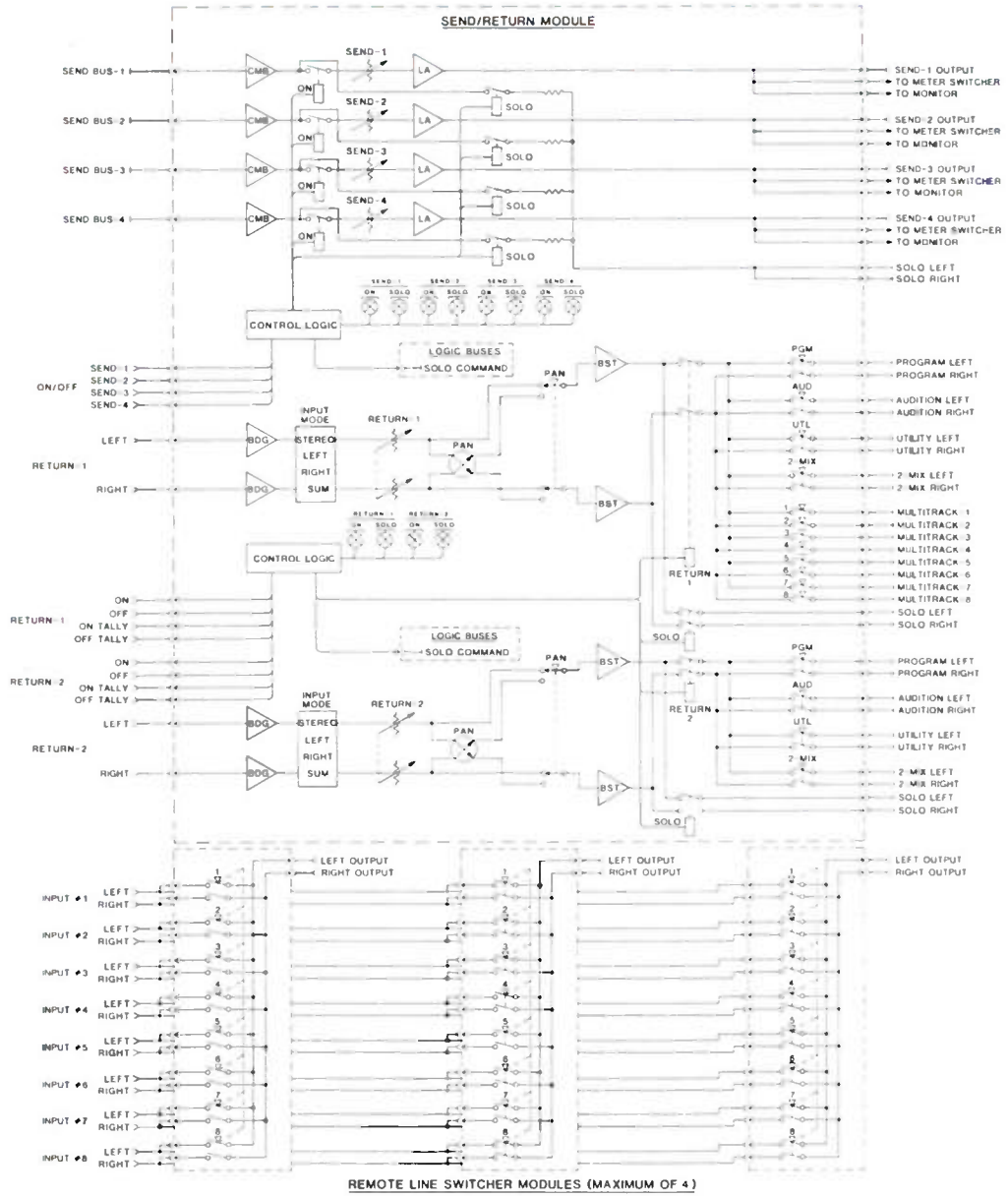
The Output Line Switcher Module selects PROGRAM, AUDITION or UTILITY buses for each of two lines out from the console.



Slate/ Talkback/ Test Module



Output Line Switcher Module



REMOTE LINE SWITCHER MODULES (MAXIMUM OF 4)

SEND/RETURN MODULE

The Send/Return Module co-houses the SEND amplifiers and the RETURN circuits

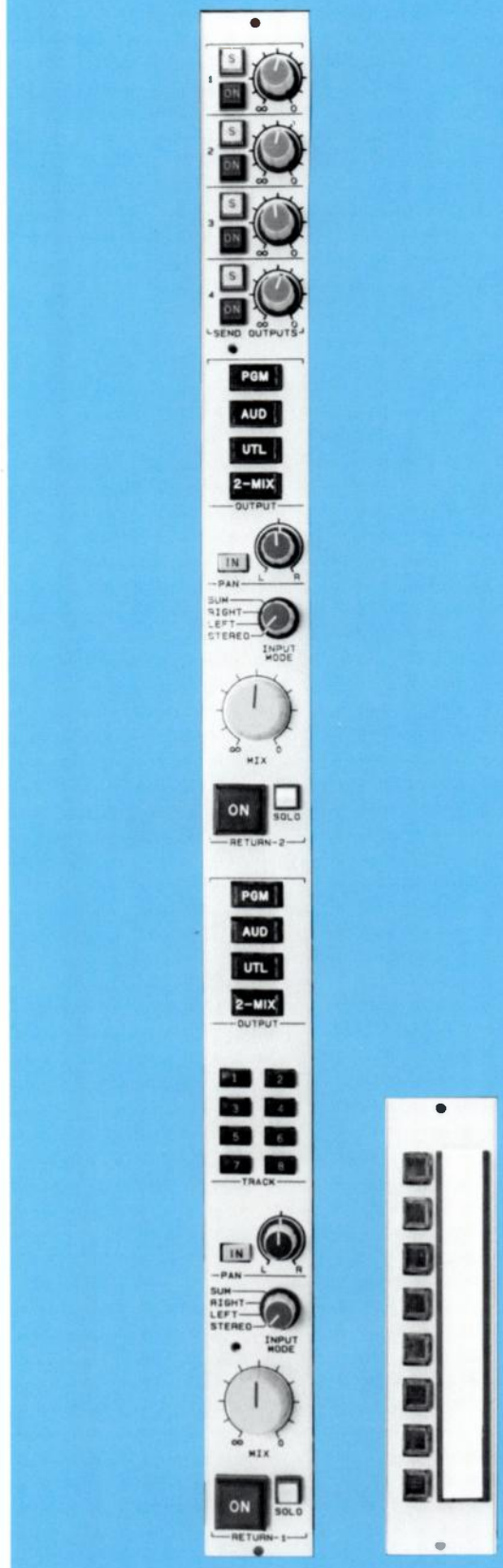
The SEND portion of the module contains the four mixing and output amplifiers for the effects/foldback channels. Each of these has a variable LEVEL control, ON/OFF and SOLO facilities.

The return section of the module contains two stereo echo return circuits with ON/OFF, SOLO, input MODE and PAN/balance controls. One of these returns may be assigned to all stereo buses and multi-tracks. The second return is equipped with assignments to the stereo buses only.

Logic circuitry is provided in both the SEND and the RETURN circuits for the remote control of the ON/OFF function of each module.

REMOTE LINE SELECTOR MODULE

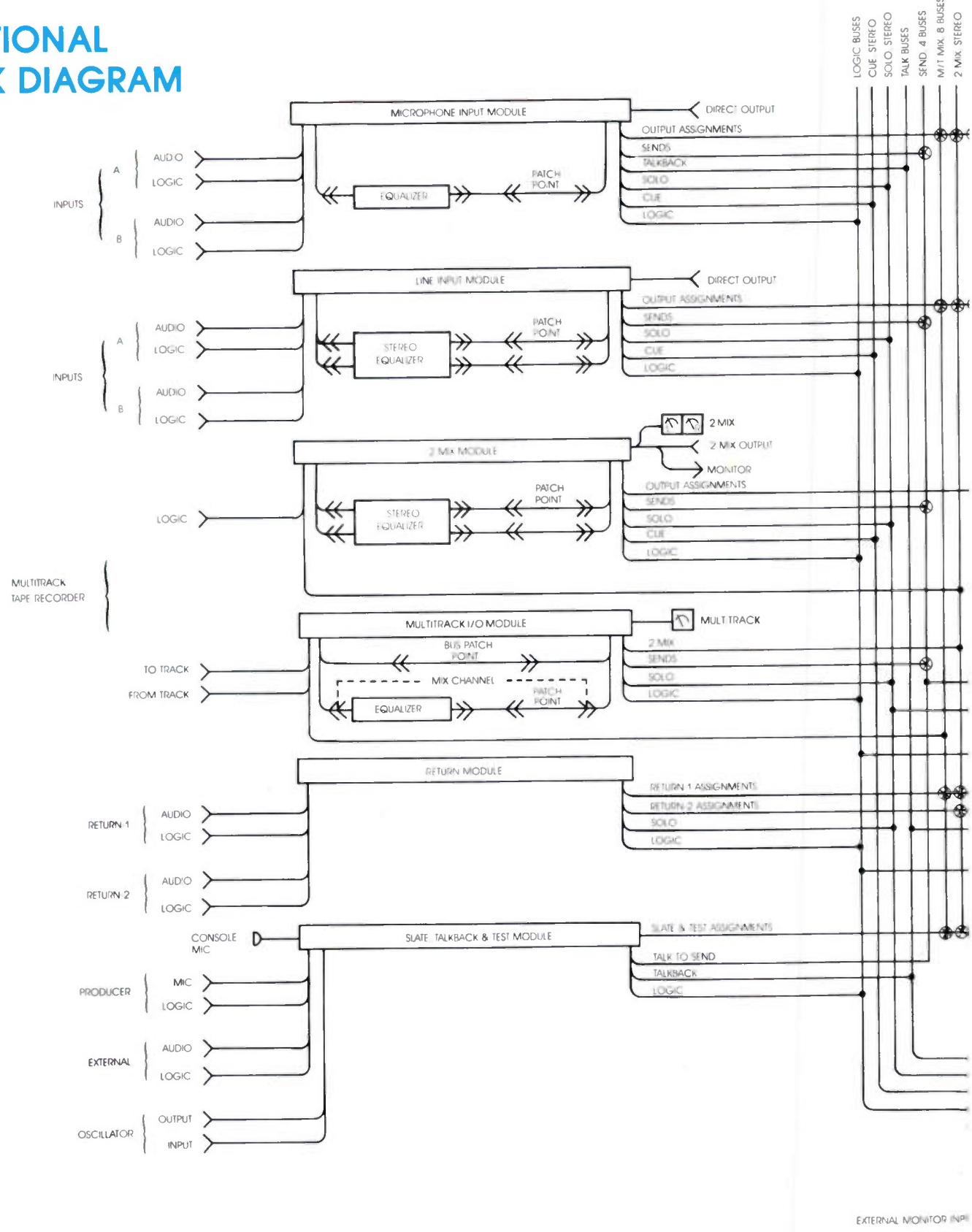
The Remote Line Selector module provides a selection of eight stereo signals switched to one output. Up to four parallel-input selector modules may be installed in the ABX. The inputs and outputs for the modules are all brought out to the connector panel for ease of assignment. Typical applications include use as a line pre-selector ahead of input modules and tape recorders.

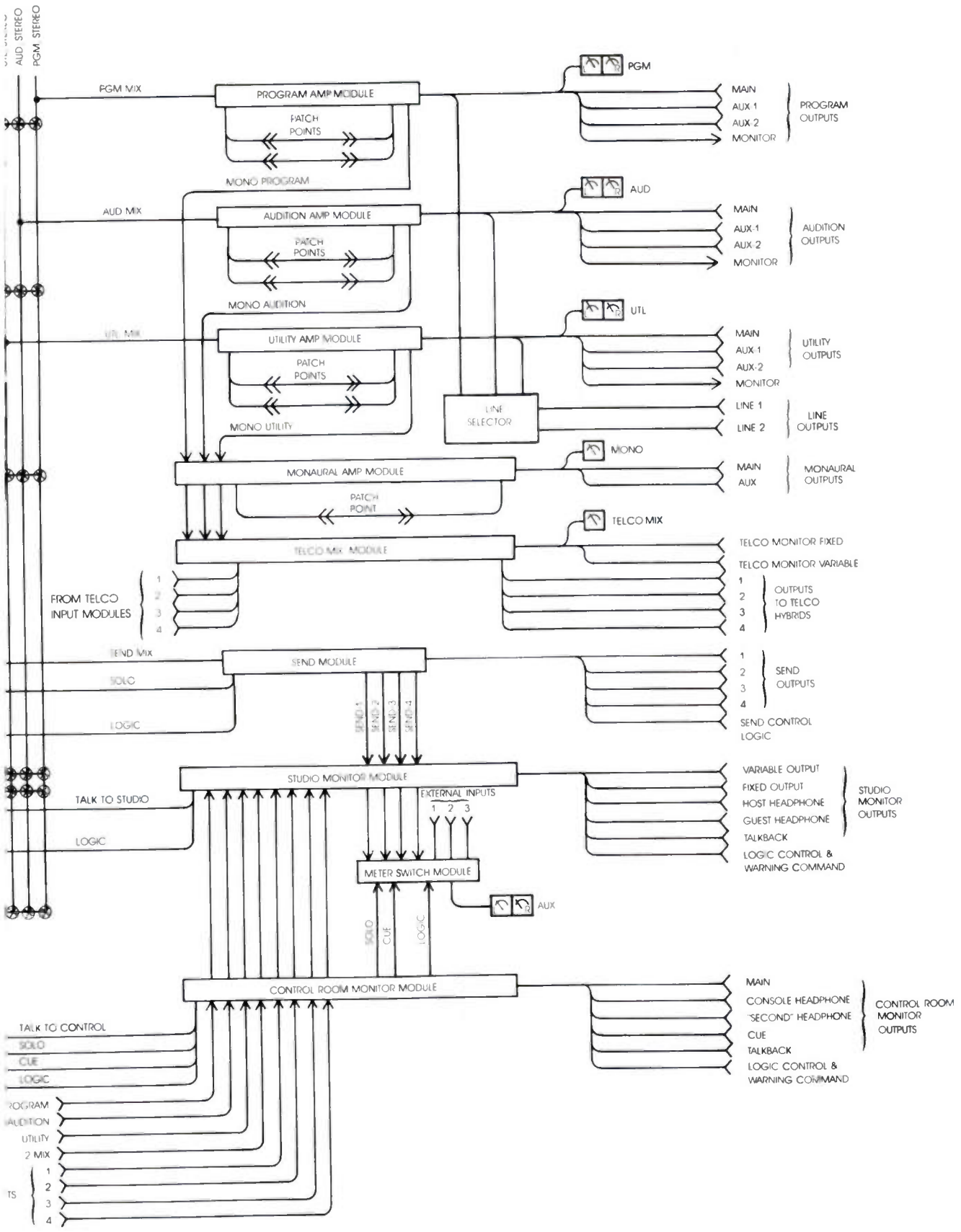


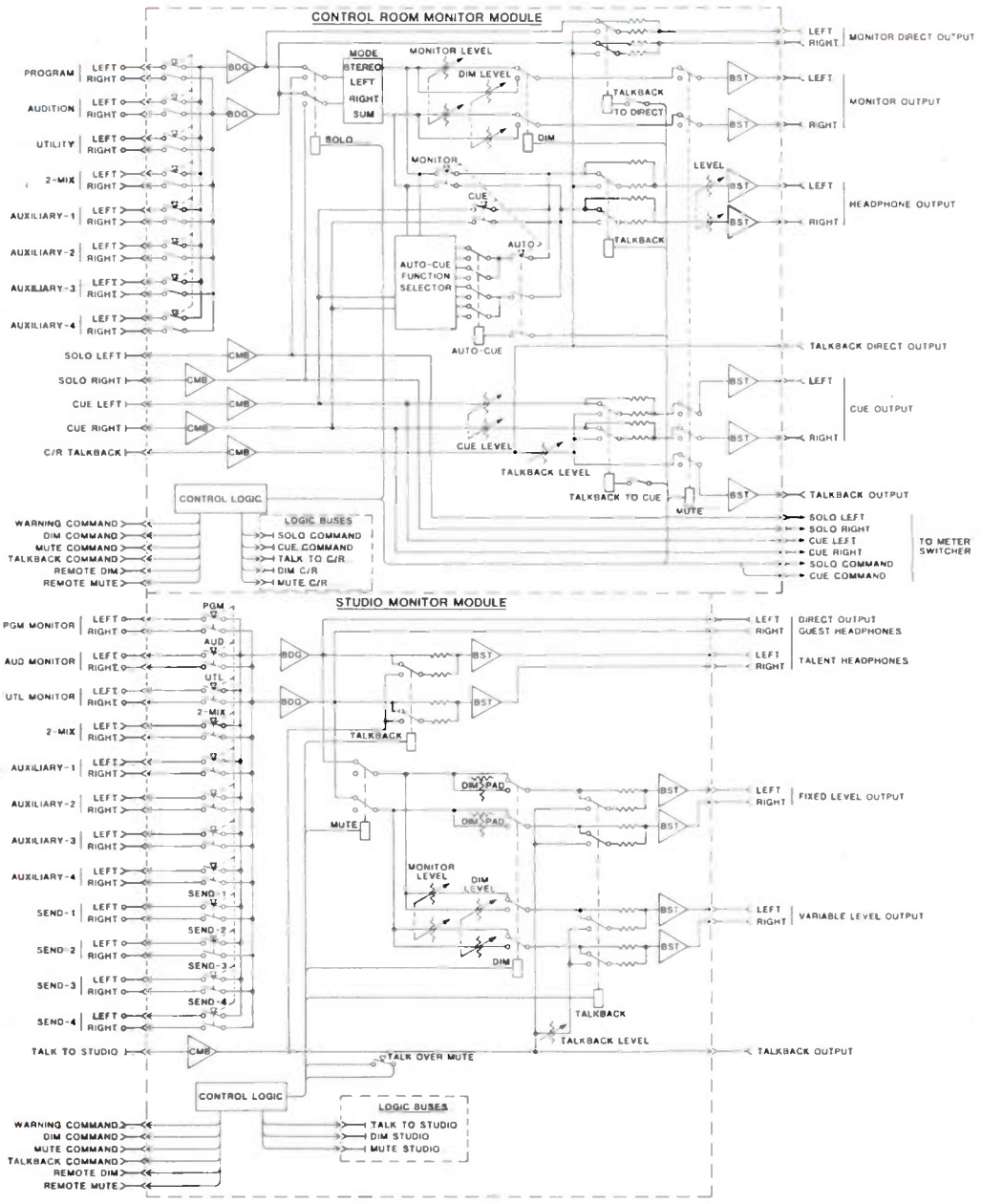
Send/ Return Module

Remote Line Selector Module

ABX FUNCTIONAL BLOCK DIAGRAM




AUD STEREO
PGM STEREO
PGM MIX
PROGRAM AMP MODULE
PATCH POINTS
MONO PROGRAM
PGM
MAIN
AUX 1
AUX 2
MONITOR
PROGRAM OUTPUTS
AUD MIX
AUDITION AMP MODULE
PATCH POINTS
MONO AUDITION
AUD
MAIN
AUX 1
AUX 2
MONITOR
AUDITION OUTPUTS
UTL MIX
UTILITY AMP MODULE
PATCH POINTS
MONO UTILITY
UTL
MAIN
AUX 1
AUX 2
MONITOR
UTILITY OUTPUTS
LINE SELECTOR
LINE 1
LINE 2
LINE OUTPUTS
MONAURAL AMP MODULE
PATCH POINT
MONO
MAIN
AUX
MONAURAL OUTPUTS
TELCO MIX MODULE
TELCO MIX
TELCO MONITOR FIXED
TELCO MONITOR VARIABLE
1
2
3
4
OUTPUTS TO TELCO HYBRIDS
FROM TELCO INPUT MODULES
1
2
3
4
SEND MIX
SOLO
LOGIC
SEND MODULE
SEND 1
SEND 2
SEND 3
SEND 4
1
2
3
4
SEND OUTPUTS
SEND CONTROL LOGIC
STUDIO MONITOR MODULE
TALK TO STUDIO
LOGIC
EXTERNAL INPUTS
1 2 3
METER SWITCH MODULE
AUX
SOLO
CUE
LOGIC
VARIABLE OUTPUT
FIXED OUTPUT
HOST HEADPHONE
GUEST HEADPHONE
TALKBACK
LOGIC CONTROL & WARNING COMMAND
STUDIO MONITOR OUTPUTS
CONTROL ROOM MONITOR MODULE
TALK TO CONTROL
SOLO
CUE
LOGIC
PROGRAM
AUDITION
UTILITY
2 MIX
TS
1
2
3
4
MAIN
CONSOLE HEADPHONE
"SECOND" HEADPHONE
CUE
TALKBACK
LOGIC CONTROL & WARNING COMMAND
CONTROL ROOM MONITOR OUTPUTS


CONTROL ROOM MONITOR MODULE
PROGRAM
AUDITION
UTILITY
2-MIX
AUXILIARY-1
AUXILIARY-2
AUXILIARY-3
AUXILIARY-4
LEFT
RIGHT
BDG
MODE
STEREO
LEFT
RIGHT
SUM
MONITOR LEVEL
DIM LEVEL
SOLO
DIM
MONITOR
CUE
AUTO
AUTO-CUE FUNCTION SELECTOR
AUTO-CUE
TALKBACK
TO DIRECT
LEVEL
BST
MONITOR DIRECT OUTPUT
MONITOR OUTPUT
HEADPHONE OUTPUT
TALKBACK DIRECT OUTPUT
SOLO LEFT
SOLO RIGHT
CUE LEFT
CUE RIGHT
C/R TALKBACK
CMB
CUE LEVEL
TALKBACK LEVEL
TALKBACK TO CUE
MUTE
CUE OUTPUT
TALKBACK OUTPUT
CONTROL LOGIC
LOGIC BUSES
WARNING COMMAND
DIM COMMAND
MUTE COMMAND
TALKBACK COMMAND
REMOTE DIM
REMOTE MUTE
SOLO COMMAND
CUE COMMAND
TALK TO C/R
DIM C/R
MUTE C/R
TO METER SWITCHER
STUDIO MONITOR MODULE
PGM
AUD
UTL
SEND-1
SEND-2
SEND-3
SEND-4
PGM MONITOR
AUD MONITOR
UTL MONITOR
TALK TO STUDIO
DIRECT OUTPUT
GUEST HEADPHONES
TALENT HEADPHONES
DIM PAD
MUTE
FIXED LEVEL OUTPUT
VARIABLE LEVEL OUTPUT
TALK OVER MUTE
TALK TO STUDIO
DIM STUDIO
MUTE STUDIO

CONTROL ROOM MONITOR MODULE

Monitoring of PROGRAM, AUDITION, UTILITY, 2-MIX or any of four external signals is provided by the interlocking monitor selector. Level control is available for DIMming, which provides an adjustable amount of level reduction during TALKBACK. Headphone selection may be directed to receive MONITOR, CUE or be placed in the AUTOmatic mode.

The AUTOmatic headphone/monitor circuit in the ABX is unique to the industry and provides the following facility: Whenever a cue button is pressed, the console operator's headphones switch from the normal stereo monitor mode to one of two user assignable states. These are stereo cue or mono cue in one earphone and mono monitor in the other. The feed to a co-host or guest headphone is not interrupted. A mode switch allows normal stereophonic operation or the choice of left, right or the sum of left and right as monaural sources.

STUDIO MONITOR MODULE

The Studio Monitor is expressly designed for applications where a separate voice/announce booth or conference studio is used. The module allows selection of PROGRAM, AUDITION, UTILITY and 2-MIX sources, any of the four SEND buses and up to four external signals. The nominal output level is adjustable as is the amount of DIMming or reduction of level during TALKBACK. A fixed level output is available in those situations where the studio personnel are provided operation of their own level control. This allows studio personnel to set their own levels, however, having the advantage of the preset DIM function.

A muting override button is provided to enable TALKBACK to the studio even when the speakers are muted. This is used when doing off-air production voice work and the talent chooses not to use headphones. An output for talent headphones is provided with talkback and the preset DIM. Another output is provided for guest headphones which contains neither TALKBACK nor DIM.

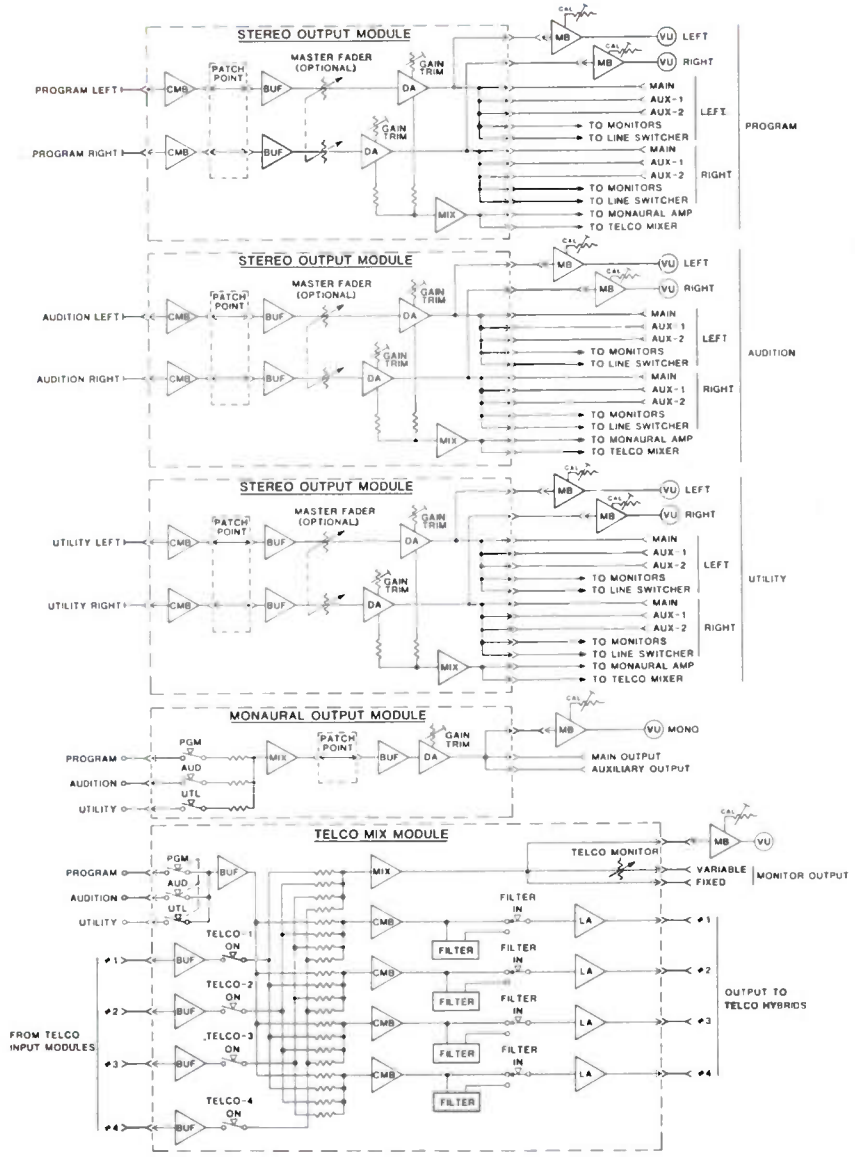
Up to two Studio Monitor Modules may be utilized in each console.



Control Room Monitor Module



Studio Monitor Module


STEREO OUTPUT MODULE
MASTER FADER (OPTIONAL)
PROGRAM LEFT
PROGRAM RIGHT
PATCH POINT
GAIN TRIM
CMB
BUF
DA
MIX
MB
VU
LEFT
RIGHT
MAIN
AUX-1
AUX-2
TO MONITORS
TO LINE SWITCHER
TO MONAURAL AMP
TO TELCO MIXER
PROGRAM
STEREO OUTPUT MODULE
AUDITION LEFT
AUDITION RIGHT
AUDITION
STEREO OUTPUT MODULE
UTILITY LEFT
UTILITY RIGHT
UTILITY
MONAURAL OUTPUT MODULE
PROGRAM
AUDITION
UTILITY
PGM
AUD
UTL
MONO
MAIN OUTPUT
AUXILIARY OUTPUT
TELCO MIX MODULE
TELCO MONITOR
VARIABLE
FIXED
MONITOR OUTPUT
TELCO-1 ON
TELCO-2 ON
TELCO-3 ON
TELCO-4 ON
FILTER IN
FILTER
LA
#1
#2
#3
#4
FROM TELCO INPUT MODULES
OUTPUT TO TELCO HYBRIDS

STEREO OUTPUT MODULE

The stereo output module contains the mixing and distriubtion amplifiers for a console line output. The console is supplied with three of these modules, one each for the PROGRAM, AUDITION and UTILITY buses. Each module supplies four stereo distribution outputs; each output is capable of supplying up to +28 dBm. Patch send and return points are available for the connection of external processing equipment and/or a patch field. The output is an active balanced design; output transformers are available as an option. A master fader may be installed as special option.

MONAURAL OUTPUT MODULE

The monaural output module provides a selection of the three main outputs. The module may select or mix any combination of the PROGRAM, AUDITION and UTILITY signals to derive a monaural output. A patch send and return point is available for the connection of external processing equipment and/or a patch field. The output is an active balanced design; an output transformer is available as an option.

TELCO MIX MODULE

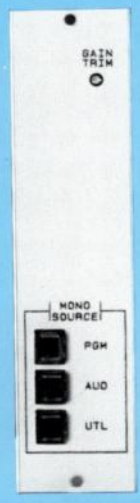
The telco mix module derives five unique mixes of the signals from up to four telephone callers and a selection of the PROGRAM, AUDITION and UTILITY buses.

The telephone signals, which are to be broadcast, are selected and controlled by the input modules connected to the external hybrid systems. The telco mix module receives the audio from the input modules and sums them. This sum signal is routed to the metering system and to the monitor output. This telephone mix-monitor output is very useful when talk show talent and/or guests prefer to not use headphones.

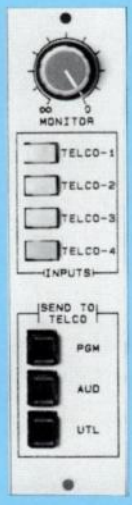
The module provides for the selection of the output bus which is to contain the "base-mix" to be fed back to all the callers so that they may hear what is transpiring, even before air time. The signal fed back to a given caller includes the selected bus plus all the other callers, except himself (mix-minus). The signals fed back to the callers may be passed through the on-board telephone bandpass filters for improved hybrid operation.



Stereo Output Module



Monaural Output Module



Telco Mix Module

MONAURAL AND STEREO EQUALIZER MODULES

These modules allow alteration of the frequency response of an input channel, either for correction of deficiencies in the original signal or for creative reasons. The mono module provides tunable highpass and lowpass filters that correct many commonly encountered problems such as hum or hiss, and creation of effects such as a telephone-type response. The equalizer section, which may be switched in or out independently of the filter section, contains bass and treble equalizers which are each independently switchable from the shelving to the peaking modes. The midrange equalizer is tunable over a considerable range and is unique in that the Q of the boost or cut is very broad at modest levels of boost or cut and becomes higher in Q as boost and cut become greater. All of these have reciprocal boost and cut curves, although an internal switch allows the bass equalizer to always remain in the shelving mode during cut. The mono filter section contains separately-tunable sharp-cutoff highpass and lowpass filters. Special care has been taken to minimize noise when switching the equalization or filtering in or out. An overload sensor provides a front panel indication that the signal levels at key points within the module are nearing the clip point.

EQUALIZER/COMPRESSOR MODULE

The Equalizer/Compressor module is a monaural device containing two major blocks. The first block is a switch-insertable equalizer, which allows alteration of the frequency response of the audio channel, for deficiency correction or for creative reasons. The bass equalizer automatically switches from the shelving mode during cut to the peaking mode during boost. The treble equalizer is tunable in frequency; it is switchable from the peaking mode to the shelving mode. An overload sensor provides a front-panel indication that the signal levels at key points within the equalizer are nearing the clip point.

The second block is a switch-insertable high-performance compressor, which also contains a flexible expander and a de-esser, all of unusual sophistication. The compressor is not intended to be a "gain-rider," it is designed to produce an effect of signal smoothness and increased sound density. The compression and the expansion circuits both use advanced AGC-bus ripple-reduction techniques, which allow remarkably short recovery times. The de-esser senses and operates only upon the treble region. As a result of the techniques used, unwanted byproducts (both audible and measurable) have been held to uncommonly low levels. The LED gain-reduction display is unique: it indicates expansion in the dot mode and compression in the bar-graph mode. A separate LED monitors the degree of de-essing.

REMOTE CONTROL PANELS

Tape deck remote control panels are available for most professional reel-to-reel tape recorders. The engraved RWD, FWD, STOP, PLAY and RECord buttons are function color-coded to common industry practice and are supplied with tally lamps.

Cartridge deck remote control panels are available for TOMCAT, Micromax and ITC cartridge recorders. Engraved buttons for TERtiary tone, SECondary tone, STOP, START and RECord are provided. The buttons are supplied with the appropriate tally lamps.

The timer control panel provides illuminated START, STOP, RESET and HOLD buttons for the meter panel mounted DT-4 digital timer. An AUTO button couples the timer's reset and restart functions to the console timer reset command bus for the automatic up-time of events, (start with module on).



Monaural Equalizer Module



Stereo Equalizer Module



Equalizer/ Compressor Module



Tape Remote Control Panel



Cart Remote Control Panel



Timer Remote Control Panel

METER PANEL

The meter panel has four centrally positioned accessory cutouts for the convenient installation and view of clocks, timers and other customer specified panels. The meter panel assembly contains an audio and logic power distribution system which has several convenient unassigned ports for the powering of future optional and/or custom meter panel mounted equipment.

CLOCK

The TD-2 digital clock provides a functional and clear LED readout for time-of-day. The clock is set by using a small magnet tool, supplied, and Hall effect magnetic switches located just behind the bezel lens. This eliminates the possibility of unauthorized or accidental time set operation. The clock utilizes a quartz crystal time base and is constructed in a black aluminum case for electrostatic shielding. The beveled black anodyzed face panel compliments the style, size and color of the level display meters.

TIMER

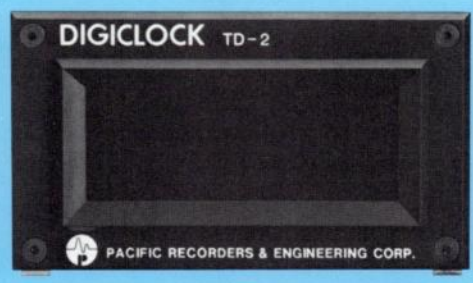
The DT-4 digital clock is a style companion to the TD-2 digital clock and is also intended for use in the sometimes hostile broadcast RF environment. The timer has a five digit readout for minutes, seconds and tenth of seconds. A rear panel remote control connector provides START, STOP, DISPLAY HOLD, RESET and a strapping option to blank the tenth of second display in all operating modes except STOP and HOLD. The timer may be installed as a dedicated event start up-timer, a manual/automatic timer using the timer control panel shown, or two timers may be installed with one dedicated to up-timing and the other only manual using a control panel without the AUTOmatic mode button.

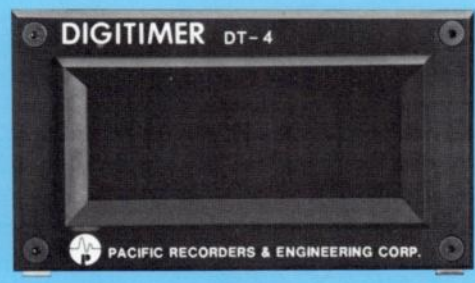
VU METERS

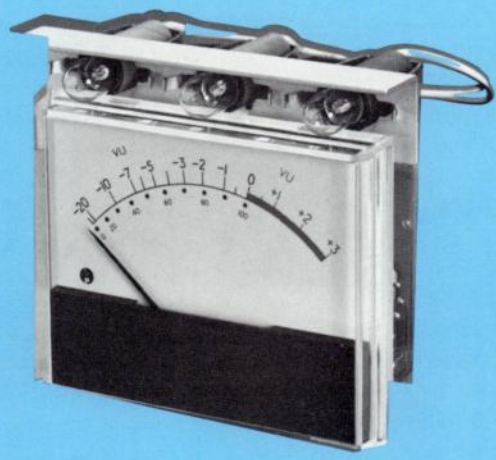
The VU meters used in the ABX console are manufactured expressly for Pacific Recorders & Engineering by Sifam Limited of England. These meters fully conform to the technical requirements of American National Standard C16.5-1954. The very important "Dynamic Characteristics" clause within this standard states that if a sinusoidal voltage between 35 and 10,000 Hz of such amplitude to give reference deflection under steady-state conditions is suddenly applied, the meter pointer shall reach 99% of reference deflection in 0.3 seconds ±10% and then shall overswing reference deflection by at least 1% and not more than 1.5%. It is the compliance with this characteristic which provides the ABX operator with an exceptionally easy to read level display. The meters are driven by bridging buffer amplifiers to isolate the meter rectifiers from the audio line and to provide ease of reference calibration. Special attention has been made to provide uniform scale illumination without "hot spots."

PPM METERS

Optional Peak Program Meters may be supplied to replace or augment the VU meters in the ABX. These meters are manufactured for Pacific Recorders & Engineering by Sifam Limited of England and fully conform to British Standard 4297:1968. This standard specifies the characteristics for the meter movement and the overall performance when connected to the required drive circuitry. The dynamic characteristics of a PPM system are radically different from a VU meter and deserve special understanding from operators unfamiliar with them. The rise time is measured with isolated, variable length, tone bursts of 5 kHz sinusoidal voltage whose steady-state value will result in a "0" reference reading. The burst times and scale indications are as follows: 100 ms = 0 dB, 10 ms = −2.5 dB, 5 ms = −4 dB, 1.5 ms = −9 dB. The fall-back time is defined as between 2.5 seconds and 3.2 seconds for the pointer to fall from +4 to −20 (white dot) after the removal of a steady-state 1 kHz sinusoidal voltage.



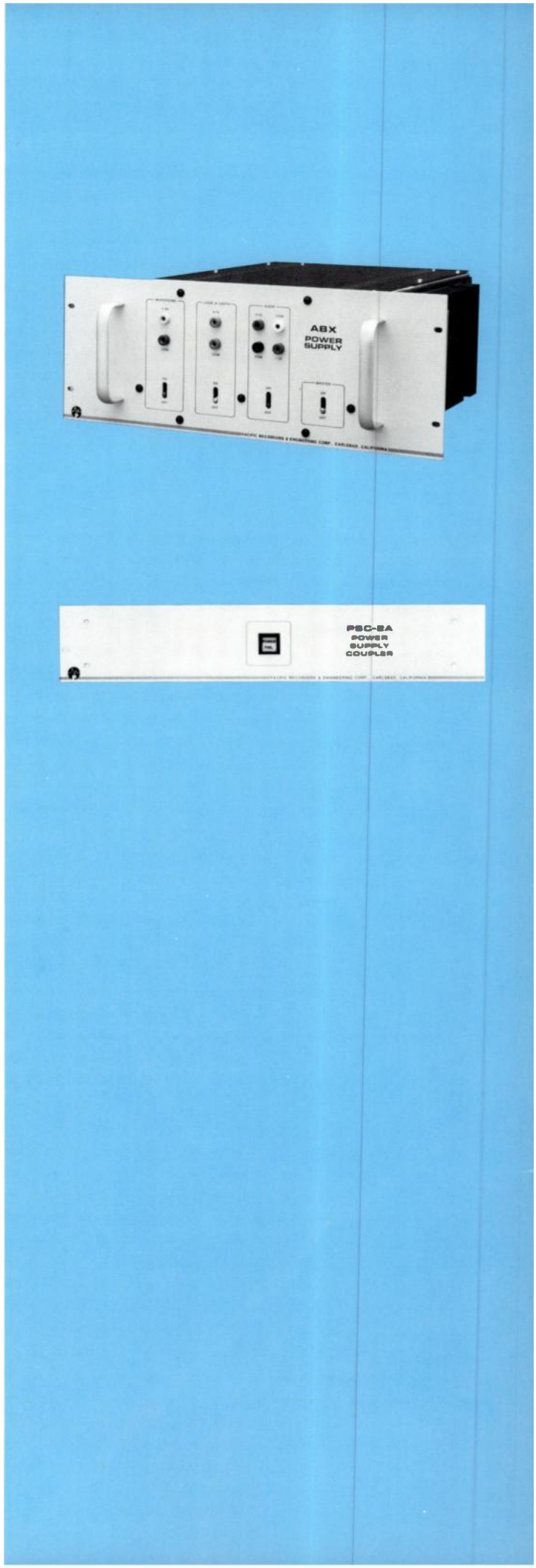






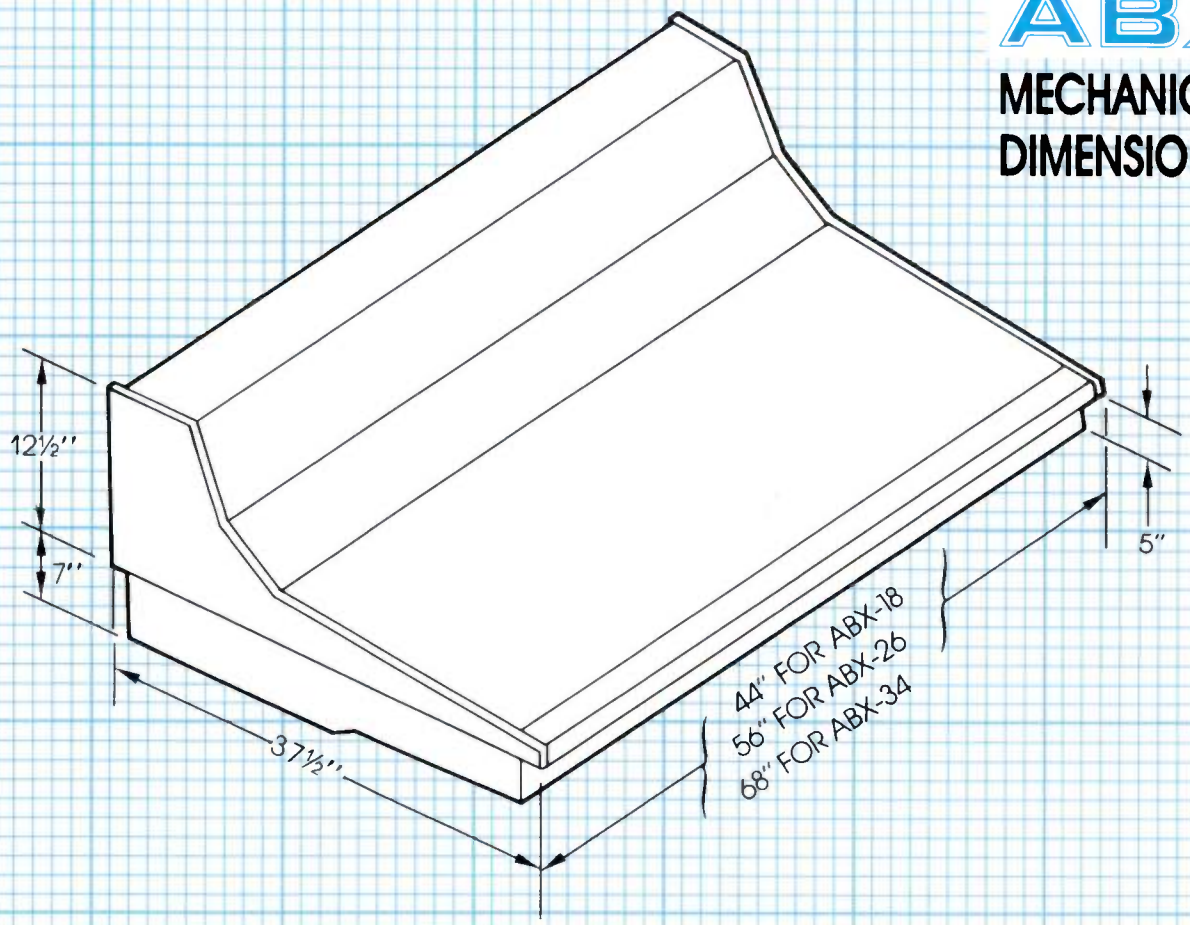
POWER SUPPLY

The Power Supply for the ABX console is a rugged assembly consisting of a set of three individual supplies, each of which is protected by its own individual magnetic circuit breaker, in addition to a master ON/OFF switch. The three supply power for the audio circuitry, the logic circuitry and the phantom supply for microphones. The power transformers each have a grounded interwinding electrostatic shield to minimize abnormal powerline transients from being coupled to the system electrostatically. Those transformers also feature a copper band to minimize stray radiated current. The various outputs are all fully regulated, although the individual plug-in modules in the console use local regulation to prevent intermodule coupling via the power supply. With the exception of the custom heavy-duty transformers, all active components are standard. The regulators are the latest of the adjustable-output integrated-circuit type, with internal current and temperature limiting, mounted on massive heatsinks. The filter capacitors are rated for high temperature operation, and are clamp-mounted and connected with screw terminals for simplified replacement. Test points are provided on the front panel for routine measurement purposes. Although over-designed for dependability, a second power supply assembly may be added with a power-supply coupler/switcher for complete redundancy.



ABX

MECHANICAL DIMENSIONS



CUTOUT DIMENSIONS

(CUTOUTS ALLOW FOR ¼'' CLEARANCE)

ABX-26
54¾'' x 35⅝''

ABX-18
42¾'' x 35⅝''

ABX-34
66¾'' x 35⅝''

TURRETS/PANELS

Turret cabinets are available in three standard sizes offering 18, 24, and 30 inches of horizontal panel space. Custom sizes are available on special order.

Microphone Control/Status Panels

The first two panels are identical except for the addition of the TALKBACK function. TALKBACK to console overrides the microphone ON/OFF status, muting the mic channel if ON, and "talks" to the console via the TALKBACK circuits. COUGH mutes the ON status of the microphone but does not unmute the studio monitor speakers.

The third panel was specifically designed for the host of a talk/public affairs show and provides the individual and group control of up to five "GUEST" microphone inputs. Selected inputs are turned ON and OFF as a group; however, any individual input may be added to or deleted from those already ON.

Monitoring Panels

The monitor control panel is designed to be connected between the console studio monitor module output and the input of the studio monitor amplifier. The headphone control panel is designed to be connected at the output of a studio headphone amplifier. This panel is supplied with a separate, panel mounted, headphone jack which is usually installed in the apron of the studio furniture top.

The third panel is a self contained monitoring system and includes an input selector, balanced bridging input buffer amplifiers and an input for console TALKBACK to MONITOR and HEADPHONE. The select buffers have a separate output, pre-talkback, to feed "GUEST" headphone amplifiers. There are two other versions of this panel which are used where the system requirements dictate separate selectors for the monitor and headphone feeds. The first version has only the selector and monitor level control while the second version has the selector and headphone control with TALKBACK override. These panels require an external bipolar 16 volt power supply.

Timers and Clocks

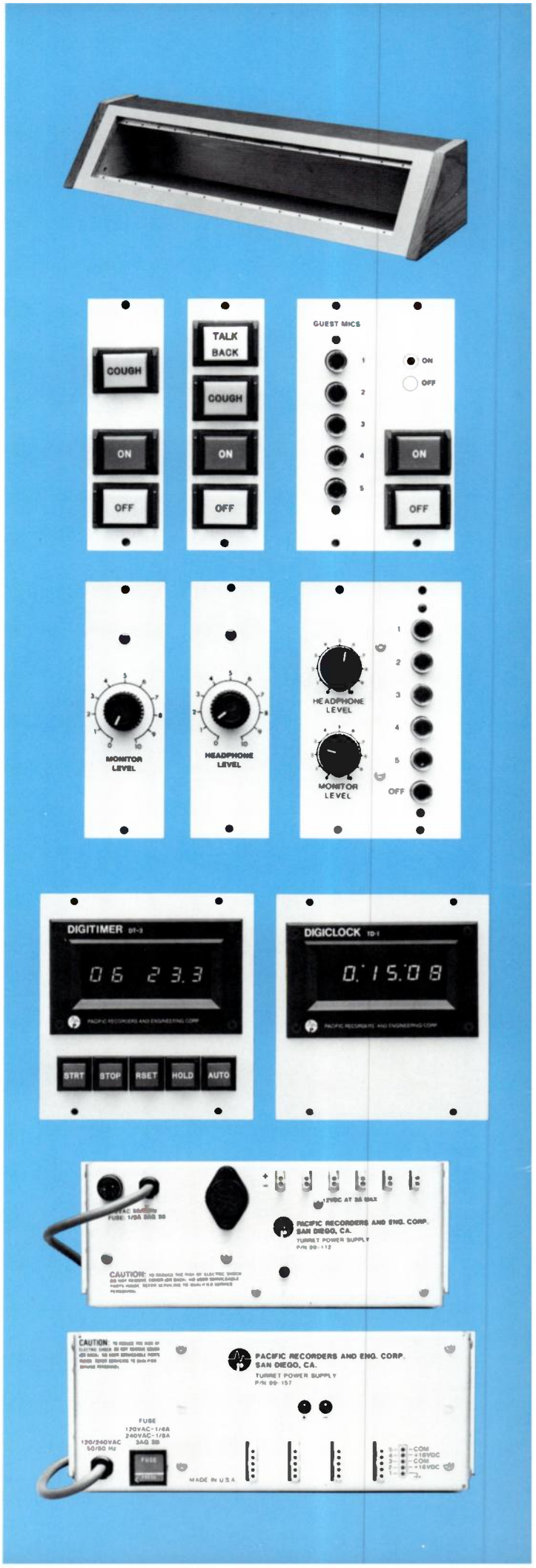
The DT-3 panel mounted digital timer is complimentary to the timer used in the console meter panel. The START, STOP, HOLD and RESET buttons provide local timer control while the AUTO button is used to link the RESET/START function to the console reset timer bus. This assembly is also available without the AUTO button, or without any of the control buttons for applications requiring just a display remoted from the console.

A panel mounted version of the TD-1 digital time of day clock is also available.

Power Supplies

The 12-volt logic and lamp power supply was designed for large studio systems where the installation of several clocks, timers and other peripherals is simplified by the use of one master power supply.

The bipolar 16-volt supply is used to power the audio circuitry in the full function studio monitor selector panels.



ABX INTERFACES

The basic purpose of logic interface units is to functionally connect the control circuits of the ABX input module to the remote control circuitry of the source equipment (e.g., tape, cartridge, turntable).

The interfaces described below translate the console commands to and from the source equipment by use of relays and/or optical couplers. The use of interfaces provides complete electrical isolation of the control circuits and, therefore, mutual protection from ground loops and potential circuitry failure damage.

Five logic interfaces are available; each is supplied with mating connectors, pins and instructions. Prefabricated and tested control cables are available for the connection of interfaces to console and to most popular brands of source equipment.

CI-2 Interface

CI-2 Interface is designed for use with conventional tape cartridge decks. Each unit contains three sets of circuitry which can control three separate cartridge decks. Each control circuit provides:

- Tape READY status
- START command
- STOP command
- Audio RESET to off at end of cartridge

TCI-2 Interface

TCI-2 Interface is designed for use with the Pacific Recorders & Engineering TOMCAT tape cartridge recorders and players. Each unit contains three sets of circuitry which can control three separate decks. Each control circuit provides:

- Tape READY status
- START command
- Multiple machine sequencing
- Play, secondary, tertiary status output connector
- STOP command
- Audio RESET to off by machine command
- Remote console ON/OFF switch/lamp connector

TT-3 Interface

TT-3 Interface is designed for use with Technics models SP-10MK II and SP-15 servo-driven turntables. Each unit contains two sets of circuitry which can control two turntables. The interface converts the toggle control logic of the turntable to the two command logic of the ABX. Two turntable modification cables with instructions are supplied with this unit. Each control circuit provides:

- Turntable READY status
- START command
- STOP command
- Remote CUE switch/lamp connector

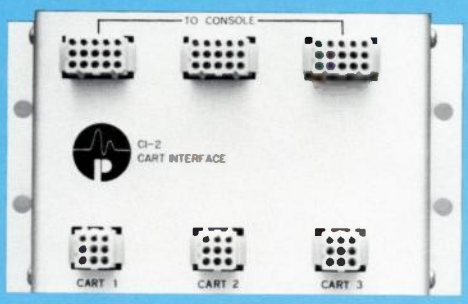
TI-2 Interface

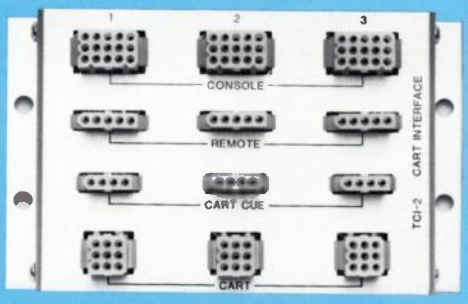
TI-2 Interface is designed for use with reel-to-reel decks. The control outputs are from "C" relay contacts which allow connection to tape machines which utilize normally open or normally closed remote control switching. The unit provides the following:

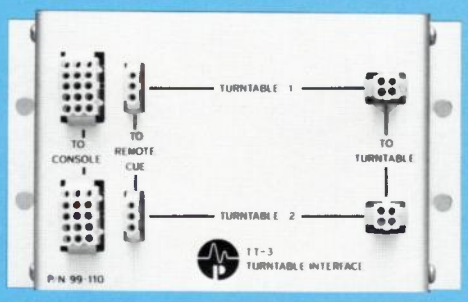
- Tape READY status
- START command
- STOP command
- Audio OFF at exit of play
- Record mode anti-feedback MUTE
- Remote CUE switch/lamp connector

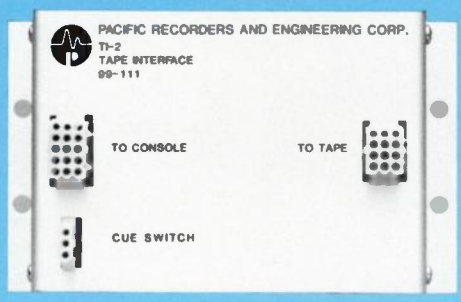
WL-2 Warning Light Interface

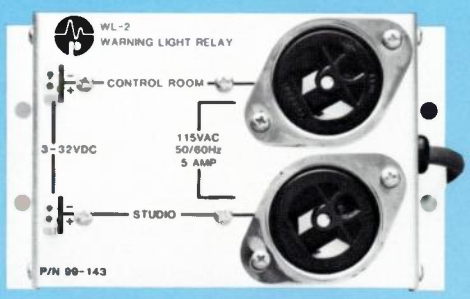
WL-2 Warning Light Interface is designed to translate the 12-volt DC studio and control room warning commands to 120-volt AC warning light systems. The interface consists of two DC controlled solid-state relays, each capable of supplying up to 5 amps into a non-inductive load.











ABX PERFORMANCE SPECIFICATIONS

Microphone Input

Source Impedance	150 ohms
Input Impedance	1000 ohms minimum, balanced
Input Level Range	Adjustable from −60 dBu to −35 dBu
Input Headroom	Greater than 30 dB above nominal input

High Level Inputs

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range	Adjustable from
Line Input	−12 dBu to +8 dBu
Multitrack Input	Adjustable from +4 dBu to +8 dBu
Reverb Return	Adjustable from −15 dBu to +8 dBu
Monitor Input	Nominal +4 dBu/+8 dBu
Patch Input	Nominal −10 dBu
Input Headroom	Greater than 30 dB above nominal input levels

Main Outputs

Load Impedance	600 ohms
Source Impedance	30 ohms
Nominal Output Level	+8 dBm, adjustable to +4 dBm
Maximum Output Level	+28 dBm, 600 ohm load
Line Amplifiers	
Two-mix Module	+26 dBm, 600 ohm load
Multitrack Module	+26 dBm, 600 ohm load
Send Module	+26 dBm, 600 ohm load

Monitor Outputs

Main Outputs

Load Impedance	600 ohms or greater
Source Impedance	30 ohms, unbalanced
Output Level	0 dBu nominal, +20 dBu maximum

Headphone Outputs

Load Impedance	45 ohms or greater
Source Impedance	Less than 4 ohms
Output Level	0 dBu nominal, +20 dBu maximum

Frequency Response

Microphone Input to Program Output	+0 dB, −0.9 dB, 20 Hz to 20 kHz
Line Input to Program Output	+0 dB, −0.8 dB, 20 Hz to 20 kHz

Noise

Microphone Input Amplifier	−127 dBu RMS equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	−88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output noise with one microphone channel ON fader at −15 dB, input sensitivity at −50 dBu	76 dB below output, reference +8 dB, 150 ohm source, 20 kHz bandwidth
Output noise with one line channel ON, fader at −15 dB, input sensitivity at +8 dBu	80 dB below output, reference +8 dB 600 ohm source, 20 kHz bandwidth
Output noise with no input channels ON	82 dB below output, reference +8 dB, 20 kHz bandwidth

Distortion, T.H.D.

Microphone Input to Program Output	Less than 0.02%, 20 Hz to 20 kHz, −50 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01T at 1 kHz, +28 dBm output
Line Input to Program Output	Less than 0.008%, 20 Hz to 20 kHz, +8 dBu, input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output

Distortion, I.M.

Microphone Input to Program Output	Less than 0.008%, −50 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load
Line Input to Program Output	Less than 0.005%, +8 dBm input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load

Crosstalk

Interchannel Crosstalk	Less than −85 dB at 1 kHz Less than −75 dB at 20 kHz

Notes:

1.) These specifications are for the basic signal paths, per channel, with either or both channels of a stereo pair operating and with 600 ohm loads connected to the program outputs.

2.) 0 dBu corresponds to an amlitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

3.) Noise specifications are for a 26-input console (ABX-26); larger consoles will have slightly reduced signal-to-noise ratios due to increased summing amplifier gain. Noise specifications are based upon a 20 kHz bandwidth; the use of a meter with a 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Specifications subject to change without notice or obligation as advanced in technology are incorporated.

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WRH

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ABX 26

BMX



PACIFIC RECORDERS & ENGINEERING CORPORATION

BMX - 10

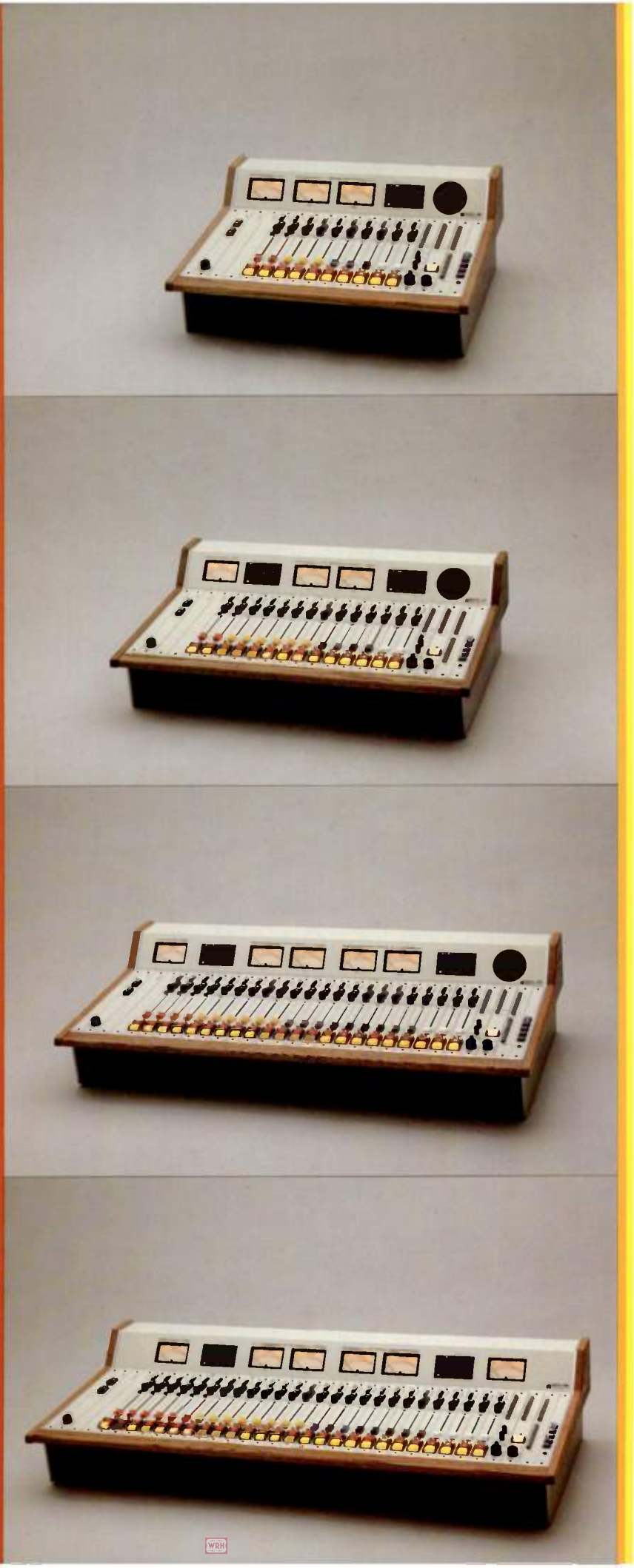
BMX

The High Performance Broadcast Console

BMX - 14

BMX - 22

BMX - 26

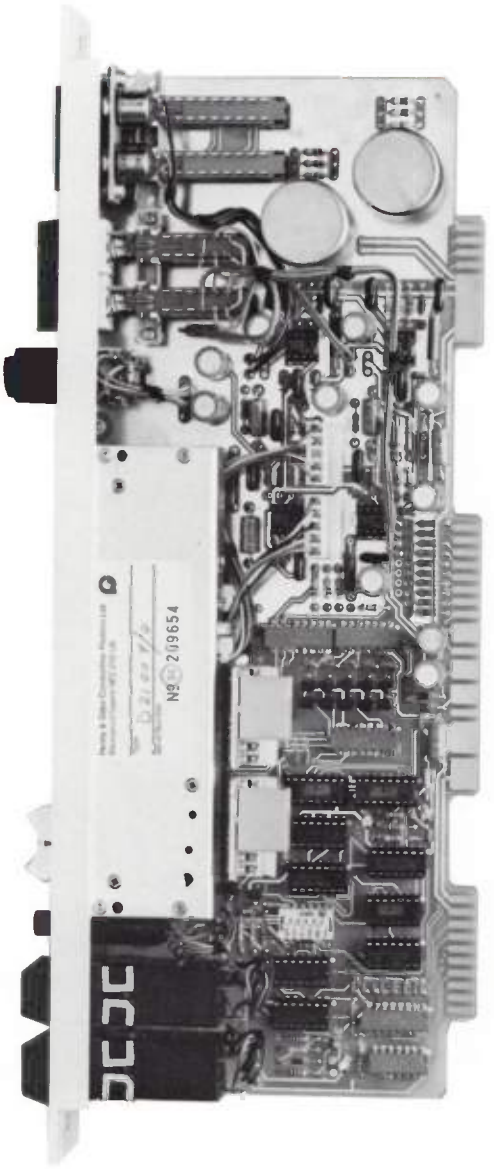


The choice of broadcast engineers around the world who want the best, BMX has become the standard of excellence and quality. Through the use of advanced circuitry, CMOS remote control logic and efficient construction techniques, BMX today continues to meet the highest performance needs of broadcasters -- at an "off the shelf" console price.

As you look through this brochure, note the attention to detail, the thoughtful selection of components and the thorough consideration of broadcaster needs that have given BMX its deserved reputation for service and reliability.

First quality components, the basis for a high performance product, are featured throughout. Advanced discrete and integrated circuitry yields low noise and distortion, and provides excellent frequency response and headroom/overload capability. At least 30 dB of microphone and line input headroom is maintained to provide that extra margin for "hot" levels and operator error. Mixers are full-travel Penny and Giles conductive-plastic faders. Their conductive - plastic elements and precious metal wipers are extremely linear and are impervious to the environment. The fader's mechanical components are non-corrodible nylon and stainless steel. All button switches are Honeywell and Schadow, chosen for their extended life ratings. All the audio transformers are designed by Deane Jensen. The VU meters conform to American National Standard C16.5-1954 and are driven by isolation bridging buffer amplifiers. Optional Peak Program Meters (PPM) conform to British Standard 4297:1969.

The sophisticated control logic of the BMX utilizes CMOS integrated circuits. CMOS provides silent and flexible control. Operating on 12 volt, low current power, CMOS is very immune to electrical noise and strong RF fields. CMOS circuits generate little electrical noise so you won't hear "chirps" or "clicks" in the audio as the logic operates. FET switches invariably introduce some form of non-linear distortion, even if slight, and the BMX is so clean that you might hear the difference. We, therefore, go a step further and use miniature, sealed, gold contact relays for all logic controlled audio switching. The relays are quiet, reliable and cannot degrade audio performance. CMOS control logic is also easy to interface to external equipment, (logic interface/translator units are available from Pacific Recorders & Engineering). The outputs of the control logic to external equipment are buffered by short-proof discrete transistor circuitry.

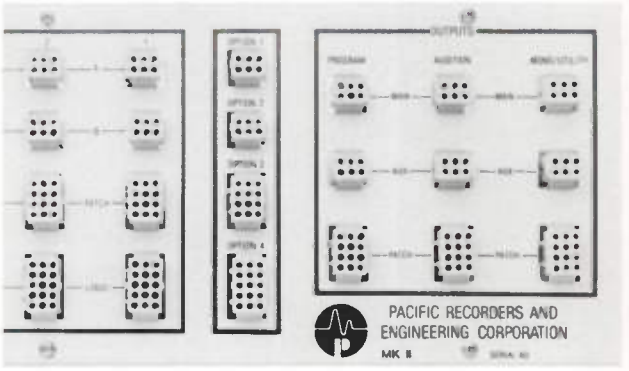




BMX Easy to Install and Easy to Use

The BMX is a compact, low profile console. Plenty of room is available for the broadcaster to arrange his peripheral equipment. Careful attention has been paid to human engineering needs in the logical placement of switches and controls. All active electronics are accessible from the face of the console. Panel modules simply unplug from the housing. The separate power supply is rack mountable and comes supplied with a six-foot interconnecting cable. All audio input/output and logic wiring between the console and studio equipment is done with easy-to-use connectors; time-consuming hardwiring to terminal blocks is eliminated. We supply mating connectors, pins, pin crimp tool, and full wiring information. By pre-pre-wiring the studio connectors, a BMX console can be installed and on-the-air in a few hours. Input assignments can be changed in the future with ease by just moving the connector plugs.

