

**PMX84**  
**Programmable**  
**Matrix Switcher**  
**Operation Manual**

advantage ®

## TABLE OF CONTENTS

Front & Rear Panel Features	pgs. 2 & 3
Remote Controls	pgs. 4 & 5
Logic Inputs	pgs. 6 & 7
Logic Outputs	pgs. 8 & 9
Configuration - PC Control Software	pgs. 10~12
Computer Control	pgs. 13~15
Applications	pgs. 16~21
Block Diagram	pg. 22
Specifications	pg. 23
Warranty	

## INTRODUCTION

The ADVANTAGE® **PMX84** Programmable Matrix Switcher provides eight inputs and four outputs under microprocessor control, with complete programmability and remote control of crosspoint switching via infrared, wall-mount panel, logic inputs, and/or computer. Multiple units may be used to expand input/output capability of the matrix. The PMX84 is extremely versatile, and ideal for applications such as room combining, zone paging, program routing, and mix-minus. The PMX84 carries a Five-Year 'Gold Seal' Warranty.

PMX84 features include:

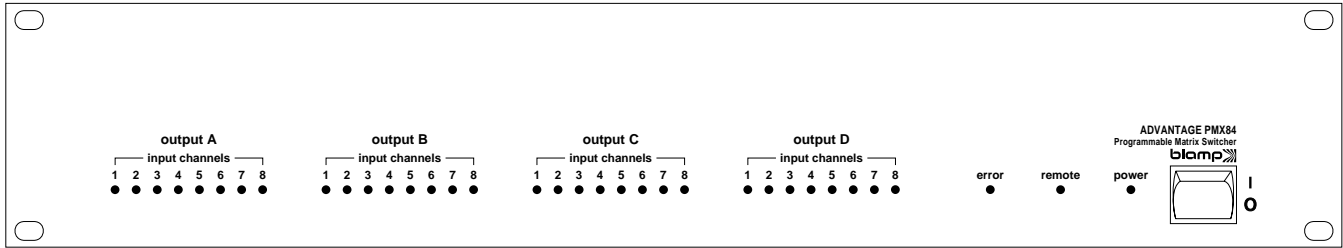
- ◆ eight balanced line inputs with level control & peak indicator
- ◆ four balanced line outputs with level, patch, & expansion
- ◆ inputs and outputs provided on plug-in barrier strip terminals
- ◆ linking of multiple units for increased matrix inputs/outputs
- ◆ all inputs are assignable to all outputs in any configuration
- ◆ input/output assignments via 'on', 'off', or 'toggle' switching
- ◆ up to fifty presets affecting single or multiple inputs/outputs
- ◆ four remote control ports with location assignable commands
- ◆ remote control via infrared, wall-panels, switches, or RS-232
- ◆ sixteen logic inputs for remote control via external switches
- ◆ logic inputs include combining, override, & default modes
- ◆ sixteen logic outputs for controlling external circuits or relays
- ◆ logic output assignments via 'on', 'off', or 'toggle' switching
- ◆ serial port for programming and/or RS-232 computer control
- ◆ linking port for combined remote control of multiple units
- ◆ front panel indicators display input-to-output assignments
- ◆ PC control software for Windows® 95 & serial cable included
- ◆ incorporates **AES** recommended grounding practices
- ◆ **CE** marked and **UL / C-UL** listed power source
- ◆ covered by Five-Year 'Gold Seal' Warranty



After reading this manual, if you have any questions or need technical assistance, please call Biamp Systems toll-free **1-800-826-1457**.



## FRONT & REAR PANEL FEATURES



### FRONT PANEL FEATURES

**Output Displays:** These four LED displays show the various input/output assignments of the matrix switcher. Each group of eight indicators will display which Inputs (1~8) are currently assigned to that Output (A~D).

**Error Indicator:** This indicator will flash when unusable information has been received via remote control (see Remote Controls on pg. 4). If an error in transmission/reception of a command occurs, the Error indicator will flash. The Error Indicator will also flash continuously whenever an emergency override is activated (see Override on pg. 3).

**Remote Indicator:** This indicator will flash when any information is received via remote control (see Remote Controls on pg. 4). If the Remote and Error indicators flash simultaneously, this may be an indication of improper installation. Check location and wiring of all remote controls.

**Power Switch & Indicator:** When the Power Switch is turned on, the adjacent indicator will light. When power is turned off, all current settings will be stored in non-volatile memory and recalled when power is turned back on.

### REAR PANEL FEATURES

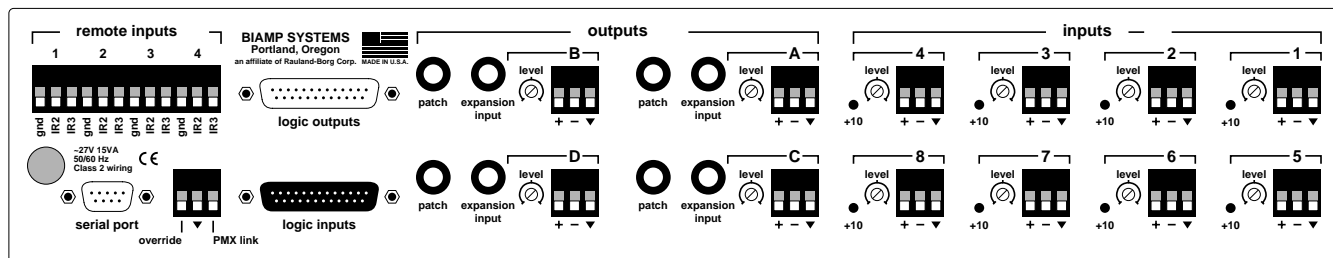
**Inputs 1~8:** These plug-in barrier strips provide the balanced line-level inputs to the matrix switcher. For balanced input, wire high to (+), low to (-), and ground to (▼). For unbalanced input, wire high to (+) and ground to both (-) & (▼). When using multiple PMX84s to expand the matrix output capability, wire each source (in parallel) to the respective input on each PMX84. From the factory, all Inputs are assigned to all Outputs.

**Input Trim Controls & +10 Indicators:** The Trim controls adjust gain at the associated inputs to compensate for different signal levels. For best performance, set Trim so the +10 indicator is activated only by occasional peaks in signal level. When the +10 indicator lights, 8dB of headroom remains before clipping. When Trim is centered, input to balanced output level will be unity gain.

**Outputs A~D:** These plug-in barrier strips provide the balanced line-level outputs from the matrix switcher. For balanced output, wire high to (+), low to (-), and ground to (▼). For unbalanced output, wire high to (+) and ground to (▼), leaving (-) unconnected. Signal level will be reduced by 6dB when outputs are unbalanced. From the factory, all Inputs are assigned to all Outputs.

**Patch & Expansion Input:** These 3-conductor 1/4" phone jacks allow insertion of external signal processing at the Outputs, as well as inter-connection of multiple PMX84s to expand the matrix input capability. Patch jacks are wired with Tip as send, Ring as return, and Sleeve as a common ground. They may be used to provide both input and output for external signal processing devices, such as remote controls & equalizers. Expansion Input jacks are wired with Tip as input, Ring as output, and Sleeve as a common ground. They are used in conjunction with the Patch jacks on other PMX84s, to increase the number of inputs assignable to the matrix. For this purpose, Expansion Input jacks are connected to Patch jacks using 3-conductor 1/4" phone cables (Biamp #909-0013-00). To combine the inputs of two PMX84s, connect the Patch jacks of the first unit to the Expansion Input jacks of the second unit. Both units will provide identical matrix output signals, with all sixteen inputs being assignable. Additional PMX84s may be connected in this same fashion, to further increase the matrix input capacity. External signal processing may still be inserted at the Outputs, by utilizing the Patch jacks available on the 'last' PMX84 in the chain. Signal processing inserted here will affect the Outputs of all PMX84s in the chain.

## FRONT & REAR PANEL FEATURES



**Logic Outputs:** This 25-pin Subminiature-D (male) connector provides Logic Outputs 1~16 (pins 1~16 respectively) and a common ground (pins 17~25). Logic Outputs allow remote control of external circuits (see Logic Outputs on pg. 8). From the factory, all Logic Outputs are 'off' and access to them is available only through Configuration (see Configuration on pg. 10). During Configuration, remote control buttons and Logic Inputs may be defined to control the various Logic Outputs, utilizing 'on', 'off', 'toggle', and 'no operation' commands (see Remote Controls on pg. 4). Logic Outputs can control relays, indicators, or other products having logic inputs (such as VSX41 Video Switchers).

**Logic Inputs:** This 25-pin Subminiature-D (female) connector provides Logic Inputs 1~16 (pins 1~16 respectively) and a common ground (pins 17~25). Logic Inputs allow remote control of PMX84 input/output assignment & Logic Output functions via external circuits (see Logic Inputs on pg. 6). From the factory, all Logic Inputs are non-functional and may be programmed to perform functions only through Configuration (see Configuration on pg. 10). During Configuration, each Logic Input may be defined as an individual input/output assignment, or as multiple input/output assignments (such as a preset). Logic Inputs are defined to affect input/output assignments using 'on', 'off', 'toggle', and 'no operation' functions. Logic Inputs can be controlled via switches, contact-closures, active driver circuits, or other products having logic outputs (such as the ADVANTAGE® AGII and DRC 4+4).

**Remote Inputs 1~4:** These plug-in barrier strips accept up to four optional remote controls (see Remote Controls on pg. 4). Remote controls may be infrared, wall-mount, and/or customized, and may be wired up to 2000 feet away from the PMX84. From the factory, Remote Inputs 1~4 are non-functional and may be programmed to perform functions only through Configuration (see Configuration on pg. 10). During Configuration, each remote control button on Remote Inputs 1~4 may be defined as an individual input/output assignment, or as multiple input/output assignments (such as a preset). Control buttons are defined to affect input/output assignments using 'on', 'off', 'toggle', and 'no operation' functions. Each control button can have different functions assigned to it, depending upon which Remote Input (1~4) it is received from. This is an effective way to customize remote control functions for specific zones or locations.

**Override:** This plug-in barrier strip terminal provides an 'emergency' (override) function. Override operates like a Logic Input, and is activated when shorted to the adjacent ground (▼). However, Override maintains a higher priority than any other Logic Input or remote control button. When Override is released (no longer shorted to ground), the PMX84 will automatically revert to its previous settings, and to normal operation. From the factory, Override is non-functional and may be programmed to perform functions only through Configuration (see Configuration on pg. 10). During Configuration, Override may be defined as an individual input/output assignment, or as multiple input/output assignments (such as a preset). Override is defined to affect input/output assignments using 'on', 'off', 'toggle', and 'no operation' functions. The Override terminal performs the functions defined for button #40 on Remote #4. When Override is activated (shorted to ground), the front panel Error Indicator will flash continuously, and all Serial Port, PMX Link, Logic Input, & Remote Input 1~4 commands will be ignored.

**PMX Link:** This plug-in barrier strip terminal provides a 'linking' interface between multiple PMX84s within a system. PMX Link is a communications bus, which allows Remote Input & Logic Input commands received by one PMX84 to be 'shared' by all PMX84s in the system. However, the way that each PMX84 in the system responds to these 'shared' commands can be completely different, as defined during Configuration (see Configuration on pg. 10). To 'link' multiple PMX84s, connect the PMX Link and adjacent ground (▼) terminals from each PMX84 to the respective terminals on the next PMX84, in a parallel fashion. **NOTE:** *RS-232 commands received at the PMX84 Serial Port are not included at PMX Link.*

**Serial Port:** This 9-pin Subminiature-D (male) connector provides an RS-232 Serial Port. PC Control Software and a serial cable are provided (see Configuration on pg. 10). The Serial Port also allows remote control via computer, or via third-party controllers which use the RS-232 protocol (see Computer Control on pg. 13).

**AC Power Cord:** The power transformer provides 27 Volts AC to the PMX84, and is detachable via a 5-pin DIN connector. The PMX84 has two internal 'self-resetting' fuses (there are no user serviceable parts inside the unit). If the internal fuses blow, they will attempt to re-set after a short period. However, this may be an indication that the PMX84 requires service.

## REMOTE CONTROLS

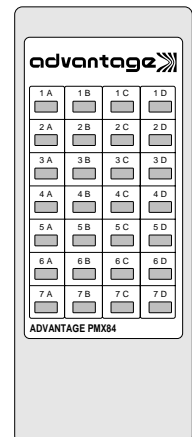
The type and quantity of remote controls are optional for the PMX84. Remote controls affect the individual input/output assignments, as well as selection of more global 'preset' assignments (see Configuration on pg. 10). Remote controls may be added at any time, and do not require the PMX84 to be modified, opened, or removed from a rack. There are four types of remote controls available: The Infrared Transmitter, the Infrared Receiver, the Wall-Mount Panel, and the Remote Interface Kit. The PMX84 may also be controlled via switches (Logic Inputs), computer (RS-232), and various third-party controllers. **NOTE:** Remote controls come with complete instructions.

**Infrared Receiver** (Biamp #909-0030-00): The Receiver consists of a black plastic box, containing an infrared photo detector, an LED indicator, and five screw terminals. To install the Receiver, first take off the front cover by removing four screws. Mount the Receiver to a wall or other surface, using the two screw holes on the back cover (screws not included). The Receiver should not be mounted in direct sunlight, or pointed directly at fluorescent lighting. Receiver performance may be adversely affected by electronic ballasts. For best results, there should be an unobstructed line-of-sight from Transmitter to Receiver. The Receiver may be wired up to 2000 feet from the PMX84, using 2-conductor shielded cable (not included). Route cable through access hole on the bottom of the Receiver. Three screw terminals inside the Receiver ("GND", "IR2", & "IR3") correspond to "Remote Input" terminals on the rear of the PMX84. Connect the cable shield to the "GND" terminals at each end. Use the two conductors to connect "IR2" to "IR2" & "IR3" to "IR3". Replace the Receiver front cover. The LED indicator inside the Receiver lights when infrared information is detected. **NOTE:** The Infrared Receiver also includes two 'Remote Translator' terminals ("GND" & "XLATE"), which allow remote control of the PMX84 via third-party 'serial' controllers. Complete instructions are included with the Infrared Receiver.



