900 Series **Module Guide**

TOA

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General

1. Which module should I use for a microphone?
2. Which module should I use for a wireless microphone receiver?
3. Which module should I use for an AM/FM tuner, cassette deck, CD player, computer sound card, juke box, mixer or satellite receiver?
4. Which modules should I use for telephone or microphone paging with priority over a music source?
5. Which module should I use for Music-On-Hold (MOH)?
6. What type of potentiometer do I need for a Remote Volume Control module?
7. How do I use one of the 900 Series processor modules?
8. What is the proper wiring for the screw terminal type input modules?
9. What's the difference between the "L" Series and "B" Series modules?
10. Which modules are for "mute send"?
11. Which modules are for "mute receive"?

Troubleshooting

12. Why won't the M-11 (Microphone Input with Mute-Receive) pass signal?
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INTRODUCTION

Welcome to the TOA 900 Series Module Guide!

In this guide, you'll find everything you need to take advantage of the powerful flexibility of 900 Series modular products — function descriptions; signal flow and wiring diagrams; specifications; jumper settings; application examples; and other useful information.

Understanding the modules will give you the freedom to configure custom systems FAST without complicated modifications. And as your customers' needs change, you can easily add more inputs or new functions by simply changing or adding modules.

An electronic version of the guide is also available for download at http://www.toaelectronics.com. If you have any questions, please contact TOA Product Support at 1-800-733-4748 — we're here to help!

TOA Electronics, Inc.

Dedicated to Bob Sweet, author of the original 900 Series Module Guide, 1990.

MODULE SELECTION

Module Categories
There are three main module categories -
1. **Mic**
2. **Line**
3. **Special Function**

Model Numbers
TOA assigns module model numbers using the following convention: **a-bbc**, where "a" indicates the module "Series", "bb" indicates the module "Function", "c" indicates the module "Connector Type".

For example, with the M-11S module,
"M" indicates "Microphone" Series
"11" indicates "Mute Receive" Function
"S" indicates "Screw Terminal" Connector.
See the "Module Selection Chart" on page 5 for further details.

Signal Levels
There are three general categories of signal levels in audio.

1. Microphone (Mic) Level
- Typically 0.25 mV (-70 dBu) to 2.5 mV (-50 dBu)
- Examples include: microphones, wireless microphone receivers

2. Line Level
- Typically from 100 mV (-18 dBu) to 7.75 V (+20 dBu)
- Examples include: AM/FM tuners, CD players, cassette decks, computer sound cards, jukeboxes, satellite receivers, signal processors, telephone page outputs, wireless microphone receivers

3. Speaker Level
- Typically higher than 7.75 V (+20 dBu)
- Amplifier output for driving speakers
- TOA does not currently offer modules to accept Speaker Level signals (external pad required).

Notes:
- Connecting a Mic Level signal to a Line Input module usually results in very low, barely audible, output.
- Connecting a Line Level signal to a Mic Input module usually results in distorted output.
- NEVER connect a Speaker Level signal to a Mic or Line Input module - this will damage the module.
- The type of module connector does not necessarily indicate the input sensitivity. For example, there are both Mic and Line Input modules available with female XLR jacks.

Installation Notes
- Always turn the power OFF on the host unit before installing or removing modules.
- Before installing each module, check the supplied module installation sheet to determine if any configuration is required. See Jumper Settings on page 35 for a list of possible configurations.
- Always secure each module to the host unit's chassis with the supplied screws.

MODULE SELECTION CHART

		Removable Terminal Block	Female XLR	Male XLR	1/4" Phone Jack	RCA Jack	Dual RCA Jacks	5 Screw Terminals
Microphone Input Modules	Mic/Line Input w/ Mute Send/Receive	ML-11T						
	Standard with high/low cut filters	M-01S	M-01F	M-01M	M-01P			
	Mute-Receive with high/low cut filters	M-11S						
	Mute-Send with high/low cut filters	M-41S						
	Voice Gate with low cut filters	M-51S	M-51F					
	Compressor with high/low cut filters	M-61S	M-61F					
	Remote Volume Control with high/low filters							M-21S
	For high-Z mic. only w/ high/low cut filters				M-03P			
Line Input Modules*	Mic/Line Input w/ Mute Send/Receive	ML-11T						
	Standard, no special features	B-01S L-01S U-01S	L-01F B-01F U-01F		U-01P	U-01R		
	Standard with high/low cut filters	U-03S					U-03R	
	Mute-Receive	B-11S L-11S U-11S				U-11R		
	Mute-Receive with high/low cut filters	U-13S					U-13R	
	Mute-Receive with variable mute depth	U-12S						
	Mute-Send	B-41S L-41S						
	Mute-Send with high/low cut filters	U-43S					U-43R	
	Remote Volume Control							B-21S U-21S
	Compressor	U-61S						
	Dual input priority w/AGC						U-14R	
Special Function Modules	Line output	T-01S						
	Line input with Music-On-Hold (MOH) output							T-02S
	Line input w/ MOH & input Mute-Receive							T-12S
	1 kHz Sine Wave test tone	S-01S						
	Buzzer/Yelp signal tone	S-02S						
	Switch-selectable tone	S-04S						
	Digital message/tone with USB	S-20S						
	Equalizer for F-122CU Speakers						E-03R	
	Equalizer for H-1 Speakers						E-04R	
	Equalizer for H-2/H-2WP Speakers						E-05R	
	Equalizer for H-3/H-3WP Speakers						E-06R	
	Low Pass Filter for FB-100/HB-1 Subwoofers	E-07S						
	Remote master volume control (VCA)	V-01S						

**For Line Input Modules:*
Use "B" modules or ML-11T for balanced/unbalanced sources.
Use "L" modules only for 600 ohm impedance matching.
Use "U" for unbalanced sources w/ short cables (≤ 15 feet).

Note: All "S" type modules with 3-screw terminal connectors transitioned to Removable Terminal Block (Phoenix-type) in 2004. Models include: B-01S, B-11S, L-01S, L-11S, L-41S, M-01S, M-11S, M-51S, M-61S, S-01S, S-02S, S-04S, T-01S, U-01S, U-11S, U-12S and U-61S. ***New Removable Terminal Block (Phoenix-type) connectors have the following pin-out: H: Hot, C: Common, E: Earth***

MUTING

Module Edge Connector

Muting Defined

Muting occurs when one signal source **Overrides**, or "**Mutes**", a second signal source. In other words, the first source has **Priority** over the second source.

For example, a common requirement is for paging to override a music source.

Mute Buses

There are two main types of 900MK2 muting modules - **Mute-Receive** and **Mute-Send**.

Both types have mute function circuitry that connects to ***two*** common "**Mute**" buses, and ***one*** common "**Ground**" bus when installed in an A-900MK2 mixer/amplifier or M-900MK2 mixer/pre-amplifier. A "**Bus**" is simply an internal connection from module-slot to module-slot. You can access these buses via rear-panel screw terminals, labeled, "**MUTE 1**", "**MUTE 2**" and "**GND**".

Mute-type modules connect to both mute buses by default. You can disconnect the module's mute function circuitry from each mute bus by cutting jumper wires on the module. This allows you to configure systems with multiple levels of priority.

Mute Function Activation

By default, Mute-Send modules ***activate*** both mute buses and Mute-Receive modules ***respond*** to both buses.

You can activate the mute bus(es) using either of two methods:

1. Mute-Send

When input signal level to a **Mute-Send** module exceeds a user-adjustable threshold, the module's mute function circuitry activates the mute function circuitry of all **Mute-Receive** modules connected to the same bus. This is also referred to as "*signal-activated muting*" or "*auto-muting*".

2. Switch Activation

A switch closure between the "**Mute (1 or 2**)" and "**GND**" screw terminals on the rear of the mixer/amplifier will activate the mute function circuitry of all **Mute-Receive** modules connected to the same bus. This is also referred to as "*manual muting*".

