

# BOGEN<sup>®</sup>

COMMUNICATIONS, INC.

## WALL MOUNT MODULAR AMPLIFIERS

### WMA-80 & WMA-160

## INSTALLATION AND OPERATION INSTRUCTIONS

The Bogen WMA-80\* and WMA-160 are professional quality wall-mounting amplifiers suited for use in gymnasiums, auditoriums, and banquet rooms where inconspicuous, permanent mounting is desired. Both models combine modular flexibility with power MOSFET performance and are available in flush-mount or surface-mount configurations. A locking panel on the front cover secures the unit when not in use, and is designed so that it cannot be removed without access to the area behind the panel.

The WMA-80 and WMA-160 are rated at 80 and 160 watts, respectively. Each has 8 input channels: a built-in Lo-Z microphone input (with a 3-pin female connector); a Hi-Z Projector input (with 1/4" connector); and six module ports. The ports accept any combination of the Bogen D-Series plug-in modules to define the function of each channel.

Inputs are mixed on an active buss, allowing interaction for three levels of priority. Modules set to priority level 1 are muted by modules set to priority levels 2 or 3. Modules set to priority level 2 mute modules set to level 1 and are muted by modules set to priority level 3.

To obtain the best control over room acoustics, the WMA Series features a 10-band graphic equalizer, which provides  $\pm 8$ dB at ISO centers of 125, 200, 315, 500, 800, 1.2k, 2k, 3.1k, 5k, and 8k Hz. Equalizer slide controls are located behind the front cover to prevent tampering after installation and setup. A low-cut filter (-3dB @ 65Hz) and tone control bypass switch are also provided and are located in the module port cage.

Individual level controls are provided for each channel. A Master Volume Control sets the final output level. A bar-graph-type LED output meter provides output level indication.

Power MOSFET output stages and protective circuitry provide performance and reliability and eliminate the need for output fuses and thermal fuse links. A built-in compressor circuit protects speakers/drivers from damage by limiting the output of the preamplifier to 1 volt.

Each amplifier has a direct 4-ohm output for use in professional applications plus transformer-coupled 8-ohm and 25V and 70V outputs. The amplifiers operate from a 120 volt, 60Hz AC source. A push-to-reset circuit breaker is included.

## UNPACKING

The amplifier was carefully checked before leaving the factory. Inspect the shipping container and components 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.

\*WMA-80 is UL listed.

## INSTALLATION

### CAUTION

*These installation instructions are for use by qualified personnel only. To avoid an electric shock, do not perform any installation or service procedures other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.*

### BACK BOX INSTALLATION

A surface-mount or flush-mount cabinet is required for installation. Follow the instructions on page 2 of this manual to install the surface mount (BB-S) or flush-mount (BB-F) enclosure.

### OUTPUT CONNECTIONS, LOW-CUT, EQ DEFEAT

The amplifiers provide a direct output at 4-ohms and transformer-coupled 8-ohm, 25V and 70V taps for use with distributed systems. The WMA-80 includes a 25V center-tapped output.

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

A Low-Cut filter switch, located in the port cage, reduces low-frequencies when using transformer-coupled outputs. Set the switch to IN when using transformer-coupled outputs, and OUT when using the direct output.

The Tone Control defeat switch, located in the port cage, bypasses the amplifier's equalizer filter controls for a flat response. Set the switch to IN to enable the equalization filters and OUT to bypass the filters.

### MODULE INSTALLATION

Before installing each module, follow the instructions on page 3 of this manual to configure it for the desired function or priority level. Set the HIGH-/LOW-CUT filter controls and GAIN controls on modules so equipped to mid-rotation.

To prevent damage to the modules or the amplifier, be sure that the amplifier POWER switch is in the OFF position before installing or removing modules. To install modules, align the top and bottom edges of the module printed circuit board in the slots of the port, and slide into the port to engage the edge connectors. Secure the module with two screws.

Modules set to priority level 1 receive (and are muted by) priority signals from any module set to priority level 2 or 3. Modules set to priority level 2 send priority signals to mute any modules set to priority level 1, and receive priority signals from any module set to priority level 3. Modules set to priority level 3 send priority signals to mute modules set to priority level 1 or 2.

