MODELS 4400 SERIES AND 4800 SERIES

AUTOMATIC MIXERS

The Model 4400 and 4800 Series Automatic Mixers, designed for applications requiring up to eight inputs, are the most advanced, full-featured, truly automatic mixers available today.

The IED Model 4400 and 4800 Series Automatic Mixers represent the latest in fully Automatic Mixing technology. While retaining the innovative features of the popular IED 4000 Series Automatic Mixers that users have come to expect, the newer IED 4400/4800 Series Automatic Mixers have incorporated additional features that will enhance their adaptability to both the new installation and existing installation markets.

These Mixers are extremely simple to set up and operate while still providing all of the functionality that users have grown accustomed to in a full-featured automatic mixer. While meeting the needs of a stand alone mixer, the IED 4800/4400 Series mixers may also operate as the central component in a larger, more complex mixing and control system.

The Model 4400 Mixer includes 4 gated microphone or line level inputs, 1 auxiliary line level input, a main and an auxiliary line level output, direct outputs for each gated input, and a single rear panel multipin connector to provide all of the remote control functions of the mixer.

The Model 4800 Mixer includes 8 gated microphone or line level inputs, 2 auxiliary line level inputs, 2 main and 2 auxiliary line level outputs, direct outputs for each gated input, and 2 multipin rear panel connectors that provide all of the remote control functions of the mixer.

An optional 3-Band Equalization circuit is available for each gated input on both of these mixers. It is ideally suited for matching dissimilar microphones as well as for general input circuit tuning. Additional optional features include input and/or output programmable gain control, compression, or remote volume control.

For remote volume control a Voltage Controlled Digital Attenuator (VCDA) can be utilized. The IED Model 142 provides precise control with a guaranteed attenuation curve. Together with the Model 412PLC, the VCDA can be connected to allow control of an input from multiple locations, also providing a visual LED display of the level setting. These options are identical to the options found on the IED 4000 Series Automatic Mixers.

Both the 4400 and 4800 Series Mixers are housed in a protected single 19" rack space housing, making them attractive for installations where space is at a premium. The IED 4400/4800 Series of Automatic Mixers are ideally suited for courtroom systems, boardroom installations, and automatic mixing for houses of worship.

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FEATURES

INPUTS

The 4400 Series has 4 Gated Inputs and 1 Auxiliary input.
The 4800 Series has 8 Gated Inputs and 2 Auxiliary inputs.

Gated Inputs - Gated inputs have a threshold which must be exceeded before the input gates on. When using multiple microphones, IED's proprietary Discriminator circuit differentiates between sounds which appear at more than one microphone and the desired program input which is directed at one microphone. Only when sound is directed toward a particular microphone will its input gate on.

The discriminator sensitivity can be tailored for a variety of applications with 3 different sensitivity settings, normal, high, and low. When an input is gated off, the level from that input which contributes to the mix can be jumper selected as down 90 dB or down 22.5 dB.

Each Gated Input is balanced, and can accomodate a range of microphone levels with gain which is adjustable from +26 dB to +46 dB. Each gated input may be configured with or without phantom power, and for microphone or line level by jumper selection.

To reduce low frequency sound such as produced by accidental contact with the microphone, a high-pass filter is included for each gated input. The filter is enabled by removing a jumper. The filters are 3 dB down at 150 Hz, and have a slope of 6 dB/octave.

To prevent the microphones from gating on and off each time there is a short program pause, each gated input has a release time which is adjustable over a range of .5 to 8 seconds. The release time is the length of time that the input remains gated on after the input signal is removed.

The Priority feature allows a gated input for which it is enabled to override all gated inputs not in priority. When it is gated on all inputs not in priority are gated off. One to four inputs can be placed in priority on one mixer card, but four in priority has the same effect as none, unless two mixer cards are combined to produce an eight input mixer.

The Force On and Force Off features set the state of the gated inputs to On or Off, respectively, regardless of the sound level or ambient noise. Force On is commonly used for applications such as a line level input from a tape recorder or other source for background music. An input may be forced on or off by installing a jumper inside the cover in one of two positions. If this jumper is not installed, an input can be forced on or off via the rear panel remote control connector. When an input is forced off it no longer contributes to the threshold of the discriminator circuit.

Each gated input has a front panel control to set its level on the mix bus, and a red LED to indicate when the input is gated 'On'. The gating sensitivity of the gated inputs is independent of the front panel level control settings.