MICROPHONE INPUT MODULES

ML-11T — Microphone/Line Input with Mute Send/Receive

ML-11T

- **Switchable Mic/Line Input**
- **Input Trim and Gain Controls**
- **Adjustable Mute-Send Threshold** (VOX sensitivity)
- **High and Low Cut Filters**
- **Phantom Power**, +24 VDC
- **VOX Function** – Voice-activated mute send operation
- **Combination Mute Send and Receive Function**
  - respond to Mute function of higher priority Mute-Send module(s)
  - activate Mute function of lower priority Mute-Receive module(s)
- **Mute Bus #1 and #2 Connection**
- **Hysteresis Function** ensures smooth muting transitions
- **Connector:** removable terminal block

BLOCK DIAGRAM

CONNECTOR DIAGRAM

ML-11T

SPECIFICATIONS

Power Source	+24VDC
Current Consumption	25mA
Input	1 channel, -60/-20 dB (changeable), 10k ohms, unbalanced, removable terminal block (3 pins)
Phantom Power	+24VDC
Frequency Response	20 - 20,000 Hz, +1, -1 dB
Distortion	0.05%
Gain	10 - 50 dB

M-01 Series — Microphone Input

M-01F

M-01M

M-01P

M-01S (old style)

M-01S (new style)

- **For Balanced, Low Impedance Microphones.**
- **High and Low Cut Filters** for tone control, 4.2 kHz and 330 Hz, 6 dB/octave.
- **Phantom Power**, +22 VDC for condenser-type microphones. Active by default, cut Jumper J1 to disable.
- **Connectors:** female XLR (M-01F), male XLR (M-01M), 1/4" phone jack (M-01P), removable terminal block (M-01S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Gain, high & low cut filters
PCB Controls	Phantom power defeat
Input Impedance	600 ohms, balanced transformer-isolated
Sensitivity	-70 ~ -50 dBu
Gain	32 ~ 52 dB
Noise (EIN)	-126 dBu, 200 ohms terminated

CONNECTOR DIAGRAMS

M-01F

M-01M

M-01P

M-01S (old style)

M-01S (new style)

M-11S — *Microphone Input with Mute-Receive*

M-11S (old style)

M-11S (new style)

- **For Balanced, Low Impedance Microphones.**
- **High and Low Cut Filters** for tone control, 4.2 kHz and 330 Hz, 6 dB/octave.
- **Phantom Power**, +22 VDC for condenser-type microphones. Active by default, cut Jumper J1 to disable.
- **Responds To Mute Bus Activation**, via Mute SEND module or switch-closure.
- **Responds To Both Mute Bus # 1 And Mute Bus # 2 By Default** (cut jumper(s) to disconnect individual mute bus).
- **Two Mute Response Modes** (cut jumpers to configure):
  1. **Normally-ON** - turns OFF during mute activation (most common)
  2. **Normally-OFF** - turns ON during mute activation (functions as an ON/OFF switch, useful for zone-paging microphones in multi-amplifier systems)

Note: Configure the M-11 Mute Response Mode first - it will not pass signal by default. See page 35, Jumper Settings for details.

- **Connector:** removable terminal block (M-11S).

BLOCK DIAGRAM

CONNECTOR DIAGRAM

M-11S (old style)

M-11S (new style)

SPECIFICATIONS

Faceplate Controls	Gain, high & low cut filters
PCB Controls	Phantom power defeat, mute bus selection
Input Impedance	600 ohms, balanced transformer-isolated
Sensitivity	-70 ~ -50 dBu
Gain	32 ~ 52 dB
Noise (EIN)	-126 dBu, 200 ohms terminated

M-21S — *Microphone Input with Remote Volume Control*

M-21S

- **For Balanced, Low Impedance Microphones.**
- **High and Low Cut Filters** for tone control, 4.2 kHz and 330 Hz, 6 dB/octave.
- **Phantom Power**, +22 VDC for condenser-type microphones. Active by default, cut Jumper J1 to disable.
- **Remote Volume Control** by connecting an external 10 kΩ, linear-taper potentiometer to screw terminals #4 and #5.

Note: Control line resistance greater than 200 Ω will prevent full attenuation (200 Ω = 3821 ft. of #24 AWG wire).

- **Tip!** You can also connect a switch between screw terminals #4 and #5 for remote on/off operation. Closing the switch turns the module OFF, opening the switch turns the module ON.
- **Connector:** screw terminal (M-21S).

BLOCK DIAGRAM

CONNECTOR DIAGRAM

M-21S

SPECIFICATIONS

Faceplate Controls	Gain, high & low cut filters, terminals for 10 kohm linear-taper pot.
PCB Controls	Phantom power defeat
Input Impedance	600 ohms, balanced transformer-isolated
Sensitivity	-70 ~ -50 dBu
Gain	32 ~ 52 dB
Noise (EIN)	-126 dBu, 200 ohms terminated

M-41S — *Microphone Input with Mute-Send*

M-41S

- **For Balanced, Low Impedance Microphones.**
- **High and Low Cut Filters** for tone control, 4.2 kHz and 330 Hz, 6 dB/octave.
- **Phantom Power**, +22 VDC for condenser-type microphones. Active by default, cut Jumper J1 to disable.
- **Signal At Input Terminals Activates Both Mute Bus # 1 and Mute Bus # 2 by Default** (cut jumper(s) to disconnect individual mute bus).
- **Connector:** removable terminal block (M-41S).

BLOCK DIAGRAM

CONNECTOR DIAGRAM

M-41S

SPECIFICATIONS

Faceplate Controls	Gain, high & low cut filters
PCB Controls	Mute send sensitivity, phantom power defeat, mute bus selection
Input Impedance	600 ohms, balanced transformer-isolated
Sensitivity	-69 ~ -45 dBu
Gain	27 ~ 51 dB
Noise (EIN)	-124 dBu, 200 ohms terminated

M-51 Series — *Microphone Input with Voice Gate*

M-51F

M-51S (old style)

M-51S (new style)

- **For Balanced, Low Impedance Microphones.**
- **Low Cut Filter** for tone control, 330 Hz, 6 dB/octave.
- **Phantom Power**, +22 VDC for condenser-type microphones. Active by default, cut Jumper J1 to disable.
- **Voice Gate Function**, module OFF until input signal exceeds threshold.
- **Sensitivity Control** - turn clockwise to increase sensitivity (to open gate with lower input signal) and counter-clockwise to reduce sensitivity (to open gate with higher input signal).
- **Connectors:** female XLR (M-51F), removable terminal block (M-51S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Gain, low cut filter, voice gate sensitivity
PCB Controls	Phantom power defeat
Input Impedance	600 ohms, balanced transformer-isolated
Sensitivity	-70 ~ -50 dBu
Gain	32 ~ 52 dB
Gate Sensitivity	-58 dBu ~ always open
Noise (EIN)	-126 dBu, 200 ohms terminated

CONNECTOR DIAGRAMS

M-51F

M-51S (old style)

M-51S (new style)

M-61

M-03

M-61 Series — *Microphone Input with Compressor*

M-61F **M-61S (old style)** **M-61S (new style)**

- **For Balanced, Low Impedance Microphones.**
- **High and Low Cut Filters** for tone control, 4.2 kHz and 330 Hz, 6 dB/octave.
- **Phantom Power**, +22 VDC for condenser-type microphones. Active by default, cut Jumper J1 to disable.
- **Compressor Function Helps Prevent Overload And Distortion**, activates when the module's input signal exceeds a preset, adjustable threshold.
- **Compression Ratio: 2:1 (fixed)**, reduces the module's output signal level to 1 dB for every 2 dB increase in input signal level.
- **Threshold Control** - turn CW to lower threshold (to activate compressor function with lower input signal) and CCW to increase threshold (to activate compressor function with higher input signal).
- **Connectors:** female XLR (M-61F) or removable terminal block (M-61S).

BLOCK DIAGRAM

CONNECTOR DIAGRAMS

M-61F

M-61S (old style)

M-61S (new style)

SPECIFICATIONS

Faceplate Controls	High and low cut filters, compressor threshold
PCB Controls	Phantom power defeat
Input Impedance	600 ohms, balanced transformer-isolated
Sensitivity	-70 ~ -50 dBu
Gain	32 ~ 52 dB
Compressor Range	20 dB
Compressor Threshold	-64 ~ -44 dBu
Noise (EIN)	-126 dBu, 200 ohms terminated

M-03P — *High Impedance Microphone Input*

M-03P

- **For Unbalanced, High Impedance Microphones.**
- **High and Low Cut Filters** for tone control, 4.2 kHz and 330 Hz, 6 dB/octave.
- **Connector:** 1/4" phone jack (M-01P).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Gain, high & low cut filters
Input Impedance	50 kohms, unbalanced
Sensitivity	-60 ~ -40 dBu
Gain	22 ~ 42 dB
Noise (S/N)	70 dB