# BACK BOX INSTALLATION

(A1)

## BB-S INSTALLATION

1. INSTALL BB-S BACK BOX ON WALL MAKING SURE THAT THE BOX IS SQUARELY MOUNTED. ALLOW FREE ACCESS ABOVE BOX FOR AC WIRING AND ABOVE OR BELOW BOX FOR AUDIO WIRING.
2. HAVE POWER WIRING RUN NEAR UPPER RIGHT HAND CORNER WHERE BOX WILL BE MOUNTED.
3. SECURE BOX ON WALL WITH SCREWS THROUGH BACK HOLES (4 SCREWS).

(A2)

## BB-F INSTALLATION

1. PREPARE MOUNTING HOLE FOR BB-F BACK BOX. HOLE SIZE SHOULD BE 24-13/16" X 14.5/16" MINIMUM OPENING WITH STUDS OR MOUNTING SURFACES ON EACH SIDE.
2. HAVE POWER WIRING RUN NEAR UPPER RIGHT HAND CORNER WHERE BOX WILL BE MOUNTED.
3. INSTALL BB-F BACK BOX IN WALL MAKING SURE THAT THE BOX IS SQUARELY MOUNTED AND THE FRONT SURFACE FLUSH WITH THE FINISHED WALL. USE SHIMS IF NECESSARY. ALLOW FREE ACCESS ABOVE BOX FOR AC WIRING AND ABOVE OR BELOW BOX FOR AUDIO WIRING.
4. SECURE BOX IN WALL WITH SCREWS THROUGH SIDE SLOTS (4 SCREWS).
5. WITH BOX POSITIONED, INSTALL 4 ADDITIONAL SCREWS IN HOLES NEXT TO SLOTS.

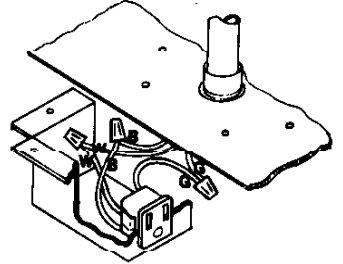


BB-S

(B)

## JUNCTION BOX WIRING

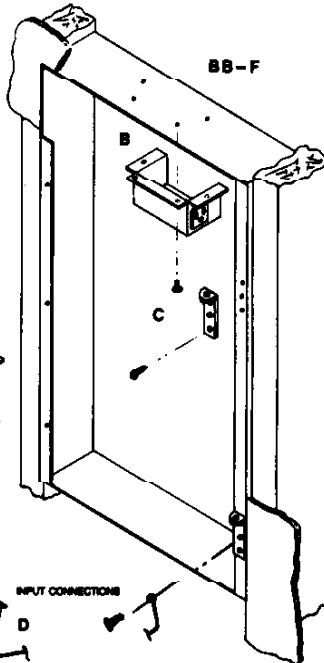
1. SUPPLY AC POWER TO UNIT THROUGH CONDUIT, BX OR ROMEX IN ACCORDANCE WITH LOCAL ELECTRICAL CODES.
2. SNAP AC RECEPTACLE INTO JUNCTION BOX (GND PIN DOWN) AND CONNECT WIRES AS SHOWN USING WIRE NUTS.
3. BB-F: INSTALL JUNCTION BOX IN BB-F AND SECURE WITH 4 #8 X 3/8 SCREWS. BB-S: INSTALL JUNCTION BOX IN BB-S AND SECURE WITH 4 #8-32 X 3/8 SCREWS AND KEPS NUTS.