There is a logic output, available throught the rear panel remote control connector, for each gated input. When an input is on, the logic output is high (+5 VDC). It is suitable for driving TTL logic or for switching a circuit which can in turn drive a higher power load such as a relay, a video camera or an LED indicator.

Auxiliary Inputs - There is one electronically balanced line level, Auxiliary (Aux) Input for each four Gated inputs. The Aux Input can be made to feed either the Main Mix Bus, pre-

or post- combining, the Aux Mix Bus, pre- or post- combining, any of these buses, or none, by the placement of the appropriate jumpers. The post-combining jumper location is offered only if stereo is needed on a 4800 mixer. Placing jumpers in the post-combining positions on both input boards of a 4800 creates two separate channels which can be used for stereo. This can be done for either or both the Main mix bus and the Auxiliary mix bus.

OUTPUTS

The 4400 Series has 1 Main Output and 1 Auxiliary Output.
The 4800 Series has 2 Main Outputs and 2 Auxiliary Outputs.

Main Outputs - Each Main Output is electronically balanced. Each has a front panel control to set the overall mix level up to the maximum of +24 dBu into a 600 Ω load.

Auxiliary Outputs - Each Auxiliary Output is balanced and has an individual rear panel level control. Each individual gated input source feed for the Auxiliary Outputs may be selected individually by jumper from the following three choices: 1. Pre option (no input processing), 2. Post option (input processing but no gating) and 3. Post gate (same mix as the Main Output). If an the optional 3-band equalizer is used, all options are after the 3-band equalizer. Each Auxiliary Output can be set by jumpers to produce line level or microphone level audio signals.

Direct Outputs - Direct Outputs are Balanced. Each has a rear panel level control. Each has a jumper selection of its source from the following choices: 1. Pre option (no input processing), 2. Post option (input processing but no gating) and 3. Post gate (same mix as the Main Output). Each Direct Output can be set by jumpers to produce line level or microphone level audio signals.

OVERALL FEATURES

Last Microphone On and Onput - It is sometimes desireable to keep at least one microphone on, even when none are being used. For example, when a speaker finishes, and before the next person starts, or when the speaker pauses to do a demonstration, it might be noticeable when all microphones gate off and the system goes quiet in a quiet environment. Two features are available to avoid this condition, Last Microphone On and Onput.

When **Last Microphone On** is enabled, the last gated microphone input remains on until another microphone input is gated on.

When **Onput** is enabled and all other microphone inputs gate off, Input 1 is gated on and remains on until another input is gated on.

Last Microphone On and **Onput** are mutually exclusive. Only one may be used at a time.

Filibuster - The Filibuster feature limits the maximum number of inputs which can be gated on at one time to 1, 2, 3, 4, or no limit. The selection is made by a jumper on the circuit card inside the case. The limit applies to the card on which the jumpers are located, but when two mixers are combined, the inputs which are gated on on the other card also count toward the total. For example, assume that mixer cards A and B are combined and that Filibuster is set to 2 on card A and 3 on card B. If one input is gated on on each card,

no more inputs can gate on on card A until one gates off, because a total of 2 are on and the limit on card A is 2. One more can gate on on card B because its limit is set at 3.

Auto/Manual Switch - The Auto/Manual switch is located on the front panel. It switches all Gated inputs between automatic gating and all gated inputs forced on.

Combining Input - When the two combining terminals on the 4800 Series mixers are connected together, the two independent 4 input mixers are completely combined, and act as one 8 input mixer. Connecting the two together combines: 1. Audio buses (Main and Auxiliary) for both input boards; 2. Control and logic buses (Priority, Filibuster, Digital Attenuator, and Discriminator) for both input boards. Connection to the Combining Inputs is made through the rear screw-terminal strip.

OPTIONS

Gated Inputs - The Gated Inputs each have a choice of four options, the 120P Programmable Gain Control, the 110C Compressor, the 142 Voltage Controlled Digital Attenuator, or bypass (no option). Selection of any option **does not** affect gating sensitivity.

The 120P Programmable Gain Control maintains an almost constant average output level without the compromises of a compressor. It does not cause increased distortion at low frequencies, nor does it "pump up" like a compressor. When a speaker pauses, the 120P holds the last level setting indefinitely. When the speaker begins again, there will be no sudden increase in level. The 120P can be forced to full gain (20 dB) via the appropriate terminals of the remote control connector.