The BMX is available in four mainframe sizes to accomodate 10, 14, 18, 22 and 26 input modules. Every BMX mainframe is factory wired and tested for the full complement of modules. Use fewer inputs if you wish. Expand the system at any time by plugging in the extra modules. Universal layout enables any input position to accept a mic or line module. Just select a mic-level or a line-level input module and connect your microphone, turntable, cartridge or reel-to-reel tape unit. The microphone input module provides for external remote control of ON,OFF,COUGH and TALKBACK functions for each of the two inputs. The line input module provides the remote control commands for turntable, cart and tape decks. In addition, the ON, OFF and CUE status of the module is remote controllable. A pre-fader patch point on each input is provided for convenient insertion of auxiliary signal processing. You might, for instance, add a compressor or equalizer on a DJ microphone or a filter/equalizer on a remote line input.







BMX Quality by Design

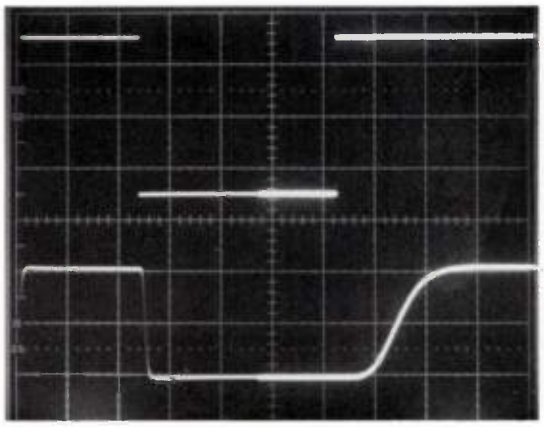
Reliability starts with a tough housing. BMX is fabricated from precision milled ¼-inch anodyzed aluminum alloy end plates that are joined and extensively reinforced by extruded rails. Sheet metal is then fastened to this precision frame, providing a "skin tensioning" effect for extra stiffness. The housing does not twist or flex and, therefore, will not degrade card edge contacts or strain circuit traces.

Hand-wiring is minimized by the use of plug-in circuit boards and a "mother-board" (large interconnecting PC board). The mother-board is strengthened and shielded by being fully enclosed with panels and extrusions. In fact, the summing busses are 100% encased by a continuous ground plane for the ultimate in RF and noise isolation. Only glass epoxy double-sided circuit boards are used. They are more expensive than single-sided boards, but they enable us to lay out components for optimum performance. Double-sided boards also support our use of ground plane shielding technology, which further reduces susceptibility to RF interference, noise and crosstalk. For added convenience, the components on each board are identified with silk-screened designations. All circuit card fingers and mating edge connectors are gold plated. Front panels are constructed on anodyzed aluminum extrusions, coated with durable polyurethane paint, and silk screened with clearly legible nomenclature.

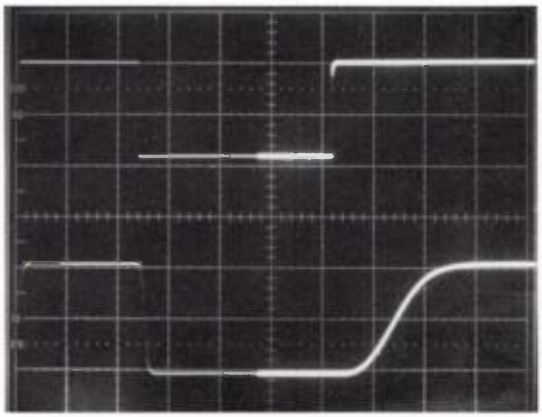
Complimented by solid oak end panels, the BMX has a attractive appearance that will withstand the rigors of continuous professional use. The power supply is constructed in a rugged steel chassis and features massive regulator heat sinks. The Audio, Logic and Phantom Supply voltages are individually switched with magnetic circuit breakers. A master switch controls the AC mains to the overall supply. For ease of service, TO-3 plug-in style regulators are utilized; spares are included with the console spare parts kit.

From a careful design philosophy utilizing state-of-the-art technology and rugged physical construction techniques, to a sensitivity to the needs of the user, BMX has it all. It's the one human-engineered console broadcasters have run through the paces and come to universally accept as the standard of comparison.

BMX...easy to buy, easy to install and easy to service...with reliability and performance that has become a Pacific Recorders & Engineering trademark.



Microphone Input
To Program Output
Top Trace: 2KHz Square Wave Input
Bottom Trace: Console Program Output, +8dBm
Left Half of Traces: .1 ms/div.
Right Half of Traces: 10 μ/div.
Console Output
Rise Time: 10 μs
Overshoot: 0%
Ringing: NONE



Line Input
To Program Output
Top Trace: 2KHz Square Wave Input
Bottom Trace: Console Program Output, +8dBm
Left Half of Traces: .1 ms/div.
Right Half of Traces: 10 μs/div.
Console Output
Rise Time: 12 μs
Overshoot: 0%
Ringing: NONE

Console Modules

Microphone Input Module

The Microphone Input Module will accommodate a wide range of input levels to permit use of all contemporary microphones. Input preamplifier gain is adjustable for nominal inputs of −60dBu to −35dBu. The A/B input selector provides two microphone inputs per module, each with programmable mute selection of control room or studio monitors. The mute circuitry incorporates an automatic 40 millisecond delay before the microphone audio is turned on to permit "room reverb" to decay off-mic. Each microphone input (A and B) provides separate remote control capability for ON, OFF, COUGH, and TALKBACK TO CONSOLE functions. The PAN control with On-Off switch allows positioning of the microphone in the stereo image. Alternate action PROGRAM and AUDITION buttons provide the ability to assign the module to either or both stereo output buses. Phantom power circuitry for condenser microphones is user assignable for both the A and B inputs.

Line Input Module

The stereo Line Input Module will accommodate nominal input levels from −12dbm to +8dbm. A user option provides nominal input sensitivity to -36 dbm for use with very low level line sources. The A/B input switch selects two stereo inputs. the module control logic may be programmed to control source equipment connected to the A or B input. The INPUT MODE switch selects STEREO, MONO, RIGHT source, or LEFT source to be directed to the output assignment switches. Alternate action PROGRAM and AUDITION buttons provide the ability to assign the module to either or both stereo output buses. The channel ON-OFF buttons are illuminated and command the logic circuitry to tape machine or turntable control.

Every line input module includes a comprehensive family of control logic input and output commands. These commands include:

- Remote control of module ON, OFF and CUE functions with tally lights.
- START/STOP command pulses for turntable, cartridge, and tape machines.
- READY/START/STOP for tape cartridge machines. A "tape ready" status illuminates the channel OFF button. the ON button starts the cartridge. Upon receipt of the end of message or the end of tape signal from the cartridge machine, the module audio is automatically turned off.
- READY/START/STOP for open reel tape machines. These functions are similar to the foregoing cartridge machine functions.
- Timer Reset function zeros and restarts the optional digital timer to provide an elapsed time countup for user-designated inputs (e.g., turntable, tape).

Control Room Monitor Module

Monitoring of Program, Audition, and eight external stereo line inputs is provided by the interlocking MONITOR selector. The input to the monitor is balanced, transformer isolated, and bridging to minimize source loading.

The CUE level controls the cue speaker level. The cue signal is available on the console connector panel should the broadcaster wish to connect an external amplifier and loudspeaker.

The METER switch (BMX-10 & 14 only), selects Program, Audition or Monitor for display on the illuminated output meters. The Headphone level control and source selector provide headphone monitor and cue. The output of this section is brought out on the connector panel for those applications where an external headphone amplifier is required. The Monitor level and Speaker ON/OFF switch controls output to a control room monitor amplifier.

Studio Monitor and Talkback Module

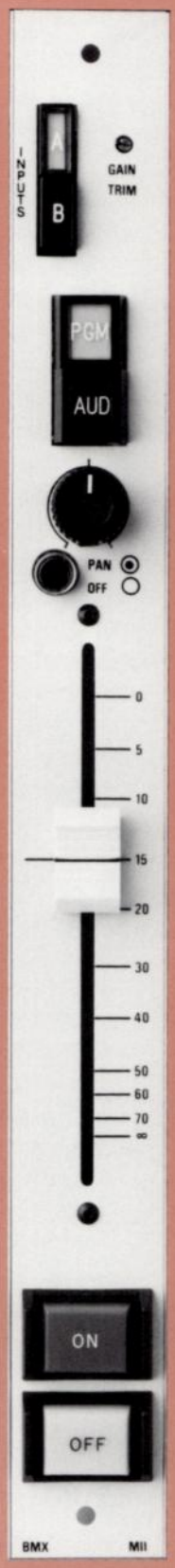
This module is expressly designed for applications where a separate voice/announce booth or conference studio is used. The Monitor selector is a duplicate of the control room selector with the same sources appearing. An electret condenser microphone and talkback ciruit allow the console operator to talk into the studio monitor system. The studio monitor has three separate stereo pairs of outputs for use with monitor amplifiers, remote level control, and studio headphones.

Remote Line Selector Module

The remote line selector is a stereo, ten station by two stereo output switcher normally used for remote line inputs. the output of this module is brought to the console connector panel where it may be connected into any desired input position or used to feed external equipment, such as a tape or cart recorder.

Monaural Output Module

This module provides a monaural line output from either the Program or Audition stereo line amplifier modules. The output amplifier is identical in performance and specifications to the main stereo output amplifiers.



Microphone Input Module



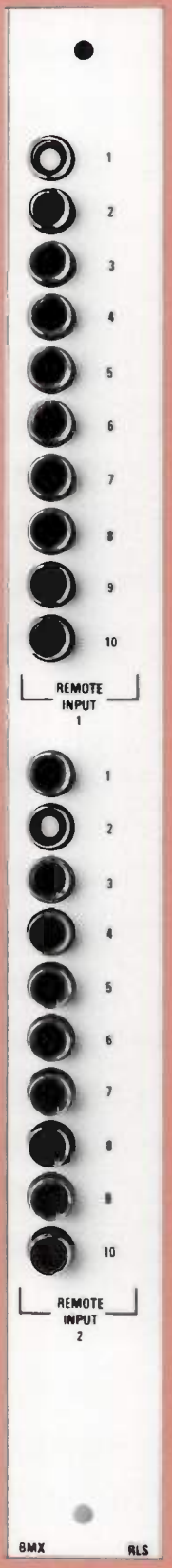
Line Input Module



Control Room Monitor Module



Studio Monitor and Talkback Module

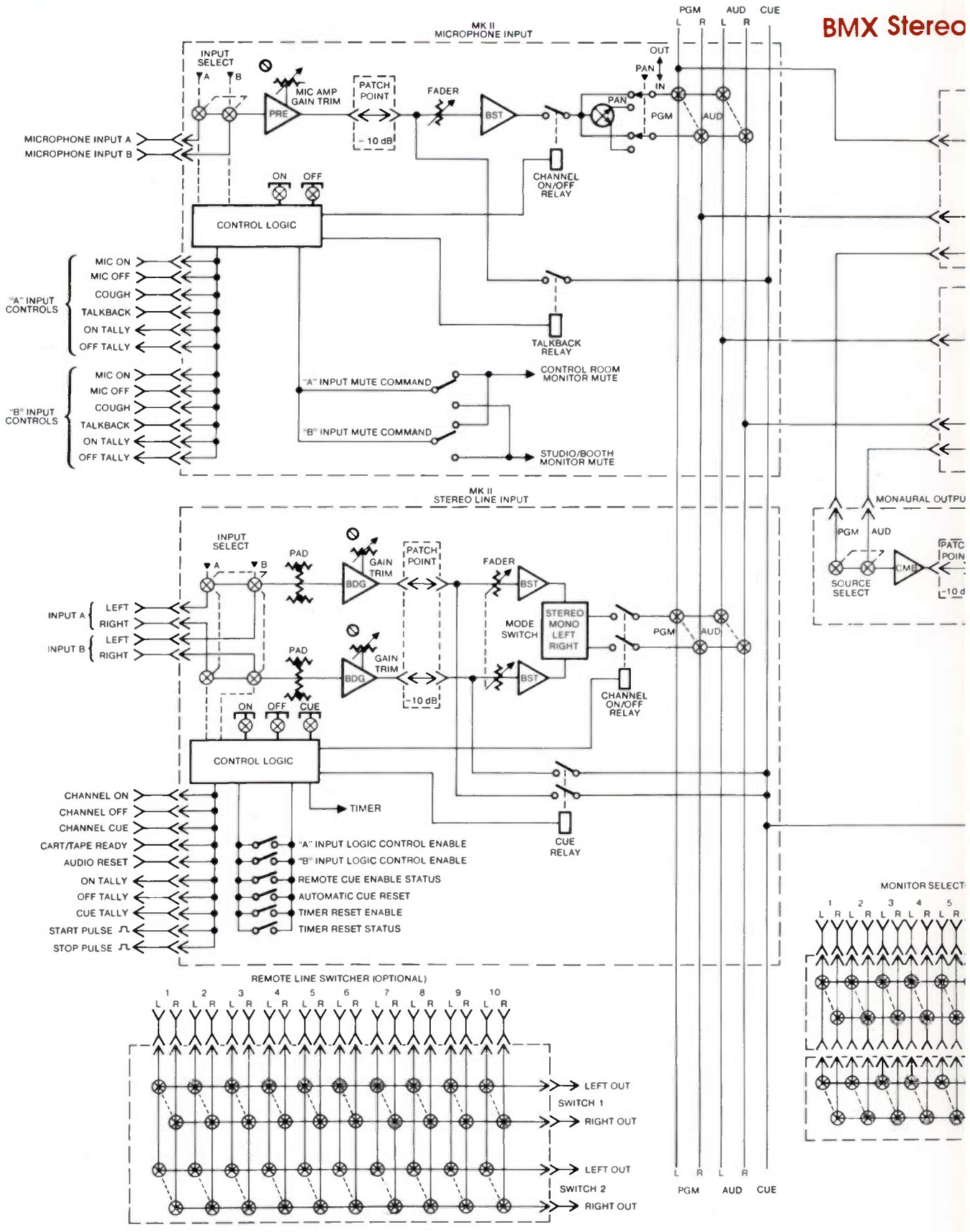


Remote Line Selector Module

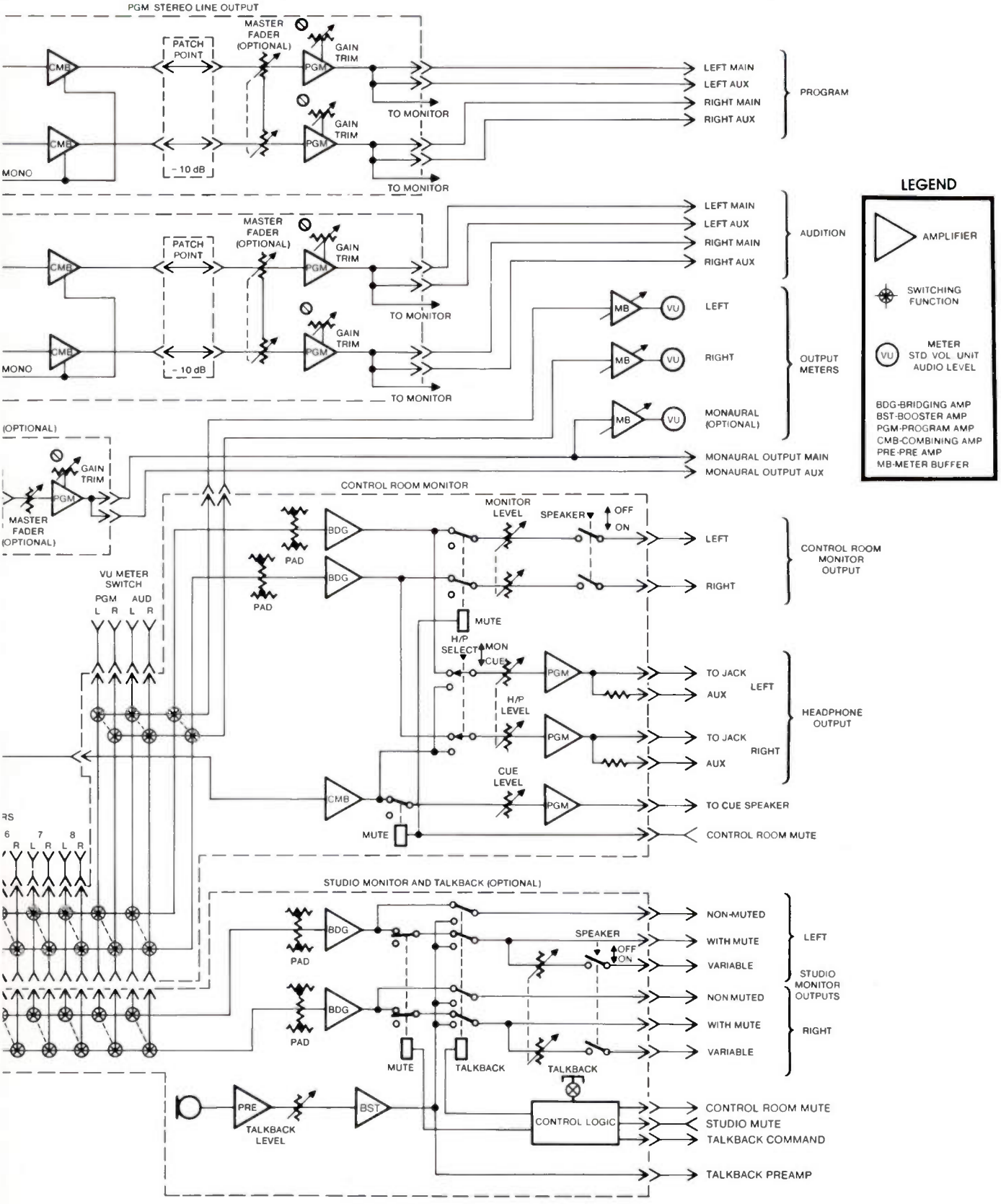


Monaural Output Module

BMX Stereo


MK II
MICROPHONE INPUT
INPUT SELECT
A
B
MIC AMP GAIN TRIM
PRE
PATCH POINT
- 10 dB
FADER
BST
PAN
OUT
IN
PGM
AUD
CHANNEL ON/OFF RELAY
MICROPHONE INPUT A
MICROPHONE INPUT B
ON
OFF
CONTROL LOGIC
"A" INPUT CONTROLS
MIC ON
MIC OFF
COUGH
TALKBACK
ON TALLY
OFF TALLY
"B" INPUT CONTROLS
TALKBACK RELAY
"A" INPUT MUTE COMMAND
"B" INPUT MUTE COMMAND
CONTROL ROOM MONITOR MUTE
STUDIO/BOOTH MONITOR MUTE
MK II
STEREO LINE INPUT
PAD
GAIN TRIM
BDG
MODE SWITCH
STEREO
MONO
LEFT
RIGHT
INPUT A
INPUT B
CUE
CONTROL LOGIC
CHANNEL ON
CHANNEL OFF
CHANNEL CUE
CART/TAPE READY
AUDIO RESET
ON TALLY
OFF TALLY
CUE TALLY
START PULSE
STOP PULSE
TIMER
CUE RELAY
"A" INPUT LOGIC CONTROL ENABLE
"B" INPUT LOGIC CONTROL ENABLE
REMOTE CUE ENABLE STATUS
AUTOMATIC CUE RESET
TIMER RESET ENABLE
TIMER RESET STATUS
REMOTE LINE SWITCHER (OPTIONAL)
LEFT OUT
SWITCH 1
RIGHT OUT
LEFT OUT
SWITCH 2
RIGHT OUT
MONAURAL OUTPU
SOURCE SELECT
MONITOR SELECT
CUE

Block Diagram



BMX Performance Specifications

Microphone Input

Source Impedance	150 ohms
Input Impedance	10 times source impedance, balanced and floating
Input Level	Adjustable from – 60dBv to – 35dBv (Reference 0.775V)
Input Headroom	Greater than 30dB above nominal input level.

High Level Input

Source Impedance	600 ohms
Input Impedance	10K ohms, balanced and floating
Input Level	Adjustable from –12dBm to +8dBm
Input Headroom	Greater than 30dB above nominal input level.

Program, Audition, Monaural Outputs

Load Impedance	600 ohms
Source Impedance	Less than 95 ohms
Nominal Output Level	+8dBm, adjustable
Maximum Output Level	+28dBm, 600 ohm load
Output Headroom, above +8dBm	Greater than 20dB

Monitor Outputs

Main Output

Output Impedance	600 ohms, unbalanced
Load Impedance	5K ohms or greater
Output Level	0dBm nominal, +20dBm maximum

Headphone Output

Output Impedance	75 ohms, resistor feed
Load Impedance	8 ohms or greater
Output Level	0 dBu nominal, +20 dBu maximum. (Reference 0.775V

Cue Output

Output Impedance	10 ohms
Load Impedance	45 ohms or greater
Output Level	0 dBu nominal, +20 dBu maximum. (Reference 0.775V

Frequency Response

Microphone Input (150 ohm) to program output

20Hz to 15KHz	+0, –1dB
20Hz to 20 KHz	+0, –1.5dB

Line Input (600 ohm) to program output

20Hz to 15KHz	+0, –1dB
20Hz to 20KHz	+0, –1.8dB

Noise

Microphone Input Amplifier	–127dBu RMS (reference) 0.775V equivalent input noise, 150 ohm source, 20KHz bandwidth
High Level Input Amplifier	– 112dBm RMS, equivalent input noise, 600 ohm source, 20KHz bandwidth
Output noise with one microphone channel ON, fader at – 15dB attenuation, input sensitivity at – 50dBu	– 75db below output, (reference +8dBm), 150 ohm source, 20KHz bandwidth
Output noise with one Line channel ON, fader at – 15dB attenuation, input sensitivity at +8dBm	– 82db below output, (reference +8dBm), 600 ohm source, 20KHz bandwidth
Output noise with no input channels on	– 84dB below output, (reference +8dBm), 20KHz bandwidth

Distortion, T.H.D.

Microphone Input to program output	Less than 0.025% at 1KHz, Less than 0.3% at +28dBm, 30Hz to 20KHz
Line Input to program output	Less than 0.015% at 1KHz, Less than 0.3% at 28dBm, 30Hz to 20KHz

Distortion, I.M.

Microphone Input to program output (+8dBm)	Less than 0.02% SMPTE
Line Input to program output (+8dBm)	Less than 0.01% SMPTE

Square Wave Response

Microphone Input to program output	Rise time less than 10 μs. Overshoot or ringing: None
Line Input to program output	Rise time less than 12 μs. Overshoot or ringing: None

Crosstalk

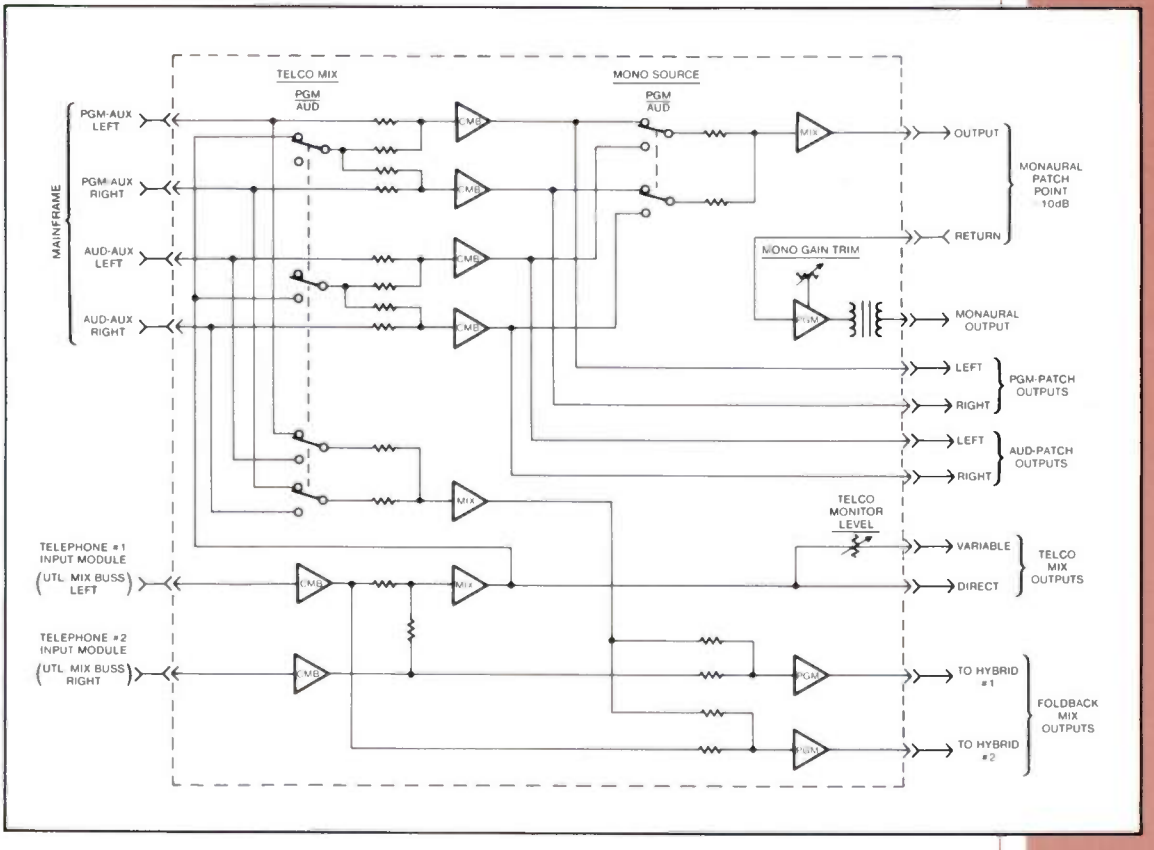
Adjacent buses, all bus assignments on, all inputs on	Less than - 85dB at 1KHz Less than - 75dB at 20KHz

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Telephone Mix/Monaural Output Module

The telephone mix/monaural output module was designed in response to the popularity of talk-show formats. The main function of the module is to provide three separate "MIX-MINUS" mixes, two for feedback to the telephone callers, the third is a mix of only the callers to feed the talk show hosts' monitor and/or headphones. The TELCO MIX buttons are used to select either the program or audition buses for the talk-show. In addition, the module provides the same functions as the standard monaural line output module.





Turrets/Panels

Turret cabinets are available in three standard sizes offering 18, 24, and 30 inches of horizontal panel space. Custom sizes are available on special order.

Microphone Control/Status Panels

The first two panels are indentical except for the addition of the TALKBACK function. TALKBACK to console overrides the microphone ON/OFF status, muting the mic channel if ON, and "talks" to the console via the cue circuits. COUGH mutes the ON status of the microphone but does not unmute the studio monitor speakers.

The third panel was specifically designed for the host of a talk/public affairs show and provides the individual and group control of up to five "GUEST" microphone inputs. Selected inputs are turned ON and OFF as a group; however, any individual input may be added to or deleted from those already ON.

Monitoring Panels

The monitor control panel is designed to be connected between the console studio monitor module output and the input of the studio monitor amplifier. The headphone control panel is designed to be connected at the output of a studio headphone amplifier. This panel is supplied with a separate, panel mounted, headphone jack which is usually installed in the apron of the studio furniture top.
The third panel is a self contained monitoring system and includes an input selector, balanced bridging input buffer amplifiers and an input for console TALKBACK to MONITOR and HEADPHONE. The selector buffers have a separate output, pre-talkback, to feed "GUEST" headphone amplifiers. There are two other versions of this panel which are used where the system requirements dictate separate selectors for the monitor and headphone feeds. The first version has only the selector and monitor level control while the second version has the selector and headphone control with TALKBACK override. These panels require an external bipolar 16 volt power supply.

Timers and Clocks

The panel mounted version of the DT-3 digital timer used in the console. The START, STOP, and HOLD and RESET buttons provide local timer control while the AUTO button is used to link the RESET/START function to the console reset timer buss. This assembly is also available without the AUTO button, or without any of the control buttons for applications requiring just a display remoted from the console.
A panel mounted version of the TD-1 digital time of day clock is also available.

Power Supplies

The 12 volt logic and lamp power supply was designed for large studio systems where the installation of several clocks, timers and other peripherals is simplified by the use of one master power supply.
The bipolar 16 volt supply is used to power the audio circuitry in the full function studio monitor selector panels.



BMX Interfaces

The basic purpose of logic interface units is to functionally connect the control circuits of the BMX input module to the remote control circuitry of the source equipment (e.g., tape, cartridge, turntable).

The interfaces described below translate the console commands to and from the source equipment by use of relays and/or optical couplers. The use of interfaces provides complete electrical isolation of the control circuits and therefore mutual protection from ground loops and potential circuitry failure damage.

Five logic interfaces are available; each is supplied with mating connectors, pins and instructions. Prefabricated and tested control cables are available for the connection of interfaces to console and to most popular brands of source equipment.

CI-2 Interface

CI-2 Interface is designed for use with conventional tape cartridge decks. Each unit contains three sets of circuitry which can control three separate cartridge decks. Each control circuit provides:

- Tape READY status
- START command
- STOP command
- Audio RESET to off at end of cartridge

TCI-2 Interface

TCI-2 Interface is designed for use with the Pacific Recorders & Engineering TOMCAT tape cartridge recorders and players. Each unit contains three sets of circuitry which can control three separate decks. Each control circuit provides:

- Tape READY status
- START command
- Multiple machine sequencing
- Play, secondary, tertiary status output connector
- STOP command
- Audio RESET to off by machine command
- Remote console ON/OFF switch lamp connector

TT-3 Interface

TT-3 Interface is designed for use with Technics models SP-10MK II and SP-15 servo-driven turntables. Each unit contains two sets of circuitry which can control two turntables. The interface converts the toggle control logic of the turntable to the two command logic of the BMX. Two turntable modification cables with instructions are supplied with this unit. Each control circuit provides:

- Turntable READY status
- START command
- STOP command
- Remote CUE switch/lamp connector

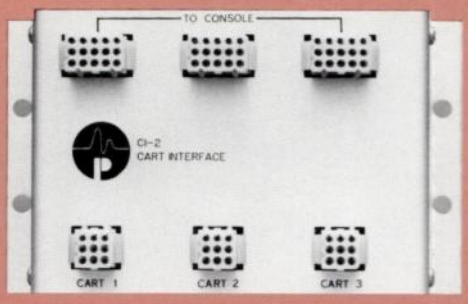
TI-2 Interface

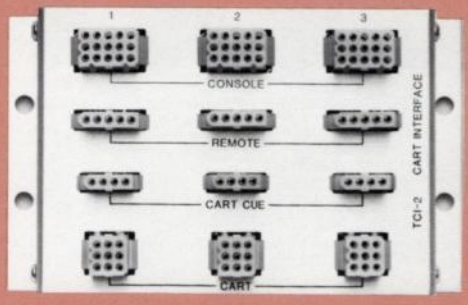
TI-2 interface is designed for use with reel to reel decks. The control outputs are form "C" relay contacts which allow connection to tape machines which utilize normally open or normally closed remote control switching. The unit provides the following:

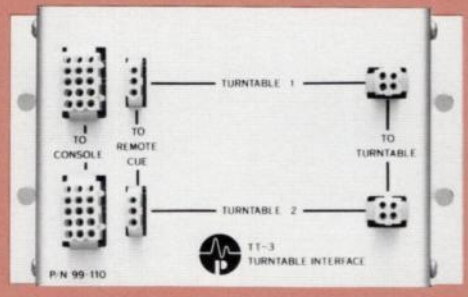
- Tape READY status
- START command
- STOP command
- Audio OFF at exit of play
- Record mode anti-feedback MUTE
- Remote CUE switch/lamp connector

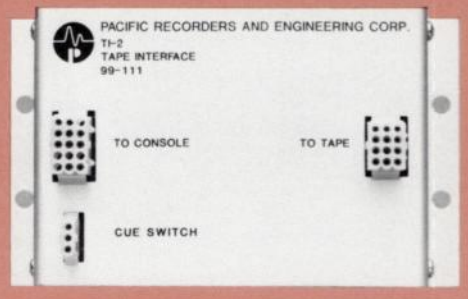
WL-2 Warning Light Interface

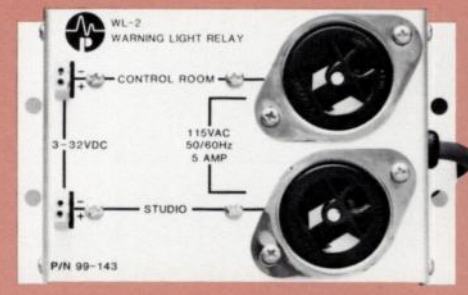
WL-2 Warning Light Interface is designed to translate the 12 volt DC studio and control room warning commands to 120 volt AC warning light systems. The interface consists of two DC controlled solid-state relays, each capable of supplying up to 5 amps into a non-inductive load.



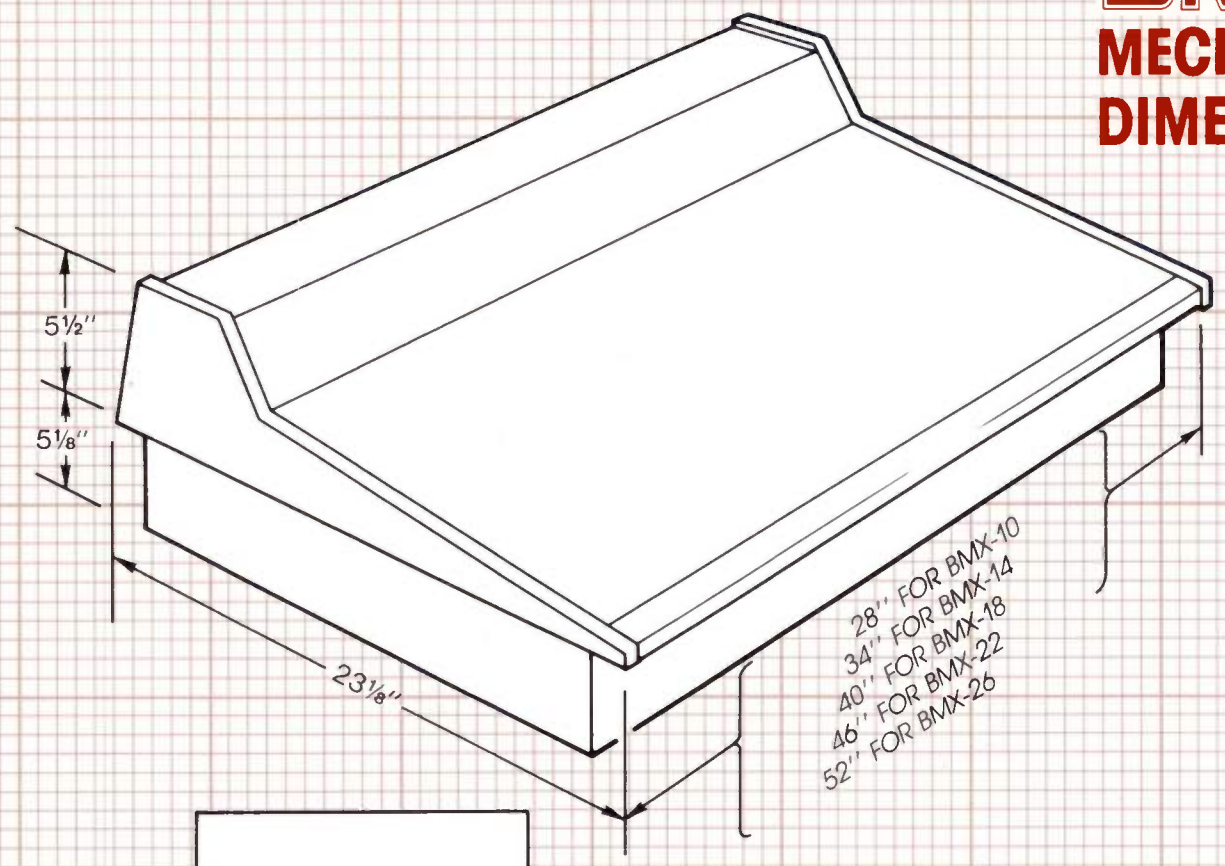








BMX
MECHANICAL DIMENSIONS



BMX - 10
26¾" x 21¼"

CUTOUT DIMENSIONS
(CUTOUTS ALLOW FOR ¼' CLEARANCE)

BMX - 14
32¾" x 21¼"

BMX - 22
44¾" x 21¼"

BMX - 18
38¾" x 21¼"

BMX - 26
50¾" x 21¼"

Copy Stands

Copy stands are available for all sizes of BMX console housings and studio control turrets. There are two styles available, the first is designed to be permanently attached to the top of the console or turret, the second is a free standing version which offers the advantage of being able to be positioned at the optimum reading distance for each operator. Stands are constructed of hardwood natural oak, with smoke-bronze plexiglass copy board.





Overbridge

The overbridge option spans the top of the standard meter panel to provide mounting space for additional peripheral equipment. Such equipment could consist of routing switchers, remote controls, intercom, status alarm lamps and controls, remote readout displays, etc. The overbridge unit may be fitted at initial order or added to any existing BMX in the field.



Turret

Turret units are designed to provide an attractive and practical housing for talent control panels and display modules. Microphone buttons, monitor/headphone panels, clocks, and timers are some of the function units that may be installed. The turrets are finished in Formica with solid oak end panels which match the profile of the oak panels on the BMX meter panel.



PACIFIC RECORDERS & ENGINEERING CORPORATION

2070 Las Palmas Drive — Carlsbad, CA 92008 — 619-438-3911 — 800-874-2172 — Telex: 181777

BMX SERIES THREE



IT'S EVERYTHING A BMX SHOULD BE, AND THEN SOME.



With program origination, your choice of an on-air console is the most critical equipment decision you can make. You don't have to be an engineer to know that your "board" is the heart of the station's operations. If your console isn't in top condition, odds are your station's health isn't either. Unfortunately, gaining more flexibility and better performance from your console isn't a matter of giving it more exercise. It's usually a matter of retirement.

When you think about all that needless anxiety, the frustrating experiences you've had over the years attempting to make yesterday's "old dog" console sit-up and perform todays new programming tricks, there's no doubt you're going to feel genuinely excited after you read about our new BMX Series Three.

With our BMX III, you're going to examine a new on-air console design that brings a whole new outlook to your station's operations. With the Series III, we've retained the essential concepts developed for our legendary BMX Series I & II consoles and enhanced them with the latest features and facilities we've incorporated into our new ABX and AMX operations consoles.

You'll see that the latest technology, important innovations and new, useful features we designed into the BMX III have one essential purpose: to make your station run better. You'll also see that our dedication to quality hasn't changed either. Pacific Recorders & Engineering is a company that is zealously dedicated to the well-being of your business. You see, that's how we stay healthy.

Should there be any question in your mind about how dedicated we are, just check our references. With more than 500 stations across the country who have invested in a BMX board, there's undoubtedly someone right in your own backyard who's already had the advantages of owning a BMX. You may have already discussed the merits of a BMX with someone who's been eager to share their experience and enthusiasm. Quite possibly, even a competitor.

One last thought before we jump into the BMX III's details: a BMX isn't for everyone. We realize that a champagne appetite is often restricted by a beer budget. When you decide to invest in a BMX Series Three this time around, rest assured you'll soon hear the sound of popping corks.

Pacific Recorders &
Engineering Corp
2070 Las Palmas Drive
Carlsbad, CA 92008
(619) 438-3911
TELEX 181777

The *choice* for more #1 stations.



Los Angeles station KRTH operates with three BMX-equipped studios. For on-air or production, the identical BMX consoles eliminate confusion and give the station staff the ultimate in programming and operational flexibility.



TODAY'S COMPLICATED RADIO PROGRAMMING AND PRODUCTION NEEDS MORE FLEXIBILITY: THE BMX III ACHIEVES THIS GOAL WITHOUT SACRIFICING SIMPLICITY OF OPERATION.

The BMX III on-air console was designed with the capacity to handle a talk show with two separate telephone mixes, record a stereo feed for later broadcast, plus the capability to work and communicate with two studios and a remote, all at the same time. In addition, the new BMX III may be optionally equipped with two effect/foldback sends and a stereo effects return, all with extensive remote control logic. This outstanding capacity has not been gained, however, at the expense of simplicity. The BMX III retains the clean, uncluttered design so important for operator understanding and simple operation.

WYAY, Atlanta (FM-106) is on-air with a new BMX-III and our Tomcat™ cart machines. Two other production studios are equipped with our operationally-compatible AMX stereo and ABX multi-track production consoles.

TODAY'S ON-AIR STUDIOS NEED A CONSOLE THAT'S PACKED WITH PRACTICAL FEATURES.

THE BMX THREE — FEATURES AT A GLANCE

- Three main stereo mix buses.
- Distribution line amplifiers on each main output.
- Full and independent remote control logic on each input of microphone and line modules.
- Stereo cue system with automatic console headphone monitor switching.
- The monitor system provides independent and unique outputs for the console, host, co-host, and guest headphone feeds.
- Stereo solo-in-place monitoring system.
- Multi-function metering with automatic cue and solo level display.
- Monitor facilities for two studios.
- Multi-way intercommunication system, including producer and external feeds.
- Multi-frequency, low distortion test oscillator.
- Voice slate system with identification tone.
- Two telephone mix-minus feeds plus telephone monitor mix.
- Two optional effect/foldback send mix buses, each with remote control logic.
- Optional stereo effects/reverb return with remote control logic.
- Fully regulated, independent supplies for audio, logic and phantom power.
- On-board audio supply regulation on each module.
- Mainframe fully wired for all present and future inputs, outputs, patch points and logic.
- Connector panel silk screened with clear, functional designations.
- Audio and logic interconnection system is compatible with AMX and ABX series consoles.
- Mainframes for 10, 14, 18, 22, 26, 30, 34 input positions, larger frame sizes available.
- Console supplied with installation connectors and tools, service tool kit and spare parts kit.

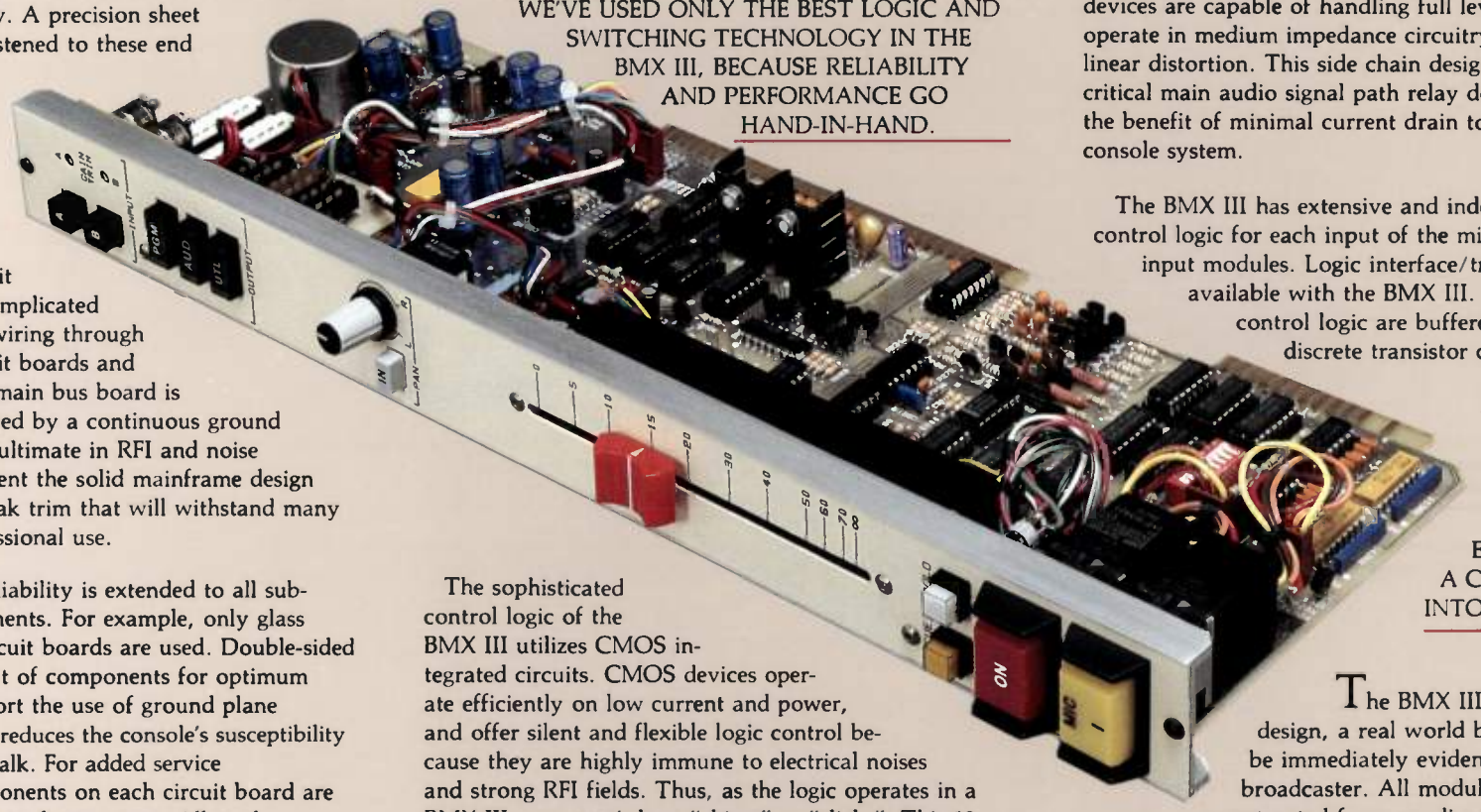
TODAY'S RADIO STATIONS STILL NEED ROCK-SOLID RELIABILITY AND THE HIGHEST QUALITY THAT INSURES PERFORMANCE WELL INTO TOMORROW.

With a BMX, the reliability starts with a sturdy housing. A BMX has always been fabricated with superior materials and methods. Heavy gauge aluminum alloy end panels are made on CNC mills for the ultimate in dimensional accuracy. A precision sheet metal chassis is then fastened to these end panels to form the mainframe housing. This BMX housing will not twist or flex and, therefore, will not degrade circuit card contacts or place strain on circuit traces. We minimize complicated and error-prone hand wiring through the use of plug-in circuit boards and "mother boards". The main bus board is strengthened and shielded by a continuous ground plane which yields the ultimate in RFI and noise isolation. We complement the solid mainframe design with attractive, solid oak trim that will withstand many years of rigorous professional use.

With a BMX, this reliability is extended to all sub-assemblies and components. For example, only glass epoxy double-sided circuit boards are used. Double-sided boards allow the layout of components for optimum performance and support the use of ground plane shielding which further reduces the console's susceptibility to RFI, noise and crosstalk. For added service convenience, the components on each circuit board are identified with silk screen designations. All card connecting fingers and their mating connectors are gold-plated for the highest reliability.

Throughout the BMX design, we use only first-quality components. Advanced discrete and integrated circuitry yields very low noise and distortion and provides excellent frequency response and headroom/overload performance. At least 30 dB of microphone and line input headroom is maintained to provide that extra margin for hot levels and "operator error". Mixers are full-travel Penny & Giles Series 4000 conductive plastic faders. Pushbuttons are Honeywell, EAO and Schadow, chosen for their extended life ratings and superior "feel". Audio transformers, where employed, are by Jensen. The VU meters conform fully to American National Standard C 16.5-1954 and are driven by bridging buffer amplifiers. Optional peak program meters (PPM) conform to British Standard 4297:1969.

WE'VE USED ONLY THE BEST LOGIC AND SWITCHING TECHNOLOGY IN THE BMX III, BECAUSE RELIABILITY AND PERFORMANCE GO HAND-IN-HAND.



The sophisticated control logic of the BMX III utilizes CMOS integrated circuits. CMOS devices operate efficiently on low current and power, and offer silent and flexible logic control because they are highly immune to electrical noises and strong RFI fields. Thus, as the logic operates in a BMX III, you won't hear "chirps" or "clicks". This 12 volt CMOS control logic is also easy to interface to external "outside" equipment like lamps and relays.

We complement the superior performance characteristics of CMOS logic circuitry with miniature, dry nitrogen-sealed, gold-contact relays for all primary path audio signal switching. These special relays (much more costly than conventional TTL or FET design components), are extremely reliable, and cannot degrade audio performance with unwanted noise or distortion. By comparison, other console designs typically use inexpensive TTL or FET analog switches which invariably introduce some form of non-linear distortion and degrade an entire audio console's performance; they're any easy, inexpensive shortcut for the average console design.

In a BMX III, less critical audio side chains (like Cue, Solo and Talkback) employ the highest quality, socketed CMOS analog switches. These solid-state, low power devices are capable of handling full level signals and operate in medium impedance circuitry to minimize non-linear distortion. This side chain design complements the critical main audio signal path relay design by offering the benefit of minimal current drain to the overall console system.

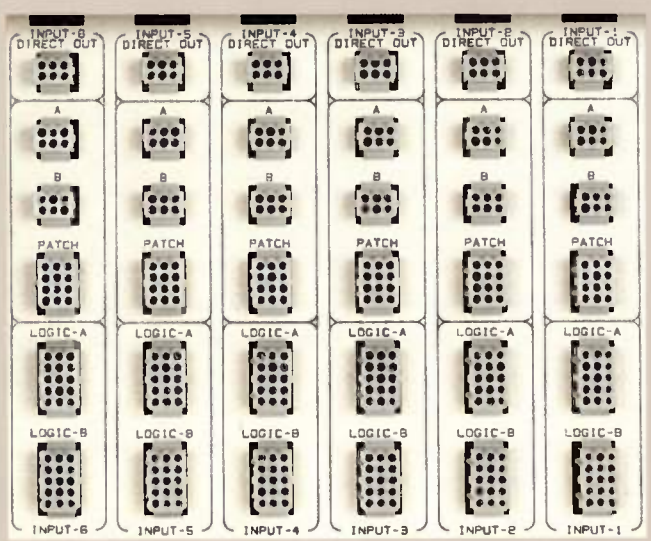
The BMX III has extensive and independent remote control logic for each input of the microphone and line input modules. Logic interface/translator units are available with the BMX III. The outputs of the control logic are buffered by short-proof discrete transistor circuitry.

RELIABILITY AND PERFORMANCE ALSO MEANS SUPERIOR ERGONOMICS AND A CONSOLE THAT FITS INTO THE REAL WORLD.

The BMX III is a low-profile design, a real world benefit that should be immediately evident to any broadcaster. All module front panels are constructed from anodized aluminum extrusions and carry aluminum inlays coated with durable polyurethane paint and silk screened with clearly labeled nomenclature.

Every BMX mainframe leaves plenty of room for the broadcaster to arrange his peripheral equipment. All active electronics are immediately accessible from the top of the console: panel modules simply unplug from the mainframe housing. Perhaps the most important aspect to a BMX's engineering is the careful attention that's been

paid to the logical placement of switches and controls. There isn't an easier board to get to know. More importantly, there isn't a board that's easier to run. Just look around at a host of look-alike consoles that curiously resemble a BMX on the surface.



Time-consuming, hand wired terminal blocks are eliminated with a BMX III. All interconnections use proven, reliable, mating connectors for rapid, easy installation.



Every BMX III comes with a rugged power supply designed to comfortably handle the heaviest BMX use — reliably and cooly.

A BMX's separate rack mounting power supply is constructed in a rugged steel chassis and features massive regulator heat sinks. For convenience, it comes with a six foot interconnecting cable. The audio, logic and microphone phantom power supply voltages are individually regulated and switched with magnetic circuit breakers for maximum reliability.

All audio input/output and logic wiring between the console and external equipment is accomplished with easy-to-use mating connectors. Time-consuming hand wiring to terminal blocks is eliminated. Console mating connectors, pins and tools are supplied with the BMX III. By prewiring the studio connectors, a BMX III console can be installed and on the air in a few hours.



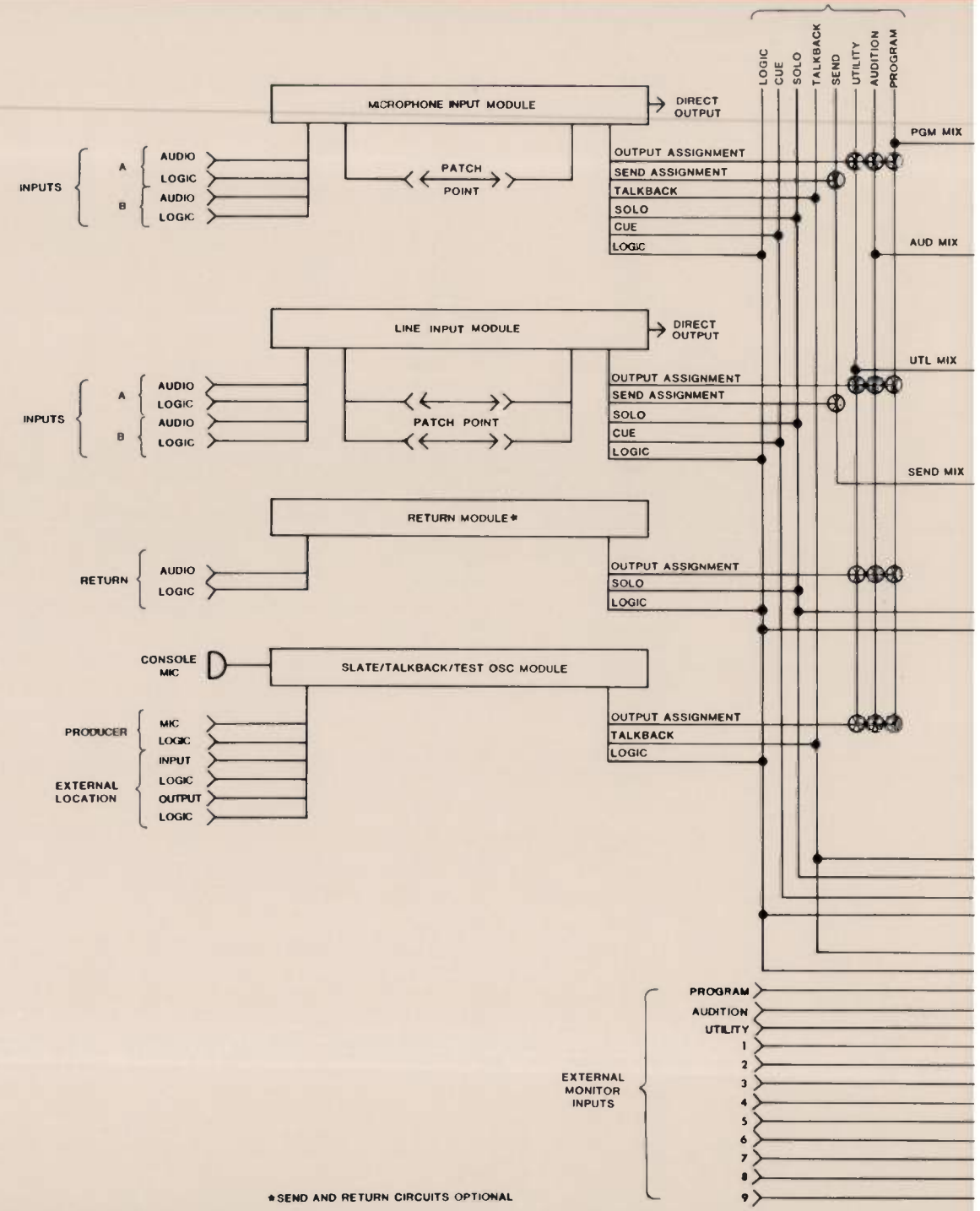
Regardless of mainframe size, the low profile design of BMX-III gives you plenty of viewing room to your studio — even when you add our optional copy stand or equipment overbridge.

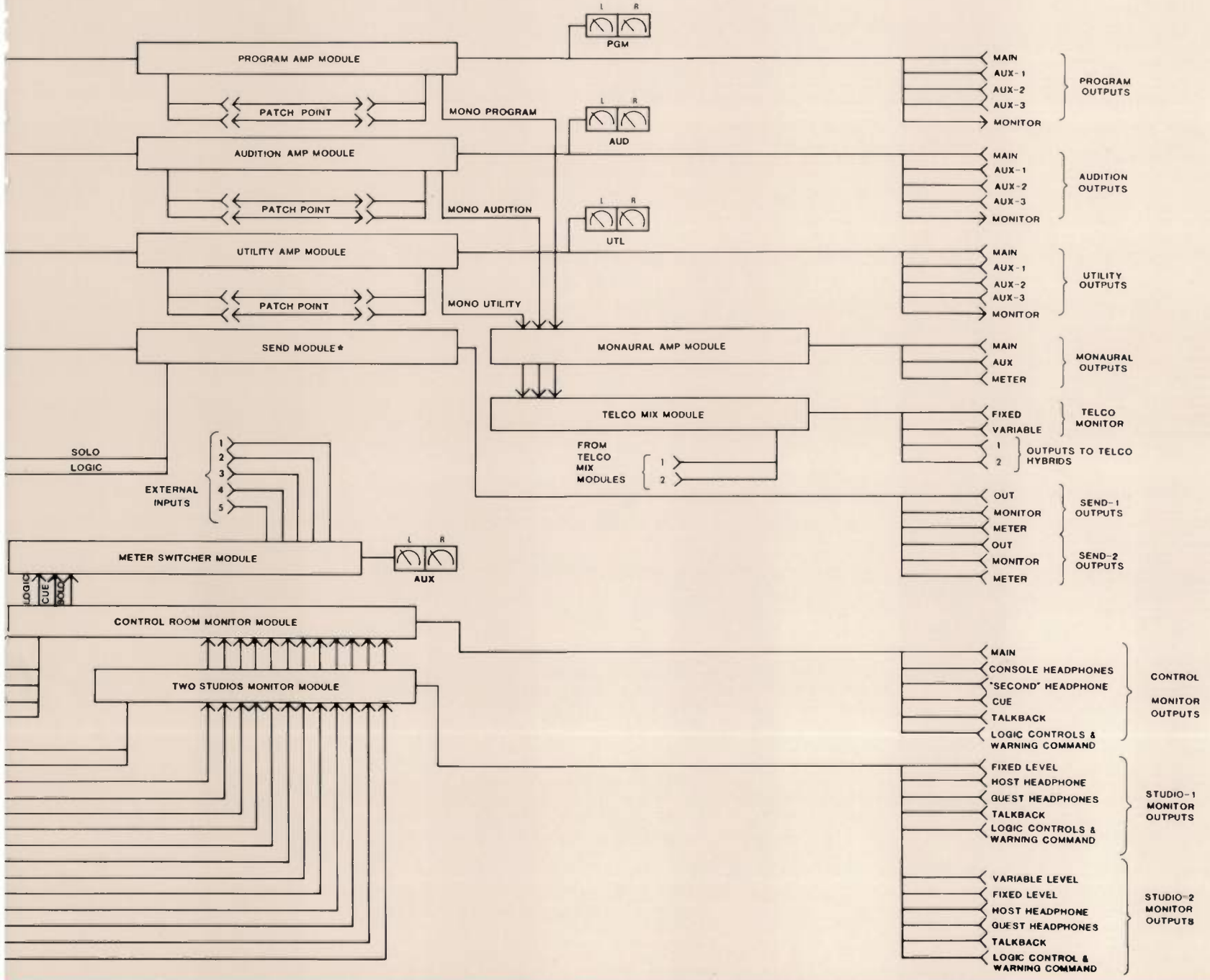
ONE LAST WORD BEFORE YOU LOOK INTO MORE DETAILS.

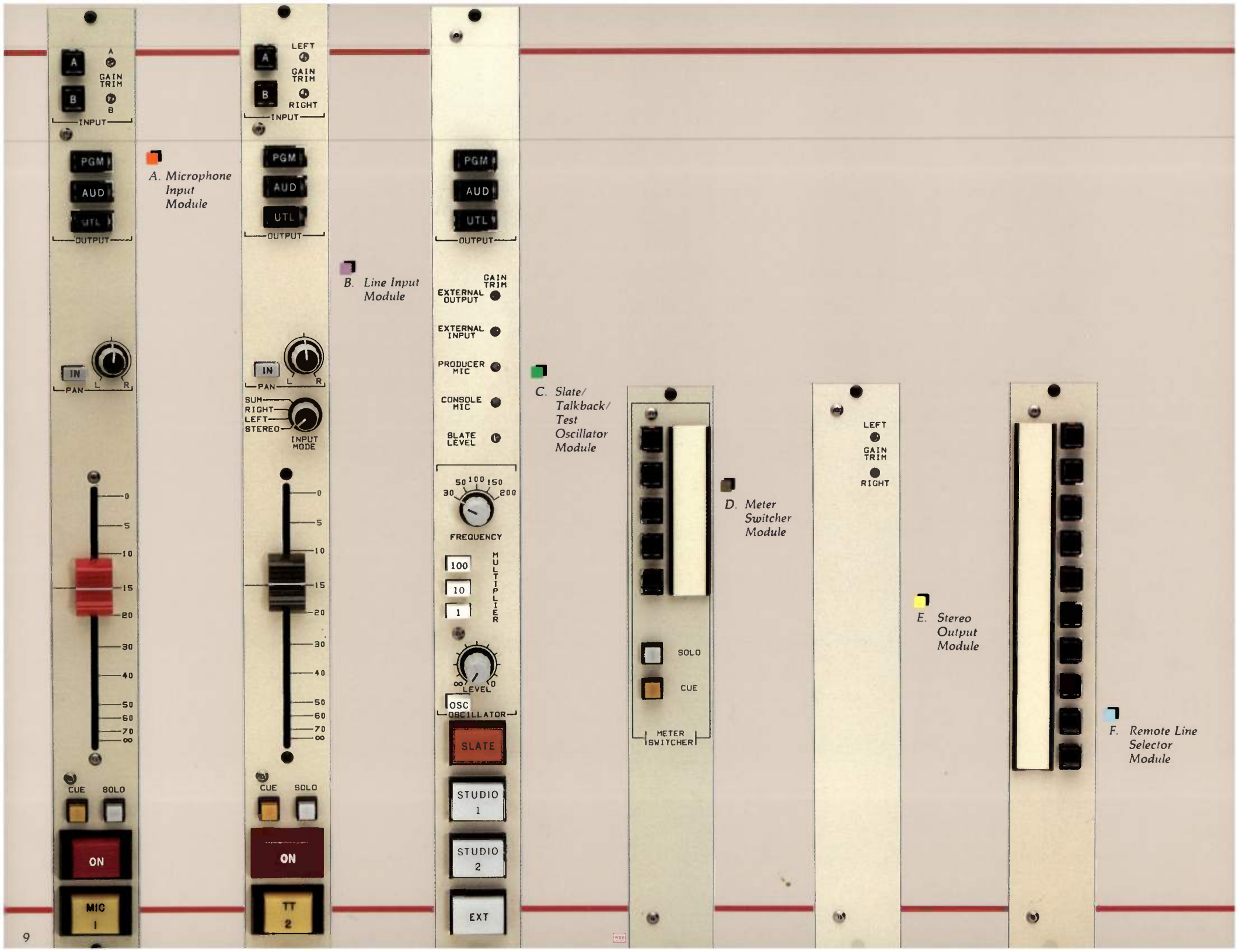
Our BMX consoles have become the standard by which many broadcasters evaluate other competitive offerings. Frankly, we're flattered by this, but not surprised. Because we've stayed in close touch with your needs, the BMX has become an evolutionary design; the purpose of which is to continuously reach for and set the highest radio broadcast standards — in features, performance, reliability and that all-too-elusive factor, quality.

If you believe that all these attributes have been attained in the exemplary console design of the BMX III, then we welcome you to a select user's group of professionals — broadcasters who have decided a Pacific Recorders & Engineering console is the best value that money can buy.

BMX III FUNCTIONAL BLOCK DIAGRAM




PROGRAM AMP MODULE
PATCH POINT
MONO PROGRAM
PGM
L R
MAIN
AUX-1
AUX-2
AUX-3
MONITOR
PROGRAM OUTPUTS
AUDITION AMP MODULE
PATCH POINT
MONO AUDITION
AUD
AUDITION OUTPUTS
UTILITY AMP MODULE
PATCH POINT
MONO UTILITY
UTL
UTILITY OUTPUTS
SEND MODULE*
MONAURAL AMP MODULE
MAIN
AUX
METER
MONAURAL OUTPUTS
TELCO MIX MODULE
FIXED
VARIABLE
TELCO MONITOR
FROM TELCO MIX MODULES
1
2
OUTPUTS TO TELCO HYBRIDS
SOLO LOGIC
EXTERNAL INPUTS
1
2
3
4
5
OUT
MONITOR
METER
SEND-1 OUTPUTS
SEND-2 OUTPUTS
METER SWITCHER MODULE
AUX
LOGIC
CUE
SOLO
CONTROL ROOM MONITOR MODULE
TWO STUDIOS MONITOR MODULE
MAIN
CONSOLE HEADPHONES
"SECOND" HEADPHONE
CUE
TALKBACK
LOGIC CONTROLS & WARNING COMMAND
CONTROL MONITOR OUTPUTS
FIXED LEVEL
HOST HEADPHONE
GUEST HEADPHONES
TALKBACK
LOGIC CONTROLS & WARNING COMMAND
STUDIO-1 MONITOR OUTPUTS
VARIABLE LEVEL
FIXED LEVEL
HOST HEADPHONE
GUEST HEADPHONES
TALKBACK
LOGIC CONTROL & WARNING COMMAND
STUDIO-2 MONITOR OUTPUTS



A. Microphone Input Module

B. Line Input Module

C. Slate/ Talkback/ Test Oscillator Module

D. Meter Switcher Module

E. Stereo Output Module

F. Remote Line Selector Module

MICROPHONE INPUT MODULE

The Microphone Input module accommodates a wide range of input levels to permit use of all contemporary microphones. Input preamplifier gain is adjustable for nominal inputs of -60 dBu to -35 dBu. The A/B input selector provides two microphone inputs per module, each with programmable monitor mute selection for control room or either of two studios. The mute circuitry incorporates an automatic 40 millisecond delay before the microphone is turned on to permit "room reverb" to decay off-mic. Each microphone input is provided with separate remote control capability for ON/OFF, COUGH and multiple TALKBACK functions. The PAN control may be inserted with the IN button to provide positioning of the microphone signal in the stereo image. The module output may be assigned to any combination of PROGRAM, AUDITION and UTILITY by the self-indicating OUTPUT buttons. The illuminated CUE button provides stereo pre-fader cue monitoring. The illuminated SOLO button provides monitoring of solo-in-place which is post-fader and pan. The channel ON/OFF buttons are illuminated to indicate the status of the channel. In addition, the ON button may be programmed so that momentary depression provides cough muting. Phantom power circuitry for condenser microphones is user assignable for both the A and B inputs.

The microphone module may be equipped with an optional SEND control which can be assigned to either or both of two send buses and is provided with a PRE/post-fader button switch. Stereo send is possible as a user option; assigning the send to either send bus results in a mono-mix signal to that bus, however, the send will be stereo when both bus assignment buttons are engaged.