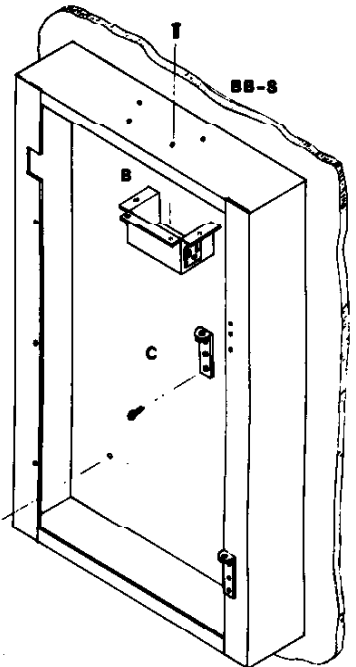
(C)

## PREPARATIONS BEFORE INSTALLING AMPLIFIER

1. RUN ALL AUDIO LEADS INTO WALL BOX. THE PREFERRED ARRANGEMENT IS FOR OUTPUT LEADS TO ENTER THROUGH THE TOP AND INPUT LEADS TO ENTER THROUGH THE BOTTOM. USE KNOCKOUTS AS NECESSARY. MAKE SURE WIRES DO NOT REST AGAINST SHARP EDGES OF BOX.
2. INSTALL HINGES (PACKED WITH AMPLIFIER) USING 6 #8 X 3/8 SCREWS. DO NOT INSTALL MIDDLE SCREWS OF LOWER HINGE (USED FOR GROUND STRAP CONNECTION - SEE 'D2').
3. CHECK TO SEE THAT AC POWER IS AVAILABLE AT THE OUTLET.



BB-F



BB-S

(D)

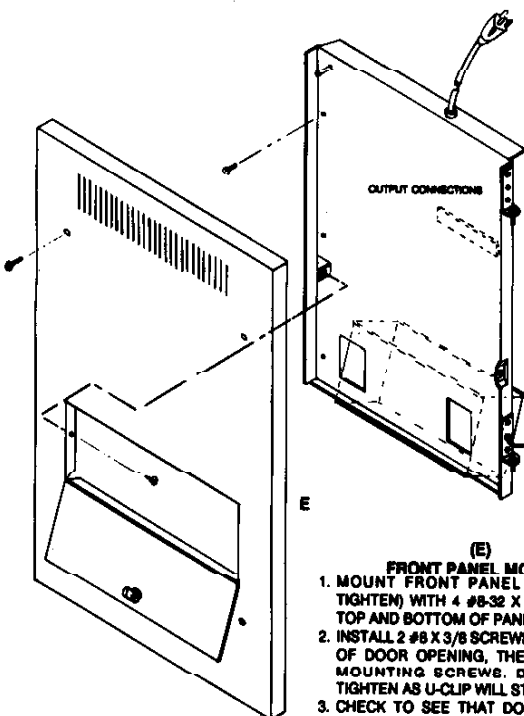
## AMPLIFIER INSTALLATION

1. MOUNT AMPLIFIER ON BACK BOX BY ALIGNING HINGE PINS AND LOWERING INTO PLACE.
2. CONNECT GROUND STRAP BY INSERTING MIDDLE HINGE SCREWS THROUGH LUGS OF GROUND STRAP AS SHOWN IN ILLUSTRATION. GROUND STRAP MUST BE INSTALLED TO MEET UL REQUIREMENTS.
3. MAKE NECESSARY INPUT AND OUTPUT CONNECTIONS (CARE SHOULD BE TAKEN TO KEEP INPUT AND OUTPUT LEADS SEPARATED AS MUCH AS POSSIBLE).
4. WITH POWER SWITCH TURNED OFF, PLUG AC CORD INTO SIDE OUTLET ON JUNCTION BOX.
5. TURN AMPLIFIER ON AND CHECK CONNECTIONS.
6. SECURE AMPLIFIER USING 3 #8-32 x 1/2 SCREWS.

(E)

## FRONT PANEL MOUNTING

1. MOUNT FRONT PANEL (BUT DO NOT TIGHTEN) WITH 4 #8-32 X 3/8 SCREWS AT TOP AND BOTTOM OF PANEL.
2. INSTALL 2 #8 X 3/8 SCREWS ON INSIDE LIPS OF DOOR OPENING, THEN TIGHTEN ALL MOUNTING SCREWS. DO NOT OVERTIGHTEN AS U-CLIP WILL STRIP.
3. CHECK TO SEE THAT DOOR OPENS AND CLOSES CORRECTLY.



E

GROUND STRAP CONNECTION. SEE 'D2'

## MODULE SETUP (FOR QUALIFIED SERVICE PERSONNEL ONLY)

### 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 has 3-pin female connector; MM-S has screw terminals (Terminal #1 is GND, #2 is LO, and #3 is HI on all modules).

