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RECORDING AND PA CONSOLES



1. GENERAL CONFIGURATION. The audio mixer shall have a mainframe capable of accommodating 16/24/32 inline input/output channels, with an optional meter bridge consisting of 16/24/32 precision LED bargraph meters to monitor signal levels in all inline input channels and VU meters to monitor control room source selection, and an optional separate expander console capable of accommodating an additional 24 inline input/output channels that shall connect to the mainframe via 37-pin D-sub connectors. Note: The separate expander frame is not available for the 16•8 mixer. The mainframe shall also include an overall master control section, and provision for directly mounting 12V gooseneck type panel lighting via BNC connectors.

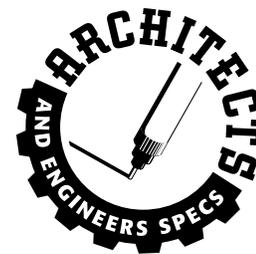
2. POWER SUPPLIES. All necessary operating voltages for the mainframe shall be supplied by a two-rack-space external power unit that shall connect to the mainframe via a 7-conductor cable terminated in an appropriate connector, and all necessary operating

voltages for the expander console shall be supplied by a two rack space external power unit that shall connect to the expander frame via a 7-conductor cable terminated in an appropriate connector.

3. CHANNEL INPUTS/OUTPUT TERMINATIONS.

Each inline input/output channel shall have the following inputs and outputs: a) one balanced transformerless input for low-impedance microphone via 3-pin female XLR connector with gold-plated pins, b) one balanced/unbalanced transformerless input for line-level signals via 3-conductor 1/4" connector, c) one balanced/unbalanced transformerless input for signals from tape, which shall be switchable globally for 8 channels for a nominal -10dBV or +4dBu operating level, d) one unbalanced line-level direct output via 2-conductor 1/4" connector, e) one unbalanced output/input channel patching insert via 3-conductor 1/4" connector (tip = send, ring = return).

4. INPUT SWITCHING. Each inline input/output channel shall have: a) a mic/line switch to select signals from either the mic input or the line input, b) a flip switch to determine whether the mic/line input is fed to the channel's primary signal path while the tape input feeds the Mix-B (Monitor) signal path, or whether the tape input feeds the channel's



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primary signal path while the mic/line input feeds the Mix-B (Monitor) signal path.

5. INPUT LEVEL ADJUSTMENT. Each inline input/output channel shall be equipped with a channel trim control to adjust the gain of the input amplifier stage to appropriately match levels presented to the mic and line inputs.

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6. DUAL I/O SIGNAL PATHS.

Each inline input/output channel shall provide separate but selectable routing for input signals: a) the primary signal path ("channel") shall route signals from the mic or line input to the channel controls via the main channel fader, with signals from the tape input routed to the channel's Mix-B (Monitor) controls as determined by the Mix-B Source selector switch, b) the routing of the primary and Mix-B signals shall be reversible via the Flip switch, which shall therefore send the signal from the mic or line input to the Mix-B (Monitor) controls, and send the signals from the tape input to the primary signal path controls via the main channel fader.

7. AUXILIARY SEND CONTROLS AND SWITCHES.

Each inline input/output channel shall also include AUX send controls as follows: a) rotary controls for AUX Send 1 and AUX Send 2 that allow the level from each individual channel output sent to the AUX 1 or AUX 2 output to be separately adjusted, along with an associated pre/post selector switch that determines whether the output is taken post EQ/post fader or post EQ/pre fader, b) rotary controls for AUX Send 3/5 and AUX Send 4/6 that allow the level from each individual channel sent to the the AUX output 3 or 5 or to the AUX outputs 4 or 6 to be separately adjusted, along with an associated shift switch, an associated pre/post selector switch, and an associated source selector switch.

The shift switch shall select whether the signal as adjusted by its associated rotary controls is sent to AUX outputs 3 and 4, or AUX outputs 5 and 6, while the pre/post switch determines whether these outputs are taken post EQ/post fader or post EQ/pre fader, and the source switch selects whether the signal appearing at AUX outputs 3/4 or AUX outputs 5/6 is derived from the primary signal path or from the Mix-B (Monitor) signal path.