LINE INPUT MODULE

The Stereo Line Input module will accommodate nominal input levels from -12 dBu to +8 dBu. The A/B input switch selects either of two stereo inputs. Separate logic control is available on each input for the remote control of tape machines and/or other sources by the module. The PAN control may be used to balance a stereo signal source or to position a mono signal in the stereo image. An INPUT MODE switch allows input selection of stereo, left channel only, right channel only or the sum of left and right channels. The module output may be assigned to any combination of PROGRAM, AUDITION and UTILITY by the self-indicating OUTPUT buttons. The illuminated CUE button provides stereo pre-fader cue monitoring. The illuminated SOLO button provides monitoring of solo-in-place which is post-fader and pan. The channel ON/OFF buttons are illuminated to indicate the status of the channel.

The line module may be equipped with an optional SEND control which is provided with a PRE/post-fader switch and can assign a mono-mix of the signal to either or both of two send buses. The user option for stereo send is available as described for the Microphone Input module.

Each Line Input module is equipped with a comprehensive family of control logic capability which includes the remote control of module ON, OFF, CUE and SOLO functions with status tally lights. Also provided are ready status and start/stop command pulses for turntables, cartridges and reel-to-reel tape machines. The ready status illuminates the channel OFF button whenever a tape is threaded or cartridge is loaded and ready for play. The ON button starts the remote controlled equipment as well as turning the channel on. The module audio is automatically turned off upon the receipt of a cartridge fast wind or end of tape command. In addition, the module may be set to control the console mounted timer system for the automatic up-time of events.

SLATE/TALKBACK/TEST/OSCILLATOR MODULE

The Slate/Talkback/Test/Oscillator module provides a test oscillator, a slate tone oscillator and talkback facilities for the BMX III console. The test oscillator generates low-distortion, stable amplitude tones to allow system test and line-up with any of 15 frequencies. The tones may be assigned to any combination of the PROGRAM, AUDITION and UTILITY mix buses.

SLATE commentary may be added to a tape recording by the console mounted electret microphone and/or from an external producer's microphone. A low distortion spotter tone (nominally 30 Hz, adjustable) with carefully controlled envelope rise and fall times, may be recorded with the commentary for ease of fast-wind identification of the cuts on a track.

The console and producer microphones can talk to any of two studios plus a remote or external location, such as a screener booth, 2-way, etc. The external location can also talk back to the studios as well as the control room. The frequency response of all the talk microphone preamplifiers has been carefully shaped to favor speech communication.

METER SWITCHER MODULE

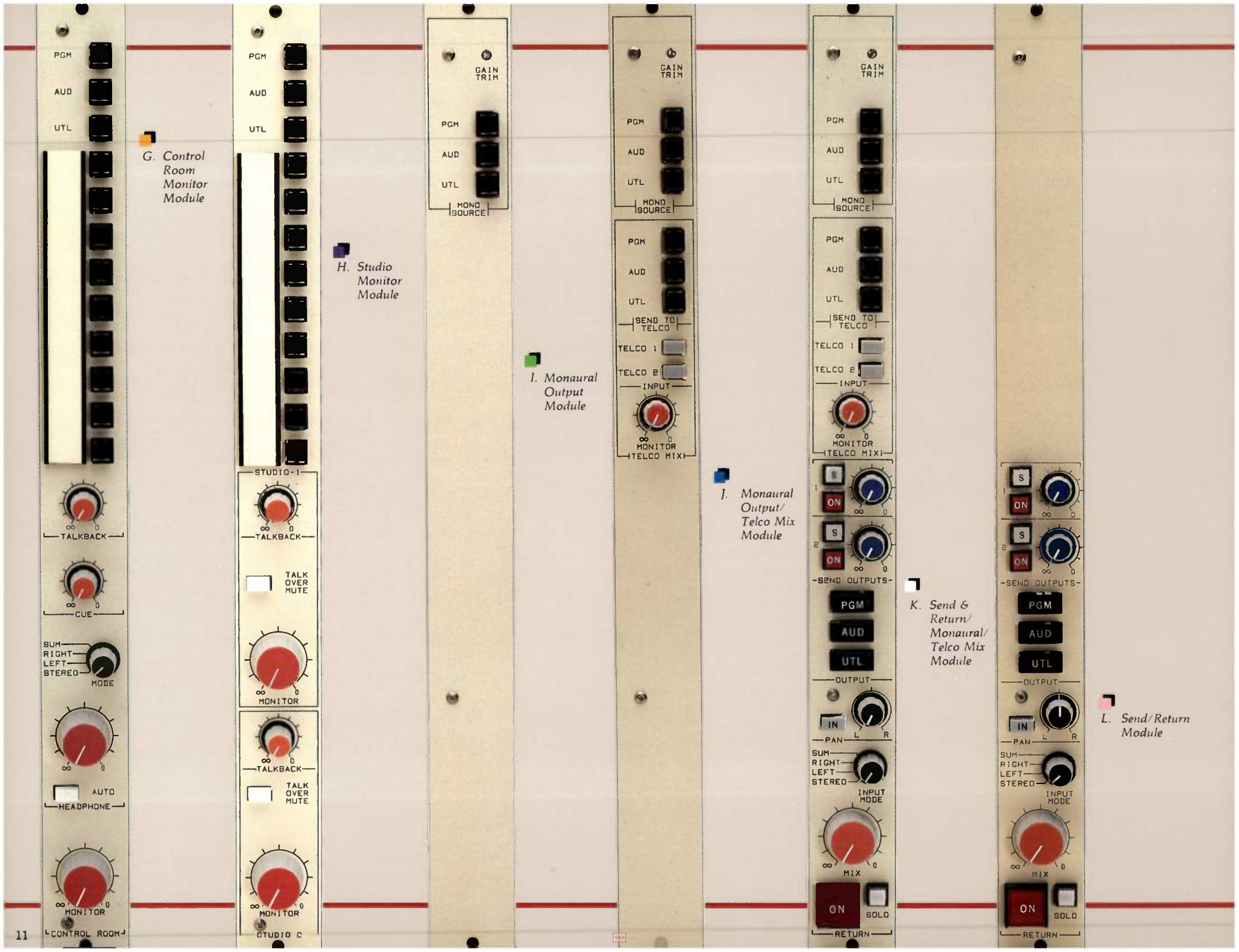
The auxilliary meters in the BMX III meter panel are driven by the Meter Switcher module. This module provides switchable metering facilities for the AUDITION and UTILITY outputs in the smaller mainframe sizes. The unassigned inputs may be used to meter user determined external sources. The module automatically defaults from the selected status whenever a CUE or SOLO button is engaged on any module. The auxilliary meters will then display the nominal operating level at the CUE or SOLO point selected. This enables a quick input level check when displaying CUE, and very convenient level line-up when displaying SOLO. The SOLO metering function eliminates the need to use a console output bus for preview and level setting.

STEREO OUTPUT MODULE

The Stereo Output module contains the mixing and distribution amplifiers for a console line output. The console is supplied with three of these modules, one each for the PROGRAM, AUDITION and UTILITY buses. Each module supplies four stereo distribution outputs; each output is capable of supplying up to +28 dBm. Patch send and return points are available for the connection of external processing equipment and/or a patch field. The output is an active balanced design; output transformers are available as an option.

REMOTE LINE SELECTOR MODULE

The Remote Line Selector module provides a selection of 10 stereo signals switched to one output. Up to two parallel-input selector modules may be installed in the BMX III. The inputs and outputs for the modules are all brought out to the connector panel for ease of assignment. Typical applications include use as a line pre-selector ahead of input modules and tape recorders.



G. *Control Room Monitor Module*

H. *Studio Monitor Module*

I. *Monaural Output Module*

J. *Monaural Output/ Telco Mix Module*

K. *Send & Return/ Monaural/ Telco Mix Module*

L. *Send/Return Module*

CONTROL ROOM MONITOR MODULE

Monitoring of PROGRAM, AUDITION and UTILITY or any of nine external signals is provided by the interlocking monitor selector. The MONITOR and HEADPHONE potentiometers are sealed long-life conductive-plastic controls which were custom designed by Penny & Giles for the BMX III, AMX and ABX consoles. The AUTO headphone monitoring facility has been derived from the ABX console and is unique in the industry. Whenever an input module CUE button is engaged, the console operator's headphones automatically switch from the normal stereo monitor mode to one of two user assignable states; these are stereo cue, or mono cue in one earphone and mono monitor in the other. The headphone feeds to a co-host and/or guests are not affected.

Level control is available for DIM, which provides an adjustable degree of monitor level reduction during talkback. The TALKBACK control adjusts the volume of incoming talk signals. Talkback may be monitored with an independent amplifier and loudspeaker, or through the stereo cue system. The CUE control adjusts the level of the cue system. Logic circuitry is provided for the remote control of monitor dim and mute.

STUDIO MONITOR MODULE

The Studio Monitor module is expressly designed for applications where separate voice/announce booths or conference studios are required. This module provides the monitor, headphone and talkback facilities for up to two studios. Monitoring or PROGRAM, AUDITION and UTILITY or any of nine external signals is provided by an interlocking monitor selector. MONITOR, DIM and TALKBACK level controls are provided along with a TALK OVER MUTE button for each studio. The mute override button enables talkback to a studio even when the monitor speakers are muted. This would normally be used when doing off-air production work and/or when the talent chooses not to wear headphones.

The module has several outputs to meet most any combination of monitoring requirements. The main output is adjustable along with the degree of dimming during talkback. Fixed level outputs are available for those situations where the studio personnel are provided their own monitor and headphone level controls. The output for talent headphones is provided with talkback and a preset dim, a second output is provided for guest headphones which contains neither talkback or dim. Logic circuitry is provided for the remote control DIM and MUTE for each of the studio monitor sections.

MONAURAL OUTPUT MODULE

The Monaural Output module provides a selection of the three main outputs. The module may select the PROGRAM, AUDITION and UTILITY signals to derive a monaural output. The output is an active balanced design; an output transformer is available as an option.

MONAURAL OUTPUT/TELCO MIX MODULE

This combination module provides the features of the Monaural Output module plus the facilities for deriving mix-minus feeds for telephone hybrids. The telco mix section derives three unique mixes of the signals from two telephone callers and a selection of the PROGRAM, AUDITION and UTILITY buses.

The telephone signals which are to be broadcast, are selected and controlled by the input modules connected to the external hybrid systems. The Telco Mix module receives the audio from the input modules and sums them. This sum signal is routed to the meter selector and to the mix-monitor output. This telephone mix-monitor output is very useful when talk show talent and/or guests prefer not to use headphones.

The module provides for the selection of the output bus which is to contain the "base-mix" to be fed back to all the callers so that they may hear what is transpiring, even before air time. The signal fed back to a given caller includes the selected bus plus all the other callers, except himself (mix-minus). The signals fed back to the callers, may be passed through the on-board telephone bandpass filters for improved hybrid operation.

SEND & RETURN/MONAURAL/TELCO MIX MODULE

This module combines the Monaural Output/Telco Mix module with the facilities of the Send & Return module. This module is installed to support the use of the send circuits in the input modules and to provide return mix and assign circuitry for effects such as reverb. The Send & Return sections of this module operate identically to the dedicated Send & Return module described below.

SEND/RETURN MODULE

The optional Send/Return module contains both the send amplifiers and the stereo return circuits. The send portion of the module contains the mixing and output amplifiers for the two effects/foldback channels. Each of these has a variable LEVEL control with ON/OFF and SOLO facilities. The stereo effects return section of the module is equipped with a conductive plastic fader, MODE selector, PAN control, ON/OFF/SOLO buttons and output assignment buttons. Logic circuitry is provided for the remote ON/OFF control of both of the send circuits and the return channel.

REMOTE CONTROL PANELS

Tape deck remote control panels are available for most professional reel-to-tape recorders. The engraved RWD, FWD, STOP, PLAY and RECord buttons are function color-coded to common industry practice and are supplied with tally lamps.

Cartridge deck remote control panels are available for TOMCAT, MICROMAX and ITC cartridge recorders. Panels for other machines are available by request. Engraved buttons for TERtiary tone, SECondary tone, STOP, START and RECord are provided. The buttons are supplied with the appropriate voltage tally lamps.

The timer control panel provides illuminated START, STOP, RESET and HOLD buttons for the meter panel mounted DT-4 digital timer. An AUTO button couples the timer's reset and restart functions to the console timer reset command bus for the automatic up-time of events, (start with module on).

BUILD A BMX III JUST THE WAY YOU WANT IT.

The BMX III is available in several mainframe sizes to accommodate every broadcast requirement. Each BMX III is factory wired and fully tested for an entire complement of modules. You may order the console with fewer than capacity and then add modules as needs arise. Simply plug in the extra modules. A universal layout enables any input position to accept any type of module. Simply select the microphone, line and optional modules your application requires. You build the console to fit your precise needs.

ACCESSORIES FOR THE BMX III.

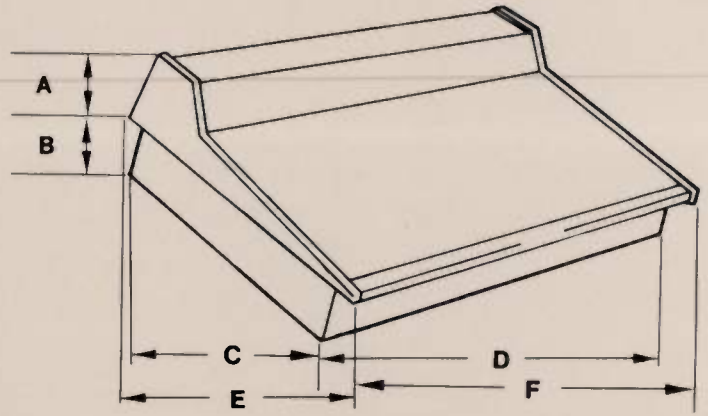
Copystands are available for all BMX consoles. There are two styles; the first is designed to be permanently attached to the top of the console, the second, a free-standing version which offers the advantage of positioning copy at an optimum reading distance for each operator.

The copystands are made of natural oak with a semi-transparent, smoke-bronze lucite copyboard.

The BMX III console may be ordered with an overbridge option which spans the top of the standard meter panel. This option provides additional mounting space for peripheral equipment such as routing switchers, remote controls, intercom, status alarm lamps and controls, remote readout displays, etc. The overbridge may be fitted at initial order or may be added to an existing BMX Series console in the field.

The optional turret units are designed to provide an attractive and practical housing for talent control panels and display modules. Microphone buttons, monitor/headphone panels, clocks, and timers are some of the devices which may be installed. The turrets are finished in a durable laminate with solid oak end panels which match the profile of the oak panels on the BMX III meter panel.

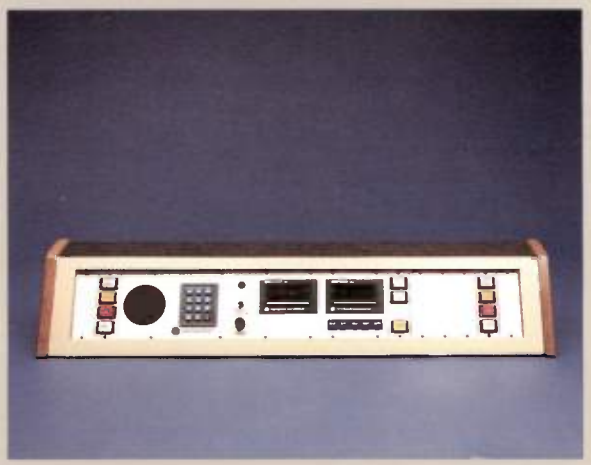
BMX III MECHANICAL DIMENSIONS



CONSOLES	DIMENSIONS					
	A	B	C	D	E	F
BMX III-10	5 3/4"	6 9/16"	24 3/4"	30 1/2"	26 9/16"	32
BMX III-14	5 3/4"	6 9/16"	24 3/4"	36 1/2"	26 9/16"	38
BMX III-18	5 3/4"	6 9/16"	24 3/4"	42 1/2"	26 9/16"	44
BMX III-22	5 3/4"	6 9/16"	24 3/4"	48 1/2"	26 9/16"	50
BMX III-26	5 3/4"	6 9/16"	24 3/4"	54 1/2"	26 9/16"	56
BMX III-30	5 3/4"	6 9/16"	24 3/4"	60 1/2"	26 9/16"	62
BMX III-34	5 3/4"	6 9/16"	24 3/4"	66 1/2"	26 9/16"	68



Copy stands are available in fixed or free-standing formats for all BMX consoles.



Optional overbridge or turrets give you extra space and they match perfectly with a BMX.

SPECIFICATIONS

MICROPHONE INPUT :

Source Impedance	150 ohms
Input Impedance	1000 ohms minimum, balanced
Input Level Range	Adjustable from -60 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS :

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range	
Line Input	Adjustable from -12 dBu to +8 dBu
Monitor Input	Nominal +4 dBu/+8 dBu
Patch Input	Nominal -10 dBu
Input Headroom	Greater than 30 dB above nominal input levels

MAIN OUTPUTS :

Load Impedance	600 ohms
Source Impedance	30 ohms
Nominal Output Level	+8 dBm, adjustable to +4 dBm
Maximum Output Level	
Line Amplifiers	+28 dBm, 600 ohm load
Send Module	+26 dBm, 600 ohm load

MONITOR OUTPUTS :

MAIN OUTPUTS:

Load Impedance	600 ohms or greater
Source Impedance	30 ohms, unbalanced
Output Level	0 dBu nominal, ± 20 dBu maximum

HEADPHONE OUTPUTS:

Load Impedance	45 ohms or greater
Source Impedance	Less than 4 ohms
Output Level	0 dBu nominal, +29 dBu maximum

FREQUENCY RESPONSE :

Microphone Input to Program Output	+0 dB, -0.9 dB, 20 Hz to 20 kHz
Line Input to Program Output	+0 dB, -0.8 dB, 20 Hz to 20 kHz

NOISE :

Microphone Input Amplifier	-127 dBu RMS equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	-88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output noise with one microphone channel ON, fader at -15 dB, input sensitivity at -50 dBu	76 dB below output, reference +8 dB 150 ohm source, 20 kHz bandwidth
Output noise with one line channel ON, fader at -15 dB, input sensitivity at +8 dBu.	80 dB below output, reference +8 dB 600 ohm source, 20 kHz bandwidth
Output noise with no input channels ON	82 dB below output, reference +8 dB, 20 kHz bandwidth

DISTORTION , T.H.D. :

Microphone input to program output	Less than 0.02%, 20 Hz to 20 kHz, -50 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output
Line input to program output	Less than 0.008%, 20 Hz to 20 kHz, +8 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output

DISTORTION, I.M. :

Microphone input to program output	Less than 0.008%, -50 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load
Line input to program output	Less than 0.005%, +8 dBm input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load

CROSSTALK :

Interchannel crosstalk	Less than -85 dB at 1 kHz Less than -75 dB at 20 kHz

NOTES:

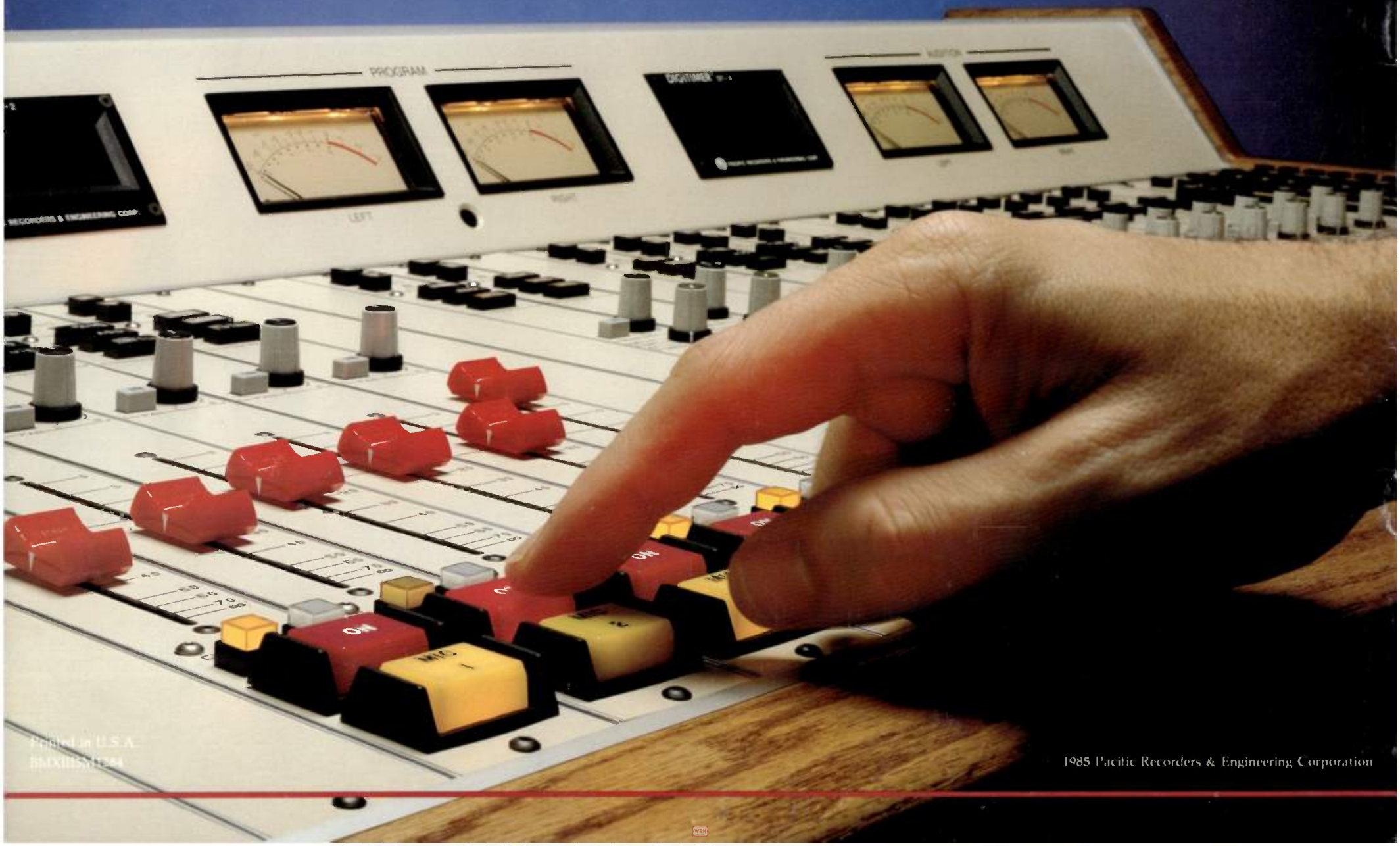
1) These specifications are for the basic signal paths, per channel, with either or both channels of a stereo pair operating and with 600 ohm loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the *same voltage value* as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

3) Noise specifications are for a 14-input console (BMX-14) larger consoles will have slightly reduced signal-to-noise ratios due to increased summing amplifier gain. Noise specifications are based upon a 20 kHz bandwidth: the use of a meter with a 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Pacific Recorders & Engineering Corp. reserves the right to change specifications without notice or obligation.

PACIFIC RECORDERS & ENGINEERING CORPORATION
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Printed in U.S.A.
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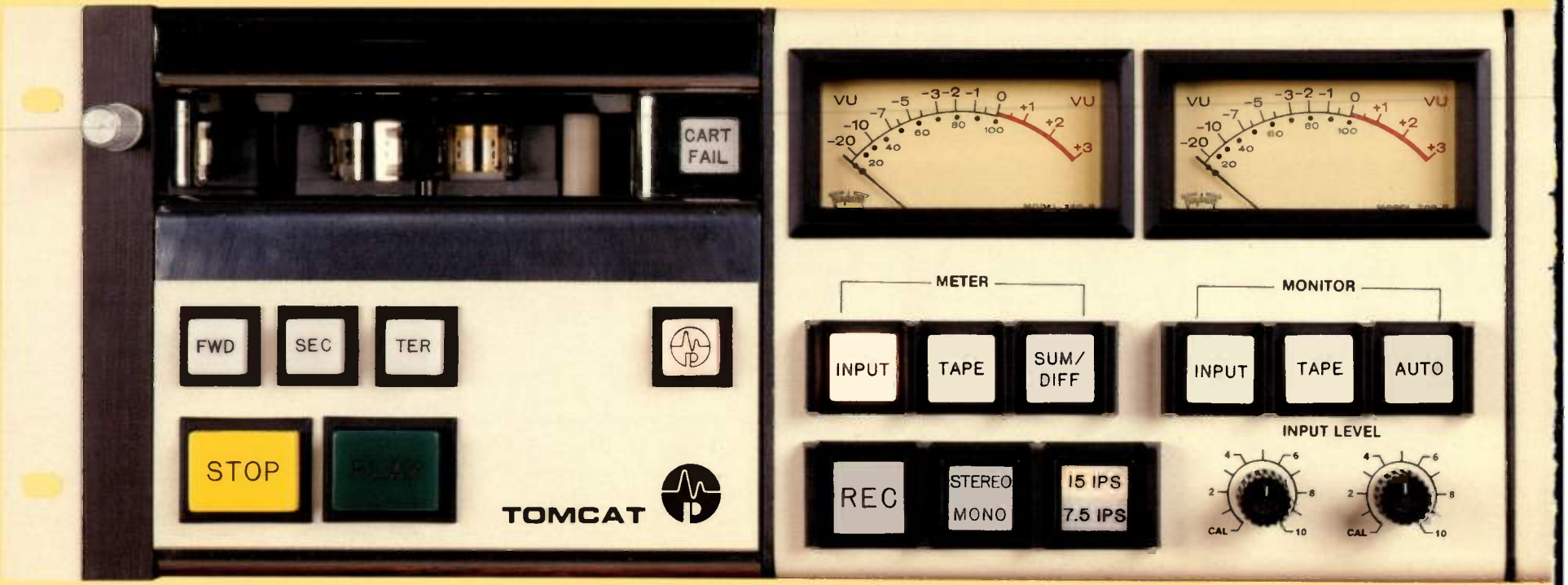
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Pacific Recorders & Engineering

t o m c a t



b r o a d c a s t c a r t r i d g e m a c h i n e

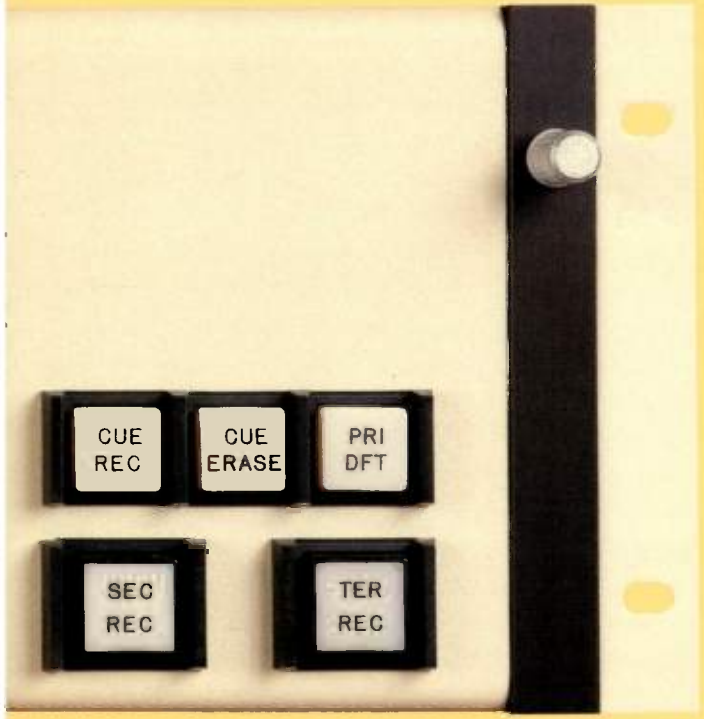


Tomcat

The Legendary Performance Standard

FEATURES:

- MAXTRAX® wide-track tape heads yield more tape signal, less tape noise.
- Precision fixed tape heads and guides for the lowest tape phase error.
- Fast-start DC servo capstan motor—runs only while pulling tape.
- Polyurethane long-life pinch roller with self-aligning, center-supported ball bearing.
- Constant-force pinch roller system, controlled electronically.
- Auxiliary cue tones standard.
- Cue tone erase capability.
- Standard 7.5 IPS & 15 IPS record/reproduce speeds.
- Automatic Fast-Wind function standard: 15 and 30 IPS selectable speeds.
- User selectable Left/Right and Sum/Difference matrix audio formats.
- Automatic Monaural/Stereo compatible playback operation provided by matrix format.
- Low noise, low distortion electronics with excellent headroom, frequency and transient response.
- Long-wearing stainless steel tape deck platen and cartridge guides.
- Accurate, repeatable cartridge positioning system.
- CMOS microprocessor logic control system with 12 volt DC interface logic.
- Low power consumption, low heat generation.
- Compact and easy to service.
- Trimount (3) Reproducers in only 5.25" of rack space.



70% OF ACTUAL SIZE

TOMCAT: the name

The name TOMCAT may seem an odd choice for a high performance cartridge recorder. It came from the working title of the three year design and engineering project to develop our first NAB cartridge machine:

Theory Optimized
Microprocessor Controlled Audio Transport

Once Project TOMCAT was out of the lab and into production, the last thing we wanted was an identity comprised of lackluster, nondescript numerals. Such a totally unique and revolutionary machine demanded something more. The engineering team's logical argument for retaining the TOMCAT name made eminently good sense. When the dust settled, the project acronym stuck.

TOMCAT: the project

As a new entry to the cartridge machine market, we had to deliver a machine which was a substantial improvement over (and not just a clone of), existing technology and hardware. Our console and system clients had already told us what they didn't like about existing cartridge system performance and challenged us to design a machine which answered their concerns. Broadcast production personnel wanted a machine which simplified dubbing by providing fully mode-automatic input/output monitor and meter switching. Film and video post-production studios wanted a machine which started faster and offered 15 IPS audio mastering performance. On-air operations suggested accidental replay lock-out and made a plea to make the drive system quieter. News departments requested faster recue speed. Engineering asked for longer head and pinch roller life and more reliability.

Our goal was to design and build the best cartridge recording and reproducing system in the world, with no shortcuts and no sacred cows. Because our sights were set on crafting a cartridge machine whose performance would rival or exceed a professional half-track reel-to-reel recorder, we designed and selected every component by only one criteria: the finest.

When the best components were uncovered, we used them: like the Deane Jensen-designed JE-990 record and reproduce amplifiers, the sophisticated 1802 CMOS microprocessor and the high-speed, low-noise 5534 IC. When we couldn't find materials or components that could cut it, we innovated and designed our own: like the superfast-start servo capstan motor, the cam-operated pinch roller assembly, and the precision MAXTRAX® format heads (to cite just a few examples). Every step along the way, Project TOMCAT knew no compromises.

First introduced at NAB 1980, TOMCAT attracted the immediate attention and critical acclaim of both the broadcast and post-production industry. Although TOMCAT was the most expensive cartridge recording system ever made (and still is), its acceptance by clients eager for performance was immediate.

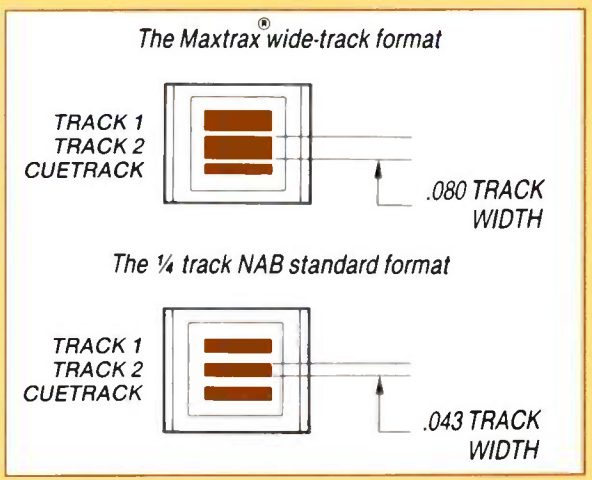
Over the years we've made small refinements, but the basic TOMCAT hasn't changed. There is only one major change since 1980: there are now several thousand in radio and television stations, plus film and video post-production facilities throughout the world. If you're ready to join this select, noncompromising users' group, read on to find out what makes TOMCAT the best.

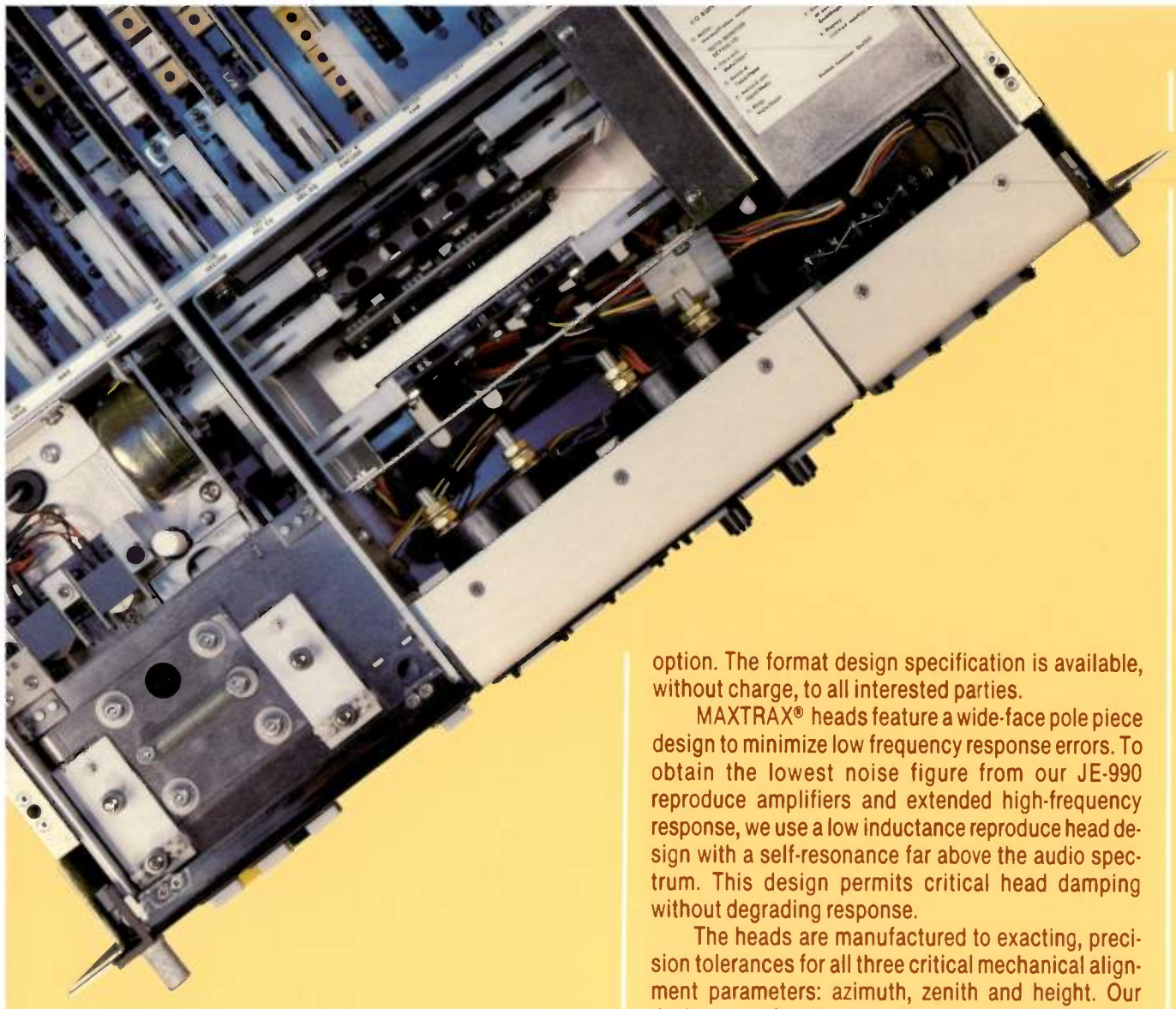
MAXTRAX®: the high performance format

One of the first problems traditional stereo cartridge machines have in competing with the performance of a half-track reel-to-reel tape recorder is the recorded track width. NAB stereo cartridge tracks, only 0.043 inch wide, provide 6 dB less signal (while only 3 dB less wide-band tape noise) output than the 0.082 inch NAB half-track reel-to-reel format.

A no-compromise decision was made to abandon the NAB stereo cartridge format and design a special wide-track, low noise head: the MAXTRAX® format. This head format offers nearly twice the track width of the conventional NAB stereo quarter-track design and provides not only more tape signal, yielding better signal-to-noise performance, but also a reduced

MAXTRAX®/NAB TRACKWIDTH COMPARISON





susceptibility to tape drop-outs. With nearly a 100% increase in the track width (.080 vs. .043), there's more signal integrity because there's more track to work with.

Although MAXTRAX® is a registered trademark of Pacific Recorders, we purposefully placed the track design in the public domain to encourage others to offer it to the industry as a high performance alternative. Several manufacturers in the U.S. and abroad (including Otari and Fidelipak) now offer MAXTRAX® heads as an option. The format design specification is available, without charge, to all interested parties.

MAXTRAX® heads feature a wide-face pole piece design to minimize low frequency response errors. To obtain the lowest noise figure from our JE-990 reproduce amplifiers and extended high-frequency response, we use a low inductance reproduce head design with a self-resonance far above the audio spectrum. This design permits critical head damping without degrading response.

The heads are manufactured to exacting, precision tolerances for all three critical mechanical alignment parameters: azimuth, zenith and height. Our design specifications for these components are the tightest in the industry. The pole pieces are constructed with exotic metal laminations which are significantly harder and longer wearing than traditional cartridge heads. The other materials used in the construction of the heads have been critically selected to have nearly equal hardness to the pole faces; this factor is very important in obtaining the uniform wear characteristics which yield extended head life.

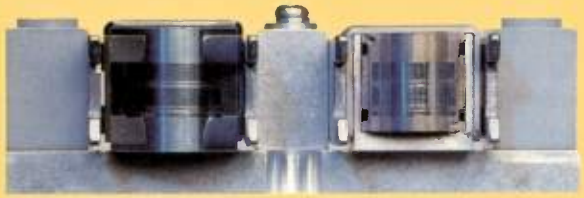
In 1980 we proposed a new recording and operating level of 250 nWb/m to take advantage of the new high-output and low-noise tape formulations (and TOMCAT's extended headroom capability). This new level is 3.8 dB higher than the "assumed" standard operating level of 160 nWb/m,* and therefore yields an additional 3.8 dB of signal-to-noise ratio. We're pleased to see that over the years this recommended level has been adopted by manufacturers of cartridges and machines. When this elevated operating level is combined with the inherent low-noise benefits of the MAXTRAX® format, there is a dramatic reduction in audible tape hiss—without resorting to the added expense, response errors and complexity of outboard noise reduction.

*NAB STANDARD, 1976
Audio Cartridge Tape Recording and
Reproducing Systems

Section 3.2.2 Standard Operating Level
The standard operating level is not specified.

TRANSPORT DESIGN:
the precision tape path

Various designs have tried to address the problems and symptoms of azimuth errors in closed-loop cartridge systems: exotic electronic circuits and Rube Goldberg mechanics abound. We analyzed the dynamic mechanisms involved and solved the various contributing mechanical problems in a much simpler way. Not surprisingly, this analysis found that both the cartridges and traditional machine design had enough built-in tolerance errors to create a wide range of azimuth errors. More importantly, we discovered that if the machine-contributed errors could be dramatically reduced, an acceptably high percentage of cartridges would yield excellent performance. Analysis of those cartridges which did not perform well confirmed that they were indeed defective in material and/or assembly. Tomcat's transport would have to be a precision tape drive, with guidance and head system which would greatly reduce the machine's contribution to azimuth error.

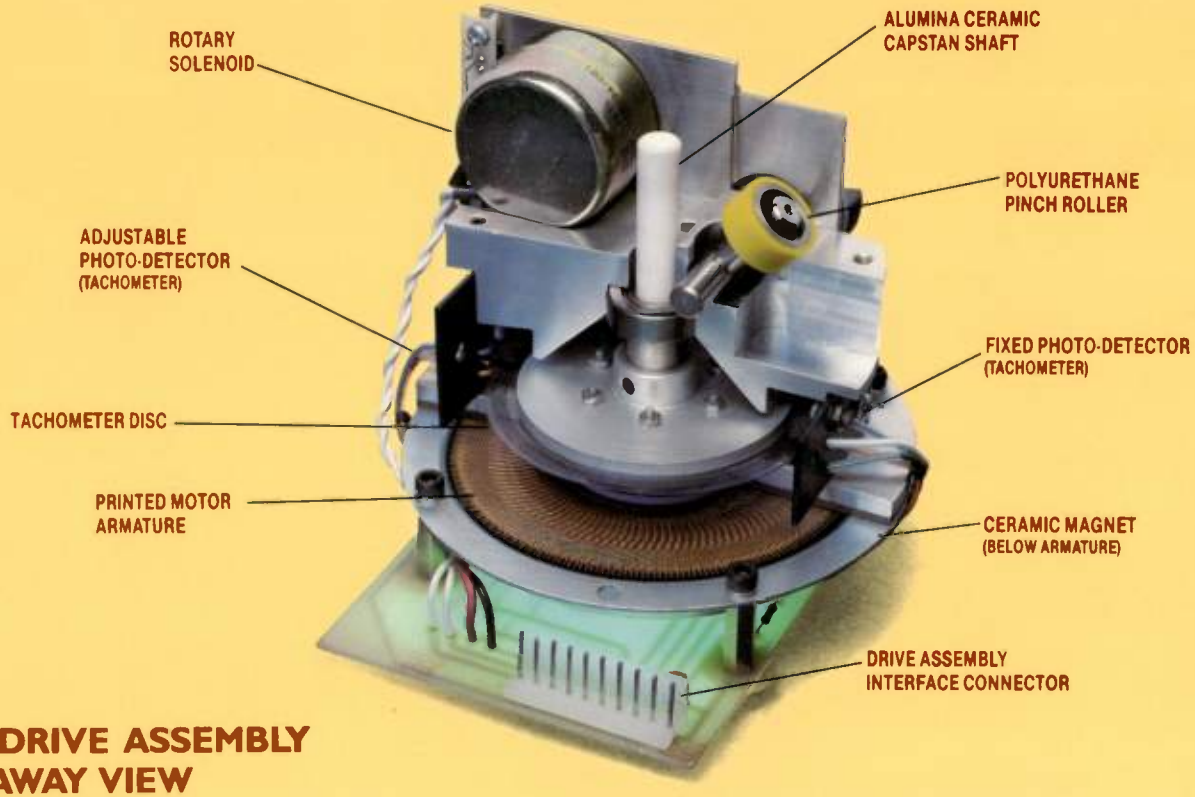


Precision head/guide assembly.

There are two critical assemblies in a cartridge transport which determine the path accuracy of the dynamic, or moving, tape web. These are the head/guide assembly and the capstan/pinch roller interface.

The tape guides must be a precise width, absolutely in-line, and the heads precisely in zenith to eliminate tape skew induced by inconsistent tape supply tension. Indeed, if the supply tension could be guaranteed from cart to cart over the life of the library, cartridge machines could be more like open reel tape recorders where heads are often adjusted to compensate for dynamic tape path errors! Our solution is to define the tape's path across rigidly mounted, fixed azimuth heads. For proper tape guidance, TOMCAT's head assembly features integral, long-wearing stainless steel guides fabricated to exacting tolerances. Secondly, the fixed head assembly itself eliminates the adjustable components whose very adjustment contributes to tape path error.

The capstan/pinch roller interface is, perhaps, one of the least understood and one of the most critical assemblies in a tape deck. Assuming that the capstan is perfectly cylindrical (not conically shaped), the drawn tape will attempt to find a path which is perpendicular to the axis of rotation. Therefore, it is critical for the head/guide assembly to be precisely in-line with the drawn tape path. The addition of the pinch roller adds another dynamic guiding element, which may not be exactly cylindrical or, worse, rotating on an axis not precisely parallel to the capstan. Of the various methods of providing proper alignment for a pinch roller, we chose to use a self-aligning ball bearing in the center of the roller. This not only aligns the roller, but greatly reduces running friction and eliminates the wear factor of the more conventional, and lower-cost, Oilite® sleeve bearing.



TAPE DRIVE ASSEMBLY CUT-AWAY VIEW

CAPSTAN MOTOR: incomparable performance

Drive System Design Goal: develop a low-mass, high performance DC servo motor which can start fast enough so that it *runs only while pulling tape!*

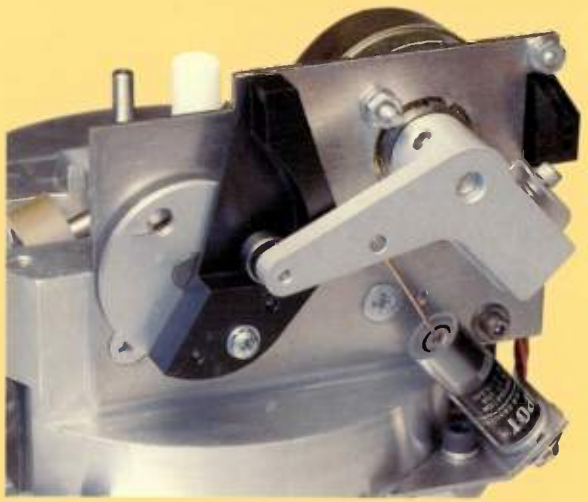
Obviously we couldn't use off-the-shelf parts. Virtually all commercially available direct drive capstan motors have heavy outside rotor armatures or require inertia flywheels to reduce flutter. Unfortunately, this heavy mass precludes the possibility of rapid acceleration. We chose a printed circuit armature, an alumina oxide ceramic shaft and a mylar tachometer disk to design a low-mass, high-torque motor which can accelerate to 15 IPS in less than 80 milliseconds! Two photo sensors generate a 482 pulse per revolution tachometer signal from a computer-plotted shadow disk. This signal is compared to a microprocessor-controlled reference frequency in a phase-locked servo system so precise that the traditional inertia flywheel is unnecessary. Low motor flutter is achieved by the tightly locked servo system providing an "electronic flywheel." To optimize the power efficiency of the motor, and generate a minimum of heat, a demand-regulated dual-voltage motor drive amplifier was developed to power the low-mass armature.

The nonmagnetic, extremely hard, ceramic capstan shaft is diamond ground to final tape drive diameter while running in the assembled capstan motor to ensure minimum runout. This final machining technique, although considerably more time-consuming and elaborate than assembling stock parts, helps achieve exceptional wow and flutter performance.

PINCH ROLLER SYSTEM:
computer-designed engagement

The pinch roller mechanism and capstan motor are designed as a single integrated module to assure the most accurate registration of the tape drive elements.

The unique pinch roller engagement system employs a compact rotary solenoid with a computer designed Delrin actuator cam. The cam's precise curve optimizes pinch engagement motion versus force; this rapidly lifts the pinch roller and applies the running pressure. The pinch pressure is electronically set by a potentiometer in the solenoid's constant current drive amplifier. The constant torque delivered by the solenoid results in carefully regulated pinch roller pressure regardless of solenoid temperature, mechanical variations or even tape thickness. A dash-pot on the pinch roller mechanism keeps engagement and disengagement smooth and silent. Unlike traditional low-cost neoprene rollers, TOMCAT's self-aligning pinch roller is made of polyurethane for very extended life.



Pinch roller actuator and cam.

CART POSITIONING:
positive and accurate

The cartridge insertion and positioning system is precise and repeatable for consistent accuracy. The multiplane location references for the cartridge housing are obtained by stainless steel dowel stops in the capstan motor block, a fixed, stainless steel entry guide and the precision deck plate itself. The cartridge is held down securely with spring-loaded nylon shoes and held against the right-hand guide by a separate spring-loaded stainless entry guide.

AUDIO CIRCUITRY:

The audio electronics are the most technically advanced ever designed into a broadcast cartridge recorder/reproducer. The designs utilize the optimum combination of discrete and integrated circuitry to provide the highest level of audio performance. The record head drive amplifiers and the reproduce head preamplifiers are specialized versions of Deane Jensen's JE-990 discrete operational amplifier design. The balance of the audio circuitry was designed using the NE5534 IC amplifier which features a very low noise figure, high speed and high drive current capability.

RECORDING:

TOMCAT's input is balanced, bridging and floating, using an instrumentation input amplifier. The input level is controlled by the front panel controls which are provided with a detented calibrate position for standard input reference.

The record equalizers provide separate high frequency control and phase correction for both 7.5 and 15 IPS tape speeds. Adjustable phase compensation is required to correct for phase shift introduced by the equalized magnetic recording/reproducing process. The record bias signal is crystal oscillator-generated, divided to 200kHz and filtered by circuitry which maintains constant amplitude and very low harmonic distortion content.

The high speed JE-990 record amplifier mixes the audio and bias signals directly without the need for bias traps and tuned circuits. The record head is located in the feedback loop of the record drive amplifier which provides a constant record current versus frequency drive characteristic. This eliminates the need for additional equalization to approximate constant record current drive. TOMCAT is the only cartridge recorder, and one of the few tape recorders of any type to utilize an active, constant-current record drive amplifier.

REPRODUCE:

The JE-990 reproduce preamplifier has been optimized for best noise performance from the low inductance MAXTRAX® head: Equalization controls for 7.5 and 15 IPS tape speeds are provided in the preamplifier feedback circuit. The output amplifier is a hybrid integrated and discrete design which is coupled to a Jensen output transformer. The amplifier output is balanced, floating, and is capable of delivering +25 dBm.

CUE TRACK FEATURES:

Cue tones are supplied by function generator circuitry designed for very stable frequency and level. The cue track may be recorded, erased and re-recorded independently of the main program tracks. The cue tones and any external control signals are recorded by the same type of record amplifier used for the main audio tracks. The equalized cue reproduce amplifier feeds the cue track signal to five phase-locked loop decoders for program detection. A balanced, floating, line level direct output for FSK or other applications is provided.

MONITORING AND METERING:

The metering and monitoring systems offer a complete selection of all audio operating and alignment functions. The VU meters conform fully to ASA specifications and are driven by balanced, floating differential amplifiers to isolate the meter rectifiers from the audio signals. The record head bias currents are measured by precision diode conversion circuitry which calibrates the VU meters to display bias in true dB scale.

AUDIO FORMATS:
Discrete or Matrix, your choice.

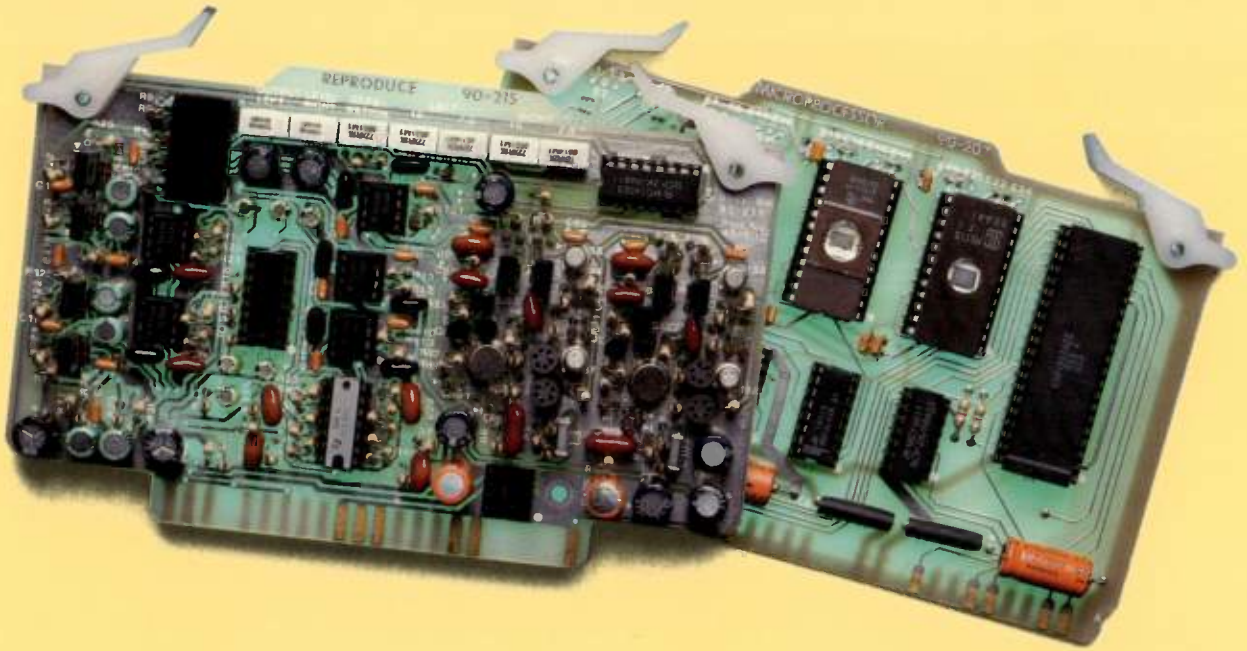
TOMCAT is capable of recording and reproducing cartridges in two formats: discrete left and right, and sum/difference matrix. The traditional discrete format records the left and right audio channels on tracks one and two respectively, while the matrix format provides automatic mono/stereo reproduce compatibility.

The matrix format is included for those applications where a significant amount of the program material may be monaural: All-News formats, for example. The monaural matrix mode records a tertiary "flag" tone with the primary stop cue at the beginning of the recording. The matrix mutes the difference track whenever a monaural flag is detected at the beginning of playback.

The Matrix format works as follows:

Stereo Mode
Record
Left + Right = Sum Channel, recorded on track #1
Left – Right = Difference Channel, recorded on track #2
Reproduce
Sum + Difference = Left Output
Sum – Difference = Right Output

Monaural Mode
Record
Monaural Channel = Sum Channel, recorded on track #1
No signal is recorded on track #2
A mono "flag" signal is recorded on the Cue track
Reproduce
Sum + "0" = Left Output
Sum – "0" = Right Output
"flag" signal mutes the Difference Channel (track #2)



MICROPROCESSOR CONTROL:

Controlling the required functions, features and options of TOMCAT presents a formidable challenge. The variety of mechanical operations, audio control switching, cue track control, as well as operator assist concepts, led to one conclusion: the speed, accuracy and power of a microprocessor. The 1802 microprocessor was chosen to achieve this functional challenge. This device has become a standard for high reliability applications in military and advanced industrial applications. This processor, along with the interface and timing logic, is of the CMOS family, which features low power usage and heat generation while offering excellent noise immunity.

The microprocessor system provides an intelligent interface between the user and tape machine functions, leaving no guesswork or obscure commands which hinder broadcast operation. Monitoring of all mechanical operations is accomplished by a mechanical interface module. The resulting close relationship between mechanics and logic further reduces the possibility of operating errors.

Cartridge in-place is sensed by an infrared optical sensor which eliminates the traditional mechanical microswitch. When the start command is received by the microprocessor, it initiates the capstan acceleration sequence. During this time, the motor is under program control to rapidly bring the capstan to tape drive speed. This start-up routine prevents servo overshoot and phase lock jitter while achieving speed in less than 80 milliseconds. The pinch roller engagement is confirmed by an infrared sensor; the audio is unmuted and the play sequence begins. Should any of the mechanical operations not occur properly, the computer will abort the mode.

The capstan motor drive amplifier is constantly monitored by the microprocessor which is looking at both motor drive current and tachometer phase lock. Should a cart with excessive tension be inserted, the drive system senses this and warns the user with the flashing front panel "Cart Fail" indicator. Should a cartridge bind and cause motor speed variation, the machine will abort the run mode. These warning and abort commands are available as logic commands on the remote control connector, allowing the use of remote warning lights or signals.

The microprocessor offers several user-designated options. The internally-selected modes for the reproducer are:

1. Audio mute at beginning or end of secondary tone.
2. Fast wind on audio mute command.
3. Fast wind speed selection of 15 and 30 IPS.
4. Play speed selection of 7.5 and 15 IPS.
5. Test sequence program for operational check of logic and mechanical interface.
6. Replay inhibit program.

The logic options for the recorder include those for the reproducer, plus:

1. Record mode: monitor output is Tape or Input.
2. Stop mode: monitor output is Input or Mute.
3. Fast wind mode: monitor output is Input or Mute.
4. Meter mode: Manual selection or follow monitor selector.
5. Power-up: 7.5 IPS or 15 IPS run speed.

REMOTE CONTROL:

TOMCAT Remote Control is complete and simple to use. No special techniques or shielded control wiring is required since the CMOS logic is designed to be immune to the electrical noise environments found in many broadcast facilities. A single, lock-ring connector provides remote control and tally light facilities for both the record and reproduce functions.

TOMCAT SPECIFICATIONS

Tape Format	NAB size AA cartridge
Tape Speeds	
Record/Play	7.5 IPS, 15 IPS user optional
Fast Wind	30 IPS, 15 IPS user optional
Tape Track Format	MAXTRAX® two 80 mil audio tracks, and 21 mil cue track
Audio Formats	Discrete channels, Left/Right Matrix channels, Sum/Difference
Start Time	Less than 100 mSec
Stop Time	Less than 40 mSec
Wow and Flutter	Better than 0.1% RMS unweighted
Speed Accuracy	Better than 0.1%
Input Impedance	20 kΩ, balanced and bridging
Input Level Range	-13 dBm to +9 dBm
Output Impedance	
Source	Less than 95Ω
Load	600Ω minimum, balanced, floating
Output Level	+4 dBm to +8 dBm, adjustable
Maximum Output Level	+25 dBm into 600Ω
Reproduce Amplifier Distortion	Less than 0.1% THD
Record Amplifier Distortion	Less than 0.1% THD
System Distortion*	Less than 0.9% THD
Frequency Response*	40 Hz to 15 kHz, ±1 dB at 7.5 IPS 55 Hz to 22 kHz, ±1 dB at 15 IPS
Square Wave Response, 1 kHz test signal	Less than 25% overshoot, no ringing at 7.5 IPS No overshoot or ringing at 15 IPS
Noise*	
7.5 IPS	-59 dB unweighted, -62 dB A weighted
15 IPS	-59 dB unweighted, -62 dB A weighted
No tape	-64 dB unweighted, -68 dB A weighted
Separation, Audio Tracks	Better than -50 dB at 1 kHz
Crosstalk, Cue to Audio	Better than -60 dB
Bias Signal	200 kHz crystal generated, less than 0.07% THD
Cue Signals	
Record	1 kHz primary, 150 Hz secondary, 8 kHz tertiary
Reproduce	1 kHz primary, 2 kHz primary at 15 IPS fast wind, 4 kHz primary at 30 IPS fast wind, 150 kHz secondary, 8 kHz tertiary
Output	24 volt DC control outputs for secondary and tertiary tone detection. Cue audio output balanced, 600Ω, 0 dBm
Cue Erase*	Better than 30 dB
External Connectors, Mating connectors supplied	Audio: XLR-type Remote: 16-pin AMP, lock-ring type Cue: 4-pin AMP, lock-ring type
Power Requirements	120 VAC, 60 Hz
Recorder	35 watts idle, 55 watts running
Reproducer	10 watts idle, 25 watts running
Weight	
Recorder	42 lbs.
Reproducer	15 lbs.
Reproducer	TRI-MOUNT 8 lbs.
Dimensions	
Recorder	Rack style case, allows 3" minimum at rear for cables and connectors. 19" wide, 5.25" high, 15" deep.
Reproducer	Tri-mount rack mount case will accommodate up to three reproducers. Allows 3" minimum at rear for cables and connectors. 19" wide, 5.25" high, 15.5" deep.
	(Recorder and reproducer cases are supplied ready for rackmounting; no additional adapter hardware is required. Only 5.25" of rack space is needed for either the recorder or reproducer trimount.)

*All measurements were taken using Audiopak® type AA-4 cartridges and tape at a standard recording level of 250nWb/m. Noise measurements taken in a 20 Hz to 20 kHz bandwidth from a reference level of 250 nWb/m. Frequency response measurements made 10 dB below the standard recording level.

Specifications subject to change without notice or obligation as advances in technology are incorporated.

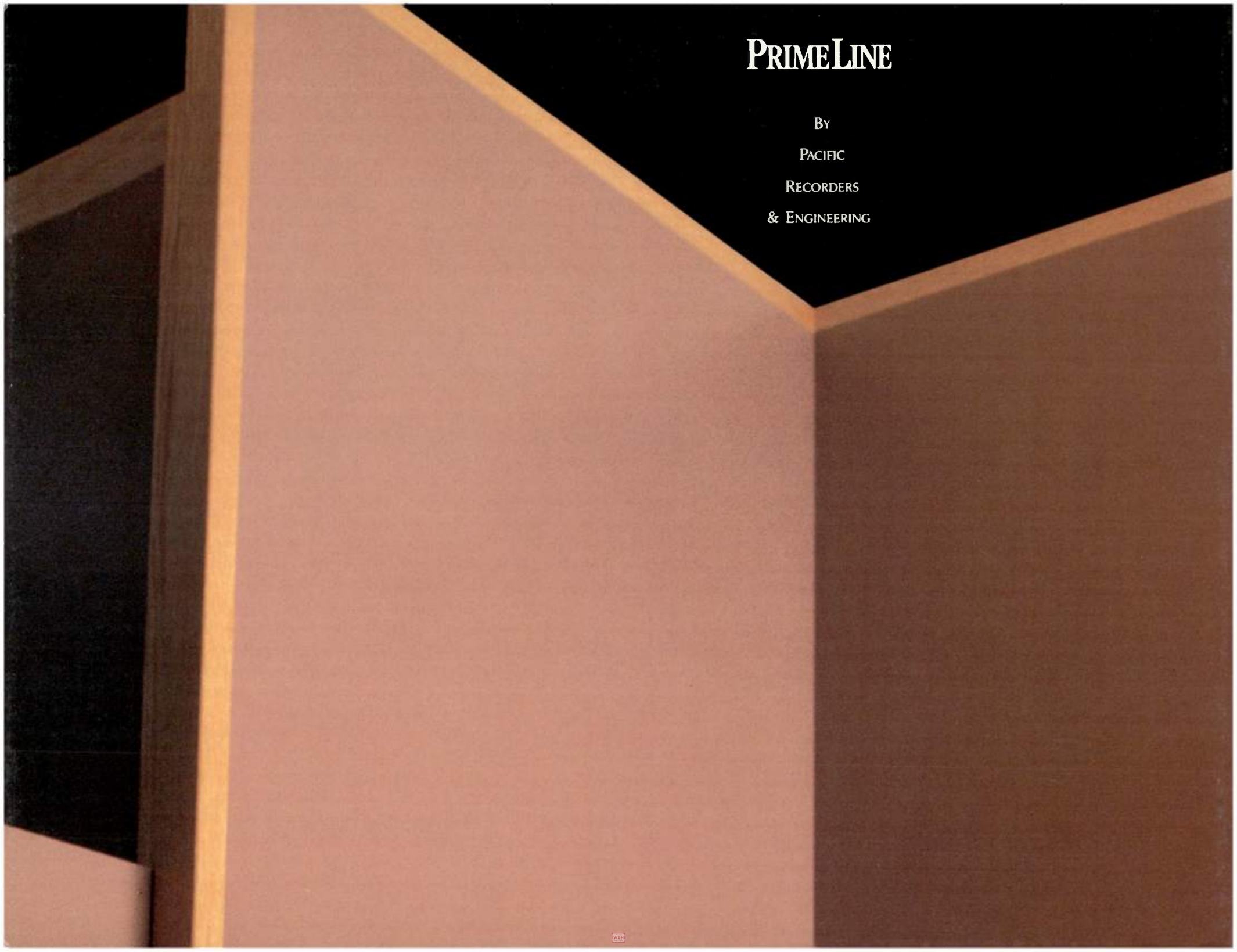


Three Tomcat reproducers may be installed in one 5.25" rackmount.

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MCI Mail: 650 285 0799 MCI UW

TCATREV21875M Price: $2.00

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PRIME LINE
BY
PACIFIC
RECORDERS
& ENGINEERING

PRIMELINE

Going with the finest equipment you can find is the basis for long-term success in our industry. Major market-leading stations have relied for over two decades on Pacific Recorders & Engineering to provide their consoles, cart machines, and systems components.

Along with PR&E equipment has come the industry's showcase studio furniture, custom built to fit any room and to accommodate any special requirement. As with any custom engineered design, that one-of-a-kind cabinetry may be beyond the budgets of many stations.

Many times, we talk with broadcasters who are attempting a renovation or addition with very limited funds. These clients want the security and performance of PR&E hardware, even if it means skimping on the cabinetry portion of the project. After all, listeners can't hear furniture.

Now, you need not compromise the quality and utility of your studio cabinetry. Even if your capital budget has been squeezed for all the audio quality it's worth, you still have enough left over for PRIMELINE. Easy to buy, easy to assemble, and easy to live with, PRIMELINE offers all these outstanding features and more:

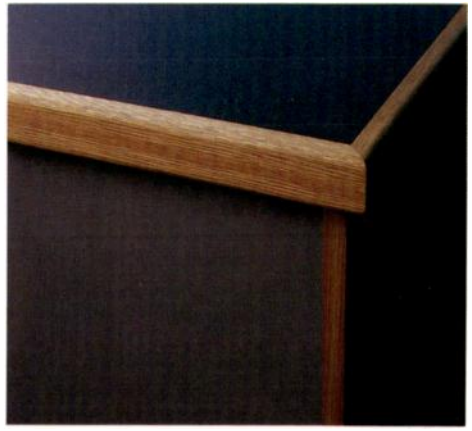
- Modular design. Any combination of basic building blocks (center section, pedestal units, turrets, or overbridge rack bays) may be ordered for each room.
- Solid wood construction. Not a wooden shell held together by a sheet metal subframe.
- Accommodates all five series of Pacific Recorders consoles.
- Flat one-piece working surface, not multilevel. Easier to work, easier to find whatever you are living perilously without.
- Flat, flush sides. No protruding corners or hardware to catch clothing or become damaged.
- High pressure laminate outside, and easy-to-clean, attractive Melamine coated interiors.
- Hardwood trim all around, hand rubbed in your choice of oils, and given a softly rounded top edge.
- No laminate meets laminate at cabinet corners, eliminating the chief cause of designed-in damage (it's chair-proof.)
- Integral guest wing is anything but an afterthought, and contains provisions for On/Off/Cough plus headphone level control panels at each guest position.
- Available in sit-down or stand-up configuration, with 21 inches of rack space in the pedestal units of the sit-down, and 28 inches in the pedestals of the stand-up versions.
- Rack turrets available with 14, 17.5, or 21 inches of vertical rack space.
- Rack bay overbridges with 14 or 21 inches of vertical space, available up to three across. Leaves the counter space open for desktop equipment, etc.
- Total access to equipment connections through rear doors.
- Reliable European hinges. Invisible, silent, sturdy and positive, these hinges easily adjust in all directions for rapid, permanent door alignment.
- Top adjustable leg levellers all around eliminate shimming.
- Plenty of cable room.
- Custom colors at nominal charge.
- Custom construction quoted for special room sizes or unique requirements.