CONNECTOR DIAGRAM

M-03P

LINE INPUT MODULES

ML-11T — *Microphone/Line Input with Mute Send/Receive*

ML-11T

- **Switchable Mic/Line Input**
- **Input Trim and Gain Controls**
- **Adjustable Mute-Send Threshold** (VOX sensitivity)
- **High and Low Cut Filters**
- **Phantom Power**, +24 VDC
- **VOX Function** – Voice-activated mute send operation
- **Combination Mute Send and Receive Function**
  - respond to Mute function of higher priority Mute-Send module(s)
  - activate Mute function of lower priority Mute-Receive module(s)
- **Mute Bus #1 and #2 Connection**
- **Hysteresis Function** ensures smooth muting transitions
- **Connector:** removable terminal block

BLOCK DIAGRAM

CONNECTOR DIAGRAM

ML-11T

SPECIFICATIONS

Power Source	+24VDC
Current Consumption	25mA
Input	1 channel, -60/-20 dB (changeable), 10k ohms, unbalanced, removable terminal block (3 pins)
Phantom Power	+24VDC
Frequency Response	20 - 20,000 Hz, +1, -1 dB
Distortion	0.05%
Gain	10 - 50 dB

B-01 Series — *Balanced Line Input*

B-01F

B-01S (old style)

B-01S (new style)

- **For Balanced Or Unbalanced Line Level Sources** such as mixer outputs, signal processors and wireless microphone receivers.
- **Transformer Isolation (10 kΩ)** minimizes ground loop problems when connecting remote equipment (greater than 15 feet). Source output should also be balanced.
- **Connector:** female XLR (B-01F), removable terminal block (B-01S).

BLOCK DIAGRAM

SPECIFICATIONS

Input Impedance	10 kohms, balanced transformer-isolated
Sensitivity	-16 dBu
Gain	-1 dB

CONNECTOR DIAGRAMS

B-01F (Balanced/Unbalanced*)

***** For unbalanced sources, use a shielded, twisted pair and connect the output to Hot and Common (inner conductors). Connect the shield to Earth at the module and leave unterminated (floating) at the source.

B-01S (Balanced/Unbalanced*) (old style)

B-01S (Balanced/Unbalanced*) (new style)

B-11S — *Balanced Line Input with Mute-Receive*

B-11S (old style) **B-11S (new style)**

- **For Balanced Or Unbalanced Line Level Sources** such as mixer outputs, signal processors and wireless microphone receivers.
- **Transformer Isolation** minimizes ground loop problems when connecting remote equipment (greater than 15 feet).
- **Responds To Mute Bus Activation**, via Mute SEND module or switch-closure.
- **Responds To Both Mute Bus # 1 And Mute Bus # 2 By Default** (cut diode(s) to disconnect individual mute bus).
- **Connector:** removable terminal block (B-11S).

BLOCK DIAGRAM

SPECIFICATIONS

PCB Controls	Mute bus selection
Input Impedance	10 kohms, balanced transformer-isolated
Sensitivity	-16 dBu
Gain	-1 dB

CONNECTOR DIAGRAM

B-11S (Balanced/Unbalanced*) (old style)

B-11S (Balanced/Unbalanced*) (new style)

***** For unbalanced sources, use a shielded, twisted pair and connect the output to Hot and Common (inner conductors). Connect the shield to Earth at the module and leave unterminated (floating) at the source.

B-11
B-21

B-21S — *Balanced Line Input with Remote Volume Control*

B-21S

- **For Balanced Or Unbalanced Line Level Sources** such as mixer outputs, signal processors and wireless microphone receivers.
- **Transformer Isolation (10 kΩ)** minimizes ground loop problems when connecting remote equipment (greater than 15 feet).
- **Remote Volume Control** by connecting an external 10 kΩ, linear-taper potentiometer to screw terminals #4 and #5.

  Note: Control line resistance greater than 200 Ω will prevent full attenuation (200 Ω = 3821 ft. of #24 AWG wire).
- **Tip!** You can also connect a switch between screw terminals #4 and #5 for remote on/off operation. Closing the switch turns the module OFF, opening the switch turns the module ON.
- **Connector:** screw terminal (B-21S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Gain, terminals for 10 kohm linear-taper pot.
Input Impedance	10 kohms, balanced transformer-isolated
Sensitivity	-16 ~ +14 dBu
Gain	-32 ~ -2 dB

CONNECTOR DIAGRAM

B-21S (Balanced/Unbalanced*)

***** For unbalanced sources, use a shielded, twisted pair and connect the output to Hot and Common (inner conductors). Connect the shield to Earth at the module and leave unterminated (floating) at the source.

B-41S — *Balanced Line Input with Mute-Send*

B-41S

- **For Balanced Or Unbalanced Line Level Sources** such as mixer outputs, signal processors and wireless microphone receivers.
- **Transformer Isolation (10 kΩ)** minimizes ground loop problems when connecting remote equipment (greater than 15 feet).
- **Signal At Input Terminals Activates Both Mute Bus # 1 and Mute Bus # 2 by Default** (cut diode(s) to disconnect individual mute bus).
- **Tip!** Use the B-41S to connect to most modern telephone system's "Page Output" (usually line level).
- **Connector:** removable terminal block (B-41S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Mute send sensitivity
PCB Controls	Mute bus selection
Input Impedance	10 kohms, balanced transformer-isolated
Sensitivity	-16 dBu, min. -34 dBu to activate mute function
Gain	-2 dB

CONNECTOR DIAGRAM

B-41S (Balanced/Unbalanced*)

***** For unbalanced sources, use a shielded, twisted pair and connect the output to Hot and Common (inner conductors). Connect the shield to Earth at the module and leave unterminated (floating) at the source.

IMPEDANCE MATCHING

Most modern audio devices have LOW Impedance outputs which are designed to drive HIGH Impedance inputs. This results in *Maximum Voltage Transfer* - almost all of the output's signal voltage is transferred to the input. This is also referred to as a *Bridged* connection.

Impedance matching (output impedance to input impedance) results in *Maximum Power Transfer* and causes approximately 6 dB of signal voltage loss. This often exceeds the source device's "minimum load impedance" specification causing distortion or, at worst, damage to the source's output circuitry.

Maximum Voltage Transfer occurs when input impedance equals at least ten times the source device's output impedance.

For example, if the source's output impedance equals 600 Ω, the input impedance of the next device should equal at least 6 kΩ or greater.

Tip! You can convert the input impedance of an "L" module to 10 kΩ by locating and cutting "R1" (680 Ω) on the module PCB. This will result in approximately 6 dB of additional gain, assuming the source's output impedance is 600 Ω.

L-01 Series — *Line Matching Input*

L-01

L-01F **L-01S (old style)** **L-01S (new style)**

- **For Applications Requiring 600 Ohm Line Matching.**
- **Transformer Isolation (600 Ω)** minimizes ground loop problems when connecting remote equipment (greater than 15 feet).
- **Connector:** removable terminal block (L-01S).

SPECIFICATIONS

Input Impedance	600 ohms, balanced transformer-isolated
Sensitivity	-16 dBu
Gain	-2 dB

BLOCK DIAGRAM

CONNECTOR DIAGRAMS

L-01F (Balanced/Unbalanced*)

L-01S (Balanced/Unbalanced*) (old style)

L-01S (Balanced/Unbalanced*) (new style)

* For unbalanced sources, use a shielded, twisted pair and connect the output to Hot and Common (inner conductors). Connect the shield to Earth at the module and leave unterminated (floating) at the source.

L-11S — *Line Matching Input with Mute-Receive*

L-11S (old style) **L-11S (new style)**

- **For Applications Requiring 600 Ohm Line Matching.**
- **Transformer Isolation (600 Ω)** minimizes ground loop problems when connecting remote equipment (greater than 15 feet).
- **Responds To Mute Bus Activation**, via Mute SEND module or switch-closure.
- **Responds To Both Mute Bus # 1 And Mute Bus # 2 By Default** (cut diode(s) to disconnect individual mute bus)
- **Connector:** removable terminal block (L-11S).

BLOCK DIAGRAM

SPECIFICATIONS

PCB Controls	Mute bus selection
Input Impedance	600 ohms, balanced transformer-isolated
Sensitivity	-16 dBu
Gain	-1 dB

CONNECTOR DIAGRAM

L-11S (Balanced/Unbalanced*) (old style)

L-11S (Balanced/Unbalanced*) (new style)

***** For unbalanced sources, use a shielded, twisted pair and connect the output to Hot and Common (inner conductors). Connect the shield to Earth at the module and leave unterminated (floating) at the source.

