

# BOGEN<sup>®</sup>

COMMUNICATIONS, INC.

## MIXER/POWER AMPLIFIERS

### DMA-20, DMA-40, DMA-80, DMA-160

#### INSTALLATION & OPERATION INSTRUCTIONS

The Bogen DMA-Series mixer/power amplifiers combine module input with high-performance MOSFET circuitry to permit a custom-designed approach to sound reinforcement using a single amplifier. The DMA-20 is a five channel (4 module/1 program) unit, rated at 20 watts. The DMA-40, DMA-80, and DMA-160 have seven channels (6 module/1 program) and are rated at 40, 80, and 160 watts, respectively.

Any of the Bogen plug-in modules may be installed in the rear panel ports to define each channel's function. Inputs are mixed on an active bus, allowing interaction for three-level priority operation. Modules set to priority level 1 can receive (are muted by) priority signals from modules set to priority levels 2 and 3. Modules set to priority level 2 send priority signals to modules set to priority level 1, and receive priority signals from modules set to priority level 3. (Modules set to priority level 1 or 2 are also muted when the rear panel MUTE terminals are shorted through a contact closure.) Modules set to priority level 3 mute the program input and modules set to priority level 1 or 2.

The program input has its own level control and is designed primarily for background music applications. This input also has a (screwdriver-adjusted) variable mute feature, activated by customer-supplied contact closure (or priority signal from a module).

An individual level control is also provided for each module channel. Remote volume control is possible with the RVC-D accessory. Full-range bass and treble controls and master level control are also provided. An LED meter provides output level indication. A low-cut filter, tone control defeat, and preamp link switch are located in the module cage to prevent tampering.

The DMA mixing bus may be strapped to other DMA amplifiers through bridging jacks on each unit. Preamp Out/Power Amp In jacks permit the installation of signal processing equipment. Direct and transformer-coupled outputs are provided to match 4- and 8-ohm speaker systems, and 25V and 70V distributed systems. The DMA-80 includes a 25V center-tapped output for applications requiring a true balanced 25V line.

## INSTALLATION

### UNPACKING

The amplifier was carefully checked before leaving the factory. Inspect the shipping container and the unit closely for evidence of improper handling. If the unit has been damaged, place an immediate claim with the dealer/distributor from whom the unit was purchased. If the unit was shipped directly to you, notify the transportation carrier without delay and file a claim.

### RACK MOUNTING

The amplifiers are designed for installation in standard equipment racks, using Model DRK-2 rack panel kit for DMA-20 and Model DRK-3 for DMA-40, -80, and -160.

## MODULES

### Caution

*Be sure that the front-panel-mounted POWER switch is in the OFF position before installing or removing modules.*

Modules are easily inserted in any available port of the module cage. Align the top and bottom edges of the module circuit board into the slots of the port, and slide the module into the cage to engage the card edge connectors. Secure the module to the amplifier with two screws.

## PRIORITY

Set the priority level on modules so equipped to the desired level before installing them in the amplifier. The level is set by repositioning printed circuit board-mounted shunts. The screening on the module printed circuit board shows which pins to connect for the desired priority level.

**PRIORITY LEVEL 1** — The module receives, and is muted by priority signals from any module set to priority level 2 or 3. A module set to priority level 1 is also muted when the rear panel MUTE terminals are shorted through a contact closure. (The program input is preset at level 1.)

**PRIORITY LEVEL 2** — The module sends priority signals to mute any module set to priority level 1, and receives priority signals from any module set to priority level 3. A module set to priority level 2 is also muted when the rear panel MUTE terminals are shorted through a contact closure.

**PRIORITY LEVEL 3** — The module set to priority level 3 sends priority signals to mute the program (PGM) input and modules set to priority level 1 or 2. (The rear panel MUTE terminals function at level 3 when shorted through a contact closure.)

## OUTPUT TERMINAL STRIP

The DMA-Series provide an unbalanced direct output at 4-ohms (DMA-80, DMA-160) and 8-ohms (DMA-20, DMA-40). 25V and 70V transformer-coupled taps are provided for distributed systems on all models. The DMA-80 includes a 25V center-tapped output.