To configure a PRIMELINE system for your studio, please call your Regional Sales Manager at 619-438-3911 and talk it over. If you thought cabinetry was going to be difficult, let the experience and enthusiasm of Pacific Recorders make the whole thing easy.

PRIMELINE

Very large cable access holes and vertical cableways make wiring your PRIMELINE system a positive experience. Top-accessed levellers keep you from lifting, guessing, turning and dropping. Note the built-in recessed headphone panel for the operator's position.





Standard colors are shown (samples can be sent to you upon request.) Custom colors and wood finishes are available at nominal charge.

Integrated "unibody" guest wings take a beating (or a leaning) by your most aggressive guests. Note the recessed headphone level control panel for the guest position.





Euro hinges provide silent operation, positive closure without latches, and long service life. Doors swing wide for easy access to equipment rear panels, and are easily adjusted in all three directions for perfect door alignment.


Put Your PR&E Consoles In Their Place.
Clean lines and one-piece working surfaces characterize PRIMELINE. Hand rubbed hardwood at all corners eliminates the chipping caused by laminate-to-laminate joints, and the radiused upper edge on the horizontal trim adds a softness to the quality appearance of your furniture.



The stand-up PRIMELINE is just as stable, sturdy, and easy to install and wire as the sit-down version. Various sizes of turrets and over-bridge rack bays add easy-to-reach rack space.

Pacific Recorders & Engineering Corporation
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STEREOMIXER



PACIFIC RECORDERS & ENGINEERING CORPORATION

STEREOMIXER

A full featured stereo broadcast console in a compact package; ideal for dubbing, public affairs, talk show and production studios.



FEATURES

- Eight input module capacity accepts any configuration of four input module types
- Microphone modules equipped with remote control logic including Cough and Talkback
- Line and Tape Recorder modules equipped with both module and machine remote control logic
- Tape Recorder Input/Output modules include stereo output amplifiers and anti-feedback logic
- Telco Mix modules include mix-minus outputs, with switchable band-pass filtering, and remote control logic
- Automatic stereo monitoring and metering of PFL (CUE) and SOLO
- Studio and external location Talkback system with built-in electret microphone
- Program bus Slate facility with 30 Hz identification tone

STEREOMIXER -A RACK MOUNTABLE CONSOLE

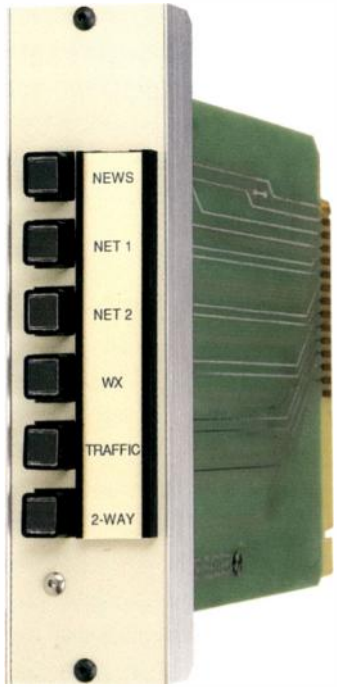
The compact modular appearance of the Stereomixer conceals a high performance, rack mountable, audio mixer incorporating many of the features of our larger BMX Series consoles. The mainframe housing needs only seven inches of rack space and may also be supplied with hardwood end panels for desktop applications.

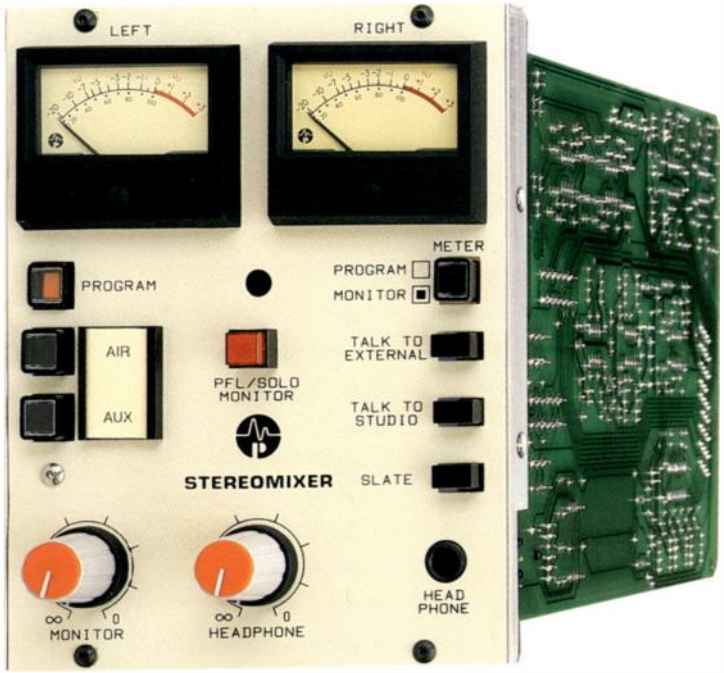
The Stereomixer was developed to meet a wide variety of broadcast needs: public affairs, talk shows, remotes, music and commercial dubbing, auxiliary production, on-air and even stereo news.

To meet any conceivable operational requirement you may have, we designed four separate types of input modules: Microphone Input, Stereo Line Input, Tape Recorder Input/Output, and Telco Input/Output. Additionally, the Stereomixer can accommodate accessory modules such as Remote Line Selectors, Mono and Stereo Equalizers, and Voice Processors. All eight positions in the mainframe are universal, accepting any combination of input and accessory modules. The basic mainframe includes a System Master Module, Power Supply, connector kit with tools, and a spare parts kit.

Compact design was not confused with miniature design. We've made it easy for you to operate the Stereomixer by using the same type of control knobs and buttons as on our larger consoles. The only "miniature" components used are the two VU meters; even these small meters fully conform to ANSI specifications and are easy to read. And, because you demand the best, you get custom designed Penny & Giles long-life conductive plastic faders.

A thorough review of the functional block diagram tells more of the story. The Stereomixer is a powerful tool designed to meet the daily demands of broadcasting.





REMOTE LINE SELECTOR

The Remote Line Selector module provides for selection of up to six external stereo sources. Typical applications include the selection of remote lines for stereo line input modules or extending the input selection capability of the monitor system. The output of the selector is brought out to a rear panel connector for user connection to the appropriate line or monitor input position.

SYSTEM MASTER MODULE

The System Master module is supplied with the mainframe and contains the stereo mix bus amplifiers, output amplifiers, monitor system, slate and talkback system and the stereo VU meters. The output level is adjustable and may be calibrated for "0" VU at either +4 dBu or +8 dBu. The VU meters are driven by bridging buffer amplifiers to isolate the meter rectifiers from the Program lines. The stereo Program amplifiers are equipped with interstage patch points for the connection of external processing equipment or a patch field.

The monitor section provides facilities for the mixer operator with logic controlled input selector switching controlled by the PFL (pre-fader listen) and SOLO (after fader listen) buttons on each of the input modules. The System Master module's selector buttons access the stereo Program bus and two external inputs. The PFL/SOLO MONITOR tally light illuminates whenever the monitor source is from one of the input modules.

The VU meters are equipped with a mode switch to select either full-time metering of the stereo Program outputs, or displaying the level of whatever source is being monitored. The "meter follows monitor" mode is valuable for previewing incoming levels with the PFL buttons, or auditioning and setting levels with the SOLO function. In either case, the levels on the PFL and SOLO buses are normalized to equal true output levels.

Front and rear panel outputs for the operator's headphone are provided along with line level monitor outputs to feed an external power amplifier and loudspeakers. Two sets of stereo monitor outputs, muting and non-muting, are also provided for connection to a voice booth or studio monitor, and headphone systems. Control Room and Studio muting is controlled by the assignable muting logic in the microphone input modules. The System Master module provides tally voltage outputs for connection to Control Room and Studio warning light relays.

A self-contained electret microphone provides talkback communication to the Studio and/or other external facility. Audio and logic inputs are also provided for the external location to talk back to the Control Room. The self-contained microphone is also used with a built-in 30 Hz tone generator for slating the Program bus. The slate function can be locked out to prevent the possibility of slating an "air" feed.

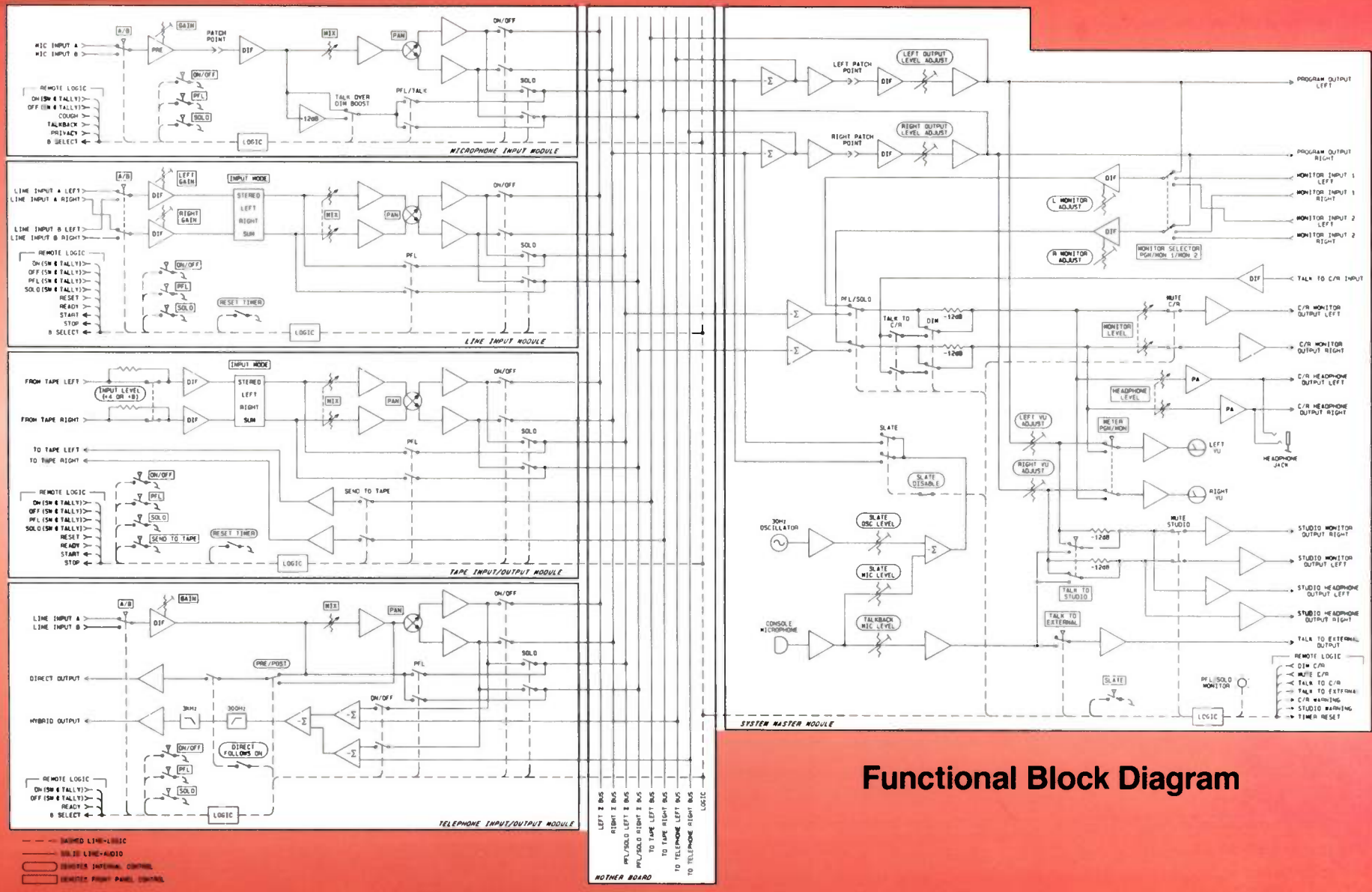
ACCESSORY MODULES

Three optional processing modules are available for the Stereomixer. Monaural Equalizer & Filter, Stereo Equalizer or Voice Processor modules may be installed in any input module position in the mainframe. Monaural processing modules are usually connected to the patch point of a microphone input module, while the stereo equalizer is usually connected to the Program patch point of the System Master module. These modules may also be wired out to an external patch field serving the system.

The Monaural Equalizer & Filter module combines both a three-knob equalizer and tunable highpass and lowpass filters into one compact module. The equalizer section, which may be switched in and out independently of the filter section, contains bass and treble equalizers which are each independently switchable from peaking to shelving modes. The midrange equalizer is tunable over a considerable mid-band frequency range. The tunable filter section consists of highpass and lowpass filters that may be used to correct many commonly encountered signal problems such as hum and hiss.

The Stereo Equalizer module contains two separate, but coupled, three-band equalizers. The high and low frequency equalization is switchable between peaking and shelving modes. The midrange equalizer has the same broad range of control provided in the monaural version.

The Voice Processor module is a special function unit designed specifically for equalizing, gating, compressing and de-essing speech. The processor is particularly useful when recording or transferring interviews where level variation, background noise or sibilance is a problem. The processor contains two major function sections. The first section is a switch insertable equalizer which covers the frequency range normally required for speech. The second section contains the expander (gate), compressor and de-esser systems. The expander threshold and attenuation are used to achieve noise reduction during pauses in speech while the compressor provides "smoothing and density" of the signal. The de-esser senses and operates only on the treble region which provides excellent control over excessive sibilance without undesirable broadband side effects.



Functional Block Diagram



MICROPHONE INPUT MODULE

The mic input module accepts a wide range of input levels to accommodate all contemporary microphones. The balanced transformerless mic preamp is adjustable for nominal inputs of -70 dBu to -35 dBu. The preamp output is available via a rear panel patch connector for connection to processing equipment. The patch return is balanced and bridging.

The front panel input selector, with programmable monitor muting for control room or studio, has two mic inputs per module. The mute circuitry incorporates an automatic 40 mSec delay before the mic is turned on, permitting "room reverb" to decay off-mic. The module is equipped with remote control capability for ON, OFF, COUGH and TALKBACK. The logic also provides current-limited tally lamp voltages for these controls.

The PAN control is used to position the mic signal in the stereo image. The module is assigned to the stereo program buses by the illuminated ON/OFF button. The illuminating PFL and SOLO buttons control the logic circuitry to send pre-fader or post-fader audio to the monitor system.



STEREO LINE INPUT MODULE

The Stereo Line Input module handles nominal input levels from -30 dBu to +9 dBu. The front panel input selector provides two stereo inputs per module. Input signal MODE selection is provided by the two alternate action button switches, L & R. The signal mode is stereo when both buttons are released; pressing the L button sources the left input, pressing the R button sources the right input and pressing both buttons simultaneously sums left and right into a monaural signal. The PAN control serves as a left/right balance control for stereo signals and as a pan assignment control for monaural signals.

The module is equipped with logic for both the remote control of the module itself and for control of connected source equipment. Module functions include ON, OFF, PFL and SOLO complete with control tally lamp voltages. Machine controls include READY, START, STOP and AUDIO RESET. In addition, the control logic may be set to provide a reset pulse for an external event timer.



TAPE INPUT/OUTPUT MODULE

The tape Input/Output module does double duty. It is the stereo line input module for the playback of a tape, cartridge or cassette recorder. With the exception of a "B" input selection, the module contains the same audio, remote and machine control logic functions as a Stereo Line Input module.

The module also contains balanced stereo output amplifiers to feed Program to the input of the connected recorder. The incorporation of Program amplifiers within the module eliminates the need for external distribution amplifiers for feeding recorders. The electronic alternate action SEND TO TAPE button also operates logic circuitry to prevent round-robin feedback via the tape machine by muting the module ON function. The PFL and SOLO buttons provide convenient stereo monitoring of tape playback for source-tape comparisons or for confirmation of recording.



TELCO INPUT/MIX-MINUS MODULE

The Telco Input/Mix-Minus module is a mono line input module with additional mixing and output circuitry for feeding telephone hybrids. It derives a specially mixed output of the Program bus with its own input to that bus subtracted. This Mix-Minus output is band-pass filtered to keep the signal within the trans-hybrid loss specification of broadcast grade hybrids.

The module has two inputs which are selected by the front panel switch. Either input may be used as a telephone or general purpose monaural input. The input preamplifier is designed to accommodate a wide input range of -30 dBu to +9 dBu. The PAN control provides positioning of the signal in the stereo image. Module remote control logic functions include ON and OFF, complete with tally lamp voltages, and READY. These control functions may be interfaced to a telephone controller.

SPECIFICATIONS

MICROPHONE INPUTS:

Source Impedance	150 ohms
Input Impedance	30K ohms minimum, balanced
Input Level Range	Adjustable from -70 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS:

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range:	
Line Input Module	Adjustable from -30 dBu to +9 dBu
Telephone Module	Adjustable from -30 dBu to +9 dBu
Tape I/O Module	Switchable to +4 dBu or +8 dBu
External Inputs	Fixed at system operating level
Patch Return Inputs	Nominal -10 dBu
Input Headroom	Greater than 30 dB above nominal input

MAIN OUTPUTS:

Load Impedance	600 ohms minimum
Source Impedance	80 ohms, balanced
Nominal Output Levels:	
Mix and Tape Outputs	+4 dBu to +8 dBu, adjustable
Telephone Mix-Minus	0 dBu
Maximum Output Levels:	
Mix Outputs	+24 dBm, 600 ohm load
Tape Outputs	+24 dBm, 600 ohm load
Mix-Minus Outputs	+24 dBm, 600 ohm load

MONITOR OUTPUTS:

Main Outputs:	
Load Impedance	600 ohms or greater
Source Impedance	40 ohms, unbalanced
Output Level	0 dBu nominal, +20 dBu maximum
Headphone Output:	
Load Impedance	300 ohms or greater
Source Impedance	100 ohms
Output Level	0 dBu nominal, +20 dBu maximum

FREQUENCY RESPONSE:

Mic Input to Program Output	+0 dB, -.7 dB, from 20 Hz to 20 kHz
Line Input to Program Output	+0 dB, -.7 dB, from 20 Hz to 20 kHz

NOISE:

Microphone Input Amplifier	-126 dBu equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	-88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output Noise with microphone channel ON, fader at 0 dB, input sensitivity at -50 dBu	75 dB below output, reference +8 dBu, 150 ohm source, 20 kHz bandwidth
Output Noise with one line channel ON, fader at 0 dB, input sensitivity at +8 dBu	83 dB below output, reference +8 dBu, 600 ohm source, 20 kHz bandwidth
Output Noise with no input channels ON	85 dB below output, reference +8 dBu, 20 kHz bandwidth

DISTORTION, T.H.D.:

Mic Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, -32 dBu input, +24 dBm output into 600 ohm load, 80 kHz meter bandwidth
Line Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, +24 dBu input, +24 dBm output into 600 ohm load, 80 kHz meter bandwidth

DISTORTION, I.M.D.:

Mic Input to Program Output	Less than 0.01%, -32 dBu input, +24 dBm output into 600 ohm load
Line Input to Program Output	Less than 0.01%, +24 dBu input, +24 dBm output into 600 ohm load

SEPARATION:

Program Outputs	Less than -70 dB at 1 kHz Less than -60 dB at 20 kHz

POWER REQUIREMENTS:

Fully configured STEREOMIXER	50 watts @117 VAC, ±10%, 60 Hz

NOTES:

1) These specifications are for the basic signal paths, per channel, with 600 ohm loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 9 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

3) Noise specifications are for one fully loaded STEREOMIXER. Noise specifications are based upon a 20 kHz measurement bandwidth; the use of a meter with 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

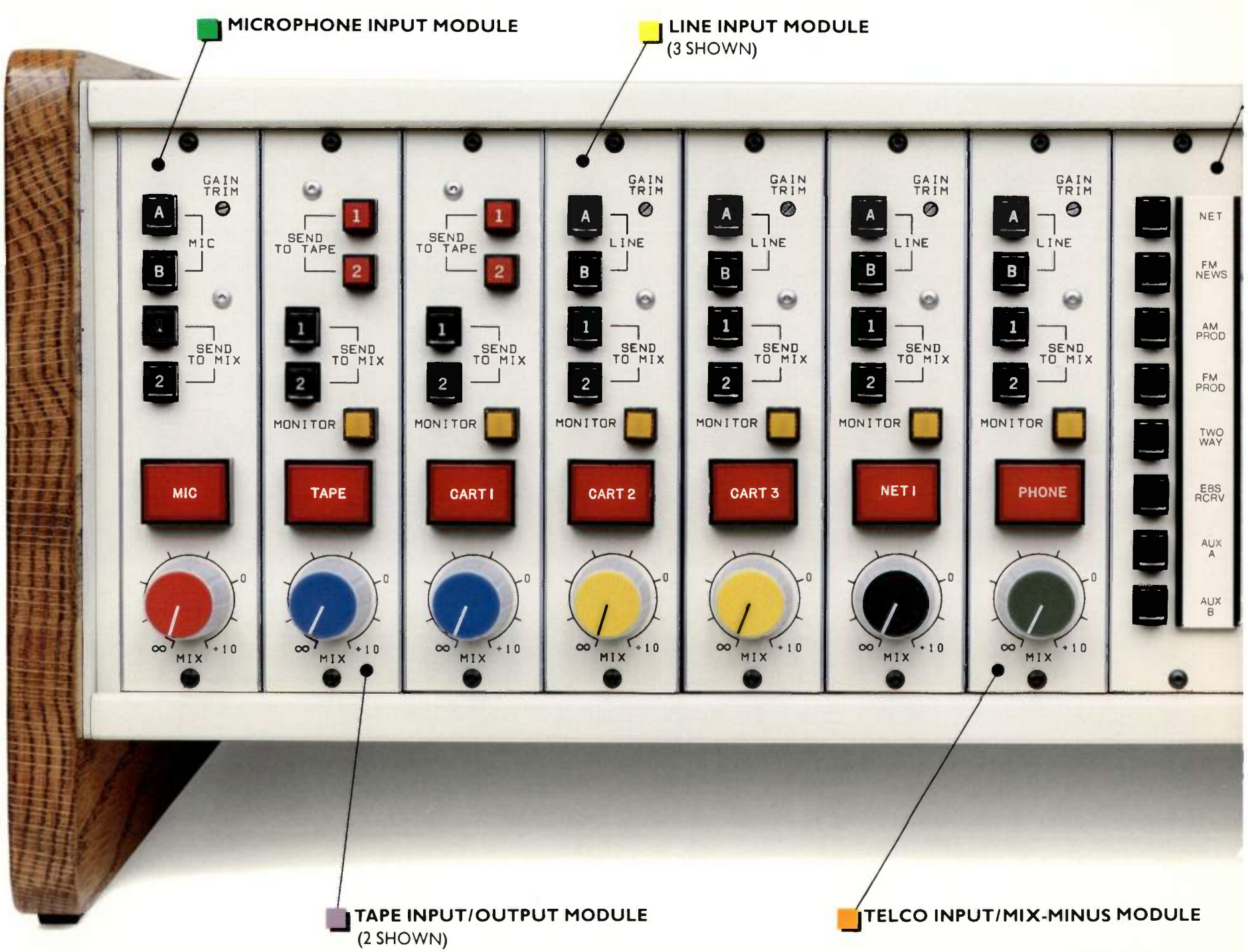
Features and specifications subject to change without notice.

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NEWSMIXER


GAIN TRIM
MIC
B
SEND TO MIX
MIC
MIX
LINE
MONITOR
NET 1
NET 2
SEND TO TAPE
TAPE
CART
CASS
MIX 1
MIX 2
EXT SOURCE
SPEAKER
INPUT MONITOR
HEADPHONE
AUX MON
TALK BACK
SLATE
HEAD PHONE


MICROPHONE INPUT MODULE
LINE INPUT MODULE
(3 SHOWN)
GAIN TRIM
A
B
MIC
LINE
1
2
SEND TO MIX
SEND TO TAPE
MONITOR
MIC
TAPE
CART 1
CART 2
CART 3
NET 1
PHONE
MIX
∞
0
+10
NET
FM NEWS
AM PROD
FM PROD
TWO WAY
EBS RCRV
AUX A
AUX B
TAPE INPUT/OUTPUT MODULE
(2 SHOWN)
TELCO INPUT/MIX-MINUS MODULE



THE NEWSMIXER

- *Modular design for custom applications*
  - *Compact, rackmount or optional tabletop design*
- *Self-contained, regulated supply with toroidal power transformer*
  - *Eight module positions for input, switching and equalizer modules*
- *Additional mainframe unit may be cascaded for more inputs*
  - *Two mixing buses with patch points for connection of external processing*
- *Transformerless microphone input modules with remote ON/OFF control*
  - *Balanced, instrumentation amplifier line input modules*
- *Tape recorder input/output modules with anti-feedback control logic*
  - *Telephone input/mix-minus output modules*
- *Input switcher modules for remote lines*
  - *Optional equalizer/filter modules for processing mix buses*
- *System output adjustable for +4 or +8 dBu operation*
  - *Miniature VU meters to ANSI specifications*
- *Unique monitoring system with direct access to line, tape and telco input modules*
  - *Monitor, headphone and talkback facilities for separate voice booth*
- *Voice with tone slating facilities for each mix bus*

SPECIFICATIONS:

MICROPHONE INPUTS:

Source Impedance	150 ohms
Input Impedance	30K ohms minimum, balanced
Input Level Range	Adjustable from -70 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS:

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range:	
Line Input Module	Adjustable from -30 dBu to +9 dBu
Telephone Module	Adjustable from -30 dBu to +9 dBu
Tape I/O Module	Switchable to +4 dBu or +8 dBu
External Input	Adjustable from -12 dBu to +9 dBu
Patch Return Inputs	Nominal -10 dBu
Input Headroom	Greater than 30 dB above nominal input

MAIN OUTPUTS:

Load Impedance	600 ohms
Source Impedance	30 ohms, balanced
Nominal Output Levels:	
Mix and Tape Outputs	+4 dBu to +8 dBu, adjustable
Telephone Mix-Minus	0 dBu
Maximum Output Levels:	
Mix, Tape and Mix-Minus Outputs	+24 dBm, 600 ohm load

MONITOR OUTPUTS:

Main Outputs:	
Load Impedance	600 ohms or greater
Source Impedance	30 ohms, unbalanced
Output Level	0 dBu nominal, +20 dBu maximum
Headphone Output:	
Load Impedance	300 ohms or greater
Source Impedance	100 ohms
Output Level	0 dBu nominal, +20 dBu maximum

FREQUENCY RESPONSE:

Mic or Line Input to Program Output	+0 dB, -.7 dB, from 20 Hz to 20 kHz

NOISE:

Microphone Input Amplifier	-126 dBu equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	-88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth

DISTORTION, T.H.D.:

Mic Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, -32 dBu input, +24 dBm output into 600 ohm load, 80 kHz meter bandwidth
Line Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, +24 dBu input, +24 dBm output into 600 ohm load, 80 kHz meter bandwidth

DISTORTION, I.M.D.:

Mic Input to Program Output	Less than 0.01%, -32 dBu input, +24 dBm output into 600 ohm load
Line Input to Program Output	Less than 0.01%, +24 dBu input, +24 dBm output into 600 ohm load

CROSSTALK:

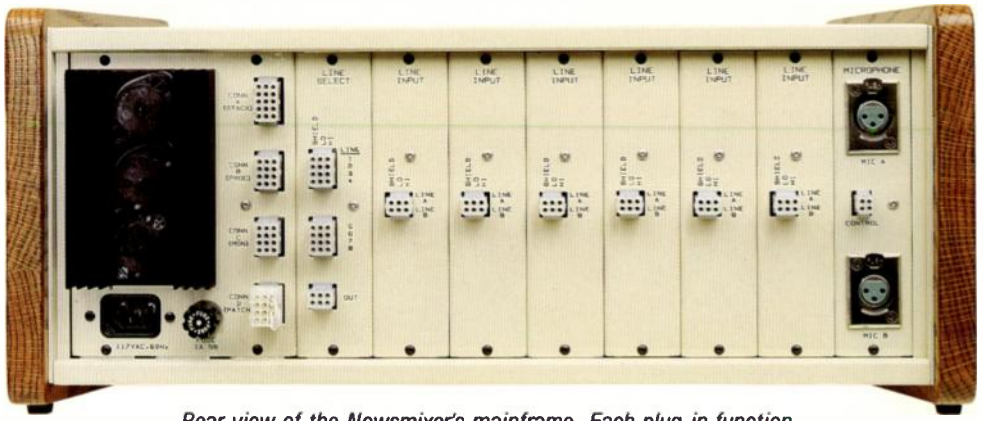
Mix Outputs	Less than -80 dB to 1 kHz Less than -70 dB at 20 kHz

POWER REQUIREMENTS:

Fully configured Newsmixer	50 watts @ 117 VAC, ±10%, 60 Hz

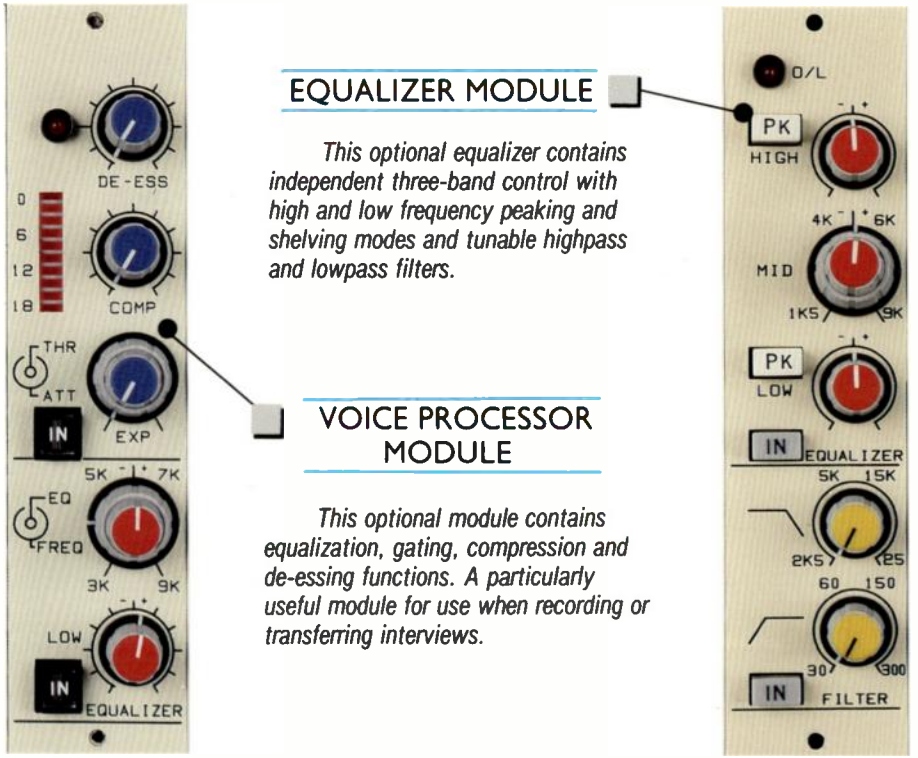
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Rear view of the Newsmixer's mainframe. Each plug-in function module has a corresponding plug-in connector panel module.

ACCESSORY MODULES



EQUALIZER MODULE

This optional equalizer contains independent three-band control with high and low frequency peaking and shelving modes and tunable highpass and lowpass filters.

VOICE PROCESSOR MODULE

This optional module contains equalization, gating, compression and de-essing functions. A particularly useful module for use when recording or transferring interviews.

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LINE INPUT MODULE:

The line input module accepts two inputs by front panel selection. The instrumentation input preamplifier is designed to accommodate a wide input level range: -30 dBu to +9 dBu. The output of the module may be assigned to either or both of the two mix buses using the self-indicating SEND TO MIX buttons. The channel ON/OFF mode is controlled by an illuminated electronic alternate action button. An illuminating alternate action MONITOR button provides cue, preview and monitor functions for the input signal to the module. This logic controlled function automatically routes the input amplifier signal directly to the monitor system in the system master module. This button actuates logic circuitry which clears any existing monitor selection and overrides the selection at the system master module. Pressing two or more buttons simultaneously allows the operator to monitor more than one input source at a time.

TAPE INPUT/OUTPUT MODULE:

The tape input/output module serves two functions. First, it is the line input module for the control and assignment of tape, cartridge or cassette playback. Second, it contains an output selector and balanced amplifier to feed the input of the recorder. The tape playback signal may be assigned to either of the two mix buses and the output of either of the two mix buses may be assigned back to the input of the tape recorder. The momentary SEND TO TAPE buttons operate logic circuitry which prevents round-robin feedback via the tape machine by muting the module ON function whenever an output bus is selected. The module MONITOR button provides input cue, preview and monitor functions similar to the regular line input module.

TELCO INPUT/MIX-MINUS MODULE:

The telco input/mix-minus module is identical in appearance and similar in operation to the regular line input module. Additional mixing and output circuitry is incorporated which derives a specially mixed output of the module's bus assignment selection with its own input subtracted (mix-minus). In addition, an internal band pass filter in the mix-minus output keeps the signal within the rejection bandwidth of the telco hybrid system. Either or both of the module's inputs may be internally selected for routing to the mix-minus circuitry. The Newsmixer will accommodate up to two of these modules, therefore, it is possible to mix and control two telephone inputs simultaneously while providing two unique mix-minus foldback signals to the callers.

REMOTE LINE SELECTOR MODULE:

The Remote Line Selector Module provides for selection of up to eight external sources. Typical applications include the selection of remote lines for a line input module, or extending the input selection capacity of the Newsmixer monitor system. The output of the selector is routed to a rear panel connector for user connection to the appropriate line or monitor input position.

ACCESSORY PROCESSING MODULES:

The optional equalizer/filter and voice processor modules may be installed in any module position in the Newsmixer mainframe. This module is usually inserted into one of the mix bus patch points by direct wiring or through an external patch field for the system.

EQUALIZER MODULE

The Equalizer Module provides both equalization and filter facilities in one compact module. This module is usually inserted into one of the mix bus patch points by direct wiring or through an external system patch field. The tunable filter section consists of highpass and lowpass filters that may be used to correct many commonly encountered signal problems such as hum and hiss. The equalizer section, which may be switched in and out independently of the filter section, contains bass and treble equalizers which are each independently switchable from peaking to shelving modes. The midrange equalizer is tunable over a considerable mid-band frequency range.

VOICE PROCESSOR MODULE

The Voice Processor Module is a special function device designed specifically for equalizing, gating, compressing and de-essing speech. The processor is particularly useful when recording or transferring interviews where level variation, background noise or sibilance is a problem. The processor contains two major function sections. The first section is a switch insertable equalizer which covers the frequency range normally required for speech correction and/or enhancement. The second section contains the expander (gate), compressor and de-esser systems. The expander threshold and attenuation are used to achieve noise reduction during pauses in speech while the compressor provides "smoothing and density" of the signal. The de-esser senses and operates only on the treble region which provides excellent control over excessive sibilance without undesirable broadband side effects.

THE STRUGGLE IS OVER

The Newsmixer is the first audio mixing, routing and monitoring system designed specifically for radio news preparation, assembly and production. With the Newsmixer, you can now easily tackle any news assignment because we designed it to include a long list of useful and sophisticated features. Best of all, your station's news staff can quickly put it to work; it doesn't require an engineering degree to operate. Our basic design concept was to meet and satisfy the wide variety of tasks which must be quickly and efficiently accomplished in the real world of radio news editing and preparation.

The Newsmixer combines the best features of a mixer, a dubbing interconnect system and a sophisticated monitoring control system into a single compact unit. Because we know that space is at a premium in most news workstations, we made it our goal to combine a wide range of control functions into a very little space. However, compact design was not confused with miniature design. The control knobs and buttons are the identical size as we use in our larger broadcast consoles. The only "miniature" components used are the two VU meters; even these small meters fully conform to ANSI specifications - and, they're easy to read.

The Newsmixer's dual bus design allows you to perform two independent jobs at the same time. For example, you can record from a booth microphone, select remote sources such as news service feeds, and accommodate any combination of tape, cart or cassette recorders. Although not designed as an "Air" console, the Newsmixer is equipped with monitor muting and warning light commands to support an on-air application.

Up to eight(8) input modules can be plugged-in and you can easily cascade an additional mainframe should you need more input facilities. All eight module positions accept any combination of microphone, line, tape recorder and equalizer modules. The last two input positions will also accommodate our optional Telco input/mix-minus and remote line switcher modules. Each plug-in function module has a separate and corresponding connector panel module which is easily installed from the rear of the mainframe. Each of these panels is equipped with the connectors and nomenclature for its appropriate function module.

Because the Newsmixer is a compact unit, there's plenty of space now for all the other equipment required for news editing and production. The rack mounting housing occupies only seven inches of rack space, but many stations will choose the Newsmixer's oak end panel version for desktop use. Inside, the Newsmixer contains a fully regulated power supply and local headphone monitor amplifier. External power amplifiers are only required for loudspeaker and voice booth monitor systems. All active modules have on-board power supply regulation and all mixer and monitor potentiometers are long-life, conductive plastic units custom manufactured for PR&E by Penny & Giles, Ltd.

MODULE DESCRIPTIONS:

SYSTEM MASTER MODULE:

The system master module is supplied with the chassis assembly and contains the mix bus amplifiers, main output amplifiers, monitor system, slate & talkback system and the mix bus VU meters. The output level is adjustable and the VU meters may be calibrated for "0" VU over the operating range of +4 dBu to +8 dBu. The VU meters are driven by balanced buffer amplifiers to isolate the meter rectifiers from the output lines.

The monitor section provides facilities for the mixer operator and an optional "talent" position. The operator's monitor section has logic controlled input selector switching controlled by the input monitor buttons located on each of the line, tape and telco input modules while the system master module's selector buttons access the two mix buses and an external source. The INPUT MONITOR tally light illuminates whenever the monitor source is from one of the input modules. Front and rear panel outputs for the operator's headphone are provided along with an output to feed an external power amplifier and monitor speaker system.

The talent position monitor may select from mix bus 1 or 2. This monitor has headphone and muting monitor outputs. These outputs are intended for voice booth talent monitor and communication. Individual muting of either the operator or talent monitor is controlled by setting mute bus command switches in the appropriate microphone input modules. The master module provides tally voltage outputs for connection to mixer and voice booth warning light relays.

A self-contained electret microphone provides talkback communication to the talent position monitor. This microphone is used along with a built-in 30 Hz tone generator for voice/tone slating of either of the two mix buses.

MICROPHONE INPUT MODULE:

The microphone input module accepts two inputs by front panel selection with assignable monitor muting for each input. The transformerless microphone preamplifier is equipped with adjustable GAIN TRIM to accommodate a wide input level range -70 dB to -35 dB. The module may be assigned to either or both of the two mix buses with the self-indicating SEND TO MIX buttons. The module to bus ON/OFF mode is controlled by an illuminating electronic alternate action button. This function may be remote controlled from a separate location such as a voice booth or announce turret.

Over for additional module descriptions.

STEREOMIXER

PACIFIC RECORDERS & ENGINEERING CORPORATION

STEREOMIXER

A full featured stereo broadcast console in a compact package; ideal for dubbing, public affairs, talk show and production studios.



FEATURES

- Eight input module capacity accepts any configuration of four input module types
- Microphone modules equipped with remote control logic including Cough and Talkback
- Line and Tape Recorder modules equipped with both module and machine remote control logic
- Tape Recorder Input/Output modules include stereo output amplifiers and anti-feedback logic
- Telco Mix modules include mix-minus outputs, with switchable band-pass filtering, and remote control logic
- Automatic stereo monitoring and metering of PFL (CUE) and SOLO
- Studio and external location Talkback system with built-in electret microphone
- Program bus Slate facility with 30 Hz identification tone

STEREOMIXER -A RACK MOUNTABLE CONSOLE

The compact modular appearance of the Stereomixer conceals a high performance, rack mountable, audio mixer incorporating many of the features of our larger BMX Series consoles. The mainframe housing needs only seven inches of rack space and may also be supplied with hardwood end panels for desktop applications.

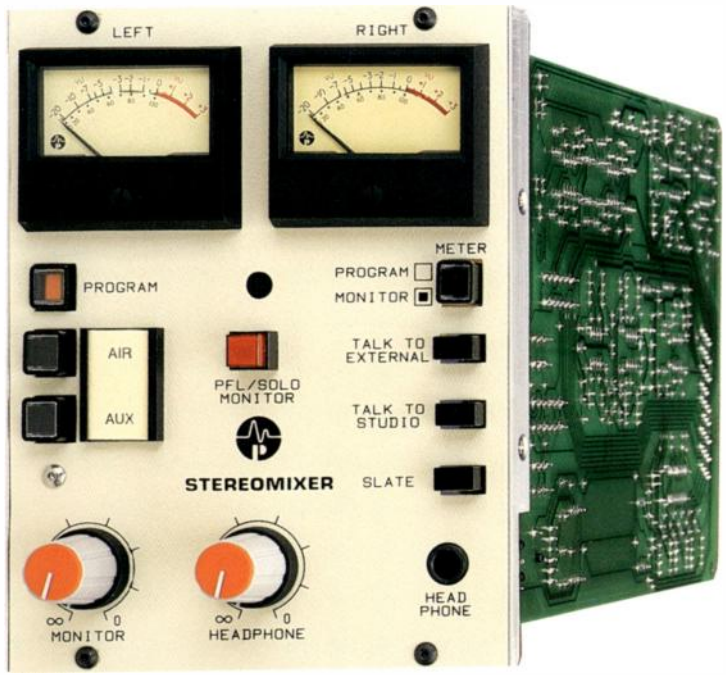
The Stereomixer was developed to meet a wide variety of broadcast needs: public affairs, talk shows, remotes, music and commercial dubbing, auxiliary production, on-air and even stereo news.

To meet any conceivable operational requirement you may have, we designed four separate types of input modules: Microphone Input, Stereo Line Input, Tape Recorder Input/Output, and Telco Input/Output. Additionally, the Stereomixer can accommodate accessory modules such as Remote Line Selectors, Mono and Stereo Equalizers, and Voice Processors. All eight positions in the mainframe are universal, accepting any combination of input and accessory modules. The basic mainframe includes a System Master Module, Power Supply, connector kit with tools, and a spare parts kit.

Compact design was not confused with miniature design. We've made it easy for you to operate the Stereomixer by using the same type of control knobs and buttons as on our larger consoles. The only "miniature" components used are the two VU meters; even these small meters fully conform to ANSI specifications and are easy to read. And, because you demand the best, you get custom designed Penny & Giles long-life conductive plastic faders.

A thorough review of the functional block diagram tells more of the story. The Stereomixer is a powerful tool designed to meet the daily demands of broadcasting.





REMOTE LINE SELECTOR

The Remote Line Selector module provides for selection of up to six external stereo sources. Typical applications include the selection of remote lines for stereo line input modules or extending the input selection capability of the monitor system. The output of the selector is brought out to a rear panel connector for user connection to the appropriate line or monitor input position.

SYSTEM MASTER MODULE

The System Master module is supplied with the mainframe and contains the stereo mix bus amplifiers, output amplifiers, monitor system, slate and talkback system and the stereo VU meters. The output level is adjustable and may be calibrated for "0" VU at either +4 dBu or +8 dBu. The VU meters are driven by bridging buffer amplifiers to isolate the meter rectifiers from the Program lines. The stereo Program amplifiers are equipped with interstage patch points for the connection of external processing equipment or a patch field.

The monitor section provides facilities for the mixer operator with logic controlled input selector switching controlled by the PFL (pre-fader listen) and SOLO (after fader listen) buttons on each of the input modules. The System Master module's selector buttons access the stereo Program bus and two external inputs. The PFL/SOLO MONITOR tally light illuminates whenever the monitor source is from one of the input modules.

The VU meters are equipped with a mode switch to select either full-time metering of the stereo Program outputs, or displaying the level of whatever source is being monitored. The "meter follows monitor" mode is valuable for previewing incoming levels with the PFL buttons, or auditioning and setting levels with the SOLO function. In either case, the levels on the PFL and SOLO buses are normalized to equal true output levels.

Front and rear panel outputs for the operator's headphone are provided along with line level monitor outputs to feed an external power amplifier and loudspeakers. Two sets of stereo monitor outputs, muting and non-muting, are also provided for connection to a voice booth or studio monitor, and headphone systems. Control Room and Studio muting is controlled by the assignable muting logic in the microphone input modules. The System Master module provides tally voltage outputs for connection to Control Room and Studio warning light relays.

A self-contained electret microphone provides talkback communication to the Studio and/or other external facility. Audio and logic inputs are also provided for the external location to talk back to the Control Room. The self-contained microphone is also used with a built-in 30 Hz tone generator for slating the Program bus. The slate function can be locked out to prevent the possibility of slating an "air" feed.

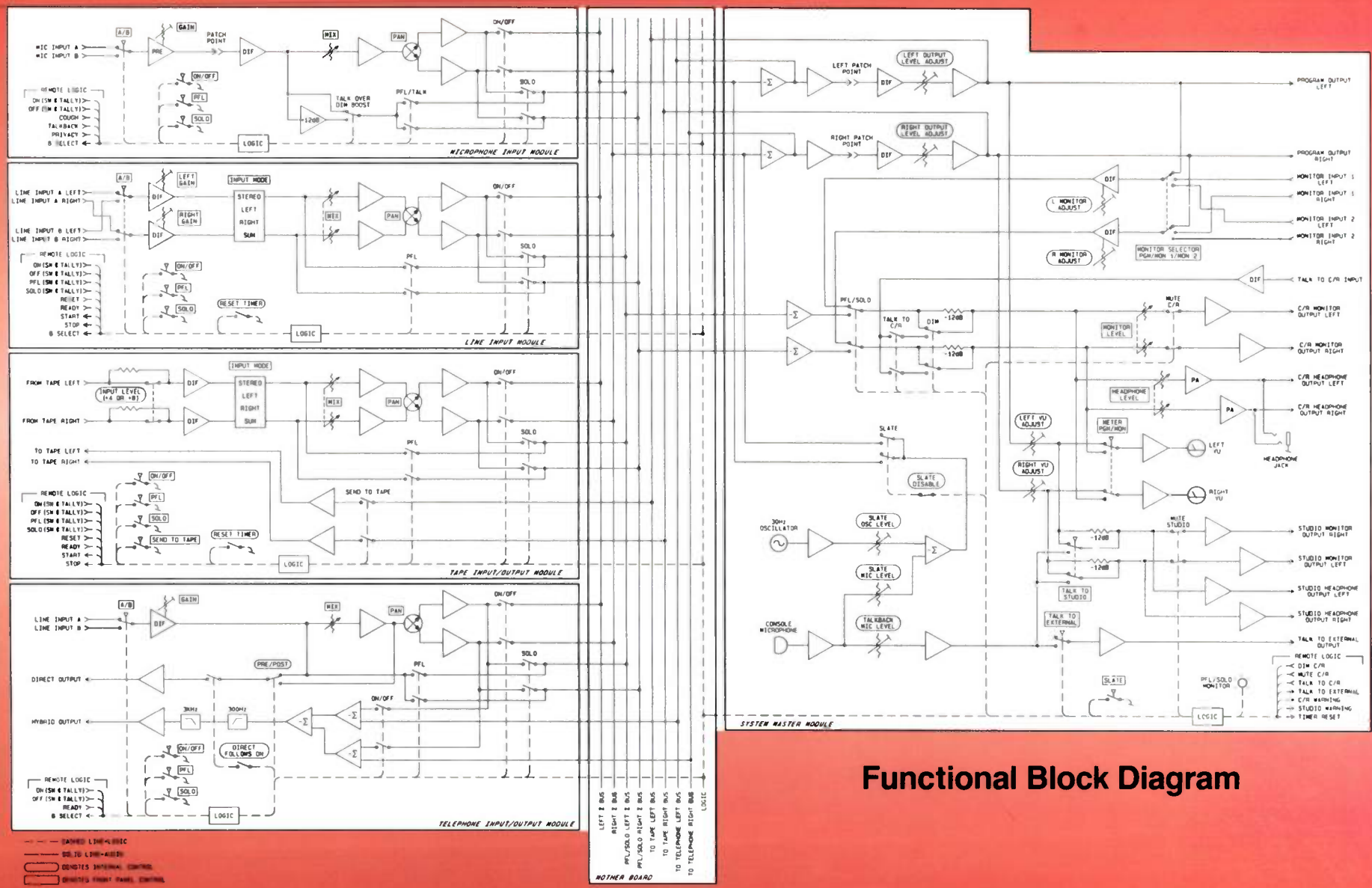
ACCESSORY MODULES

Three optional processing modules are available for the Stereomixer. Monaural Equalizer & Filter, Stereo Equalizer or Voice Processor modules may be installed in any input module position in the mainframe. Monaural processing modules are usually connected to the patch point of a microphone input module, while the stereo equalizer is usually connected to the Program patch point of the System Master module. These modules may also be wired out to an external patch field serving the system.

The Monaural Equalizer & Filter module combines both a three-knob equalizer and tunable highpass and lowpass filters into one compact module. The equalizer section, which may be switched in and out independently of the filter section, contains bass and treble equalizers which are each independently switchable from peaking to shelving modes. The midrange equalizer is tunable over a considerable mid-band frequency range. The tunable filter section consists of highpass and lowpass filters that may be used to correct many commonly encountered signal problems such as hum and hiss.

The Stereo Equalizer module contains two separate, but coupled, three-band equalizers. The high and low frequency equalization is switchable between peaking and shelving modes. The midrange equalizer has the same broad range of control provided in the monaural version.

The Voice Processor module is a special function unit designed specifically for equalizing, gating, compressing and de-essing speech. The processor is particularly useful when recording or transferring interviews where level variation, background noise or sibilance is a problem. The processor contains two major function sections. The first section is a switch insertable equalizer which covers the frequency range normally required for speech. The second section contains the expander (gate), compressor and de-esser systems. The expander threshold and attenuation are used to achieve noise reduction during pauses in speech while the compressor provides "smoothing and density" of the signal. The de-esser senses and operates only on the treble region which provides excellent control over excessive sibilance without undesirable broadband side effects.



Functional Block Diagram



MICROPHONE INPUT MODULE

The mic input module accepts a wide range of input levels to accommodate all contemporary microphones. The balanced transformerless mic preamp is adjustable for nominal inputs of -70 dBu to -35 dBu. The preamp output is available via a rear panel patch connector for connection to processing equipment. The patch return is balanced and bridging.

The front panel input selector, with programmable monitor muting for control room or studio, has two mic inputs per module. The mute circuitry incorporates an automatic 40 mSec delay before the mic is turned on, permitting "room reverb" to decay off-mic. The module is equipped with remote control capability for ON, OFF, COUGH and TALKBACK. The logic also provides current-limited tally lamp voltages for these controls.

The PAN control is used to position the mic signal in the stereo image. The module is assigned to the stereo program buses by the illuminated ON/OFF button. The illuminating PFL and SOLO buttons control the logic circuitry to send pre-fader or post-fader audio to the monitor system.



STEREO LINE INPUT MODULE

The Stereo Line Input module handles nominal input levels from -30 dBu to +9 dBu. The front panel input selector provides two stereo inputs per module. Input signal MODE selection is provided by the two alternate action button switches, L & R. The signal mode is stereo when both buttons are released; pressing the L button sources the left input, pressing the R button sources the right input and pressing both buttons simultaneously sums left and right into a monaural signal. The PAN control serves as a left/right balance control for stereo signals and as a pan assignment control for monaural signals.

The module is equipped with logic for both the remote control of the module itself and for control of connected source equipment. Module functions include ON, OFF, PFL and SOLO complete with control tally lamp voltages. Machine controls include READY, START, STOP and AUDIO RESET. In addition, the control logic may be set to provide a reset pulse for an external event timer.



TAPE INPUT/OUTPUT MODULE

The tape Input/Output module does double duty. It is the stereo line input module for the playback of a tape, cartridge or cassette recorder. With the exception of a "B" input selection, the module contains the same audio, remote and machine control logic functions as a Stereo Line Input module.

The module also contains balanced stereo output amplifiers to feed Program to the input of the connected recorder. The incorporation of Program amplifiers within the module eliminates the need for external distribution amplifiers for feeding recorders. The electronic alternate action SEND TO TAPE button also operates logic circuitry to prevent round-robin feedback via the tape machine by muting the module ON function. The PFL and SOLO buttons provide convenient stereo monitoring of tape playback for source-tape comparisons or for confirmation of recording.



TELCO INPUT/MIX-MINUS MODULE

The Telco Input/Mix-Minus module is a mono line input module with additional mixing and output circuitry for feeding telephone hybrids. It derives a specially mixed output of the Program bus with its own input to that bus subtracted. This Mix-Minus output is band-pass filtered to keep the signal within the trans-hybrid loss specification of broadcast grade hybrids.

The module has two inputs which are selected by the front panel switch. Either input may be used as a telephone or general purpose monaural input. The input preamplifier is designed to accommodate a wide input range of -30 dBu to +9 dBu. The PAN control provides positioning of the signal in the stereo image. Module remote control logic functions include ON and OFF, complete with tally lamp voltages, and READY. These control functions may be interfaced to a telephone controller.

SPECIFICATIONS

MICROPHONE INPUTS:

Source Impedance	150 ohms
Input Impedance	30K ohms minimum, balanced
Input Level Range	Adjustable from -70 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS:

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range:	
Line Input Module	Adjustable from -30 dBu to +9 dBu
Telephone Module	Adjustable from -30 dBu to +9 dBu
Tape I/O Module	Switchable to +4 dBu or +8 dBu
External Inputs	Fixed at system operating level
Patch Return Inputs	Nominal -10 dBu
Input Headroom	Greater than 30 dB above nominal input

MAIN OUTPUTS:

Load Impedance	600 ohms minimum
Source Impedance	80 ohms, balanced
Nominal Output Levels:	
Mix and Tape Outputs	+4 dBu to +8 dBu, adjustable
Telephone Mix-Minus	0 dBu
Maximum Output Levels:	
Mix Outputs	+24 dBm, 600 ohm load
Tape Outputs	+24 dBm, 600 ohm load
Mix-Minus Outputs	+24 dBm, 600 ohm load

MONITOR OUTPUTS:

Main Outputs:	
Load Impedance	600 ohms or greater
Source Impedance	40 ohms, unbalanced
Output Level	0 dBu nominal, +20 dBu maximum
Headphone Output:	
Load Impedance	300 ohms or greater
Source Impedance	100 ohms
Output Level	0 dBu nominal, +20 dBu maximum

FREQUENCY RESPONSE:

Mic Input to Program Output	+0 dB, -.7 dB, from 20 Hz to 20 kHz
Line Input to Program Output	+0 dB, -.7 dB, from 20 Hz to 20 kHz

NOISE:

Microphone Input Amplifier	-126 dBu equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	-88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output Noise with microphone channel ON, fader at 0 dB, input sensitivity at -50 dBu	75 dB below output, reference +8 dBu, 150 ohm source, 20 kHz bandwidth
Output Noise with one line channel ON, fader at 0 dB, input sensitivity at +8 dBu	83 dB below output, reference +8 dBu, 600 ohm source, 20 kHz bandwidth
Output Noise with no input channels ON	85 dB below output, reference +8 dBu, 20 kHz bandwidth

DISTORTION, T.H.D.:

Mic Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, -32 dBu input, +24 dBm output into 600 ohm load, 80 kHz meter bandwidth
Line Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, +24 dBu input, +24 dBm output into 600 ohm load, 80 kHz meter bandwidth

DISTORTION, I.M.D.:

Mic Input to Program Output	Less than 0.01%, -32 dBu input, +24 dBm output into 600 ohm load
Line Input to Program Output	Less than 0.01%, +24 dBu input, +24 dBm output into 600 ohm load

SEPARATION:

Program Outputs	Less than -70 dB at 1 kHz Less than -60 dB at 20 kHz

POWER REQUIREMENTS:

Fully configured STEREOMIXER	50 watts @117 VAC, ±10%, 60 Hz

NOTES:

1) These specifications are for the basic signal paths, per channel, with 600 ohm loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 9 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

3) Noise specifications are for one fully loaded STEREOMIXER. Noise specifications are based upon a 20 kHz measurement bandwidth; the use of a meter with 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Features and specifications subject to change without notice.

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ABX
PACIFIC RECORDERS & ENGINEERING CORPORATION
AUDITION
RIGHT
LEFT
UTILITY
TELCO MIX
PGM
AUD
UTL
2-MIX
METER SWITCHER

SYSTEMS INTEGRATORS FOR THE BROADCAST INDUSTRY.

Pacific Recorders & Engineering Corporation was founded in 1969 to serve Southern California's professional recording and broadcast industries with audio product design/manufacturing and facility development.

Today, operating from a 55,000 square foot facility in Carlsbad, California, PR&E has grown to become one of the world's leading manufacturers of broadcast consoles, cart machines and related peripherals and is recognized for its expertise as a broadcast and production systems integrator.

PR&E has designed and fabricated more than 1500 custom control, studio, newsroom and master control systems, and is setting the standards for exciting new products, for innovative solutions to complex facility design, and for maximum performance from both.



ABX FEATURES

- Three main stereo mix buses: Program, Audition & Utility
- Distribution amplifiers on main outputs, each capable of +28 dBm
- 2-Mix multitrack to stereo mixdown buses
- Eight multitrack mix buses
- Four effect/foldback send mix buses, each with remote control logic
- Four telephone mix-minus feeds plus telephone mix monitor
- Comprehensive module control logic, including multiway talkback facilities, for each input of microphone modules
- Extensive module and machine control logic for each input of line input modules
- Two stereo reverb/effects returns each with remote control logic
- Stereo cue system with automatic console headphone monitor switching
- Stereo solo monitoring system
- Multifunction metering with automatic cue (PFL) and solo (AFL) level display
- Monaural equalizers with filters
- Stereo tracking equalizers
- Voice Processors with equalizer, gate, compressor and de-esser
- Monitor system provides independent and unique outputs for console, host, co-host, and guest headphone feeds
- Two fully independent studio monitor systems
- Multi-way intercommunication system including producer and external site facilities
- Multi-frequency low distortion test oscillator
- Voice slate system with identification tone
- Fully regulated, independent supplies for audio, logic and phantom power
- On-board audio supply regulation on each module
- Console mainframe fully wired for all present and future inputs, outputs, patch points and logic
- Connector panel silkscreened with descriptive text designations
- Audio and logic interconnection system is compatible with BMX and AMX series consoles
- Mainframes for 18, 26, 34 input positions
- Console supplied with installation connectors and tools, service tool kit and spare parts kit

DOUBLE DUTY

The ABX is the most flexible and full-featured radio console available today. It has been designed from the group up to meet any production *or* on-air challenge.

Historically, radio broadcast consoles have been built to achieve a single operational need: on-air duty. When selecting a console for production, the choices were either another on-air console which was not equipped with full equalization, reverb, foldback, solo, multitrack and mixdown capabilities; or a recording studio console which did not have multiple stereo outputs, interactive machine control and sufficient stereo inputs. The ABX design provides the best features of both console types in a single, well integrated, audio board. Equally important, the controls and features of the ABX were designed specifically for radio operators - no need to learn how to use different types of consoles in the on-air and production studios. The meter panel provides extensive full-time metering of all broadcast and production outputs thus eliminating the confusion created by switched meter designs. The meters are logically and symetrically arranged with the broadcast outputs to the left of center and the production outputs to the right.

Because you need a rugged, reliable console that will operate at peak performance - day in and day out, PR&E uses only first-quality components. Advanced discrete and integrated circuitry yields very low noise and distortion, and provides excellent frequency response and headroom/overload capability (at least 30 dB of input headroom is maintained to provide that extra margin for "hot" levels and operator error). The main stereo outputs, Program, Audition and Utility, are equipped with built-in distribution amplifiers. Each amplifier drives four outputs with each output capable of delivering +28 dBm. The amplifiers are an active balanced design with more than enough power to drive double terminations on all outputs!

Mixers are full-travel Penny & Giles type 4000 faders, far more reliable than the lower cost series designed for semi-professional or light duty applications. Module control button switches are by Honeywell, which have proven themselves for over 15 years in custom console designs and in over 1000 BMX Series consoles. The microphone input transformers are designed and supplied by Deane Jensen; again, more expensive than commercial off-the-shelf parts, but very important to the

way your talent sounds. The VU meters fully conform to American National Standard C16.5-1954 and are driven by balanced isolation buffer amplifiers. The optional Peak Program meters (PPM) conform to British Standard 4297:1969.

The sophisticated control logic of the ABX utilizes CMOS integrated circuits. Operating on 12 volt, low current power, CMOS based logic is immune to electrical noise and strong RF fields. Unlike low-cost, 5 volt, high-current TTL logic, CMOS logic circuits generate very little electrical noise, so you won't hear "chirps or clicks" in the audio as the logic operates. Outputs, such as control pulses and tally lights, are delivered by short-circuit-proof driver circuitry to prevent any problem in the console should an external connection become compromised. The CMOS control circuitry is interfaced to external equipment through simple logic interfaces which provide both a common control format for different brands and models, and complete electrical isolation between the various pieces of equipment.

The ABX is a compact design for a console of its extensive sophistication. Careful attention has been paid to human engineering in the placement of switches and controls. All active electronics, except the meter buffer amplifiers, are accessible from the face of the console. Panel modules simply unplug from the mainframe and may be removed and reinstalled with the power applied! A real plus in the event of an emergency.

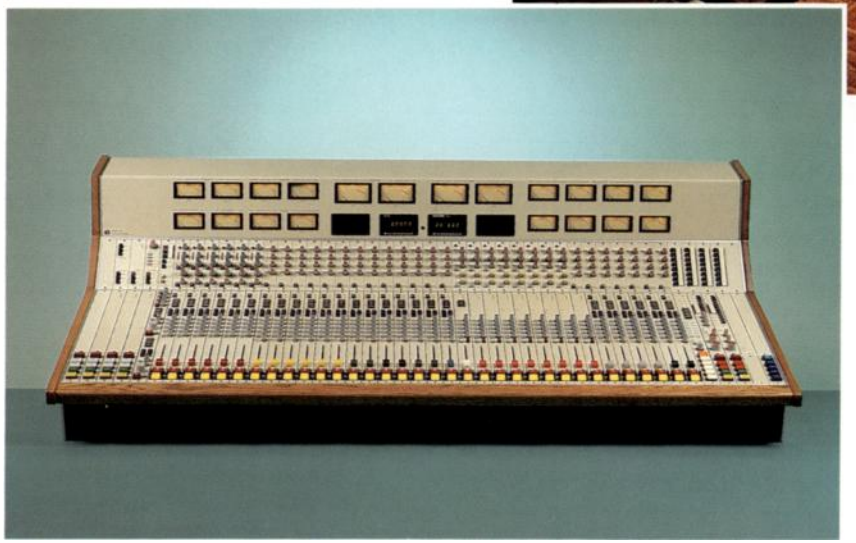
All input, output and logic wiring is accomplished with individual easy-to-use connectors. The use of individual connectors for each function provides more flexibility in configuration and future reassignment than multi-pin connectors. The connector pinouts are standardized and the console's connector panel labeled with descriptive text designations for ease of configuration. The console comes complete with connectors, pins, tools and full wiring information. By prewiring the studio connectors, an ABX console can be installed and in service in a few hours. Input assignments can be changed in the future with ease by just moving the appropriate connector plugs.

You may order an ABX with just the modules you need today, and expand the system as required in the future. ABX console mainframes are available for 18, 26 or 34 input modules and each mainframe is supplied completely wired for every input, output, patch point and option. Universal layout enables any input position to accept any type of input module, so adding extra modules later is quick and simple. Just connect the peripheral gear and the ABX is ready.

PR&E uses aerospace materials and modern manufacturing technology to create a tough reliable housing that won't twist or flex causing degradation of card edge contacts and straining of circuit traces. The mother board, used for power distribution, audio summing buses, and logic buses, is equipped with a full ground plane shield and a very low impedance "audio common" bus to keep current-induced cross-talk to uncommonly low levels. This type of mother board is considerably more expensive than a simple ribbon wire busing system; however, it is the best method for providing both the ground plane shield and a heavy signal common bus.

The console modules are all constructed on double sided printed circuit boards. These are more expensive than single sided construction but allow us to optimize component placement and to provide extensive ground plane shielding of both the analog and logic control circuitry. All components are clearly identified with silk-screened legends. All circuit card fingers and mating edge connectors are gold plated.



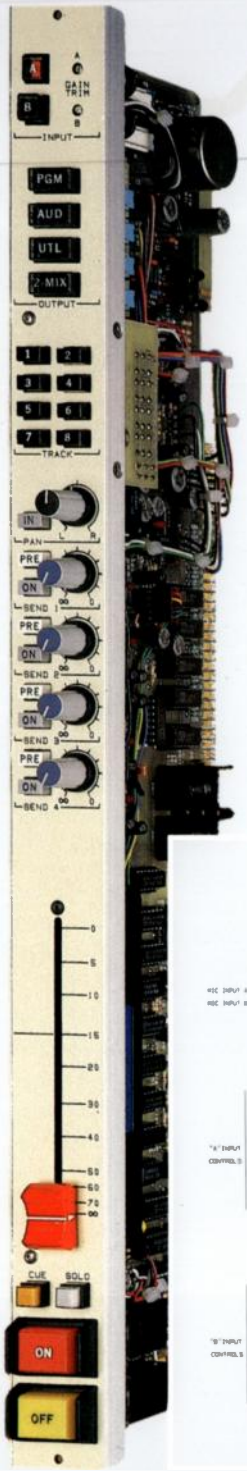


The rack mount power supply is constructed in a rugged steel chassis and features massive regulator heat sinks to provide very efficient convection cooling. The audio, logic and phantom supply voltages are individually switched by magnetic circuit breakers and are provided with front panel test jacks on standard ¾" centers. A coupler unit with power fail detection and tally is available for configuring redundant power supply systems.

PR&E's design philosophy of combining state of the art technology, rugged physical construction, and sensitivity to user needs, make the ABX the standard for comparison in the broadcast industry.

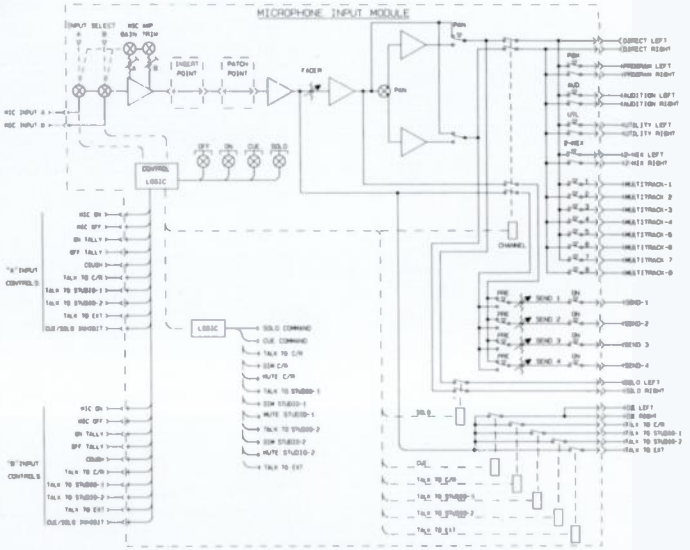
ABX...easy to buy, easy to install, easy to operate and easy to service, with reliability, performance, and above all, the value you've come to expect from PR&E.