*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.

*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.

*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 buss 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.

*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.

*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 Control/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 level of the MASTER control on the D-Series unit.

*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 accessory RVC-D to terminals #2 and #3.

### 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.

*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 buss.

*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 full-range RVC allowing any output setting up to maximum preset on amplifier channel control. Screw terminal connectors.

*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 accessory RVC-D to terminals #1 and #4.

# PHYSICAL FEATURES

## FRONT CHASSIS CONTROLS AND INDICATORS (Refer to Figure 1)

<b>POWER</b>	Rocker-type switch illuminates when power has been applied
<b>LED LEVEL INDICATORS</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
<b>MASTER</b>	Master control sets overall output level
<b>MIC</b>	Level control for fixed microphone input channel
<b>PROJECTOR</b>	Level control for the fixed projector input
<b>MIC IN</b>	Professional 3-pin female connector provides a Lo-Z balanced microphone input
<b>PROJECTOR IN</b>	1/4" connector provides a Hi-Z projector input for audio-visual applications
<b>EQ FILTER</b>	10 linear-action filter controls provide $\pm 8\text{dB}$ at ISO centers of 125, 200, 315, 500, 800, 1.2k, 2k, 3.1k, 5k, and 8k Hz
<b>AC BREAKER</b>	Press-to-Reset AC circuit breaker protects against excessive current flow

## REAR CHASSIS CONTROLS AND CONNECTORS (Refer to Figure 2)

<b>INPUT PORTS</b>	Card-edge connectors accept plug-in modules
<b>OUTPUT TERMINAL STRIP</b>	Screw-terminal strip for connection to direct and transformer-coupled outputs. Remove the link between the <b>DIRECT +</b> terminal and <b>OT IN</b> terminal when using direct output
<b>LO-CUT FILTER SWITCH</b>	<b>IN:</b> Provides -3dB attenuation @ 65Hz, 6dB/octave <b>OUT:</b> Bypasses Lo-Cut filter action
<b>TONE CONTROL SWITCH</b>	<b>IN:</b> Enables EQ filter controls <b>OUT:</b> Bypasses EQ filter controls for flat response

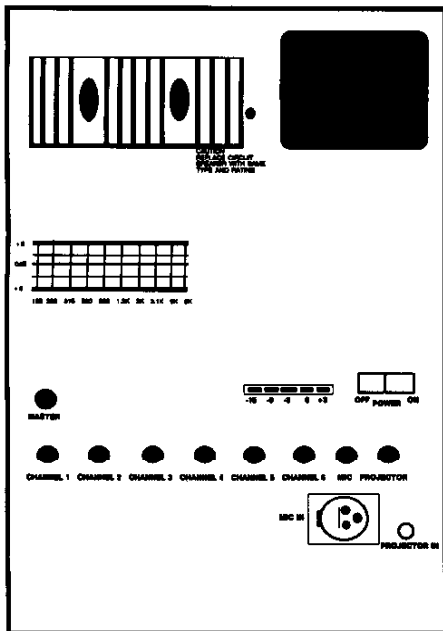


FIGURE 1

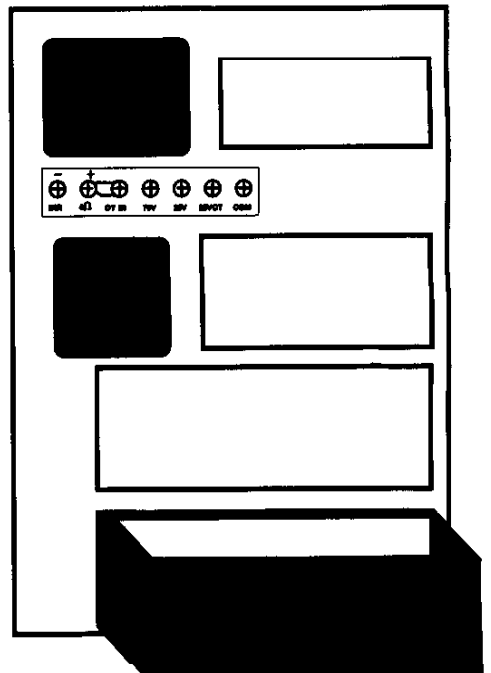


FIGURE 2  
(WMA-80 shown)

## OPERATION

### POWER

The front-panel-mounted rocker switch applies power to the amplifier and illuminates when power is applied.

