ADVANTAGE® DDL12
Digital Delay Line

Operation Manual

advantage®

TABLE OF CONTENTS

INTRODUCTION

The ADVANTAGE® **DDL12** Digital Delay Line is a programmable DSP-based 1-input by 2-output digital delay. Gain & delay settings are adjusted via Windows® 95 programming software, eliminating the need for front panel controls or security codes, and providing a completely tamper proof unit. Up to 8 presets may be stored in non-volatile memory, and recalled via programmable logic inputs. The DDL12 is covered by a five-year warranty.

DDL12 features include:

♦ 1-in/2-out DSP-based programmable dual-tap digital delay

♦ balanced input & outputs on plug-in barrier strip connectors

♦ variable input & output levels with metering & bypass mode

♦ broad delay range useful for room delay or driver alignment

♦ distance calculations & 'automatic' unity gain for easy setup

♦ 48kHz sampling rate with 16-bit sigma delta converters

♦ 64x oversampling A/D (in) & 128x oversampling D/A (out)

♦ eight non-volatile memory presets store/recall delay settings

♦ programmable logic inputs for remote control via switches

♦ no manual controls on chassis, to help prevent tampering

♦ controls & indicators provided by software graphic interface

♦ RS-232 serial port & Windows® 95 programming software

♦ incorporates **AES** recommended grounding practices

♦ C€ marked and **UL** / **C-UL** listed power source

♦ covered by Five-Year "Gold Seal" Warranty
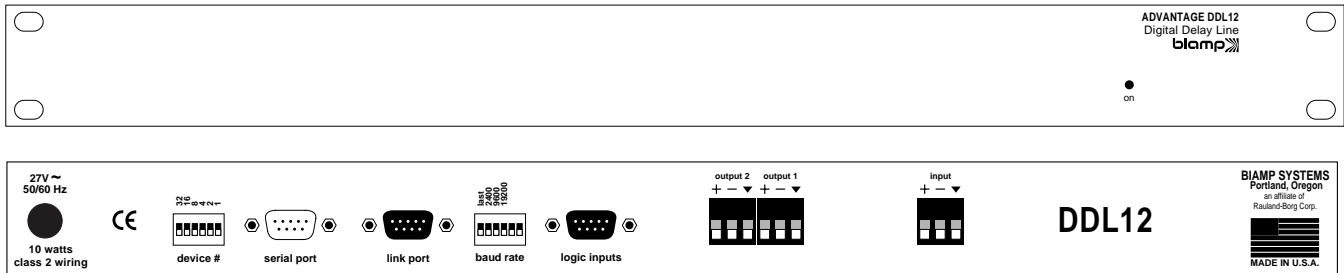
On Indicator: This red LED indicates power is applied to the unit. The DDL12 provides no power switch. Power is applied by simply plugging the wall-mount transformer into a proper AC outlet.

AC Power Cord: The power transformer provides 27 Volts AC to the DDL12, and is detachable via a 5-pin DIN connector. The DDL12 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 DDL12 requires service.

Device #: This 6-gang DIP switch allows the DDL12 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 DDL12 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. 8). The Serial Port has the following pin assignments (left-to-right & top-to-bottom): **Pin 1)** not used; **Pin 2)** Receive Data (RxD) input; **Pin 3)** Transmit Data (TxD) 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. 3). *NOTE: The Serial Port can also transmit commands received via the Logic Inputs (see Setup on pg. 4).*

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. 8). 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 (TxD) output; **Pin 3)** Receive Data (RxD) 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 received via the Logic Inputs (see Setup on pg. 4).*

Baud Rate: This 6-gang DIP switch allows the DDL12 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 (labeled '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).

Logic Inputs: This 9-pin Sub-D (female) connector provides eight logic inputs for controlling the DDL12 via contact-closures (see Logic Inputs on pg. 6). Logic Inputs have the following pin assignments (right-to-left & top-to-bottom): **Pins 1~8)** Logic Inputs 1~8; **Pin 9)** switch ground. Logic Inputs are programmed using the PC Control Software and serial cable provided with the DDL12 (see Setup on pg. 4). From the factory, Logic Inputs 1~8 are programmed to recall presets 1~8 respectively.

Input: These plug-in barrier strip terminals provide a balanced line-level input. For balanced connection, wire high to (+), low to (-), & ground to (▼). For unbalanced connection, wire high to (+), and ground to both (-) & (▼). Input gain is adjusted via software or RS-232 control (see Setup on next page).

Output 1 & Output 2: These plug-in barrier strip terminals provide the two independently delayed balanced line-level outputs. For balanced connections, wire high to (+), low to (-), and ground to (▼). For unbalanced connections, wire high to (+) and ground to (▼), leaving (-) unconnected. Signal level will be reduced by 6dB when outputs are unbalanced. Output gain is adjusted via software or RS-232 control (see Setup on next page).