L-41S — *Line Matching Input with Mute-Send*

L-41S (old style) **L-41S (new style)**

- **For Applications Requiring 600 Ohm Line Matching.**
- **Transformer Isolation (600 Ω)** minimizes ground loop problems when connecting remote equipment (greater than 15 feet).
- **Signal At Input Terminals Activates Both Mute Bus # 1 and Mute Bus # 2 Buses by Default** (cut diode(s) to disconnect individual mute bus).
- **Connector:** removable terminal block (L-41S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Mute send sensitivity
PCB Controls	Mute bus selection
Input Impedance	600 ohms, balanced transformer-isolated
Sensitivity	-16 dBu, min. -34 dBu to activate mute function
Gain	-2 dB

CONNECTOR DIAGRAM

L-41S (Balanced/Unbalanced*) (old style)

L-41S (Balanced/Unbalanced*) (new style)

***** For unbalanced sources, use a shielded, twisted pair and connect the output to Hot and Common (inner conductors). Connect the shield to Earth at the module and leave unterminated (floating) at the source.

UNBALANCED LINE INPUT

Sources with unbalanced outputs should always be located adjacent to the mixer/amplifier (less than 15 feet). If the source is located further than 15 feet, convert the unbalanced output to balanced with an appropriate transformer (available from other vendors) and connect to a B or M module, depending on the signal level.

U-01 Series — *Unbalanced Line Input*

U-01F **U-01P** **U-01R** **U-01S (old style)** **U-01S (new style)**

- **For Unbalanced, Line Level Sources** such as AM/FM tuners, cassette decks, CD players, computer sound cards, jukeboxes, mixers and satellite receivers.
- **Use For Adjacent Sources** (less than 15 feet from the host unit).
- **Connectors:** female XLR (U-01F), 1/4" phone jack (U-01P), RCA jack (U-01R), removable terminal block (U-01S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Gain
Input Impedance	220 kohms, unbalanced
Sensitivity	-18 ~ +12 dBu
Gain	-30 ~ 0 dB
Noise (S/N)	90 dB

U-01

CONNECTOR DIAGRAMS

U-01F

U-01P

U-01R

U-01S (old style)

U-01S (new style)

U-03 Series — *Unbalanced Line Input with High/Low Cut Filters*

U-03R **U-03S**

- **For Unbalanced, Line Level Sources** such as AM/FM tuners, cassette decks, CD players, computer sound cards, jukeboxes, mixers and satellite receivers.
- **Use For Adjacent Sources** (less than 15 feet from the host unit).
- **High and Low Cut Filters** for tone control, 4.2 kHz and 330 Hz, 6 dB/octave.
- **Connectors:** dual RCA jack w/ passive summing (U-03R), removable terminal block (U-03S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Gain, high & low cut filters
Input Impedance	220 kohms, unbalanced
Sensitivity	-17 ~ +13 dBu
Gain	-30 ~ -1 dB
Noise (S/N)	85 dB

CONNECTOR DIAGRAMS

U-03R

U-03S

U-11 Series — *Unbalanced Line Input with Mute-Receive*

U-11R **U-11S (old style)** **U-11S (new style)**

- **For Unbalanced, Line Level Sources** such as AM/FM tuners, cassette decks, CD players, computer sound cards, jukeboxes, mixers and satellite receivers.
- **Use For Adjacent Sources** (less than 15 feet from the host unit).
- **Responds To Mute Bus Activation**, via Mute SEND module or switch-closure.
- **Responds To Both Mute Bus # 1 And Mute Bus # 2 By Default** (cut jumper(s) to disconnect individual mute bus).
- **Connectors:** RCA jack (U-11R), removable terminal block (U-11S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Gain
PCB Controls	Mute bus selection
Input Impedance	220 kohms, unbalanced
Sensitivity	-18 ~ +12 dBu
Gain	-30 ~ 0 dB
Noise (S/N)	90 dB

CONNECTOR DIAGRAMS

U-11R

U-11S (old style)

U-11S (new style)

U-12S — *Unbalanced Line Input with Variable Mute-Receive Depth*

U-12S (old style) **U-12S (new style)**

- **For Unbalanced, Line Level Sources** such as AM/FM tuners, cassette decks, CD players, computer sound cards, jukeboxes, mixers and satellite receivers.
- **Use For Adjacent Sources** (less than 15 feet from the host unit).
- **Responds To Mute Bus Activation**, via Mute SEND module or switch-closure.
- **Responds To Both Mute Bus # 1 And Mute Bus # 2 By Default** (cut jumper(s) to disconnect individual mute bus).
- **Adjustable Mute Depth Provides Ducking Rather Than Full Muting.**
- **Connector:** removable terminal block (U-12S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Gain, muting depth
PCB Controls	Mute bus selection
Input Impedance	220 kohms, unbalanced
Sensitivity	-18 ~ +12 dBu
Gain	-30 ~ 0 dB
Muting Depth	-60 ~ 0 dB
Noise (S/N)	90 dB

CONNECTOR DIAGRAM

U-12S (old style)

U-12S (new style)

U-13 Series — *Unbalanced Line Input with High/Low Cut Filters and Mute-Receive*

U-12
U-13

U-13R **U-13S**

- **For Unbalanced, Line Level Sources** such as AM/FM tuners, cassette decks, CD players, computer sound cards, jukeboxes, mixers and satellite receivers.
- **Use For Adjacent Sources** (less than 15 feet from the host unit).
- **High and Low Cut Filters** for tone control, 4.2 kHz and 330 Hz, 6 dB/octave.
- **Responds To Mute Bus Activation**, via Mute SEND module or switch-closure.
- **Responds To Both Mute Bus # 1 And Mute Bus # 2 By Default** (cut jumper(s) to disconnect individual mute bus).
- **Connectors:** dual RCA jacks w/ passive summing (U-13R), removable terminal block (U-13S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Gain, high & low cut filters
PCB Controls	Mute bus selection
Input Impedance	220 kohms, unbalanced
Sensitivity	-17 ~ +13 dBu
Gain	-30 ~ -1 dB
Noise (S/N)	85 dB

CONNECTOR DIAGRAMS

U-13R

U-13S

U-14R — *Dual Input Priority w/AGC and Mute-Receive*

U-14R

BLOCK DIAGRAM

CONNECTOR DIAGRAM

U-14R

- **Dual Input Module** for applications with business music plus an on-premises CD jukebox or other source
- **Two Line Inputs** – Jukebox and BGM
- **Auto-Mute Function** with adjustable Mute threshold (Jukebox overrides BGM)
- **Automatic Gain Control (AGC)** on Jukebox input for consistent signal levels
- **Individual Input Level Controls**
- **Connector:** Stereo-Summing Dual RCA Jacks
- **Mute-Receive Function** – Cut jumper(s) to disable Mute 1 or Mute 2

SPECIFICATIONS

Input	47k ohms (unbalanced)
Maximum Output	+14 dBV (5 Vrms)
Frequency Response	20 - 20,000 Hz, +1, -1 dB
Distortion	BGM: 0.03% (1 kHz, 1 Vrms) JUKE: 0.05% (1 kHz, 1 Vrms)
Output Level Var. Range	BGM: -24 to -4 dBV (-10 dBV input to L and R) JUKE: -24 to -4 dBV (-10 dBV input to L and R)
JUKE Gate Threshold Level Var. Range	-60 to -30 dB (input to L and R)

U-21S — *Unbalanced Line Input with Remote Volume Control*

U-21S

BLOCK DIAGRAM

CONNECTOR DIAGRAMS

U-21S

U-21S (Master Volume)

- **For Unbalanced, Line Level Sources** such as AM/FM tuners, cassette decks, CD players, computer sound cards, jukeboxes, mixers and satellite receivers.
- **Use For Adjacent Sources** (less than 15 feet from the host unit).
- **Remote Volume Control** by connecting an external 10 kΩ, linear-taper potentiometer to screw terminals #4 and #5.
- **Tip!** You can also connect a switch between screw terminals #4 and #5 for remote on/off operation. Closing the switch turns the module OFF, opening the switch turns the module ON.
  Note: Control line resistance greater than 200 Ω will prevent full attenuation (200 Ω = 3821 ft. of #24 AWG wire).
- **Tip!** You can also use the U-21 as a stand-alone Remote Volume control by cutting Jumper J2 to disconnect the module's output from the mix bus. This function is useful in original 900 Series mixer/amplifiers which did not have built-in Remote Master Volume terminals or, as a second Remote Master Volume for the A-903/6/12MK2 mixer/amplifiers, the AX-1000A auto-mixer or the M-900MK2 mixer/pre-amplifier. Connect the module input to the "Pre-Out" jack (or mixer output) and the module output to the "Power-In" jack (or adjacent power amplifier).
- **Connector:** screw terminal (U-21S).