MICROPHONE INPUT MODULE

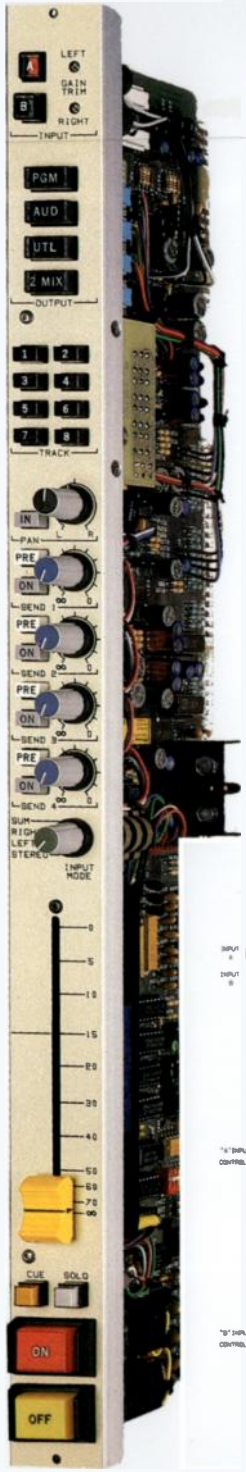


The Microphone Input Module accepts a wide range of input levels to accommodate all contemporary types of microphones. Each input, A and B, may be individually adjusted for nominal input levels from -60 dBu to -35 dBu. The A & B input selectors provide for two microphone inputs, each with individually programmable monitor muting which incorporates an automatic 40 millisecond delay to allow "room reverb" to decay off mic. Each mic input has independent remote control capability for ON, OFF, COUGH and multiple destination TALKBACK functions.

The module output is assignable to the PROGRAM, AUDITION, UTILITY, 2-MIX and the eight MULTITRACK mix buses. Each of the four effects/foldback SENDS has a level control, PRE/POST fader and ON/OFF switches. The PAN control, with insert switch, allows positioning of the microphone in the stereo image. The illuminated CUE button provides cue monitor pre-fader (PFL), while the SOLO button provides stereo monitor after fader and pan (AFL). The channel ON and OFF buttons are illuminated to indicate the status of the channel; the control logic may be programmed to provide momentary cough muting when the ON button is held depressed.

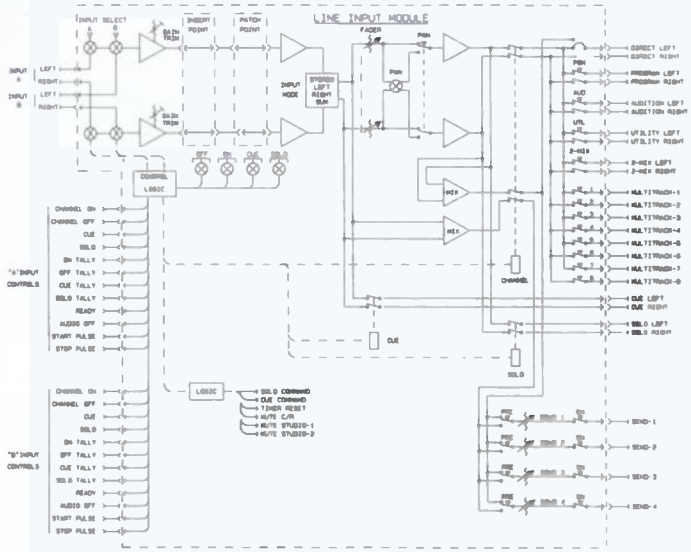


LINE INPUT MODULE



The stereo Line Input Module will accommodate nominal input levels from -12 dBu to +8 dBu. The A & B input switches select either of two stereo inputs with independent control logic provided for each input. An INPUT MODE switch allows source selection of stereo, left channel or a monaural sum of left and right channels. Module output is assignable to the PROGRAM, AUDITION, UTILITY, 2-MIX and the eight MULTITRACK mix buses. Each of the four effects/foldback SENDS has a level control, PRE fader and ON button switches. PAN is provided to balance a stereo signal source or to position a mono source in the stereo image. Both CUE and SOLO facilities are available, as in the microphone input modules.

Each input includes a comprehensive family of logic control input and output commands including remote control of the module's ON, OFF, CUE and SOLO functions complete with tally light voltages. Machine controls include start and stop command pulses for turntables, cartridge decks, CD players and open reel tape machines. The module also accommodates "audio reset" and "ready" status commands from the peripheral equipment. "Audio reset" turns off the module audio at end-of-message or end-of-event, without generating a machine stop command. "Ready" status is used to illuminate the module's OFF button when a cartridge is loaded, tape threaded, or a turntable or CD player cued. The control logic may also be programmed to reset and restart the console event timer providing an elapsed time countup for designated inputs.

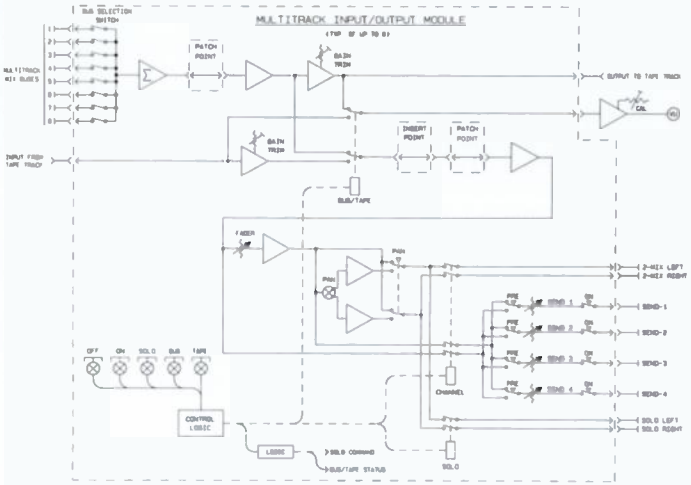


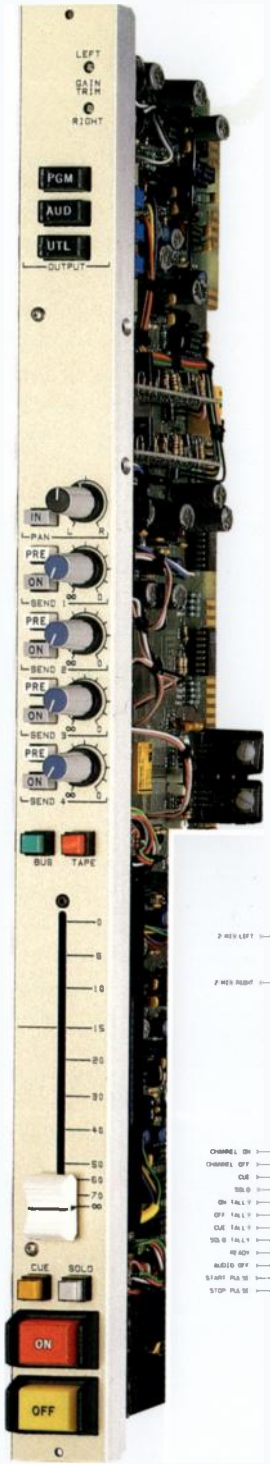


MULTITRACK MODULE

Each Multitrack Module is a combination input and output module for one track of a multitrack tape recorder. The module provides line output to the track as well as stereo mixdown facilities for bus (record) or tape (playback) signals. The BUS and TAPE buttons select the source to be mixed by the module and displayed on the track meter. The outputs of the multitrack modules are permanently assigned to the 2-Mix buses which are summed in the 2-Mix module and displayed on the 2-Mix meters.

Each of the four effects/foldback SENDS has a level control, PRE fader and ON button switches. The PAN control, with insert switch, allows positioning of the signal in the stereo image. The illuminated SOLO button provides stereo monitor after fader and pan (AFL). The channel ON and OFF buttons are illuminated to indicate the status of the channel.



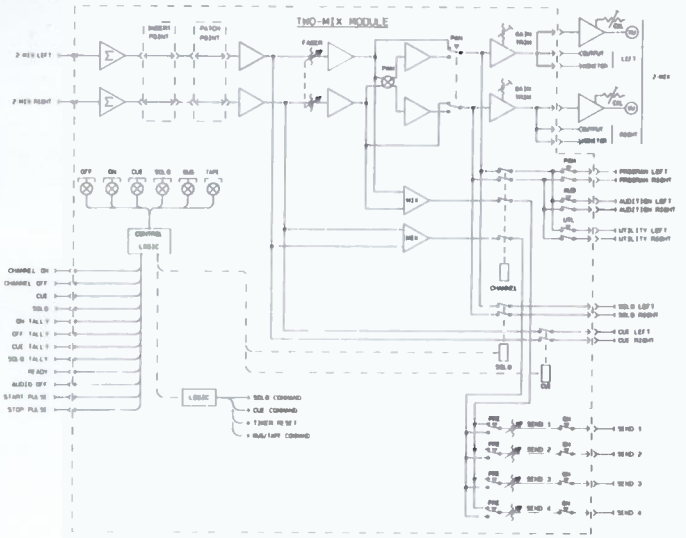


2-MIX MODULE

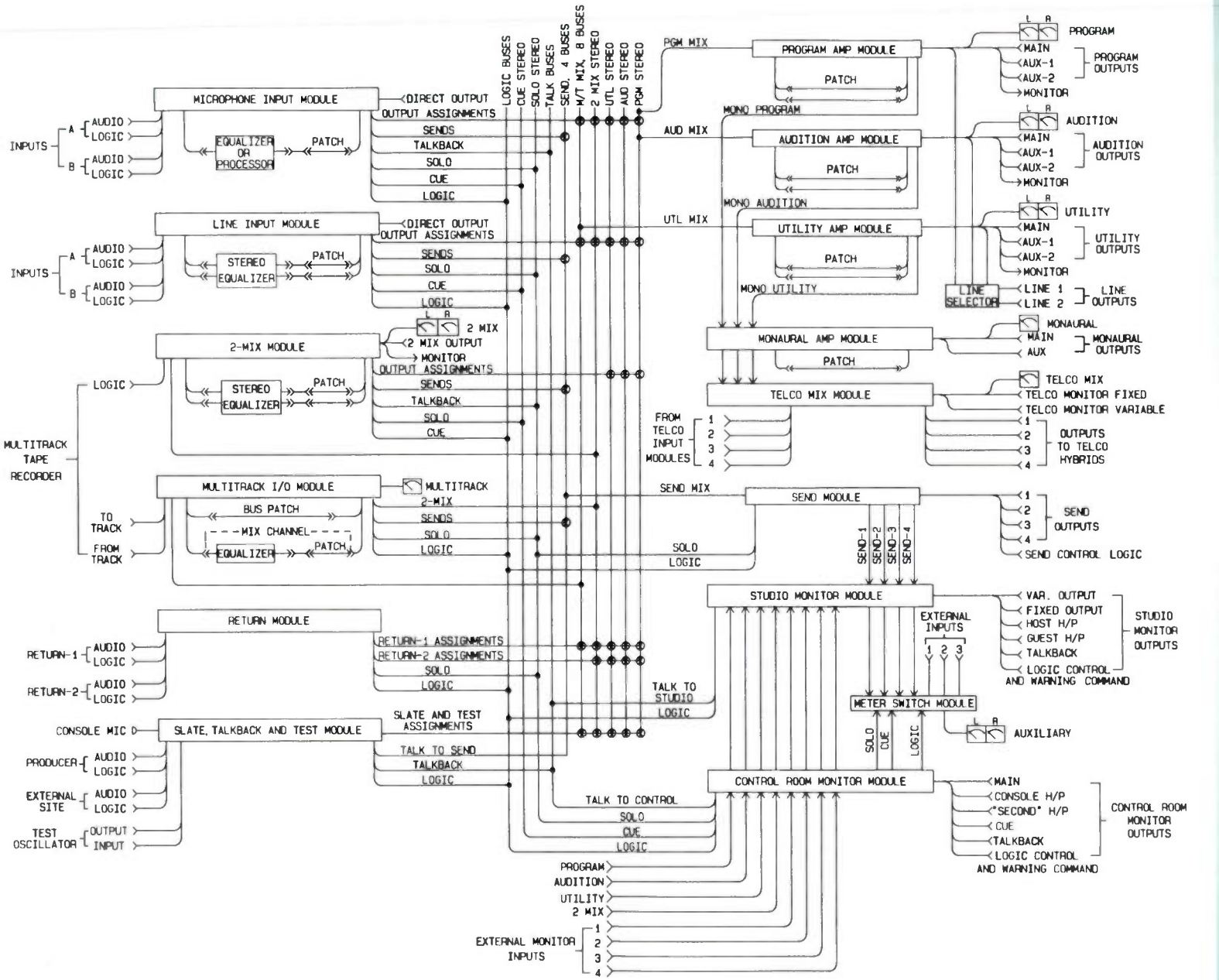
The 2-Mix Module is the mixing amplifier for the multitrack modules and, therefore, should be viewed as the master stereo "input" module for the multitrack tape machine. This module is equipped with the same audio and logic features as a stereo line input module, except that its inputs are the multitrack modules and any other modules assigned to the 2-Mix bus. The master BUS and TAPE buttons control the mixdown selection status of all the individual multitrack modules.

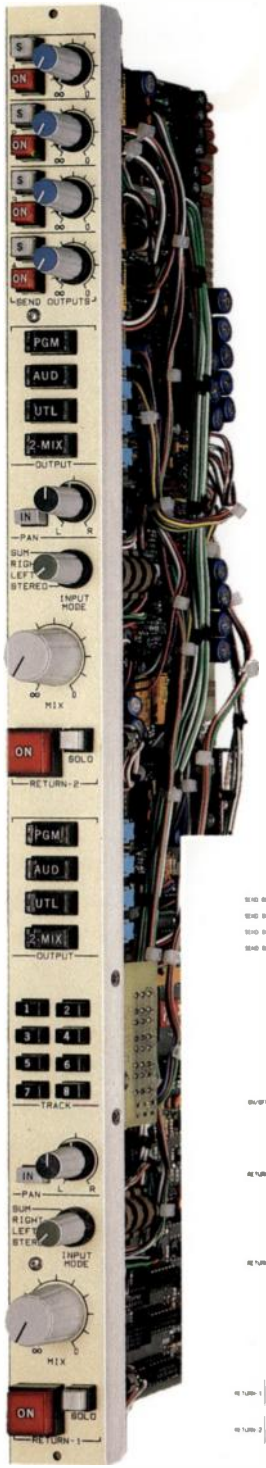
The stereo output of the module may be assigned to the PROGRAM, AUDITION and UTILITY buses. The full-time, line level outputs of the module are displayed by the 2-Mix meters. Each of the four effects/foldback SENDS has a level control, PRE fader and ON button switches. The PAN control, with insert switch, provides balancing of the stereo signal.

The channel ON and OFF buttons are illuminated to indicate the status of the channel. The illuminated CUE button provides cue monitor pre-fader (PFL), while the SOLO button provides stereo monitor after fader and pan (AFL). Tape machine controls include start and stop command pulses, "audio reset" and "ready" status. Automatic reset of the console event timer may also be programmed.



Functional Block Diagram



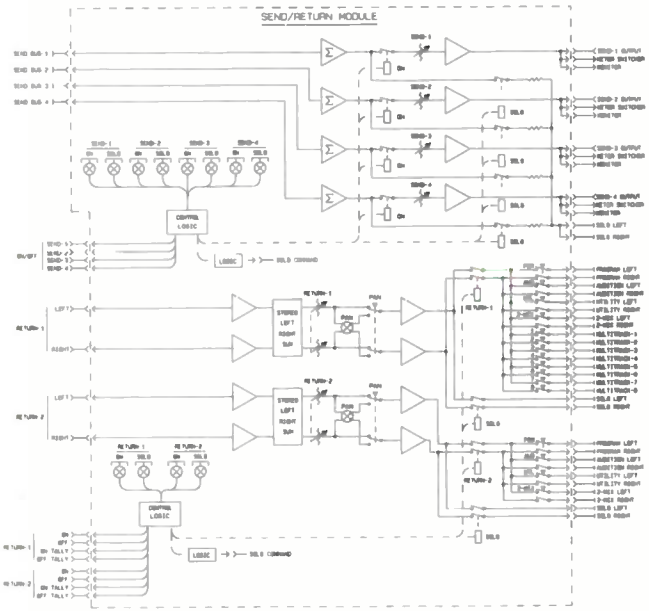


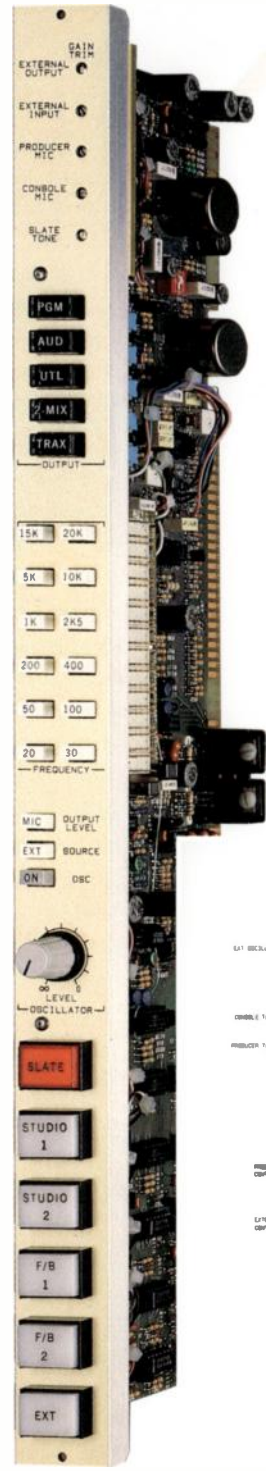
SEND & RETURN MODULE

The Send & Return Module contains both the SEND mixing and output line amplifiers and the reverb/effects RETURN input circuits.

The SEND portion of the module has the four sets of bus summing and output amplifiers for the effects/foldback send circuits. Each output is equipped with a master LEVEL control, logic controlled ON/OFF button and SOLO capability. The ON/OFF function can also be remote controlled; a typical application would be to provide an announcer with an echo send button, etc.

The RETURN section of the module contains two stereo effects input sections with ON/OFF, SOLO, input MODE and PAN/balance controls. Return-1 may be assigned to all four stereo mix and eight multitrack buses. Return-2 may only be assigned to the four stereo output buses. The returns are both equipped with external ON/OFF control logic with tally light voltages.





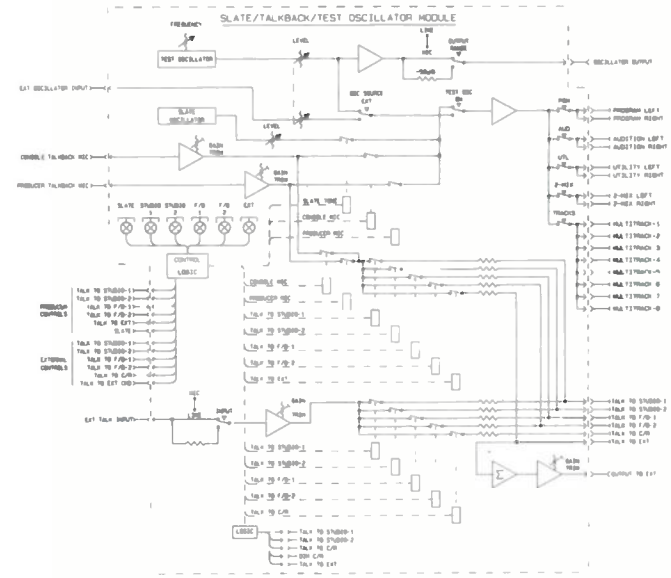
SLATE/TALKBACK/TEST MODULE

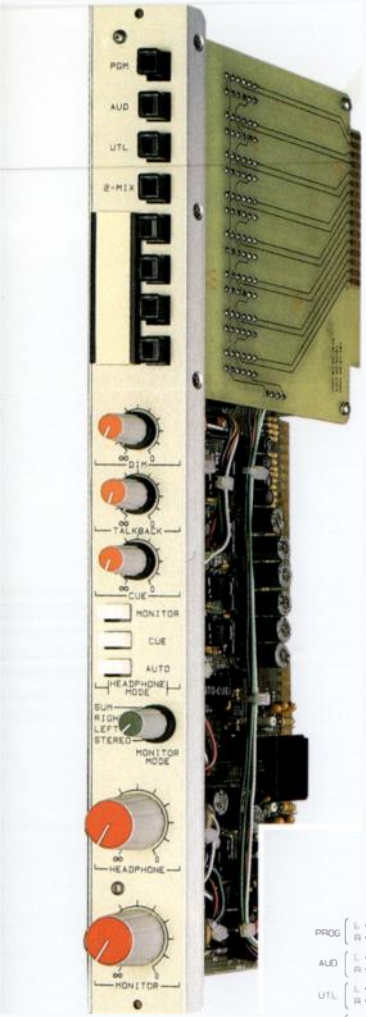
The Slate/Talkback/Test Module provides a test oscillator, slate system and communication capabilities for the ABX console.

The test tone oscillator generates 12 low-distortion audio tones for system testing and level alignment. The generator's output may be assigned to the PROGRAM, AUDITION, UTILITY, 2-MIX and all multitrack buses (TRAX) and is also available for external application at a connector on the rear of the console. The external output is balanced and may be switched between line or mic level. An external test signal may be selected in place of the internal generator with the EXT SOURCE button. Typical applications would be sweep tone, pink noise, and music tuning generators.

SLATE commentary may be added to a recording with the console's built-in electret microphone or from the producer's external microphone. A low-distortion slate identification tone (nominally 30Hz, adjustable) may also be recorded onto a tape for ease of track/cut identification.

The console and producer's talkback microphones may communicate with up to two studios, two of the foldback circuits and to an external location. The external location could be a call screener booth, 2-way radio, announce booth, etc. The frequency response of the talkback microphone preamplifiers has been carefully tailored to provide optimum speech communication.



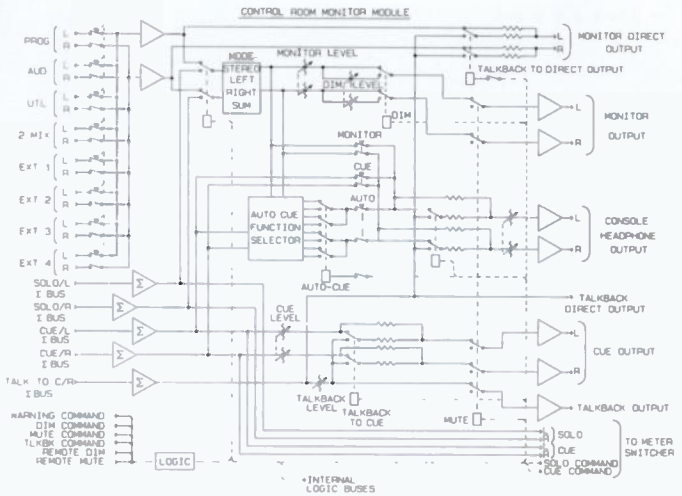


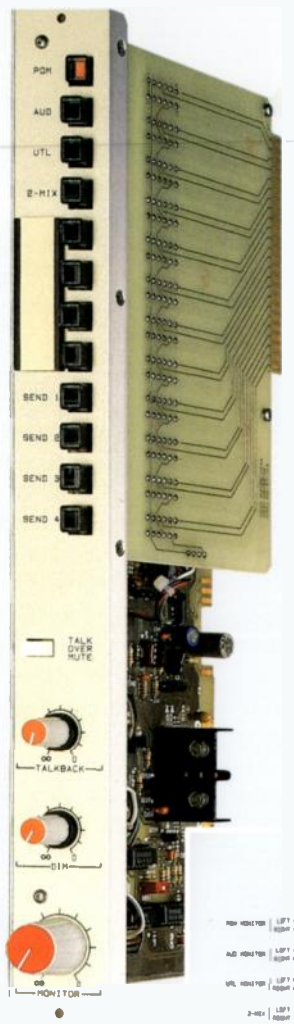
CONTROL ROOM MONITOR MODULE

Monitoring of PROGRAM, AUDITION, UTILITY, 2-MIX or any of four external signals is provided by the interlocking monitor selector. The DIM level control provides an adjustable amount of monitor level reduction while using the talkback facilities. The TALKBACK level control adjusts the volume of incoming communication.

The HEADPHONE MODE switch selects the source, MONITOR, CUE or the AUTOMATIC system for the console operator's headphone circuit. The automatic headphone system, unique to the ABX, AMX and BMX Series III family of broadcast consoles, senses whenever a cue button is pressed on an input module and switches the headphone circuit from monitor to one of two user assignable modes. These are stereo cue or mono cue in one earphone and mono monitor in the other. The headphone feeds to a co-host and/or guest are not interrupted.

The MONITOR MODE switch provides selection of monitoring stereo, left, right or sum sources. The HEADPHONE and MONITOR level controls are conductive plastic units custom manufactured by Penny & Giles.



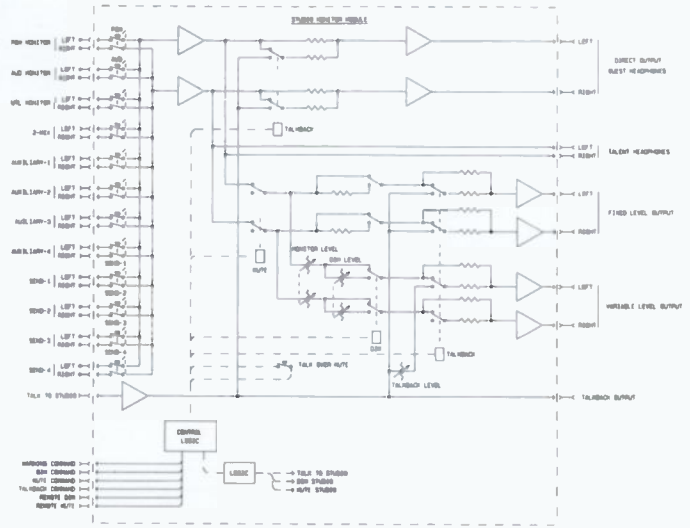


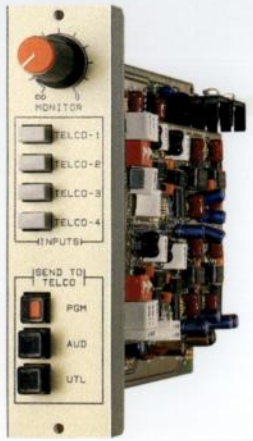
STUDIO MONITOR MODULE

The Studio Monitor is designed for applications where a separate voice/announce booth or conference studio is used. Monitor sources include: PROGRAM, AUDITION, UTILITY, 2-MIX, any of the four SEND buses and up to four external signals. Outputs provided are: variable level with talkback insert and adjustable DIM, fixed level with talkback insert and fixed dim, talent headphone feed with talkback insert and fixed dim, and guest headphone feed without talkback or dim.

The variable level output is usually used with a small voice booth or studio where it is not required nor desirable for talent to have volume control. The fixed level output is designed to feed a studio monitor control turret.

A muting override button is provided to enable TALKBACK to the studio even when the speakers are muted. This is normally used when doing off-air production voice work and the talent chooses not to use headphones. Up to two Studio Monitor Modules may be installed in the console.





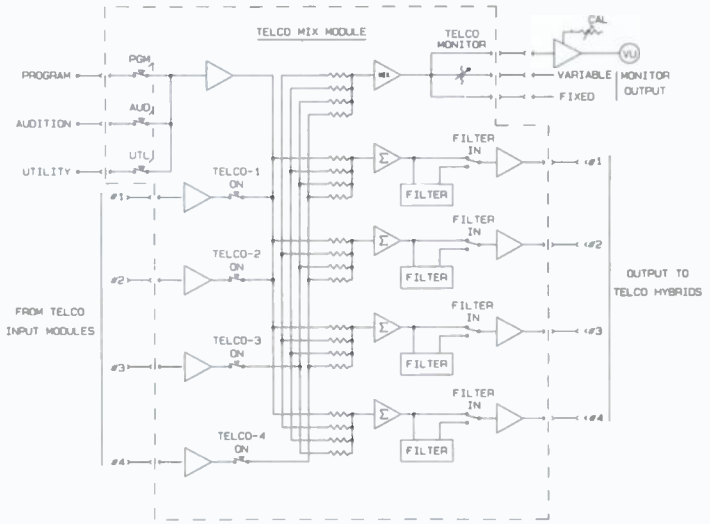
TELCO MIX MODULE

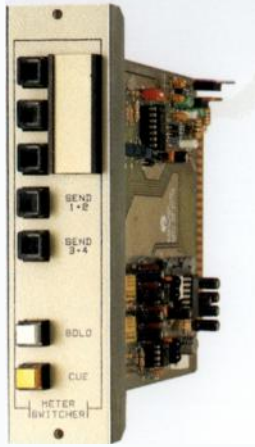
The Telco Mix Module derives five unique mixes of the signals from up to four telephone callers and a selection of the PROGRAM, AUDITION and UTILITY buses.

The telephone signals for broadcast are selected and controlled by the input modules connected to each of the external hybrid systems. The Telco Mix Module receives the audio from the selected input modules and sums them into a "monitor-mix". The telephone monitor-mix signal is very useful in applications where talk show talent and/or guests prefer to not use headphones to hear the callers.

The Telco Mix Module provides for the selection of the output bus which will contain the "base-mix" to be fed back to all the callers. In addition, the module creates a unique mix for each caller which includes the selected bus plus all the other callers, except himself ("mix-minus"). Each mix-minus output may be band-pass limited for improved hybrid operation, with internally switchable filters.

The Telco Mix Module may also be used for other applications where it is desired to create one or more custom mix-minus foldback mixes or cue feeds, such as to remote pick-ups, sports booths, and two-way systems.



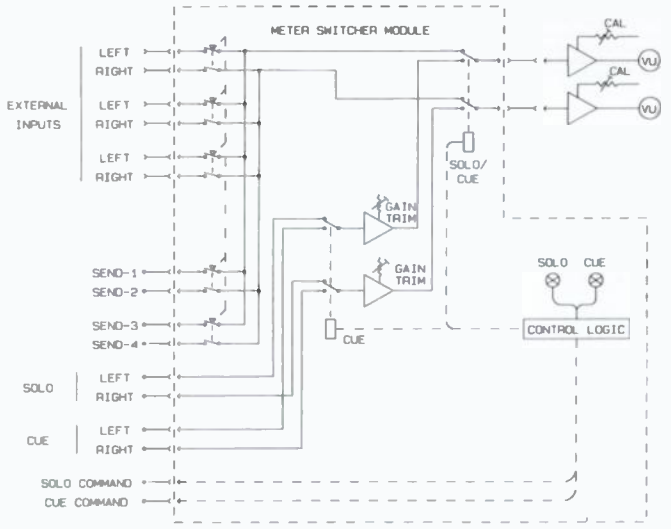


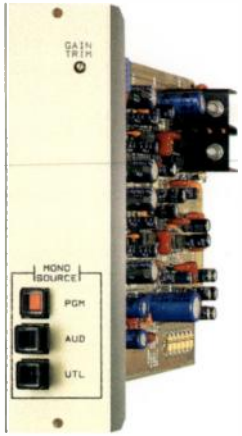
METER SWITCHER MODULE

The ABX Meter Panel displays the levels of the following console outputs: Program, Audition, Utility, 2-Mix, Multitrack, Monaural, Telco Mix and Auxiliary.

The Auxiliary meters are driven by the Meter Switcher Module which may select between three external signals and SEND 1 & 2 and SEND 3 & 4. These meters automatically default to either CUE or SOLO whenever either function is selected on a module. CUE metering provides rapid confirmation of module input levels, while SOLO metering eliminates the need to use a main output bus for preview and level setting.

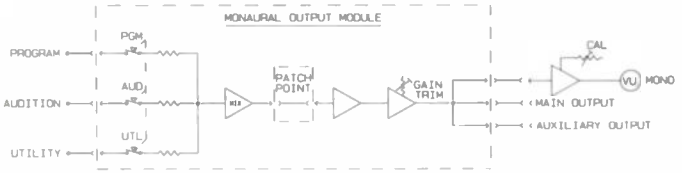
The smaller ABX-18 meter panel supports only four multitrack meters, and uses the Meter Switcher Module and Auxiliary meters to display Utility, Monaural and Telco Mix levels.

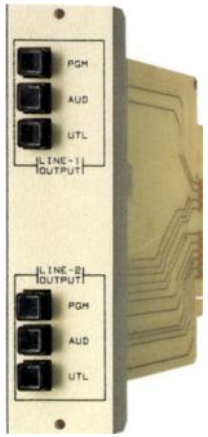




MONAURAL OUTPUT MODULE

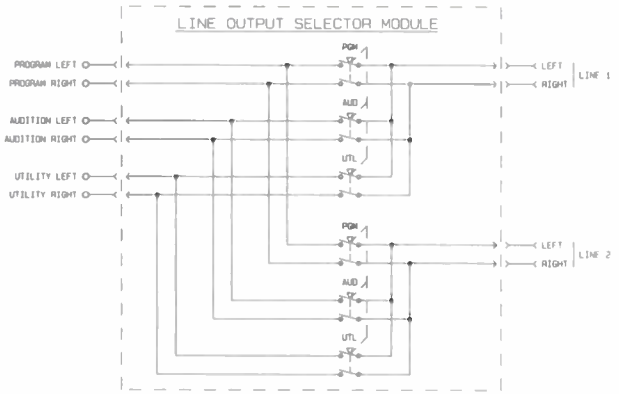
The Monaural Output Module provides a selection of the three main outputs, and may select or mix any combination of the PROGRAM, AUDITION and UTILITY signals to derive a monaural output. A patch send and return point is available for the connection of external processing equipment and/or a patch field. The output amplifier is an active balanced design identical to those used in the stereo line output modules.

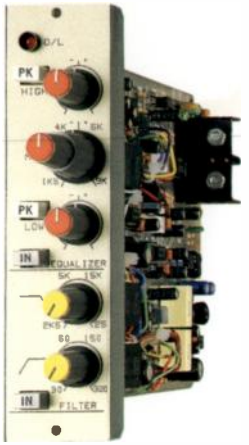




LINE OUTPUT SELECTOR MODULE

The Line Output Selector Module selects a distribution amplifier output of the PROGRAM, AUDITION or UTILITY buses for each of two separate output lines. Typical applications would include main and back-up transmitter lines or input selection for tape recorders.





MONAURAL EQUALIZER/FILTER MODULE

The Monaural Equalizer Module provides both tunable highpass and lowpass filtering and a three-knob equalizer in one compact module. Each section may be individually switched in and out of the signal path. From the signal flow perspective, the highpass filter precedes the equalizer section, which is then followed by the lowpass filter. This configuration allows the highpass filter to protect the equalizer from heavy sub-sonic signals, and provides the possibility of lowpass filtering of some of the noise resulting from extreme high frequency equalization.

The equalizer section contains bass and treble equalizers; each is independently switchable from shelving to peaking modes. The midrange equalizer is tunable over a considerable range. The "Q" is very broad when using modest levels of boost or cut, and increases only as boost and cut increase. All have reciprocal boost and cut curves, although an internal option switch causes the bass equalizer always to remain in the more desirable shelving mode during attenuation.

The tunable high and lowpass filter sections are designed with an attenuation of 18 dB per octave.



STEREO EQUALIZER MODULE

The Stereo Equalizer Module is a stereo tracking version of the equalizer section of the three-band monaural equalizer module.

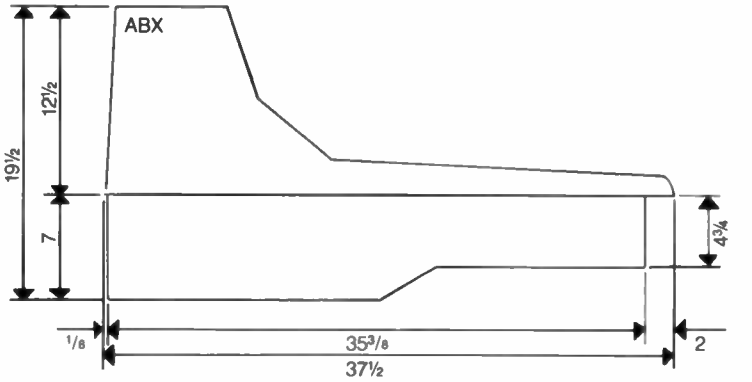


VOICE PROCESSOR MODULE

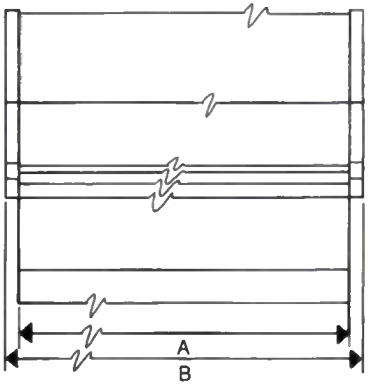
The Voice Processor Module is a combination module with the following functions and signal path: equalizer, gate, compressor and de-esser. The equalization and dynamics sections may be independently switched in and out of the signal path. This module is specifically designed for processing voice signals: DJ's, news presenters, talk show hosts and guests. The gate and de-esser features are particularly helpful with inexperienced talk show guests.

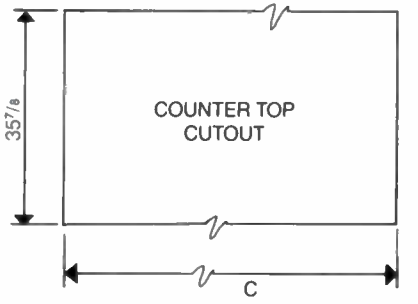
The equalizer section is a two-knob, two band design with a fixed low frequency and adjustable voice (mid to high) frequency equalizer controls. The low frequency equalizer provides a peaking response in the boost mode and a shelving response when attenuating.

The dynamics section is a high-performance compressor, containing a flexible expander and de-esser. The compressor is not intended to be a "gain-rider", but is designed to provide signal smoothness and increased density. The action of the expander/compressor is shown by a unique LED display, which indicates expansion with a moving dot and compression with a bargraph. The de-esser section senses and operates only upon the sibilance region of the signal, with a separate LED indicating the degree of action.



FRONT





	A	B	C
ABX-18	42½	44	42¾
26	54½	56	54¾
34	66½	68	66¾

ABX SPECIFICATIONS

MICROPHONE INPUT:

Source Impedance	150 ohms
Input Impedance	1000 ohms minimum, balanced
Input Level Range	Adjustable from -60 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS:

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range:	
Line Input	Adjustable from -12 dBu to +8 dBu
Multitrack Input	Adjustable from -4 dBu to +8 dBu
Reverb Return	Adjustable from -15 dBu to +8 dBu
Monitor Input	Nominal +4 dBu/+8 dBu
Patch Input	Nominal -10 dBu
Input Headroom	Greater than 30 dB above nominal input

MAIN OUTPUTS:

Load Impedance	600 ohms
Source Impedance	30 ohms
Nominal Output Level	+8 dBm adjustable to +4 dBm
Maximum Output Level	
Line Amplifiers	+28 dBm, 600 ohm load
Two-Mix Module	+26 dBm, 600 ohm load
Multitrack Module	+26 dBm, 600 ohm load
Send Module	+26 dBm, 600 ohm load

MONITOR OUTPUTS:

Main Outputs:	
Load Impedance	600 ohms or greater
Source Impedance	30 ohms, unbalanced
Output Level	0 dBu nominal, +20 dBu maximum
Headphone Outputs:	
Load Impedance	45 ohms or greater
Source Impedance	Less than 4 ohms
Output Level	0 dBu nominal, +20 dBu maximum

FREQUENCY RESPONSE:

Mic Input to Program Output	+0 dB, -0.9 dB, 20 Hz to 20 kHz
Line Input to Program Output	+0 dB, -0.8 dB, 20 Hz to 20 kHz

NOISE:

Microphone Input Amplifier	-127 dBu RMS equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	-88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output Noise with 1 microphone channel ON, fader at -15 dB, input sensitivity at -50 dBu	75 dB below output, reference +8 dBm, 150 ohm source, 20 kHz bandwidth
Output Noise with one line channel ON, fader at -15 dB, input sensitivity at +8 dBu	80 dB below output, reference +8 dBm, 600 ohm source, 20 kHz bandwidth
Output Noise with no input channels ON	82 dB below output, reference +8 dBm, 20 kHz bandwidth

DISTORTION, T.H.D.:

Mic Input to Program Output	Less than 0.02%, 20 Hz to 20 kHz, -50 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output
Line Input to Program Output	Less than 0.008%, 20 Hz to 20 kHz, +8 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output

DISTORTION, I.M.D. (SMPTE):

Mic Input to Program Output	Less than 0.008%, -50 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load
Line Input to Program Output	Less than 0.005%, +8 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load

CROSSTALK:

Interchannel Crosstalk	Less than -85 dB at 1 kHz Less than -75 dB at 20 kHz

---

NOTES:

1) These specifications are for the basic signal paths, per channel, with either or both channels of a stereo pair operating and with 600 ohm loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

3) Noise specifications are for for a 26-input console (ABX-26); larger consoles will have slightly reduced signal-to-noise ratios due to increased summing amplifier gain. Noise specifications are based upon a 20 kHz bandwidth; the use of a meter with a 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Features and specifications subject to change without notice.

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AMX SERIES


DIGICLOCK TD-2
PACIFIC RECORDERS & ENGINEERING CORP
AMX-14
PACIFIC RECORDERS & ENGINEERING CORPORATION
AUXILIARY
LEFT
RIGHT
RECORD
RECORD
ON
ON
ON
ON
PGM
AUD
UTL
IN
STEREO EQUALIZER
STEREO EQUALIZER
STEREO EQUALIZER

SOPHISTICATED ON-AIR & STEREO PRODUCTION: YOU HAVE BOTH WITH THE AMX OPERATIONS CONSOLE.



Pacific Recorders & Engineering Corporation

The AMX operations console is a comprehensive stereo production console as well as an advanced on-air control center. Because we designed the AMX with the flexibility to handle both assignments, you can be on-air one minute and in the next, all the features you need for efficient stereo production are at your fingertips. Although many stations with tight quarters and even tighter budgets will appreciate this dual-mode versatility, it doesn't mean that our high performance standards for either task have been compromised in any way.

The AMX was designed with the capacity to handle a talk show with four independent telephone input mixes, the capability to equalize and/or process all its inputs, send and mix effects, record a stereo feed for later broadcast, and work with two separate studios and a remote — all at the same time.

When you examine the AMX, you'll note that directly above the mic and line input modules there's ample space for signal processing on every input. Choose from our Stereo Equalizer, Mono Equalizer/Filter, or our exclusive Voice Processor modules (more on these later, see Optional Signal Processing Modules). This same console section supports the Monaural Output Amplifier, Telco Mix-Minus, Meter Switcher, Line Output Switcher, Output Line Switcher, and up to four Remote Line Selector modules.

The AMX console mainframe comes with a Control Room Monitor, three Stereo Output Distribution Amplifiers, Effects/Foldback Send & Return module and Automatic Meter Switcher. Simply add the desired complement of input, processing and accessory modules to configure an AMX to meet your particular requirements. Accessory modules include the Two-Studio Monitor, Slate/Talkback/Test Oscillator, Monaural Output Amplifier and Telco Mix modules. Even with a fully complemented AMX, there's still accessory panel spaces for the installation of optional timer, delay and full function machine remote controls.

There isn't a "combo" board around that offers so much, yet is so easy to get to know. This outstanding capacity has not been gained at the expense of simplicity. The AMX retains the clean, uncluttered design so important for operator understanding and efficient operation, just like our BMX Series of on-air consoles. If you're already familiar with the BMX, you'll appreciate just how easy it will be to "learn the ropes" with an AMX.

As you read through this brochure, you will discover a new generation console which will bring a whole new outlook to your station's operations. You'll see that the latest in technology, important new innovations and useful features have one essential purpose: to make your facility run smoother.

In addition to the AMX, our console line includes the BMX Series II and III on-air consoles, the ABX multitrack production and operations console and Newsmixer, the unique mixing, routing and monitoring system for news.



WYAY, Atlanta, depends on both the on-air and stereo production capabilities of an AMX. They're also equipped with our BMX Series III and ABX consoles, as well as Tomcat cart machines.

SONY

TODAY'S COMPLICATED RADIO PROGRAMMING AND PRODUCTION NEEDS MORE FLEXIBILITY: THE AMX ACHIEVES THIS GOAL WITHOUT SACRIFICING SIMPLICITY OF OPERATION.

The AMX on-air console was designed with the capacity to handle a talk show with four separate telephone mixes, record a stereo feed for later broadcast, plus the capability to work and communicate with two studios and a remote, all at the same time. In addition, the AMX is equipped with two effect/foldback sends and a stereo effects return, all with extensive remote control logic.

We believe this brochure will answer most of your questions. Should you have specific questions regarding your installation or planned use of an AMX, please call us: we're here to assist you in every way possible.

WDBO, Orlando, Florida. A top-market AM/FM station, WDBO has three AMX consoles for AM, FM and News Production. In addition, they're on-air with four BMX consoles, and the newsroom is equipped with three Newsmixers. Pictured here, the News Production Studio with an AMX-18.

WHEN WE SAY AN "OPERATIONS" CONSOLE, WE MEAN IT.

AMX FEATURES — AT A GLANCE.

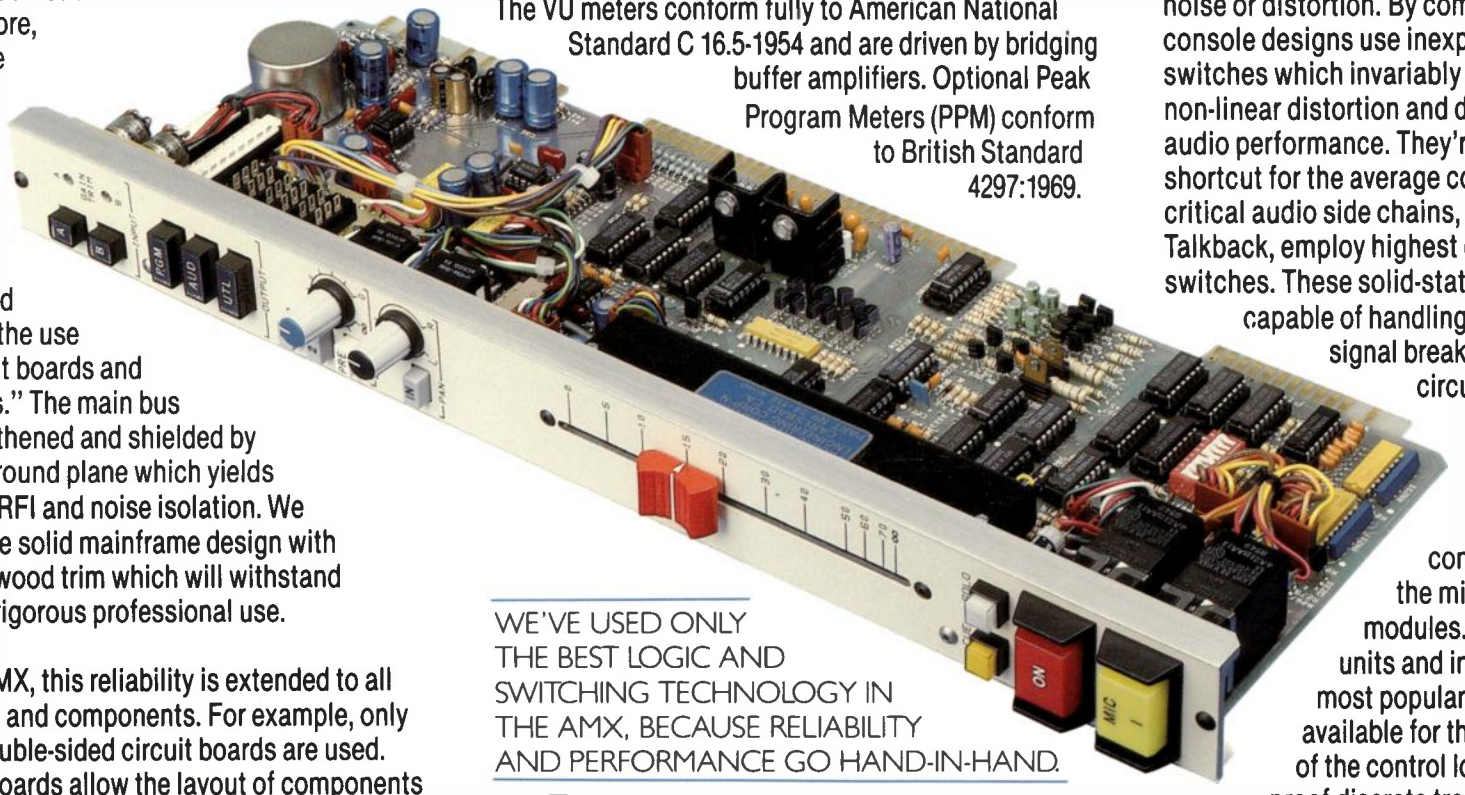
- Three main stereo mix busses.
- Distribution amplifiers on each main output.
- Two effect/foldback send mix busses, with remote control logic.
- Stereo effects return, with remote control logic.
- Stereo cue system with automatic console headphone monitor switching.
- Stereo solo-in-place system for all inputs, sends and returns.
- Multi-function metering with automatic cue and solo level display.
- Monaural and stereo equalizer/filter modules.
- Voice Processor modules with equalizer, gate, compressor and de-esser.
- Monitor system provides independent and unique outputs for console, co-host, and guest headphone feeds.
- Monitor and headphone facilities for two separate studios.
- Multi-way talkback system, including producer and external feeds.
- Multi-frequency low-distortion test oscillator.
- Voice slating system with identification tone.
- Four telephone mix-minus feeds plus telephone monitor-mix.
- Full and independent remote control logic on each input of microphone and line modules.
- Fully regulated and independent power supplies for audio, logic and phantom power.
- Additional on-board audio power supply regulation on each module.
- Connector panel silk screened with clear, functional designations.
- Audio and logic interconnection system is compatible with the BMX and ABX Series consoles.
- Mainframes for 10, 14, 18, 22, 26, 30 & 34 input positions.
- Every mainframe is factory prewired to accept a full complement of function modules including inputs, outputs, patch points and logic.
- Console supplied complete with installation connectors and tools, service tool kit and spare parts kit.

TODAY'S RADIO STATIONS NEED ROCK-SOLID RELIABILITY AND THE HIGHEST QUALITY TO INSURE PERFORMANCE WELL INTO TOMORROW.

With the AMX, reliability starts with a sturdy mainframe housing. Heavy gauge aluminum alloy end panels are made on CNC mills for the ultimate in dimensional accuracy. A precision fabricated and riveted sheet metal chassis assembly is then fastened to these end panels to form the mainframe housing. The resulting housing will not twist or flex and, therefore, will not degrade circuit card contacts or strain circuit traces. We minimize complicated and error-prone hand wiring through the use of plug-in circuit boards and "mother boards." The main bus board is strengthened and shielded by a continuous ground plane which yields the ultimate in RFI and noise isolation. We complement the solid mainframe design with attractive hardwood trim which will withstand many years of rigorous professional use.

With an AMX, this reliability is extended to all subassemblies and components. For example, only glass epoxy double-sided circuit boards are used. Double-sided boards allow the layout of components for optimum performance and support the use of ground plane shielding which further reduces the console's susceptibility to RFI, noise and crosstalk. For added service convenience, the components on each circuit board are identified with silk screened designations.

Throughout the AMX design, we use only first-quality components. Advanced discrete and integrated circuitry yields very low noise and distortion while providing excellent frequency response and signal headroom/overload performance. At least 30 dB of microphone and line input headroom is maintained to provide that extra margin for hot levels and "operator error." Mixers are full-travel Penny & Giles Series 4000 conductive plastic faders. Push buttons are Honeywell, EAO and Schadow, chosen for their extended life ratings and superior "feel." Audio transformers, where employed, are by Deane Jensen. The VU meters conform fully to American National Standard C 16.5-1954 and are driven by bridging buffer amplifiers. Optional Peak Program Meters (PPM) conform to British Standard 4297:1969.



WE'VE USED ONLY THE BEST LOGIC AND SWITCHING TECHNOLOGY IN THE AMX, BECAUSE RELIABILITY AND PERFORMANCE GO HAND-IN-HAND.

The sophisticated control logic of the AMX utilizes CMOS integrated circuits. CMOS devices are very efficient, operating on low current at 12 volt power. CMOS logic offers silent and flexible logic control because it is very immune to electrical noise and strong RFI fields. Thus, as the logic operates in an AMX, you won't hear "chirps" or "clicks." This 12 volt CMOS control logic is very easy to interface to a wide variety of external equipment and remote control panels.

We complement the superior performance characteristics of CMOS logic circuitry with miniature, dry nitrogen-sealed, gold-contact relays for all primary audio path switching. These special relays (much more costly than conventional TTL or FET design components) are extremely reliable and cannot degrade audio performance with unwanted noise or distortion. By comparison, many other console designs use inexpensive TTL or FET analog switches which invariably introduce some form of non-linear distortion and degrade an entire console's audio performance. They're an easy, inexpensive shortcut for the average console design. The less critical audio side chains, such as Cue, Solo and Talkback, employ highest quality CMOS analog switches. These solid-state, low power devices are capable of handling full level signals, without signal breakthrough, and operate in circuitry designed to minimize non-linear distortion.

The AMX has extensive and independent remote control logic for each input of the microphone and line input modules. Logic interface/translator units and interconnection cables for most popular broadcast equipment are available for the AMX. The voltage outputs of the control logic are buffered by short-proof discrete transistor circuitry.

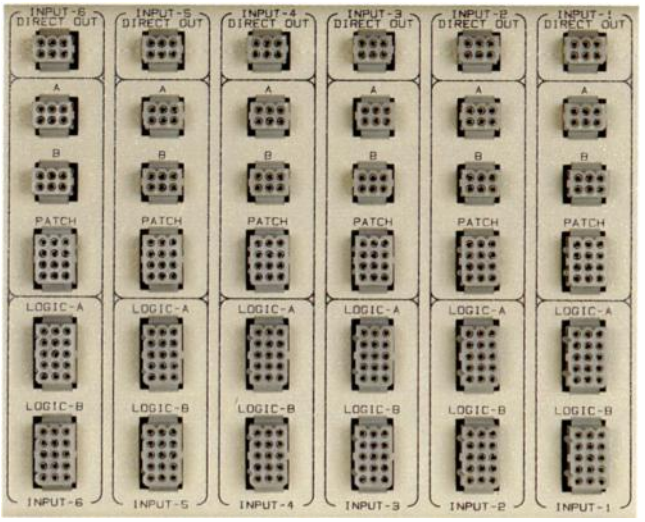
RELIABILITY AND PERFORMANCE ALSO MEANS SUPERIOR ERGONOMICS AND A CONSOLE THAT FITS INTO THE REAL WORLD.

For all of its capabilities, the AMX is a low-profile design, a real world benefit that should be immediately evident to any broadcaster. All module front panels are constructed from anodized aluminum extrusions which carry aluminum inlays coated with durable polyurethane paint and silk screened with clearly labeled nomenclature.

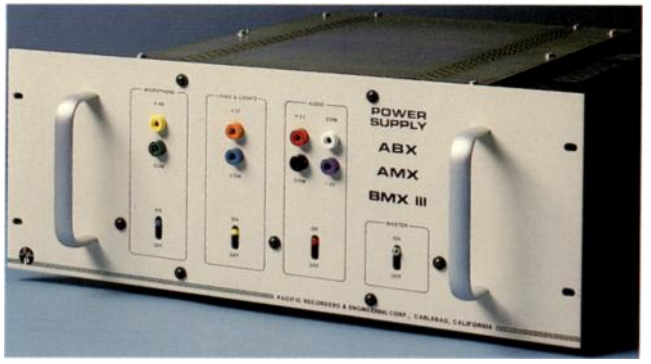
Every AMX mainframe leaves plenty of room for the broadcaster to arrange his peripheral equipment. All active electronics are immediately accessible from the top of the console: panel modules simply unplug from the mainframe housing. Perhaps the most important aspect of the AMX design is the careful attention that's been paid to the logical placement of panel controls. There isn't an easier board to get to know; more importantly, there isn't a board that's easier to operate.

The separate rack mounting power supply is constructed in a rugged steel chassis and features massive regulator heat sinks. The audio, logic and microphone phantom power supply voltages are individually regulated and switched with magnetic circuit breakers for maximum reliability.

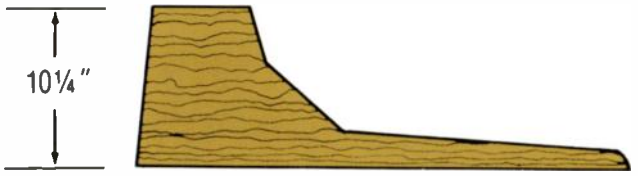
All audio input/output and logic wiring between the console and external equipment is accomplished with easy-to-use mating connectors. Time consuming hand wiring to barrier strips, terminal blocks or exotic miniature connectors is eliminated. Console mating connectors, pins and tools are supplied with the AMX. By prewiring the connector kit, an AMX console can be installed and on the air in a few hours.



Confusing and time-consuming wiring to terminal blocks, barrier strips or exotic multi-in connectors are eliminated with an AMX. All interconnections use proven, reliable, mating connectors, which are mounted on a clearly identified panel for rapid, easy installation.



Every AMX comes with a rugged power supply designed to comfortably handle the largest mainframe size with all accessories—reliably and cooly.



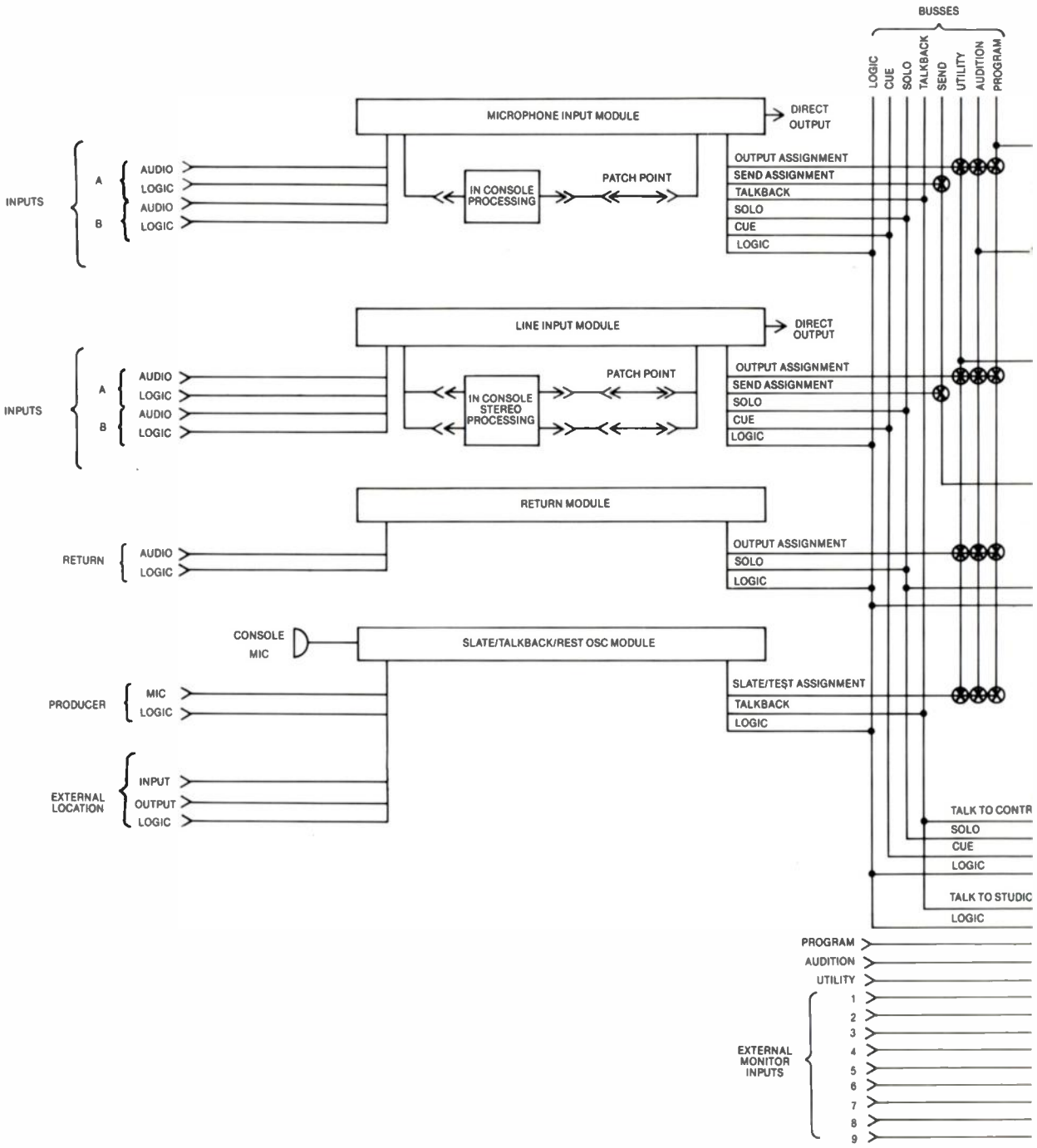
Regardless of mainframe size, the low profile design of AMX gives you plenty of viewing room to your studio—even when you add our optional copystand.

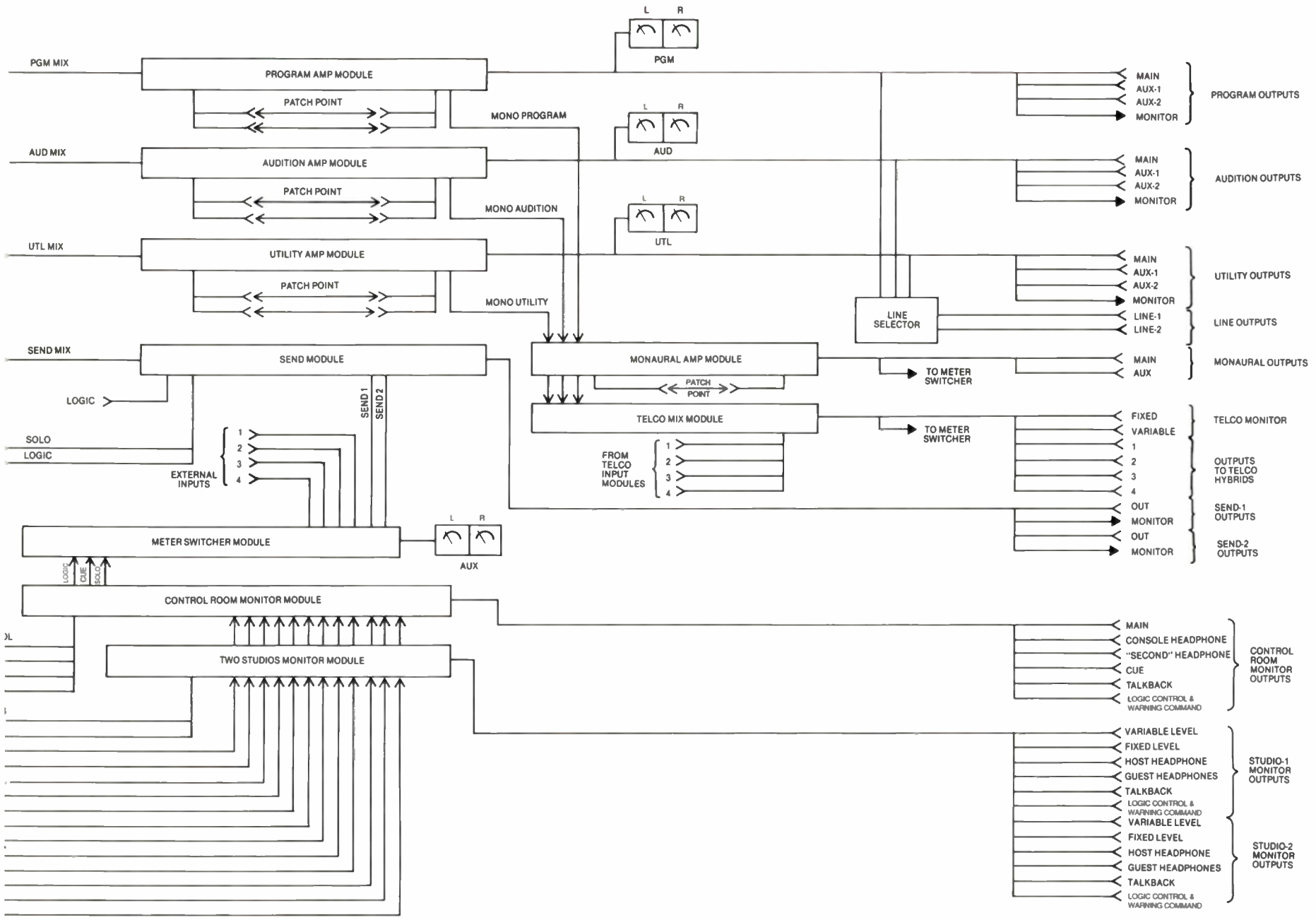
ONE LAST WORD BEFORE YOU LOOK INTO MORE DETAILS.