**External Receiver**  
(Biamp #909-0030-00)

**InfraRed Transmitter** (Biamp #909-0065-00): The Transmitter is a hand-held controller, which transmits infrared codes unique to Biamp. Therefore, the Transmitter should not affect any other infrared controlled equipment (such as TVs or VCRs). Likewise, other infrared controllers will not provide proper control of Biamp equipment. The Transmitter requires two AAA batteries, which are included with the unit (user installed). The Transmitter has twenty-eight buttons. Each button is labelled with both a number and a letter, as a generic button reference. From the factory, remote control buttons are non-functional and may be programmed to perform functions only through Configuration (see Configuration on pg. 10). During Configuration, each remote control button may be defined as an individual input/output assignment, or as multiple input/output assignments (such as a preset). Control buttons are defined to affect input/output assignments using 'on', 'off', 'toggle', and 'no operation' functions. Each control button can have different functions assigned to it, depending upon which Remote Input (1~4) it is received from. This is an effective way to customize remote control functions for specific zones or locations. By downloading a specific file ('startup.pmx') during Configuration, the PMX84 may be programmed so that each button assigns a specific input to a specific output. Under these circumstances, the button labelling indicates which input (number) is assigned to which output (letter). (Example: button '1 A' assigns Input 1 to Output A; button '2 B' assigns Input 2 to Output B; button '3 C' assigns Input 3 to Output C; button '4 D' assigns Input 4 to Output D; etc.). This file does not allow Input 8 to be assigned via the Transmitter. It is reserved as an 'emergency/all-call' input, which can be assigned to Outputs A~D using the Override terminal (see Rear Panel Features on pg. 3). This file also designates a 'toggle' function for the remote control buttons. This 'toggle' function works as a 'push-on/push-off' assignment. (Example: pressing button '7 A' once assigns Input 7 to Output A; pressing button '7 A' again un-assigns Input 7 from Output A; etc.). For best results, there should be an unobstructed line-of-sight from Transmitter to receiver. The Transmitter will operate up to 30 feet from a receiver. In addition to the Infrared Receiver described above, receivers are also included on the PMX84 and the Wall-Mount panel (see next page). **NOTE:** Default button definitions are all 'no operation'.

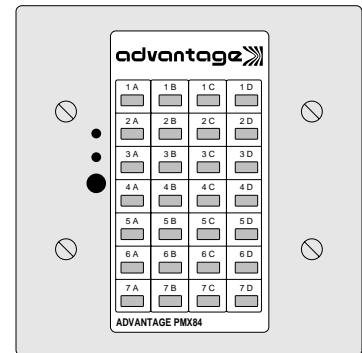


**Infrared Transmitter**  
(Biamp #909-0065-00)

## REMOTE CONTROLS

**Wall-Mount** (Biamp #909-0075-00): The Wall-Mount is a "hard-wired" control, which is powered by the PMX84. There are no batteries to wear out, and it is not easily lost or stolen. The Wall-Mount may be wired up to 2000 feet from the PMX84, using 2-conductor shielded cable (not included). To install the Wall-Mount, first remove the mounting box from the front panel. Route the cable through a "knock-out" hole on the rear of the mounting box. Install the mounting box in a wall or panel. Three screw terminals on the circuit board ("GND", "IR2", & "IR3") correspond to "Remote Input" terminals on the rear of the PMX84. Connect the cable shield to the "GND" terminals at each end. Use the two conductors to connect "IR2" to "IR2" & "IR3" to "IR3". Install the front panel on the mounting box. The Wall-Mount has twenty-eight buttons. Each button is labelled with both a number and a letter, as a generic button reference. From the factory, remote control buttons are non-functional and may be programmed to perform functions only through Configuration (see Configuration on pg. 10). During Configuration, each remote control button may be defined as an individual input/output assignment, or as multiple input/output assignments (such as a preset). Control buttons are defined to affect input/output assignments using 'on', 'off', 'toggle', and 'no operation' functions. Each control button can have different functions assigned to it, depending upon which Remote Input (1-4) it is received from. This is an effective way to customize remote control functions for specific zones or locations. By downloading a specific file ('startup.pmx') during Configuration, the PMX84 may be programmed so that each button assigns a specific input to a specific output. Under these circumstances, the button labelling indicates which input (number) is assigned to which output (letter). (Example: button '1 A' assigns Input 1 to Output A; button '2 B' assigns Input 2 to Output B; button '3 C' assigns Input 3 to Output C; button '4 D' assigns Input 4 to Output D; etc.). This file does not allow Input 8 to be assigned via the Transmitter. It is reserved as an 'emergency/all-call' input, which can be assigned to Outputs A~D using the Override terminal (see Rear Panel Features on pg. 3). This file also designates a 'toggle' function for the remote control buttons. This 'toggle' function works as a 'push-on/push-off' assignment. (Example: pressing button '7 A' once assigns Input 7 to Output A; pressing button '7 A' again un-assigns Input 7 from Output A; etc.). The red LED will flash whenever the Wall-Mount is transmitting information. The Wall-Mount includes an infrared detector, which allows it to operate as an Infrared Receiver, as well. The infrared detector may be disabled via an internal circuit board jumper strap (labelled "IR RECV").

**NOTE:** Default button definitions are all 'no operation'.



**Wall-Mount Panel**  
(Biamp #909-0075-00)

**Remote Interface Kit** (Biamp #909-0041-00): The Remote Interface Kit allows the user to create a customized control panel, using his own momentary switches, enclosure, and panel. It can provide up to 40 buttons (12 more than standard remote controls), which are supported by the PMX84. The Remote Interface Kit is a tested circuit board assembly, which includes two wiring harnesses. The circuit board connects to the PMX84 in exactly the same way the Infrared Receiver or Wall-Mount does, using 2-conductor shielded cable (not included), and may be wired up to 2000 feet from the PMX84. The circuit board is 2.27"W by 2.65"H, with four mounting holes (2" centers) and #6 mounting hardware provided.

## LOGIC INPUTS

---

The sixteen Logic Inputs are available on a rear panel 25-pin Subminiature D (female) connector. Logic Inputs allow remote control of PMX84 input/output assignment & Logic Output functions via external circuits, such as switches, contact-closures, active driver circuits, and/or 'open-collector' logic outputs. From the factory, all Logic Inputs are non-functional and may be programmed to perform functions only through Configuration (see Configuration on pg. 10). During Configuration, each Logic Input may be defined as an individual input/output assignment, or as multiple input/output assignments (such as a preset). Each Logic Input may also be defined with either an 'on', 'off', 'toggle', or 'no operation' function.

Furthermore, Logic Inputs may be assigned in 'prioritized' groups (see Global Configuration Screen on pg. 12). There are seven possible 'priority' group assignments: **A) No Priority** (all Logic Inputs at same priority level); **B) One Group of Four** (Logic Inputs 1~4); **C) Two Groups of Four** (Logic Inputs 1~4 & 5~8); **D) Three Groups of Four** (Logic Inputs 1~4, 5~8, & 9~12); **E) Four Groups of Four** (Logic Inputs 1~4, 5~8, 9~12, & 13~16); **F) One Group of Eight** (Logic Inputs 1~8); **G) Two Groups of Eight** (Logic Inputs 1~8 & 9~16). Within each priority group, the lower numbered Logic Input has highest priority. Logic Inputs are affected by priority only within these groups. Logic Inputs in one group will not have priority over Logic Inputs in another group. Likewise, Logic Inputs assigned to priority groups do not have priority over Logic Inputs which are not assigned to priority groups. Also, within each priority group there is a 'fall-back' function. This 'fall-back' function allows a higher priority Logic Input to override a lower priority Logic Input, and then automatically revert to the lower priority Logic Input when the higher priority Logic Input is released (assuming the lower priority Logic Input is still being activated). Since Logic Inputs are controlled by switches, contact-closures, etc., each Logic Input is allowed two button definitions (one for switch 'closed' and one for switch 'open'). Therefore, button definitions are also available for when certain groups of Logic Inputs are all 'open'. This is very effective for creating an additional 'fall-back' priority level. For example, when all of the Logic Input 1~4 priority group are 'open' (no paging), a special button definition may be activated which selects a 'fall-back' assignment (such as background music).

Logic Inputs may also be set for 'normal' or 'binary' modes of operation. The 'binary' mode reconfigures Logic Inputs 9~12 for 'room combining' applications, utilizing one Logic Input (switch) for each room partition. This supports up to four rooms, with sixteen possible combinations of 'open' or 'closed' partitions. Under these circumstances, button definitions are created which perform the appropriate input/output assignments when specific room partitions are moved (switches 'opened'). In Binary mode, Logic Inputs 1~8 operate normally, however, Logic Inputs 13~16 are unused (disabled). Files are available for downloading to the PMX84, which represent typical uses of Logic Input Priority & Logic Input Mode, for page routing & room combining applications (see Application on pgs. 16~21).

When nothing is connected to a Logic Input, an internal pull-up resistor keeps it at a 'high' idle state (+5.0 VDC). The Logic Input is activated when its input goes 'low' (less than +0.8 VDC), and is de-activated when its input goes 'high' (greater than +2.4 VDC). A Logic Input is controlled in one of three ways: **1)** Use an NPN style 'open-collector' logic output from an external device (such as an AGII Autogate or DRC 4+4 Digital Remote Control) to short the Logic Input to ground. **2)** Use a switch, relay, or other contact-closure (such as from a third-party controller) to short the Logic Input to ground. **3)** Use an active TTL output driver circuit (such as from a third-party controller) to actively drive the Logic Input to a 'high' or 'low' state.

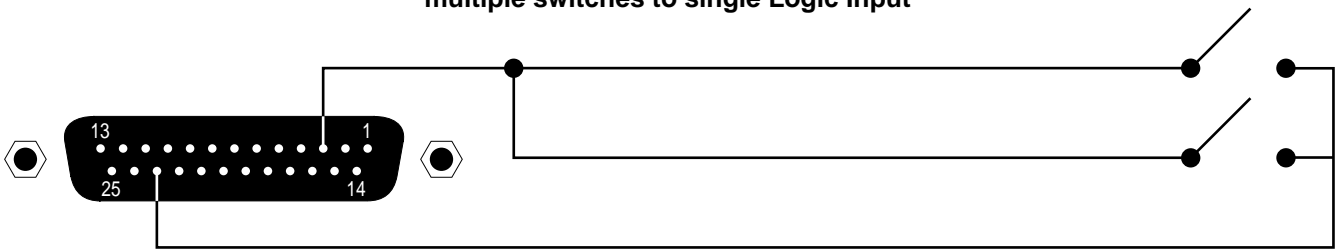
Multiple contact-closures or 'open-collector' logic outputs or may be wired in parallel to a single Logic Input (see diagrams on next page). Likewise, a single contact-closure or 'open-collector' logic output may be wired in parallel to multiple Logic Inputs. In some circumstances, a diode matrix may be necessary to isolate multiple switches which are controlling similar groups of Logic Inputs. However, these circumstances may be rare, since each individual Logic Input may be defined to perform multiple functions. Logic Outputs and contact-closures should be rated for at least 5 Volts / 1mA operation. Low-current / dry-contact closures are recommended for reliability. Active output driver circuits should not exceed a signal range of 0~5 Volts DC, and should have a minimum pulse width of 100 milli-seconds. Logic Input impedances are approximately 10k ohms.

# LOGIC INPUTS

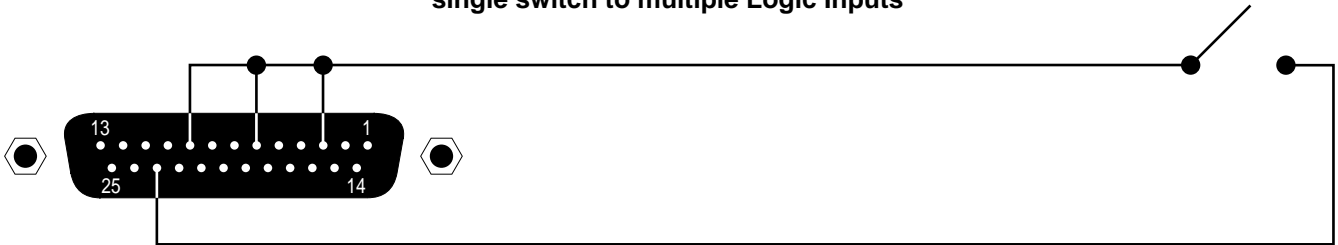


logic inputs	pin numbers
logic #1~16	pin #1~16
ground	pin #17~25

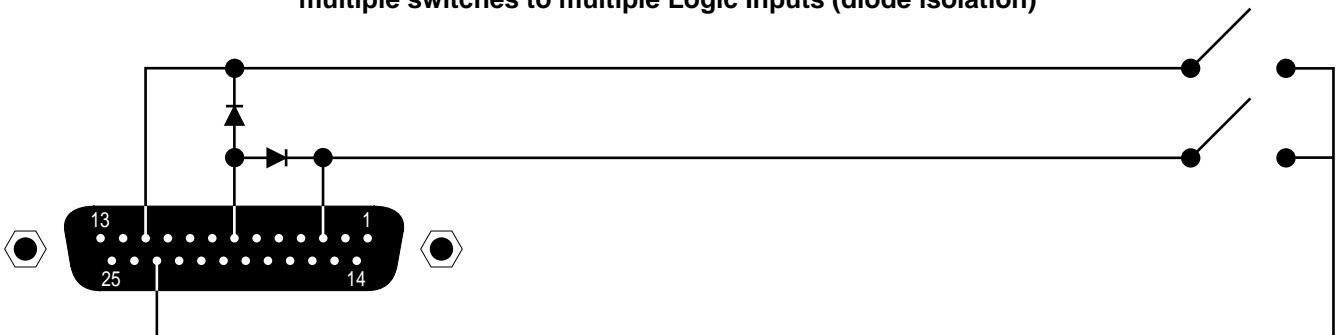
**multiple switches to single Logic Input**



**single switch to multiple Logic Inputs**



**multiple switches to multiple Logic Inputs (diode isolation)**





## LOGIC OUTPUTS

---

The sixteen Logic Outputs are available on a rear panel 25-pin Subminiature D (male) connector. Logic Outputs provide remote control of external circuits, such as relays and/or indicators. From the factory, all Logic Outputs are 'off' and access to them is available only through Configuration (see Configuration on pg. 10). During Configuration, remote control buttons and Logic Inputs may be defined to control switching of the various Logic Outputs, utilizing 'on', 'off', 'toggle', and/or 'no operation' commands.