SPECIFICATIONS

Faceplate Controls	Gain, terminals for 10 kohm linear-taper pot.
Input Impedance	220 kohms, unbalanced
Sensitivity	-18 ~ +12 dBu
Gain	-30 ~ 0 dB
Noise (S/N)	90 dB

U-43 SERIES *Unbalanced Line Input with High/Low Cut Filters and Mute-Send*

U-43R **U-43S**

BLOCK DIAGRAM

CONNECTOR DIAGRAMS

U-43R

U-43S

- **For Unbalanced, Line Level Sources** such as AM/FM tuners, cassette decks, CD players, computer sound cards, jukeboxes, mixers and satellite receivers.
- **Use For Adjacent Sources** (less than 15 feet from the host unit).
- **High and Low Cut Filters** for tone control, 4.2 kHz and 330 Hz, 6 dB/octave.
- **Signal At Input Terminals Activates Both Mute Bus # 1 and Mute Bus # 2 by Default** (cut jumper(s) to disconnect individual mute bus).
- **Connectors:** dual RCA jacks w/ passive summing (U-43R), removable terminal block (U-43S).

SPECIFICATIONS

Faceplate Controls	Gain, high & low cut filters
PCB Controls	Mute send sensitivity, mute bus selection
Input Impedance	220 kohms, unbalanced
Sensitivity	-17 ~ +13 dBu
Gain	-30 ~ -1 dB
Noise (S/N)	85 dB

U-61S

Unbalanced Line Input with Compressor

U-61S (old style) **U-61S (new style)**

BLOCK DIAGRAM

CONNECTOR DIAGRAMS

U-61S (old style)

U-61S (Master Compressor - old style)

U-61S (new style)

U-61S (Master Compressor - new style)

- **For Unbalanced, Line Level Sources** such as AM/FM tuners, cassette decks, CD players, computer sound cards, jukeboxes, mixers and satellite receivers.
- **Use For Adjacent Sources** (less than 15 feet from the host unit).
- **Compressor Function Helps Prevent Overload And Distortion**, activates when the module's input signal exceeds a preset, adjustable threshold.
- **Compression Ratio: 2:1 (fixed)** reduces the module's output signal level to 1 dB for every 2 dB increase in input signal level.
- **Tip!** You can also use the U-61 as a standalone Compressor or Master Compressor by cutting Jumper J2 to disconnect the module's output from the mix bus. Connect the "Pre-Out" jack (or mixer output) to the module input and the "Power-In" jack (or adjacent power amplifier) to the module output.
- **Connector:** removable terminal block (U-61S).

SPECIFICATIONS

Faceplate Controls	Gain
Input Impedance	220 kohms, unbalanced
Sensitivity	-18 ~ +12 dBu
Gain	-30 ~ 0 dB
Compressor Range	20 dB
Compressor Threshold	+2 dBu
Noise (S/N)	90 dB

SPECIAL FUNCTION MODULES

T-01S — *Balanced Line Output*

T-01S (old style) **T-01S (new style)**

- **Transformer-Isolated Line Output** of the mixing bus signal to feed other remote mixers, amplifiers, and tape recorders.
- **Note:** Functions only in specific models - see page 33, Modular Products chart.
- **Tip!** You can use multiple T-01's to create a distribution amplifier for large multi-amplifier systems, media feeds, recording, etc.
- **Connector:** removable terminal block (T-01S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Output gain
Gain	4 ~ 20 dB
Output	Balanced transformer-isolated, drives loads ≥ 600 ohms, +15 dBu max.
Noise (S/N)	80 dB

CONNECTOR DIAGRAMS

T-01S (Balanced/Unbalanced) (old style)

T-01S (Balanced/Unbalanced) (new style)

T-02S — *Unbalanced Line Input with Music-On-Hold Output*

T-02S

- **Unbalanced Line Input** for AM/FM tuners, cassette decks, CD players, computer sound cards, jukeboxes, mixers and satellite receivers.
- **Balanced, Uninterrupted Output Of Module's Input Signal**, transformer-isolated for feeding remote equipment such as a telephone system's Music-On-Hold input.
- **Output Gain Control** for adjusting the MOH output signal level, eliminating the need for an external 1 Watt MOH amplifier.
- **Connector:** screw terminal (T-02S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Input gain, output gain
Input Impedance	220 kohms, unbalanced
Slave Output	Balanced transformer-isolated, drives loads ≥ 600 ohms, +16 dBu max.
Sensitivity	-18 ~ +2 dBu
Gain	Mix bus: -20 ~ 0 dB / slave: 4 ~ 20 dB
Noise (S/N)	Mix bus: 90 dB / slave: 80 dB

CONNECTOR DIAGRAM

T-02S (Balanced/Unbalanced Output)

T-12S — *Unbalanced Line Input with Music-On-Hold Output & Input Mute-Receive*

T-12S

- **Unbalanced Line Input** for for AM/FM tuners, cassette decks, CD players, computer sound cards, jukeboxes, mixers and satellite receivers.
- **Balanced, Uninterrupted Output Of Module's Input Signal**, transformer-isolated for feeding remote equipment such as a telephone system's Music-On-Hold input.
- **Output Gain Control** for adjusting the MOH output signal level, eliminating the need for an external 1 Watt MOH amplifier.
- **Responds To Mute Bus Activation**, via Mute SEND module or switch-closure.
- **Responds To Both Mute Bus # 1 And Mute Bus # 2 By Default** (cut jumper(s) to disconnect individual mute bus).
- **Tip!** You can pair the T-12S with the B-41S Mute-Send module for telephone paging, mutable music input, and uninterrupted MOH output, all with only two modules.
- **Connector:** screw terminal (T-12S).

BLOCK DIAGRAM

CONNECTOR DIAGRAM

T-12S (Balanced/Unbalanced Output)

SPECIFICATIONS

Faceplate Controls	Input gain, output gain
PCB Controls	Mute bus selection
Input Impedance	220 kohms, unbalanced
Slave Output:	Balanced transformer-isolated, drives loads ≥ 600 ohms, +16 dBu max.
Sensitivity	-18 ~ 0 dBu
Gain	Mix bus: -18 ~ 0 dB / slave: 4 ~ 20 dB
Noise (S/N)	Mix bus: 85 dB / slave: 85 dB

S-20S — *Digital Message/Tone w/USB and Mute-Send*

S-20S

- **Digital Audio Storage Module** for messaging and tone-signaling applications
- **USB Interface** for fast audio file transfer between PC and module
- **Three Minutes of CD Quality Digital Storage** – 50 to 20k Hz frequency response
- **Versatile CD-ROM Tone Library** included
- **Accepts Four Audio Files** – 44.1 kHz, 16 bit PCM WAV format
- **External Activation** for single or continuous playback
- **Automatic Priority** overrides current message
- **Stop Function** immediately cancels playback
- **Selectable Playback Interval** for each message
- **Auto-Mute Function** for priority over background music
- **Adjustable Level Control**
- **USB Cable Included**

BLOCK DIAGRAM

CONNECTOR DIAGRAM

S-20S

SPECIFICATIONS

File Format	44.1 kHz sampling frequency, 16-bit PCM WAV (monaural)
Frequency Response	50 - 20,000 Hz +/- 3 dB (1 kHz)
Distortion	Under 1% (1 kHz)
Recording System	USB data transfer
Control Inputs	Playback 1-4, Stop: No voltage make contact input, pulse make length: 200ms, open circuit voltage: 24 VDC, short circuit current: 2mA, removable terminal block (6 pins)
Max. # of Messages	4
Total Storage Capacity	3 minutes (180 seconds)
Playback Interval Time	Continuous, 0/5/10/30 seconds, 1/5/10/30 mins., 1 hour (selectable for each message)

S-01S — *1 kHz Sine Wave Test Tone*

S-01S (old style)

S-01S (new style)

- **1 kHz Test Tone**, activates with a switch closure (short-circuit) across module screw terminals #2 and #1.
- **Connector:** removable terminal block (S-01S).

SPECIFICATIONS

Faceplate Controls	Gain, terminals for triggering tone
Gain	Off ~ 0 dB
Noise (S/N)	80 dB
Available Tone	1 kHz sine wave

BLOCK DIAGRAM

CONNECTOR DIAGRAM

S-01S (old style)

S-01S (new style)

S-02S — *Buzzer/Yelp Tone*

S-02S (old style)

S-02S (new style)

- **"Buzzer" Tone** activates with a switch closure (short-circuit) across module screw terminals #2 and #1.
- **"Yelp" Tone** activates with a switch closure (short-circuit) across module screw terminals #3 and #1.
- **Continuous Tone Activation** for the duration of the switch closure.
- **Connector:** removable terminal block (S-02S).