8. I/O CHANNEL EQUALIZATION.

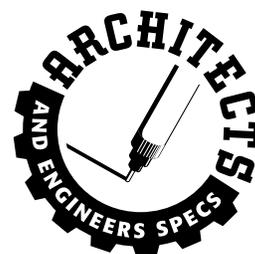
Each inline input/output channel shall include an equalizer section consisting of one fully parametric hi-mid equalizer utilizing separate rotary controls for boost/cut, frequency sweep and bandwidth ("Q"), with a control range of $\pm 15\text{dB}$ boost/cut, a frequency range 500Hz to 18kHz sweep, and a bandwidth ("Q") range from 1/12 of an octave to 3 octaves, one semi-parametric lo-mid equalizer consisting of separate rotary controls for boost/cut and frequency sweep, with a control range of $\pm 15\text{dB}$ boost cut, and a frequency range of 45Hz to 3kHz, a shelving high frequency equalizer providing $\pm 15\text{dB}$ boost/cut at 12kHz, and a shelving low frequency equalizer providing $\pm 15\text{dB}$ boost/cut at 80Hz. All equalizer circuitry shall be able to be inserted into or removed from the primary signal path via an associated in/out switch. Additionally, the high and low shelving equalizers shall be assignable to operate only in the Mix-B (Monitor) signal path, without regard to whether the parametric and semi-parametric equalizers are used in the primary signal path.

9. I/O CHANNEL HIGH PASS FILTER. Each inline input/output channel shall include an 18dB/octave, 75Hz low cut (high pass) filter, with an associated on/off switch.

10. I/O CHANNEL LEVEL INDICATORS. Each inline input/output channel primary signal path shall have two LED signal level indicators: a) a red LED that indicates signals 3dB below the onset of clipping in the input stage, the equalizer stages, and/or the output stage, b) a green "activity" LED that indicates signals at -20dB or greater @ 1KHz.

11. I/O CHANNEL FADER AND PAN. Each inline input/output channel shall utilize a 100mm main channel fader that incorporates a complex precision resistive network to deliver true logarithmic attenuation. The main channel fader shall provide 10dB of gain over Unitey while also providing 100dB of attenuation. In addition, each input/output channel shall include an active buffered constant power pan control (-3dB @ center), providing a maximum of 85dB of attenuation.

12. I/O CHANNEL MIX-B (MONITOR) CONTROLS AND SWITCHES. An additional signal path and pair of L/R I/O Buses shall be provided in each inline input/output channel, and shall be dual purpose, and shall therefore be labeled Mix-B (Monitor). The Mix-B (Monitor) controls shall include switching that allows these Buses to derive their signals from either the tape input, mic/line preamp output or the channel output pre-fader, and additional switching that allows the high and low shelving equalizers to be removed



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from the primary signal path and inserted into the Mix-B (Monitor) signal path.

Associated switching in the AUX send section affects the Mix-B (Monitor) Buses (see paragraph 8).

13. I/O CHANNEL SOLO, WITH LEVEL CHECKING.

Each inline input/output channel shall include stereo-in-place solo switching that allows the individual channel to be singled out of the mix and auditioned alone or in combination with any other signals in the control room and studio outputs. Additionally, activating the channel's solo shall allow the channel's output level to be observed on the solo/main bargraph meters, reflecting the L/R balance the signal has on the main L/R mix Buses.

14. I/O CHANNEL MUTE WITH INDICATOR. Each inline input/output channel shall include a mute switch to turn off the individual channel's output to all Buses and the direct output. The LED indicator associated with the mute switch shall be yellow, and shall be lighted when the channel is muted.

15. I/O CHANNEL ASSIGNMENT SWITCHES. Each inline input/output channel shall be fitted with five routing switches, allowing the channel's output to be routed to any combination of subgroup and/or main L/R Buses, in stereo pairs, or to a combination of single Buses (odd OR even) in conjunction with the channel's pan control.

16. MASTER SECTION - SUBMASTERS. The audio mixer's master section shall

include faders, routing, solo switching, metering, insert sends with insert returns (patching), and tape outputs for each of the 8 submasters. Overall subgroup level control shall be provided by a 100mm fader that incorporates a complex precision resistive network to deliver true logarithmic attenuation, down to -100dB. Submaster signal routing shall be governed by a mono assign switch that sends the submaster output to both the left and right main outputs (single assign switch must be "in" to activate mono switch), and/or by a single Bus assign switch that routes the submaster to only the left output (odd numbered) or to only the right output (even numbered). Each submaster shall be equipped with stereo-in-place solo switching that allows the individual submaster to be singled out of the mix and auditioned alone or in combination with any other signals in the control room and/or studio outputs. Twelve segment LED bargraph meters shall be provided for each submaster, and shall indicate peak levels from -40dBu to +10dBu, with green LED's indicating levels from -40dBu to 0dBu inclusive, and yellow LED's indicating levels from +2dBu to +10dBu inclusive. Meters reading 0dB will reflect an output level of +4dBu or -10dBV, depending on the position of the Submaster Output Level Switch. Each submaster shall have a low impedance insert send that may be used separately as an output alone, or in conjunction with its associated return for insert channel patching. In addition, each of the eight submasters shall have three submaster

outputs via balanced/unbalanced transformerless 1/4" TRS connectors configured in pairs for use with 16 recording tracks (1/9/17, 2/10/18, 3/11/19, 4/12/20, 5/13/21, 6/14/22, 7/15/23, 8/16/24), and mounted on the rear panel lower apron. Reference operating level for the tape outputs (and tape returns) shall be globally selectable for either -10dBu or +4dBu via two switches: one controls outputs 1/9/17, 2/10/18, 3/11/19 and 4/12/20; the other controls outputs 5/13/21, 6/14/22, 7/15/23, & 8/16/24 (see paragraph 3).