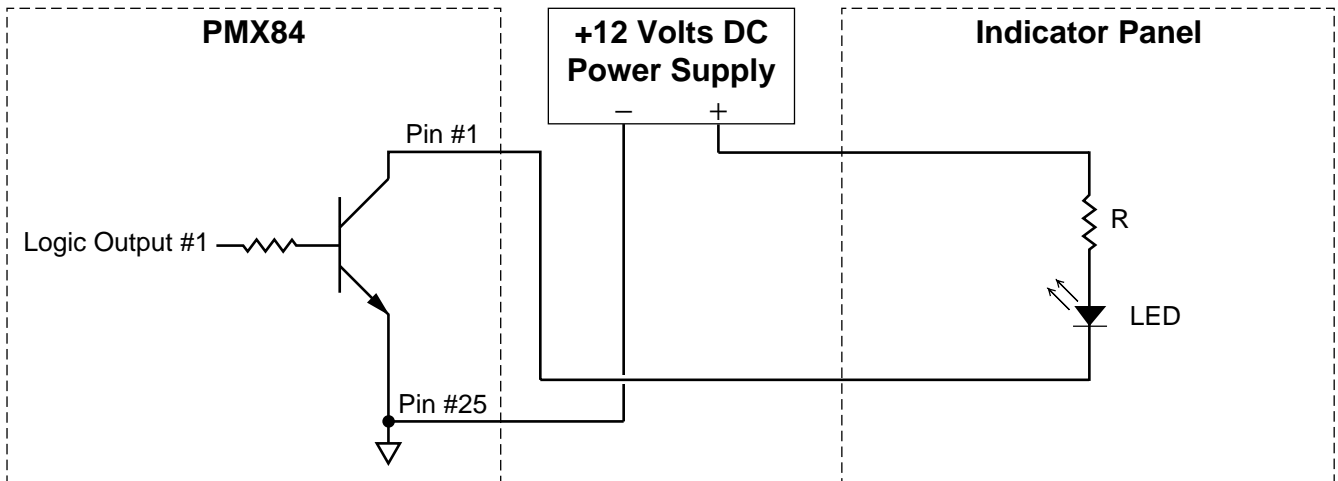
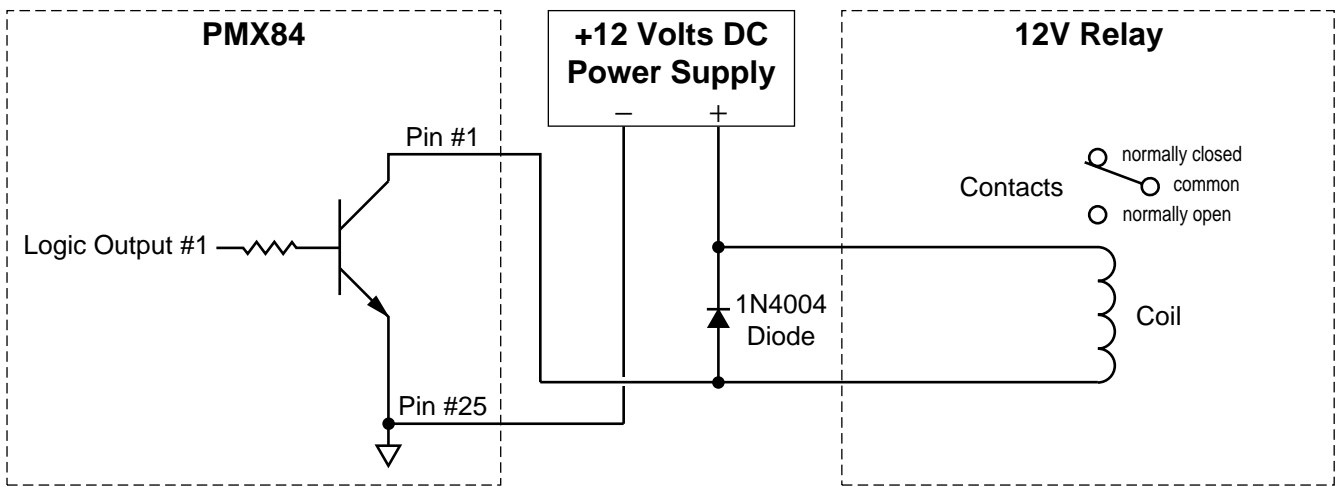
The PMX84 logic outputs are 'open collector' outputs. Each logic output is an NPN transistor with the collector being the output and the emitter being ground (see diagram on next page). When a logic output is turned on, the transistor provides a path for DC current to flow. The logic outputs do not provide any voltage or current. They act only as switches (with a common ground return). To activate external relays, an external power supply must be used (see diagram on next page). The logic output transistors are rated up to a maximum of 24 VDC and 50 mA per output (24 volt relay coils maximum). However, +12 Volts DC is sufficient power for most applications. When using the logic outputs to control relays, protection diodes must be used to suppress high voltage transients that are generated when the relays turn off (see diagram below). Any of the 1N4004 family of diodes (1N4001, 1N4002, 1N4003, 1N4004, 1N4005, 1N4006, 1N4007, or equivalent) will provide proper protection. A 12 Volt Power Supply (#929-0011-00), 12 Volt DPDT Relays (#520-0064-00), and 1N4004 Diodes (#190-0003-09) are available from Biamp. When a logic output goes on, the associated relay may be wired to perform on, off, or 'A/B' switching functions. To use a logic 'on' command to turn on (or activate) a device, wire across the 'normally open' relay contacts, in series with the device (or control voltage source). To use a logic 'on' command to turn off a device (or speaker), wire across the 'normally closed' relay contacts, in series with the device (or control voltage source). To use a logic 'on' command to select between 'A' or 'B' signals (inputs or outputs), wire one to the 'normally closed' relay terminal and the other to the 'normally open' relay terminal, with the common relay terminal providing the feed (input or output).

Likewise, Logic Outputs may be used in conjunction with an external power supply, for controlling external indicators such as LEDs (see diagram on next page). When a Logic Output goes on, the circuit for the external indicator is completed (Logic Output provides path for DC current to flow). Again, a +12 Volts DC power supply is appropriate. Typically, an LED will require about 8 mA of current to achieve sufficient brightness. Therefore, the value of 'R' should be 1.2k ohms. If the LED used requires more current to achieve sufficient brightness, the value of 'R' may be reduced to a minimum of 1k ohm. This would provide 10 mA of current to the LED. Remote control buttons and Logic Inputs can be defined to control matrix input/output assignments and/or Logic Output switching. Therefore, external LED circuits may be used to indicate virtually anything, including PMX84 matrix input/output assignments or status of external systems.

# LOGIC OUTPUTS

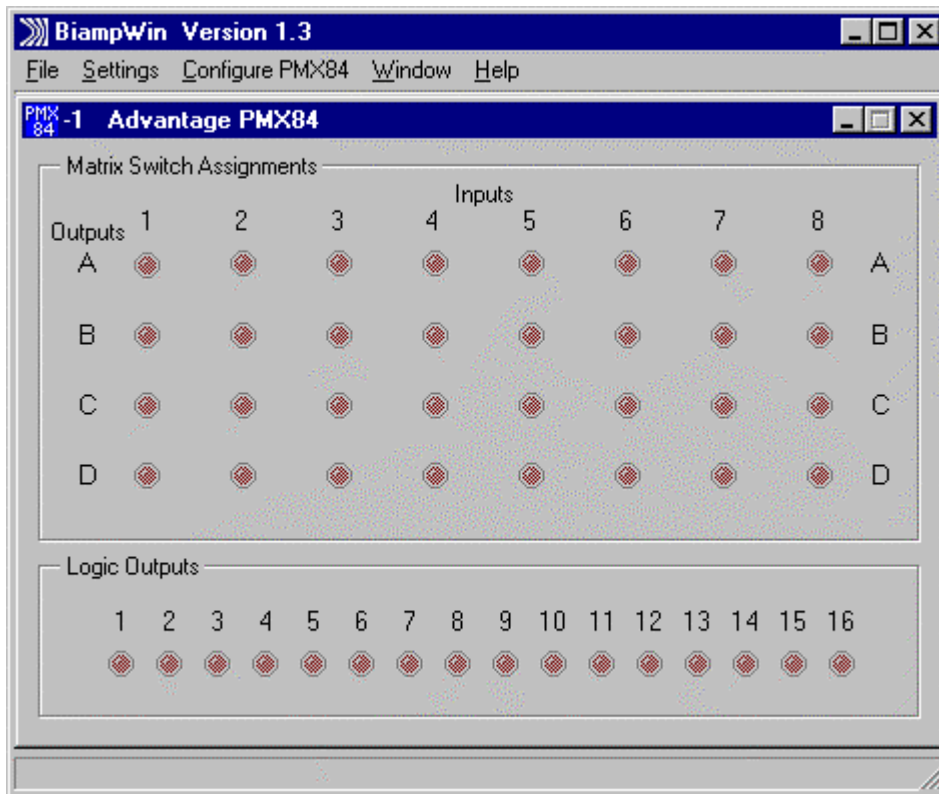


logic outputs	pin numbers
logic #1~16	pin #1~16
ground	pin #17~25



## CONFIGURATION

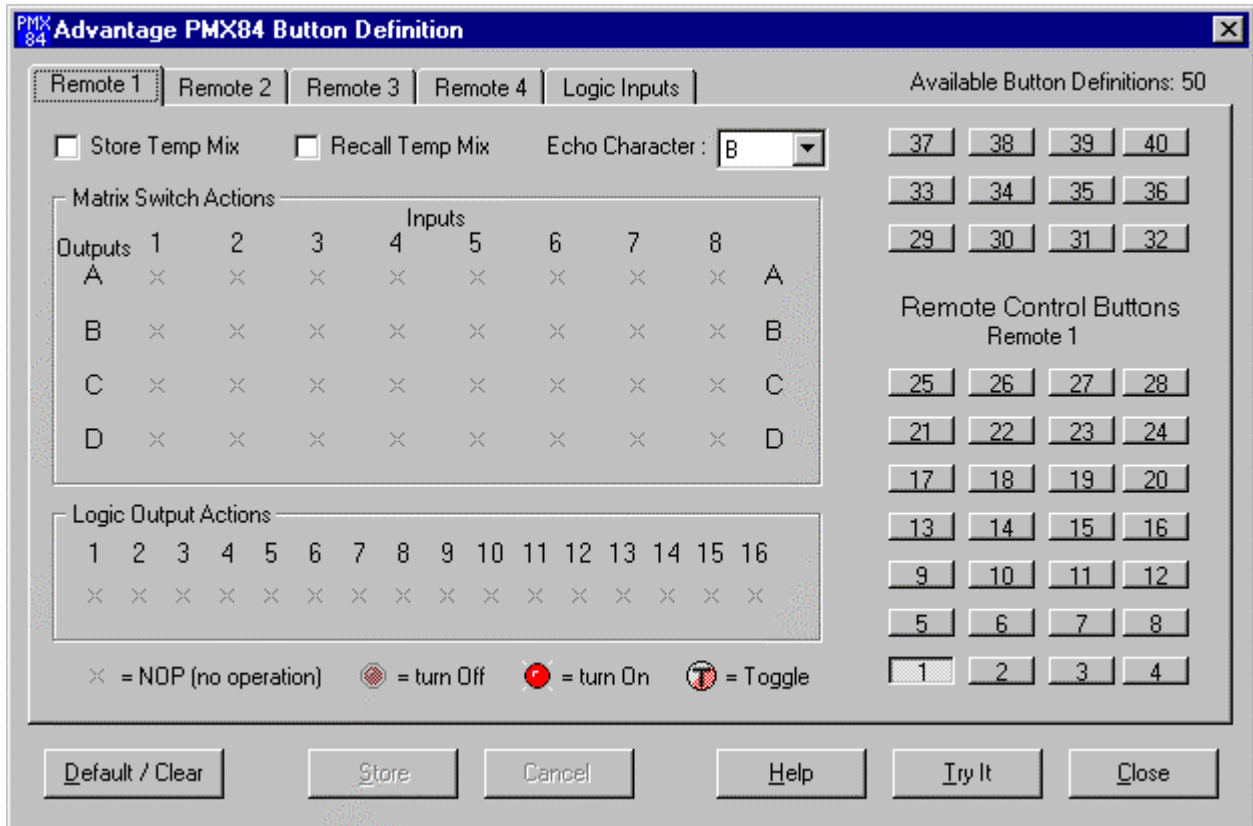
All Configuration parameters are adjustable using the Windows® 95 'PC Control Software' and serial cable provided with the PMX84. The PC Control Software provides programs for various ADVANTAGE® products, including the PMX84. The PMX84 program includes multiple control screens, which are described on the following pages. Factory default settings are shown on each screen. Once the software is started (and Comm Port Configuration is set), various screens are accessible through the drop-down menus at the top of the opening screen. The Mix screen appears whenever a PMX84 file is opened. Additional control screens are then available from the Configure PMX84 menu. The File menu provides functions such as open, close, save, etc. Pre-programmed files are provided with the PC Control Software, which can be downloaded to the PMX84 for typical applications, such as page routing & room combining. The Settings menu recalls the Comm Port Configuration screen. The Window menu arranges the active product screens. The Help menu explains the available adjustments. To install the Windows® 95 PC Control Software: Select 'Run' from the Windows® 95 'Start' menu, then type **A:\SETUP** and click 'OK'. System Requirements: Windows® 95 with 8MB RAM & 2MB available hard disk space. A serial port is required for actual 'on-line' operation and control of a PMX84).