When using transformer-coupled outputs, be sure that the link on the output terminal strip connects the **OUTPUT XMR IN** terminal to the **DIRECT+** terminal. **Remove the link when using the direct output.**

## OPERATION

### Caution

*Ensure that all input and output connections have been properly made before applying power to the unit and that all plug-in modules are seated in the edge connectors.*

## TECHNICAL SPECIFICATIONS

<b>Rated Power Output (RPO)</b>	
DMA-20	20 watts @ 4-ohms, 8-ohms, 25V and 70V
DMA-40	40 watts @ 4-ohms, 8-ohms, 25V and 70V
DMA-80	80 watts @ 4-ohms, 8-ohms, 25VCT, 25V and 70V
DMA-160	160 watts @ 4-ohms, 8-ohms, 25V and 70V
<b>Frequency Response</b>	20Hz-20,000Hz, +0, -2dB
<b>Distortion</b>	
Direct	0.3% (max.), 20Hz-20kHz, +0, -2dB, 1 watt to rated output power
Transformer	0.3% (max.), 65Hz-20kHz, +0, -2dB, 1 watt to rated output power
<b>Signal-to-Noise Ratio</b>	-75dB or better
<b>Input Sensitivity/Impedance</b>	
Module Channel	100mV/10-kilohms
Program Input	100mV/10-kilohms
Bridging I/O	100mV/3-kilohms
Power Amp Input	1V/10-kilohms
<b>Tone Control</b>	
Bass:	±10dB @ 100Hz
Treble:	±10dB @ 10,000Hz
<b>Preamp Out</b>	1V @ 600-ohms
<b>Variable Mute Range</b>	60dB (min.)
<b>Lo-Cut Filter</b>	-3dB @ 65Hz, 6dB/octave
<b>Dimensions</b>	
DMA-20	3-1/2"H x 16-1/2"W x 9-1/8"D
DMA-40, -80, -160	5-1/2"H x 16-1/2"W x 11-3/8"D

### POWER

The front-panel rocker switch applies power to the amplifier. An integral pilot lamp illuminates when power has been applied.

### LEVEL CONTROL

Set gain and filter controls on modules so equipped to mid-rotation. Set the amplifier front-panel channel level controls to their full counterclockwise position. Control the level of each channel with clockwise rotation of these controls. The overall output level is adjusted with the MASTER control. The output level LED meter will begin to illuminate red as the amplifier reaches full output power. A constantly lit LED indicates possible signal clipping.

### tone control

When the tone control switch in the module cage is in the OUT position, the front panel tone controls are disabled and the tone response will be flat. To enable the tone controls, set the tone control switch to the IN position. Bass and treble tone controls provide 10dB cut/boost at 100Hz and 10kHz, respectively.

### LOW-CUT FILTER

A low cut switch is used to reduce unnecessary low frequency when using transformer-coupled outputs. Set this switch to IN when using transformer-coupled outputs, and OUT when using the direct output.

### VARIABLE MUTE

A customer-supplied contact closure across the MUTE terminals will activate the PGM input variable-mute (adjustable at the rear panel MUTE LEVEL control), and will also mute any modules set to priority level 1 or 2.

## MAINTENANCE

### Caution

*There are no user-serviceable parts within the unit. Refer all servicing to qualified service personnel only.*

### AC CIRCUIT BREAKER

If the AC circuit breaker trips, the power switch pilot lamp will go out and there will be no output. Set the AC power switch to OFF and depress the red button on the circuit breaker to reset it. Return the AC power switch to ON. If the breaker trips again, have the trouble investigated by a qualified technician.

### THERMAL BREAKER

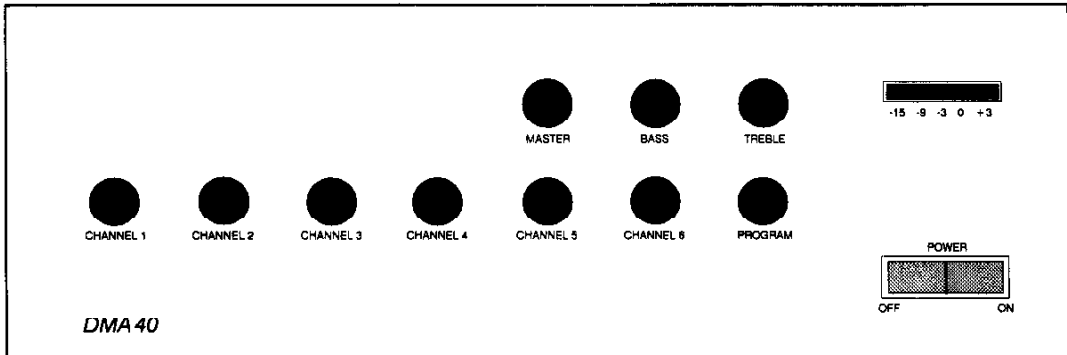
The thermal breaker will open when the temperature at the output transistor heat sink reaches 105°C (221°F) on all models. If the breaker opens, there will be no output but the power switch pilot lamp will remain illuminated. Wait approximately two minutes for the breaker to reset. If the breaker resets and then opens again, investigate the cause of the temperature overload. This may be due to improper connections at the output terminals or excessive environmental heat with inadequate ventilation.