The 142 Voltage Controlled Digital Attenuator provides precise control of level in response to a 0 - 5 V control voltage. The control input may be connected to a 412PLC Programmable Level Controller, or a 10 kΩ linear taper pot may be used, using the control voltage source which is available at the remote control connector.

The 110C Compressor helps to keep a more constant sound output level by reducing average level excursions.

If the bypass option is selected, a fixed gain results.

3-Band Equalizer - The 3-band equalizer option provides continuously adjustable cut or boost of up to 12 dB centered at frequencies of 200 Hz, 1 kHz, and 4 kHz, with a Q of 1. Equalizer controls are accessed through the front panel. The 3-band equalizer option can only be installed on four gated inputs or eight gated inputs.

Auxiliary Input Remote Control - Remote control of the Auxiliary Input may be accomplished, if this option is selected, by connecting a 10 kΩ linear taper pot to the appropriate terminals of the remote control connector.

Phantom Power - As an option to the 15 volt standard Phantom Powering voltage, 30 volt and 48 volt Phantom Power may be provided.

Line Voltage - An external transformer rated for operation from a 240 volt AC line may be supplied in place of the standard 120 volt AC UL listed transformer.

SPECIFICATIONS

ELECTRICAL

1. Number of Inputs
   - 4400 . . . . . 5 inputs, 4 gated, 1 non-gated
   - 4800 . . . . . 10 inputs, 8 gated, 2 non-gated
2. Gated Input Gain . . . . . 0 dB, 26 dB to 46 dB
   - Jumper selectable between line level and microphone level
   - Microphone level gain is pot adjustable over the range of 26 dB to 46 dB
3. Overall Gain, Input Options 0, 1
   - Gated Inputs to Direct Output
     - Pre option . . . . . 6 dB Min, 52 dB Max
     - Post option . . . . . 26 dB Min, 72 dB Max
     - Post gate . . . . . 26 dB Min, 72 dB Max
   - Gated Inputs to Auxiliary Output, Input Options 0, 1
     - Pre option . . . . . 6 dB Min, 52 dB Max
     - Post option . . . . . 26 dB Min, 72 dB Max
     - Post gate . . . . . 26 dB Min, 72 dB Max
   - Gated Inputs to Main Output, Output Options 0, 1 . . . . 26 dB Min, 72 dB Max
   - Gated Inputs to Main Output, Output Options 2, 4 . . . . 26 dB Min, 72 dB Max
4. Overall Gain, Input Options 2, 4
   - Gated Inputs to Direct Output
     - Pre option . . . . . 6 dB Min, 52 dB Max
     - Post option . . . . . 26 dB Min, 72 dB Max
     - Post gate . . . . . 26 dB Min, 72 dB Max
   - Gated Inputs to Auxiliary Output
     - Pre option . . . . . 6 dB Min, 52 dB Max
     - Post option . . . . . 26 dB Min, 72 dB Max
     - Post gate . . . . . 26 dB Min, 72 dB Max
   - Gated Inputs to Main Output, Output Options 0, 1 . . . . 26 dB Min, 72 dB Max
   - Gated Inputs to Main Output, Output Options 2, 4 . . . . 26 dB Min, 72 dB Max
   - Auxiliary Input, normal and Option A
     - To Auxiliary Output . . . . . 20 dB Max
     - To Main Output, Output Options 0, 1 . . . . . 20 dB Max
     - To Main Output, Output Options 2,4 . . . . . 40 dB Max
5. Input Impedance (Z_{in})
   - Gated Inputs . . . . . 13 kΩ
   - Auxiliary Input . . . . . 200 kΩ
6. Input Source Impedance (Z_s)
   - Gated Inputs . . . . . Any, 0 - 10 kΩ preferred
   - Auxiliary Input . . . . . <10 kΩ
7. Input Overload
   - Gated inputs
     - Input Gain = +46 dB . . . . . -28 dBu
     - Input Gain = +26 dB . . . . . -8 dBu
     - Input Gain = 0 dB . . . . . +18 dBu
   - Auxiliary Input . . . . . +18 dBu

