

**DRI**  
**Digital Remote**  
**Interface**  
**operation manual**

advantage ®

## TABLE OF CONTENTS

Front Panel	pg. 2
Rear Panel	pg. 3
Control Voltage Outputs	pgs. 4-5
Remote Controls	pgs. 6-7
Setup	pgs. 8-11
Logic Inputs	pgs. 12-13
RS-232 Control	pg. 14-15
Applications	pg. 16-17
Specifications & Block Diagram	pg. 18
Warranty	pg. 19

## INTRODUCTION

ADVANTAGE® DRI Digital Remote Interface provides microprocessor control to ADVANTAGE® DLA93 & RCII products. The DRI accepts control via contact-closures, infrared, wall-mount & custom panels, computer, and/or third-party controllers. The DRI provides control voltages & logic outputs. Software & cables are included for programming & control. Control buttons & presets are definable. The DRI is covered by a five-year warranty.

DRI features include:

- ◆ provides advanced control options for ADVANTAGE® DLA93
- ◆ provides advanced control options for ADVANTAGE® RCII
- ◆ up to twelve 0-10VDC outputs for controlling external VCAs
- ◆ 'user definable' upper & lower voltage limits for each output
- ◆ up to two logic outputs for switching of external circuits
- ◆ eight non-volatile memory presets (user specified functions)
- ◆ forty possible button definitions (presets, levels, muting, etc.)
- ◆ eight 'user definable' logic inputs for contact-closure control
- ◆ remote port for infrared, wall-mount, or custom panel control
- ◆ RS-232 serial port for computer or third-party controllers
- ◆ PC control software for Windows® 95 & serial cable included
- ◆ device number switch & link port for controlling multiple units
- ◆ baud rate switch provides choice of communications rates
- ◆ optional remote display panels indicate 8 levels & 4 presets
- ◆ modular ±12 Volt DC Out jack for powering external devices
- ◆ front panel indicators for remote activity, errors, & power
- ◆ 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**.

**E-mail:** [biamp@biamp.com](mailto:biamp@biamp.com) **Web-Site:** [www.biamp.com](http://www.biamp.com)



## FRONT PANEL

---

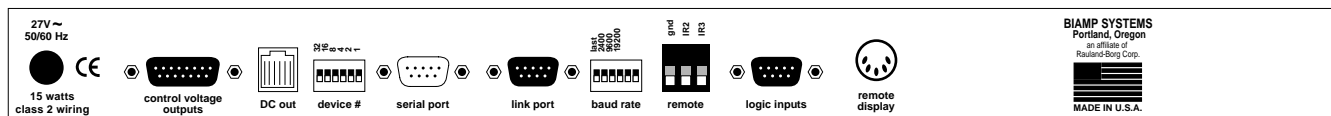


**Error:** This red LED indicates unusable information is being received via remote control (see Remote on pg. 3). If an error in transmission/reception of a remote control command occurs, the Error indicator will flash.

**Remote:** This red LED indicates information is being received via remote control (see Remote & Logic Inputs on pg. 3). If the Remote and Error indicators flash simultaneously, this may be an indication of improper installation. Check the location and wiring of all remote controls.

**On:** This red LED indicates power is applied to the unit.

## REAR PANEL



**AC Power Cord:** The power transformer provides 27 Volts AC to the DRI, and is detachable via a 5-pin DIN connector. The DRI has two internal 'self-resetting' fuses (there are no user servicable 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 DRI requires service.

**Control Voltage Outputs:** This 15-pin Sub-D (female) connector provides up to twelve 0~+10 Volt DC control voltages, and up to two logic outputs (see Control Voltage Outputs on pg. 4). Control Voltage Outputs have the following pin assignments (right-to-left & top-to-bottom): **Pins 1 ~11)** Control Voltage Outputs 1~11; **Pin 12)** not used; **Pin 13)** Logic Output 1; **Pin 14)** Logic Output 2; **Pin 15)** Ground. When controlling an ADVANTAGE® DLA93, the DRI Control Voltage Outputs are connected directly to the DLA93 Remote Control connector, using the 'inter-connect' cable provided with the DRI. The DRI controls the following DLA93 functions: Channel 1~8 level; Aux Input level; Main Output level; Aux 1 Output level; Master/Slave switching; and Auto/Manual switching. When controlling ADVANTAGE® RCII's, Logic Output 2 may be converted to Control Voltage Output 12, via an internal jumper strap (see Control Voltage Outputs on pg. 4). A custom cable is then wired from the DRI Control Voltage Outputs to the appropriate control terminals of the RCII's. Each Control Voltage Output can be used to control single or multiple RCII channels.

**DC Out:** This 6-pin Modular jack supplies  $\pm 12$  Volts DC, for powering external accessory devices. DC Out provides 150mA maximum current.

**Device #:** This 6-gang DIP switch allows the DRI to be assigned a specific device number. Up to 64 different device numbers (0~63) may be assigned to allow RS-232 control of multiple ADVANTAGE® products in a common system. From the factory, the DRI is assigned Device # 1.

**Serial Port:** This 9-pin Sub-D (male) connector provides an RS-232 Serial Port for remote control via computer or third-party controllers (see RS-232 Control on pg. 14). The Serial Port has the following pin assignments (left-to-right & top-to-bottom): **Pin 1)** not used; **Pin 2)** Receive Data (Rx) input; **Pin 3)** Transmit Data (Tx) output; **Pin 4)** Data Terminal Ready (DTR) output; **Pin 5)** Ground; **Pin 6)** not used; **Pin 7)** Request To Send (RTS) output; **Pin 8)** not used; **Pin 9)** not used. PC Control Software and a serial cable are provided for programming via Windows® 95 (see Setup on pg. 8). **NOTE:** *The Serial Port can also transmit commands which are received via Remote & Logic Inputs (see Setup on pgs. 8 & 9).*

**Link Port:** This 9-pin Sub-D (female) connector provides a Link Port for RS-232 control of multiple ADVANTAGE® products (see RS-232 Control on pg. 15). The Link Port of one device simply connects to the Serial Port of the next device (and so forth). Link cables are available as an option (Biamp #909-0057-00). **NOTE:** *All but the final device in a system should have its 'last' switch down (see Baud Rate). The Link Port has the following pin assignments* (right-to-left & top-to-bottom): **Pin 1)** not used; **Pin 2)** Transmit Data (Tx) output; **Pin 3)** Receive Data (Rx) input; **Pin 4)** not used; **Pin 5)** Ground; **Pin 6)** not used; **Pin 7)** not used; **Pin 8)** not used; **Pin 9)** not used. **NOTE:** *The Link Port will also transmit commands which are received via Remote & Logic Inputs (see Setup on pgs. 8 & 9).*

**Baud Rate:** This 6-gang DIP switch allows the DRI to be assigned a specific communications baud rate. Baud rates available are 2400, 9600, & 19200 bps. The factory default is 9600 bps. Only one baud rate should be selected at a time, by raising the corresponding switch. The two switches on the far right are not used. The switch on the far left (labelled 'last') is used when connecting multiple devices in a 'Link Port to Serial Port' configuration (see Link Port). From the factory, the 'last' switch is up. When connecting multiple devices, the 'last' switch must be switched down on all devices except the final ('last') device in the system (the device with no Link Port connection).

**Remote:** This plug-in barrier strip accepts commands from optional remote controls (see Remote Controls on pg. 6). Remote Controls may be infrared, wall-mount, or custom panels, and may be wired up to 2000 feet away from the DRI. From the factory, remote controls provide control of DLA93 functions (as described above). However, the DRI may be programmed (via PC Control Software) to perform customized functions (see Setup on pg. 8).

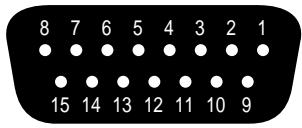
**Logic Inputs:** This 9-pin Sub-D (female) connector provides eight logic inputs for controlling the DRI via contact-closures (see Logic Inputs on pg. 12). Logic Inputs have the following pin assignments (right-to-left & top-to-bottom): **Pins 1~4)** Logic Inputs 1~4; **Pins 5)** switch ground point; **Pins 6~9)** Logic Inputs 5~8. Logic Input functions may be programmed using the PC Control Software and serial cable provided with the DRI (see Setup on pg. 8). From the factory, Logic Inputs 1~8 are programmed to recall presets 1~8 respectively.

**Remote Display:** This 5-pin DIN (female) connector provides an output for optional Remote Display Panels (see Remote Controls on pg. 7).