### MIX SCREEN

The Mix screen allows direct control of the individual Matrix Switch (input/output) Assignments and the Logic Outputs of the PMX84. The Mix screen is divided into two sections. The upper section affects the **Matrix Switch Assignments** and the lower section affects the **Logic Outputs**. Left-clicking a Matrix Switch Assignment or a Logic Output will 'toggle' it on or off. Right-clicking will instead open a pop-up menu, which allows Matrix Switch Assignments & Logic Outputs to be turned on & off individually or in groups. The Mix screen provides a graphic display of all current Matrix Switch Assignments and Logic Outputs, as well as allowing real-time control of the PMX84. The title bar at the top of the Mix screen shows Device Number, custom Device Name, & Model of the product being controlled. The PC Control Software can operate 'off-line' (no product connected) by opening a 'new' file for the desired product. The Device Number for 'off-line' files is assigned sequentially as a negative number. **NOTE:** Files are available for downloading during Configuration, which are designed for specific applications (see Applications on pgs. 16-21).

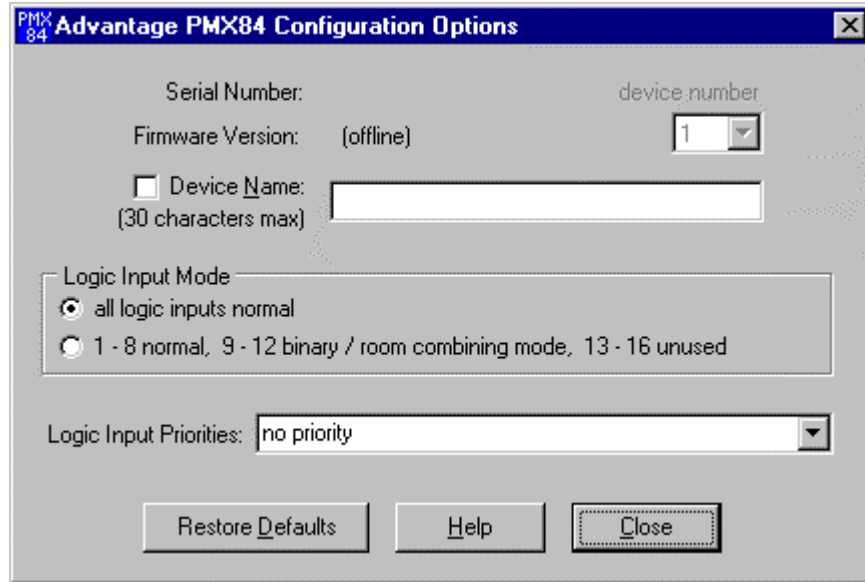
## CONFIGURATION



### BUTTON DEFINITION SCREENS

Button Definition screens are used to assign specific 'actions' to remote control buttons (and logic inputs). Button Definition screens are accessed through the Configure PMX84 drop-down menu. There are five Button Definition screen tabs to choose from (**Remote 1~4 & Logic Inputs**). Button Definition screens are divided into two sections. The right section indicates which **Remote Control Button** is currently selected. The lower set of twenty-eight buttons represents the buttons found on a standard remote control (see Remote Controls on pg. 4). The PMX84 also supports the 12 buttons shown above, which are accessible via Remote Interface Kit or Computer control. Left-clicking a button selects it to be defined. The left section of the screen shows the **Matrix Switch & Logic Output Actions** assigned to the selected button. Left-clicking a Matrix Switch or Logic Output cycles through the four actions available actions (no operation, turn off, turn on, & toggle). Right-clicking instead opens a pop-up menu, allowing Matrix Switch & Logic Output Actions to be assigned individually or in groups. A button can be assigned multiple actions, affecting any number of Matrix Switches & Logic Outputs, much like a preset. Button Definition not only allows a particular button to be defined, but also from which Remote Input (1~4) that button command is received. This allows a button to perform different actions, depending upon which location it comes from. The sixteen Logic Inputs (and the Override terminal) are also available for button definition. **Logic Inputs** are activated by switches. Therefore, each Logic Input is allowed two button definitions (one for switch 'closed' and one for switch 'open'). Button definitions are also available for when certain groups of Logic Inputs are all 'open'. The Logic Inputs screen also includes a special definition which is triggered each time the PMX84 is powered up. The **Override** terminal acts like a logic input, but performs the actions as defined for button #40 on Remote #4. The Override terminal has the ability to temporarily store current settings, and recall them when Override is released (switch opened). This same function is available for buttons & logic inputs, by selecting **Store Temp Mix** or **Recall Temp Mix** at the upper-left of the screen. These actions are typically used for paging, where it is desired to return to previous settings after the page. (Example: Logic Input 'closed' stores current settings and initiates page, then Logic Input 'opened' recalls previous settings.) When a button is selected, the **Echo Character** is shown at the upper portion of the screen. Echo Characters may be used (via RS-232 computer control) to emulate the remote control buttons. However, the Echo Character for a button may be changed via the drop-down menu, for customizing RS-232 system control. Left-clicking **Default / Clear** opens a pop-up menu, allowing the selected button (or all buttons) to be reset to 'no operation'. Once a button definition is changed, left-clicking **Store** saves the new definition, or left-clicking **Cancel** reverts to the prior definition. Left-clicking **Help** provides additional instruction. Once a button definition is stored, left-clicking **Try It** will actually perform those actions. Left-clicking **Close** returns to the Mix screen. Fifty button definitions are available, and the number of remaining definitions is shown at the upper-right of the screen. **NOTE:** Default button definitions are all 'no operation'.

## CONFIGURATION



### **CONFIGURATION OPTIONS SCREEN**

The Configuration Options screen has three sections. The top section displays the **Serial Number & Firmware Version** for the current PMX84 (if operating 'on-line'). The PC Control Software can operate 'off-line' (with no product connected) by opening a 'new' file for the desired product. The Serial Number & Firmware Version are not displayed for 'new' (off-line) files. Left-clicking **Device Number** opens a drop-down menu which allows assignment of an 'address' number (1-8). When more than one PMX84 is used in a system, their serial ports may be connected together (see Computer Control on pg. 14). Under these circumstances, RS-232 commands (from computer or certain third-party controllers) may be routed to specific PMX84s in the system, using their Device Numbers. Left-clicking **Device Name** allows a custom name to be given to the PMX84, by entering up to 30 characters of text. The middle section of the screen selects the **Logic Input Mode**. Left-clicking **all logic inputs normal** allows all Logic Inputs to operate independently, except for priority as described below. Left-clicking **1-8 normal, 9-12 binary/room combining mode, 13-16 unused** instead reconfigures Logic Inputs 9-12 for 'room combining' applications, utilizing one Logic Input (switch) for each room partition. This supports up to four rooms, with sixteen possible combinations of 'open' or 'closed' partitions. Under these circumstances, button definitions are created which perform the appropriate Matrix Switch (input/output) assignments when specific room partitions are moved (switches 'opened'). In the binary/room combining mode, Logic Inputs 1-8 operate normally, however, Logic Inputs 13-16 are unused (disabled). The bottom section of the screen selects the desired grouping of **Logic Input Priorities**. Left-clicking the adjacent arrow button opens a drop-down menu of seven different priority schemes for the Logic Inputs. Logic Input Priority allows the PMX84 to establish a priority scheme suitable to a particular application. The Logic Inputs may be assigned in single or multiple groups, with each group having 4 or 8 priority levels. Within each group, the lower numbered Logic Input has highest priority. Logic Inputs are affected by priority only within these groups. (Example: 'Four Groups of Four Priority' would work well when four levels of paging priority are required in four independent paging zones. Where Logic Inputs 1, 5, 9, & 13 represent the highest 'emergency' priority level, Logic Inputs 2, 6, 10, & 14 represent the second 'all-call' priority level, Logic Inputs 3, 7, 11, & 15 represent the third 'local page' priority level, and Logic Inputs 4, 8, 12, & 16 represent the lowest 'message repeater' priority level. Also, button definitions may be created which automatically select 'background music' when no zone paging is present. Left-clicking **Restore Defaults** allows all Configuration Options to be restored to their factory default settings. Left-clicking **Help** provides additional instruction. Left-clicking **Close** will return you to the Mix screen. **NOTE:** Factory default settings are shown on the screen above. Files are available for downloading during Configuration, which are designed for specific applications (see Applications on pgs. 16-21). These files represent typical uses of Logic Input Priority & Logic Input Mode, for paging routing & room combining applications.

## COMPUTER CONTROL

---

The ADVANTAGE® PMX84 has an RS-232 compatible serial interface, which allows it to be controlled by a computer (see Rear Panel Features on page 3). In addition to the PC Control Software, the PMX84 offers two other methods of computer control.

**Control Button Emulation:** This method allows the computer to emulate the operation of the infrared transmitter or wall-mount control panel. Using this method, the computer outputs ASCII characters, which are equivalent to the commands generated by the standard control buttons. The PMX84 is unable to tell whether these commands come from the computer or from a standard control. However, Control Button Emulation allows the computer to utilize up to forty button definitions (unlike standard controls, which have only twenty-eight buttons). When using up to four PMX84s in a system, Control Button Emulation also allows the computer to designate which device or devices should react to each control button command.

**Advanced Computer Control:** This method provides advanced commands, which allow the computer to retrieve or edit matrix assignments, retrieve or edit control button definitions, and a variety of other functions. The computer may also emulate control buttons. Using this method, the computer may designate up to eight devices, and may create unlimited presets and control button definitions. The computer may also provide "real-time" display of input/output assignments.

This manual only describes the Control Button Emulation method of computer control. For complete details about using the PMX84 with a computer, including Advanced Computer Control, contact Biamp Systems for manual "[Computer Control of PMX84](#)".

Each control button on the infrared transmitter or the wall-mount control panel corresponds to one character in the standard ASCII character set. The character equivalents are summarized in the following table. This table includes all forty of the possible buttons, their button numbers, their ASCII code equivalents, and their factory default button definitions. From the factory, remote control buttons are non-functional and may be programmed to perform functions only through Configuration (see Configuration on pg. 10).

button 01	B	no definition assigned	button 15	P	no definition assigned	button 29	^	no definition assigned
button 02	C	no definition assigned	button 16	Q	no definition assigned	button 30	_	no definition assigned
button 03	D	no definition assigned	button 17	R	no definition assigned	button 31	'	no definition assigned
button 04	E	no definition assigned	button 18	S	no definition assigned	button 32	b	no definition assigned
button 05	F	no definition assigned	button 19	T	no definition assigned	button 33	c	no definition assigned
button 06	G	no definition assigned	button 20	U	no definition assigned	button 34	d	no definition assigned
button 07	H	no definition assigned	button 21	V	no definition assigned	button 35	e	no definition assigned
button 08	I	no definition assigned	button 22	W	no definition assigned	button 36	f	no definition assigned
button 09	J	no definition assigned	button 23	X	no definition assigned	button 37	g	no definition assigned
button 10	K	no definition assigned	button 24	Y	no definition assigned	button 38	h	no definition assigned
button 11	L	no definition assigned	button 25	Z	no definition assigned	button 39	i	no definition assigned
button 12	M	no definition assigned	button 26	[	no definition assigned	button 40	j	no definition assigned
button 13	N	no definition assigned	button 27	\	no definition assigned			
button 14	O	no definition assigned	button 28	]	no definition assigned			

The computer can initiate any functions or actions that a standard control can, by simply transmitting the equivalent control button ASCII character. When interfacing the PMX84 to a computer, the computer must be aware that the PMX84 will "echo" all characters it receives (both from computer and standard controls) via the Serial Port 'transmit data' (TXD) signal.

Up to four PMX84s may be connected together, and addressed individually, when using Control Button Emulation. When multiple units are used, each unit should be assigned a unique "Device Number" (see Configuration on pg. 10). Normally, all of the PMX84s would react to control button commands. However, the computer can send commands to specific units, by preceding each command with a "device select prefix" character (see following table). Only those PMX84s whose Device Numbers are specified will respond to the command which follows. If a command is not immediately preceded by a device select prefix character, then all PMX84s in the system will react to that command.