### SERVICE

We are interested in the maintenance of your Bogen equipment. If you encounter difficulty, do not hesitate to ask our advice. Information can be obtained by writing to Service Department, Bogen Communications Inc., P.O. Box 575, Ramsey, NJ 07446.

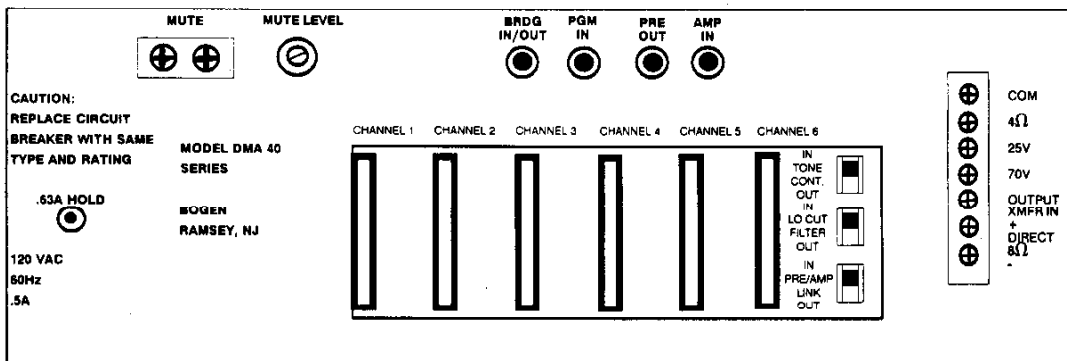
When communicating with us, give the model and series designation (stamped on the rear panel) of your unit. Describe the difficulty and include details on the electrical connection to associated equipment. We will send you service information if the trouble appears simple. If the amplifier requires servicing, we will send you the name and address of the nearest Bogen Service Agency to which you can send the unit for repairs.

When shipping the unit, pack carefully to prevent damage in transit. Send the unit, insured and freight prepaid, via any responsible carrier. The unit will be promptly repaired and returned to you collect (freight prepaid while in warranty)