## CONTROL VOLTAGE OUTPUTS

Control Voltage Outputs is a 15-pin Sub-D (female) connector, which provides up to twelve 0~+10 Volt DC variable control voltages, and up to two logic outputs. These control voltages & logic outputs provide control of ADVANTAGE® DLA93 and RCII products, as well as other 'voltage controlled' and/or 'logic controlled' devices. The control voltage & logic output settings are themselves manipulated using Remote Controls (see pg. 6), Logic Inputs (see pg. 12), and/or RS-232 (see pg. 14).

Control Voltage Outputs have the following pin assignments (right-to-left & top-to-bottom): **Pins 1 ~11** Control Voltage Outputs 1~11; **Pin 12** not used; **Pin 13** Logic Output 1; **Pin 14** Logic Output 2 (Control Voltage Output 12); **Pin 15** Ground.



- |                                   |                                     |                                     |
|-----------------------------------|-------------------------------------|-------------------------------------|
| <b>pin #1</b> = Control Voltage 1 | <b>pin #6</b> = Control Voltage 6   | <b>pin #11</b> = Control Voltage 11 |
| <b>pin #2</b> = Control Voltage 2 | <b>pin #7</b> = Control Voltage 7   | <b>pin #12</b> = not used           |
| <b>pin #3</b> = Control Voltage 3 | <b>pin #8</b> = Control Voltage 8   | <b>pin #13</b> = Logic Output 1     |
| <b>pin #4</b> = Control Voltage 4 | <b>pin #9</b> = Control Voltage 9   | <b>pin #14</b> = Logic Output 2 *   |
| <b>pin #5</b> = Control Voltage 5 | <b>pin #10</b> = Control Voltage 10 | <b>pin #15</b> = ground             |

### control voltage outputs

\* Logic Output 2 ( pin #14) can be converted to Control Voltage 12 via an internal jumper (see below).

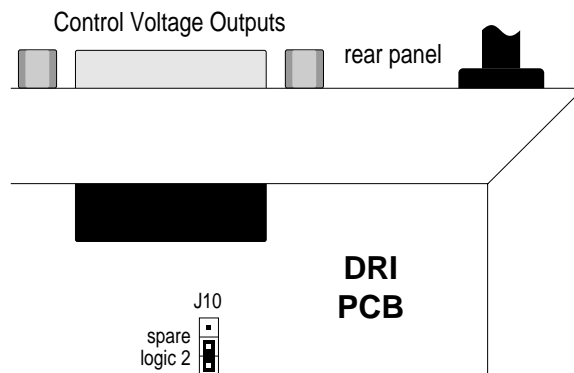
From the factory, the DRI is programmed for controlling an ADVANTAGE® DLA93 (or DLA93tc) Digital-Logic Automixer. When controlling a DLA93, the DRI Control Voltage Outputs are connected directly to the Remote Control connector on the rear panel of the DLA93, using the 'inter-connect' cable provided with the DRI (see Applications on pg. 16).

Under these circumstances, the DRI Control Voltage Outputs & Logic Outputs control the following DLA93 functions: **Control Voltage Outputs 1~8**) Channel 1~8 levels; **Control Voltage Output 9**) Aux Input level; **Control Voltage Output 10**) Main Output level; **Control Voltage Output 11**) Aux 1 Output level; **Logic Output 1**) Master/Slave switching; **Logic Output 2**) Auto/Manual switching. See the DLA93 Operation Manual for a more in-depth description of these functions.

The DRI Control Voltage Outputs may instead be programmed for controlling other 'voltage controlled' devices, such as ADVANTAGE® RCII 4-Channel VCA Remote Controls (see Setup on pg. 8).

When controlling ADVANTAGE® RCII's, Logic Output 2 may be converted to Control Voltage Output 12, via an internal jumper strap (see below). A custom cable is then wired from the DRI Control Voltage Outputs to the appropriate control terminals of the RCII's (see Applications on pg. 17). Each Control Voltage Output can be used to control single or multiple RCII channels (see diagram on next page).

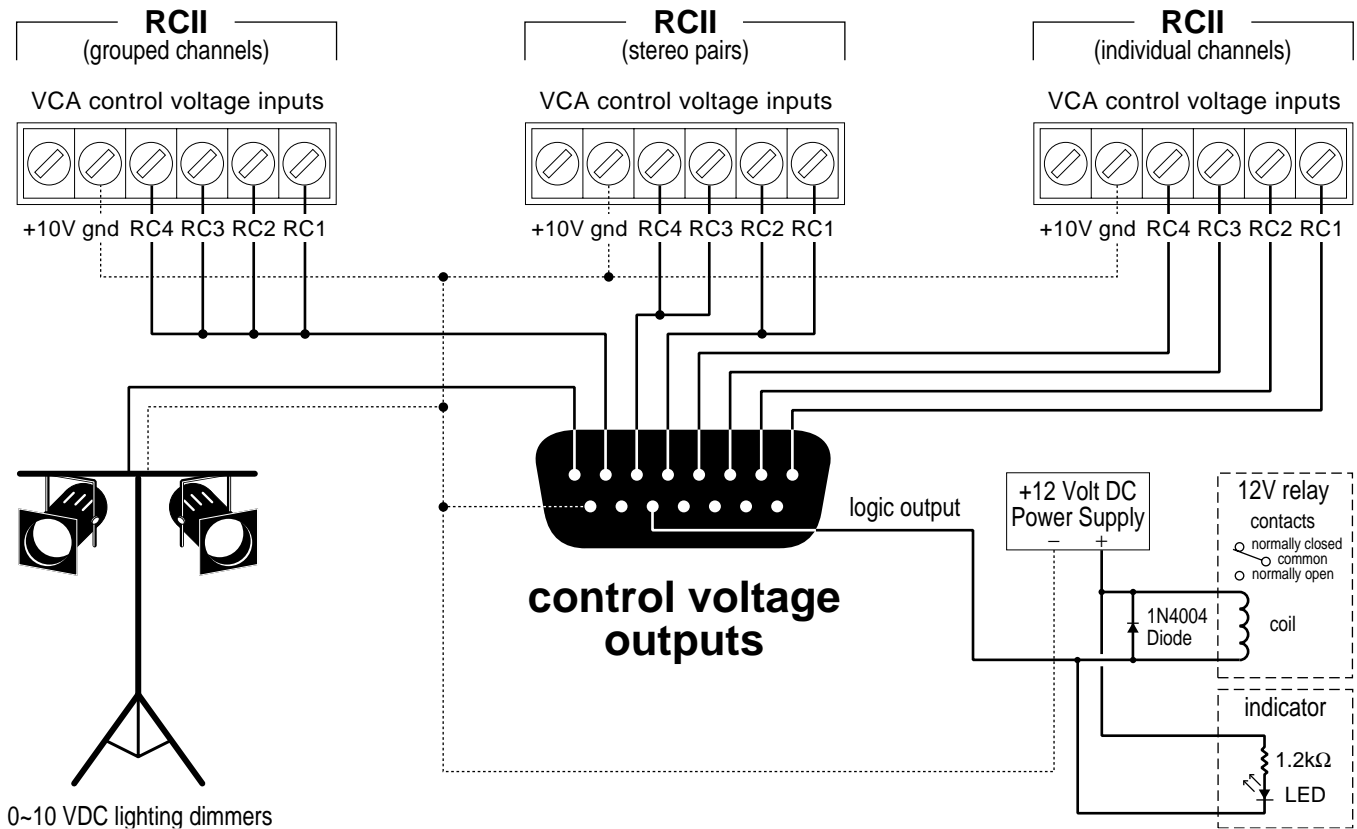
To convert Logic Output 2 to Control Voltage 12: **1)** Disconnect the DRI power transformer from the AC outlet. **2)** Lay the DRI on a flat surface, with the top panel facing up and the rear panel facing away. **3)** Remove the top panel, which is secured with six screws. **4)** Find jumper J10 (located at the right-rear corner of the circuit board, in front of the Control Voltage Outputs connector). **5)** Using needle-nose pliers, move the jumper strap one pin towards the rear panel (to the 'spare' position). **6)** Replace & secure the top panel. **NOTE:** To convert Control Voltage 12 back to Logic Output 2, simply move the jumper strap one pin towards the front panel (to the 'logic 2' position).



## CONTROL VOLTAGE OUTPUTS

Each Control Voltage Output has a range of 0~+10 Volts DC, with a maximum current capability of 4mA. Upper & lower voltage limits may be set for each Control Voltage Output (see Setup on pg. 8). Logic Outputs 1 & 2 are open collector/negative true logic outputs, with a maximum sink current of 50mA and a maximum collector voltage of +24 Volts DC.