SPECIFICATIONS

Faceplate Controls	Gain, terminals for triggering buzzer and yelp tones
Gain	Off ~ 0 dB
Noise (S/N)	80 dB
Available Tones	Buzzer, yelp

BLOCK DIAGRAM

CONNECTOR DIAGRAM

S-02S (old style)

S-02S (new style)

S-01
S-02

S-04S — Switch-Selectable Tone

S-04S (old style) S-04S (new style)

- **Eight Available Tones**, selected via DIP switches.
- **Single Tone Activation** with a switch closure (short-circuit) across module screw terminals #3 and #1.
- **Continuous Tone Activation** with a switch closure (short-circuit) across module screw terminals #2 and #1.
- **Applications:** doorbell, paging, door/gate release, telephone night ringer, annunciator, class change or pre-announcement tone.
- **Connector:** removable terminal block (S-04S).

BLOCK DIAGRAM

SPECIFICATIONS

Faceplate Controls	Gain, terminals to trigger tones (single or repeated)
PCB Controls	Dip switch for selecting among 8 tones
Gain	Off ~ 0 dB
Noise (S/N)	80 dB
Available Tones	1 tone chime, 2 tone chime, 4 tone chime up, 4 tone chime down, gong, Westminster, holding tone 1, holding tone 2

CONNECTOR DIAGRAM

S-04S (old style) S-04S (new style)

DIP Switch Settings

S1	S2	S3	Tone
On	On	On	4 tone chime (up)
Off	On	On	2 tone chime
On	Off	On	Gong
Off	Off	On	Westminster chime
On	On	Off	1 tone chime
Off	On	Off	Hold 1
On	Off	Off	Hold 2
Off	Off	Off	4 tone chime (down)

SPECIAL FUNCTION MODULES: VOLUME CONTROL

V-01S — Remote Master Volume Control (VCA)

V-01S

- **Voltage Controlled Amplifier (VCA)** for applications requiring preset remote master volume control
- **Line Input and Output** connect to host amplifier's pre-amp output and power amp input
- **24 VDC Output and Control Input** interfaces directly to RDL RLC3 Remote Level Control
- **Connectors:** RCA and removable terminal block

BLOCK DIAGRAM

CONNECTOR DIAGRAM

V-01S

SPECIFICATIONS

Input	10k ohms (unbalanced)
Max. Allowable Input	+14 dBV (5 Vrms)
Frequency Response	20 - 20,000 Hz +/- 1 dB
Distortion	0.03% (1 kHz, 1 Vrms)

E Series

Processor Modules for TOA Speakers

E-03R
E-04R
E-05R
E-06R

E-07S

BLOCK DIAGRAM

CONNECTOR DIAGRAM

E-03R, E-04R, E-05R, E-06R

E-07S

- **Optimized Equalization Curve For TOA Speakers** (see chart).
- **Connects Between 900MK2 Mixer/Amplifier's "Pre-Out" And "Power-In" Jacks or Between Separate Mixer and Amplifier (E-03R – E-06R).**
- **Includes Dual RCA Cable.**
- **Unbalanced Input and Output** (see Figure 1).
- **Connector:** dual RCA jack, removable terminal block (E-07S).

Connection Methods:

A-903MK2, A-906MK2, A-912MK2 Mixer/Amplifiers

- Connect the "Pre-amp Out" jack to the E module's "In" jack and the E module's "Out" jack to the "Power Amp In" jack (Figure 2).

M-900MK2 Mixer/Pre-amplifier

- Connect the "Aux. Output" jack to the E module's "In" jack and the E module's "Out" jack to the input of an adjacent power amplifier such as the TOA P-900MK2 Series (Figure 3).

P-906MK2, P-912MK2, P-924MK2 Power Amplifiers

- Connect the mixer output to the E module's "In" jack and the "Out" jack to the amplifier's "Direct Input" screw terminals (Figure 4).
- **Note:** Since the E module's jacks are unbalanced, install external devices adjacent to the module. If the device is located further than 15 feet, convert all inputs and outputs to balanced with appropriate transformers (available from other vendors).

***SPECIFICATIONS* (E-03R – E-06R)**

Input Impedance	100 kohms, unbalanced
Output Impedance	1 kohms, unbalanced
Sensitivity	+2.2 dBu
Output Level	+2.2 dBu
Noise (S/N)	86 dB

Modules & Corresponding Speakers

Module:	Speaker:
E-03R	F-122CU/CU2
E-04R	H-1
E-05R	H-2/H-2WP
E-06R	H-3/H-3WP
E-07S	FB-100/HB-1

E-03
E-04
E-05
E-06
E-07

E Series *Processor Modules for TOA Speakers*

Figure 1 - E Module Signal Flow (E-03R – E-06R)

Figure 2 - E Module Connection in A-900MK2

Figure 3 - E Module Connection in M-900MK2 and P-924MK2

Figure 4 - E Module Connection in P-900MK2

E-03
E-04
E-05
E-06
E-07

APPLICATIONS

Paging Over a Music Source

1. Connect the Telephone Page output to a B-41S (Balanced Line Input with Mute-Send) module or, for Microphone Paging, use an M-41S (Microphone Input with Mute-Send) module.
2. Connect the Music Source to a U-13R (Unbalanced Line Input with Mute-Receive) module.
3. Adjust the mute threshold as necessary with the Sensitivity control (located on the mute-send module's circuit board). If the paging audio falls below the mute threshold for greater than approximately two seconds, the music will resume.

Since mute-type modules connect to both Mute Bus #1 and #2 by default, no jumper configuration is required.

Telephone Paging and Music-On-Hold

1. Connect the Telephone Page output to a B-41S (Balanced Line Input with Mute-Send) module.
2. Connect the Music Source to a T-12S (Unbalanced Line Input with Music-On-Hold Output) module's input.
3. Connect the T-12S module's output to the telephone system's Music-On-Hold input.
4. Adjust the output signal level with the T-12S front panel Output Gain control.

Since mute-type modules connect to both Mute Bus #1 and #2 by default, no jumper configuration is required.

Banquet Room Sound System

Banquet room sound systems usually include a podium microphone and a music source. Since there will be a variety of presenters, the signal level present at the microphone will vary. The music volume level will also need to be remote controlled from the podium. Because the microphone level will not be continuous, Switch Closure Muting will be necessary to ensure that the music remains off until after the presentation.

1. Connect the Podium Microphone to an M-61S (Microphone Input with Compressor).
2. Connect the Music Source output to a U-21S (Unbalanced Input with Remote Volume Control).
3. Connect a 10 kΩ linear-taper potentiometer to screw terminals 4 and 5 of the U-21S.
4. Connect a switch (normally-open) between screw terminals 4 and 5 of the U-21S.

5. Set the M-61S Threshold control according to the highest potential signal at the microphone.

Closing the switch mutes the music, opening the switch allows the music to resume.

School Gymnasium Sound System

School gymnasium sound systems often have similar requirements as the banquet room system plus telephone paging which must override both the podium microphone and the music.

1. Connect the Telephone Page output to a B-41S (Balanced Line Input with Mute-Send) module.
2. Connect the Podium Microphone to an M-11S (Microphone Input with Mute-Receive) after cutting Jumpers J4 and J5. This configures the module for Normally-On mute activation mode on Mute Bus #1 only.
3. Connect a switch (normally-open) between the screw terminals Mute #2 and Ground on the amplifier's rear panel.
4. Connect the Music Source output to a U-13R (Unbalanced Line Input with Mute-Receive) module.

Pressing the podium mic's "press-to-talk" switch activates Mute Bus #2 and mutes the music. The telephone page activates both Mute Bus #1 and #2, muting both the podium mic and the music source.

FREQUENTLY ASKED QUESTIONS

General

1 Which module should I use for a microphone?
For a standard low impedance microphone, use the ML-11T or, for a high impedance microphone (uncommon), use the M-03. See pages 9-12 for details on other available microphone modules.

2 Which module should I use for a wireless microphone receiver?
If the wireless receiver has a line-level output, use the B-01 or, for a mic level output, use the ML-11T. Both types give you the flexibility to locate the receiver remote from the module, if necessary. See pages 9-23 for details on other available microphone and line input modules.