All DDL12 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 DDL12. The DDL12 program includes three different control screens (Main, Logic Input & Button Definition & Configuration Options), which are described on the following pages. Once the software is started (and Comm Port Configuration is set), the control screens are accessible through the drop-down menus at the top of the opening screen. The Main screen appears whenever a DDL12 file is opened. Logic Input & Button Definition and Configuration Options screens are then available from the Configure DDL12 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).
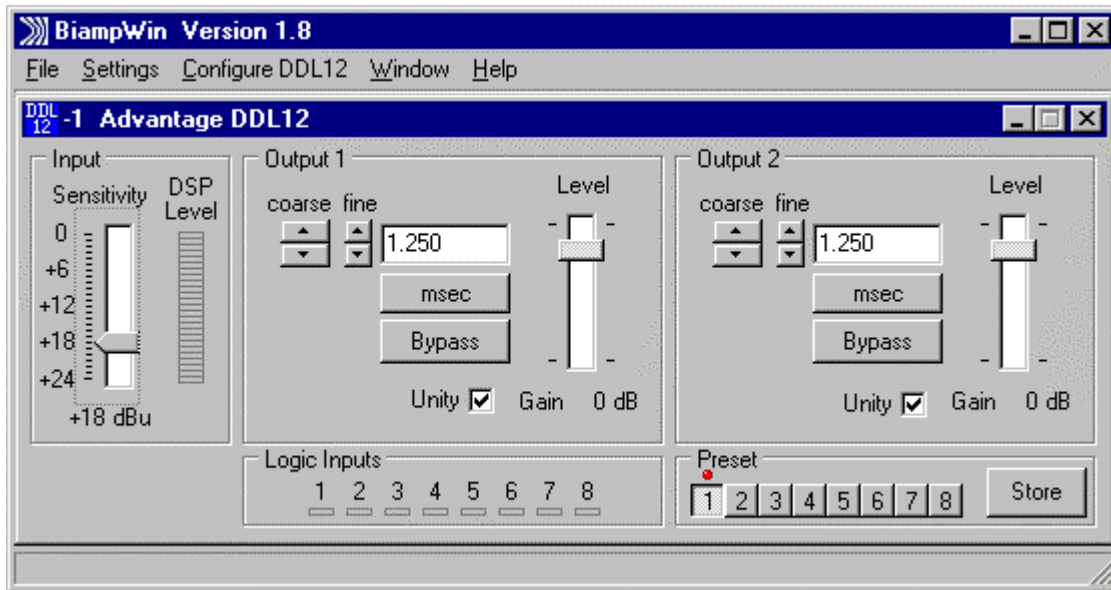
MAIN SCREEN