Logic Outputs 1 & 2 are NPN transistors, with the collectors being the output and the emitters being ground. When a Logic Output is turned on, the transistor provides a path for DC current to flow. Logic Outputs do not provide any voltage or current. They act only as switches, with a common ground return. Logic Outputs can be used to control external circuits, such as relays & indicators (see diagram below). Logic Outputs may be combined (wired in parallel) to control a common circuit, or individually they may be used to control multiple circuits. When using Logic Outputs to control relays, protection diodes must be used to suppress high voltage transients that are generated when the relays turn off. **NOTE:** 12 Volt Power Supplies (#909-0011-00), 12 Volt relays (#520-0064-00), and 1N4004 diodes (#190-0003-09) are available from Biamp Systems.

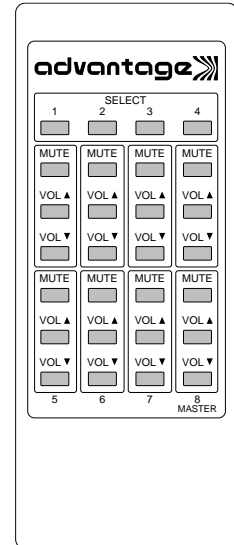


## REMOTE CONTROLS

The type and quantity of remote controls is optional for the DRI. Remote controls affect Control Voltage Outputs & Logic Outputs of the DRI. Remote controls may be added at any time, and do not require the DRI to be modified, opened, or removed from a rack. There are five types of remote controls available: The Infrared Transmitter, the Infrared Receiver, the Wall-Mount Panel, the Remote Interface Kit, and the Remote Display Panel. The DRI may also be controlled via external contact-closures and RS-232.

**NOTE:** Remote controls come with complete instructions.

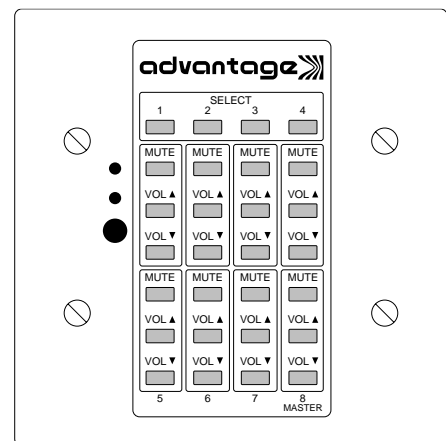
**Infrared Transmitter** (Biamp #909-0061-00): The transmitter is a hand-held control, which transmits infrared codes unique to Biamp. Therefore, the transmitter should not affect any other infrared controlled equipment (such as TVs or VCRs). Likewise, other infrared controllers will not provide proper control of Biamp equipment. The transmitter requires two AAA batteries, which are included with the unit (user installed). The transmitter has twenty-eight buttons. From the factory, the DRI is programmed for controlling an ADVANTAGE® DLA93. The Select 1-4 buttons are used to recall presets 1~4. The eight sets of MUTE, VOL ▲, and VOL ▼ buttons provide volume up, volume down, and volume off functions for Channels 1~7 and the Main Output (Master). The DRI may be programmed (via PC Control Software) for controlling other functions of the DLA93, or other VCA devices such as ADVANTAGE® RCII's (see Setup on pg. 8). 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. When infrared information is transmitted to a receiver, the Remote indicator on the DRI front panel will flash.



**External Infrared Receiver** (Biamp #909-0030-00): The receiver consists of a black plastic box, which contains an infrared photo detector, an LED indicator, and three screw terminals. To install the receiver, first take off the front cover by removing the 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. 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 DRI, using 2-conductor shielded cable (not included). Route the cable through the access hole on the bottom of the receiver. The three screw terminals inside the receiver ("GND", "IR2", & "IR3") directly correspond to the Remote terminals on the rear panel of the DRI. Connect the cable shield to the "GND" terminal at each end. Use the two conductors to connect "IR2" to "IR2" and "IR3" to "IR3". Replace the receiver front cover. The LED indicator inside the receiver will flash whenever infrared information is detected. **NOTE:** The Infrared Receiver includes a "Remote Translator", which allows remote control of ADVANTAGE® products via third-party controllers (complete instructions are included with the receiver).



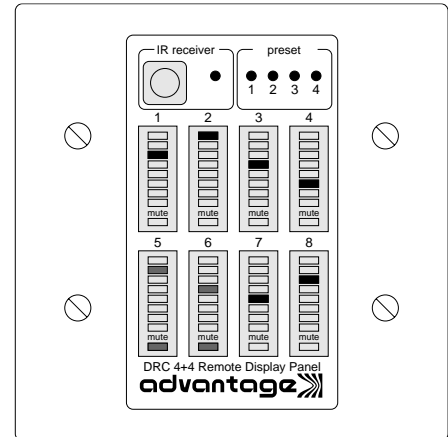
**Wall-Mount Panel** (Biamp #909-0071-00): The wall-mount is a "hard-wired" control, which receives power from the DRI. There are no batteries to wear out, and it is not easily lost or stolen. The wall-mount may be wired up to 2000 feet from the DRI, using 2-conductor shielded cable (not included). Remove 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. The three screw terminals on the circuit board ("GND", "IR2", & "IR3") directly correspond to the Remote terminals on the rear panel of the DRI. Connect the cable shield to the "GND" terminal at each end. Use the two conductors to connect "IR2" to "IR2" and "IR3" to "IR3". Install the front panel in the mounting box. The wall-mount has twenty-eight buttons. From the factory, the DRI is programmed for controlling an ADVANTAGE® DLA93. The Select 1-4 buttons are used to recall presets 1~4. The eight sets of MUTE, VOL ▲, and VOL ▼ buttons provide volume up, volume down, and volume off functions for Channels 1~7 and the Main Output (Master). The DRI may be programmed (via PC Control Software) for controlling other functions of the DLA93, or other VCA devices such as ADVANTAGE® RCII's (see Setup on pg. 8). When the DRI is turned on, power is delivered to the wall-mount and the green LED indicator will light. The red LED indicator on the wall-mount (and the Remote indicator on the DRI front panel) will flash whenever a button is pressed. The wall-mount also includes an infrared detector, which allows it to operate as an External Infrared Receiver as well. The infrared detector may be disabled via a circuit board jumper strap.