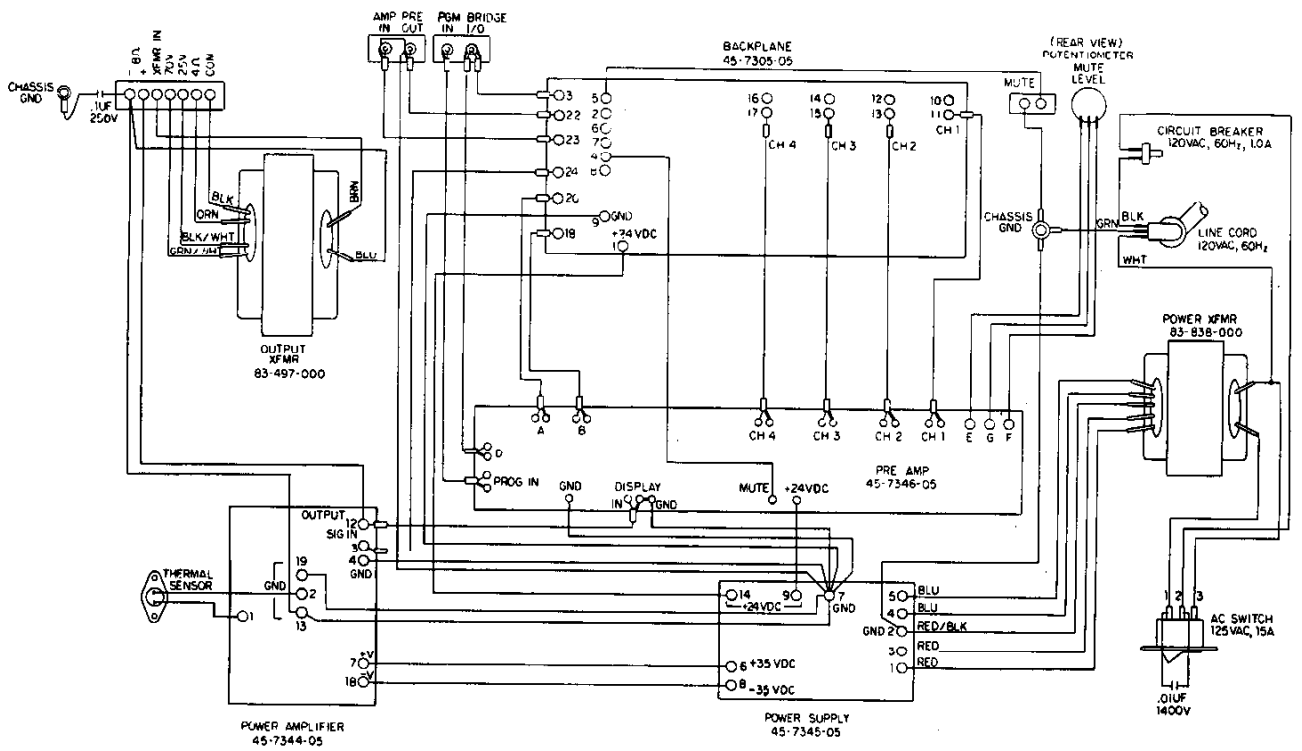
## FRONT PANEL CONTROLS AND INDICATORS

<b>POWER</b>	Rocker-type switch illuminates when power has been applied.
<b>LEVEL</b>	Bar-type LED meter provides a graphic display of the output level. Illuminates red when levels above 0dB are reached, to indicate possible signal clipping.
<b>CHANNEL 1-6</b>	Individual level controls for module input channels 1 through 6 (1 - 4 on DMA-20).
<b>PROGRAM</b>	Level control for the fixed program input.
<b>MASTER</b>	Master output level control.
<b>BASS</b>	Provides $\pm 10$ dB attenuation at 100Hz (with tone control switch IN).
<b>TREBLE</b>	Provides $\pm 10$ dB attenuation at 10kHz (with tone control switch IN).