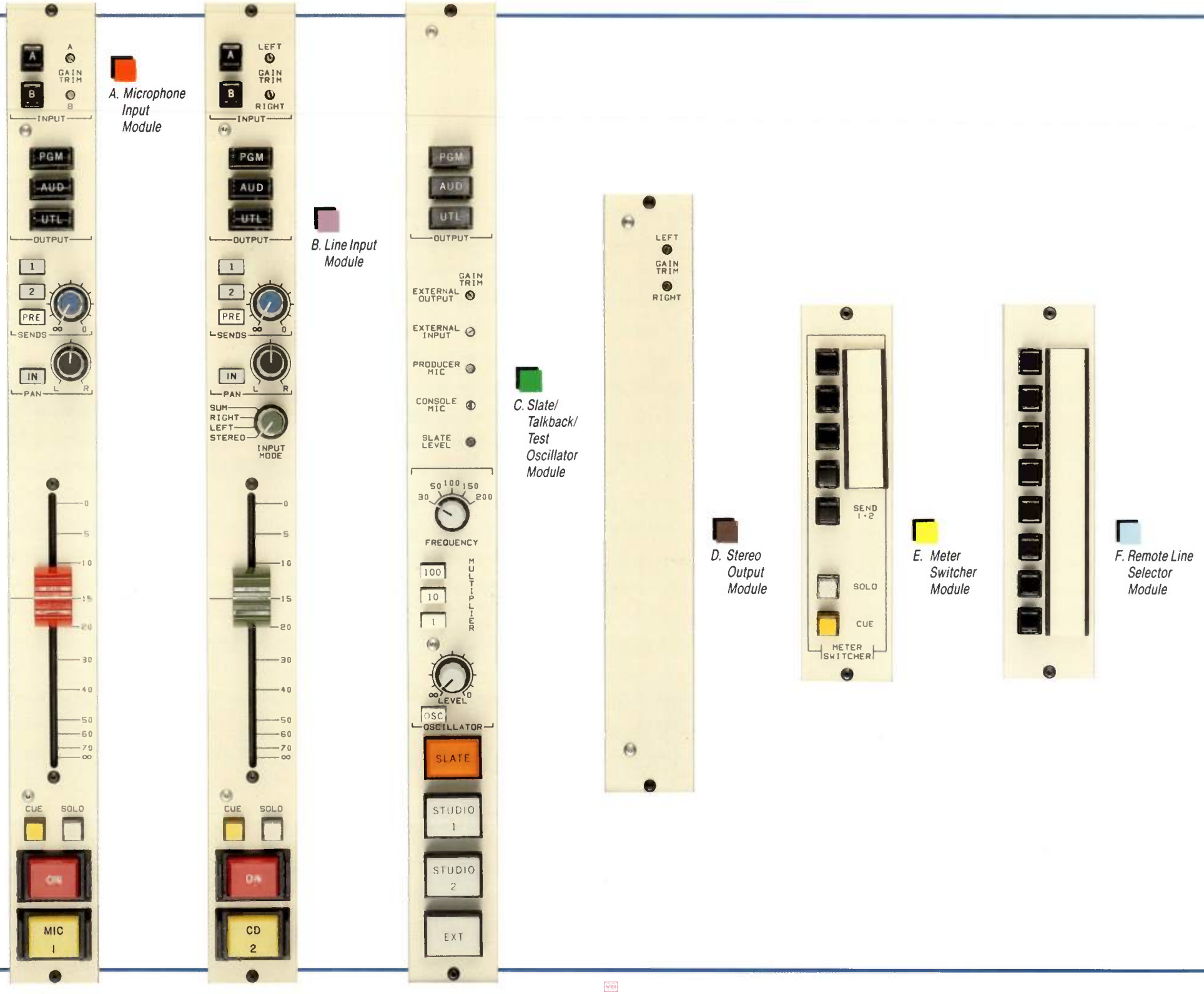
Our BMX, AMX and ABX consoles have become the standard by which many broadcasters evaluate other competitive offerings. Frankly, we're flattered by this, but not surprised. Because we've stayed in close touch with your needs, our family of consoles are an evolutionary design; the purpose of which is to continuously reach for and set the highest broadcast standards — in features, performance, reliability and that all too elusive factor, long-term quality.

If you believe that all these attributes have been attained in the exemplary design of the AMX, then we welcome you to a select user's group of professionals — broadcasters who have decided a Pacific Recorders & Engineering console is the best value that money can buy.

AMX FUNCTIONAL BLOCK DIAGRAM




PGM MIX
PROGRAM AMP MODULE
PATCH POINT
MONO PROGRAM
L R
PGM
MAIN
AUX-1
AUX-2
MONITOR
PROGRAM OUTPUTS
AUD MIX
AUDITION AMP MODULE
PATCH POINT
MONO AUDITION
L R
AUD
MAIN
AUX-1
AUX-2
MONITOR
AUDITION OUTPUTS
UTL MIX
UTILITY AMP MODULE
PATCH POINT
MONO UTILITY
L R
UTL
MAIN
AUX-1
AUX-2
MONITOR
UTILITY OUTPUTS
LINE SELECTOR
LINE-1
LINE-2
LINE OUTPUTS
SEND MIX
SEND MODULE
LOGIC
SEND 1
SEND 2
MONAURAL AMP MODULE
PATCH POINT
TO METER SWITCHER
MAIN
AUX
MONAURAL OUTPUTS
TELCO MIX MODULE
TO METER SWITCHER
FIXED
VARIABLE
1
2
3
4
TELCO MONITOR
OUTPUTS TO TELCO HYBRIDS
FROM TELCO INPUT MODULES
1
2
3
4
SOLO
LOGIC
EXTERNAL INPUTS
1
2
3
4
OUT
MONITOR
SEND-1 OUTPUTS
OUT
MONITOR
SEND-2 OUTPUTS
METER SWITCHER MODULE
L R
AUX
LOGIC
CUE
SOLO
CONTROL ROOM MONITOR MODULE
TWO STUDIOS MONITOR MODULE
MAIN
CONSOLE HEADPHONE
"SECOND" HEADPHONE
CUE
TALKBACK
LOGIC CONTROL & WARNING COMMAND
CONTROL ROOM MONITOR OUTPUTS
VARIABLE LEVEL
FIXED LEVEL
HOST HEADPHONE
GUEST HEADPHONES
TALKBACK
LOGIC CONTROL & WARNING COMMAND
STUDIO-1 MONITOR OUTPUTS
VARIABLE LEVEL
FIXED LEVEL
HOST HEADPHONE
GUEST HEADPHONES
TALKBACK
LOGIC CONTROL & WARNING COMMAND
STUDIO-2 MONITOR OUTPUTS



A. Microphone Input Module

B. Line Input Module

C. Slate/ Talkback/ Test Oscillator Module

D. Stereo Output Module

E. Meter Switcher Module

F. Remote Line Selector Module

MICROPHONE INPUT MODULE

The Microphone Input module accommodates a wide range of input levels to permit the use of all contemporary microphones. Input preamplifier gain is adjustable for each input over the nominal input range of −60 dBu to −35 dBu. The A/B input selector provides two microphone inputs per module, each with programmable monitor mute selection for control room or either of two studios. The mute circuitry incorporates an automatic 40 millisecond delay before the microphone is turned on to permit "room reverb" to decay off-mic. Each microphone input is provided with separate remote control capability for ON/OFF, COUGH, and multiple TALKBACK functions. The PAN control may be inserted with the IN button to provide positioning of the microphone signal in the stereo image. The module output may be assigned to any combination of PROGRAM, AUDITION AND UTILITY by the self-indicating OUTPUT buttons. The illuminated CUE button provides stereo pre-fader cue monitoring. The illuminated SOLO button provides monitoring of solo-in-place which is post-fader and pan. The channel ON and OFF buttons are illuminated to indicate the status of the channel. In addition, the ON button may be programmed so that momentary depression provides cough muting. Phantom power circuitry for condenser microphones is user assignable for both the A and B inputs.

The microphone module is equipped with a SEND control which may be assigned to either or both of two send busses and is provided with a PRE/post-fader source button switch. Stereo send is possible as a user option; assigning the send to either send bus results in a mono-mix signal to that bus, however, the send is stereo when both bus assignment buttons are engaged together.

LINE INPUT MODULE

The Stereo Line Input module will accommodate nominal input levels from −12 dBu to +8 dBu. The A/B INPUT switch selects either of two stereo inputs. Separate logic control is available on each input for the remote control of tape machines and/or other sources by the module. The PAN control may be used to balance a stereo signal source or to position a mono signal in the stereo image. An INPUT MODE switch allows input selection of stereo, left channel only, right channel only, or the sum of left and right channels. The module output may be assigned to any combination of PROGRAM, AUDITION and UTILITY by the self-indicating OUTPUT buttons. The illuminated CUE button provides stereo pre-fader cue monitoring. The illuminated SOLO button provides monitoring of solo-in-place which is post-fader and pan. The channel ON and OFF buttons are illuminated to indicate the status of the channel.

The line module is equipped with a SEND control which may be assigned to either or both of two send busses and is provided with a PRE/post-fader source button switch. The user option of stereo send is available as described for the Microphone Input module.

Each Line Input module is equipped with a comprehensive family of control logic capability which includes the remote control of module ON, OFF, CUE and SOLO functions with status tally lights. Also provided are ready status and start/stop command pulses for turntables, cartridges and reel-to-reel tape machines. The ready status illuminates the channel OFF button whenever a tape is threaded or cartridge is loaded and ready for play. The ON button starts the remote controlled equipment as well as turning the channel on. The module audio is automatically turned off upon the receipt of a cartridge fast wind or end of tape command. In addition, the module may be set to control the console mounted timer system for the automatic up-time of events.

SLATE/TALKBACK/TEST/ OSCILLATOR MODULE

The Slate/Talkback/Test/Oscillator module provides a test oscillator, a slate tone oscillator and talkback facilities for the AMX console. The test oscillator generates low-distortion, stable amplitude tones to allow system test and line-up with any 15 frequencies. The tones may be assigned to any combination of the PROGRAM, AUDITION and UTILITY mix busses.

SLATE commentary may be added to a tape recording by the console mounted electret microphone and/or from an external producer's microphone. A low-distortion spotter tone (nominal 30 Hz, adjustable) with carefully controlled envelope rise and fall times, may be recorded with the commentary for ease of fast-wind identification of the cuts on a track.

The console and producer microphones can talk to any two studios plus a remote or external location, such as a screener booth, 2-way, etc. The external location can also talk back to the studios as well as the control room. The frequency response of all the talkback microphone preamplifiers has been carefully shaped to favor speech communication.

STEREO OUTPUT MODULE

The Stereo Output module contains the mixing and distribution amplifiers for a console line output. The console is supplied with three of these modules, one each for the PROGRAM, AUDITION and UTILITY busses. Each module supplies four stereo distribution outputs with each output capable of supplying up to +28 dBm. Patch send and return points are available for the connection of external processing equipment and/or a patch field. The output is an active balanced design; output transformers are available as an option.

METER SWITCHER MODULE

The auxiliary meters in the AMX meter panel are driven by the Meter Switcher module. This module also provides switchable metering facilities for the AUDITION and UTILITY outputs in the smaller mainframe sizes. The unassigned inputs may be used to meter user determined external sources. The module automatically defaults from the selected status whenever a CUE or SOLO button is engaged on any module. The auxiliary meters will then display the nominal operating level at the CUE or SOLO point selected. This enables a quick input level check when displaying CUE, and very convenient level line-up when displaying SOLO. The SOLO metering function eliminates the need to use one of the main output busses for preview and level setting.

REMOTE LINE SELECTOR MODULE

The Remote Line Selector module provides a selection of eight stereo signals switched to one output. Up to four parallel-input selector modules may be installed in the AMX. The inputs and outputs for the modules are all brought out to the connector panel for ease of assignment. Typical applications include use as a line pre-selector ahead of input modules and tape recorders.

(MODULE DESCRIPTIONS CONTINUED—OVER)



G. Control Room Monitor Module



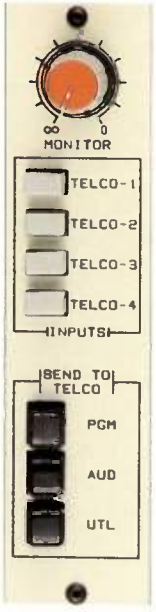
H. Studio Monitor Module



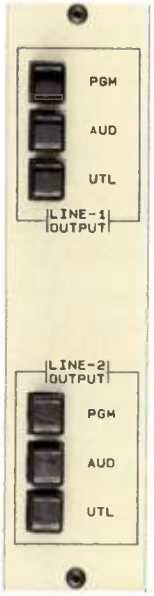
L. Send/Return Module



L. Monaural Output Module



M. Telco Mix Module



N. Line Output Switcher Module

CONTROL ROOM MONITOR MODULE

Monitoring of PROGRAM, AUDITION and UTILITY, or any of nine external signals is provided by the interlocking monitor selector. The MONITOR and HEADPHONE potentiometers are sealed long-life conductive plastic controls which were custom designed by Penny & Giles for the BMX-III, AMX and ABX consoles. The AUTO headphone monitoring facility has been derived from the ABX console and is unique in the industry. Whenever and input module CUE button is engaged, the console operator's headphones automatically switch from the normal stereo monitor mode to one of two user assignable states; these are stereo cue, or mono cue in one earphone and mono monitor in the other. The headphone feeds to a co-host and/or guest and are not interrupted by the cue or solo systems, while the co-host may optionally receive incoming talkback signals.

Level control is available for DIM, which provides an adjustable degree of monitor level reduction during talkback. The TALKBACK control adjusts the volume of incoming talk signals. Talkback may be monitored with an independent amplifier and loudspeaker, or through the stereo cue system. The CUE control adjusts the level of the cue system. Logic circuitry is provided for the remote control of monitor dim and mute.

STUDIO MONITOR MODULE

The Studio Monitor module is expressly designed for applications where separate voice/announce booths or conference studios are required. This module provides the monitor, headphone and talkback facilities for up to two studios. Monitoring of PROGRAM, AUDITION and UTILITY, or any of nine external signals is provided by an interlocking monitor selector. MONITOR, DIM and TALKBACK level controls are provided along with a TALK OVER MUTE button for each studio. The mute override button enables talkback to a studio even when the monitor speakers are muted by a "live" mic in the studio. This would normally be used as a production "effect" and/or when the talent chooses not to wear headphones.

The module has several outputs to meet most any combination of monitoring requirements. The main output is adjustable along with the degree of dimming during talkback. Fixed level outputs are available for those situations where the studio personnel are provided with their own monitor and headphone level controls. The output for talent headphones is provided with talkback and a preset dim; a second output is provided for guest headphones which contains neither talkback or dim. Logic circuitry is provided for the remote control DIM and MUTE for each of the studio monitor sections.

SEND & RETURN MODULE

The Send & Return module contains both the two send amplifiers and the stereo return circuits. The send portion of the module contains the mixing and output amplifiers for the two effects/foldback channels. Each of these has a variable LEVEL control with ON/OFF and SOLO facilities. The stereo effects return section of the module is equipped with a conductive plastic fader, MODE selector, PAN control, ON/OFF/SOLO buttons and output assignment buttons. Logic circuitry is provided for the remote ON/OFF control of both of the send circuits and the return channel.

MONAURAL OUTPUT MODULE

The Monaural Output module provides a selection of the three main outputs. The module may select or mix any combination of the PROGRAM, AUDITION and UTILITY signals to derive a monaural output. A patch send and return point is available for the connection of external processing equipment and/or a patch field. The output is an active balanced design; an output transformer is available as an option.

TELCO MIX MODULE

The Telco Mix module derives five unique mixes of the signals from up to four telephone callers and a selection of the PROGRAM, AUDITION and UTILITY busses.

The telephone signals for broadcast are selected and controlled by the input modules connected to each of the external hybrid systems. The Telco Mix module receives the audio from the selected input modules and sums them into a "monitor-mix." The telephone monitor-mix signal is very useful in applications where talk show talent and/or guests prefer to not use headphones to hear the callers.

The Telco Mix module provides for the selection of the output bus which will contain the "base-mix" to be fed back to all the callers. In addition, the module creates a unique mix for each caller which includes the selected bus plus all the other callers, except himself ("mix-minus"). Each mix-minus output may be band-pass limited for improved hybrid operation, with internally switchable filters.

The Telco Mix module may also be used for othr applications where it is desired to create one or more custom mix-minus foldback mixes or cue feeds, such as to remote pick-ups, sports booths, and two-way systems.

LINE OUTPUT SWITCHER MODULE

The output line switcher module selects an independent output from the PROGRAM, AUDITION Or UTILITY distribution amplifiers for each of two console output lines. The module may be used as a transmission line selector, a tape recorder input selector, etc.

REMOTE CONTROL PANELS

Tape deck remote control panels and cables are available for most professional reel-to-tape recorders. The engraved RWD, FWD, STOP, PLAY and RECord buttons are function color-coded to common industry practice and are supplied with tally lamps.

Cartidge deck remote control panels and cables are available for TOMCAT, MICROMAX and ITC cartridge recorders. Panels for other machines are available on request. Engraved buttons for TERtiary tone, SECondary tone, STOP, START and RECord are provided. The buttons are supplied with the appropriate voltage tally lamps.

The timer control panel provides illuminated START, STOP, RESET and HOLD buttons for the meter panel mounted DT-4 digital timer. The AUTO button couples the timer's reset and restart functions to the console timer reset command bus for the automatic up-time of events (start with module ON).

BUILD A AMX JUST THE WAY YOU WANT IT.

The AMX is available in several mainframe sizes to accommodate every broadcast requirement. Each AMX is factory wired and fully tested for an entire complement of modules. You may order the console with fewer than capacity and then add modules as needs arise. Simply plug in the extra modules. A universal layout enables any input position to accept any type of module. Simply select the microphone, line and optional modules your application requires. You build the console to fit your precise needs.

ACCESSORIES

Copystands are available for all AMX consoles. The sliding, free-standing copystand offers the advantage of positioning copy at an optimum reading distance for each operator.

The copystands are made of natural oak with a semi-transparent, smoke-bronze lucite copyboard.

The optional turret units are designed to provide an attractive and practical housing for talent control panels and display modules. Microphone buttons, monitor/headphone panels, clocks, and timers are some of the devices which may be installed. The turrets are finished in a durable laminate with solid oak end panels which match the profile of the oak panels on the AMX meter panel.

OPTIONAL SIGNAL PROCESSING MODULES



VOICE PROCESSOR

This module contains equalization, noise gating, compression and de-essing functions. A particularly useful module for tailoring individual talent "personality" parameters.



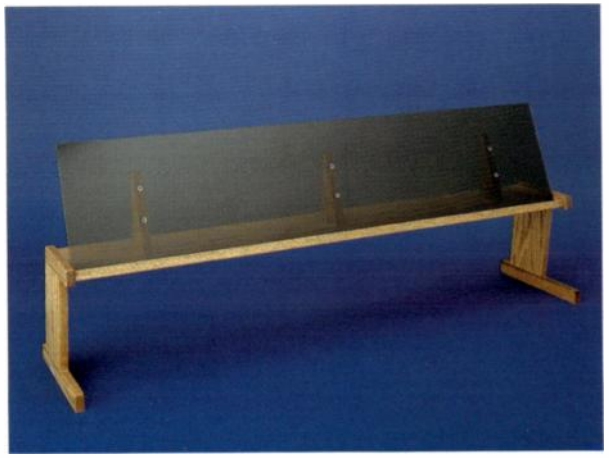
MONO EQUALIZER

This plug-in module contains independent three-band equalization control, with high and low frequency peaking and shelving modes, and tunable highpass and lowpass filters.

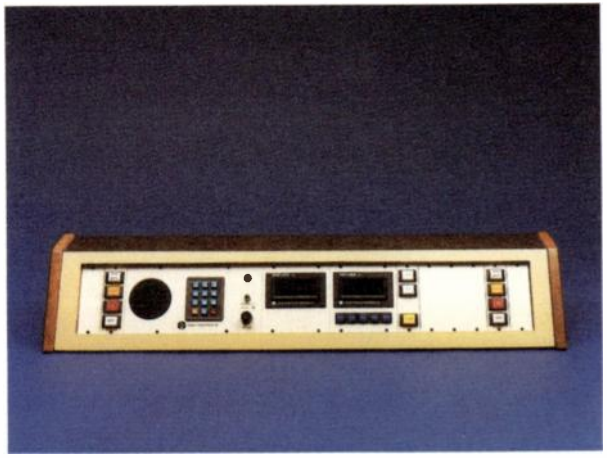


STEREO EQUALIZER

This module contains two stereo-tracking three-band equalizers with a flexible dual control mid-band section. Peaking and shelving modes on high and low frequency sections.

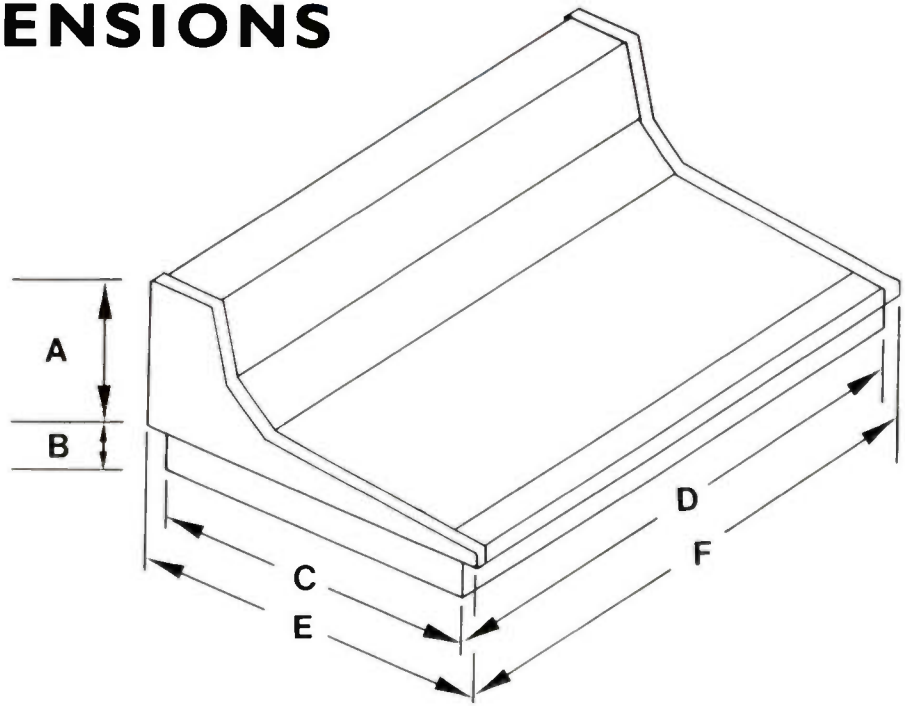


Sliding, free-standing copystands are available for all AMX consoles.



Optional control turrets give you extra space and they match perfectly with an AMX.

AMX MECHANICAL DIMENSIONS



CONSOLES	DIMENSIONS					
	A	B	C*	D*	E	F
AMX-10	10¼"	7"	29"	30½"	31"	32
AMX-14	10¼"	7"	29"	36½"	31"	38
AMX-18	10¼"	7"	29"	42½"	31"	44
AMX-22	10¼"	7"	29"	48½"	31"	50
AMX-26	10¼"	7"	29"	54½"	31"	56
AMX-30	10¼"	7"	29"	60½"	31"	62
AMX-34	10¼"	7"	29"	66½"	31"	68

*Please add ¼" for cabinet opening.

WNYC's futuristic reception lobby. Pacific Recorders & Engineering's consoles are used throughout the New York facility.



SOME FINAL CONSIDERATIONS

The AMX console is one of a complete family of compatible systems from PR&E. Many of the modules for the AMX may be utilized in either our new BMX Series III on-air board or the ABX multi-track production console.

In addition to this console family, we also make the Newsmixer, the Tomcat and Micromax cart machines, plus an extensive array of signal processing, amplification, routing, distribution and switching peripherals. Full technical and feature information on all products is available.

Many of our consoles have been designed into complete studio facilities packages. We offer not only superlative products but a complete systems engineering service which encompasses a broad range of technical expertise. If you are considering renovation or new construction you may want to contact us about these services and discuss putting our 17 years of systems design experience to work for you.

SPECIFICATIONS

MICROPHONE INPUT:

Source Impedance	150 ohms
Input Impedance	1000 ohms minimum, balanced
Input Level Range	Adjustable from −60 dBu to −35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS:

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range	
Line Input	Adjustable from −12 dBu to +8 dBu
Monitor Input	Nominal +4 dBu/+8 dBu
Patch Input	Nominal −10 dBu
Input Headroom	Greater than 30 dB above nominal input

MAIN OUTPUTS:

Load Impedance	600 ohms
Source Impedance	30 ohms
Nominal Output Level	+8 dBm, adjustable to +4 dBm
Maximum Output Level	
Line Amplifiers	+28 dBm, 600 ohm load
Send Module	+26 dBm, 600 ohm load

FREQUENCY RESPONSE:

Microphone Input to Program Output	+0 dB, −0.9 dB, 20 Hz to 20 kHz
Line Input to Program Output	+0 dB, −0.8 dB, 20 Hz to 20 kHz

MONITOR OUTPUTS:

MAIN OUTPUTS:	
Load Impedance	600 ohms or greater
Source Impedance	30 ohms, unbalanced
Output Level	0 dBu nominal, +20 dBu maximum
HEADPHONE OUTPUTS:	
Load Impedance	45 ohms or greater
Source Impedance	Less than 4 ohms
Output Level	0 dBu nominal, +20 dBu maximum

NOISE:

Microphone Input Amplifier	−127 dBu RMS equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	−88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output noise with one microphone channel ON, fader at −15 dB, input sensitivity at −50 dBu	76 dB below output, reference +8 dB 150 ohm source, 20 kHz bandwidth
Output noise with one line channel ON, fader at −15 dB, input sensitivity at +8 dBu.	80 dB below output, reference +8 dB 600 ohm source, 20 kHz bandwith
Output noise with no input channels ON	82 dB below output, reference +8 dB, 20 kHz bandwidth

DISTORTION, T.H.D.:

Microphone input to program output	Less than 0.02%, 20 Hz to 20 kHz, −50 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output
Line input to program output	Less than 0.008%, 20 Hz to 20 kHz, +8 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output

DISTORTION, I.M.:

Microphone input to program output	Less than 0.008%, -50 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load
Line input to program output	Less than 0.005%, +8 dBm input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load

CROSSTALK:

Interchannel crosstalk	Less than −85 dB at 1 kHz Less than −75 dB at 20 kHz

NOTES:

1) These specifications are for the basic signal paths, per channel, with either or both channels or a stereo pair operating and with 600 ohm loads connected to the program outputs.
2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the *same voltage value* as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohms circuits.
3) Noise specifications are for a 14-input console (AMX); larger consoles will have slightly reduced signal-to-noise ratios due to increased summing amplifier gain. Noise specifications are based upon a 20 kHz bandwidth: the use of a meter with a 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Pacific Recorders & Engineering Corporation reserves the right to change specifications without notice or obligation.

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Printed in U.S.A. 5M886

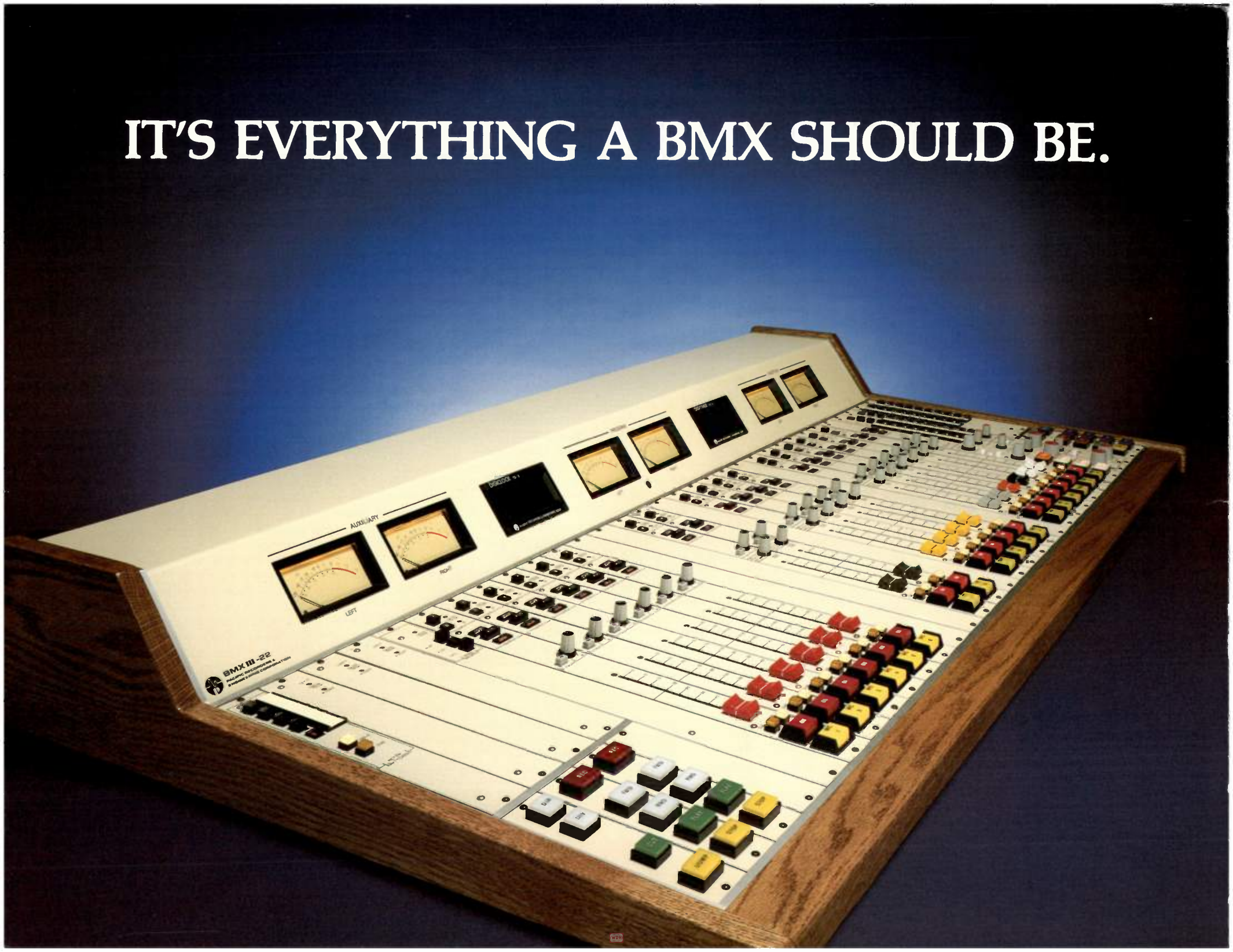
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BMX III

PACIFIC RECORDERS & ENGINEERING CORPORATION



IT'S EVERYTHING A BMX SHOULD BE.



With program origination, your choice of an on-air console is the most critical equipment decision you can make. You don't have to be an engineer to know that your "board" is the heart of the station's operations. If your console isn't in top condition, odds are your station's health isn't either. Unfortunately, gaining more flexibility and better performance from your console isn't a matter of giving it more exercise. It's usually a matter of retirement.

When you think about all that needless anxiety, the frustrating experiences you've had over the years attempting to make yesterday's "old dog" console sit-up and perform today's new programming tricks, there's no doubt you're going to feel genuinely excited after you read about our new BMX Series Three.

With our BMX III, you're going to examine a new on-air console design that brings a whole new outlook to your station's operations. With the Series III, we've retained the essential concepts developed for our legendary BMX Series I & II consoles and enhanced them with the latest features and facilities we've incorporated into our new ABX and AMX operations consoles.

You'll see that the latest technology, important innovations and new, useful features we designed into the BMX III have one essential purpose: to make your station run better. You'll also see that our dedication to quality hasn't changed either. Pacific Recorders & Engineering is a company that is zealously dedicated to the well-being of your business. You see, that's how we stay healthy.

Should you wish to see for yourself how dedicated we are, just check our references. With so many stations and networks across the country investing in a BMX console, there's undoubtedly someone in your own backyard who's already had the advantages of owning a BMX. You may already have discussed the merits of a BMX with someone who's been eager to share his experience and enthusiasm. Quite possibly, even a competitor.

Pacific Recorders & Engineering Corporation
The *choice* for more #1 stations.



While cosmetics are easily copied, the features, functions, and flexibility of BMX Series consoles are what have made BMX systems the outright leader in major market installations.



TODAY'S COMPLICATED RADIO PROGRAMMING AND PRODUCTION NEEDS MORE FLEXIBILITY: THE BMX III ACHIEVES THIS GOAL WITHOUT SACRIFICING SIMPLICITY OF OPERATION.

The BMX III on-air console was designed with the capacity to handle a talk show with two separate telephone mixes, record a stereo feed for later broadcast, plus the capability to work and communicate with two studios and a remote, all at the same time. In addition, the new BMX III may be optionally equipped with two effect/foldback sends and a stereo effects return, all with extensive remote control logic. This outstanding capacity has not been gained, however, at the expense of simplicity. The BMX III retains the clean, uncluttered design so important for operator understanding and simple operation.

Keep your crew cooking with a PR&E system that keeps delivering top performance no matter how complex or demanding your programming requirement.

TODAY'S ON-AIR STUDIOS NEED A CONSOLE THAT'S PACKED WITH PRACTICAL FEATURES.

THE BMX THREE — FEATURES AT A GLANCE

- Three main stereo mix buses.
- Distribution line amplifiers on each main output.
- Full and independent remote control logic on each input of microphone and line modules.
- Stereo cue system with automatic console headphone monitor switching.
- The monitor system provides independent and unique outputs for the console, host, co-host, and guest headphone feeds.
- Stereo solo-in-place monitoring system.
- Multi-function metering with automatic cue and solo level display.
- Monitor facilities for two studios.
- Multi-way intercommunication system, including producer and external feeds.
- Multi-frequency, low distortion test oscillator.
- Voice slate system with identification tone.
- Two telephone mix-minus feeds plus telephone monitor mix.
- Two optional effect/foldback send mix buses, each with remote control logic.
- Optional stereo effects/reverb return with remote control logic.
- Fully regulated, independent supplies for audio, logic and phantom power.
- On-board audio supply regulation on each module.
- Mainframe fully wired for all present and future inputs, outputs, patch points and logic.
- Connector panel silk screened with clear, functional designations.
- Audio and logic interconnection system is compatible with AMX and ABX series consoles.
- Mainframes for 10, 14, 18, 22, 26, 30, 34 input positions, larger frame sizes available.
- Console supplied with installation connectors and tools, service tool kit and spare parts kit.

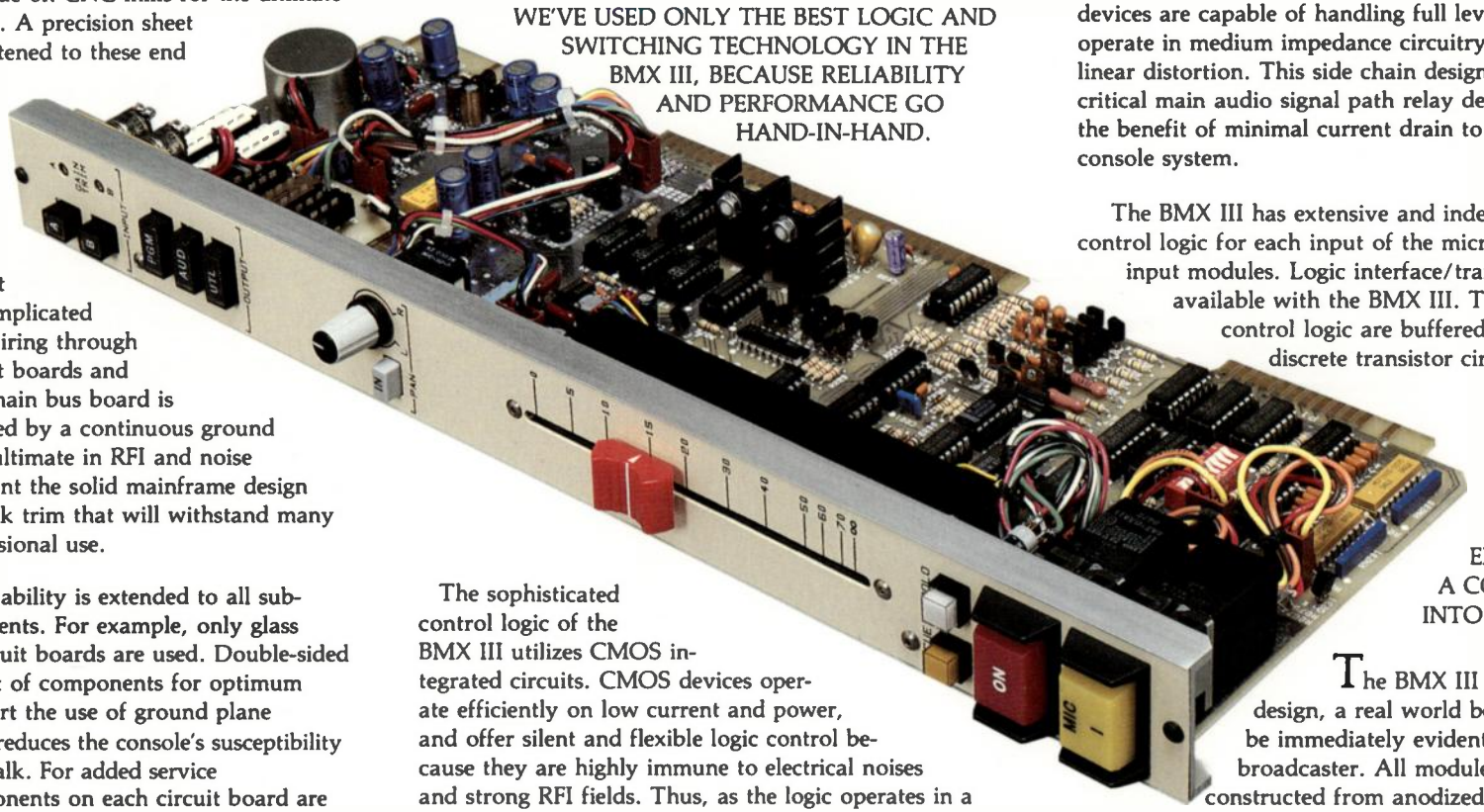
TODAY'S RADIO STATIONS STILL NEED ROCK-SOLID RELIABILITY AND THE HIGHEST QUALITY THAT INSURES PERFORMANCE WELL INTO TOMORROW.

With a BMX, the reliability starts with a sturdy housing. A BMX has always been fabricated with superior materials and methods. Heavy gauge aluminum alloy end panels are made on CNC mills for the ultimate in dimensional accuracy. A precision sheet metal chassis is then fastened to these end panels to form the mainframe housing. This BMX housing will not twist or flex and, therefore, will not degrade circuit card contacts or place strain on circuit traces. We minimize complicated and error-prone hand wiring through the use of plug-in circuit boards and "mother boards". The main bus board is strengthened and shielded by a continuous ground plane which yields the ultimate in RFI and noise isolation. We complement the solid mainframe design with attractive, solid oak trim that will withstand many years of rigorous professional use.

With a BMX, this reliability is extended to all sub-assemblies and components. For example, only glass epoxy double-sided circuit boards are used. Double-sided boards allow the layout of components for optimum performance and support the use of ground plane shielding which further reduces the console's susceptibility to RFI, noise and crosstalk. For added service convenience, the components on each circuit board are identified with silk screen designations. All card connecting fingers and their mating connectors are gold-plated for the highest reliability.

Throughout the BMX design, we use only first-quality components. Advanced discrete and integrated circuitry yields very low noise and distortion and provides excellent frequency response and headroom/overload performance. At least 30 dB of microphone and line input headroom is maintained to provide that extra margin for hot levels and "operator error". Mixers are full-travel Penny & Giles Series 4000 conductive plastic faders. Pushbuttons are Honeywell, EAO and Schadow, chosen for their extended life ratings and superior "feel". Audio transformers, where employed, are by Jensen. The VU meters conform fully to American National Standard C 16.5-1954 and are driven by bridging buffer amplifiers. Optional peak program meters (PPM) conform to British Standard 4297:1969.

WE'VE USED ONLY THE BEST LOGIC AND SWITCHING TECHNOLOGY IN THE BMX III, BECAUSE RELIABILITY AND PERFORMANCE GO HAND-IN-HAND.



The sophisticated control logic of the BMX III utilizes CMOS integrated circuits. CMOS devices operate efficiently on low current and power, and offer silent and flexible logic control because they are highly immune to electrical noises and strong RFI fields. Thus, as the logic operates in a BMX III, you won't hear "chirps" or "clicks". This 12 volt CMOS control logic is also easy to interface to external "outside" equipment like lamps and relays.

We complement the superior performance characteristics of CMOS logic circuitry with miniature, dry nitrogen-sealed, gold-contact relays for all primary path audio signal switching. These special relays (much more costly than conventional TTL or FET design components), are extremely reliable, and cannot degrade audio performance with unwanted noise or distortion. By comparison, other console designs typically use inexpensive TTL or FET analog switches which invariably introduce some form of non-linear distortion and degrade an entire audio console's performance; they're any easy, inexpensive shortcut for the average console design.

In a BMX III, less critical audio side chains (like Cue, Solo and Talkback) employ the highest quality, socketed CMOS analog switches. These solid-state, low power devices are capable of handling full level signals and operate in medium impedance circuitry to minimize non-linear distortion. This side chain design complements the critical main audio signal path relay design by offering the benefit of minimal current drain to the overall console system.

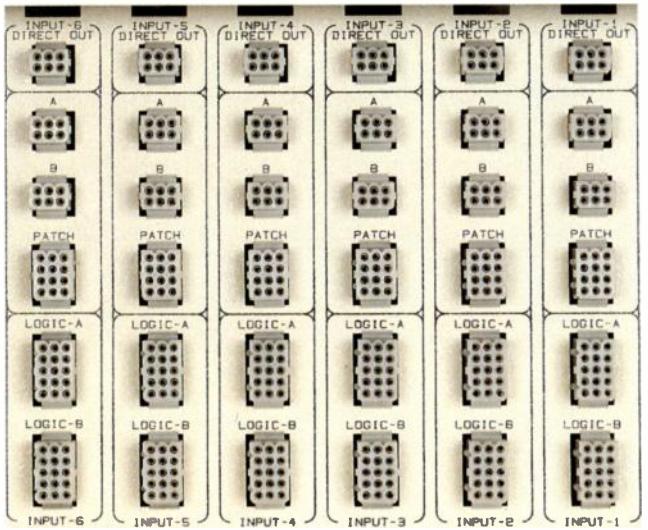
The BMX III has extensive and independent remote control logic for each input of the microphone and line input modules. Logic interface/translator units are available with the BMX III. The outputs of the control logic are buffered by short-proof discrete transistor circuitry.

RELIABILITY AND PERFORMANCE ALSO MEANS SUPERIOR ERGONOMICS AND A CONSOLE THAT FITS INTO THE REAL WORLD.

The BMX III is a low-profile design, a real world benefit that should be immediately evident to any broadcaster. All module front panels are constructed from anodized aluminum extrusions and carry aluminum inlays coated with durable polyurethane paint and silk screened with clearly labeled nomenclature.

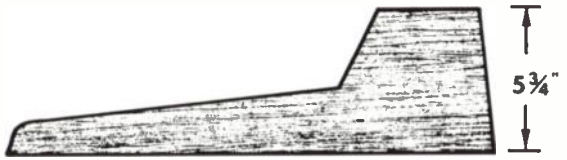
Every BMX mainframe leaves plenty of room for the broadcaster to arrange his peripheral equipment. All active electronics are immediately accessible from the top of the console: panel modules simply unplug from the mainframe housing. Perhaps the most important aspect to a BMX's engineering is the careful attention that's been

paid to the logical placement of switches and controls. There isn't an easier board to get to know. More importantly, there isn't a board that's easier to run. Just look around at a host of look-alike consoles that curiously resemble a BMX on the surface.

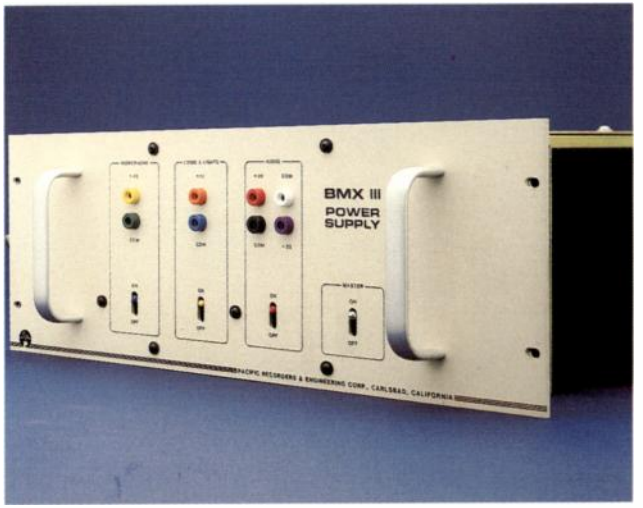


Time-consuming, hand wired terminal blocks are eliminated with a BMX III. All interconnections use proven, reliable, mating connectors for rapid, easy installation.

A BMX's separate rack mounting power supply is constructed in a rugged steel chassis and features massive regulator heat sinks. For convenience, it comes with a six foot interconnecting cable. The audio, logic and microphone phantom power supply voltages are individually regulated and switched with magnetic circuit breakers for maximum reliability.



Regardless of mainframe size, the low profile design of BMX-III gives you plenty of viewing room to your studio — even when you add our optional copy stand or equipment overbridge.



Every BMX III comes with a rugged power supply designed to comfortably handle the heaviest BMX use — reliably and cooly.

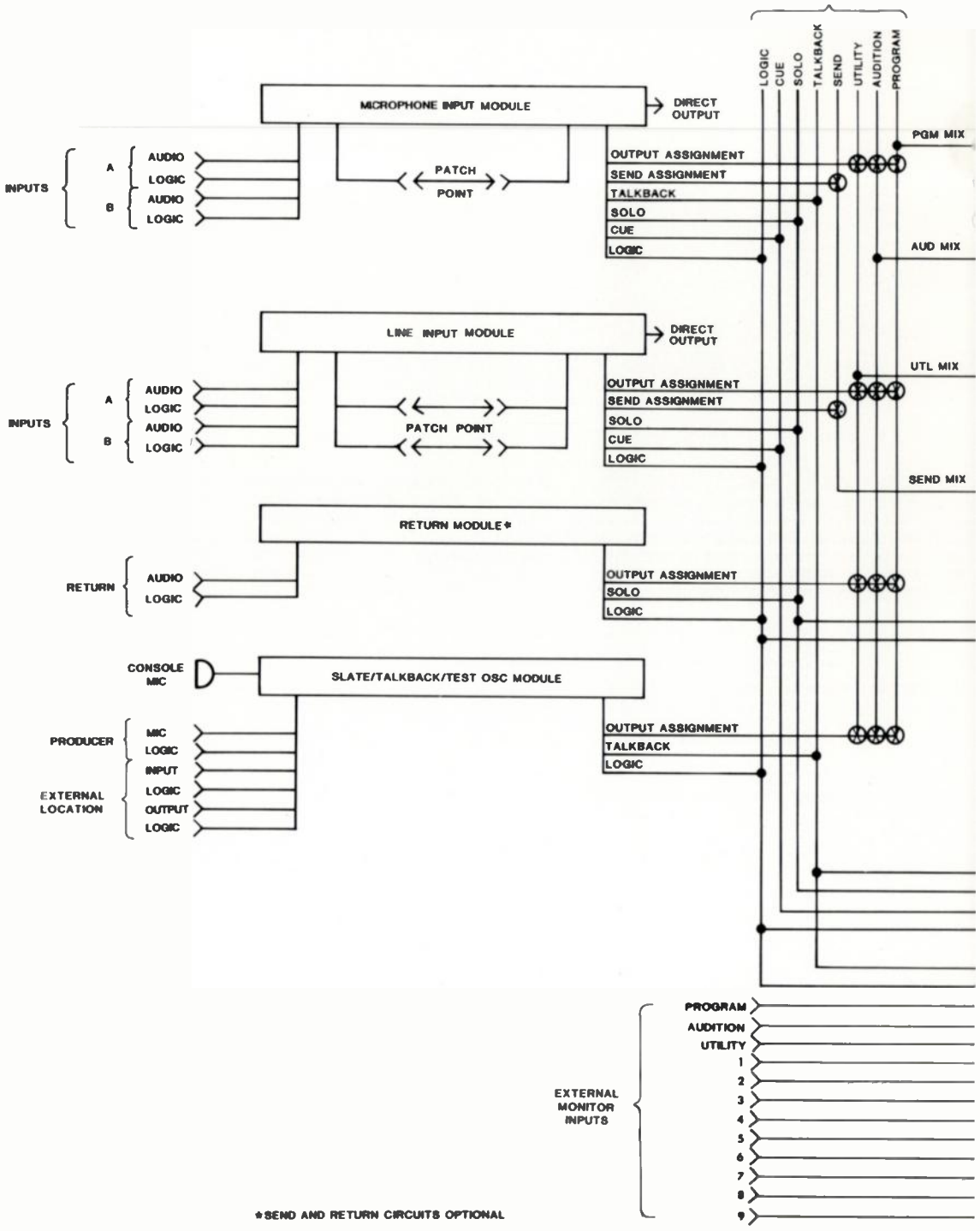
All audio input/output and logic wiring between the console and external equipment is accomplished with easy-to-use mating connectors. Time-consuming hand wiring to terminal blocks is eliminated. Console mating connectors, pins and tools are supplied with the BMX III. By prewiring the studio connectors, a BMX III console can be installed and on the air in a few hours.

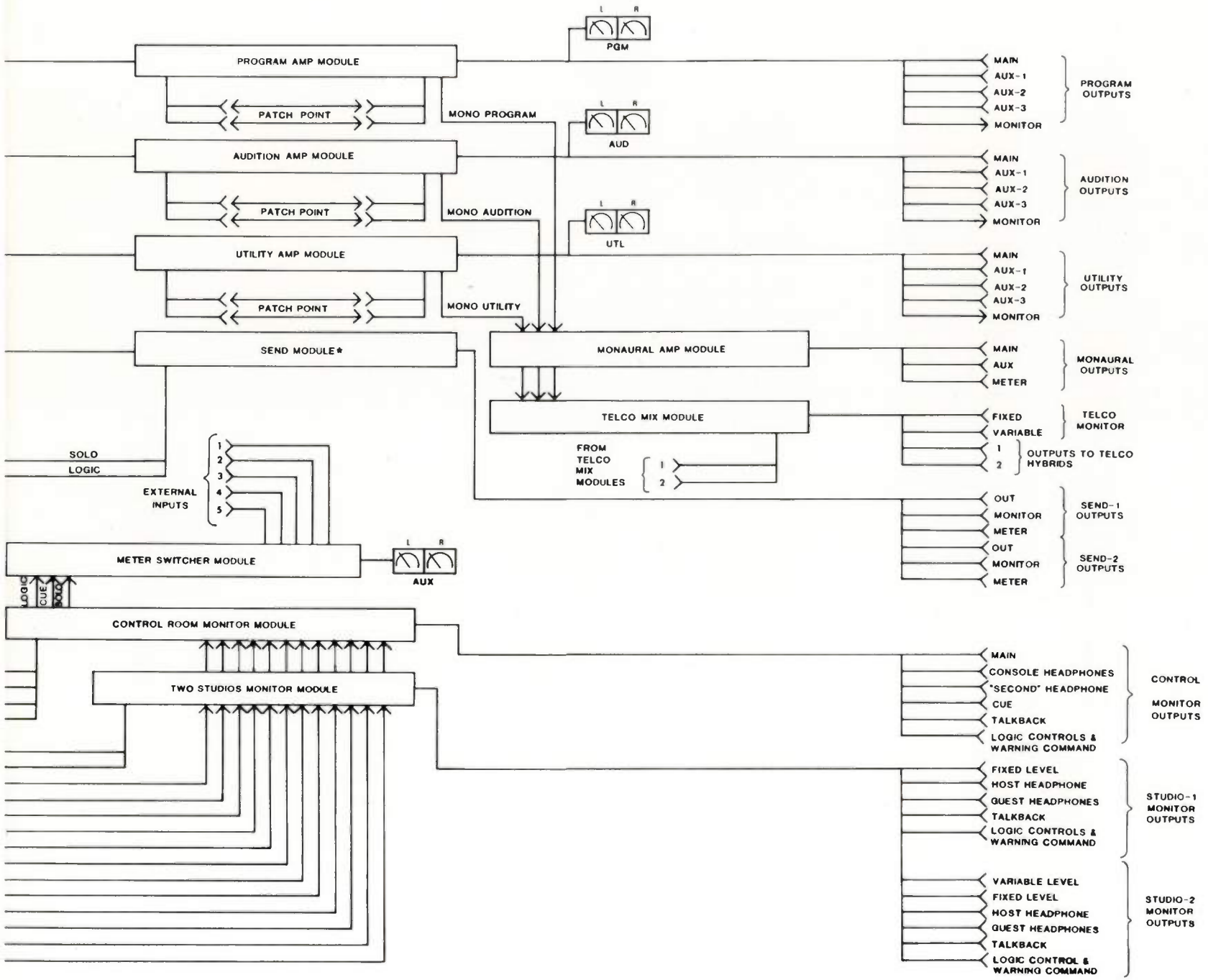
ONE LAST WORD BEFORE YOU LOOK INTO MORE DETAILS.

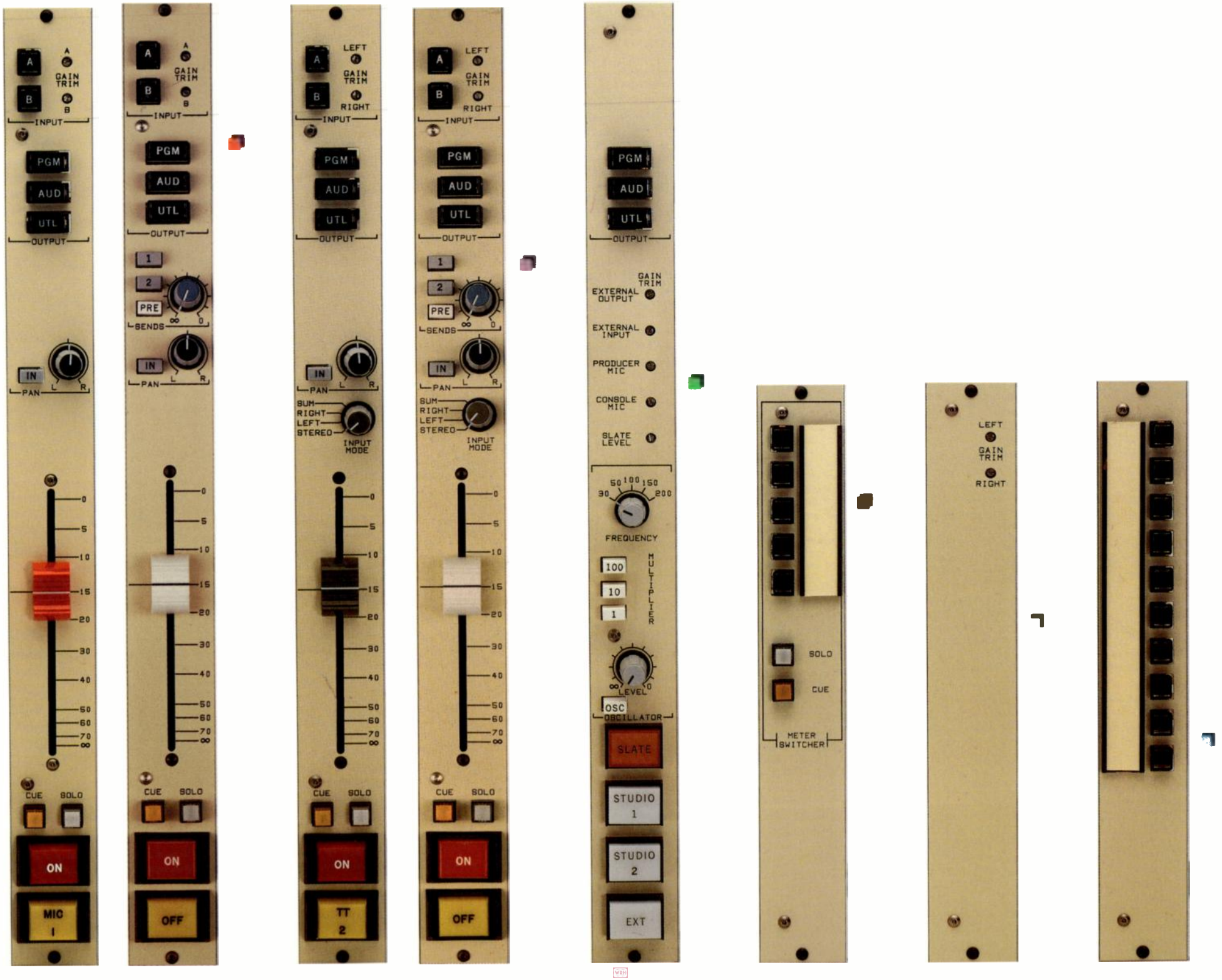
Our BMX consoles have become the standard by which many broadcasters evaluate other competitive offerings. Frankly, we're flattered by this, but not surprised. Because we've stayed in close touch with your needs, the BMX has become an evolutionary design; the purpose of which is to continuously reach for and set the highest radio broadcast standards — in features, performance, reliability and that all-too-elusive factor, quality.

If you believe that all these attributes have been attained in the exemplary console design of the BMX III, then we welcome you to a select user's group of professionals — broadcasters who have decided a Pacific Recorders & Engineering console is the best value that money can buy.

BMX III FUNCTIONAL BLOCK DIAGRAM




PROGRAM AMP MODULE
PATCH POINT
MONO PROGRAM
PGM
L
R
MAIN
AUX-1
AUX-2
AUX-3
MONITOR
PROGRAM OUTPUTS
AUDITION AMP MODULE
PATCH POINT
MONO AUDITION
AUD
MAIN
AUX-1
AUX-2
AUX-3
MONITOR
AUDITION OUTPUTS
UTILITY AMP MODULE
PATCH POINT
MONO UTILITY
UTL
MAIN
AUX-1
AUX-2
AUX-3
MONITOR
UTILITY OUTPUTS
SEND MODULE*
MONAURAL AMP MODULE
MAIN
AUX
METER
MONAURAL OUTPUTS
TELCO MIX MODULE
FIXED
VARIABLE
TELCO MONITOR
1
2
OUTPUTS TO TELCO HYBRIDS
FROM TELCO MIX MODULES
1
2
SOLO LOGIC
EXTERNAL INPUTS
1
2
3
4
5
OUT
MONITOR
METER
SEND-1 OUTPUTS
OUT
MONITOR
METER
SEND-2 OUTPUTS
METER SWITCHER MODULE
AUX
LOGIC
CUE
SOLO
CONTROL ROOM MONITOR MODULE
TWO STUDIOS MONITOR MODULE
MAIN
CONSOLE HEADPHONES
"SECOND" HEADPHONE
CUE
TALKBACK
LOGIC CONTROLS & WARNING COMMAND
CONTROL MONITOR OUTPUTS
FIXED LEVEL
HOST HEADPHONE
GUEST HEADPHONES
TALKBACK
LOGIC CONTROLS & WARNING COMMAND
STUDIO-1 MONITOR OUTPUTS
VARIABLE LEVEL
FIXED LEVEL
HOST HEADPHONE
GUEST HEADPHONES
TALKBACK
LOGIC CONTROL & WARNING COMMAND
STUDIO-2 MONITOR OUTPUTS


A
B
GAIN TRIM
INPUT
PGM
AUD
UTL
OUTPUT
LEFT
RIGHT
1
2
PRE
SENDS
IN
PAN
SUM
RIGHT
LEFT
STEREO
INPUT MODE
CUE
SOLO
ON
MIC 1
OFF
TT 2
EXTERNAL OUTPUT
EXTERNAL INPUT
PRODUCER MIC
CONSOLE MIC
SLATE LEVEL
FREQUENCY
MULTIPLIER
100
10
1
LEVEL
OSC
OSCILLATOR
SLATE
STUDIO 1
STUDIO 2
EXT
METER SWITCHER

MICROPHONE INPUT MODULE

The Microphone Input module accommodates a wide range of input levels to permit use of all contemporary microphones. Input preamplifier gain is adjustable for nominal inputs of -60 dBu to -35 dBu. The A/B input selector provides two microphone inputs per module, each with programmable monitor mute selection for control room or either of two studios. The mute circuitry incorporates an automatic 40 millisecond delay before the microphone is turned on to permit "room reverb" to decay off-mic. Each microphone input is provided with separate remote control capability for ON/OFF, COUGH and multiple TALKBACK functions. The PAN control may be inserted with the IN button to provide positioning of the microphone signal in the stereo image. The module output may be assigned to any combination of PROGRAM, AUDITION and UTILITY by the self-indicating OUTPUT buttons. The illuminated CUE button provides stereo pre-fader cue monitoring. The illuminated SOLO button provides monitoring of solo-in-place which is post-fader and pan. The channel ON/OFF buttons are illuminated to indicate the status of the channel. In addition, the ON button may be programmed so that momentary depression provides cough muting. Phantom power circuitry for condenser microphones is user assignable for both the A and B inputs.

The microphone module may be equipped with an optional SEND control which can be assigned to either or both of two send buses and is provided with a PRE/post-fader button switch. Stereo send is possible as a user option; assigning the send to either send bus results in a mono-mix signal to that bus, however, the send will be stereo when both bus assignment buttons are engaged.

LINE INPUT MODULE

The Stereo Line Input module will accommodate nominal input levels from -12 dBu to +8 dBu. The A/B input switch selects either of two stereo inputs. Separate logic control is available on each input for the remote control of tape machines and/or other sources by the module. The PAN control may be used to balance a stereo signal source or to position a mono signal in the stereo image. An INPUT MODE switch allows input selection of stereo, left channel only, right channel only or the sum of left and right channels. The module output may be assigned to any combination of PROGRAM, AUDITION and UTILITY by the self-indicating OUTPUT buttons. The illuminated CUE button provides stereo pre-fader cue monitoring. The illuminated SOLO button provides monitoring of solo-in-place which is post-fader and pan. The channel ON/OFF buttons are illuminated to indicate the status of the channel.

The line module may be equipped with an optional SEND control which is provided with a PRE/post-fader switch and can assign a mono-mix of the signal to either or both of two send buses. The user option for stereo send is available as described for the Microphone Input module.

Each Line Input module is equipped with a comprehensive family of control logic capability which includes the remote control of module ON, OFF, CUE and SOLO functions with status tally lights. Also provided are ready status and start/stop command pulses for turntables, cartridges and reel-to-reel tape machines. The ready status illuminates the channel OFF button whenever a tape is threaded or cartridge is loaded and ready for play. The ON button starts the remote controlled equipment as well as turning the channel on. The module audio is automatically turned off upon the receipt of a cartridge fast wind or end of tape command. In addition, the module may be set to control the console mounted timer system for the automatic up-time of events.

SLATE/TALKBACK/TEST/OSCILLATOR MODULE

The Slate/Talkback/Test/Oscillator module provides a test oscillator, a slate tone oscillator and talkback facilities for the BMX III console. The test oscillator generates low-distortion, stable amplitude tones to allow system test and line-up with any of 15 frequencies. The tones may be assigned to any combination of the PROGRAM, AUDITION and UTILITY mix buses.

SLATE commentary may be added to a tape recording by the console mounted electret microphone and/or from an external producer's microphone. A low distortion spotter tone (nominally 30 Hz, adjustable) with carefully controlled envelope rise and fall times, may be recorded with the commentary for ease of fast-wind identification of the cuts on a track.

The console and producer microphones can talk to any of two studios plus a remote or external location, such as a screener booth, 2-way, etc. The external location can also talk back to the studios as well as the control room. The frequency response of all the talk microphone preamplifiers has been carefully shaped to favor speech communication.

METER SWITCHER MODULE

The auxilliary meters in the BMX III meter panel are driven by the Meter Switcher module. This module provides switchable metering facilities for the AUDITION and UTILITY outputs in the smaller mainframe sizes. The unassigned inputs may be used to meter user determined external sources. The module automatically defaults from the selected status whenever a CUE or SOLO button is engaged on any module. The auxilliary meters will then display the nominal operating level at the CUE or SOLO point selected. This enables a quick input level check when displaying CUE, and very convenient level line-up when displaying SOLO. The SOLO metering function eliminates the need to use a console output bus for preview and level setting.

STEREO OUTPUT MODULE

The Stereo Output module contains the mixing and distribution amplifiers for a console line output. The console is supplied with three of these modules, one each for the PROGRAM, AUDITION and UTILITY buses. Each module supplies four stereo distribution outputs; each output is capable of supplying up to +28 dBm. Patch send and return points are available for the connection of external processing equipment and/or a patch field. The output is an active balanced design; output transformers are available as an option.

REMOTE LINE SELECTOR MODULE

The Remote Line Selector module provides a selection of 10 stereo signals switched to one output. Up to two parallel-input selector modules may be installed in the BMX III. The inputs and outputs for the modules are all brought out to the connector panel for ease of assignment. Typical applications include use as a line pre-selector ahead of input modules and tape recorders.


PGM
AUD
UTL
TALKBACK
CUE
SUM
RIGHT
LEFT
STEREO
MODE
AUTO
HEADPHONE
MONITOR
CONTROL ROOM


PGM
AUD
UTL
STUDIO-1
TALKBACK
TALK OVER MUTE
MONITOR
TALKBACK
TALK OVER MUTE
MONITOR
STUDIO-2


GAIN TRIM
PGM
AUD
UTL
MONO SOURCE


GAIN TRIM
PGM
AUD
UTL
MONO SOURCE
PGM
AUD
UTL
SEND TO TELCO
TELCO 1
TELCO 2
INPUT
MONITOR
TELCO MIX


GAIN TRIM
PGM
AUD
UTL
MONO SOURCE
PGM
AUD
UTL
SEND TO TELCO
TELCO 1
TELCO 2
INPUT
MONITOR
TELCO MIX
S
ON
SEND OUTPUTS
PGM
AUD
UTL
OUTPUT
IN
PAN
SUM
RIGHT
LEFT
STEREO
INPUT MODE
MIX
ON
SOLO
RETURN


S
ON
SEND OUTPUTS
PGM
AUD
UTL
OUTPUT
IN
PAN
SUM
RIGHT
LEFT
STEREO
INPUT MODE
MIX
ON
SOLO
RETURN

CONTROL ROOM MONITOR MODULE

Monitoring of PROGRAM, AUDITION and UTILITY or any of nine external signals is provided by the interlocking monitor selector. The MONITOR and HEADPHONE potentiometers are sealed long-life conductive-plastic controls which were custom designed by Penny & Giles for the BMX III, AMX and ABX consoles. The AUTO headphone monitoring facility has been derived from the ABX console and is unique in the industry. Whenever an input module CUE button is engaged, the console operator's headphones automatically switch from the normal stereo monitor mode to one of two user assignable states; these are stereo cue, or mono cue in one earphone and mono monitor in the other. The headphone feeds to a co-host and/or guests are not affected.

adjustable degree of monitor level reduction during talkback. The TALKBACK control adjusts the volume of incoming talk signals. Talkback may be monitored with an independent amplifier and loudspeaker, or through the stereo cue system. The CUE control adjusts the level of the cue system. Logic circuitry is provided for the remote control of monitor dim and mute.

STUDIO MONITOR MODULE

The Studio Monitor module is expressly designed for applications where separate voice/announce booths or conference studios are required. This module provides the monitor, headphone and talkback facilities for up to two studios. Monitoring or PROGRAM, AUDITION and UTILITY or any of nine external signals is provided by an interlocking monitor selector. MONITOR, DIM and TALKBACK level controls are provided along with a TALK OVER MUTE button for each studio. The mute override button enables talkback to a studio even when the monitor speakers are muted. This would normally be used when doing off-air production work and/or when the talent chooses not to wear headphones.