## REMOTE CONTROLS

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

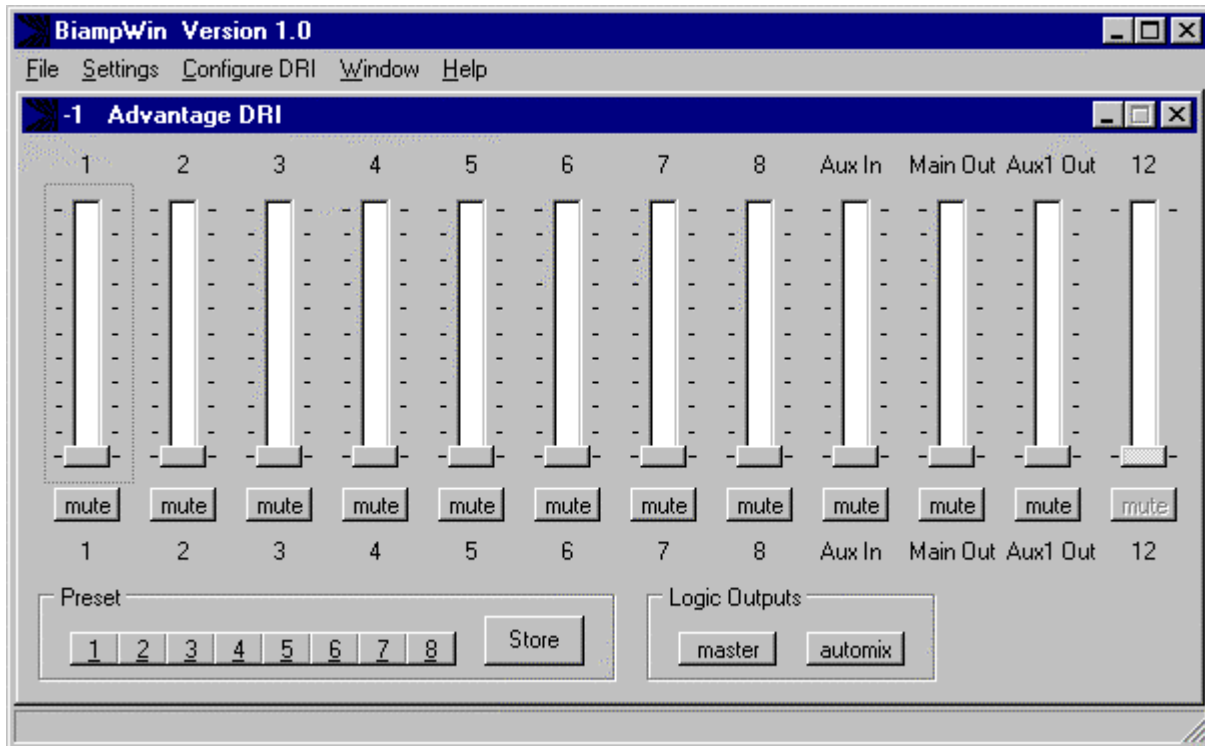
**Remote Display Panels** (Biamp #909-0081-00): Remote Display Panels are hard-wired, wall-mount panels, which provide a visual indication of which DRI preset (1~4) is currently selected, and the relative level settings of eight DRI Control Voltage Outputs. When a preset mix has been selected, the respective Preset 1~4 indicator will light. LED ladders indicate the relative level settings for eight Control Voltage Outputs (Channels 1~7 & Main Output of a DLA93). The particular Control Voltage Outputs (channels/outputs) to be displayed may be programmed using the PC Control Software and serial cable provided with the DRI (see Setup on pg. 11). These are not signal level meters. Only one LED in each ladder will be on, indicating the level ('fader') setting for that channel. However, when a channel is muted, the relative level LED and the 'mute' (bottom) LED will both remain dimly lit. The relative level LED indicates the level to which that channel will return when it is un-muted. Volume down commands will still affect the relative level setting of a channel that is muted. However, volume up commands will instead un-mute the channel. Remote Display Panels also include an infrared detector, which can be wired separately to the Remote input on the DRI, and will operate as an Infrared Receiver. The adjacent LED will flash whenever infrared information is detected. Remote Display Panels are connected to a DRI through a separate **Remote Display Controller** (Biamp #909-0080-00). Remote Display Panels can be wired up to 2000 feet from a Remote Display Controller using 4-conductor shielded cable (not included). To install Remote Display Panels, first remove mounting box from front panel. Route cable through "knock-out" hole on rear of mounting box. Install mounting box in wall or panel (see next page). Five screw terminals on circuit board ("POWER GROUND", "+10v", "SHIELD", "DATA+", & "DATA-") correspond to terminals inside Remote Display Controller. Connect cable shield to "SHIELD" terminals at each end. Use conductors to connect "POWER GROUND" to "POWER GROUND", "+10V" to "+10V", "DATA+" to "DATA+", & "DATA-" to "DATA-". **CAUTION:** The combined resistance of the 'POWER GROUND' & '+10V' conductors must not exceed 32 ohms (16 ohms per conductor). **NOTE:** Make sure that the Remote Display Controller circuit board jumper straps are in the following positions (J1 & J2 = 'HI-Z'; J3 & J4 = 'DOWN'; J5 = 'OFF'). Jumper strap (J4) must be moved to the 'DOWN' position for DRI (DRC 4+4) Remote Display Panels. Install front panel on mounting box. Complete instructions are included with the Remote Display Panels.





## SETUP

All DRI parameters are adjustable using the Windows® 95 'PC Control Software' and serial cable provided with the unit. The PC Control Software provides programs for various ADVANTAGE® products, including the DRI. The DRI program includes four different control screens (Main, Button Definition, Logic Input Definition & Configuration Options), which are described on the following pages. Once the software is started (and Comm Port Configuration is set), the four control screens are accessible through the drop-down menus at the top of the opening screen. The Main screen appears whenever a DRI file is opened. Button Definition, Logic Input Definition & Configuration Options screens are then available from the Configure DRI menu. The File menu provides functions such as open, close, save, etc. 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 PC Control Software: Select 'Run' from Windows® 95 'Start' menu, and enter A:\SETUP. System Requirements: Windows® 95 with 8M of RAM & 2M of available hard disk space (serial port required for 'on-line' operation).



### MAIN SCREEN

The Main Screen is used to adjust the DRI control voltage & logic outputs, as well as to store & recall the eight memory presets. From the factory, the DRI is programmed for controlling an ADVANTAGE® DLA93 Digital-Logic Automixer. Therefore, labelling for the control voltages is shown as level & mute functions for Channels 1~8, Aux In, Main Out, & Aux 1 Out (Channel 12 is inactive). Also, labelling for Logic Outputs 1 & 2 is shown as Master/Slave & Automix/Manual switching. When the DRI is programmed for use with ADVANTAGE® RCIs, labelling for the control voltages is shown as level & mute functions for Channels 1~12. Also, labelling for Logic Output 1 is shown as Off/On switching (Logic Output 2 is inactive). **NOTE:** Channel 12 (control voltage) is only available by converting Logic Output 2 via an internal jumper (see Control Voltage Outputs on pg. 4). Adjustments are made with the computer mouse (or keyboard). Levels are adjusted by dragging the corresponding 'faders' up or down. Each fader provides fifty-one volume (voltage) steps. Left-clicking above or below a fader will adjust the level five steps at a time. Right-clicking on a fader opens a drop-down menu for setting upper & lower limits for that fader. This restricts the volume (voltage) range of that fader, but only for remote controls which utilize 'volume up' & 'volume down' button definitions (i.e...Remote, Logic Inputs, & RS-232 Control Button Emulation). These upper & lower limits do not restrict software level adjustments, muting, or fader settings which are part of a preset. Left-clicking a Mute button will toggle that channel/output off & on. Left-clicking a Preset button will recall the corresponding preset from non-volatile memory. Left-clicking the Store button will open a drop-down menu for storing the current settings in any of the Presets 1~8. Left-clicking the Logic Output buttons will toggle them on & off. The title bar across the top of the Main screen will indicate the Device #, the custom Device Name, and the model of product being controlled. The PC Control Software can operate 'off-line' (with no product connected) by opening a 'new' file for the desired product. The Device # for 'off-line' files is assigned sequentially as a negative number.

## SETUP

The screenshot shows the 'Advantage DRI Button Definitions' window. It features a title bar with the text 'Advantage DRI Button Definitions' and standard window control icons. The main area is divided into several sections:

- Preset Action:** A dropdown menu and an 'Advanced Settings...' button.
- Volume Actions:** A series of dropdown menus labeled 'Channel 1' through 'Channel 12'. Channel 5 is currently set to 'volume down'. To the right is a grid of buttons numbered 37, 38, 39, 40, 33, 34, 35, 36, 29, 30, 31, 32.
- Logic Output Actions:** Three dropdown menus labeled 'Master / Slave', 'AutoMix / Manual', and 'Echo Character' (set to 'B').
- Remote Control Buttons:** A grid of buttons numbered 25, 26, 27, 28, 21, 22, 23, 24, 17, 18, 19, 20, 13, 14, 15, 16, 9, 10, 11, 12, 5, 6, 7, 8, 1, 2, 3, 4.

At the bottom of the window are five buttons: 'Clear', 'Default', 'Help', 'Try It', and 'Close'.

### **BUTTON DEFINITION SCREEN**

The Button Definition screen is used to assign specific 'actions' to remote control buttons. ADVANTAGE® infrared & wall-mount remote controls have twenty-eight buttons. However, the DRI supports twelve additional buttons, which are only available when using Remote Interface Kit or RS-232 control (see Remote Controls on pg. 7). From the factory, the DRI is programmed for controlling an ADVANTAGE® DLA93. Buttons 1~24 provide volume up, volume down, and mute functions for Channels 1~7 and the Main Output. Buttons 25~32 recall Presets 1~8. Buttons 33~40 provide volume up, volume down, and mute functions for Channel 8, Aux Input, & Aux 1 Out. However, using the Button Definition screen, each button may be assigned various different 'actions' (button definition). Left-clicking on a numbered button will select that button to be defined. Left-clicking on a channel or output Volume Action will open a drop-down menu of the Volume Actions available for that channel or output. Left-clicking the desired Volume Action will then assign that action to the currently selected button. Logic Actions & Preset Actions are also available, and may be assigned to buttons in the same way that Volume Actions are assigned. Multiple actions may be assigned to a single button. Likewise, a particular action may be assigned to multiple buttons. To un-assign a particular action from a button, left-click on the blank space at the top of the drop-down menu for that action. When a Preset Action is assigned to a button, Advanced Settings are made available. Left-clicking on Advanced Settings will then open a special screen which allows specific channels or outputs to be excluded from that preset (when recalled using that button). When a channel or output is excluded from a preset, the volume settings for that channel or output will not change (when that preset is recalled using that button). Left-clicking on Echo Character opens a drop-down menu, which allows the equivalent ASCII character for the selected button to be changed. This is the RS-232 'echo' character which will be transmitted via the DRI Serial Port, whenever the selected button is pressed. Changing the echo character is used primarily for customizing remote control commands amongst various RS-232 controlled products within a system. Left-clicking on Clear opens a drop-down menu, which allows button definitions (actions) to be cleared from the selected button, or from all buttons. Left-clicking on Default opens a drop-down menu, which allows button definitions (actions) to be set back to the factory default for the selected button, or for all buttons. Left-clicking on Try It causes the actions currently assigned to the selected button to be performed by the DRI. Left-clicking on Help provides additional instruction. Left-clicking on Close will close the Button Definition screen.