8. Maximum Output Level
   - Main Output . . . . . +24 dBu
   - Auxiliary Output . . . . . +18 dBu
   - Direct Output . . . . . +18 dBu
9. Output Impedance
   - Main Output . . . . . <1 Ω
   - Auxiliary Output . . . . . <1 kΩ
   - Direct Output . . . . . <1 kΩ
10. Output Load Impedance, all outputs . . . . . <600Ω
    - Frequency Response, 20 Hz - 20 kHz
    - Gated Inputs to Main, Direct, or Auxiliary Output, no EQ . . . . . +0, –0.1 dB
    - Gated Inputs to Main, Direct, or Auxiliary Output, EQ flat . . . . +0, –1.5 dB
    - Aux Input to Main or Auxiliary Output . . . . . +0, –0.1 dB
12. Total Harmonic Distortion, THD
    - All input and output options except 110C, 20 Hz - 20 kHz . . . . . <0.06%
    - 110C, 2 kHz - 20 kHz . . . . . <0.06%
13. Intermodulation Distortion, IM, 60 Hz+7 kHz. . . . . <0.06%
14. Noise Referred to the Input (NRI). . . . . –127 dB
    - All input and output options, +50 dBu in, +4 dB out, Z_S = 50Ω, 20 Hz - 20 kHz filter
15. Signal to Noise Ratio, S/N
    - No options, +4 dBu in, +4 dB out, Z_S = 50Ω, 20 Hz - 20 kHz filter. . . <–85 dB
    - Input gated off, 20 Hz - 20 kHz filter . . . . . <–91 dB
16. Feedback Prevention (Main Output)
    - For each doubling of the number of gated inputs . . . . . 3 dB
17. Gated Input Attack Time . . . . . 25 μSec - 25 mSec
    - (½ wave, 20 Hz - 20 kHz after signal exceeds threshold)
18. Gated Input Release Time . . . . . 0.5 - 8 Sec
    - Trimpot adjustable per channel
19. EQ . . . . . ±12 dB adjustment at 200 Hz, 1 kHz, 4 kHz
20. High Pass Filter . . . . . –3 dB at 150 Hz, 6 dB/octave slope

CONTROLS AND INDICATORS

1. Front Panel Controls
   - Gated Input Mix Bus Gain
   - Aux Input Gain
   - EQ Cut and Boost (Low/Mid/High)
   - Phantom Power Switch (On/Off)
   - Automatic/Manual Switch
2. Front Panel Indicators
   - Input Gated On
   - Power On

CONNECTORS

1. Inputs and Outputs
   Standard . . . . . Plug-in lugless compression-type screw terminal connectors
2. Power . . . . . Plug-in lugless compression-type screw terminal connector

MECHANICAL

1. Rack Space . . . . . 1 standard EIA rack space
2. Maximum Overall Dimensions
   Height . . . . . 1 3/4"
   Width . . . . . 19"
   Depth . . . . . 14"