Select Device 1	l	Select Devices 2 & 3	q	Select Devices 1 & 2 & 4	v
Select Device 2	m	Select Devices 1 & 2 & 3	r	Select Devices 3 & 4	w
Select Devices 1 & 2	n	Select Device 4	s	Select Devices 1 & 3 & 4	x
Select Device 3	o	Select Devices 1 & 4	t	Select Devices 2 & 3 & 4	y
Select Devices 1 & 3	p	Select Devices 2 & 4	u	Select Devices 1 & 2 & 3 & 4	z

## COMPUTER CONTROL

---

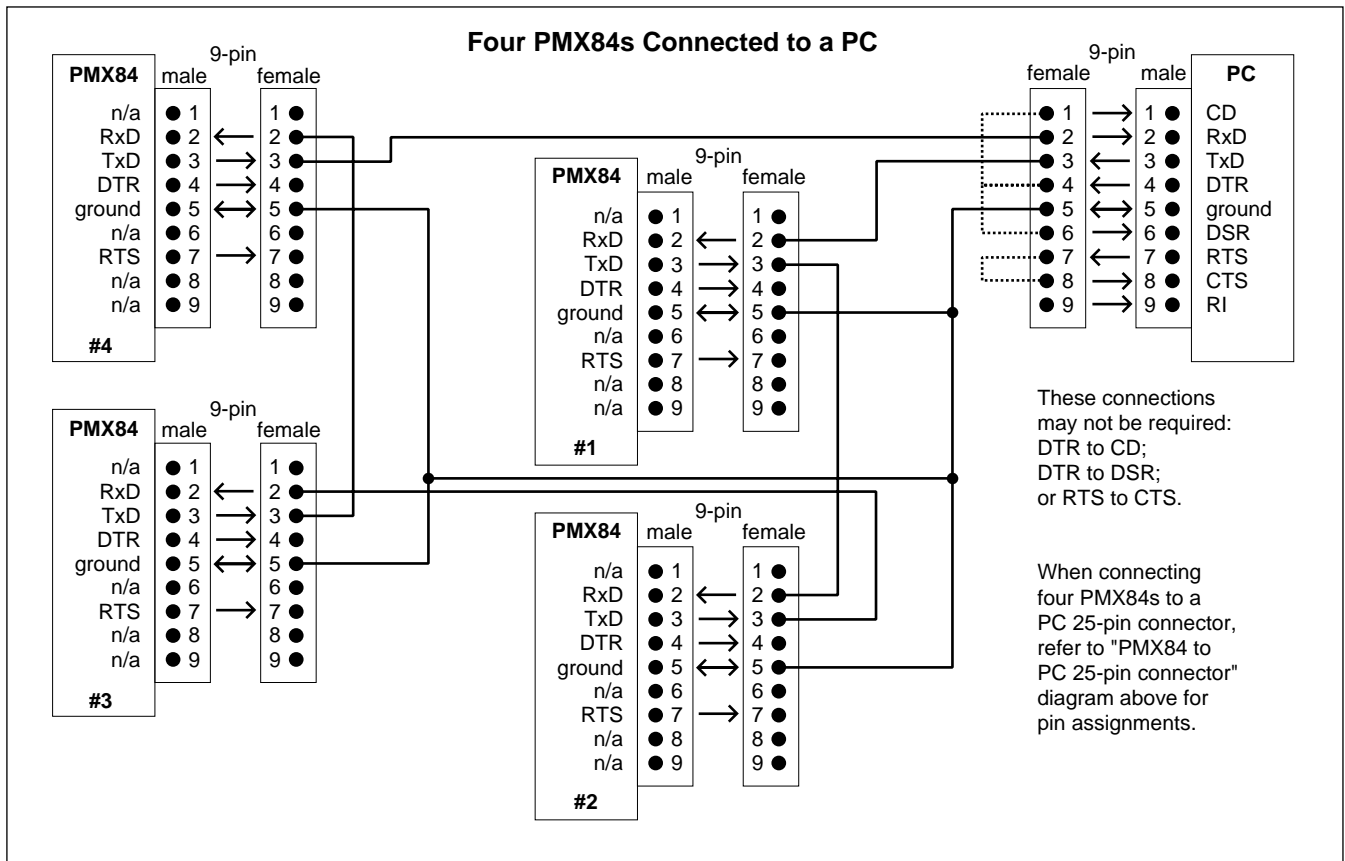
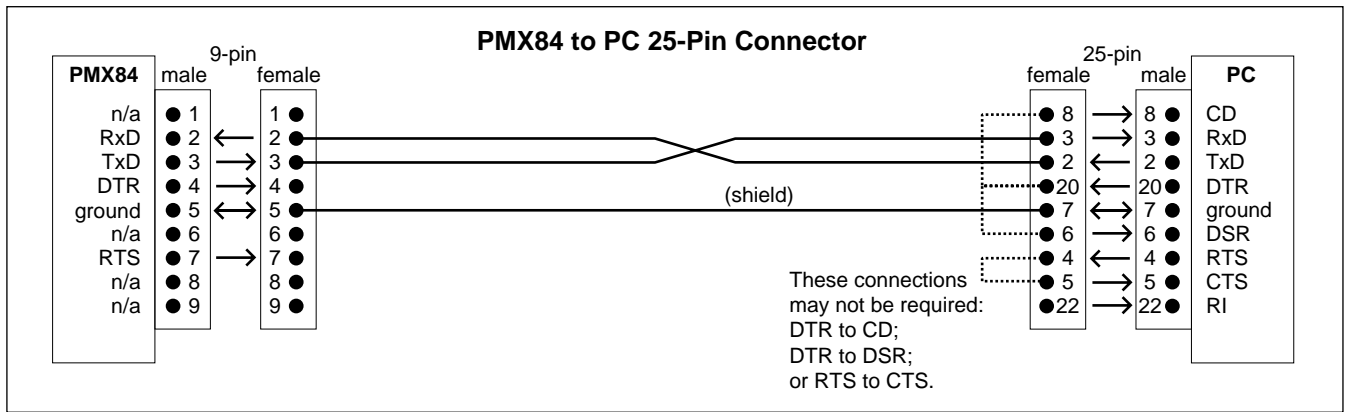
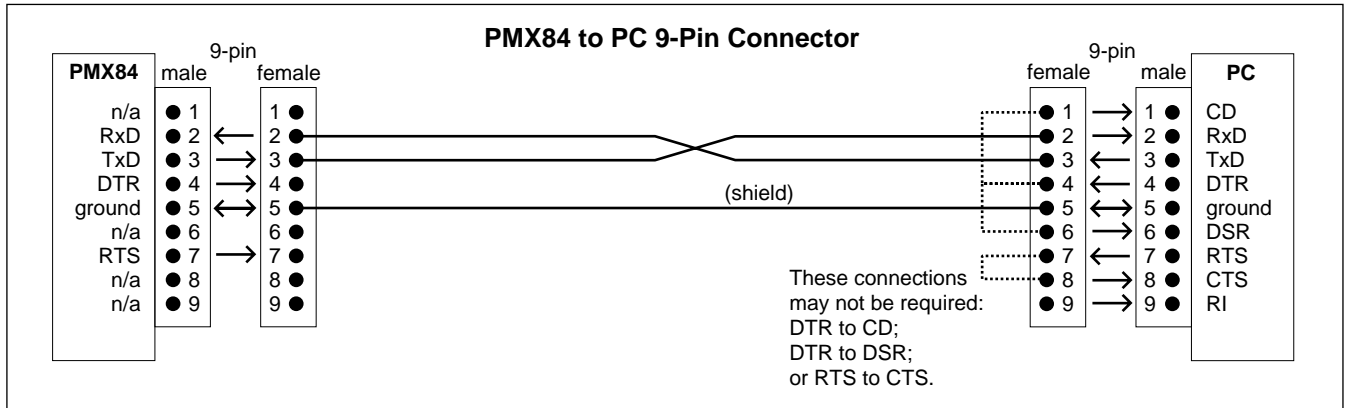
**Serial Interface Electrical Connections & Cabling:** The 9-pin Subminiature D (male) connector on the PMX84 rear panel provides the RS-232 compatible serial interface signals used for computer control. The PMX84 transmits serial data on pin 3 (TxD) and receives serial data on pin 2 (RxD). The serial interface ground is on Pin 5. The DTR & RTS signals are connected to the +12 Volt power supply (each through its own resistor) and are always asserted when the PMX84 power is on. Most IBM compatible PCs use either 25-pin or 9-pin (male) connectors for their serial ports. The following table summarizes the pin assignments for the PMX84 serial interface, and for the standard IBM compatible 9-pin and 25-pin serial ports.

SIGNAL NAME	DIRECTION	PMX84 9-PIN	IBM-PC 9-PIN	IBM-PC 25-PIN
CD (carrier detect)	input	n/a	pin 1	pin 8
RxD (receive data)	input	pin 2	pin 2	pin 3
TxD (transmit data)	output	pin 3	pin 3	pin 2
DTR (data terminal ready)	output	pin 4	pin 4	pin 20
signal ground	n/a	pin 5	pin 5	pin 7
DSR (data set ready)	input	n/a	pin 6	pin 6
RTS (request to send)	output	pin 7	pin 7	pin 4
CTS (clear to send)	input	n/a	pin 8	pin 5
RI (ring indicator)	input	n/a	pin 9	pin 22

The PMX84 only requires receive data (pin 2), transmit data (pin 3), and signal ground (pin 5) to be connected for successful data communications. However, the PC may require that signals be present on the data set ready, clear to send, or carrier detect inputs, as well as the receive data, transmit data, and signal ground pins. The diagrams on the following page show cables for interfacing to a PC with either a 9-pin or a 25-pin serial port connector. In most cases, one or the other of these cables will work. However, success or failure depends entirely on the actual computer hardware and software being used. When trying to solve an interfacing problem, the most important thing to remember is that an output of one device should connect to one or more inputs of the other device, and that two outputs should never be connected together. Also, keep in mind that the RS-232 specification calls for the cable length to be no greater than 50 feet (although it is not unusual to be able to operate over distances of 150 to 250 feet), and the connectors must be of the appropriate gender (male or female) to mate properly. For best results, a shielded cable should be used, with the shield connected to signal ground. Since the PMX84 serial interface ground is also tied (indirectly) to the analog signal ground, undesirable ground loops may occur when the PMX84 is connected to a PC (if the system grounding is not carefully designed). For best performance, the PC ground and the chassis ground of the PMX84 should be at the same potential, and the PC should get AC power from the same source as the PMX84 (and any other audio equipment which is connected to the PMX84).

**Serial Interface Data Communications Parameters:** The PMX84 communicates through the serial interface at a rate of 9600 bits per second, with 8 data bits, 1 stop bit, and no parity. The PMX84 utilizes a subset of the standard 7-bit ASCII character set. The eighth data bit of each character (the most significant bit) should always be 0. The computer should not echo the characters it receives. The computer should not be set for either hardware (DTR) or software (XON/XOFF) flow control. The baud rate may be changed to 2400 bits per second by means an internal jumper strap (J31). Jumper strap J31 is located on the right front corner of the lower circuit board, directly in front of the microprocessor (U36). To select 2400 baud rate: 1) Disconnect power from the PMX84. 2) Remove top panel. 3) Using needle-nose pliers, lift jumper strap J31 and move it over one pin (to the left). 4) Replace top panel & turn power on.

# COMPUTER CONTROL

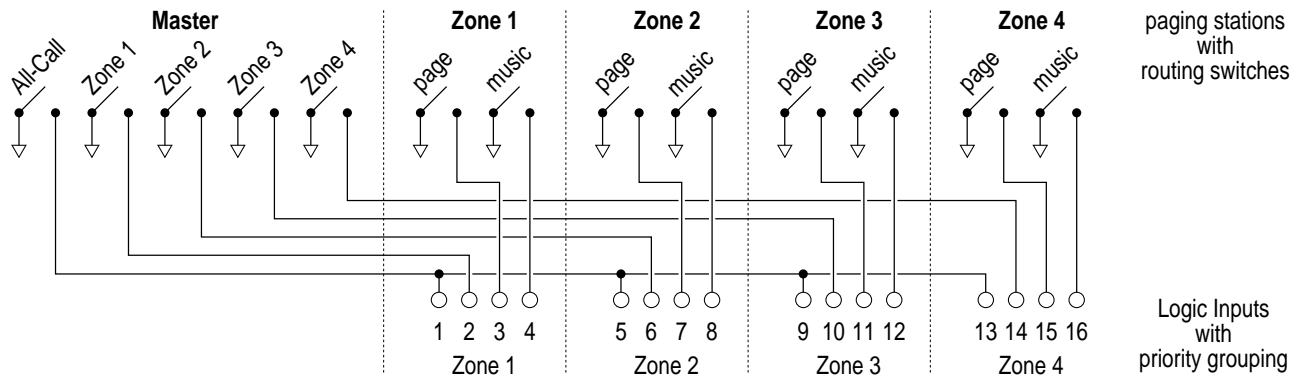
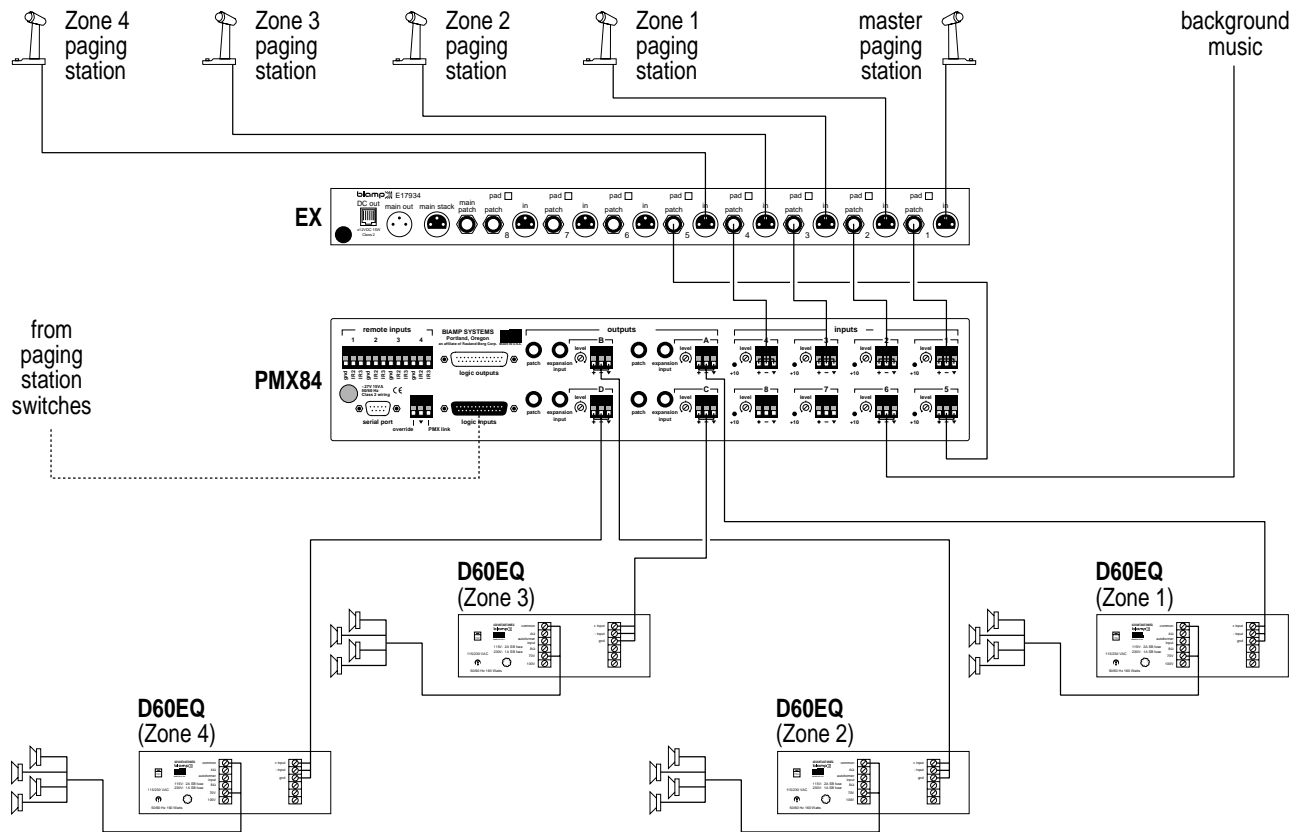