## SETUP

**Advantage DRI Logic Input Definitions**

Preset Action: recall preset 1  
Advanced Settings...

Volume Actions:

Channel 1  
Channel 2  
Channel 3  
Channel 4  
Channel 5  
Channel 6  
Channel 7  
Channel 8  
Aux Input / Ch 9  
Main Out / Ch 10  
Aux1 Out / Ch 11  
Channel 12

Logic Output Actions:

Master / Slave  
AutoMix / Manual  
Echo Character Z

Power-Up Actions

logic 7 Open logic 8 Open  
logic 7 Close logic 8 Close

logic 5 Open logic 6 Open  
logic 5 Close logic 6 Close

logic 3 Open logic 4 Open  
logic 3 Close logic 4 Close

logic 1 Open logic 2 Open  
logic 1 Close logic 2 Close

Clear Default Help Try It Close

### LOGIC INPUT DEFINITION SCREEN

The Logic Input Definition screen is the same as the Button Definition screen, except that the 'actions' are assigned to Logic Inputs 1~8, instead of to remote control buttons. Logic Inputs allow remote control of the DRI via external circuits, such as switches, contact-closures, active driver circuits, and/or 'open-collector' logic outputs (see Logic Inputs on pg. 12). From the factory, Logic Inputs 1~8 are programmed to recall Presets 1~8, respectively. However, using the Logic Input Definition screen, each Logic Input may be assigned various different 'actions' (Logic Input definition). Since Logic Inputs are controlled by switches, contact-closures, etc., each Logic Input may be assigned one set of actions to perform when the switch is 'opened', and a different set of actions to perform when that switch is 'closed'. **NOTE:** *Logic Inputs do not include an automatic repeat function when 'open'. Therefore, if a Logic Input 'open' is assigned a volume up or volume down action, it will not continuously raise or lower that volume (unless the Logic Input is repeatedly switched). Keeping a Logic Input in an 'opened' state will not ramp the volume. Logic Inputs do include an automatic repeat function when 'closed'.* From the factory, the echo characters assigned to Logic Inputs 1~8 ('close') correspond to those assigned to remote control Buttons 25~32, due to the fact that they both recall Presets 1~8. Logic Inputs 1~8 ('open') are not assigned echo characters. As with remote control buttons, changing echo characters is used primarily for customizing remote control commands amongst various RS-232 controlled products within a system. The Logic Input Definition screen also includes the ability to assign specific actions to be performed each time the DRI is powered up. Left-clicking Power Up Actions selects this function to be defined. Power Up Actions are then assigned in exactly the same way as they would be for a Logic Input. From the factory, the DRI has no Power Up Actions assigned. When a DRI is powered up, and no Power Up Actions have been assigned, the DRI will automatically recall the last settings which existed before the DRI was powered off.

## SETUP

Serial Number:

Firmware Version: (offline)

Device Name:   
(30 characters max)

Configure for use with Advantage DLA93 (11 channels, 2 logic outputs)  
 Configure for use with Advantage RCII (12 channels, 1 logic output)

Include Logic Output 1 (master/slave) in presets  
 Include Logic Output 2 (automix/manual) in presets

Channels to be displayed on optional Remote Display Panel:  
(must select exactly 8 channels)

<input checked="" type="checkbox"/> Channel 1	<input checked="" type="checkbox"/> Channel 5	<input type="checkbox"/> Aux Input / Ch 9
<input checked="" type="checkbox"/> Channel 2	<input checked="" type="checkbox"/> Channel 6	<input checked="" type="checkbox"/> Main Output / Ch 10
<input checked="" type="checkbox"/> Channel 3	<input checked="" type="checkbox"/> Channel 7	<input type="checkbox"/> Aux1 Output / Ch 11
<input checked="" type="checkbox"/> Channel 4	<input type="checkbox"/> Channel 8	<input type="checkbox"/> Channel 12

Restore Defaults    Help    Close

### **CONFIGURATION OPTIONS SCREEN**

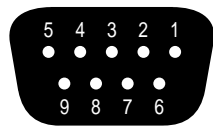
The Configuration Options screen is used to select options which customize the operation of the DRI. At the top of the Configuration Options screen, the Serial Number and Firmware Version of the DRI will be displayed. The PC Control Software can operate 'off-line' (with no product connected) by opening a 'new' file for the desired product. The Serial Number and Firmware Version are not displayed for 'new' ('off-line') files. Left-clicking on Device Name allows a custom name to be given to the particular DRI, by entering up to 30 characters of text. The Device Name will be stored in the DRI memory, and will be displayed on the title bar of the Main screen whenever that DRI is accessed with the software. Left-clicking on Configure for use with Advantage RCII will change the labelling and available functions on the other control screens. From the factory, the DRI is programmed for controlling an ADVANTAGE<sup>®</sup> DLA93. Therefore, labelling for the control voltages is shown as Channels 1~8, Aux In, Main Out, & Aux 1 Out (Channel 12 is inactive). Also, labelling for Logic Outputs 1 & 2 is shown as Master/Slave & Automix/Manual switching. When the DRI is programmed for use with ADVANTAGE<sup>®</sup> RCII, labelling for the control voltages is shown as Channels 1~12. Also, labelling for Logic Output 1 is shown as Off/On switching (Logic Output 2 is inactive). **NOTE:** Channel 12 (control voltage) is only available by converting Logic Output 2 via an internal jumper (see Control Voltage Outputs on pg. 4). From the factory, the Logic Output 1 and Logic Output 2 settings are included whenever a preset is recalled. Left clicking on Include Logic Output 1 or Include Logic Output 2 will remove the check-mark, and thereby prevent the associated Logic Output settings from being recalled as part of any preset. From the factory, Channels to be displayed on Optional Remote Display Panel are assigned as Channels 1~7 and Main Output (for a DLA93). Left-clicking on any of the channels/outputs allows a different set of eight signals to be assigned to an optional Remote Display Panel (see Remote Controls on pg. 7). Exactly eight signals must be selected. Left-clicking on Restore Defaults will set all Configuration Options back to their factory defaults.

## LOGIC INPUTS

---

Eight Logic Inputs are available on a rear panel 9-pin Sub-D (female) connector. Logic Inputs allow remote control of the DRI via external circuits, such as switches, contact-closures, active driver circuits, and/or 'open-collector' logic outputs. From the factory, Logic Inputs 1~8 are programmed to recall presets 1~8, respectively. However, the Logic Inputs may be individually programmed to perform other functions, such as volume up, volume down, mute, & logic output on/off, using the PC Control Software and serial cable provided with the DRI (see Setup on pg. 8). Since Logic Inputs are controlled by switches, contact-closures, etc., each Logic Input may be assigned two remote control functions (one for switch 'closed' and one for switch 'open').

Logic Inputs have the following pin assignments (right-to-left & top-to-bottom): **Pins 1~4)** Logic Inputs 1~4; **Pin 5)** Ground; **Pins 6~9)** Logic Inputs 5~8.



**pin #1** = Logic Input 1  
**pin #2** = Logic Input 2  
**pin #3** = Logic Input 3  
**pin #4** = Logic Input 4  
**pin #5** = ground

**pin #6** = Logic Input 5  
**pin #7** = Logic Input 6  
**pin #8** = Logic Input 7  
**pin #9** = Logic Input 8

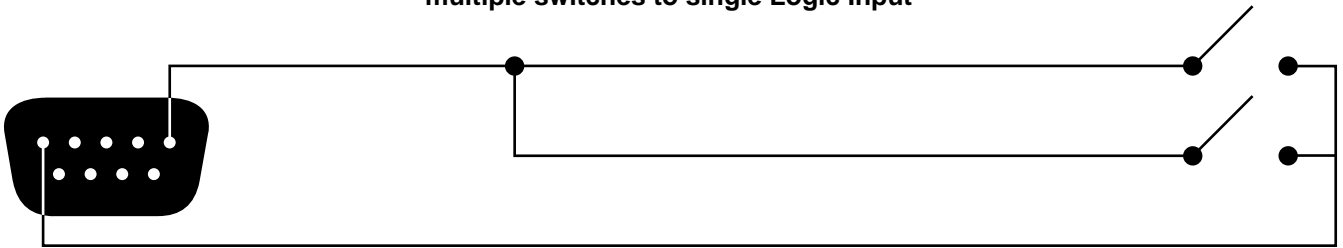
### logic inputs

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 ADVANTAGE® PMX84 or DRC4+4) 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.