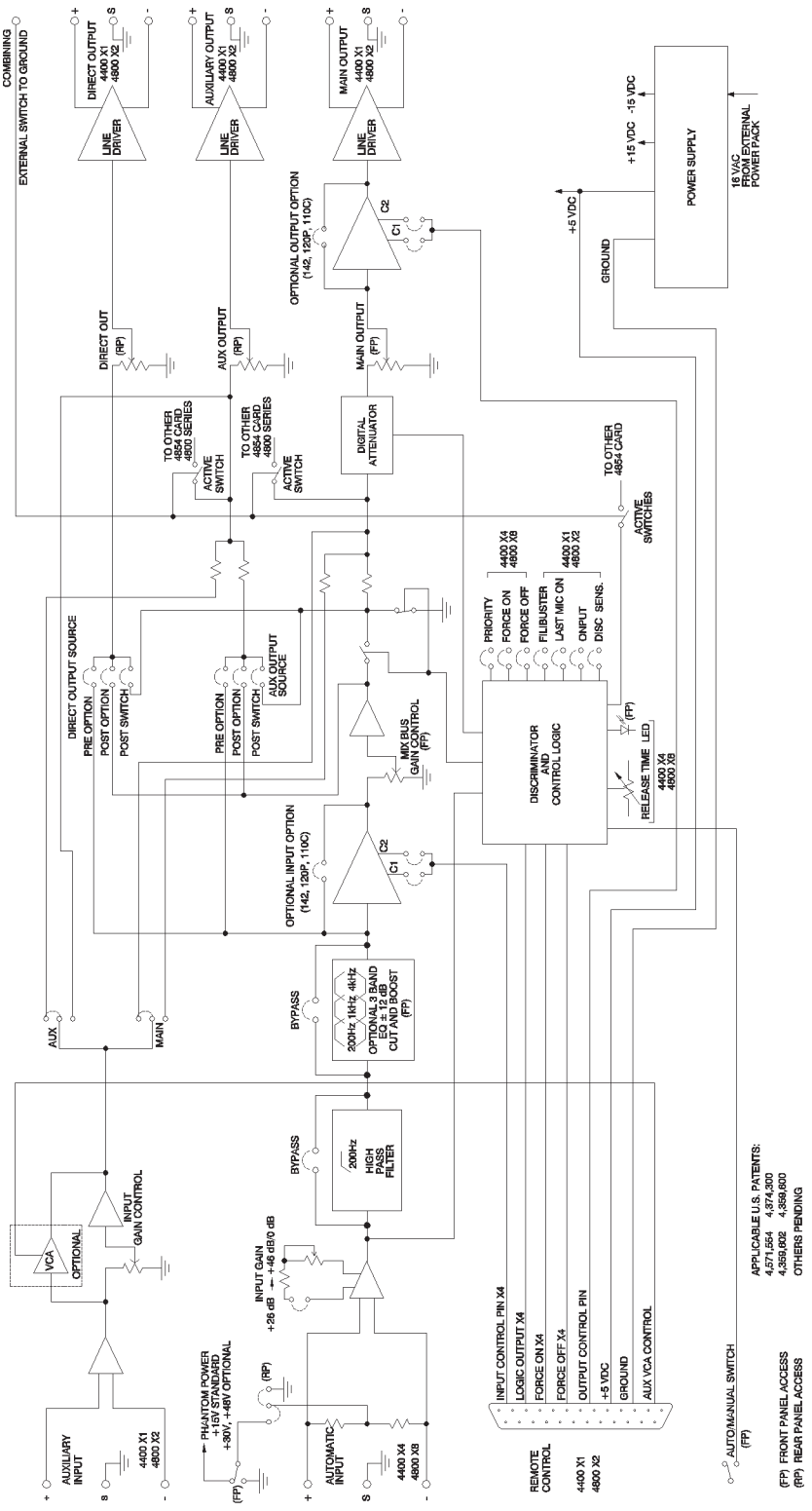

Figure 1 - Block Diagram
4400 and 4800 Series Automatic Mixers

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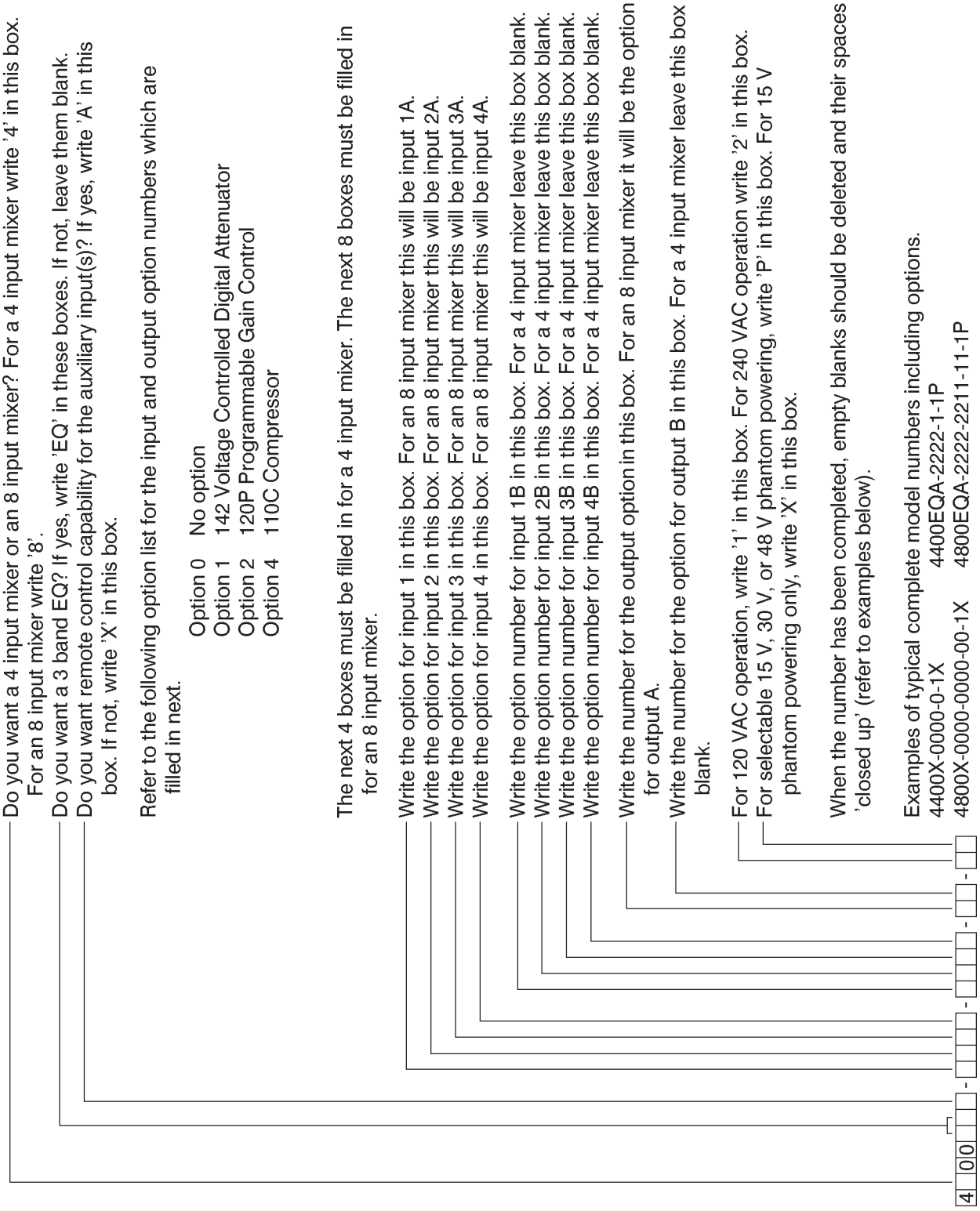