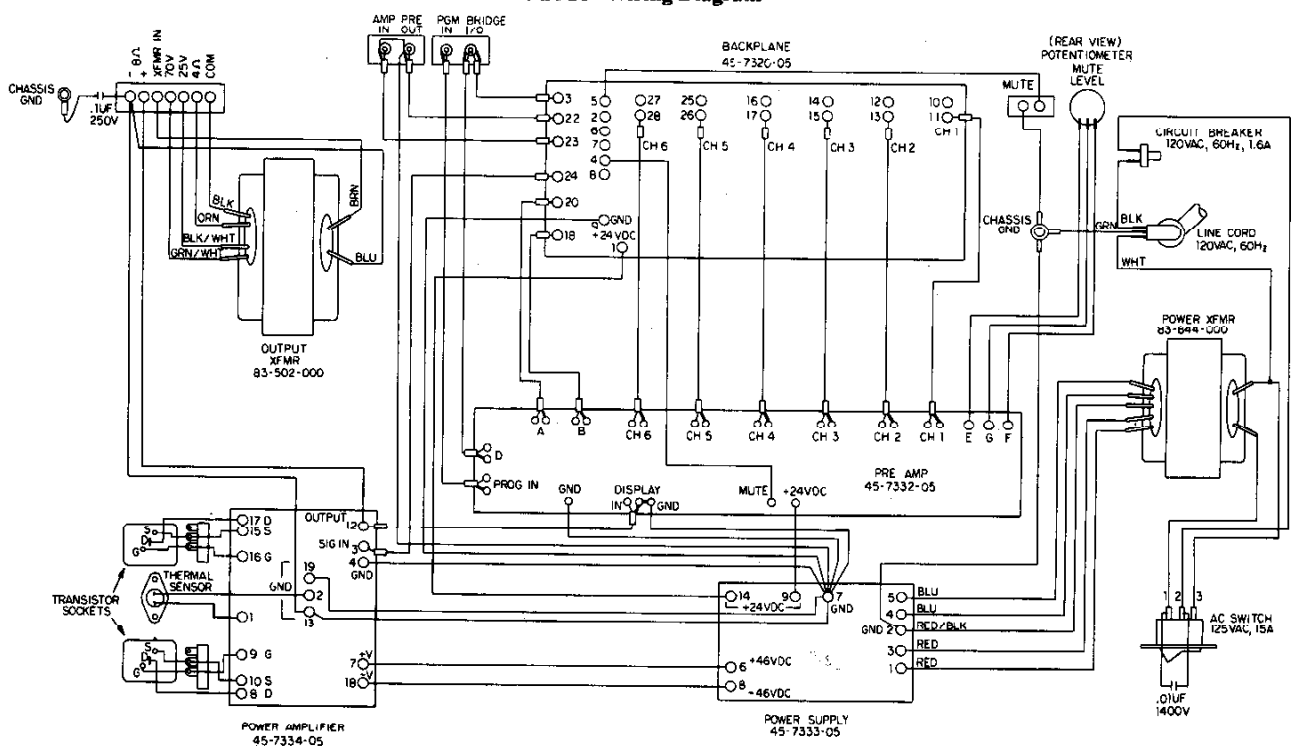


## REAR PANEL CONTROLS AND CONNECTORS

<b>LINE CORD</b>	Three-wire line cord supplies power to the amplifier.
<b>AC BREAKER</b>	Press-to-reset AC circuit breaker protects against excessive current flow.
<b>INPUT PORTS</b>	Card edge connectors accept plug-in modules.
<b>PGM IN</b>	Fixed program input for high level source (e.g., tape player or phono).
<b>MUTE</b>	Customer-supplied contact closure across the MUTE terminals activates the PGM input variable-mute (adjustable at rear panel MUTE LEVEL control), and mutes modules set to priority level 1 or 2.
<b>MUTE LEVEL</b>	Screwdriver-adjustable mute level control for PGM IN input. 60dB range.
<b>BRDG IN/OUT</b>	Allows strapping of mixing busses from another DMA amplifier. Output level is independent of master control; may be used as an output for tape recorder.
<b>PREAMP OUT</b>	Provides output of preamp for connection to signal processing modules. Used with PRE/AMP LINK switch OUT.
<b>AMP IN</b>	Input connector for power amplifier when PRE/AMP LINK switch is OUT.
<b>OUTPUT</b>	Screw-terminal strip for connection to direct and transformer-coupled outputs.
<b>LOW CUT</b>	<b>IN:</b> Provides -3dB attenuation @ 65Hz 6dB/octave. <b>OUT:</b> Disables low-cut filter action.
<b>PRE/AMP LINK</b>	<b>IN:</b> Connection between preamplifier and power amplifier. <b>OUT:</b> Provides disconnect between preamplifier and power amplifier.
<b>tone CONTROL</b>	<b>IN:</b> Enables front panel bass and treble controls. <b>OUT:</b> Bypasses tone controls for flat response.



**DMA-20 Wiring Diagram**



**DMA-40 Wiring Diagram**

## PLUG-IN MODULES

### Sound Reinforcement – Modules MM-F & MM-S

Low-impedance, transformer-balanced microphone preamplifier module with **HIGH-/LOW-CUT** filters, **GAIN** control (25dB range), phantom power. MM-F – female XLR-type connector; MM-S – screw terminals (Terminal #1 is GND, #2 is LO, and #3 is HI on all modules).

#### Operation

*Phantom Power:* Move **PHANTOM P.S.** jumper to the **ON** position for +22V phantom supply. Select **OFF** position to bypass.

### Microphone Paging – Module MP-S

Signal-activated low-impedance, transformer-balanced microphone preamplifier module with **HIGH-/LOW-CUT** filters, **GAIN** control (25dB range). Automatic Level Control (**ALC**), three levels of priority and phantom power are jumper selected. Screw terminal connectors.

#### Operation

*Phantom Power:* Move **PH. P.S.** jumper to **ON** position for +22V phantom supply. Place jumper on either header pin to bypass.

*ALC:* Move **ALC** jumper to **ON** position; move to **OFF** to bypass.

*Muting Priority (using PRIORITY ASSIGN jumpers):*

**Level 1** – Place one jumper in the "1" position and store the unused jumper on an empty pin.

**Level 2** – Place both jumpers in the "2" position.

**Level 3** – Place one jumper in the "3" position and store the unused jumper on an empty pin.

### Telephone Paging – Module TP-S

Signal-activated telephone paging module provides a 600-ohm balanced input with -24dBm sensitivity for matching to telephone page lines. Includes **HIGH-/LOW-CUT** filters and **GAIN** control (25dB range). Automatic Level Control (**ALC**) and three levels of priority are jumper-selected. Screw terminal connectors.

#### Operation

*ALC:* Move the **ALC** jumper to **ON** position to enable **ALC**; move to **OFF** position to bypass.