17. MASTER SECTION - L/R MIX. The audio mixer's master section shall include a stereo fader for setting the overall output level delivered via the unbalanced transformerless 1/4" TS connectors in the master section designated main mix L/R, and duplicated on 3-pin balanced XLR connectors on the rear panel lower apron. Overall L/R mix level control shall be provided by a 100mm stereo fader that incorporates a complex precision resistive network to deliver true logarithmic attenuation, down to -100dB.

18. MASTER SECTION - MIX B (MONITOR). The audio mixer's master section shall include a rotary master level control to govern the overall output level and/or mix level of signals on the Mix-B (Monitor) Bus. In addition, a switch associated with the level control shall assign/unassign Mix-B (Monitor) signals to the main L/R output Buses, but shall have no effect on signals appearing at the Mix-B (Monitor) outputs. Mix-B (Monitor) signals shall be made available to the outside world as a separate group via two

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unbalanced transformerless 1/4" TS connectors in the master output section, designated Mix-B (Monitor) Outputs L/R.

19. MASTER SECTION - PHONES 1, PHONES 2. The audio mixer's master section shall include two headphone systems, each with a rotary level control to govern the overall output level as delivered to the respective outputs in the master section designated Phones 1 and Phones 2. In addition, each phones system shall include selection switches that allow signals from the control room, Mix-B (Monitor), AUX send 3(L) and 4(R), AUX send 5(L) and 6(R), or from the stereo external inputs to be used individually or together in any combination to drive the phones output. Note: Selecting Control Room will override all other selections. Solo switching shall provide stereo solo-in-place auditioning of the overall signal level on each of the phone systems via the control room/studio monitor outputs. If control room is the source for a phones circuit, the solo function shall be disabled. Output signals from Phones 1 and Phones 2 shall be via 1/4" stereo connector (tip=left, ring=right).

20. MASTER SECTION - CONTROL ROOM AND STUDIO LEVEL (SPEAKERS). The audio mixer's master section shall include two rotary level controls to govern the overall output level as delivered to the control room and studio outputs, respectively. In addition, the control room/studio circuits shall provide selection switches that allow signals from the main

L/R Bus, Mix-B (Monitor), tape, or from the external inputs to be used individually or together in any combination to drive the respective outputs. An additional switch shall cause the control room/studio outputs to operate as stereo L/R or mono L+R. Outputs from the control room and studio section shall be via unbalanced transformerless 1/4" TS connectors in the master output section. Input to the 2-track return for the control room and studio section shall be via unbalanced transformerless 1/4" TS connectors in the master section, and shall be designated 2-track input. Input to the external input for the control room and studio section shall be via unbalanced transformerless 1/4" TS connectors in the master section, and shall be designated external input.

21. MASTER SECTION - SOLO. The audio mixer's master section shall include a rotary level control to govern the overall level of the stereo-in-place solo system. The rotary control shall have a detent at top dead center, which shall be the Unity Gain calibration point employed for proper inline input/output channel level checking in solo mode. In addition, the solo level control shall have an operator's stress reducing device in the form of a big rude flashing LED that indicates solo system operation, working in conjunction with the individual solo LED's on each panel or output subsection.

22. MASTER SECTION - TALKBACK. The audio mixer's master section shall include a rotary level control to govern the level of the talkback system, with

associated selection momentary switches that allow signals to be sent from the talkback to the Submaster and MainL/R outputs; AUX send 1; AUX send 2; to Phones 1, Phones 2 and Studio outputs, individually or together in any combination. A microphone shall be provided inside of the audio mixer's front panel in the master section to drive the talkback system.

23. MASTER SECTION - AUX SENDS. The audio mixer's master section shall include six rotary level controls to set overall signal levels delivered to the AUX Send outputs for AUX 1, AUX 2, AUX 3, AUX 4, AUX 5, and AUX 6. Each AUX Send shall have an associated solo switch to allow an individual AUX Send to be singled out of the mix and auditioned alone or in combination with any other signals in the control room and studio outputs. Additionally, activating this solo shall allow the AUX Send's output level to be observed on the solo/main bargraph meters.