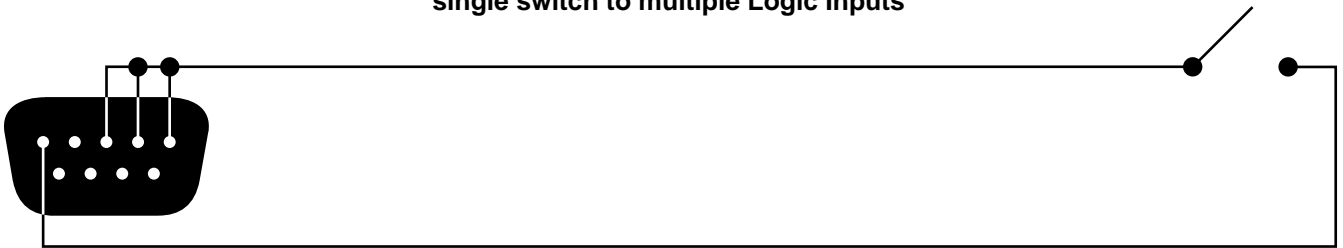
Multiple contact-closures or 'open-collector' logic outputs or may be wired in parallel to a single Logic Input (see diagrams on next page). Likewise, a single contact-closure or 'open-collector' logic output may be wired in parallel to multiple Logic Inputs. In some circumstances, a diode matrix may 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

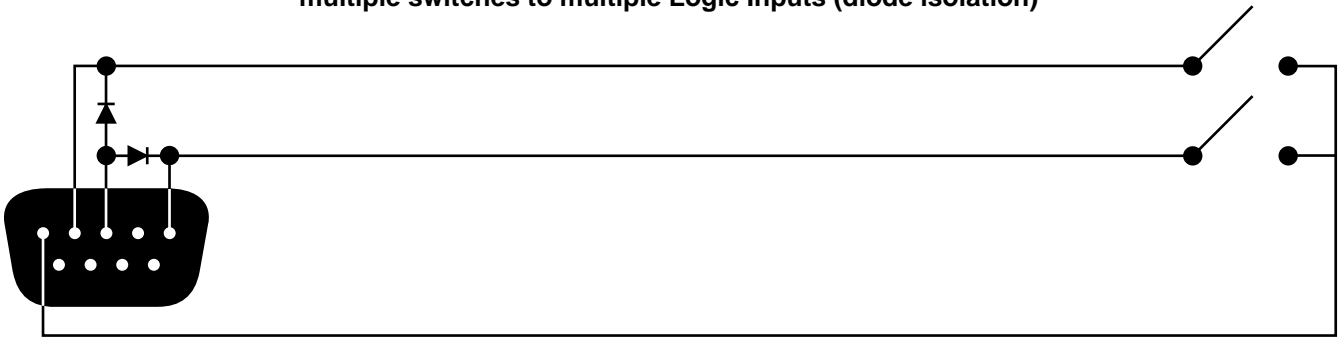
multiple switches to single Logic Input



single switch to multiple Logic Inputs



multiple switches to multiple Logic Inputs (diode isolation)



## RS-232 CONTROL

The DRI has an RS-232 compatible Serial Port, which allows it to be controlled by a computer (see Rear Panel: Serial Port on pg. 3). In addition to the PC Control Software, the DRI 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 remote control buttons. The DRI is unable to tell whether these commands come from the computer or from a standard remote control. However, Control Button Emulation allows the computer to utilize up to forty button definitions (unlike standard remote controls, which have only twenty-eight buttons). When using up to four devices 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 control voltage & logic output settings, 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 sixty-four devices, and may create unlimited presets. The computer may also provide 'real-time' display of control voltage & logic output settings.

This manual only describes the Control Button Emulation method of computer control. For complete details about using the DRI with a computer, including Advanced Computer Control, contact Biamp Systems for the manual "Computer Control of ADVANTAGE® DRI".

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.

button 01	B	Volume Down channel 5	button 15	P	Volume Down channel 3	button 29	^	Recall Preset 5
button 02	C	Volume Down channel 6	button 16	Q	Volume Down channel 4	button 30	_	Recall Preset 6
button 03	D	Volume Down channel 7	button 17	R	Volume Up channel 1	button 31	`	Recall Preset 7
button 04	E	Volume Down main out	button 18	S	Volume Up channel 2	button 32	b	Recall Preset 8
button 05	F	Volume Up channel 5	button 19	T	Volume Up channel 3	button 33	c	Volume Down channel 8
button 06	G	Volume Up channel 6	button 20	U	Volume Up channel 4	button 34	d	Volume Up channel 8
button 07	H	Volume Up channel 7	button 21	V	Toggle Mute channel 1	button 35	e	Toggle Mute channel 8
button 08	I	Volume Up main out	button 22	W	Toggle Mute channel 2	button 36	f	Volume Down aux 1 out
button 09	J	Toggle Mute channel 5	button 23	X	Toggle Mute channel 3	button 37	g	Volume Up aux 1 out
button 10	K	Toggle Mute channel 6	button 24	Y	Toggle Mute channel 4	button 38	h	Toggle Mute aux 1 out
button 11	L	Toggle Mute channel 7	button 25	Z	Recall Preset 1	button 39	i	Volume Down aux in
button 12	M	Toggle Mute main out	button 26	[	Recall Preset 2	button 40	j	Volume Up aux in
button 13	N	Volume Down channel 1	button 27	\	Recall Preset 3			
button 14	O	Volume Down channel 2	button 28	]	Recall Preset 4			

When a control button is first pressed, the DRI receives the character which corresponds to that button. If the control button is pressed longer than 110 milliseconds, the DRI receives a "repeat code", indicating the control button is still being pressed. The DRI continues to receive the repeat code (approximately nine times per second) until the control button is released. The ASCII character which corresponds to the repeat code is @ (the "commercial at" sign).

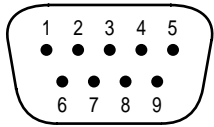
The computer can initiate any functions or actions that a standard control can, by simply transmitting the equivalent control button ASCII character. When interfacing the DRI to a computer, the computer must be aware that the DRI will 'echo' all characters it receives (both from computer and standard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

When using Control Button Emulation, up to four ADVANTAGE® products may be connected together, and addressed individually. When multiple units are used, each unit is assigned a unique "Device #" (see Rear Panel: Device # on pg. 3). Normally, all units would react to control button commands. However, a computer can send commands to specific units, by preceding each command with a "device select prefix" character (see following table). Only those units whose Device #s are specified will respond to the command which follows. If a command is not immediately preceded by a device select prefix character, then all units 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

## RS-232 CONTROL

**Serial Port:** The 9-pin Sub-D (male) connector on the DRI rear panel provides the RS-232 compatible serial interface signals used for computer control. The DRI Serial Port transmits serial data on pin 3 (TxD), receives serial data on pin 2 (RxD), and provides a ground on Pin 5. The Data Terminal Ready (DTR) & Request To Send (RTS) output signals are connected to the +12 Volt power supply (through a resistor) and are always asserted when the DRI power is on. **NOTE:** *The Serial Port may also transmit commands which are received via Remote & Logic Inputs, depending upon the echo character assignments (see Setup on pgs.8 & 9).*



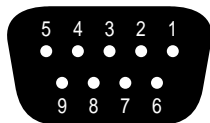
- |  |  |
|--|--|
| <b>pin #1</b> = not used                         | <b>pin #6</b> = not used                     |
| <b>pin #2</b> = Receive Data (RxD) input         | <b>pin #7</b> = Request To Send (RTS) output |
| <b>pin #3</b> = Transmit Data (TxD) output       | <b>pin #8</b> = not used                     |
| <b>pin #4</b> = Data Terminal Ready (DTR) output | <b>pin #9</b> = not used                     |
| <b>pin #5</b> = ground                           |  |

### serial port

The DRI only requires receive data (pin 2), transmit data (pin 3), and signal ground (pin 5) to be connected for successful data communications (see cable diagram below). 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. 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 DRI serial interface ground is also tied (indirectly) to the analog signal ground, undesirable ground loops may occur when the DRI 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 DRI should be at the same potential, and the PC should get AC power from the same source as the DRI (and any other audio equipment which is connected to the DRI).