3 Which module should I use for an AM/FM tuner, cassette deck, CD player, computer sound card, jukebox, mixer or satellite receiver?
If the source will be less than 15 feet from the module, use the U-03R or, to respond to mute activation, the U-13R. Both modules have dual RCA jacks for quick connection of stereo sources and high/low-cut filters for EQ adjustment. If the music source is further than 15 feet, use the B-01 or the B-11, which accept balanced lines and offer transformer isolation. See pages 13-23 for details on other available line input modules.

4 Which modules should I use for telephone or microphone paging with priority over a music source?
Use the B-41 for the telephone paging input or the M-41 for microphone paging. If the music source is less than 15 feet, use the U-13. If the music source is further than 15 feet, use the B-11, which accepts balanced lines and offers transformer isolation.

5 Which module should I use for Music-On-Hold (MOH)?
Use the T-12 module which has an unbalanced line input for the MOH source plus a balanced, transformer-isolated, adjustable output to connect to the telephone system's MOH input. The MOH signal routes to both the internal mix bus and the MOH output. The mix bus input also responds to mute bus activation without interrupting the MOH output. See page 25 for more information.

6 What type of potentiometer do I need for a Remote Volume Control module?
Use a commonly available, 10 kΩ, linear-taper potentiometer for the B-21, M-21, or U-21 Remote Volume Control modules. Also, use the same type for the rear-panel Remote Master Volume screw terminals on A-903MK2, A-906MK2 and A-912MK2 mixer/amplifiers, or the M-900MK2 mixer/pre-amplifier.

FREQUENTLY ASKED QUESTIONS (continued)

General

7 How do I use one of the 900 Series processor modules?

When using one of the processor modules such as the E-03R, E-04R, E-05R, E-06R with an A-900MK2, insert the module in an empty module slot. Then run a cable from the pre- amp out jack located on the rear of the A-900MK2 to the input jack of the processor module. Next run a cable from the output jack of the module to the power amp in jack on the rear of the amp. This will route all audio signal through the processor module before it reaches the power amp section of the unit.

When using a processor module with an M-900MK2 mixer and P-900MK2 power amp, the processor module can be inserted in an empty slot on the M-900MK2. Connect a cable from the aux out jack on the M-900MK2 to the input of the processor module. Then connect a cable from the output jack of the processor module to the input of the P-900MK2 power amp.

Another way of doing this would be to insert the processor module in the module slot of the P-900MK2. Connect a cable from the output of the mixer to the input of the processor module. Then connect a cable from the output of the module to the screw terminal input of the P-900MK2 power amp.

8 What is the proper wiring for the screw terminal type input modules?

Pin 1: Earth. Pin 2: Common. Pin 3: Hot. When wiring an unbalanced source to a balanced input module: Connect the source (+) output to Pin 3 Hot. Connect the source (-) or shield output to Pin 2 Common.

9 What's the difference between the "L" Series and "B" Series modules?

"B" Series modules are balanced, line level, high impedance inputs.
"L" Series modules are balanced, line level, low impedance inputs.
Most modern audio equipment provide low impedance outputs which are designed to drive high impedance inputs. Maximum voltage transfer occurs when the input impedance is at least ten times the source output impedance. Almost all of the output signal voltage is transferred to the input.
Impedance matching (output impedance to input impedance) results in maximum power transfer and causes approximately -6dB of signal voltage loss. This can often exceed a source device's minimum output load impedance specification. In most cases, use B Series instead of L Series modules.

10 Which modules are for "mute send"?

M-41S for microphone level input. B-41S, L-41S for balanced line level input. U-43R, U-43S for unbalanced line level input. ML-11T for microphone or line level input (selectable). S-20S is a digital message repeater module with mute send select-ability.

11 Which modules are for "mute receive"?

M-11S for microphone level input. B-11S for balanced line level input. L-11 for balanced or unbalanced line level input, low impedance, line matching. ML-11T for microphone or line level input (selectable). U-11R, U-11S, U-12S & U-13R can be used for unbalanced line level input. U-14R for unbalanced dual input priority (Jukebox input mutes BGM input), both are muted when the mute receive jumper is set.

Troubleshooting

12 Why won't the M-11 (Microphone Input with Mute-Receive) pass signal?

The M-11 will not pass signal "out-of-the-box". Cut jumpers to select the mute response mode: Normally-Off or Normally-On. See page 35, Jumper Settings, for more information.

13 Why won't my paging source override my music source?

First, verify that the paging source is connected to a Mute-Send module and the music source is connected to a Mute-Receive module. Next, verify that the module jumpers are configured for Mute Bus #1 or Mute Bus #2 (or both). Test the Mute-Receive module's mute function by placing a jumper between Mute Bus #1 (or #2) and Ground terminals. Last, adjust the Mute-Send module's "Sensitivity" control to lower the mute activation threshold. The Mute-Send module activates the mute function based on input signal level exceeding this threshold.

14 Why isn't my condenser microphone working with an M Series module?

Verify that Jumper "J1" on the M Series module circuit board is intact and secure the module to the chassis with the supplied screws.

15 Why is my signal level low with an L Series module?

Removing resistor R1 (680 Ω) on the module's circuit board will provide approximately 6 dB additional gain by converting the module's input impedance to 10 kΩ. See page 16, "Impedance Matching".

MODULAR PRODUCTS REFERENCE

Model	A-706 A-712 A-724	A-901A	A-903A A-906A A-912A	A-903MK2 A-906MK2 A-912MK2	BG-1015 BG-1030 BG-1060 BG-1120	M-900A	M-900MK2	P-906A P-912A P-924A	P-906MK2 P-912MK2 P-924MK2	W-906A W-912A
	Mixer/ Amplifier	Mixer/ Amplifier	Mixer/ Amplifier	Mixer/ Amplifier	Mixer/ Amplifier	Mixer / Pre-amplifier	Mixer / Pre-amplifier	Power Amplifier	Power Amplifier	Wall-mount Mixer/Amplifier
		Discontinued	Discontinued			Discontinued		Discontinued		Screw terminal or RTB modules only
Power	60 / 120 / 240 W	10 W	30 / 60 / 120 W	30 / 60 / 120 W	15 / 30 / 60 / 120 W	N/A	N/A	60 / 120 / 240 W	60 / 120 / 240 W	60 / 120 W
Module Slots	1	2	6	8	1	6	8	1	1	6 (exp. to 8)
Mute Bus(es)	1	1	1	2	N/A	1	2	0	0	1
Pre-Out / Power-In Jacks	Y	N	Y	Y	Y	N	N	N	N	N
MODULE										
ML-11T	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
M-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
M-11	N	Ch. #2 only	Y	Y	N	Y	Y	N	N	Y
M-21	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
M-41	N	Ch. #2 only	Y	Y	N	Y	Y	N	N	Y
M-51	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
M-61	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
M-03	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
B-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
B-11	N	Ch. #2 only	Y	Y	N	Y	Y	N	N	Y
B-21	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
B-41	N	Ch. #2 only	Y	Y	N	Y	Y	N	N	Y
L-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
L-11	N	Ch. #2 only	Y	Y	N	Y	Y	N	N	Y
L-41	N	Ch. #2 only	Y	Y	N	Y	Y	N	N	Y
U-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
U-03	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
U-11	N	Ch. #2 only	Y	Y	N	Y	Y	N	N	Y
U-12	N	Ch. #2 only	Y	Y	N	Y	Y	N	N	Y
U-13	N	Ch. #2 only	Y	Y	N	Y	Y	N	N	Y
U-14R	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
U-21	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
U-43	N	Ch. #2 only	Y	Y	N	Y	Y	N	N	Y
U-61	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
T-01	Y	N	Ch. #5 and #6 only	Y	Y	Ch. #5 and #6 only	Y	N	N	Ch. #5 and #6 only
T-02	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
T-12	N	Ch. #2 only	Y	Y	N	Y	Y	Y	Y	Y
S-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
S-02	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
S-04	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
S-20S	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
V-01S	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
E-03/04	Y	N	Y	Y	Y	Y	Y	Y	Y	N
E-05/06	Y	N	Y	Y	Y	Y	Y	Y	Y	N
E-07	Y	N	Ch. #5 and #6 only	Y	Y	Ch. #5 and #6 only	Y	N	N	Ch. #5 and #6 only

DISCONTINUED MODULE CROSS-REFERENCE

Discontinued	Description	Current Model
H-01	Microphone Input, Low Impedance	**M-01 Series, ML-11T**
H-02	Microphone Input, Low Impedance (Low cut only)	**M-01 Series, ML-11T**
H-21	Microphone Input, Low Impedance, with Remote Volume Control	**M-21S**
H-22	Microphone Input, Low Impedance, with Remote Volume Control (Low cut only)	**M-21S**
H-31	Microphone Input, Low Impedance, with Mute Receive	**M-11S, ML-11T**
H-32	Microphone Input, Low Impedance, with Mute-Receive (Low cut only)	**M-11S, ML-11T**
H-03	Microphone Input, High Impedance	**M-03P**
S-03S	Chime	**S-04S**
X-01	Unbalanced Line Input	**U-01, U-03 Series**
X-11	Unbalanced Line Input with Mute-Receive	**U-11, U-13 Series**
X-21	Unbalanced Line Input with Remote Volume Control	**U-21S**

Notes:

- H Series microphone modules do not provide phantom power.
- Original mute-type modules (pre-1994) connect to Mute Bus #1 only. Newer "MK2" mute-type modules connect to both Mute Bus #1 and Mute Bus #2 and have a "MK2" label on the module faceplate.