*Muting Priority (using PRIORITY ASSIGN jumpers):*

**Level 1** – Place one jumper in the "1" position and store the unused jumper on an empty pin.

**Level 2** – Place both jumpers in the "2" position.

**Level 3** – Place one jumper in the "3" position and store the unused jumper on an empty pin.

### Auxiliary Input – Module BL-S

Transformer-balanced auxiliary input module suitable for line-bridging or line-matching. Use the printed circuit board jumper to select either 600-ohm input or 10-kilohm input. Screw terminal connectors.

### Line Output – Module LO-S

Module provides jumper-selected 600-ohm transformer-balanced (+4dBm) output or 0.5-watt direct output at 8-ohms. May be used for line output from the D-Series mixing bus or for music-on-hold applications. Parallel RCA jacks permit one music source to be used for M.O.H. and background music. A jumper-selected pad provides 20dB attenuation of the signal from the music source. **LEVEL** control sets the module output level.

#### Operation

*Output Selection:* Select **DIRECT** or **XFMR**-coupled output by placing jumper **J4** in the appropriate position. (When using the direct output, connect the 8-ohm load between screw terminals #1 and #3. When using transformer output, terminal #1 is GND, #2 is LO, and #3 is HI.)

Place jumper **J2** in **L.O.** position for line output or in **M.O.H.**

position for music-on-hold applications. Connect the music source to the **MUSIC IN** (RCA) jack; the **MUSIC OUT** jack is paralleled to allow same signal source to be used for background music.

*Attenuator Pad:* Place jumper **J3** in the 20dB position to attenuate the signal connected to the **MUSIC IN** jack. Bypass the pad by placing the jumper in the 0dB position.

### Tone Signal Generation – Module TG-S

The module generates four distinct tones: **CHIME**, **STEADY**, **ALARM**, and **BURST**. May be assigned to any of three levels of priority. Requires customer-supplied contact closure between the desired Tone and **ENABLE** screw terminal connectors.

#### Operation

*Muting Priority (using PRIORITY ASSIGN jumpers):*

**Level 1** – Place one jumper in the "1" position and store the unused jumper on an empty pin.

**Level 2** – Place both jumpers in the "2" position.

**Level 3** – Place one jumper in the "3" position and store the unused jumper on an empty pin.

### Remote Volume Control or Compression – Module VC-C

Dual-function (jumper-selected) compressor/remote volume control module. The compressor limits the power amplifier input signal to 1 volt to prevent overdrive. The DC-operated full range volume control allows any output setting up to the maximum preset on the D-Series unit **MASTER** level control.

#### Operation

*Compression:* Set the **PRE/AMP LINK** switch on the D-Series unit to **OUT** position. Connect the **PREAMP OUT** jack on the D-Series unit to the **VC-C IN** connector. Connect the **VC-C OUT** jack to the **AMP IN** connector on the D-Series unit. Place jumper **J1** in the **IN** position to enable the compression function; move to the **OUT** position to bypass.

*Remote Volume Control:* Connect **RVC-D** to terminals 1 and 3 on **VC-C**. (Terminals 1 and 2 are common.)

### FM Reception – Module FM-T

**FM** tuner module designed as a preset background music source. Screwdriver-adjusted tuning. The output is jumper-selected to the mixing bus of the D-Series unit or to the module's RCA-type connector. May be configured to accept priority signals from other modules. Monaural operation. Screw terminals for antenna.

#### Operation

*Output:* Place jumper **J1** in **OUT** position to assign tuner output to the module's RCA connector. Place jumper **J1** in **MIX BUS** position to assign module's output to the D-Series mixing bus.

*Mute:* Place jumper **J2** in the **ON** position to mute **FM-T** with any level 2 or 3 priority signal. Place in **OFF** position to prevent muting from priority signals.

### MIC/Line Remote Control – Module MR-S

Low-impedance transformer-coupled **MIC** preamp. or line-level module with **HIGH-/LOW-CUT** filters, **GAIN** control (25dB range), phantom power. Full-range DC-operated Remote Volume Control allows any output setting up to maximum preset on amplifier channel control. Screw terminal connectors.

#### Operation

*Input:* Set Jumper **J2** to **MIC** position for microphone input. Set to **LINE** position for line level input.

*Phantom Power:* Move jumper **J1** to **ON** position for +22V phantom supply. Select **OFF** position to bypass.

*Mute:* Place jumper **J3** in the **ON** position to mute **MR-S** with any level 2 or 3 priority signal. Place in **OFF** position to prevent muting from priority signals.

*RVC:* Connect **RVC-D** to terminals 1 and 4.

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