The module has several outputs to meet most any combination of monitoring requirements. The main output is adjustable along with the degree of dimming during talkback. Fixed level outputs are available for those situations where the studio personnel are provided their own monitor and headphone level controls. The output for talent headphones is provided with talkback and a preset dim, a second output is provided for guest headphones which contains neither talkback or dim. Logic circuitry is provided for the remote control DIM and MUTE for each of the studio monitor sections.

MONAURAL OUTPUT MODULE

The Monaural Output module provides a selection of the three main outputs. The module may select the PROGRAM, AUDITION and UTILITY signals to derive a monaural output. The output is an active balanced design; an output transformer is available as an option.

MONAURAL OUTPUT/TELCO MIX MODULE

This combination module provides the features of the Monaural Output module plus the facilities for deriving mix-minus feeds for telephone hybrids. The telco mix section derives three unique mixes of the signals from two telephone callers and a selection of the PROGRAM, AUDITION and UTILITY buses.

The telephone signals which are to be broadcast, are selected and controlled by the input modules connected to the external hybrid systems. The Telco Mix module receives the audio from the input modules and sums them. This sum signal is routed to the meter selector and to the mix-monitor output. This telephone mix-monitor output is very useful when talk show talent and/or guests prefer not to use headphones.

The module provides for the selection of the output bus which is to contain the "base-mix" to be fed back to all the callers so that they may hear what is transpiring, even before air time. The signal fed back to a given caller includes the selected bus plus all the other callers, except himself (mix-minus). The signals fed back to the callers, may be passed through the on-board telephone bandpass filters for improved hybrid operation.

SEND & RETURN/MONAURAL/TELCO MIX MODULE

This module combines the Monaural Output/Telco Mix module with the facilities of the Send & Return module. This module is installed to support the use of the send circuits in the input modules and to provide return mix and assign circuitry for effects such as reverb. The Send & Return sections of this module operate identically to the dedicated Send & Return module described below.

SEND/RETURN MODULE

The optional Send/Return module contains both the send amplifiers and the stereo return circuits. The send portion of the module contains the mixing and output amplifiers for the two effects/foldback channels. Each of these has a variable LEVEL control with ON/OFF and SOLO facilities. The stereo effects return section of the module is equipped with a conductive plastic fader, MODE selector, PAN control, ON/OFF/SOLO buttons and output assignment buttons. Logic circuitry is provided for the remote ON/OFF control of both of the send circuits and the return channel.

REMOTE CONTROL PANELS

Tape deck remote control panels are available for most professional reel-to-tape recorders. The engraved RWD, FWD, STOP, PLAY and RECord buttons are function color-coded to common industry practice and are supplied with tally lamps.

Cartridge deck remote control panels are available for TOMCAT, MICROMAX and ITC cartridge recorders. Panels for other machines are available by request. Engraved buttons for TERtiary tone, SECondary tone, STOP, START and RECord are provided. The buttons are supplied with the appropriate voltage tally lamps.

The timer control panel provides illuminated START, STOP, RESET and HOLD buttons for the meter panel mounted DT-4 digital timer. An AUTO button couples the timer's reset and restart functions to the console timer reset command bus for the automatic up-time of events, (start with module on).

BUILD A BMX III JUST THE WAY YOU WANT IT.

The BMX III is available in several mainframe sizes to accommodate every broadcast requirement. Each BMX III is factory wired and fully tested for an entire complement of modules. You may order the console with fewer than capacity and then add modules as needs arise. Simply plug in the extra modules. A universal layout enables any input position to accept any type of module. Simply select the microphone, line and optional modules your application requires. You build the console to fit your precise needs.

ACCESSORIES FOR THE BMX III.

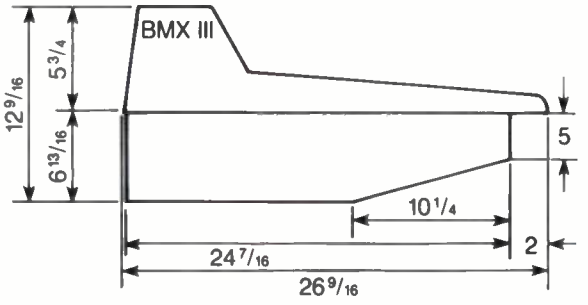
Copystands are available for all BMX consoles. There are two styles; the first is designed to be permanently attached to the top of the console, the second, a free-standing version which offers the advantage of positioning copy at an optimum reading distance for each operator.

The copystands are made of natural oak with a semi-transparent, smoke-bronze lucite copyboard.

The BMX III console may be ordered with an overbridge option which spans the top of the standard meter panel. This option provides additional mounting space for peripheral equipment such as routing switchers, remote controls, intercom, status alarm lamps and controls, remote readout displays, etc. The overbridge may be fitted at initial order or may be added to an existing BMX Series console in the field.

The optional turret units are designed to provide an attractive and practical housing for talent control panels and display modules. Microphone buttons, monitor/headphone panels, clocks, and timers are some of the devices which may be installed. The turrets are finished in a durable laminate with solid oak end panels which match the profile of the oak panels on the BMX III meter panel.

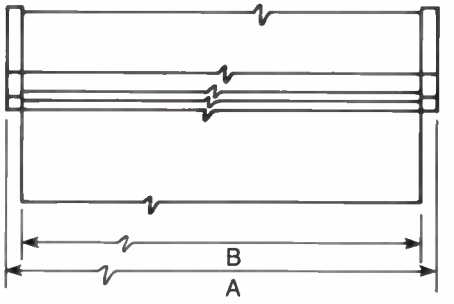
BMX III MECHANICAL DIMENSIONS



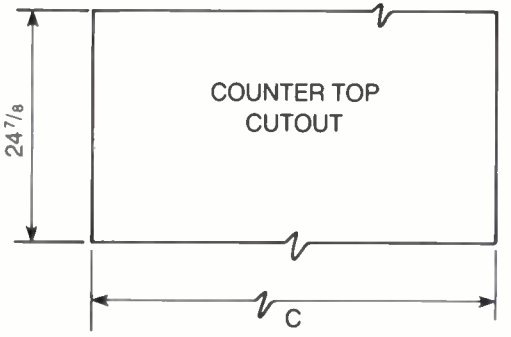
SIDE VIEW

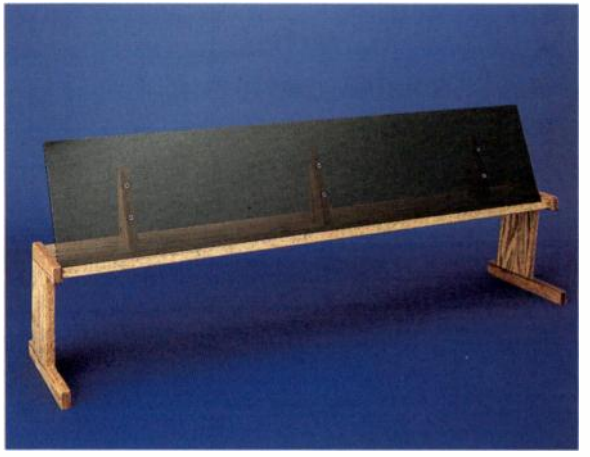
CONSOLE	A	B	C
BMX III-10	32	30½	30¾
BMX III-14	38	36½	36¾
BMX III-18	44	42½	42¾
BMX III-22	50	48½	48¾
BMX III-26	56	54½	54¾
BMX III-30	62	60½	60¾
BMX III-34	68	66½	66¾

NOTE: All Dimensions are in Inches

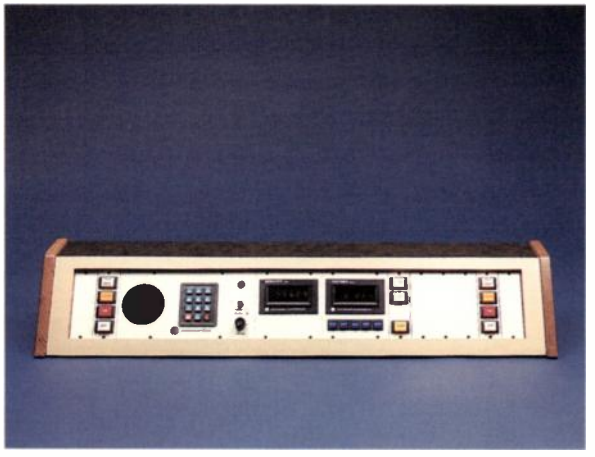


FRONT VIEW





Copy stands are available in fixed or free-standing formats for all BMX consoles.



Optional overbridge or turrets give you extra space and they match perfectly with a BMX.

SPECIFICATIONS

MICROPHONE INPUT :

Source Impedance	150 ohms
Input Impedance	1000 ohms minimum, balanced
Input Level Range	Adjustable from -60 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS :

Source Impedance	600 ohms
Input Impedance	Greater than 40K ohms, balanced
Input Level Range	
Line Input	Adjustable from -12 dBu to +8 dBu
Monitor Input	Nominal +4 dBu/+8 dBu
Patch Input	Nominal -10 dBu
Input Headroom	Greater than 30 dB above nominal input levels

MAIN OUTPUTS :

Load Impedance	600 ohms
Source Impedance	30 ohms
Nominal Output Level	+8 dBm, adjustable to +4 dBm
Maximum Output Level	
Line Amplifiers	+28 dBm, 600 ohm load
Send Module	+26 dBm, 600 ohm load

MONITOR OUTPUTS :

MAIN OUTPUTS:

Load Impedance	600 ohms or greater
Source Impedance	30 ohms, unbalanced
Output Level	0 dBu nominal, ±20 dBu maximum

HEADPHONE OUTPUTS:

Load Impedance	45 ohms or greater
Source Impedance	Less than 4 ohms
Output Level	0 dBu nominal, +29 dBu maximum

FREQUENCY RESPONSE :

Microphone Input to Program Output	+0 dB, -0.9 dB, 20 Hz to 20 kHz
Line Input to Program Output	+0 dB, -0.8 dB, 20 Hz to 20 kHz

NOISE :

Microphone Input Amplifier	-127 dBu RMS equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	-88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output noise with one microphone channel ON, fader at -15 dB, input sensitivity at -50 dBu	76 dB below output, reference +8 dB 150 ohm source, 20 kHz bandwidth
Output noise with one line channel ON, fader at -15 dB, input sensitivity at +8 dBu.	80 dB below output, reference +8 dB 600 ohm source, 20 kHz bandwidth
Output noise with no input channels ON	82 dB below output, reference +8 dB, 20 kHz bandwidth

DISTORTION , T.H.D. :

Microphone input to program output	Less than 0.02%, 20 Hz to 20 kHz, -50 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output
Line input to program output	Less than 0.008%, 20 Hz to 20 kHz, +8 dBu input, +8 dBm output into 600 ohm load, 80 kHz meter bandwidth; less than 0.01% at 1 kHz, +28 dBm output

DISTORTION, I.M. :

Microphone input to program output	Less than 0.008%, -50 dBu input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load
Line input to program output	Less than 0.005%, +8 dBm input, +8 dBm output into 600 ohm load; less than 0.01% at +28 dBm into 600 ohm load

CROSSTALK :

Interchannel crosstalk	Less than -85 dB at 1 kHz Less than -75 dB at 20 kHz

NOTES:

1) These specifications are for the basic signal paths, per channel, with either or both channels of a stereo pair operating and with 600 ohm loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the *same voltage value* as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

3) Noise specifications are for a 14-input console (BMX-14) larger consoles will have slightly reduced signal-to-noise ratios due to increased summing amplifier gain. Noise specifications are based upon a 20 kHz bandwidth: the use of a meter with a 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Pacific Recorders & Engineering Corp. reserves the right to change specifications without notice or obligation.



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Printed in U.S.A.
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BMX II

PACIFIC RECORDERS & ENGINEERING CORPORATION



SYSTEMS INTEGRATORS FOR THE BROADCAST INDUSTRY.

Pacific Recorders & Engineering Corporation was founded in 1969 to serve Southern California's professional recording and broadcast industries with audio product design/manufacturing and facility development.

Today, operating from a 55,000 square foot facility in Carlsbad, California, PR&E has grown to become one of the world's leading manufacturers of broadcast consoles, cart machines and related peripherals and is recognized for its expertise as a broadcast and production systems integrator.

PR&E has designed and fabricated more than 1500 custom control, studio, newsroom and master control systems, and is setting the standards for exciting new products, for innovative solutions to complex facility design, and for maximum performance from both.



FEATURES

- Two main stereo mix buses, each capable of +28 dBm output
- 30 dB of headroom on all inputs
- In-phase, equal level insert/processing patch points on all input and output modules
- Full and independent remote control logic for ON, OFF, COUGH and TALKBACK on each input of microphone modules
- Full remote control of START, STOP, AUDIO, RESET, ON, OFF, CUE and TIMER RESET on line input modules
- Cue system with console headphone switching
- Sophisticated control room and studio monitor systems with programmable muting
- Monaural output module with independent metering
- Two telephone mix-minus feeds plus telephone monitor mix
- Fully regulated and independent supplies for audio, logic and phantom power
- On-board power supply decoupling to provide in-use serviceability
- Universal mainframe accepts any module in any position
- Low-noise 12 volt CMOS logic for stable operation in adverse RFI environments
- Mainframes available for 10, 14, 18, 22 and 26 input positions
- Function labeled, independent connectors for each input, output and logic function
- Each console supplied with connector kit, tools and spare parts kit

BMX SERIES II ON-AIR CONSOLES

Tried and True

Time is the test of technology. The wealth of promotional support from a product's manufacturer should not be as convincing to a prospective buyer as are a few words of praise (or scorn) from a friend who has owned the product for years.

The BMX Series II Console is widely recognized as one of the finest on-air boards available today. Its success has been shared by so many friends that well over 1000 BMX's are now installed. They rarely show up on the used market, usually when the station is building new facilities with new BMX's, but rather are passed along to new friends where they continue to function quietly year after year.

As you look through this brochure, note the attention to detail and the thorough consideration of broadcaster needs that have given the BMX Series II its deserved reputation for service and reliability.

PR&E's design engineers will tell you that the track record of the BMX Series II is no accident. First quality components, the basis for high performance equipment, are used throughout. Advanced discrete and integrated circuitry yields very low noise and distortion, and provides excellent frequency response and headroom/overload capability. At least 30 dB of input headroom is maintained to provide that extra margin for "hot" levels and operator error. Mixers are full-travel Penny & Giles type 1900 faders, far more reliable than the lower cost series designed for semi-professional or light-duty applications. Module control button switches are by Honeywell, which have proven themselves for 15 years in all our custom broadcast console designs. The microphone input transformers are designed and supplied by Deane Jensen; again, more expensive than commercial off-the-shelf parts, but important to the way your air talent sounds. The VU meters fully conform to American National Standard C16.5-1954 and are driven by balanced isolation buffer amplifiers. You can even get Peak Program Meters (PPM) conforming to British Standard 4297:1969.

The sophisticated control logic of the BMX II utilizes CMOS integrated circuits. Operating on 12 volt, low current power, CMOS based logic is immune to electrical noise and strong RF fields. Unlike low-cost, 5 volt high-current TTL logic, CMOS logic circuits generate very little electrical noise, so you won't hear "chirps or clicks" in the audio as the logic operates. Outputs, such as control pulses and tally lights, are delivered by short-circuit-proof driver circuitry to prevent a problem in the console should an external connection fail. The CMOS control circuitry communicates with external equipment through simple logic interfaces which provide both a common control format for different brands and models, and complete electrical isolation between the various pieces of equipment.

The BMX II is a low profile design, so you have plenty of room to arrange the peripheral equipment. Careful attention has been paid to ergonomics in the placement of switches and controls. All active electronics, except the meter buffer amplifiers, are accessible from the face of the console. Panel modules simply unplug from the mainframe, and may be removed and reinstalled with the power on - a real plus in the event of an emergency.

All input, output and logic wiring is accomplished with individual easy-to-use connectors. The use of individual connectors for each function provides more flexibility in configuration and future reassignment than multi-pin connectors. Input assignments can be changed in the future with ease by just moving the appropriate connector plugs. The connector pinouts are standardized and the console's connector panel labeled with descriptive text designations for ease of configuration. The console comes complete with connectors, pins, tools and full wiring information. By prewiring the studio connectors, a BMX console can be installed and on the air in a few hours.

The BMX II comes in 10, 14, 18, 22 and 26 input module configurations. You may order a BMX II with just the modules you need today, and expand the system as your needs increase. Universal layout enables any input position to accept any input module, so adding extra modules later is quick and simple. Every BMX II mainframe is factory wired and tested. Just connect your peripheral gear and your BMX II is air-ready.

PR&E uses aerospace materials and modern methods, creating a tough reliable housing that won't twist or flex to cause degradation of card edge contacts and straining of circuit traces. The mother board, used for both power distribution and the summing buses, is equipped with a full ground plane shield and a very low impedance "audio common" bus to keep current-induced cross-talk to uncommonly low levels. This type of mother board is considerably more expensive than a simple ribbon wire busing system; however, it is the best method for providing both the ground plane shield and a heavy common bus.

The console modules are all constructed on double sided printed circuit boards. These are more expensive than single sided construction but allow us to optimize shielding of both the analog and logic control circuitry. All components are clearly identified with silk-screened legends. All circuit card fingers and mating edge connectors are gold plated.



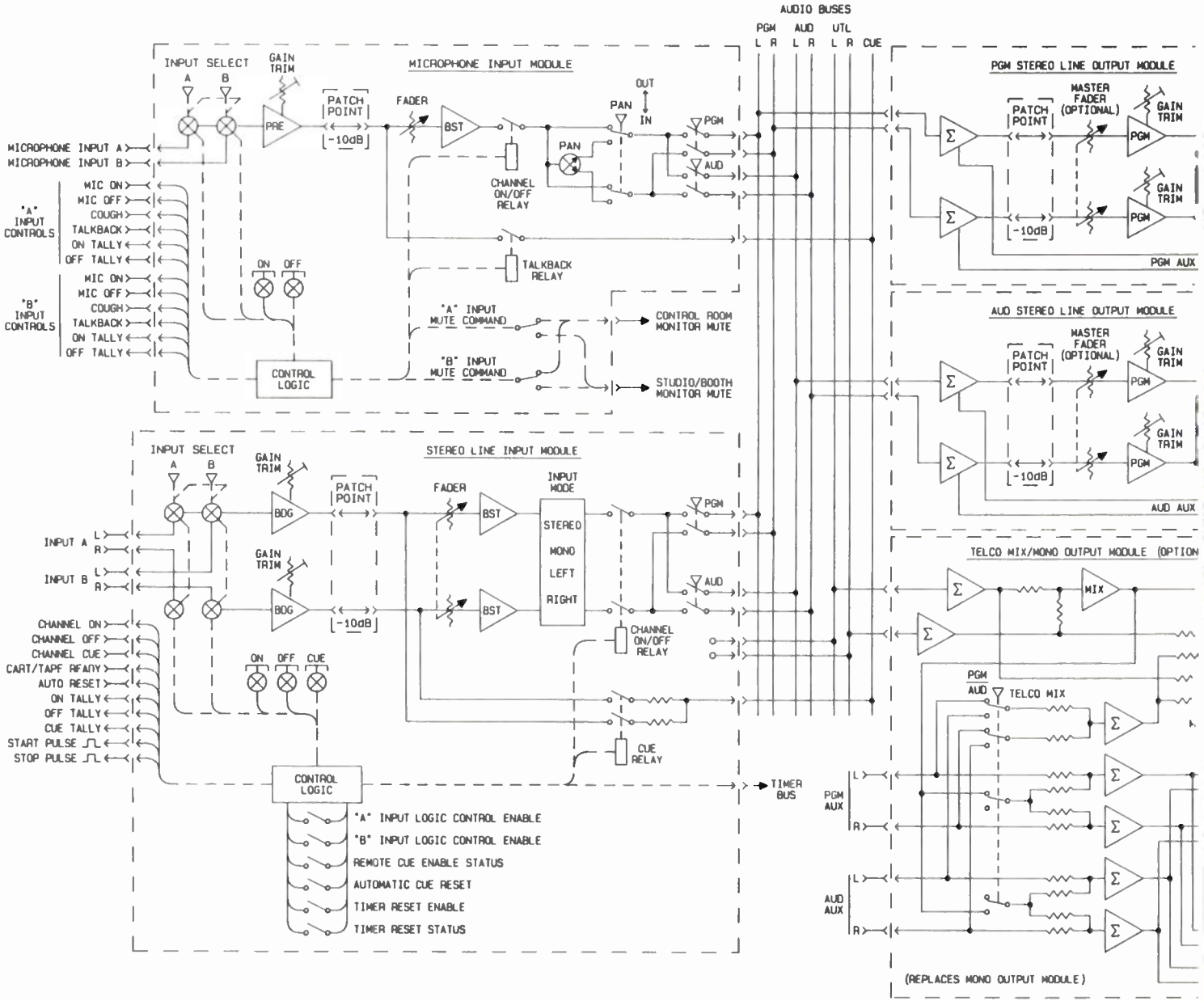


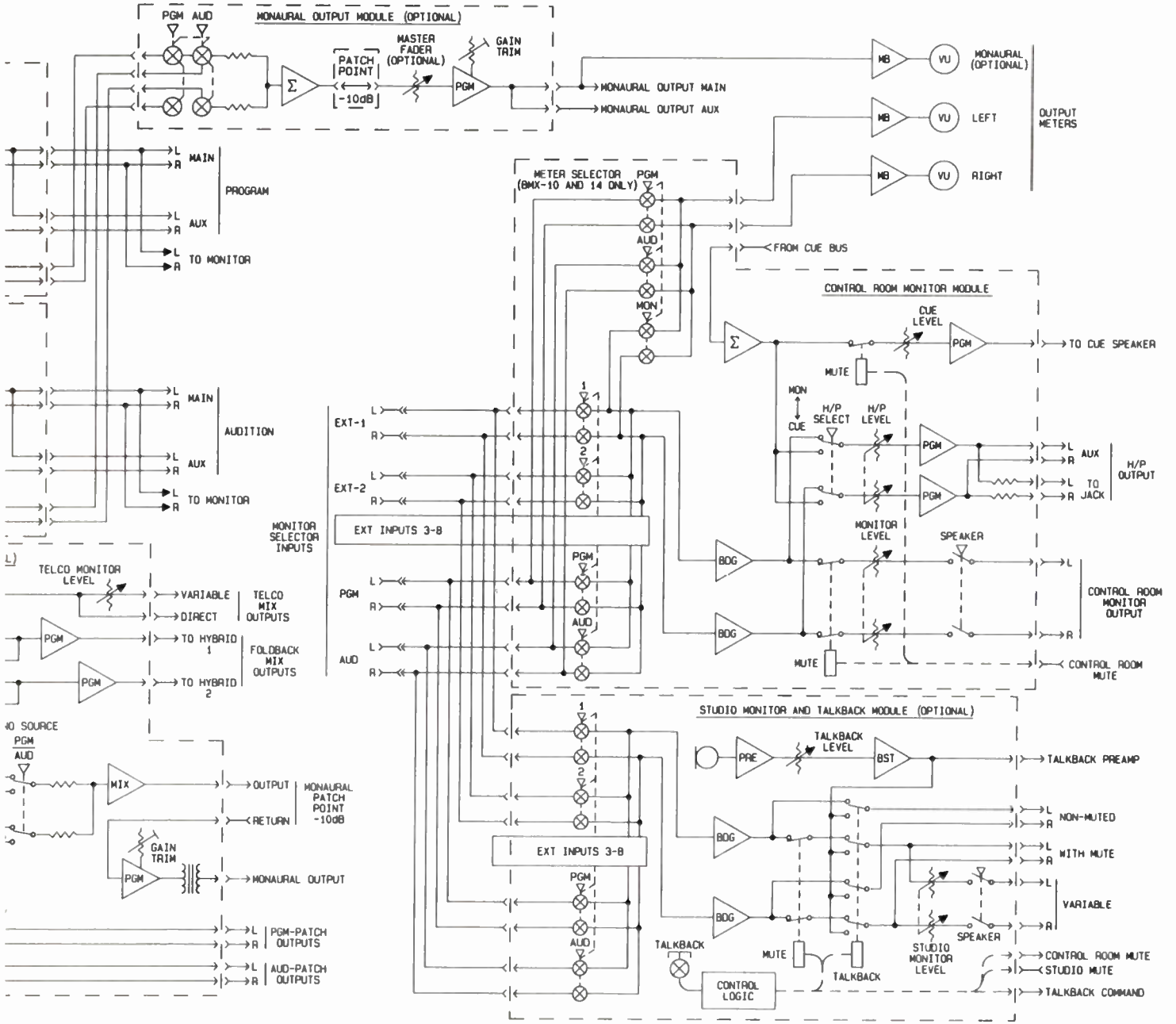
The rack mount power supply is constructed in a rugged steel chassis and features massive regulator heat sinks to provide very efficient convection cooling. The audio, logic and phantom supply voltages are individually switched by magnetic circuit breakers and are provided with front panel test jacks on standard ½ inch centers. A coupler unit with power fail detection and tally is available for configuring redundant power supply systems.

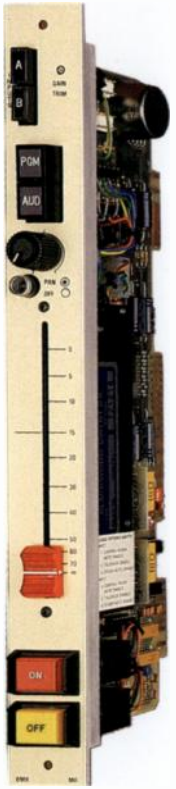
PR&E's proven understanding of user needs, and a design philosophy that combines leading edge technology with ultra-rugged construction, makes the BMX II a benchmark of excellence in the broadcast industry.

BMX II...easy to buy, easy to install and easy to service ...with reliability and performance that has become the hallmark of PR&E products.

Functional Block Diagram




MONAURAL OUTPUT MODULE (OPTIONAL)
PGM AUD
PATCH POINT
-10dB
MASTER FADER (OPTIONAL)
GAIN TRIM
MONAURAL OUTPUT MAIN
MONAURAL OUTPUT AUX
MB
VU
MONAURAL (OPTIONAL)
LEFT
RIGHT
OUTPUT METERS
METER SELECTOR (BMX-10 AND 14 ONLY)
FROM CUE BUS
CONTROL ROOM MONITOR MODULE
CUE LEVEL
TO CUE SPEAKER
MUTE
MON
CUE
H/P SELECT
H/P LEVEL
AUX
TO JACK
H/P OUTPUT
MONITOR LEVEL
SPEAKER
CONTROL ROOM MONITOR OUTPUT
CONTROL ROOM MUTE
MAIN
AUX
PROGRAM
TO MONITOR
AUDITION
EXT-1
EXT-2
EXT INPUTS 3-8
MONITOR SELECTOR INPUTS
PGM
AUD
MON
BDG
TELCO MONITOR LEVEL
VARIABLE
DIRECT
TELCO MIX OUTPUTS
TO HYBRID 1
TO HYBRID 2
FOLDBACK MIX OUTPUTS
STUDIO MONITOR AND TALKBACK MODULE (OPTIONAL)
TALKBACK LEVEL
PRE
BST
TALKBACK PREAMP
NON-MUTED
WITH MUTE
VARIABLE
TALKBACK
CONTROL LOGIC
STUDIO MONITOR LEVEL
CONTROL ROOM MUTE
STUDIO MUTE
TALKBACK COMMAND
MIX
OUTPUT
RETURN
MONAURAL PATCH POINT -10dB
GAIN TRIM
MONAURAL OUTPUT
PGM-PATCH OUTPUTS
AUD-PATCH OUTPUTS







MICROPHONE INPUT MODULE

The Microphone Input Module allows you to use any contemporary microphone. The Jensen transformer coupled mic preamp is adjustable to handle nominal inputs ranging from -60 dBu to -35 dBu. The A/B input selector gives you two mic inputs per module with programmable mute of control room and/or studio monitors. Monitor mute circuitry incorporates an automatic 40 mSec delay before the mic is turned on, permitting "room reverb" to decay off-mic. Pan, with ON/OFF switch lets you position signals in the stereo image. You may remotely control ON, OFF, COUGH and TALKBACK. Alternate action PROGRAM and AUDITION buttons give you the ability to assign the module to either or both stereo output buses. Phantom power for condenser mics is individually assignable to the A and B inputs.

LINE INPUT MODULE

The Line Input Module handles nominal input levels from -12 dBu to +8 dBu. The transformerless balanced inputs are instrumentation amplifiers offering extraordinary performance in terms of audio quality, plus the most important virtue of input transformers: very high common-mode input headroom which lower-cost, single operational amplifier differential input circuits cannot deliver.

The A/B input switch selects two stereo inputs. Module control logic may be programmed to control source equipment connected to the A or B input. The INPUT MODE switch sends the STEREO, MONO, RIGHT or LEFT SOURCE, to the output assignment switches. PROGRAM AND AUDITION buttons assign the module to either or both stereo output buses. The ON, OFF and CUE buttons illuminate to indicate status, and may also be remote controlled.

Every Line Input Module is equipped with logic for the remote START and STOP control of source equipment. The module OFF button may be illuminated to tally source "ready" status, such as a cart in place. When you reach a cart's "end of message" or the tape machine signals "end of tape," module audio is automatically reset to off. The Timer Reset system zeros and restarts the optional digital timer, giving you an elapsed time countup.

CONTROL ROOM MONITOR MODULE

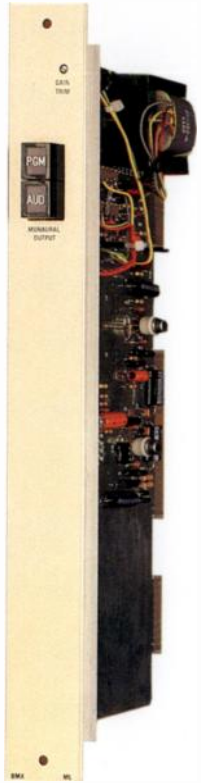
The interlocking MONITOR selector allows you to monitor Program, Audition and eight stereo line inputs. The input is balanced, transformer isolated and bridging to minimize source loading. The CUE controls the cue speaker level; the cue amplifier output and speaker input is also available on the console's connector panel.

On the 10 and 14 input models, the METER switch selects Program, Audition or Monitor for display on the pair of output meters. The Headphone level control and source selector give you headphone monitor and cue. The headphone amplifier output is also available on the connector panel should you desire an external headphone amp. The Monitor level and Speaker ON/OFF switch controls output to the control room monitor amp.



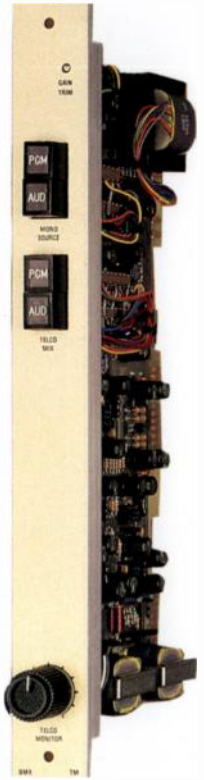
STUDIO MONITOR AND TALKBACK MODULE

If you have a separate voice/announce booth or conference studio, this module is designed just for you. The Monitor and Control Room selectors have the same sources. An electret condenser mic and talkback circuit lets the operator talk into the Studio monitor system. The Studio monitor has three separate pairs of outputs for use with monitor amps, remote level control and studio headphones.



MONAURAL OUTPUT MODULE

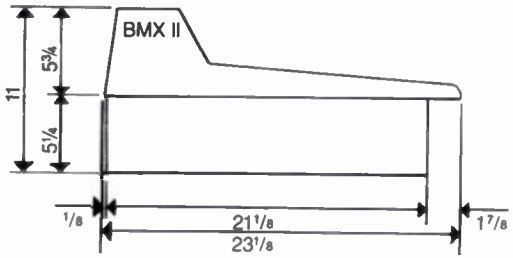
This module gives you mono line output of either the Program or Audition stereo line amp modules, and is identical in specifications and performance to the Main Stereo Output Amplifiers.

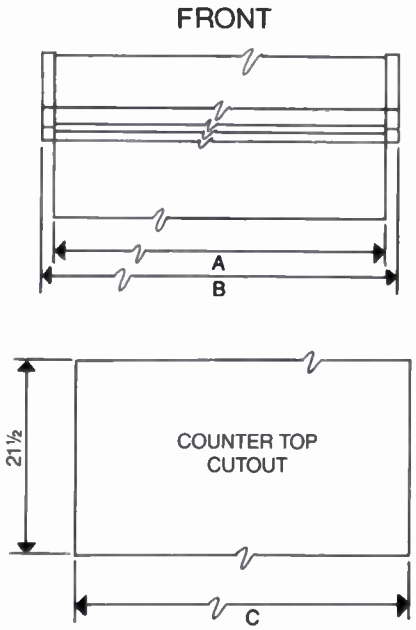


TELCO MIX/MONO OUTPUT MODULE

The Telco Mix section of this module gives you three unique and separate "MIX-MINUS" mixes. Two mixes are used for feedback to the callers, while the third is a mix of just the callers which may be fed to a "telco monitor" speaker and/or headphone system. This module derives specially mixed outputs of the Program or Audition bus, as selected by the TELCO MIX buttons, with the telephone callers mixed selectively.

The Mono Output section of this module provides exactly the same features as a standard Monaural Output Module.





	A	B	C
BMXII-10	26½	28	26¾
14	32½	34	32¾
18	38½	40	38¾
22	44½	46	44¾
26	50½	52	50½

BMX SPECIFICATIONS

MICROPHONE INPUT:

Source Impedance	150 ohms
Input Impedance	1000 ohms minimum, balanced
Input Level Range	Adjustable from -60 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input level

HIGH LEVEL INPUTS:

Source Impedance	600 ohms
Input Impedance	Transformer, 10K ohms, balanced Transformerless, 40K ohms, balanced
Input Level:	Adjustable from -12 dBu to +8 dBu
Input Headroom	Greater than 30 dB above nominal input level

PROGRAM, AUDITION, MONAURAL OUTPUTS:

Load Impedance	600 ohms
Source Impedance	Less than 95 ohms
Nominal Output Level	+8 dBm, adjustable
Maximum Output Level	+28 dBm, 600 ohm load
Output Headroom, above +8 dBm	Greater than 20 dB

MONITOR OUTPUTS:

Main Outputs:	
Output Impedance	600 ohms, unbalanced
Load Impedance	5K ohms or greater
Output Level	0 dBm nominal, +20 dBm maximum
Headphone Outputs:	
Output Impedance	75 ohms, resistor feed
Load Impedance	8 ohms or greater
Output Level	0 dBu nominal, +20 dBu maximum (Reference 0.775V)

CUE OUTPUT:

Output Impedance	10 ohms
Load Impedance	45 ohms or greater
Output Level	0 dBu nominal, +20 dBu maximum

FREQUENCY RESPONSE:

Mic Input (150 ohm) to Program Output	+0 , -0.9 dB, 20 Hz to 20 kHz
Line Input (600 ohm) to Program Output	+0, -0.8 dB, 20 Hz to 20 kHz

NOISE:

Microphone Input Amplifier	-127 dBu RMS equivalent input noise, 150 ohm source, 20 kHz bandwidth
High Level Input Amplifier	-88 dBu RMS, equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output Noise with 1 microphone channel ON, fader at -15 dB attenuation, input sensitivity at -50 dBu	-75 dB below output, reference +8 dBm, 150 ohm source, 20 kHz bandwidth
Output Noise with one line channel ON, fader at -15 dB attenuation, input sensitivity at +8 dBu	-82 dB below output, reference +8 dBm, 600 ohm source, 20 kHz bandwidth
Output Noise with no input channels ON	-84 dB below output, reference +8 dBm, 20 kHz bandwidth

DISTORTION, T.H.D.:

Mic Input to Program Output	Less than 0.025% at 1 kHz, less than 0.3% at +28 dBm, 30 Hz to 20 kHz
Line Input to Program Output	Less than 0.015% at 1 kHz, less than 0.3% at +28 dBm, 30 Hz to 20 kHz

DISTORTION, I.M. (SMPTE):

Mic Input to Program Output (+8 dBm)	Less than 0.02%
Line Input to Program Output (+8 dBm)	Less than 0.01%

CROSSTALK:

Adjacent buses, all bus assignments on, all inputs on	Less than -85 dB at 1 kHz Less than -75 dB at 20 kHz

---

NOTES:

1) These specifications are for the basic signal paths, per channel, with either or both channels of a stereo pair operating and with 600 ohm loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

Features and specifications subject to change without notice.

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RADIOMIXER

PACIFIC RECORDERS & ENGINEERING CORPORATION



Easily the finest in its class.

Radio on-air consoles come in many varieties. Radiomixer® is the first of a new class – and its quality makes it stand alone.

Since the introduction of the now-legendary BMX, the radio industry has seen clones and copies from one manufacturer after another. Each one has claimed to be just as good as a BMX, for less.

The rush to capitalize on the success of the BMX created a category of consoles which imitates the shape, color and much of the layout of our original, without matching BMX's full complement of features and performance.

Competition in this range produced cutthroat discounting, encouraged product cheapening, and left the industry with a confusing array of "affordable" mediocrity.

The next move was for these manufacturers to slowly raise their prices...to the point where some of their boards cost almost as much as a BMX, which still sells for its 1982 price. That encouraged even more low end consoles – the low end of price, and the low end of quality.

While PR&E will not design a console which is less than a fully professional product, we know many quality stations have been unable to purchase our consoles due to realistic budget constraints.

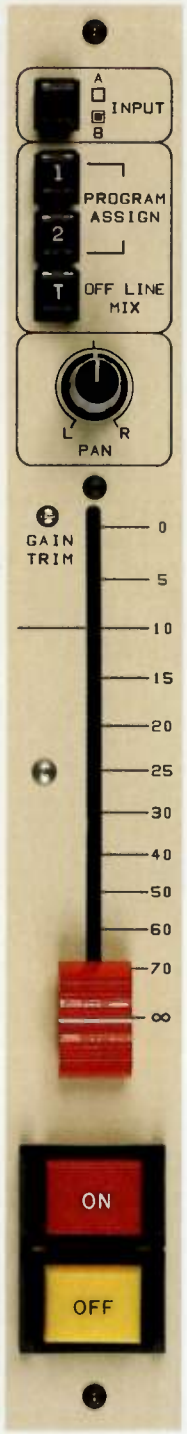
We offer Radiomixer: BMX-style operation, a compact and modular design, a very sophisticated telephone mix system, and unique operating features which clearly separate it from the pack.

The latest in engineering and manufacturing technology, plus first-class electronic and mechanical components, allow us to deliver a high-performance original at a clone cost.

Investigate the details of Radiomixer's design, construction, features, operation and audio performance. You will agree – we have built another great console.

Standard on every Radiomixer:

- True modularity, with all mainframe positions fully wired, invites individual configurations and permits easy future growth. Mainframes accommodate up to 12 and 20 input positions.
- Microphone input modules with A and B inputs, transformerless preamp, phantom power, processing patch point, and pan control. Remote control logic follows input selection and includes: ON and OFF with tallies, COUGH and TALKBACK.
- Line input modules with A and B inputs, transformerless instrumentation preamps, stereo processing patch points and input mode selector. Remote control logic follows input selection, and includes: ON, OFF and CUE with tallies, START, STOP and AUDIO RESET. Timer RESET is assignable for each input.
- Low-noise 12-volt CMOS logic is used for reliable operation in adverse RF environments. Control outputs are equipped with short-circuit-protected drivers.
- Advanced differential-mode VCA's with specially tailored attenuation characteristic and optimized for maximum dynamic range over the full fader travel.
- Penny & Giles 3000 series conductive plastic faders.
- Telco Mix System – a sophisticated mix-minus system with outputs for two hybrids, split-track outputs for tape, plus telco-mix monitor and cue. Handles any telephone situation easily.
- Control Room monitor with headphone Auto-Cue, Input Mode switch, external input to Cue, six external monitor inputs, and remote mute and dim controls.
- Two stereo Program outputs, each with transformerless distribution amplifiers.
- Monaural output, selectable from the Program outputs, with transformerless distribution amplifier.
- True Sifam R32 VU meters – no guessing where the pointer "should" be.
- Built-in time-of-day clock and event timer, including manual timer control panel with Auto-Reset function.
- Fully regulated and independent audio, logic and phantom power supplies.



Microphone Input Module

The transformerless mic preamp is adjustable for inputs of -70 dBu to -35 dBu. Preamp output is available for connection to processing equipment. Phantom power is assignable to each input.

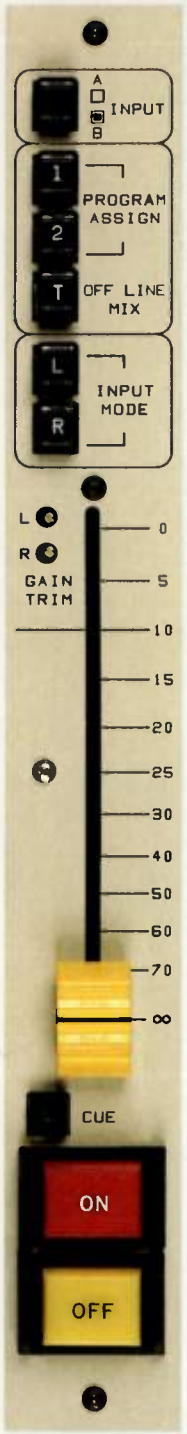
Select A or B input, assign the module to any combination of the PGM-1 and PGM-2 stereo buses, and the Telephone Mix System. Use PAN to position the signal in the stereo image.

The P&G fader controls a differential-mode VCA by means of unique circuitry which provides real fader "feel" and maintains optimum headroom throughout the control range.

Remote control logic for each input includes:

- ON with tally
- OFF with tally
- COUGH (momentary mute)
- TALKBACK (to console)

Programmable Control Room and Studio monitor muting incorporates a 40 msec delay before the mic channel is turned on, permitting "room reverb" to decay off mic.



Stereo Line Input Module

The transformerless input preamps are instrumentation type designs, chosen for true input symmetry plus very high common-mode headroom capability, performance which single differential amplifier circuits cannot equal. Left and right gain trims set input sensitivity.

Input mode selection is made with L and R switches. The signal mode is stereo when both are released; pressing L sources the left input, pressing R sources the right input and pressing both buttons sums left and right into a mono signal.

Assign the module to any combination of the PGM-1 and PGM-2 stereo buses and the Telephone Mix System.

The P&G fader controls a stereo pair of VCAs with the same unique circuitry used in the mic input module.

Remote control logic for each input includes:

- ON with tally
- OFF with tally
- CUE with tally
- READY (source)
- AUDIO RESET (to OFF)
- START pulse
- STOP pulse



Telco Mix System & Monaural Output Module

The monaural section provides a DA sum of either PGM-1 or PGM-2 as selected by the front panel buttons.

Radiomixer's Telephone Mix System is one of the most flexible yet easy to use mix-minus systems ever designed for a radio console.

It takes four different categories of signals from the input modules:

- Selected mics
- Selected lines
- Caller #1
- Caller #2 (if used)

And produces five unique mix-minus oututs to:

- Hybrid #1
- Hybrid #2 (if used)
- Tape (composite mix)
- Tape (split mix to 2 tracks)
- Monitor Mix

The Monitor Mix may also be sent to the CUE speaker.

Master Mode buttons set up the console for:

- OFF-LINE MIX for taping contest callers.
- PGM-1 for traditional on-air talk radio.
- AUTO SELECT switches between modes as determined by the caller's input module ON/OFF status.

Real VU Meters

Genuine Sifam R32 VU meters – not just "audio level indicators" equipped with VU scales.

Clock & Timer

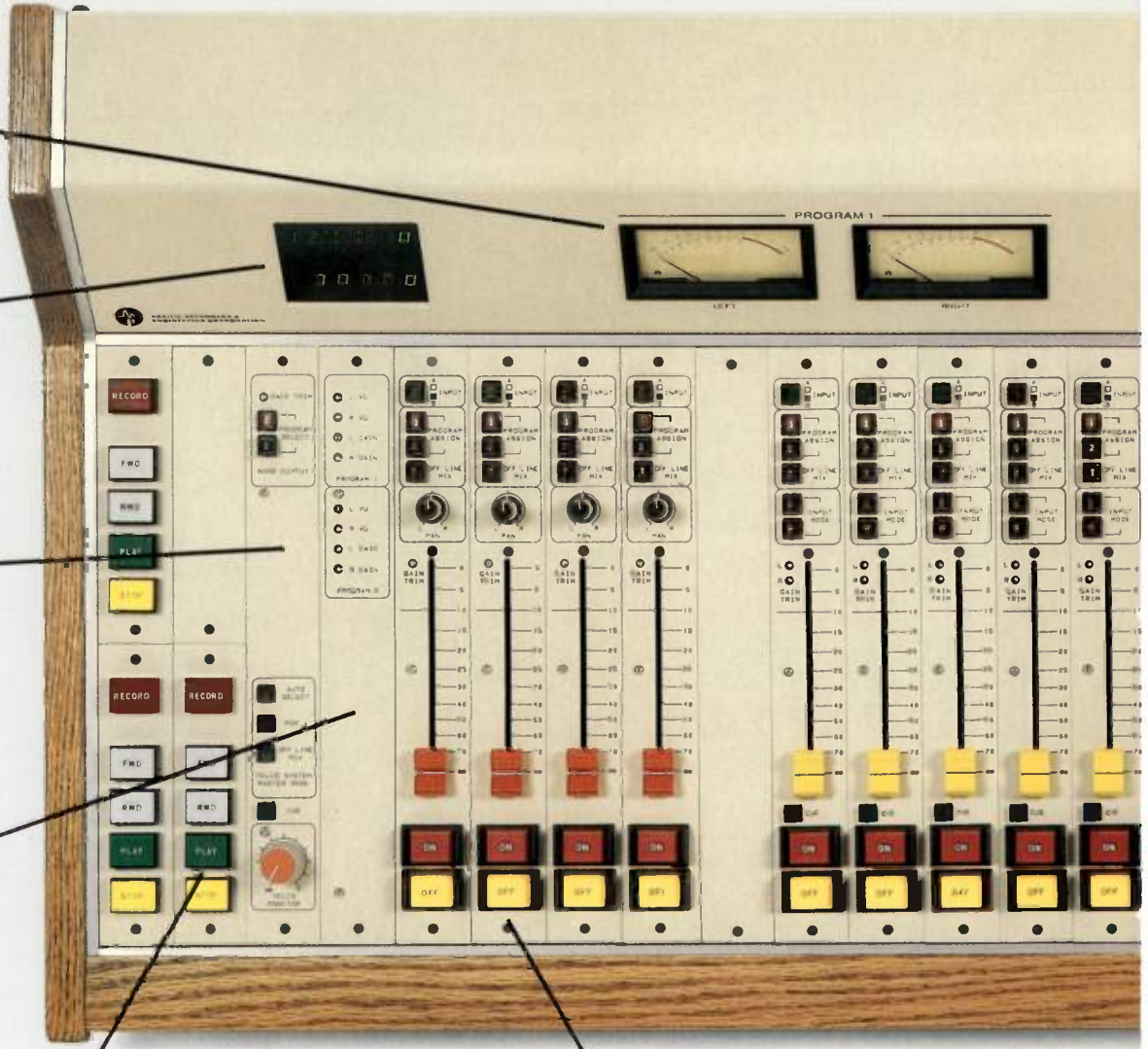
Built-in digital time-of-day clock and event timer.

Telco Mix System & Monaural Output

Supports one of the most advanced and easy to use telephone mix-minus systems in the industry. The Telco Mix System handles any phone situation with elegant simplicity.

Stereo Program Output

Contains the bus summing and distribution output amplifiers for the two stereo program channels, PGM-1 and PGM-2.

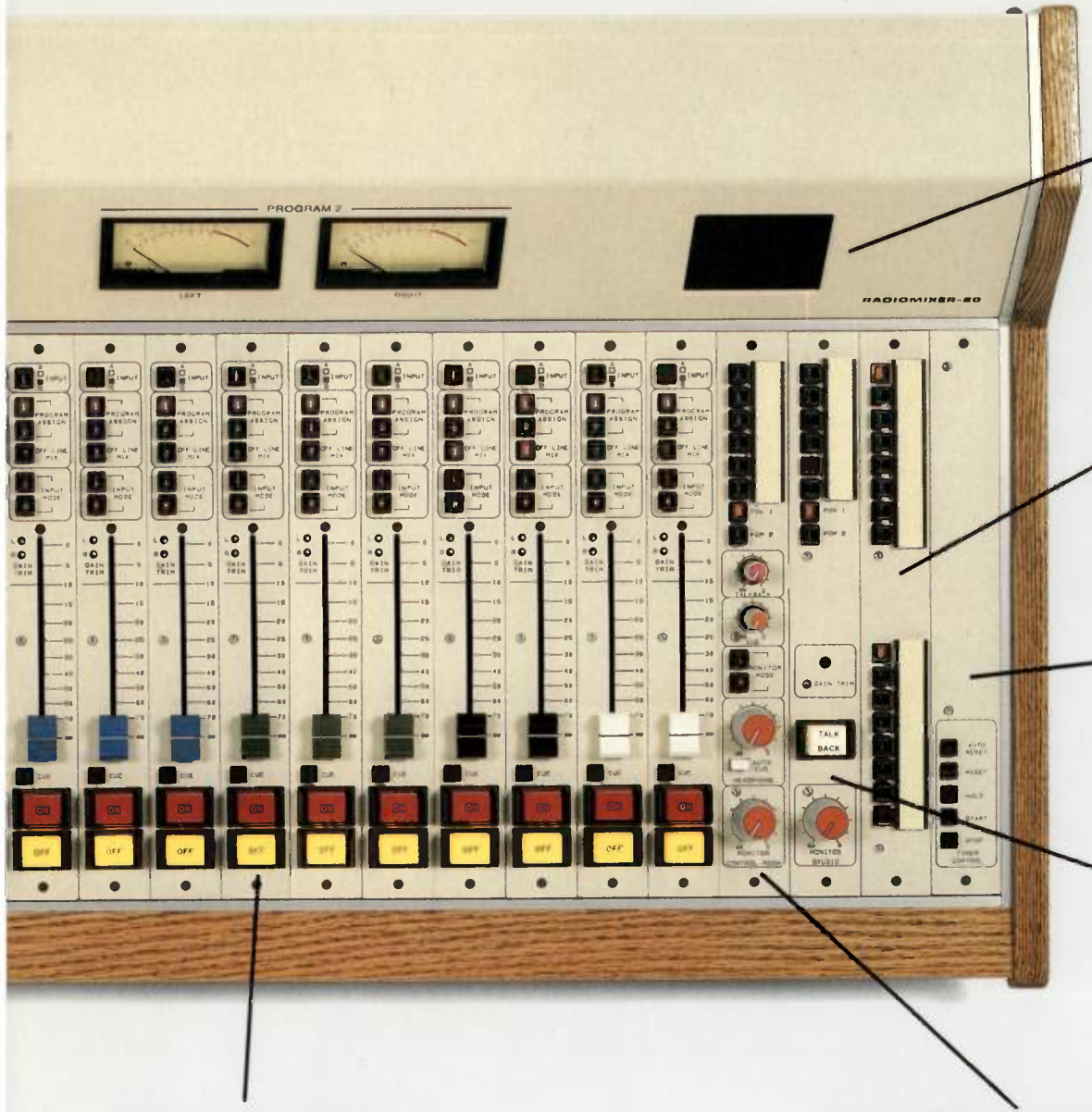


Machine Remote Controls

Control the transport functions of outboard tape decks: cassette, cart, or open reel.

Microphone Input

Two inputs per module with assignable phantom powering. Transformerless preamp accommodates all professional microphones. Stereo Pan control. Assignable to PGM-1, PGM-2, and Telephone System bus. Control logic follows input selection.



Built-in Cue Speaker

Used for input module cue, talkback to console and telco mix monitoring.

Dual Remote Line Selector

Provides for the choice of up to eight external stereo sources by two selectors. Typical applications: selecting remote lines for stereo line input modules, or extending the input selection capability of the monitor system.

Timer Control

For manual and automatic control of the digital timer – Start, Stop, Reset and Hold (display freeze). The Auto button allows the console to reset the timer for automatic uptiming of selected events.

Studio Monitor

Provides monitor, talent headphone, guest headphone and talkback facilities for a voice booth or studio.

Stereo Line Input

Two stereo inputs per module with transformer-less instrumentation preamplifiers. Input mode selection: L, R, stereo, or mono (summed). Assignable to PGM-1, PGM-2, and Telephone System buses. Control logic follows input selection.

Control Room Monitor

Monitors PGM-1, PGM-2, or any of six external signals. Features include: monitor mode selector, operator's headphone Auto-Cue, guest head-phone feed and remote control dim and mute.



Control Room Monitor Module

Monitoring of PGM-1, PGM-2 plus six external signals is provided by the monitor selector. A buffered selector output is available for feeding guest headphone circuits.

Monitor mode selection is made with L and R switches and does not affect the guest headphone feed.

The AUTO headphone facility has been derived from our larger consoles. Input module CUE automatically switches the operator's headphones from stereo monitor to either:

- split monitor and cue, or
- cue in both phones.

A Talkback control adjusts the level of incoming talk to the cue speaker; a separate output is available for a co-host's monitor turret.

The Cue control adjusts the level of the meter panel mounted cue speaker. An external input to the Cue system is provided with muting optional.

Monitor volume is dimmed automatically whenever the console receives or initiates talkback. Logic circuitry is also provided for remote control of monitor dim and mute.



Studio Monitor Module

The Studio Monitor Module provides an extensive range of facilities for applications requiring a voice booth or studio.

The input selector duplicates the sources of the Control Room Monitor module.

Talkback to the studio uses a built-in electret condenser mic whose preamplifier response has been specifically tailored for speech communication.

Four types of outputs meet most any combination of studio monitoring and communication requirements:

- Main – level may be fixed or locally controlled, as required, for the studio monitor amplifier and speaker system. Includes talkback insertion with monitor dim.
- Talent Headphones – fixed level output; includes talkback insertion with monitor dim.
- Guest Headphones – fixed level output; does not include talkback.
- Talkback – audio and logic signal for connection to a host's monitor selector and control turret.

Easy to install, easy to use, easy to service.

Radiomixer is probably the easiest console to install available today. All connections are made with easy to use connectors following a standardized wiring convention.

The use of dedicated, independent connectors for the more important signal points yields both ease of installation and flexibility of reconfiguration. The connector panel is silk-screened with clear descriptive text instead of designations such as "J13" which require a reference manual to translate.

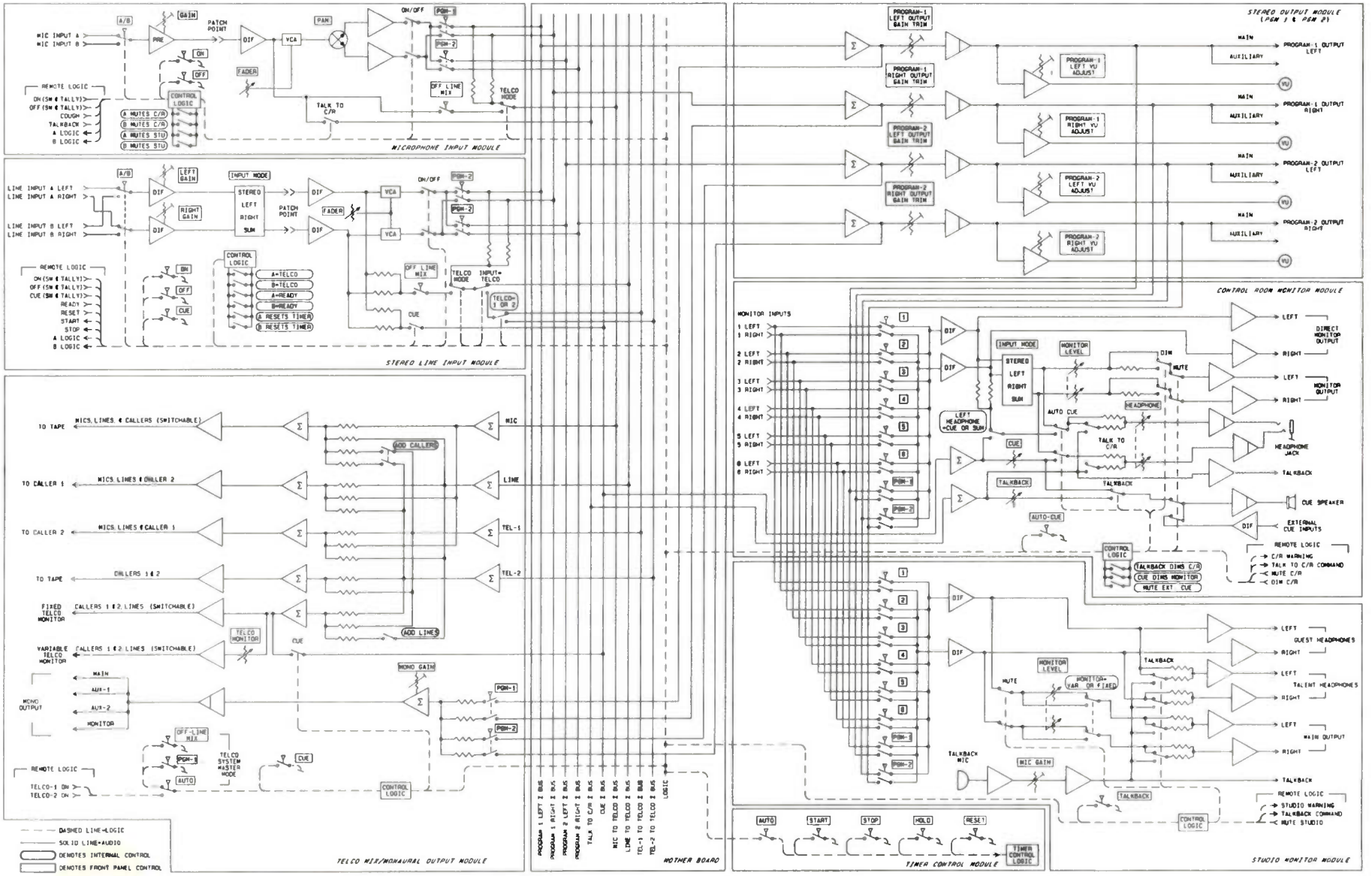
Radiomixer retains the control layout philosophy which has been field proven since 1977. The intuitive physical relationship between channel control buttons and fader, pioneered in our System One and BMX consoles, has become an industry standard.

Like all of our consoles, Radiomixer is designed to be serviced "hot". Modules can be removed and replaced with power applied.

Full documentation is supplied covering every aspect of installation, operation, maintenance, options and modifications.

And easy to order.

Call and ask your regional sales manager to explain the benefits of Radiomixer and its options. You may choose to include an oak copystand, an overbridge for peripheral equipment, or a control turret for talent and producer positions. Or, ask us to help you design and supply your entire system. Our designers and cabinet shop are experienced at what you are trying to do.



Functional Block Diagram

RADIOMIXER SPECIFICATIONS

MICROPHONE INPUTS:

Source Impedance	150 ohms
Input Impedance	30K ohms minimum, balanced
Input Level Range	Adjustable from -70 dBu to -35 dBu
Input Headroom	Greater than 30 dB above nominal input

HIGH LEVEL INPUTS:

Source Impedance	600 ohms or less
Input Impedance	Greater than 40K ohms, balanced
Input Level Range:	
Line Input Module	Adjustable from -12 dBu to +9 dBu
Patch Return Inputs	Nominal -10 dBu
Monitor Inputs	Fixed at the system operating reference level (+4 dBu or +8 dBu)
Input Headroom	Greater than 30 dB above nominal input

MAIN OUTPUTS:

Load Impedance	600 ohms minimum
Source Impedance	80 ohms, balanced
Output Levels:	
Program & Monaural	+4 dBm to +8 dBm, adjustable
Telephone Mix-Minus	Nominal 0 dBu
Tape Mix-Minus	Fixed at the system operating reference level (+4 dBm or +8 dBm)
Maximum Output Levels:	
Program & Monaural	+26 dBm, 600 ohm load
Telephone Mix-Minus	+24 dBm, 600 ohm load
Tape Mix-Minus	+24 dBm, 600 ohm load

MONITOR OUTPUTS:

Main Outputs:	
Load Impedance	600 ohms or greater
Source Impedance	40 ohms, unbalanced
Output Level	0 dBu nominal, +20 dBu maximum
Headphone Outputs:	
Load Impedance	8 ohms or greater
Source Impedance	100 ohms
Output level	0 dBu nominal, +20 dBu maximum

FREQUENCY RESPONSE:

Mic Input to Program Output	+0, -0.7 dB, from 20 Hz to 20 kHz
Line Input to Program Output	+0, -0.7 dB, from 20 Hz to 20 kHz

NOISE:

Microphone Input Amplifier	-128 dBu equivalent input noise, 150 ohm source, 20 kHz bandwidth
Line Input Amplifier	-88 dBu equivalent input noise, 600 ohm source, 20 kHz bandwidth
Output Noise with microphone channel ON, fader at -10 dB, input sensitivity at -50 dBu	75 dB below output, reference +8 dBu 150 ohm source, 20 kHz bandwidth
Output Noise with one line channel ON, fader at -10 dB, input sensitivity at +8 dBu,	80 dB below output, reference +8 dBu 600 ohm source, 20 kHz bandwidth
Output Noise with no input channels ON	82 dB below output, reference +8 dBu, 20 kHz bandwidth

DISTORTION, T.H.D.:

Mic Input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, -32 dBu input, +24 dBm output into 600 ohm load, 80 kHz meter bandwidth
Line input to Program Output	Less than 0.01%, 20 Hz to 20 kHz, +24 dBu input, +24 dBm output into 600 ohm load, 80 kHz meter bandwidth

DISTORTION, I.M.D.:

Mic Input to Program Output	Less than 0.01%, -32 dBu input, +24 dBm output into 600 ohm load
Line Input to Program Output	Less than 0.01%, +24 dBu input, +24 dBm output into 600 ohm load

BUS CROSSTALK:

Program-1 to Program-2	Less than -85 dB at 1 kHz Less than -75 dB at 20 kHz
Program-2 to Program-1	Less than -85 dB at 1 kHz Less than -75 dB at 20 kHz

STEREO SEPARATION:

Program Outputs	Less than -80 dB at 1 kHz Less than -60 dB at 20 kHz

POWER REQUIREMENTS:

Fully configured RADIOMIXER-12	350 watts @ 117 VAC, ±10%, 60 Hz
Fully configured RADIOMIXER-20	425 watts @ 117 VAC, ±10%, 60 Hz

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NOTES:

1) These specifications are for the basic signal paths, per channel, with 600 ohm loads connected to the program outputs.

2) 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit. It is the same voltage value as 0 dBm measured in a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits.