JUMPER SETTINGS

Function	Model	Jumper	Jumper	Details
Mute-Receive	**M-11, T-12, U-11, U-12, U-13, U-14R**	**J5**	**J6**	
		ON	ON	Responds to both Mute Bus #1 and Mute Bus #2 activation.
		CUT	ON	Responds to Mute Bus #1 activation only
		ON	CUT	Responds to Mute Bus #2 activation only
		CUT	CUT	No mute function
	B-11, L-11	**D3**	**D4**	
		ON	ON	Responds to both Mute bus #1 and Mute bus #2 activation.
		CUT	ON	Responds to Mute Bus #1 activation only
		ON	CUT	Responds to Mute Bus #2 activation only
		CUT	CUT	No muting
M-11S Mute Response Mode	**M-11**	**J3**	**J4**	(Normally-On or Normally-Off)
		ON	ON	No output signal - cut J3 or J4.
		CUT	ON	Normally "OFF" turns "ON" during mute bus activation
		ON	CUT	Normally "ON" turns "OFF" during mute bus activation
		CUT	CUT	No muting function.
Mute-Send	**S-20S**	**SJP2**		Enables Mute Send (VOX)
	M-41, U-43	**J5**	**J6**	
		ON	ON	Activates both Mute Bus #1 and Mute Bus #2
		CUT	ON	Activates only Mute Bus #1
		ON	CUT	Activates only Mute Bus #2
		CUT	CUT	No mute activation.
	B-41, L-41	**D3**	**D4**	
		ON	ON	Activates both Mute Bus #1 and Mute Bus #2
		CUT	ON	Activates only Mute Bus #1
		ON	CUT	Activates only Mute Bus #2
		CUT	CUT	No mute activation.
Phantom Power	**M-01, M-11, M-21, M-41, M-51, M-61**	**J1**		
		CUT		Disables phantom power.
Master Compressor	**U-61**	**J2**		
		CUT		Configures module as a Master Compressor (see page 23).
Remote Master Volume	**U-21**	CUT		Configures module as a Remote Master Volume control (see page 21).
Input Impedance Conversion (600 Ω to 10 kΩ)	**L-01, L-11, L-41**	**R1**		
		CUT		Changes input impedance from 600 Ω to 10 kΩ allowing maximum voltage transfer (see page 16).
Hysteresis	**ML-11T**	**SJP101**		
		CUT		Disables Mute Send hysteresis
Mute Send (VOX)		**SJP102**		
		ON		Enables VOX function
		OFF		Disables VOX function
Mute Bus #1		**SJP103**		
		Receive		Responds to Mute Bus #1 activation only
		Send		Activates only Mute Bus #1
		N/A		Disconnects from Mute Bus #1
Mute Bus #2		**SJP104**		
		Receive		Responds to Mute Bus #2 activation only
		Send		Activates only Mute Bus #2
		N/A		Disconnects from Mute Bus #2

Note:

1. In many applications, NO jumper changes are required. Mute-Receive and Mute-Send modules connect to both Mute Bus #1 and Mute Bus #2 by default.

2. Configure the M-11S Mute Response Mode before use - it will not pass signal out-of-the-box.

CONNECTOR WIRING

Model	Connector Type	Pinout		
B-01F	XLR jack, Female	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
B-01S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
B-11S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
B-21S	Screw terminals, 5 pin	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
		Pin 4 and 5: Remote Volume Control - 10 kΩ (linear-taper potentiometer)		
B-41S	Removable terminal block	H: Hot	C: Common	E: Earth (shield)
E-03R	RCA jack, dual	Tip: Hot	Sleeve: Earth (shield)	
E-04R	RCA jack, dual	Tip: Hot	Sleeve: Earth (shield)	
E-05R	RCA jack, dual	Tip: Hot	Sleeve: Earth (shield)	
E-06R	RCA jack, dual	Tip: Hot	Sleeve: Earth (shield)	
E-07S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot (output)
L-01F	XLR jack, Female	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
L-01S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
L-11S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
L-41S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
M-01F	XLR jack, Female	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
M-01M	XLR jack, Male	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
M-01P	1/4" phone jack	Tip: Hot	Ring: Common	Sleeve: Earth (shield)
M-01S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
M-03P	1/4" phone jack	Tip: Hot	Ring: Common	Sleeve: Shield
M-11S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
M-21S	Screw terminals, 5 pin	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
		Pin 4 and 5: Remote Volume Control - 10 kΩ (linear-taper potentiometer)		
M-41S	Removable terminal block	H: Hot	C: Common	E: Earth (shield)
M-51F	XLR jack, Female	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
M-51S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
M-61F	XLR jack, Female	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
M-61S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot
ML-11T	Removable terminal block	Hot	Cold	Earth
S-01S	Removable terminal block	Pin 1: Earth	Pin 2: 1 kHz Tone	Pin 3: n/a
S-02S	Removable terminal block	Pin 1: Earth	Pin 2: Buzzer	Pin 3: Yelp
S-04S	Removable terminal block	Pin 1: Earth	Pin 2: Continuous Tone	Pin 3: Single Tone
S-20S	Removable terminal block	Message 1 - 4	Stop	Common
T-01S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Common	Pin 3: Hot (output)
T-02S	Screw terminals, 5 pin	Pin 1: Earth (shield)	Pin 2: Common (output)	Pin 3: Hot (output)
		Pin 4: Hot (input)	Pin 5: Earth (shield)	
T-12S	Screw terminals, 5 pin	Pin 1: Earth (shield)	Pin 2: Common (output)	Pin 3: Hot (output)
		Pin 4: Hot (input)	Pin 5: Earth (shield)	
U-01F	XLR jack, Female	Pin 1: Earth (shield)	Pin 2: Earth (shield)	Pin 3: Hot
U-01P	1/4" phone jack	Tip: Hot	Sleeve: Earth (shield)	
U-01R	RCA jack, single	Tip: Hot	Sleeve: Earth (shield)	
U-01S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Earth (shield)	Pin 3: Hot
U-03R	RCA jack, dual (stereo summing)	Tip: Hot	Sleeve: Earth (shield)	
U-03S	Removable terminal block	H: Hot	C: Common	E: Earth (shield)
U-11R	RCA jack, single	Tip: Hot	Sleeve: Earth (shield)	
U-11S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Earth (shield)	Pin 3: Hot
U-12S	Removable terminal block	Pin 1: Earth (shield)	Pin 2: Earth (shield)	Pin 3: Hot
U-13R	RCA jack, dual (stereo summing)	Tip: Hot	Sleeve: Earth (shield)	
U-13S	Removable terminal block	H: Hot	C: Earth (shield)	E: Earth (shield)
U-14R	RCA jack, dual (stereo summing)	Tip: Hot	Sleeve: Earth (shield)	
U-21S	Screw terminals, 5 pin	Pin 1: Output (cut J2)	Pin 2: Earth (shield)	Pin 3: Hot
		Pin 4 and 5: Remote Volume Control - 10 kΩ (linear-taper potentiometer)		
U-43R	RCA jack, dual (stereo summing)	Tip: Hot	Sleeve: Earth (shield)	
U-43S	Removable terminal block	H: Hot	C: Earth (shield)	E: Earth (shield)
U-61S	Removable terminal block	Pin 1: Output (cut J2)	Pin 2: Earth (shield)	Pin 3: Hot
V-01S	Removable terminal block	Tip: Hot	Sleeve: Earth (shield)	+/-24 VDC CTRL

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900 Series Modules

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