### EQUALIZATION

Equalizer filter controls are accessible by removing the front cover (WMA-D). The equalizer provides  $\pm 8$ dB at ISO centers of 125, 200, 315, 500, 800, 1.2k, 2k, 3.1k, 5k, and 8kHz. Response is flat at the center detent position.

#### CAUTION

*Removal of the front cover presents an electrical shock hazard. For this reason, adjustment of equalizer filter slide controls should be performed by qualified service personnel only.*

### LEVEL CONTROLS

The level of each channel is controlled by an individual CHANNEL control. The overall output level is controlled by the MASTER control. The LED output meter will begin to illuminate red as the amplifier reaches full output power. A constantly lit red LED indicates possible signal clipping.

### AC CIRCUIT BREAKER

If the AC circuit breaker trips, the power switch pilot lamp will go out and there will be no output. Place the POWER switch in the OFF position and reset the breaker by inserting a screwdriver into the hole on the front panel and depressing the reset switch. Once the breaker has been reset, return the POWER switch to ON. If the breaker trips again, the difficulty must be investigated by a qualified service technician.

### THERMAL BREAKER

The thermal breaker opens when the temperature at the output transistor heat sink reaches 105°C (220°F). 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, arrange for qualified service personnel to investigate the cause of the temperature overload. This may be due to improper load connections or excessive environmental heat (ambient air temperature above 40°C) with inadequate ventilation.

### SERVICE

#### CAUTION

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

If you experience difficulty with this unit, do not hesitate to ask our advice or assistance. Information can be obtained by writing to Service Department, Bogen Communications, Inc., P.O. Box 575, Ramsey NJ 07446. Include the model number and series designation (a letter followed by numbers, stamped on the amplifier chassis) 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, or the name and address of the nearest authorized Bogen Service agency to which you can send the unit for repairs.

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

## SPECIFICATIONS

<b>Output Power Rating</b>	
WMA-80:	80 Watts @ 4-ohms, 8-ohms/25V (WMA-80), 25V and 70V
WMA-160:	160 Watts @ 4-ohms, 8-ohms, 25V and 70V
<b>Frequency Response</b>	20Hz to 20kHz, +0,-2dB
<b>Distortion</b>	
Direct:	0.3% (max.)
Transformer:	0.3% (max.)
<b>Input Sensitivity/Impedance</b>	
Module Channels:	100mV/10-kilohms
Projector Input:	100mV/10-kilohms
Mic. Input:	300 $\mu$ V/300-ohms
<b>Equalization</b>	$\pm 8$ dB @ ISO centers of 125, 200, 315, 500, 800, 1.2k, 2k, 3.1k, 5k, and 8kHz
<b>Hum &amp; Noise</b>	-75dB or better
<b>Inputs</b>	Low-Z balanced microphone, Hi-Z Projector, 6 input module ports
<b>Lo-Cut Filter</b>	-3dB @ 65Hz, 6dB/octave
<b>Outputs</b>	Direct — 4-ohms; Transformer — 8-ohms, 25V, 25VCT (WMA-80), 70V
<b>Controls</b>	Level controls for channels 1 - 6, MIC, PROJECTOR; MASTER Volume; 10 Equalizer filter slide controls; Illuminated POWER switch; LO-CUT filter switch; TONE IN/OUT switch; Push-to-Reset circuit breaker
<b>Dimensions</b>	
BB-F Flush-mount Box:	24-3/4"H x 14-1/4"W x 3-7/8"D (62.8x36.2x9.8cm)
BB-S Surface-mount Box:	26-3/4"H x 16-1/4"W x 3-7/8"D (67.9x41.3x9.8cm)
WMA-D Front Cover:	26-3/4"H x 16-1/4"W x 3/4"D (67.9x41.3x1.9cm)
<b>Power Required</b>	120V, 60Hz AC

**BOGEN.**  
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