Figure 2 - 4400 and 4800 Model Numbering System
How to specify options

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Figure 3 - 4400/4800 Series Mixers, Front View

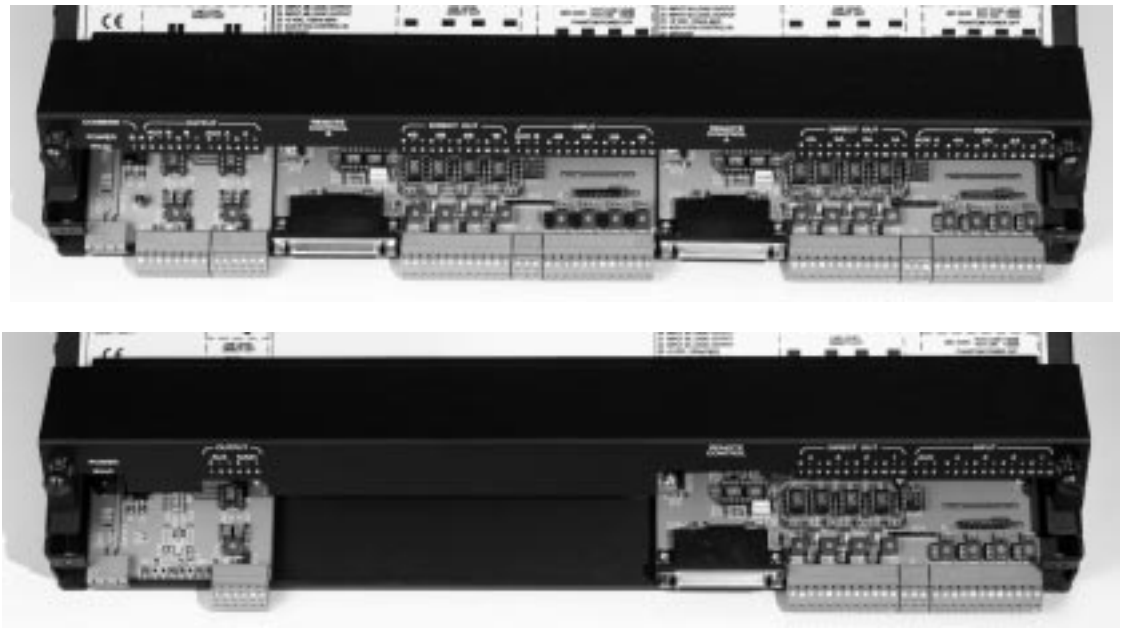

Figure 4 - 4800/4800EQ (top) and 4400/4400EQ (bottom)
with covers removed and placed on top of the cases