# APPLICATIONS

## Zone Paging with Background Music

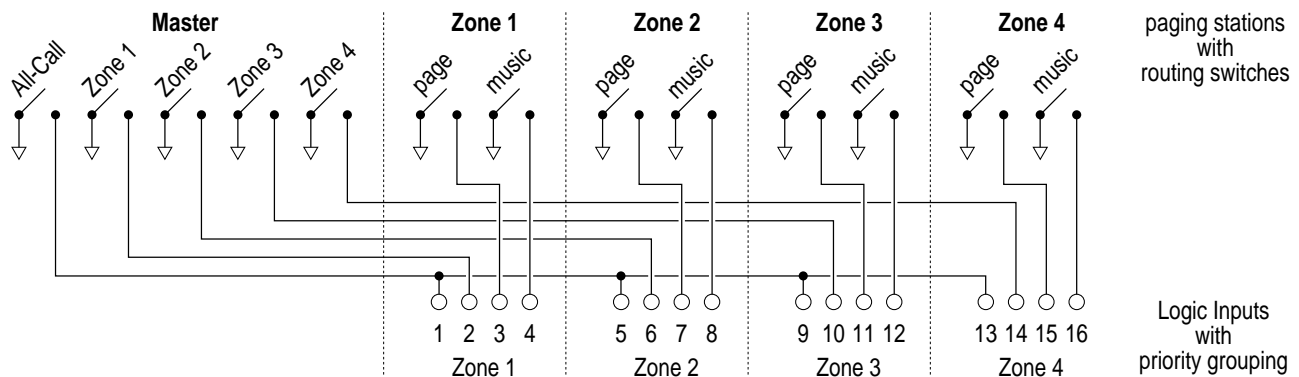
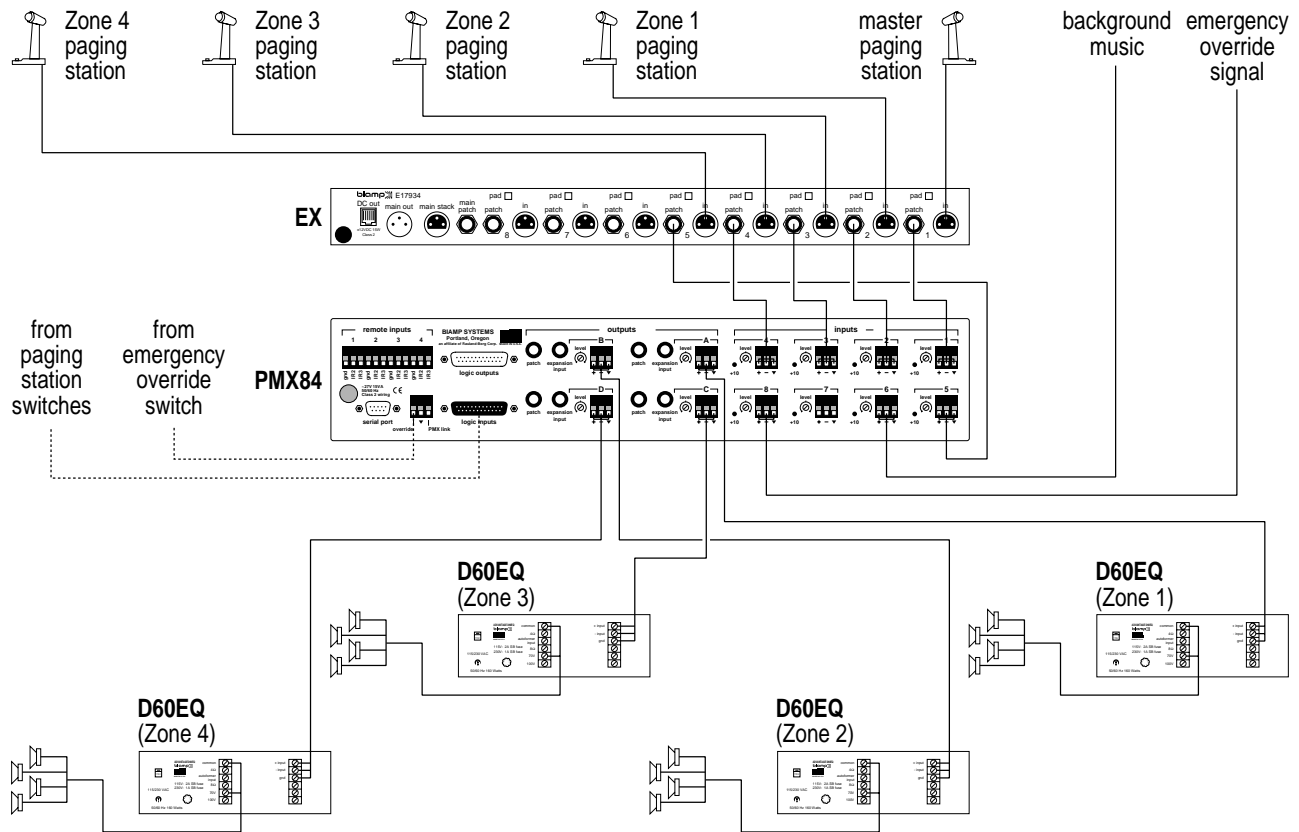
Programming of the PMX84 for this application can be done simply by opening & downloading a file (page1a.pmx) during Configuration. This application shows (1) master & (4) zone paging microphones connected to an Advantage EX module. The EX module provides the mic preamplification necessary before entering the PMX84 (line-level signals do not require preamplification). Unbalanced line-level signals from the EX Patch jacks (Channels 1~5) are then connected to Inputs 1~5 of the PMX84, respectively. A background music source is connected to Input 6 of the PMX84. Outputs A~D of the PMX84 are connected to inputs of Advantage D60EQs for Zones 1~4, respectively. The D60EQs provide amplification, equalization, & transformer output necessary for the distributed speakers in each zone. Routing switches at each of the paging stations are wired to the appropriate Logic Inputs on the PMX84 (see diagram at bottom of page). The Logic Inputs are programmed to perform the input/output assignments associated with their corresponding routing switches. The Logic Inputs are also programmed in 'four groups of four priority'. This allows each of the (4) zones to have its own (4) levels of priority. The first level of priority in each zone is 'all-call' paging from the master paging station. The second level of priority in each zone is 'zone' paging from the master paging station. The third level of priority in each zone is 'local' paging from the respective zone paging station. The fourth level of priority in each zone is 'background music', which can be turned on or off at the respective zone paging station.



# APPLICATIONS

## Zone Paging with Background Music & Emergency Override

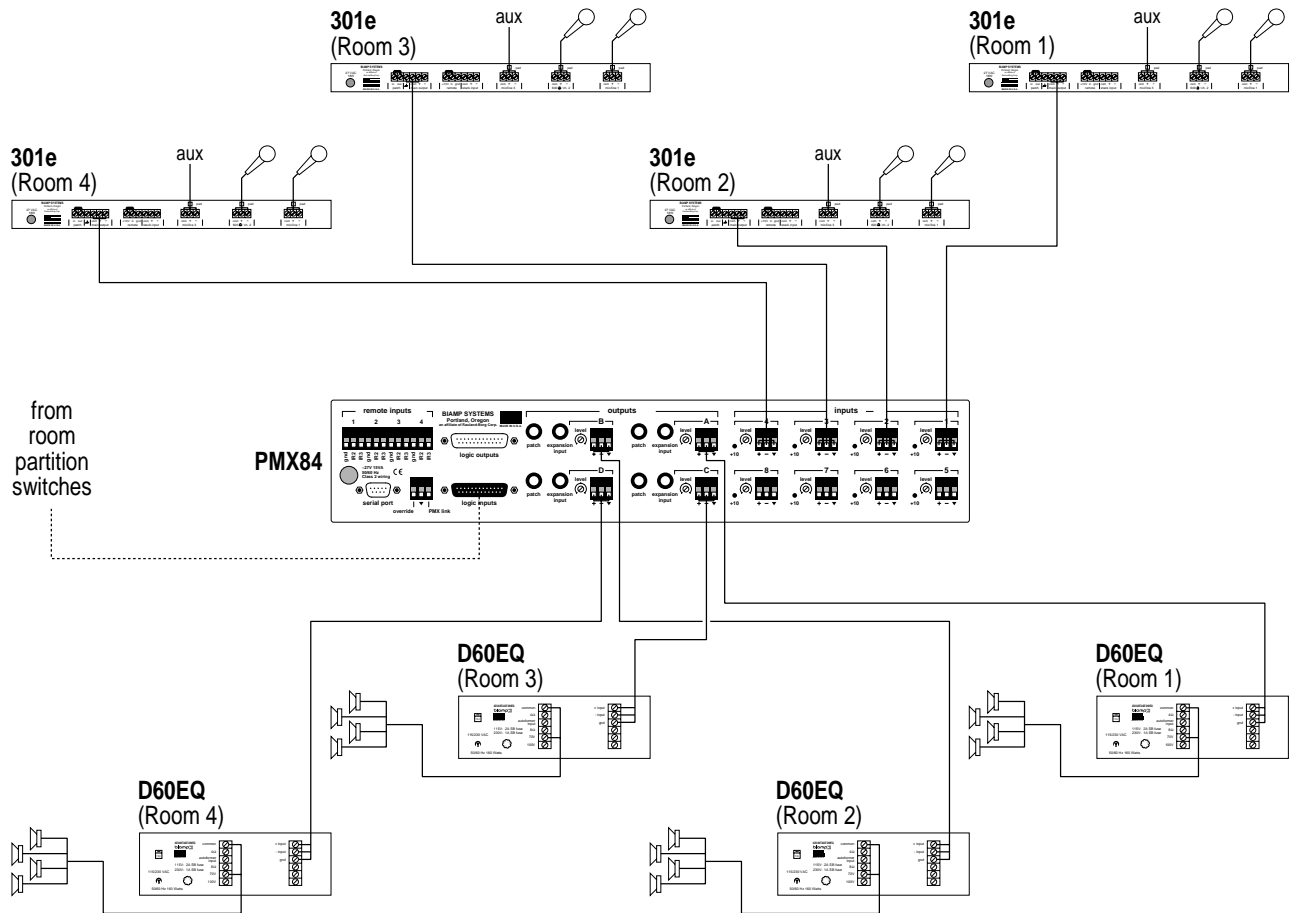
Programming of the PMX84 for this application can be done by simply opening & downloading a file (page1b.pmx) during Configuration. This application is identical to the application on the previous page, except that an emergency override signal has been added. The emergency override signal is connected to Input 8 of the PMX84, and an emergency override switch (or contact-closure) is connected between the Override terminal and the adjacent ground (▼) on the PMX84. Override is programmed to assign Input 8 to Outputs A~D. Override maintains a higher priority than any of the Logic Inputs. When Override is activated (shorted to ground), all paging & background music assignments will be shut off and the emergency override signal will be applied to all outputs. When Override is released (no longer shorted to ground), the PMX84 will automatically revert to its previous settings, and normal operation. The emergency override signal may be paging, an alarm, or a siren. If no emergency override signal is connected to Input 8 of the PMX84, the Override terminal will still provide an override function. Under these circumstances, Override will still shut off all paging & background music assignments, but no emergency signal will be applied to the outputs.