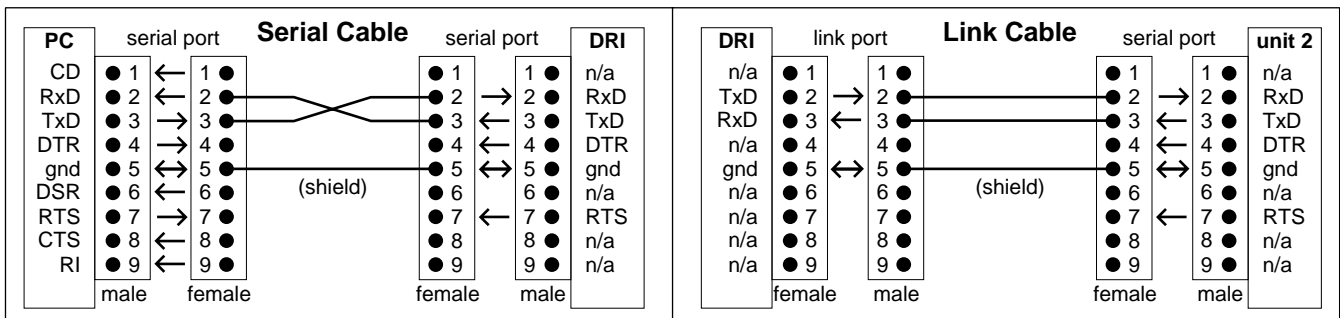
**Serial Port Data Communications Parameters:** The DRI communicates through the Serial Port at the factory selected rate of 9600 bits per second, with 8 data bits, 1 stop bit, and no parity. The DRI utilizes a subset of the standard 7-bit ASCII character set. The eighth data bit of each character (the 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 either 2400 or 19,200 bits per second by means of the rear panel Baud Rate DIP switches.

**Link Port Connections:** The 9-pin Sub-D (female) connector on the DRI rear panel provides the RS-232 compatible serial interface signals used for linking multiple ADVANTAGE® products within a system. The Link Port of one device simply connects to the Serial Port of the next device, and so forth (see diagram below). Link cables are available as an option (Biamp #909-0057-00). **NOTE:** *All but the final device in a system should have its 'last' switch down (see Rear Panel: Baud Rate on pg. 3). The Link Port will also transmit commands which are received via Remote & Logic Inputs.*



- |  |                          |
|--|--------------------------|
| <b>pin #1</b> = not used                   | <b>pin #6</b> = not used |
| <b>pin #2</b> = Transmit Data (TxD) output | <b>pin #7</b> = not used |
| <b>pin #3</b> = Receive Data (RxD) input   | <b>pin #8</b> = not used |
| <b>pin #4</b> = not used                   | <b>pin #9</b> = not used |
| <b>pin #5</b> = ground                     |                          |

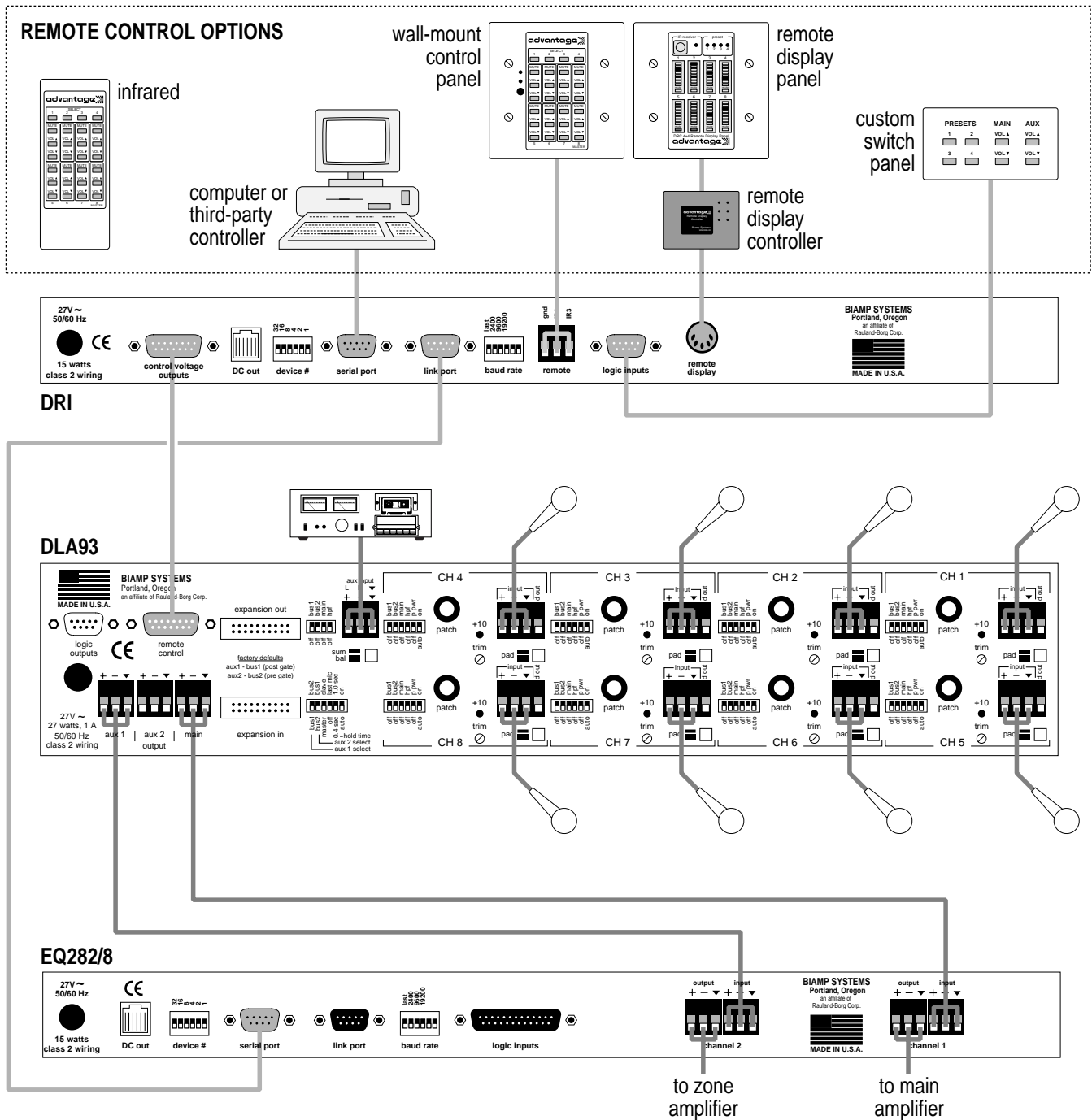
### link port





# APPLICATIONS

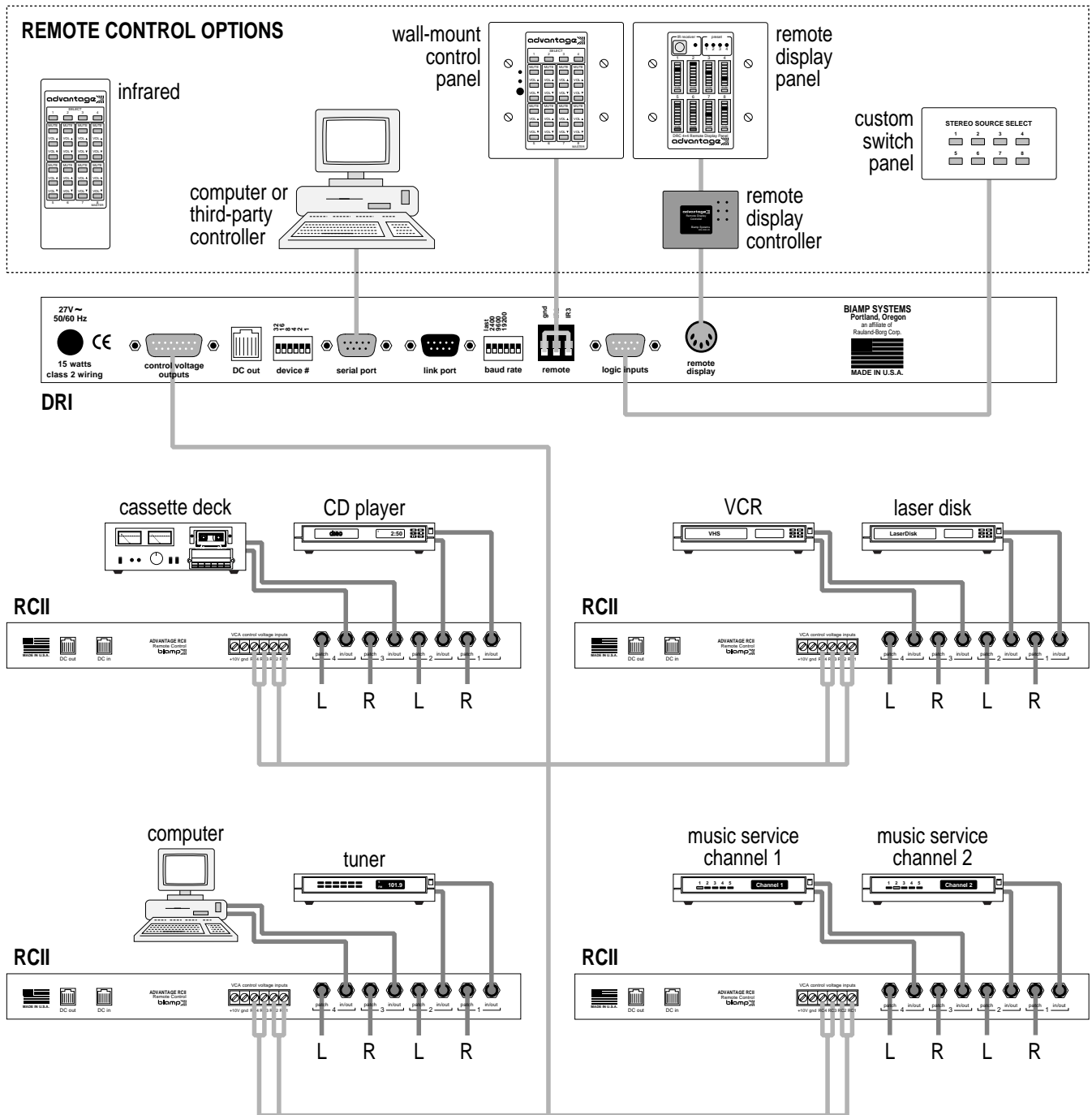
## DRI Controlling DLA93 Digital-Logic Automixer