3) Noise specifications are for a fully loaded RADIOMIXER-12. Noise specifications are based upon a 20 kHz measurement bandwidth; the use of a meter with 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

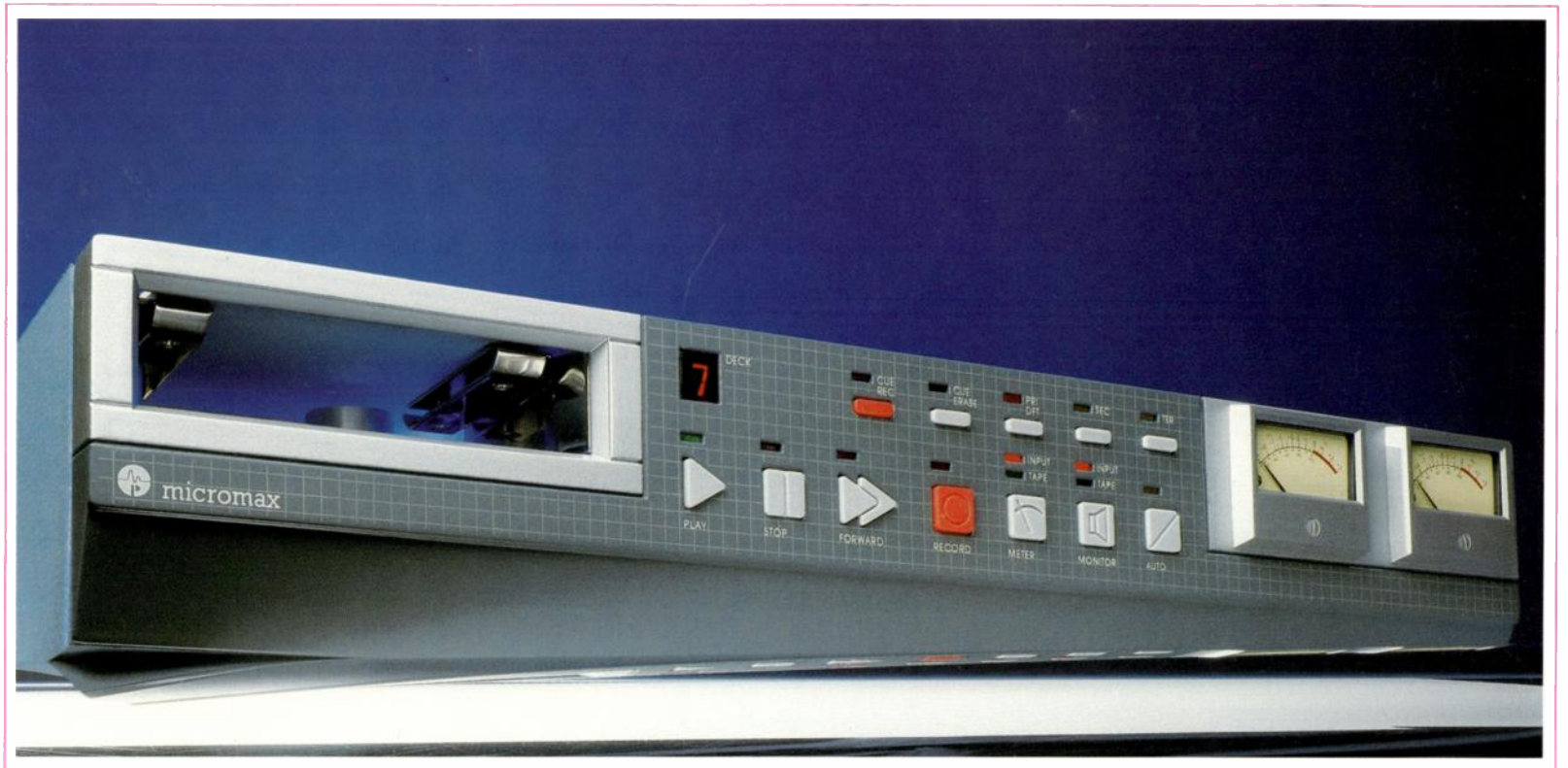
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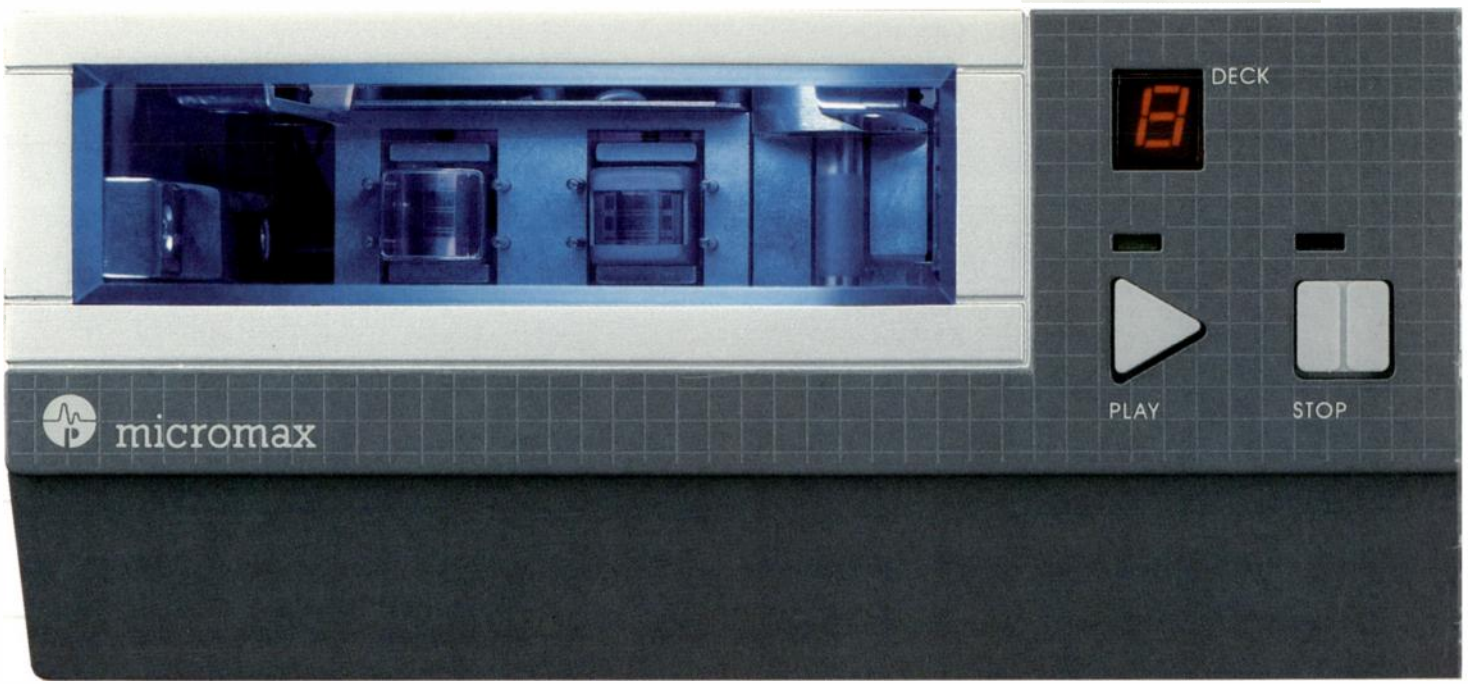
AC5M 4-89
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Pacific recorders & engineering

micromax recorder



State of the Cart™



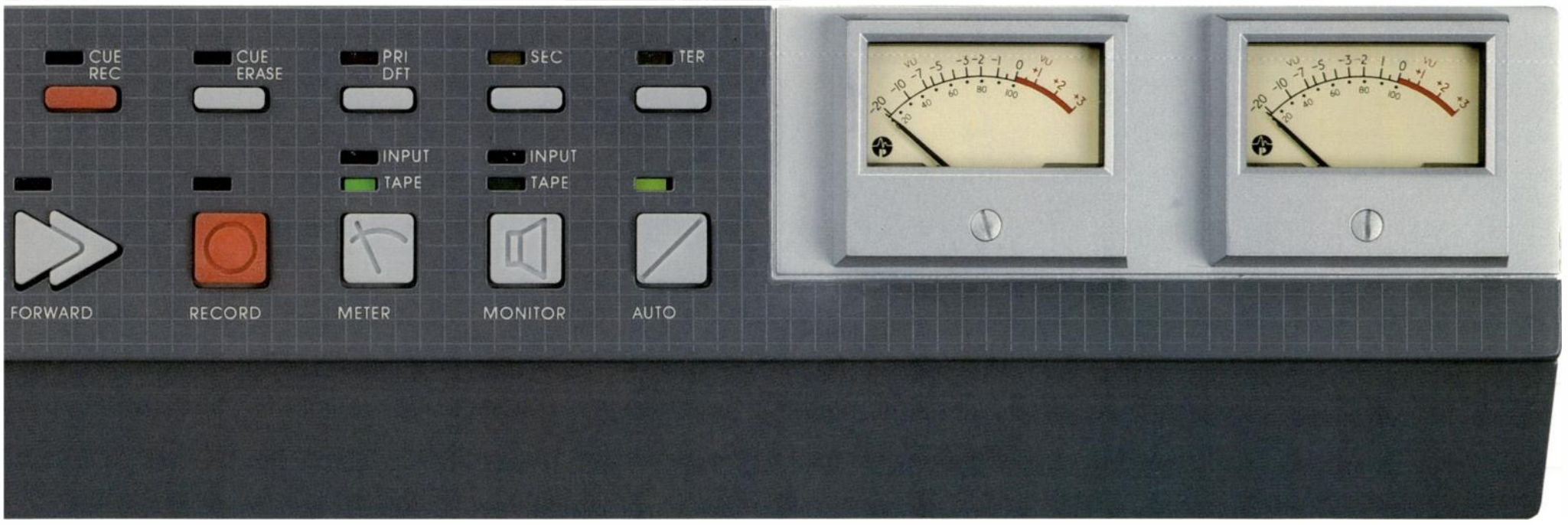
Our new Micromax stereo cartridge recorder is specifically designed for the broadcaster who demands exemplary audio performance from his studio's equipment.

The Micromax recorder and companion reproducer offer performance and practical features which exceed many other machines costing substantially more. Starting with this brochure, we invite you to compare it with any other cart machine made, at any price.

Because a high-quality cartridge recorder is one of the most vital pieces of equipment in the entire station's operation, a majority of broadcasters would like to own the finest stereo cartridge recorder made. For those who can afford this "luxury," we make it and it's called a Tomcat. Like the Tomcat, our new Micromax recorder embodies many advanced, innovative electronic and mechanical designs to achieve comparable outstanding performance. Unlike our Tomcat, however, the Micromax is a machine which practically any station can afford to own.

Although the Micromax costs significantly less than the Tomcat and other manufacturers' "high-performance" cartridge recorders, we have not made important feature compromises. As you will see, we didn't sacrifice product quality on the way to the altar of "value" either. While designing and crafting an affordable and reliable machine which offers the best of today's technology, we sought only one objective:

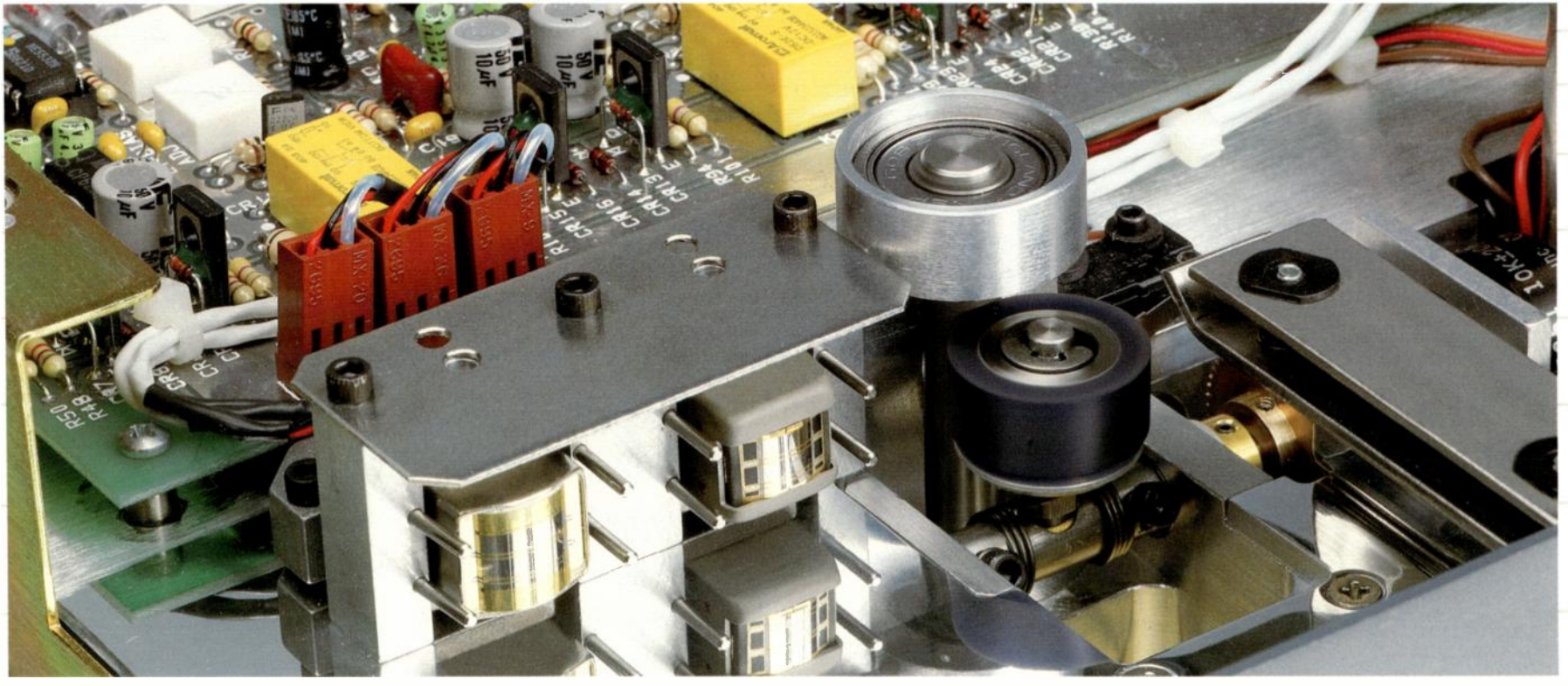
The State-Of-The-Cart.



ACTUAL SIZE

Micromax Recorder Features—A Quick Look.

- Maxtrax™ format half-track tape heads; the wide-track tape format yields more tape output and significantly less tape noise. NAB format quarter-track heads are also available.
- Compact design, available with attractive desk-top case or rack-mount chassis housing.
- Automatic input/output monitor and meter switching.
- DC servo-controlled capstan and pinch roller drive systems.
- Constant pressure, polyurethane pinch roller with self-aligning ball bearings.
- Split-second, 60 millisecond tape start.
- Automatic 22.5 ips fast wind recue.
- Cool operation; only 15 watts consumed in record mode (13 watts in idle).
- Fixed tape guide bridge, with easily adjusted head mounts.
- Genuine, full ANSI specification VU meters driven by buffer amplifiers.
- Low-noise, DC servo feedback head preamplifiers.
- Active audio/bias summing record head drivers eliminate bias traps.
- Adjustable record phase compensation.
- Cue track erase.
- Active, balanced program outputs with +24 dBm capability.
- Three cue tones standard.
- CMOS control logic with replay lockout feature.
- Tomcat-compatible remote connectors with standard 12 volt tally lamp drivers.
- Shielded toroidal power transformer.



The companion Micromax reproducer, Maxtrax™ stereo heads are standard with the recorder. The Maxtrax half-track tape head format offers nearly twice the track width of the conventional NAB quarter-track format. The audio quality obtained with the Maxtrax format is superior to the NAB format because Maxtrax's significantly increased track width yields a much broader signal-to-noise ratio. With an approximate 100% increase in the recorded signal path, there's more signal integrity, recording or playing back, regardless of the type of program material.

Because many broadcasters already have an extensive NAB format cart library, the Micromax can be ordered with NAB-type heads at no additional cost. Although you won't get the improved performance of Maxtrax, you will obtain performance that makes the Micromax the best NAB format recorder you've ever heard. When you're ready to take advantage of the Maxtrax format benefits, the Maxtrax head conversion is a low-cost, simple and straightforward change. In addition to the heads, the only change to the electronic circuitry is the substitution of a few resistors.

THE MECHANICS: STRONG AND SIMPLE.

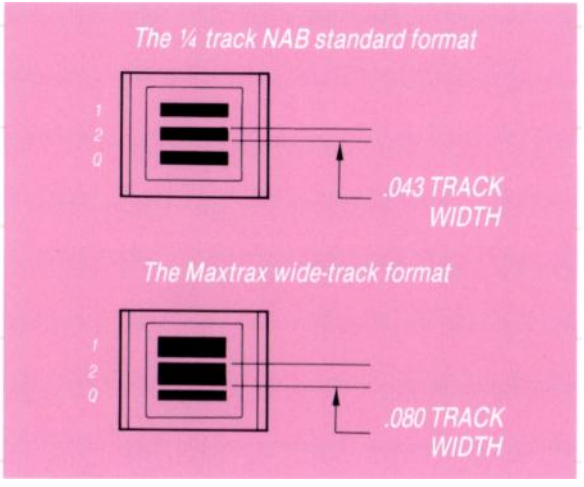
At the heart of the Micromax Series are two unique DC servo motor control systems: a powerful, compact capstan motor and an independent, equally compact servo motor for engaging the pinch roller.

A miniature but powerful DC servo motor uses a long-life polyurethane belt to drive a large underdeck flywheel and capstan shaft. The finely-honed capstan shaft is supported at the top and bottom with two microfine ball bearings in a solid, machined housing and support assembly for maximum rigidity. The capstan drive assembly is carefully machined for perpendicularity and securely mounted to the cartridge deckplate.

Micromax's flywheel/capstan and belt drive system offers several cost/performance advantages over conventional AC or DC "direct drive" motor systems:

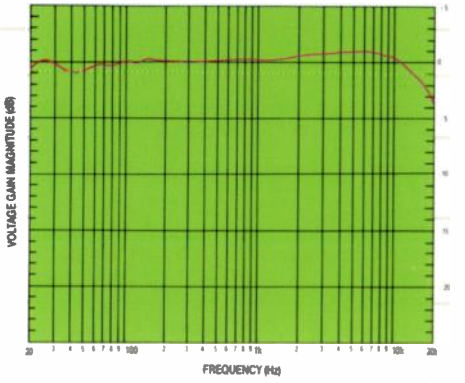
- Dramatically reduced space requirements
- Substantially increased torque
- Greater power efficiency
- Reduced wow and flutter components

In addition to these significant benefits which combine to produce higher overall performance specifications, there's less maintenance too. The cost of replacing the component motor is a fraction of the cost of a conventional direct drive system, which by definition, has to include



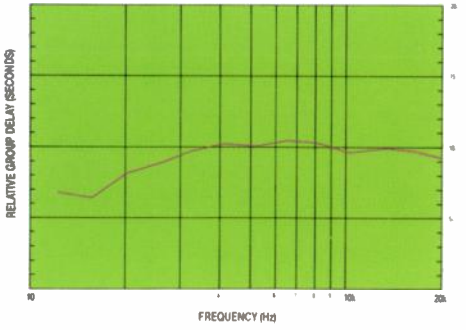
Nearly twice as much track width with Maxtrax. The bottom line here is better sound.

FREQUENCY RESPONSE



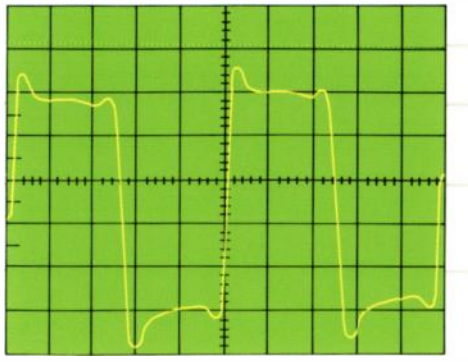
Very flat response across the most critical portion of the audio bandpass: ± 1.0 dB, from 40 Hz to 16 kHz.

MICROMAX GROUP DELAY



Computer-aided design and careful selection of electronic components has resulted in nearly linear, 10 μ seconds group delay response characteristics.

SQUARE WAVE RESPONSE (2 kHz)



Micromax incorporates adjustable record phase compensation circuitry to correct from time-domain anomalies. As depicted here, only 10% overshoot, with no ringing.

Please refer to the Specifications for test parameters and notes.

the capstan shaft and bearings. Because the simplified electromechanical drive system isn't dependent on a sophisticated microprocessor, you don't need an advanced engineering degree and logic analyzers to keep your machines up and running.

The pinch roller mechanism is just as innovative and trouble-free as the capstan drive system. Micromax's polyurethane pinch roller is engaged with an independent, unique DC servo motor system. This design approach, in addition to yielding the fastest Start and Stop performance of any cart machine made, has several other important benefits.

Center supported by a low-friction floating ball bearing, the pinch roller self-aligns to the capstan automatically and thus practically eliminates the associated problems with pinch roller induced tape skewing. This advanced servo mechanism requires power only when lifting and retracting—never while the tape is in motion!

Because this innovative pinch roller design requires substantially less power than conventional solenoid operated designs, the machine runs much cooler. Complicated, noisy, heat-generating solenoids are now antiquated in comparison. Tedious and sometimes frequent adjustments of damper screws or chains are eliminated; any adjustment required for Micromax's pinch roller is made with trim potentiometers located on the easily accessible servo control electronics PC board. The pinch roller system is very quiet.

Both the capstan and pinch roller subassemblies are securely mounted to a thick, machined alloy deckplate. Cartridges are precisely aligned to Micromax's heads with the aid of heavy-duty, spring-loaded, polished stainless steel guide "shoes."

Simple, but extremely effective solid stainless steel tape guide rods are fixed to the head block assembly.

PR&E

THE HEADS: THE BEST ANYWHERE.

The tape heads are solidly mounted and easy to adjust. The machined head mountings feature independent provision for head height, zenith and azimuth. Tensioned with compression springs, the heads will stay accurately aligned. Rarely, if ever, should you need to re-adjust them.

The heads are manufactured to stringent tolerances to minimize undesirable low frequency pole-tip profile effects. The manufacturing test specifications of our heads are the tightest in the industry.

Other further refinements in the electronics include active audio and bias summing record head driver circuitry which eliminates tedious record bias trap adjustments, and in the reproduce preamplifiers, an exclusive high frequency equalization stage. The latter is independent from the conventional reproduce equalization circuit and permits trimming the preamplifier band-edge response to compensate for reproduce head-gap loss.

The stereo outputs are active, balanced with a +24 dBm capability for plenty of headroom.

For convenience, a user-settable LED deck number (assignable from "1" to "9") doubles as the "power" indicator. Micromax's functionally-shaped control buttons provide immediate visual recognition.

The recorder's compact design only requires 3.5" of vertical rack space. Two companion Micromax reproducers may be installed in an equivalent amount of space. Together, the three machines would only require a total rack space of 7."



REAR VIEW

THE ELECTRONICS: COMPUTER-AIDED DESIGN.

The electronic design of the Micromax is just as impressive.

To complement the superior performance of our tape heads, we designed a new generation of high performance, state-of-the-art electronics. The critical head preamplifiers feature a true DC servo feedback which results in reduced distortion and improved noise specifications. This design, which utilizes some of the finest IC components available, was designed with the aid of a computer system with sophisticated circuit-modeling software. To retain the high standards of performance obtained by this engineering effort, we utilized yet another computer-based system to optimize critical printed circuit design parameters—our separate CAD/CAM systems. The result was an optimized design which allows us to achieve superlative, repeatable characteristics in the real world of electronics manufacturing.

OPERATIONAL FEATURES: LOADED.

Micromax's CMOS control logic can be easily set for a Replay Inhibit mode which prevents accidental cartridge replay.

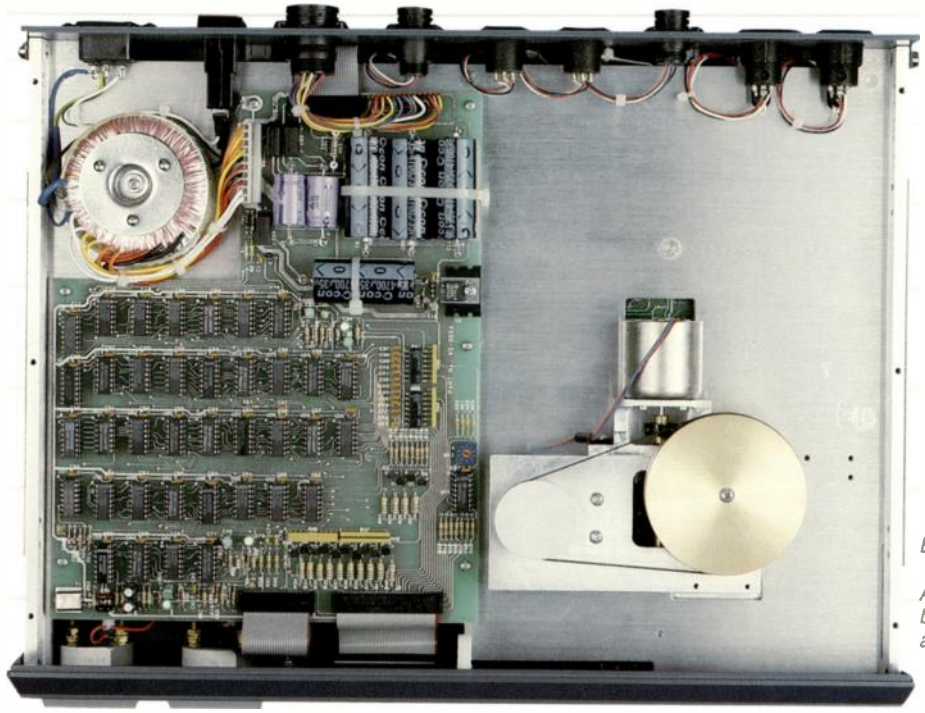
Auxiliary cue tones, secondary and tertiary, are included with independent tally indicators. Cue track erasure is standard. At the end of a recorded secondary tone, the 22.5 ips fast wind mode (recueing) may be automatically initiated.

Full specification, miniature VU meters are automatically switched between input or output monitoring modes by the record set and reproduce status of the recorder. The meters and monitor may also be manually mode-switched with the convenient front panel buttons.

Tally lamp voltage outputs for all functions are available on a remote control connector located on the rear of the chassis. Separate connectors cue track input and output audio. Both the remote and cue track connectors are plug compatible with our Tomcat Series machines.

THE POWER SUPPLY AND OTHER DETAILS.

The Micromax recorder consumes only 15 watts while recording (13 in idle). Due to this very cool operation, the machine simply doesn't need chassis openings. You won't find "ventilation slots" or screens which can admit more of the outside world into your machine than you want, like spilled coffee, dust, smoke, etc! This important benefit is largely a result of the compact capstan/pinch roller motor design, but the compact power supply additionally deserves some credit. This fully regulated power supply is mounted directly beneath the thick deck platen on an easily reached circuit board together with the logic circuitry. Tucked neatly next to this circuit board is a shielded toroidal power transformer. This efficient transformer not only generates less heat, it emits less stray hum-inducing EMI fields.



Bottom View:

All logic is contained on a single circuit board. The power supply utilizes a compact and efficient toroidal transformer.

EASY TO APPRECIATE: EASIER TO LIVE WITH.

The overall design of the Micromax puts a machine in your hands that's uncommonly easy to maintain. The rear-hinged top panel may be quickly and easily unlatched with three quick-release fasteners and raised wide-open for complete routine maintenance access. Likewise, the bottom panel is easily removable.

All the electronics are mounted on a minimum of circuit boards: audio/cue, logic/power supply, and servo control. The audio/cue electronics are mounted immediately adjacent to the record and reproduce heads to minimize lead length. The servo control circuitry board is adjacent to the capstan/pinch roller drive system. These boards feature quick-release, reliable miniature connectors.

The logic and power supply PC assembly is located under the deck assembly platen and may be accessed from the bottom. A single hole in the bottom chassis cover permits an easy screw driver adjustment for setting the front panel deck number.

All boards are flat-mounted, designed so that all the electronic components and their interconnections are easily accessible. All IC's are socketed.

Although we're confident you'll rarely have any reason to examine and appreciate the superior internal design of a Micromax, we've made the internals a breeze to service.

MICROMAX: READY FOR TODAY'S BROADCAST REQUIREMENTS.

A radio broadcaster's technical challenge to produce continually better sounding programs is not a question of replacing the traditional cartridge machine, vinyl LP's or reel-to-reel tape with the Compact Disc (CD) or computer-stored audio program material.

Broadcast carts have been around for a long time because they're a great medium for many program elements. They're easy to handle and store. Easy to record and re-record. Easy to label. Easy to identify. A single media with a single event. Best of all, "accessing" and playing a cart doesn't require complicated and unrealistic programming time to accomplish; while recovering from an operator error is very simple.

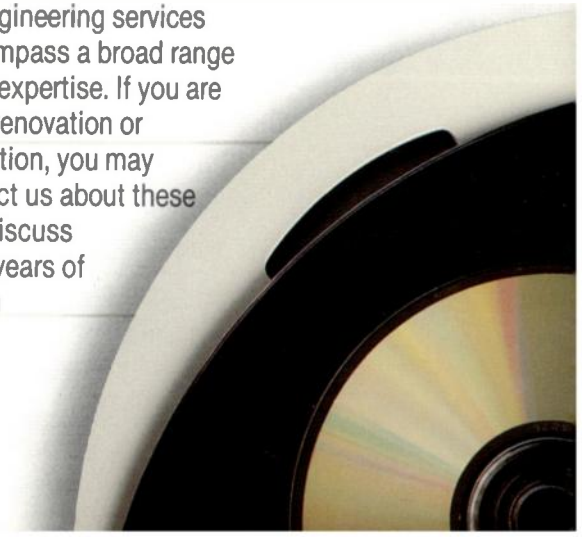
Lastly, we're all familiar with the punishment a cart can (and does) take in control room operations. For now, it's hard to improve on the great on-air sound that's available with today's cart machines. The real challenge, as it has been for many years, is the improvement of all source and delivery systems.

Digital audio technology is here with exciting potential in the near future. For today's programming though, the exemplary performance and useful features of our new Micromax Series are right in step with improved source materials, regardless of their format.

In addition to the Micromax Series and Tomcat cartridge machines we also manufacture an extensive console line which includes the BMX Series II and III on-air consoles, the AMX Operations console, the ABX Multitrack Production Console and the Newsmixer. An extensive array of signal processing, routing, distribution and switching peripheral equipment is also available.

Many of our cart machines have been designed into complete studio facilities packages. We offer not only excellent products but also complete systems engineering services which encompass a broad range of technical expertise. If you are considering renovation or new construction, you may want to contact us about these services and discuss putting our 17 years of systems design experience to work for you.

PR&E



MICROMAX RECORDER SPECIFICATIONS

Tape Format	NAB size AA cartridge
Tape Speed	
Record/Play:	7.5 IPS
Fast Wind:	22.5 IPS
Tape Track Format	
MAXTRAX™:	Two 80 mil audio tracks, 21 mil cue track
NAB:	Three 43 mil tracks for stereo audio and cue
Start Time	Less than 60 mSec
Stop Time	Less than 40 mSec
Wow and Flutter	Better than 0.08% RMS unweighted
Speed Accuracy	Better than 0.1%
Input Impedance	40 KΩ, balanced and bridging
Input Level Range	-1 dBu to +9 dBu
Output Impedance	
Source:	Less than 150Ω
Load:	600Ω minimum

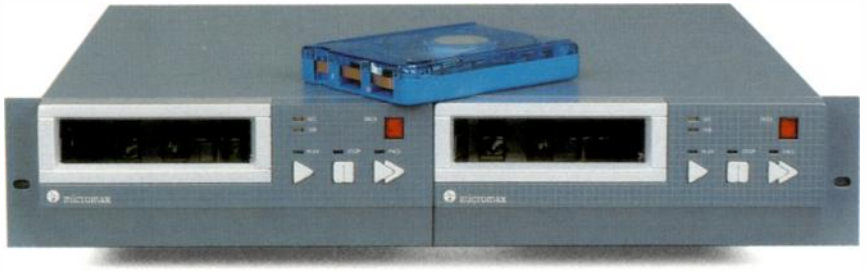
Output Level	-1 dBu to +9 dBu, (follows input level)
Maximum Output Level	+24 dBm into 600Ω
Reproduce Amplifier Distortion	Less than 0.01% THD, 20 Hz - 20 kHz
Record Amplifier Distortion	Less than 0.01% THD, 20 Hz - 20 kHz
System Distortion*	Less than 1% THD, 1 kHz
Frequency Response*	40 Hz to 16 kHz, ±1 dB
Square Wave Response*	Less than 10% overshoot, no ringing, 2 kHz test signal. Phase compensated.
Noise*	
Bias only, MAXTRAX™:	-56 dB unweighted; -60 dB A weighted
Bias only NAB:	-55 dB unweighted; -59 dB A weighted
Without tape:	-58 dB unweighted; -62 dB A weighted
Separation, Audio Tracks*	Better than 45 dB at 1 kHz
Crosstalk, Cue to Audio*	
MAXTRAX™:	Better than 55 dB at 1 kHz
NAB:	Better than 50 dB at 1 kHz
Bias Signal	100 kHz crystal generated, less than 0.07% THD

Cue Signals	All crystal generated.
Record:	1 kHz primary, 150 Hz secondary, 8 kHz tertiary
Reproduce:	1 kHz primary, 3 kHz primary at fast wind, 150 Hz secondary, 8 kHz tertiary
Output:	12 volt DC control outputs for secondary and tertiary tone detection. Cue audio output unbalanced, 0 dBu nominal.
Cue Erase*	Better than 30 dB
External Connectors	
Audio:	XLR type
Remote:	16 pin AMP, lock-ring type
Cue:	4 pin AMP, lock-ring type
Power Requirements	115 VAC, 60 Hz 13 watts idle, 15 watts running
Weight	17 lbs. (without case)
Dimensions	
Rack mount version:	19" Wide, 3.5" High, 14" Deep. (Allow 3" minimum at rear for cables and connectors.)
Desk-top version:	18.25" Wide, 3.5" High, 14" Deep.

*NOTE: All measurements were taken using Audiopak type AA-4 cartridges and tape at a standard recording level of 250 nWb/m. Noise measurements taken in a 20 Hz to 20 kHz bandwidth from a reference level of 250 nWb/m. Frequency response measurements made 10 dB below the standard recording level.

0 dBu corresponds to a voltage level of 0.775 VRMS regardless of the impedance of the circuit. It is the *same voltage* value as 0 dBm measured in a 600 Ω circuit. This enables convenient level measurement with meters calibrated for 600 Ω circuits.

Graphical data courtesy Deane Jensen/Jensen Transformers. Graphs derived from measured data using COMTRAN™ FFT Waveform Analysis and Time Domain Data Acquisition.



The micromax series includes a high-performance Stereo Reproducer. Two compact Reproducers may be rack-mounted side-by-side in only 3½" of height. A separate detailed brochure is available.

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Hands Down, the #1 Choice

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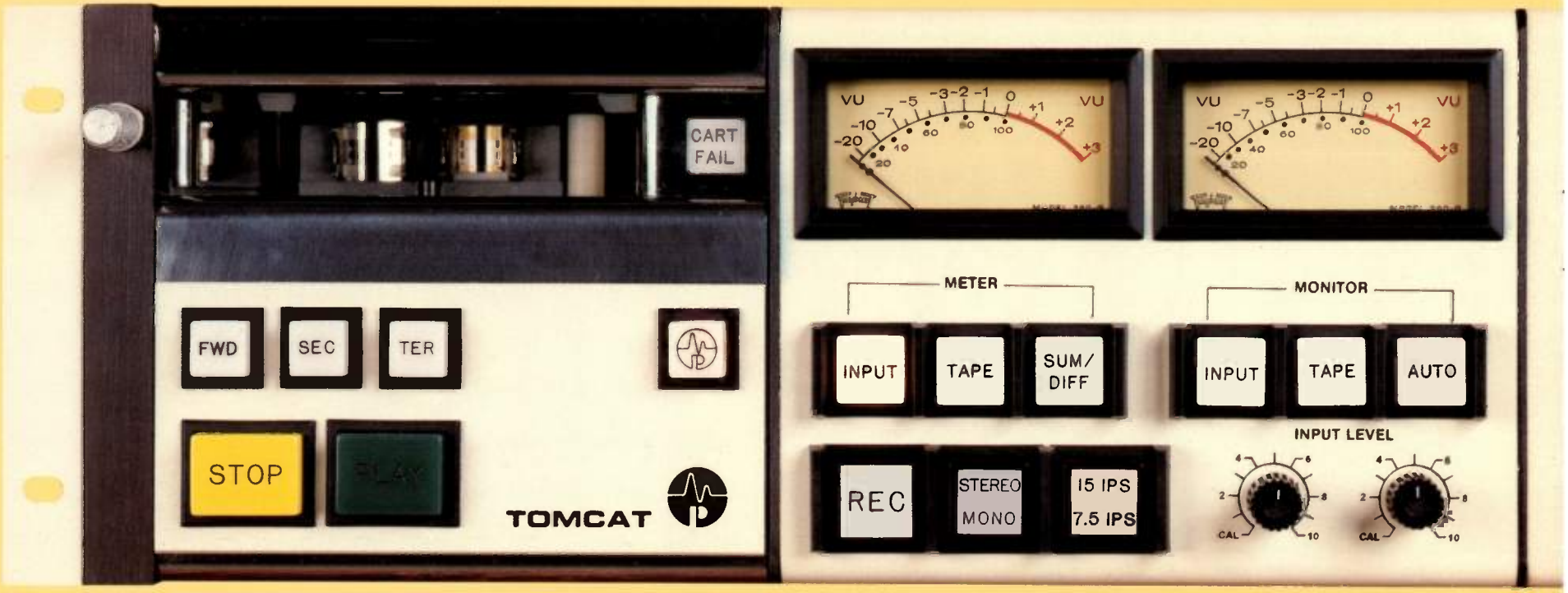
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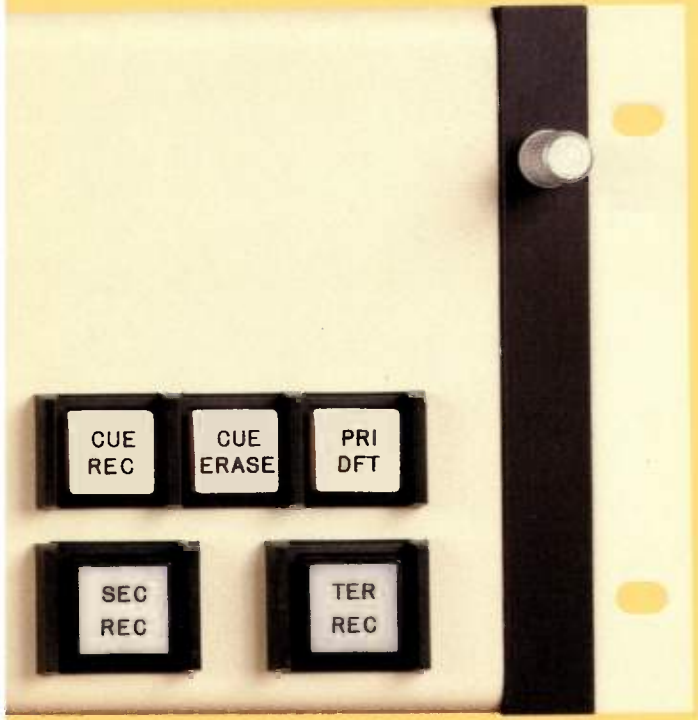


Tomcat

The Legendary Performance Standard

FEATURES:

- MAXTRAX® wide-track tape heads yield more tape signal, less tape noise.
- Precision fixed tape heads and guides for the lowest tape phase error.
- Fast-start DC servo capstan motor—runs only while pulling tape.
- Polyurethane long-life pinch roller with self-aligning, center-supported ball bearing.
- Constant-force pinch roller system, controlled electronically.
- Auxiliary cue tones standard.
- Cue tone erase capability.
- Standard 7.5 IPS & 15 IPS record/reproduce speeds.
- Automatic Fast-Wind function standard: 15 and 30 IPS selectable speeds.
- User selectable Left/Right and Sum/Difference matrix audio formats.
- Automatic Monaural/Stereo compatible playback operation provided by matrix format.
- Low noise, low distortion electronics with excellent headroom, frequency and transient response.
- Long-wearing stainless steel tape deck platen and cartridge guides.
- Accurate, repeatable cartridge positioning system.
- CMOS microprocessor logic control system with 12 volt DC interface logic.
- Low power consumption, low heat generation.
- Compact and easy to service.
- Trimount (3) Reproducers in only 5.25" of rack space.



70% OF ACTUAL SIZE

TOMCAT: the name

The name TOMCAT may seem an odd choice for a high performance cartridge recorder. It came from the working title of the three year design and engineering project to develop our first NAB cartridge machine:

Theory Optimized
Microprocessor Controlled Audio Transport

Once Project TOMCAT was out of the lab and into production, the last thing we wanted was an identity comprised of lackluster, nondescript numerals. Such a totally unique and revolutionary machine demanded something more. The engineering team's logical argument for retaining the TOMCAT name made eminently good sense. When the dust settled, the project acronym stuck.

TOMCAT: the project

As a new entry to the cartridge machine market, we had to deliver a machine which was a substantial improvement over (and not just a clone of), existing technology and hardware. Our console and system clients had already told us what they didn't like about existing cartridge system performance and challenged us to design a machine which answered their concerns. Broadcast production personnel wanted a machine which simplified dubbing by providing fully mode-automatic input/output monitor and meter switching. Film and video post-production studios wanted a machine which started faster and offered 15 IPS audio mastering performance. On-air operations suggested accidental replay lock-out and made a plea to make the drive system quieter. News departments requested faster recue speed. Engineering asked for longer head and pinch roller life and more reliability.

Our goal was to design and build the best cartridge recording and reproducing system in the world, with no shortcuts and no sacred cows. Because our sights were set on crafting a cartridge machine whose performance would rival or exceed a professional half-track reel-to-reel recorder, we designed and selected every component by only one criteria: the finest.

When the best components were uncovered, we used them: like the Deane Jensen-designed JE-990 record and reproduce amplifiers, the sophisticated 1802 CMOS microprocessor and the high-speed, low-noise 5534 IC. When we couldn't find materials or components that could cut it, we innovated and designed our own: like the superfast-start servo capstan motor, the cam-operated pinch roller assembly, and the precision MAXTRAX® format heads (to cite just a few examples). Every step along the way, Project TOMCAT knew no compromises.

First introduced at NAB 1980, TOMCAT attracted the immediate attention and critical acclaim of both the broadcast and post-production industry. Although TOMCAT was the most expensive cartridge recording system ever made (and still is), its acceptance by clients eager for performance was immediate.

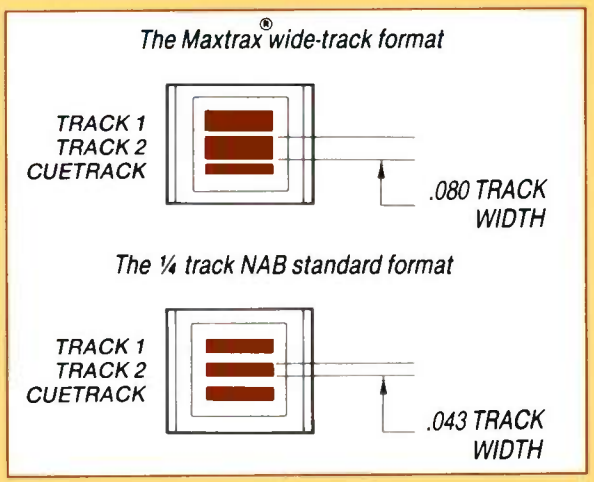
Over the years we've made small refinements, but the basic TOMCAT hasn't changed. There is only one major change since 1980: there are now several thousand in radio and television stations, plus film and video post-production facilities throughout the world. If you're ready to join this select, noncompromising users' group, read on to find out what makes TOMCAT the best.

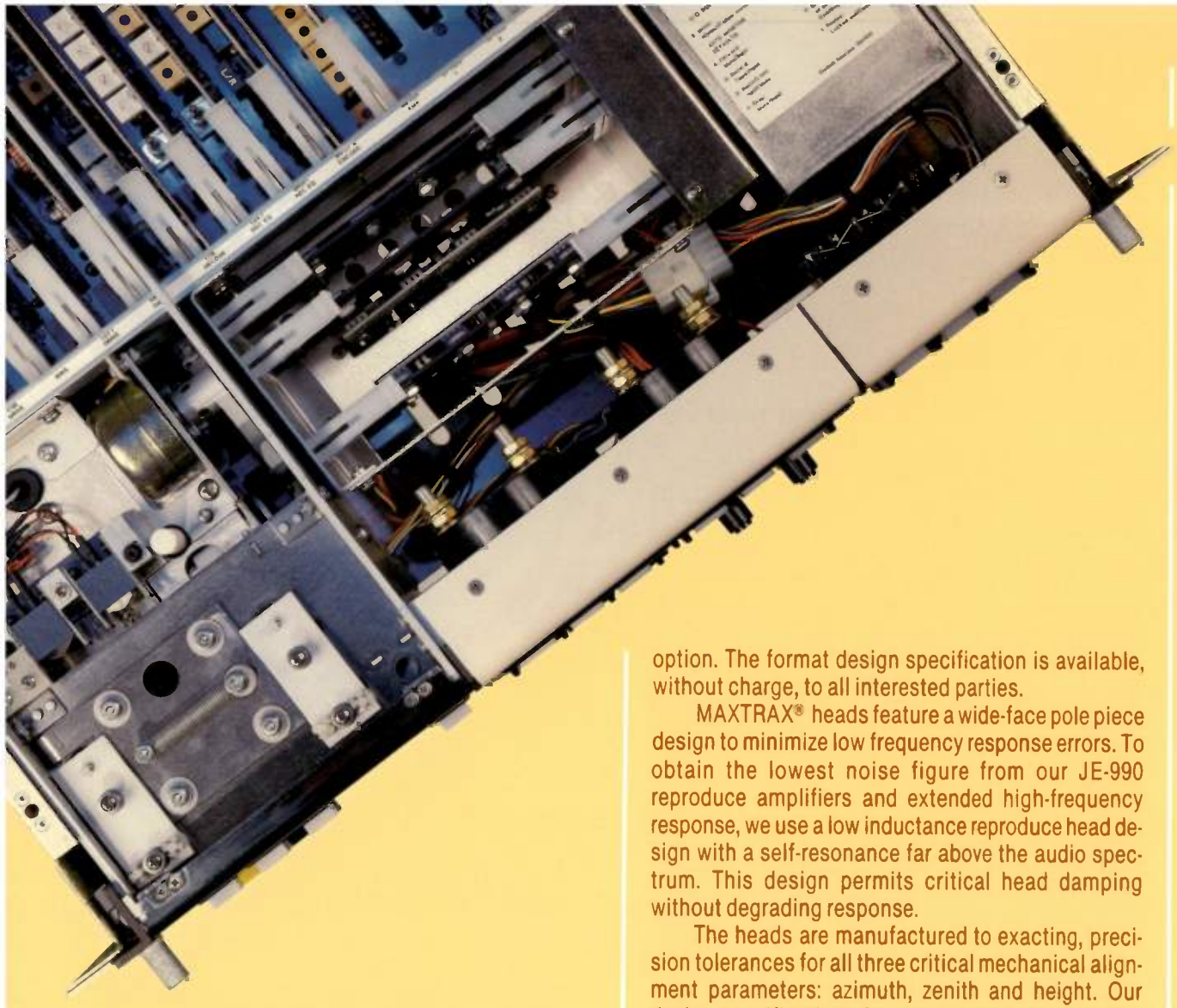
MAXTRAX®: the high performance format

One of the first problems traditional stereo cartridge machines have in competing with the performance of a half-track reel-to-reel tape recorder is the recorded track width. NAB stereo cartridge tracks, only 0.043 inch wide, provide 6 dB less signal (while only 3 dB less wide-band tape noise) output than the 0.082 inch NAB half-track reel-to-reel format.

A no-compromise decision was made to abandon the NAB stereo cartridge format and design a special wide-track, low noise head: the MAXTRAX® format. This head format offers nearly twice the track width of the conventional NAB stereo quarter-track design and provides not only more tape signal, yielding better signal-to-noise performance, but also a reduced

MAXTRAX®/NAB TRACKWIDTH COMPARISON





susceptibility to tape drop-outs. With nearly a 100% increase in the track width (.080 vs. .043), there's more signal integrity because there's more track to work with.

Although MAXTRAX® is a registered trademark of Pacific Recorders, we purposefully placed the track design in the public domain to encourage others to offer it to the industry as a high performance alternative. Several manufacturers in the U.S. and abroad (including Otari and Fidelipak) now offer MAXTRAX® heads as an option. The format design specification is available, without charge, to all interested parties.

MAXTRAX® heads feature a wide-face pole piece design to minimize low frequency response errors. To obtain the lowest noise figure from our JE-990 reproduce amplifiers and extended high-frequency response, we use a low inductance reproduce head design with a self-resonance far above the audio spectrum. This design permits critical head damping without degrading response.

The heads are manufactured to exacting, precision tolerances for all three critical mechanical alignment parameters: azimuth, zenith and height. Our design specifications for these components are the tightest in the industry. The pole pieces are constructed with exotic metal laminations which are significantly harder and longer wearing than traditional cartridge heads. The other materials used in the construction of the heads have been critically selected to have nearly equal hardness to the pole faces; this factor is very important in obtaining the uniform wear characteristics which yield extended head life.

In 1980 we proposed a new recording and operating level of 250 nWb/m to take advantage of the new high-output and low-noise tape formulations (and TOMCAT's extended headroom capability). This new level is 3.8 dB higher than the "assumed" standard operating level of 160 nWb/m,* and therefore yields an additional 3.8 dB of signal-to-noise ratio. We're pleased to see that over the years this recommended level has been adopted by manufacturers of cartridges and machines. When this elevated operating level is combined with the inherent low-noise benefits of the MAXTRAX® format, there is a dramatic reduction in audible tape hiss—without resorting to the added expense, response errors and complexity of outboard noise reduction.

*NAB STANDARD, 1976
Audio Cartridge Tape Recording and
Reproducing Systems

Section 3.2.2 Standard Operating Level
The standard operating level is not specified.

TRANSPORT DESIGN:
the precision tape path

Various designs have tried to address the problems and symptoms of azimuth errors in closed-loop cartridge systems: exotic electronic circuits and Rube Goldberg mechanics abound. We analyzed the dynamic mechanisms involved and solved the various contributing mechanical problems in a much simpler way. Not surprisingly, this analysis found that both the cartridges and traditional machine design had enough built-in tolerance errors to create a wide range of azimuth errors. More importantly, we discovered that if the machine-contributed errors could be dramatically reduced, an acceptably high percentage of cartridges would yield excellent performance. Analysis of those cartridges which did not perform well confirmed that they were indeed defective in material and/or assembly. Tomcat's transport would have to be a precision tape drive, with guidance and head system which would greatly reduce the machine's contribution to azimuth error.

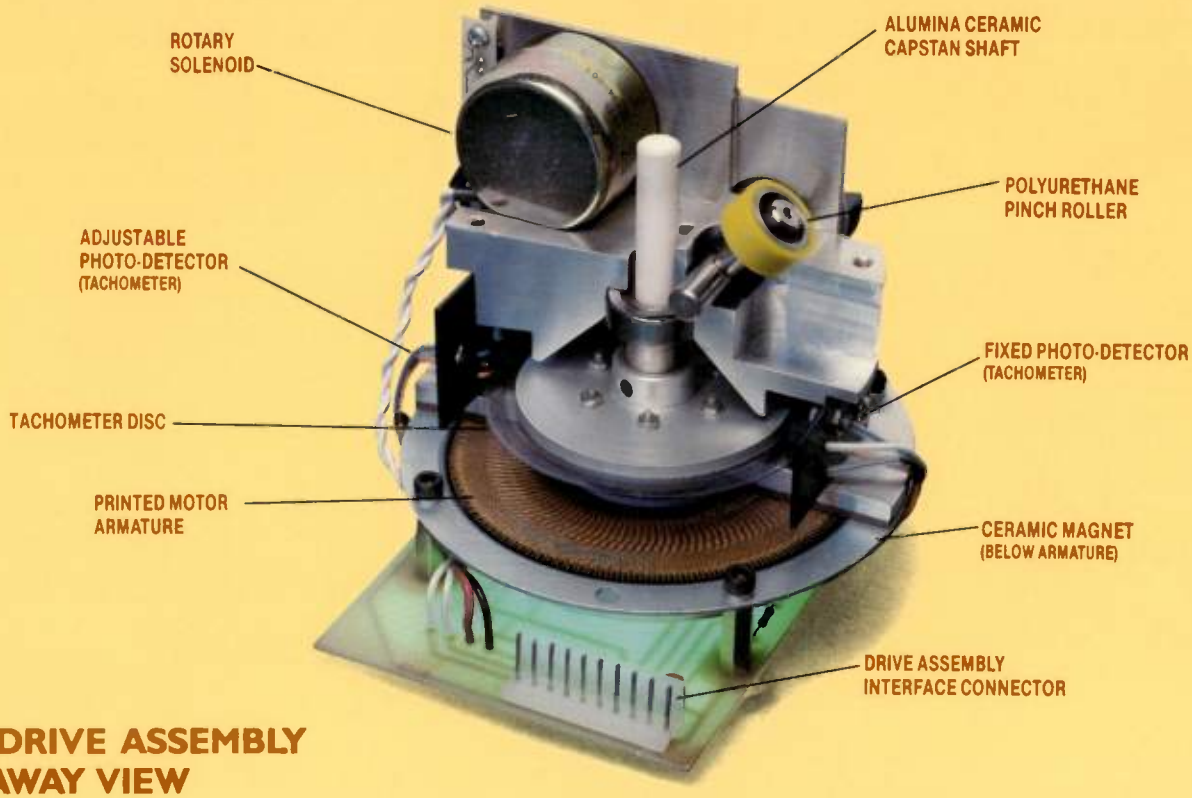


Precision head/guide assembly.

There are two critical assemblies in a cartridge transport which determine the path accuracy of the dynamic, or moving, tape web. These are the head/guide assembly and the capstan/pinch roller interface.

The tape guides must be a precise width, absolutely in-line, and the heads precisely in zenith to eliminate tape skew induced by inconsistent tape supply tension. Indeed, if the supply tension could be guaranteed from cart to cart over the life of the library, cartridge machines could be more like open reel tape recorders where heads are often adjusted to compensate for dynamic tape path errors! Our solution is to define the tape's path across rigidly mounted, fixed azimuth heads. For proper tape guidance, TOMCAT's head assembly features integral, long-wearing stainless steel guides fabricated to exacting tolerances. Secondly, the fixed head assembly itself eliminates the adjustable components whose very adjustment contributes to tape path error.

The capstan/pinch roller interface is, perhaps, one of the least understood and one of the most critical assemblies in a tape deck. Assuming that the capstan is perfectly cylindrical (not conically shaped), the drawn tape will attempt to find a path which is perpendicular to the axis of rotation. Therefore, it is critical for the head/guide assembly to be precisely in-line with the drawn tape path. The addition of the pinch roller adds another dynamic guiding element, which may not be exactly cylindrical or, worse, rotating on an axis not precisely parallel to the capstan. Of the various methods of providing proper alignment for a pinch roller, we chose to use a self-aligning ball bearing in the center of the roller. This not only aligns the roller, but greatly reduces running friction and eliminates the wear factor of the more conventional, and lower-cost, Oilite® sleeve bearing.



TAPE DRIVE ASSEMBLY CUT-AWAY VIEW

CAPSTAN MOTOR: incomparable performance

Drive System Design Goal: develop a low-mass, high performance DC servo motor which can start fast enough so that it *runs only while pulling tape!*

Obviously we couldn't use off-the-shelf parts. Virtually all commercially available direct drive capstan motors have heavy outside rotor armatures or require inertia flywheels to reduce flutter. Unfortunately, this heavy mass precludes the possibility of rapid acceleration. We chose a printed circuit armature, an alumina oxide ceramic shaft and a mylar tachometer disk to design a low-mass, high-torque motor which can accelerate to 15 IPS in less than 80 milliseconds! Two photo sensors generate a 482 pulse per revolution tachometer signal from a computer-plotted shadow disk. This signal is compared to a microprocessor-controlled reference frequency in a phase-locked servo system so precise that the traditional inertia flywheel is unnecessary. Low motor flutter is achieved by the tightly locked servo system providing an "electronic flywheel." To optimize the power efficiency of the motor, and generate a minimum of heat, a demand-regulated dual-voltage motor drive amplifier was developed to power the low-mass armature.

The nonmagnetic, extremely hard, ceramic capstan shaft is diamond ground to final tape drive diameter while running in the assembled capstan motor to ensure minimum runout. This final machining technique, although considerably more time-consuming and elaborate than assembling stock parts, helps achieve exceptional wow and flutter performance.

PINCH ROLLER SYSTEM:
computer-designed engagement

The pinch roller mechanism and capstan motor are designed as a single integrated module to assure the most accurate registration of the tape drive elements.

The unique pinch roller engagement system employs a compact rotary solenoid with a computer designed Delrin actuator cam. The cam's precise curve optimizes pinch engagement motion versus force; this rapidly lifts the pinch roller and applies the running pressure. The pinch pressure is electronically set by a potentiometer in the solenoid's constant current drive amplifier. The constant torque delivered by the solenoid results in carefully regulated pinch roller pressure regardless of solenoid temperature, mechanical variations or even tape thickness. A dash-pot on the pinch roller mechanism keeps engagement and disengagement smooth and silent. Unlike traditional low-cost neoprene rollers, TOMCAT's self-aligning pinch roller is made of polyurethane for very extended life.



Pinch roller actuator and cam.

CART POSITIONING:
positive and accurate

The cartridge insertion and positioning system is precise and repeatable for consistent accuracy. The multiplane location references for the cartridge housing are obtained by stainless steel dowel stops in the capstan motor block, a fixed, stainless steel entry guide and the precision deck plate itself. The cartridge is held down securely with spring-loaded nylon shoes and held against the right-hand guide by a separate spring-loaded stainless entry guide.

AUDIO CIRCUITRY:

The audio electronics are the most technically advanced ever designed into a broadcast cartridge recorder/reproducer. The designs utilize the optimum combination of discrete and integrated circuitry to provide the highest level of audio performance. The record head drive amplifiers and the reproduce head preamplifiers are specialized versions of Deane Jensen's JE-990 discrete operational amplifier design. The balance of the audio circuitry was designed using the NE5534 IC amplifier which features a very low noise figure, high speed and high drive current capability.

RECORDING:

TOMCAT's input is balanced, bridging and floating, using an instrumentation input amplifier. The input level is controlled by the front panel controls which are provided with a detented calibrate position for standard input reference.

The record equalizers provide separate high frequency control and phase correction for both 7.5 and 15 IPS tape speeds. Adjustable phase compensation is required to correct for phase shift introduced by the equalized magnetic recording/reproducing process. The record bias signal is crystal oscillator-generated, divided to 200kHz and filtered by circuitry which maintains constant amplitude and very low harmonic distortion content.

The high speed JE-990 record amplifier mixes the audio and bias signals directly without the need for bias traps and tuned circuits. The record head is located in the feedback loop of the record drive amplifier which provides a constant record current versus frequency drive characteristic. This eliminates the need for additional equalization to approximate constant record current drive. TOMCAT is the only cartridge recorder, and one of the few tape recorders of any type to utilize an active, constant-current record drive amplifier.

REPRODUCE:

The JE-990 reproduce preamplifier has been optimized for best noise performance from the low inductance MAXTRAX® head: Equalization controls for 7.5 and 15 IPS tape speeds are provided in the preamplifier feedback circuit. The output amplifier is a hybrid integrated and discrete design which is coupled to a Jensen output transformer. The amplifier output is balanced, floating, and is capable of delivering +25 dBm.

CUE TRACK FEATURES:

Cue tones are supplied by function generator circuitry designed for very stable frequency and level. The cue track may be recorded, erased and re-recorded independently of the main program tracks. The cue tones and any external control signals are recorded by the same type of record amplifier used for the main audio tracks. The equalized cue reproduce amplifier feeds the cue track signal to five phase-locked loop decoders for program detection. A balanced, floating, line level direct output for FSK or other applications is provided.

MONITORING AND METERING:

The metering and monitoring systems offer a complete selection of all audio operating and alignment functions. The VU meters conform fully to ASA specifications and are driven by balanced, floating differential amplifiers to isolate the meter rectifiers from the audio signals. The record head bias currents are measured by precision diode conversion circuitry which calibrates the VU meters to display bias in true dB scale.

AUDIO FORMATS:
Discrete or Matrix, your choice.

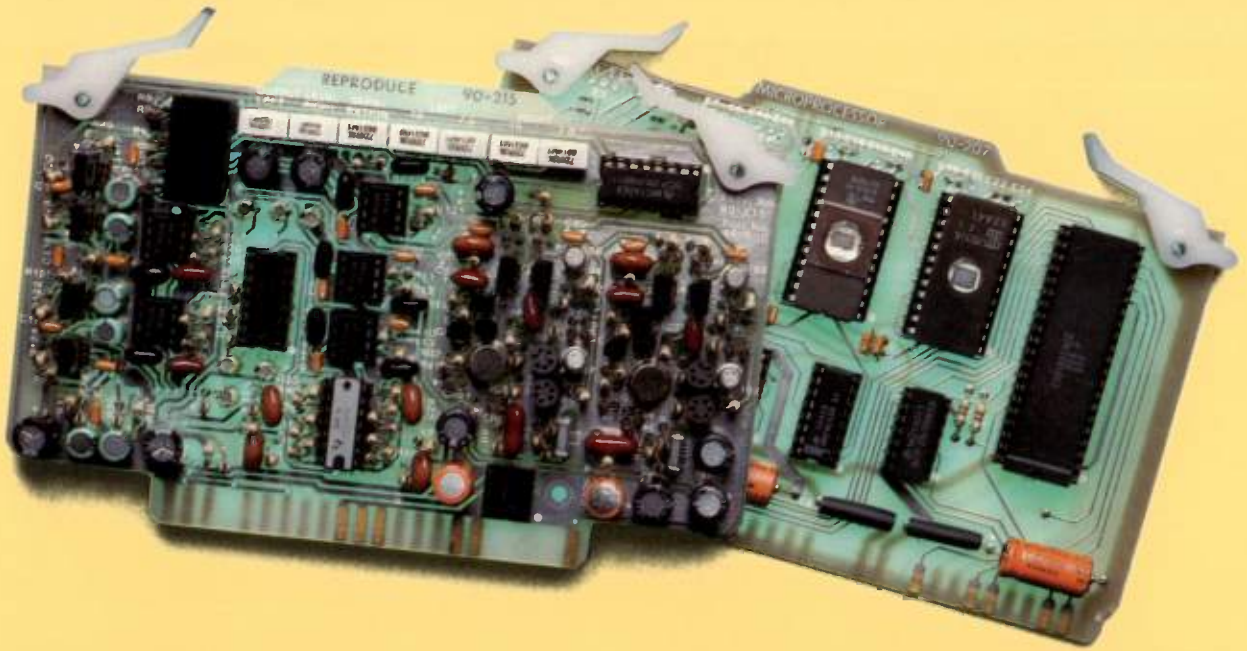
TOMCAT is capable of recording and reproducing cartridges in two formats: discrete left and right, and sum/difference matrix. The traditional discrete format records the left and right audio channels on tracks one and two respectively, while the matrix format provides automatic mono/stereo reproduce compatibility.

The matrix format is included for those applications where a significant amount of the program material may be monaural: All-News formats, for example. The monaural matrix mode records a tertiary "flag" tone with the primary stop cue at the beginning of the recording. The matrix mutes the difference track whenever a monaural flag is detected at the beginning of playback.

The Matrix format works as follows:

Stereo Mode
Record
Left + Right = Sum Channel, recorded on track #1
Left – Right = Difference Channel, recorded on track #2
Reproduce
Sum + Difference = Left Output
Sum – Difference = Right Output

Monaural Mode
Record
Monaural Channel = Sum Channel, recorded on track #1
No signal is recorded on track #2
A mono "flag" signal is recorded on the Cue track
Reproduce
Sum + "0" = Left Output
Sum – "0" = Right Output
"flag" signal mutes the Difference Channel (track #2)



MICROPROCESSOR CONTROL:

Controlling the required functions, features and options of TOMCAT presents a formidable challenge. The variety of mechanical operations, audio control switching, cue track control, as well as operator assist concepts, led to one conclusion: the speed, accuracy and power of a microprocessor. The 1802 microprocessor was chosen to achieve this functional challenge. This device has become a standard for high reliability applications in military and advanced industrial applications. This processor, along with the interface and timing logic, is of the CMOS family, which features low power usage and heat generation while offering excellent noise immunity.

The microprocessor system provides an intelligent interface between the user and tape machine functions, leaving no guesswork or obscure commands which hinder broadcast operation. Monitoring of all mechanical operations is accomplished by a mechanical interface module. The resulting close relationship between mechanics and logic further reduces the possibility of operating errors.

Cartridge in-place is sensed by an infrared optical sensor which eliminates the traditional mechanical microswitch. When the start command is received by the microprocessor, it initiates the capstan acceleration sequence. During this time, the motor is under program control to rapidly bring the capstan to tape drive speed. This start-up routine prevents servo overshoot and phase lock jitter while achieving speed in less than 80 milliseconds. The pinch roller engagement is confirmed by an infrared sensor; the audio is unmuted and the play sequence begins. Should any of the mechanical operations not occur properly, the computer will abort the mode.

The capstan motor drive amplifier is constantly monitored by the microprocessor which is looking at both motor drive current and tachometer phase lock. Should a cart with excessive tension be inserted, the drive system senses this and warns the user with the flashing front panel "Cart Fail" indicator. Should a cartridge bind and cause motor speed variation, the machine will abort the run mode. These warning and abort commands are available as logic commands on the remote control connector, allowing the use of remote warning lights or signals.

The microprocessor offers several user-designated options. The internally-selected modes for the reproducer are:

1. Audio mute at beginning or end of secondary tone.
2. Fast wind on audio mute command.
3. Fast wind speed selection of 15 and 30 IPS.
4. Play speed selection of 7.5 and 15 IPS.
5. Test sequence program for operational check of logic and mechanical interface.
6. Replay inhibit program.

The logic options for the recorder include those for the reproducer, plus:

1. Record mode: monitor output is Tape or Input.
2. Stop mode: monitor output is Input or Mute.
3. Fast wind mode: monitor output is Input or Mute.
4. Meter mode: Manual selection or follow monitor selector.
5. Power-up: 7.5 IPS or 15 IPS run speed.

REMOTE CONTROL:

TOMCAT Remote Control is complete and simple to use. No special techniques or shielded control wiring is required since the CMOS logic is designed to be immune to the electrical noise environments found in many broadcast facilities. A single, lock-ring connector provides remote control and tally light facilities for both the record and reproduce functions.

TOMCAT SPECIFICATIONS

Tape Format	NAB size AA cartridge
Tape Speeds	
Record/Play	7.5 IPS, 15 IPS user optional
Fast Wind	30 IPS, 15 IPS user optional
Tape Track Format	MAXTRAX® two 80 mil audio tracks, and 21 mil cue track
Audio Formats	Discrete channels, Left/Right Matrix channels, Sum/Difference
Start Time	Less than 100 mSec
Stop Time	Less than 40 mSec
Wow and Flutter	Better than 0.1% RMS unweighted
Speed Accuracy	Better than 0.1%
Input Impedance	20 kΩ, balanced and bridging
Input Level Range	-13 dBm to +9 dBm
Output Impedance	
Source	Less than 95Ω
Load	600Ω minimum, balanced, floating
Output Level	+4 dBm to +8 dBm, adjustable
Maximum Output Level	+25 dBm into 600Ω
Reproduce Amplifier Distortion	Less than 0.1% THD
Record Amplifier Distortion	Less than 0.1% THD
System Distortion*	Less than 0.9% THD
Frequency Response*	40 Hz to 15 kHz, ±1 dB at 7.5 IPS 55 Hz to 22 kHz, ±1 dB at 15 IPS
Square Wave Response, 1 kHz test signal	Less than 25% overshoot, no ringing at 7.5 IPS No overshoot or ringing at 15 IPS
Noise*	
7.5 IPS	-59 dB unweighted, -62 dB A weighted
15 IPS	-59 dB unweighted, -62 dB A weighted
No tape	-64 dB unweighted, -68 dB A weighted
Separation, Audio Tracks	Better than -50 dB at 1 kHz
Crosstalk, Cue to Audio	Better than -60 dB
Bias Signal	200 kHz crystal generated, less than 0.07% THD
Cue Signals	
Record	1 kHz primary, 150 Hz secondary, 8 kHz tertiary
Reproduce	1 kHz primary, 2 kHz primary at 15 IPS fast wind, 4 kHz primary at 30 IPS fast wind, 150 kHz secondary, 8 kHz tertiary
Output	24 volt DC control outputs for secondary and tertiary tone detection. Cue audio output balanced, 600Ω, 0 dBm
Cue Erase*	Better than 30 dB
External Connectors, Mating connectors supplied	Audio: XLR-type Remote: 16-pin AMP, lock-ring type Cue: 4-pin AMP, lock-ring type
Power Requirements	120 VAC, 60 Hz
Recorder	35 watts idle, 55 watts running
Reproducer	10 watts idle, 25 watts running
Weight	
Recorder	42 lbs.
Reproducer	15 lbs.
Reproducer	TRI-MOUNT 8 lbs.
Dimensions	
Recorder	Rack style case, allows 3" minimum at rear for cables and connectors. 19" wide, 5.25" high, 15" deep.
Reproducer	Tri-mount rack mount case will accommodate up to three reproducers. Allows 3" minimum at rear for cables and connectors. 19" wide, 5.25" high, 15.5" deep.
	(Recorder and reproducer cases are supplied ready for rackmounting; no additional adapter hardware is required. Only 5.25" of rack space is needed for either the recorder or reproducer trimount.)

*All measurements were taken using Audiopak® type AA 4 cartridges and tape at a standard recording level of 250nWb/m. Noise measurements taken in a 20 Hz to 20 kHz bandwidth from a reference level of 250 nWb/m. Frequency response measurements made 10 dB below the standard recording level.

Specifications subject to change without notice or obligation as advances in technology are incorporated.



Three Tomcat reproducers may be installed in one 5.25" rackmount.

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TCATREV21875M Price $2.00

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