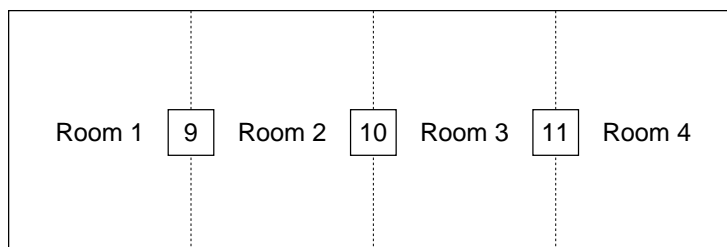
# APPLICATIONS

## 'In-Line' Room Combining

Programming of the PMX84 for this application can be done by simply opening & downloading a file (inline4a.pmx) during Configuration. This application shows (4) rooms in a row ('in-line'). Each room has (2) mics & (1) auxiliary input connected to an Advantage 301e. The 301e mic/line mixers provide mixing, remote level control, auto-muting of aux inputs, and balanced line-level outputs for Rooms 1~4. The 301e outputs for Rooms 1~4 are then connected to Inputs 1~4 of the PMX84, respectively. Outputs A~D of the PMX84 are connected to inputs of Advantage D60EQs for Rooms 1~4, respectively. The D60EQs provide amplification, equalization, & transformer output necessary for the distributed speakers in each room. CMA mixer/amplifiers may be used instead of the 301e mixers & D60EQ amplifiers. A switch on each room partition is wired to the appropriate Logic Input on the PMX84 (see diagram at bottom of page). The Logic Inputs are programmed for a 'binary' (room combining) mode. This allows the PMX84 to recognize the various room combinations, by reading the status of all three room partition switches. The Logic Inputs are also programmed to perform the input/output assignments associated with the various room combinations. Eight different room combinations are possible: 1 / 2 / 3 / 4; 1+2 / 3 / 4; 1 / 2+3 / 4; 1 / 2 / 3+4; 1+2 / 3+4; 1+2+3 / 4; 1 / 2+3+4; and 1+2+3+4. This same application can be used when combining only three rooms. Under these circumstances, use Inputs 1~3 and Outputs A~C for Rooms 1~3 respectively, and Logic Inputs 9 & 10 for the room partition switches.



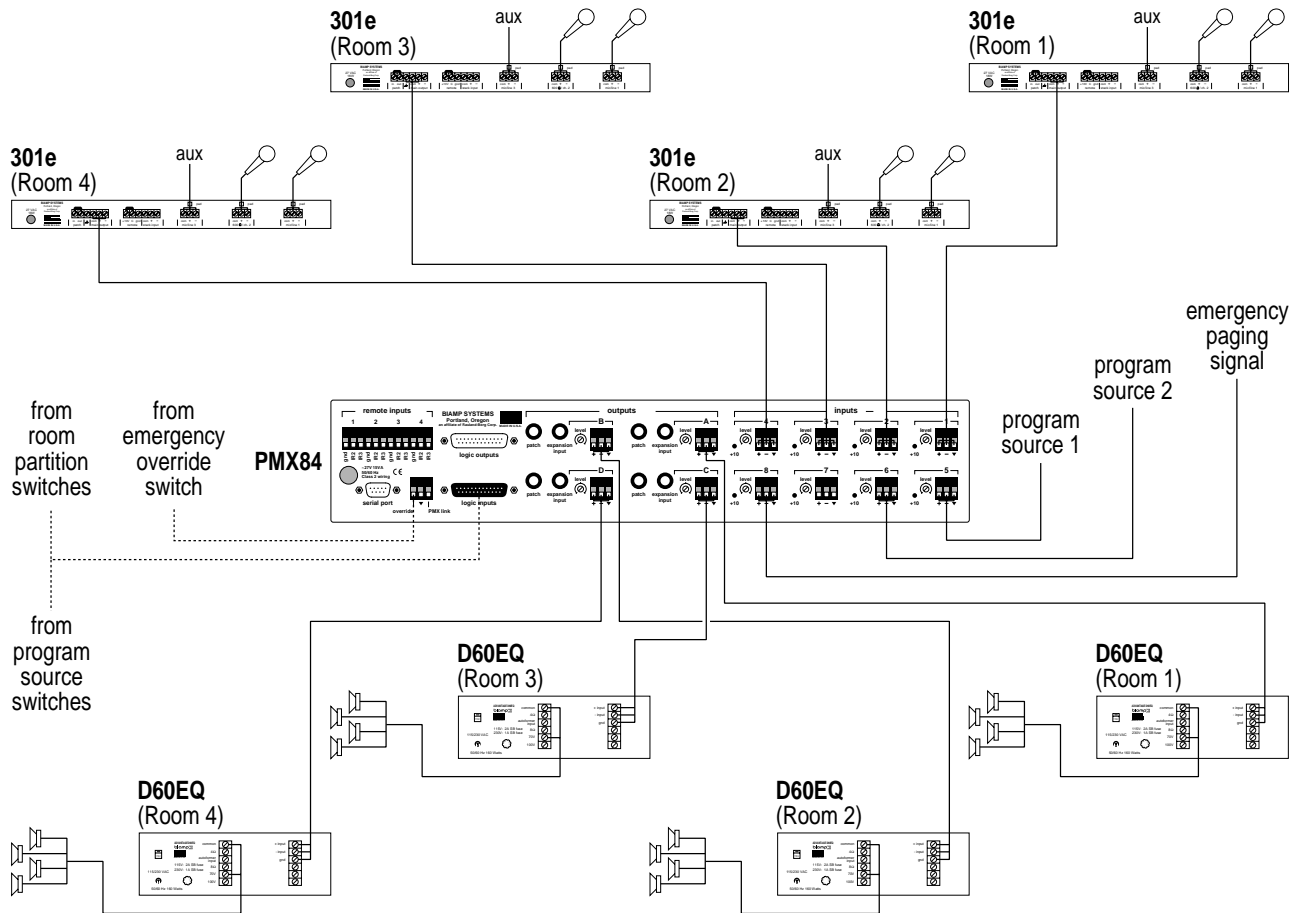
Room Configuration and Logic Input/Switch Assignments



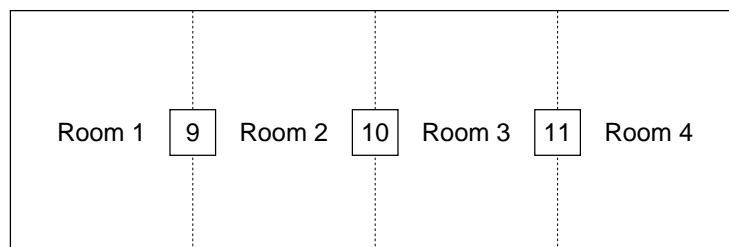
# APPLICATIONS

## 'In-Line' Room Combining with Program Sources & Emergency Paging

Programming of the PMX84 for this application can be done by simply opening & downloading a file ([inline4b.pmx](#)) during Configuration. This application is identical to the application on the previous page, except that (2) program sources and an emergency paging signal have been added. Program sources 1 & 2 are connected to Inputs 5 & 6 of the PMX84, respectively. Logic Inputs 1, 3, 5, & 7 are programmed to assign Input 5 to Outputs A~D, respectively. Logic Inputs 2, 4, 6, & 8 are programmed to assign Input 6 to Outputs A~D, respectively. Therefore, two switches may be located in each room, for the selection of program sources 1 & 2. An emergency paging signal is connected to Input 8 of the PMX84, and an emergency override (or contact-closure) is connected between the Override terminal and the adjacent ground (▼) on the PMX84. Override is programmed to assign Input 8 to Outputs A~D. Override maintains a higher priority than any of the Logic Inputs. When Override is activated (shorted to ground), all room & source signals will be shut off and the emergency override signal will be applied to all outputs. When Override is released (no longer shorted to ground), the PMX84 will automatically revert to its previous settings, and normal operation. The emergency paging signal may instead be an alarm or siren. If no emergency signal is connected to Input 8 of the PMX84, the Override terminal will still provide an override function. Under these circumstances, Override will still shut off all room & source signals, but no emergency signal will be applied to the outputs.



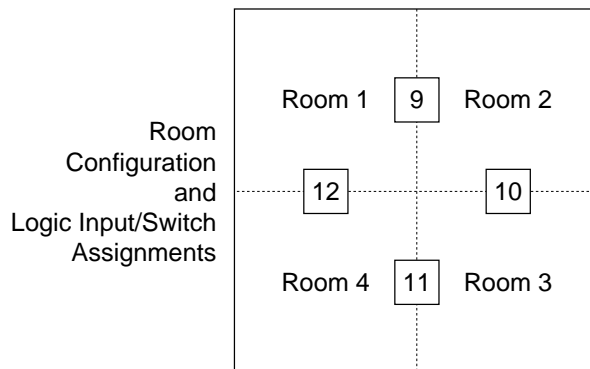
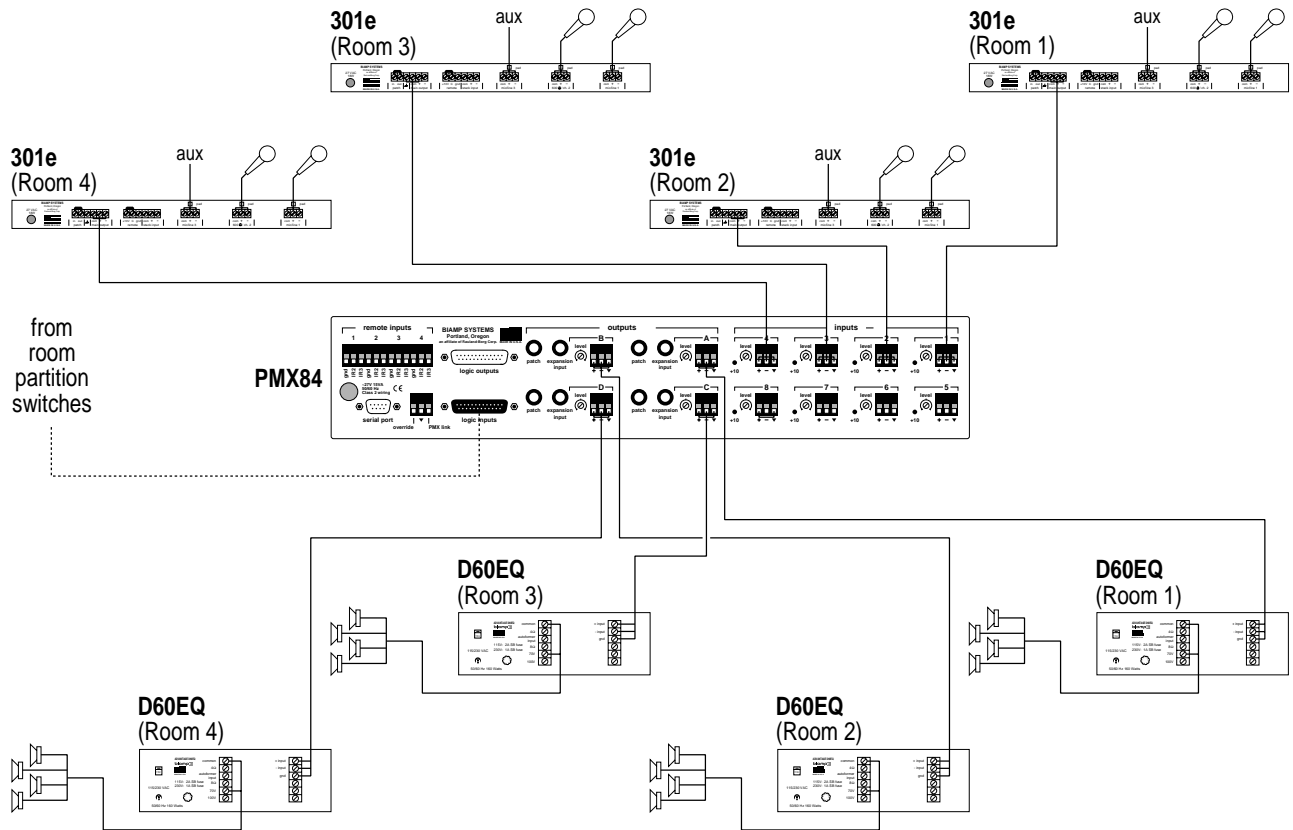
Room Configuration and Logic Input/Switch Assignments