This application shows Control Voltage Outputs of a DRI connected to Remote Control of a DLA93 (an 'inter-connect' cable is provided with the DRI for this purpose). The DRI accepts commands from a variety of remote control methods, including: infrared, wall-mount or custom push-button panels, contact-closures or switch panels, and computer or third-party RS-232 controllers. These commands affect the DRI control voltage & logic outputs (as programmed), and they in turn affect the DLA93. The DRI is factory programmed to control the following DLA93 functions: Channels 1~8 level & mute; Aux Input level & mute; Main Output level & mute; Aux 1 Output level & mute; Master/Slave switching; and Auto/Manual switching. In addition, the DRI provides the ability to store and recall up to eight presets from non-volatile memory. Each preset may be programmed to affect any or all of the DLA93 functions mentioned above. This application also shows the DRI Link Port connected to an EQ282/8 Serial Port ('link' cable is optional). The EQ282/8 may be programmed to respond to specific commands. This is an effective means of controlling multiple units, including the capability for simultaneous preset selection.

# APPLICATIONS

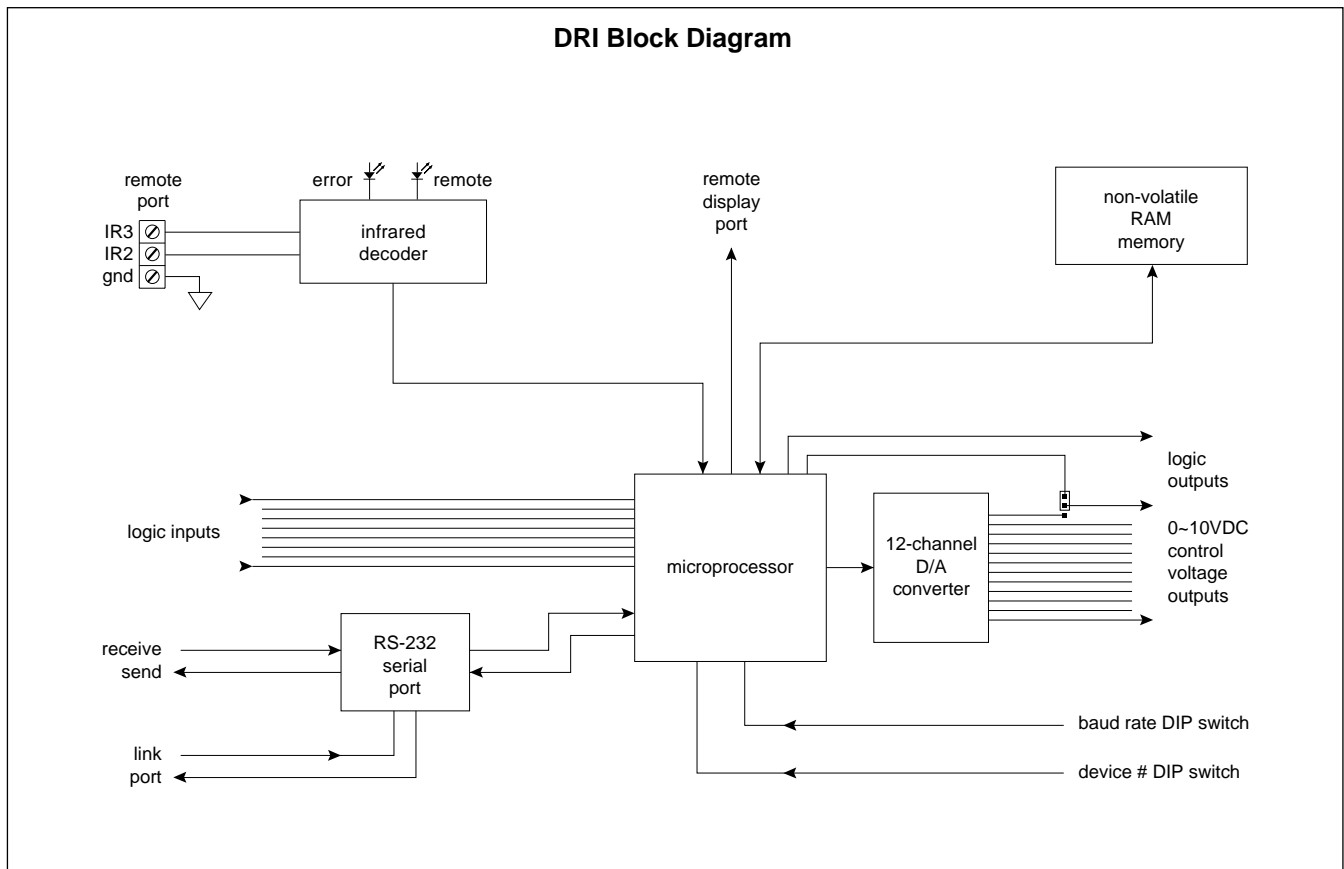
## DRI Controlling Multiple RCII 4-Channel VCAs



This application shows Control Voltage Outputs of a DRI connected to Control Voltage Inputs of four RCII's (custom cabling is required). The DRI accepts commands from a variety of remote control methods, including: infrared, wall-mount or custom push-button panels, contact-closures or switch panels, and computer or third-party RS-232 controllers. These commands affect the DRI control voltage outputs (as programmed), and they in turn affect the RCII's. Eight of the DRI control voltages are each connected to two channels of an RCII, thereby providing common control of both left & right (stereo) signals. The DRI factory programming allows control of the RCII functions (level & mute) for the eight stereo sources (Channels 1-8). In addition, the DRI provides the ability to store and recall up to eight presets from non-volatile memory. Each preset may be programmed to affect any or all of the RCII functions mentioned above. The DRI control voltages may be programmed and connected to RCII's in a variety of configurations, including: up to twelve individual or 'grouped' signals, up to six stereo signals with balance control, or even combined control over both VCAs & external circuits (such as lighting dimmers).

## SPECIFICATIONS & BLOCK DIAGRAM

<b>Logic Inputs</b> (TTL compatible):	5VDC / 1mA	<b>Power Requirements:</b>	120/240VAC
<b>Logic Outputs</b> (open collector/negative true):	sink current - 50mA max.	<b>Power Consumption:</b>	15 watts max.
	collector voltage - 24VDC max.		
<b>Control Voltages</b> (per output):	0~10VDC / 4mA max.	<b>Dimensions:</b>	
		Height (1 rack space)	1.75 inches (44mm)
		Width	19 inches (483mm)
<b>Baud Rates</b> (serial & link ports):	2400, 9600, 19200	Depth	7 inches (178mm)
<b>Device Numbers</b> (serial & link ports):	0~63	<b>Weight:</b>	7 lbs. (3.18kg)
<b>DC Out:</b>	±12VDC / 150mA max.		



## 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-mechanical fans, electrolytic capacitors, and the normal wear and tear of appearance items such as paint, knobs, handles, and covers are 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  
(503) 641-7287  
<http://www.biamp.com>