24. MASTER SECTION - AUX RETURNS. The audio mixer's master section shall include six rotary level controls to set overall signal levels returned via the stereo AUX Returns which shall be designated AUX Return 1, AUX Return 2, AUX Return 3, AUX Return 4, AUX Return 5, and AUX Return 6. Each AUX Return shall have an associated solo switch to allow an individual AUX Return to be singled out of the mix and auditioned alone or in combination with any other signals in the control room and/or studio outputs. Additionally, activating the solo shall allow the AUX Return's output level to be observed on the solo/main bargraph meters. Switchable assignment routing switches



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associated with AUX Returns 1 and 2 shall allow signals fed through these returns to be delivered to the L/R mix, or to the Submasters in pairs (1/2, 3/4, 5/6, 7/8), in any combination, used in conjunction with its associated balance potentiometer. Switchable assignment routing switches associated with AUX returns 3 and 4 shall allow signals fed through these returns to be delivered to phones 1, phones 2 and the L/R mix, in any combination. AUX returns 5 and 6 shall be dedicated to the L/R mix. Termination for all AUX returns is via unbalanced 1/4" TS connectors, which shall be capable of accepting nominal signal levels from -20dBu to +22dBu.

25. EXPANDER CONSOLE.

The audio mixer is constructed to accept an (optional) separate expander frame capable of accommodating an additional 24 inline input/output channels, each channel providing performance and control functions identical to those provided by the inline input/output channels in the mainframe. Note: This feature is not available on the 16•8 console.

26. METER BRIDGE. An optional meter bridge shall be available for both the mainframe in 16, 24 and 32 channel configurations and the separate expander console 24-channel frame.

The mainframe meter bridge shall consist of an enclosure that shall attach to the mainframe with supplied hardware. It shall provide 12-segment LED ladders calibrated from -40dB to +10dB for each input channel. The signal source for these meters is globally selectable between the output of the corresponding tape return preamp or the channel's direct output. It shall also provide lighted VU meters indicating left and right Control Room selection.

27. OVERALL MINIMUM SPECIFICATIONS.

CHANNEL STRIP. Mic In: Electronically balanced; discrete input configuration. **Noise** (Mic E.I.N. 20Hz-20kHz): -129.0 dBm, 150Ω source, -131.2 dBV, 150Ω source, -131.5 dBm, input shorted, -133.7 dBV, input shorted. **Distortion:** 0.005% 20Hz-20kHz @ 1kHz, +14dBu. **Gain Range:** +10dB to +50dB. **Line In:** Electronically balanced/unbalanced. **Gain Range:** Unity to +42dB. **Max Input:** +22dBu. **Channel Fader Range:** -100dB to Unity to +10dB. **AUX Send Gain Range:** off to Unity to +15dB. **Mix B Gain Range:** off to Unity to +15dB.

Equalization: Hi Mid: full parametric, ±15dB freq. sweep from 500Hz-18kHz bandwidth (Q) variable from 1/12 oct. to 3 oct, Lo Mid sweep: 45Hz-3kHz ±15dB, Hi shelving: 12kHz ±15dB, Lo shelving: 80Hz ±15dB,

Lo Cut (HPF): 75Hz 18dB/octave (Tchebechev).

Channel Direct Out Max Output: +22dBu Noise (Ch. @ Unity Gain) -101dBu. **Output Impedance:** 120Ω. **Tape Returns:** Bal./unbal. 1/4" jacks, globally switchable from +4dBu to -10dBV; **Channel Insert Max Out:** +22dBu, **Max In:** +22dBu. **Ch.-to-Ch. Crosstalk:** -95dB @ 1kHz.

SUBMASTER SECTION.

Noise: -90dB re: 20Hz to 20kHz +4dBu 16 chs. assigned & set @ Unity Gain. **Submaster Output Max Out:** +22dBu bal., +22dBu unbal. **Submaster Insert Max Out:** +22dBu. **Submaster Insert Max In:** +22dBu. **Fader Range:** -100dB to Unity to +10dB.

MAIN L/R SECTION. Mix noise (24 channels assigned, channel faders at Unity Gain): -92dB, -96dB (ref. +4). **Max Output:** +28dBu balanced XLR, +22dBu unbalanced 1/4".

AUX SECTIONS. AUX Returns **Gain Range:** off to Unity to +20dB. **AUX Sends Max Out:** +22dBu.

GENERAL. **Distortion:** 0.009%, @1kHz, 20Hz-20kHz bandwidth. Below 0.025%, 20Hz-20kHz at normal operating levels, any input to any output. **Frequency Response:** 20Hz-40kHz ±1dB any input to any output; 10Hz-120kHz ±3dB

The audio mixer shall be a Mackie Designs 8•Bus mixer.

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