# APPLICATIONS

## 'Square' Room Combining

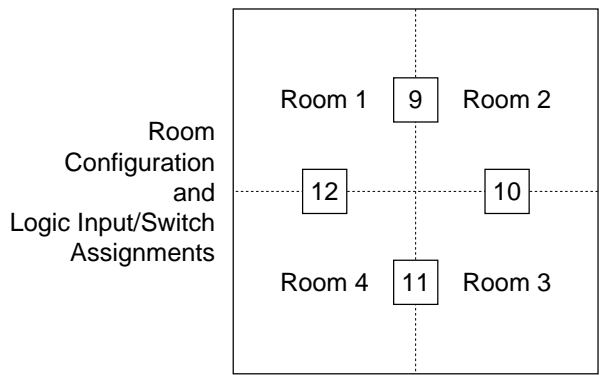
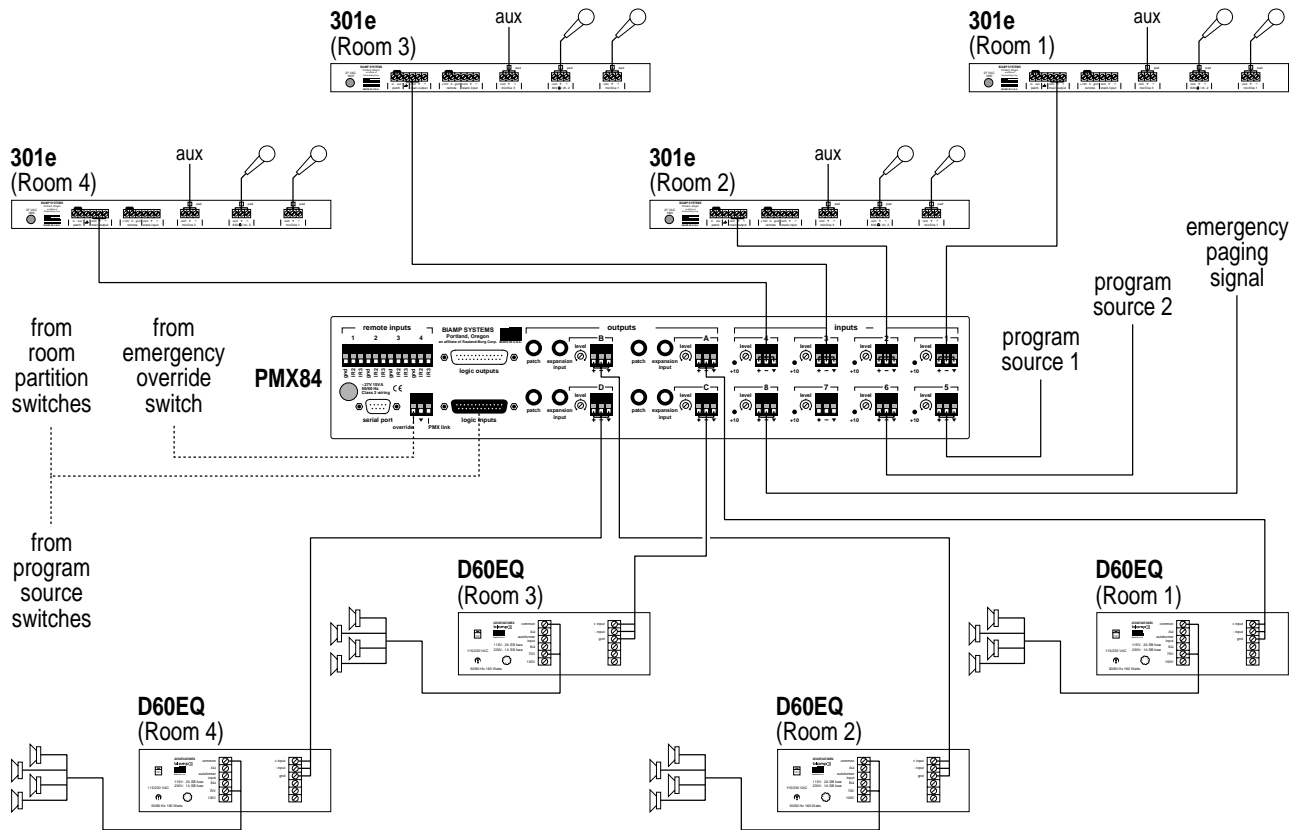
Programming of the PMX84 for this application can be done by simply opening & downloading a file (square1a.pmx) during Configuration. This application shows (4) rooms in a 'square'. Each room has (2) mics & (1) auxiliary input connected to an Advantage 301e. The 301e mic/line mixers provide mixing, remote level control, auto-muting of aux inputs, and balanced line-level outputs for Rooms 1~4. The 301e outputs for Rooms 1~4 are then connected to Inputs 1~4 of the PMX84, respectively. Outputs A~D of the PMX84 are connected to inputs of Advantage D60EQs for Rooms 1~4, respectively. The D60EQs provide amplification, equalization, & transformer output necessary for the distributed speakers in each room. CMA mixer/amplifiers may be used instead of the 301e mixers & D60EQ amplifiers. A switch on each room partition is wired to the appropriate Logic Input on the PMX84 (see diagram at bottom of page). The Logic Inputs are programmed for a 'binary' (room combining) mode. This allows the PMX84 to recognize the various room combinations, by reading the status of all four room partition switches. The Logic Inputs are also programmed to perform the input/output assignments associated with the various room combinations. Twelve practical room combinations are available: 1 / 2 / 3 / 4; 1+2 / 3 / 4; 1 / 2+3 / 4; 1 / 2 / 3+4; 4+1 / 2 / 3; 1+2+3 / 4; 1 / 2+3+4; 1+3+4 / 2; 1+2+4 / 3; 1+2 / 3+4; 1+4 / 2+3; and 1+2+3+4. Whenever a single room partition is closed (no rooms isolated), the PMX84 is programmed to assume all rooms are combined (1+2+3+4).

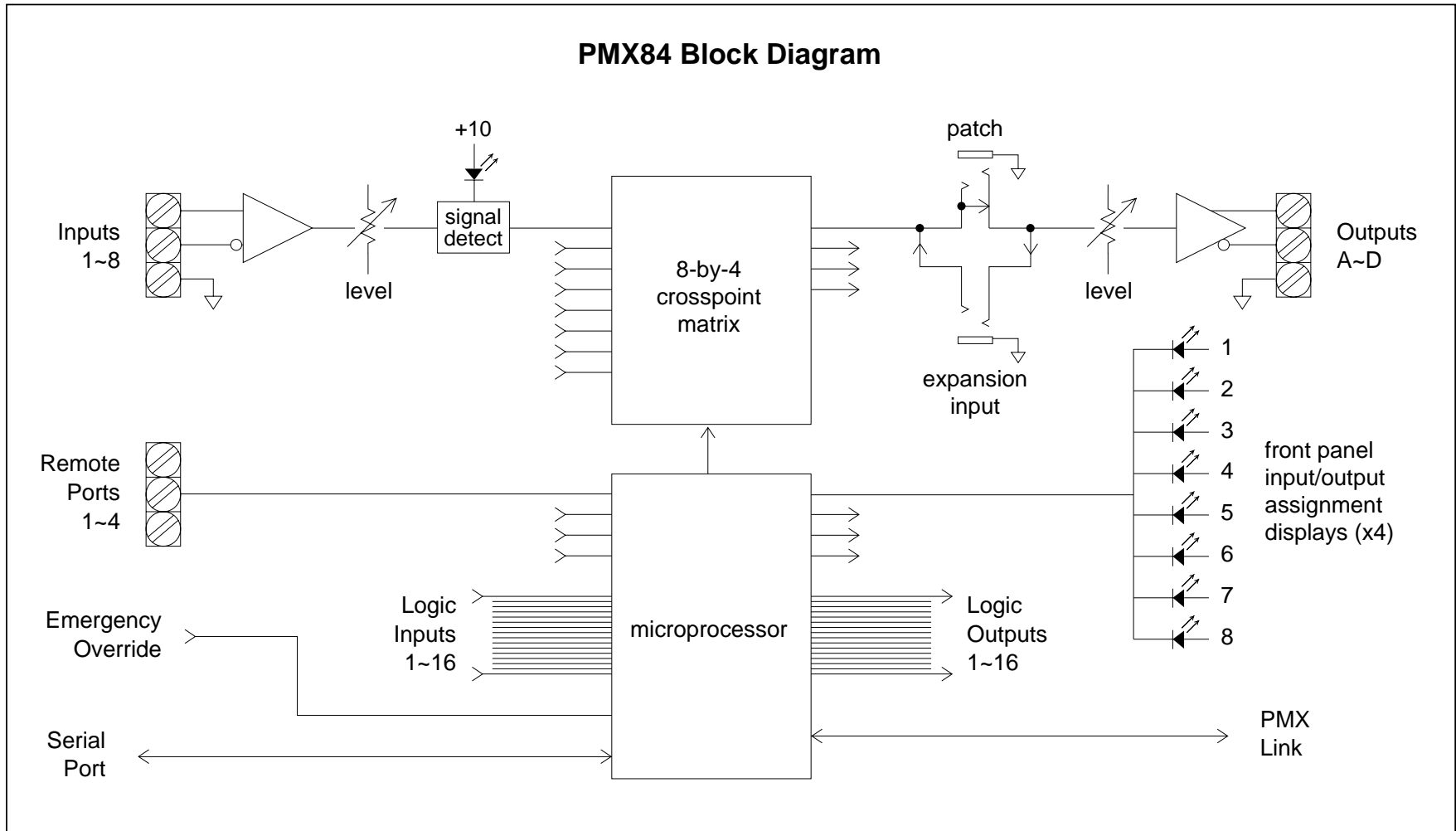


# APPLICATIONS

## 'Square' Room Combining with Program Sources & Emergency Paging

Programming of the PMX84 for this application can be done by simply opening & downloading a file (square1b.pmx) during Configuration. This application is identical to the application on the previous page, except that (2) program sources and an emergency paging signal have been added. Program sources 1 & 2 are connected to Inputs 5 & 6 of the PMX84, respectively. Logic Inputs 1, 3, 5, & 7 are programmed to assign Input 5 to Outputs A-D, respectively. Logic Inputs 2, 4, 6, & 8 are programmed to assign Input 6 to Outputs A-D, respectively. Therefore, two switches may be located in each room, for the selection of program sources 1 & 2. An emergency paging signal is connected to Input 8 of the PMX84, and an emergency override switch (or contact-closure) is connected between the Override terminal and the adjacent ground (▼) on the PMX84. Override is programmed to assign Input 8 to Outputs A-D. Override maintains a higher priority than any of the Logic Inputs. When Override is activated (shorted to ground), all room & source signals will be shut off and the emergency override signal will be applied to all outputs. When Override is released (no longer shorted to ground), the PMX84 will automatically revert to its previous settings, and normal operation. The emergency paging signal may instead be an alarm or siren. If no emergency signal is connected to Input 8 of the PMX84, the Override terminal will still provide an override function. Under these circumstances, Override will still shut off all room & source signals, but no emergency signal will be applied to the outputs.





## SPECIFICATIONS

---

<b>Frequency Response</b> (20Hz~20kHz @ +4dBu):	+0/-0.2dB
<b>Total Harmonic Distortion</b> (20Hz~20kHz @ +4dBu):	< 0.007%
<b>Output Noise</b> (20Hz~20kHz @ unity gain):	
one input assigned	-93dBu
eight inputs assigned	-87dBu
<b>Maximum Gain</b> (input & output level controls max.):	+20dB
<b>Input Level Control Range:</b>	-∞~+10dB
<b>Output Level Control Range:</b>	-∞~+10dB
<b>Input Impedance:</b>	
input (balanced)	20k ohms
patch (unbalanced - level control dependent)	7k~25k ohms
expansion in (unbalanced)	20k ohms
<b>Maximum Input:</b>	
input	+18dBu
patch	+18dBu
expansion in	+18dBu
<b>Output Impedance:</b>	
output (balanced)	200 ohms
patch (unbalanced)	50 ohms
<b>Maximum Output:</b>	
output (balanced)	+24dBu
patch (unbalanced)	+18dBu
<b>Input Off Attenuation</b> (20Hz~20kHz @ +4dBu):	-60dB
<b>Logic Inputs</b> (TTL compatible):	5V
<b>Logic Outputs</b> (open collector):	24V / 50mA max.
<b>Power Requirements:</b>	115/230V @ 50/60Hz
<b>Power Consumption:</b>	< 15 Watts
<b>Dimensions:</b>	
height (2 rack-spaces)	3.5" (89mm)
width	19" (483mm)
depth	7.5" (191mm)
<b>Weight:</b>	8.0 lbs. (3.63kg)

---



## WARRANTY

---

### BIAMP SYSTEMS IS PLEASED TO EXTEND THE FOLLOWING 5-YEAR LIMITED WARRANTY TO THE ORIGINAL PURCHASER OF THE PROFESSIONAL SOUND EQUIPMENT DESCRIBED IN THIS MANUAL.

BIAMP Systems expressly warrants this product to be free from defects in material and workmanship for a period of 5 YEARS from the date of purchase as a new product from an authorized BIAMP Systems dealer under the following conditions.

1. The Purchaser is responsible for completing and mailing to BIAMP Systems, within 10 days of purchase, the attached warranty application.
2. In the event the warranted BIAMP Systems product requires service during the warranty period, BIAMP Systems will repair or replace, at its option, defective materials, provided you have identified yourself as the original purchaser of the product to any authorized BIAMP Systems Service Center. Transportation and insurance charges to and from an authorized Service Center or the BIAMP Systems factory for warranted products or components thereof to obtain repairs shall be the responsibility of the purchaser.
3. This warranty will be VOIDED if the serial number has been removed or defaced; or if the product has been subjected to accidental damage, abuse, rental usage, alterations, or attempted repair by any person not authorized by BIAMP Systems to make repairs; or if the product has been installed contrary to BIAMP Systems's recommendations.
4. Electro-magnetic fans, electrolytic capacitors, and the normal wear and tear of appearance items such as paint, knobs, handles, and covers is not covered under this warranty.
5. BIAMP SYSTEMS SHALL NOT IN ANY EVENT BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, LOSS OF USE, PROPERTY DAMAGE, INJURY TO GOODWILL, OR OTHER ECONOMIC LOSS OF ANY SORT. EXCEPT AS EXPRESSLY PROVIDED HEREIN, BIAMP SYSTEMS DISCLAIMS ALL OTHER LIABILITY TO PURCHASER OR ANY OTHER PERSONS ARISING OUT OF USE OR PERFORMANCE OF THE PRODUCT, INCLUDING LIABILITY FOR NEGLIGENCE OR STRICT LIABILITY IN TORT.
6. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED. BIAMP SYSTEMS EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE REMEDIES SET FORTH HEREIN SHALL BE THE PURCHASER'S SOLE AND EXCLUSIVE REMEDIES WITH RESPECT TO ANY DEFECTIVE PRODUCT. THE AGENTS, EMPLOYEES, DISTRIBUTORS, AND DEALERS OF BIAMP SYSTEMS ARE NOT AUTHORIZED TO MODIFY THIS WARRANTY OR TO MAKE ADDITIONAL WARRANTIES BINDING ON BIAMP SYSTEMS. ACCORDINGLY, ADDITIONAL STATEMENTS SUCH AS DEALER ADVERTISEMENTS OR REPRESENTATIONS DO NOT CONSTITUTE WARRANTIES BY BIAMP SYSTEMS.
7. No action for breach of this warranty may be commenced more than one year after the expiration of this warranty.

Thank you for purchasing BIAMP SYSTEMS...  
AMERICAN SOUND CRAFTSMANSHIP

Biamp Systems  
10074 S.W. Arctic Drive  
Beaverton, Oregon 97005 U.S.A.  
(503) 641-7287  
<http://www.biamp.com>