The Main Screen is used to adjust the DDL12 input/output levels & delay times, as well as to store & recall the eight memory presets. Adjustments are made with the computer mouse (or keyboard). Levels are adjusted by dragging the corresponding 'faders' up or down. Input Sensitivity adjusts for the proper input signal peak reference level by providing up to 24dB of attenuation, adjustable in 1dB steps. The DSP Level meter will display the corresponding input signal level. For best performance, adjust Input Sensitivity so the DSP Level meter shows occasional peaks in the yellow area, *but never to the red (top)*. Output 1 & Output 2 provide delay & gain adjustments. Delay time is shown in the window, with adjacent buttons providing the up/down adjustments. Left-clicking coarse buttons will change the delay time in 1 milli-second increments. Left-clicking fine buttons will change the delay time in 21 micro-second increments. Delay time may also be entered directly into the window, but will be rounded to the nearest available setting. Left-clicking msec allows delay times to instead be entered & calculated in terms of distance measurements (inches, feet, centimeters, or meters). Left-clicking Bypass temporarily sets delay for that output to minimum, but has no effect on input/output gain settings. Level provides gain adjustment for that output, but the range will be affected by the Input Sensitivity settings. Left-clicking Unity will link that output Level fader to the Input Sensitivity fader, maintaining a constant unity gain setting through the DDL12. 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 current settings in any of the Presets 1~8. Logic Inputs are strictly indicators of remote on/off activity at the Logic Inputs. 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. *NOTE: Distances should be measured in terms of the difference between direct and delayed sound sources, with respect to the listener (i.e...direct source to listener = 200 feet; delayed source to listener = 20 feet; distance = 180 feet). Also, when sounds from the direct source & delayed source reach the listener at roughly the same volume level, additional delay (approximately 10~30 milliseconds) may be added to the calculated delay time. This added delay will produce what is known as the 'Haas Effect', which gives the listener the impression that all sound is emanating from the direct source. This added delay should be fine-tuned by ear to achieve the desired results.*
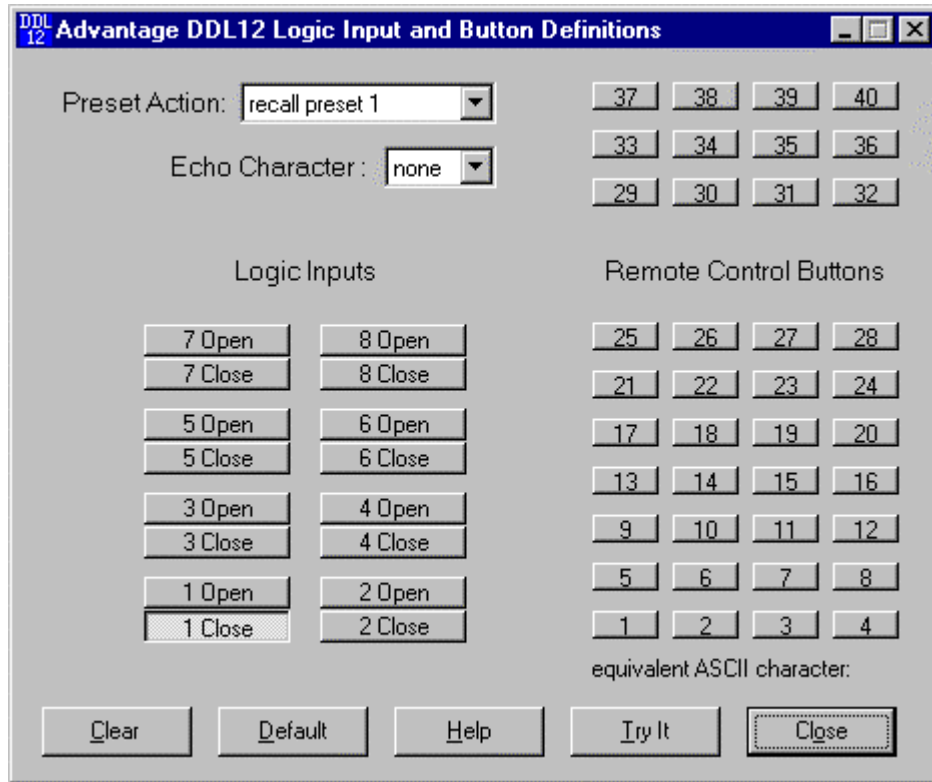
LOGIC INPUT & BUTTON DEFINITIONS SCREEN

The Logic Input & Button Definitions screen is used to assign specific 'recall preset actions' to the Logic Inputs (and remote control buttons). Logic Inputs allow remote control of preset selection via external circuits, such as switches, contact-closures, active driver circuits, and/or 'open-collector' logic outputs (see Logic Inputs on pg. 6). From the factory, Logic Inputs 1~8 are programmed to recall presets 1~8 respectively. However, using the Logic Input & Button Definitions screen, each Logic Input may be assigned different 'recall preset actions'. Left-clicking on a numbered button will select that Logic Input to be defined. Left-clicking on Preset Action will open a drop-down menu of the available recall preset actions. Left-clicking the desired recall preset action will then assign that action to the currently selected Logic Input. Since Logic Inputs are controlled by switches, contact-closures, etc., each Logic Input may be assigned certain recall preset actions to perform when the switch is 'opened', and different recall preset actions to perform when that same switch is 'closed'. Left-clicking on Echo Character opens a drop-down menu, which allows the 'echo' character for the selected Logic Input to be changed. This is the RS-232 ASCII character which will be transmitted via the Serial Port whenever that Logic Input is switched. From the factory, no echo characters are assigned to Logic Inputs 1~8. Changing the echo character is used primarily for customizing remote control commands amongst various RS-232 controlled products within a system (see RS-232 Control on pg. 8). ***NOTE:*** *Unlike other remote controls, the DDL12 Logic Inputs do not include a 'repeat' function. Therefore, a Logic Input in an 'opened' or 'closed' state will not continuously repeat an echo character via RS-232.* Although the DDL12 does not accept infrared or wall-mount remote controls itself, it can still receive echo characters (via RS-232) from other ADVANTAGE® products which are utilizing these types of remote controls. From the factory, Remote Control Buttons have equivalent ASCII characters permanently assigned to them (see RS-232 Control on pg. 8). Therefore, recall preset actions can be assigned to Remote Control Buttons in the same way they are assigned to Logic Inputs. Left-clicking on Clear opens a drop-down menu, which allows recall preset actions to be cleared from the selected Logic Input (or all Logic Inputs). Left-clicking on Default opens a drop-down menu, which allows recall preset actions to be set back to the factory default for the selected Logic Input (or all Logic Inputs). Left-clicking on Try It causes the recall preset actions currently assigned to the selected Logic Input to be performed by the DDL12. Left-clicking on Help provides additional instruction. Left-clicking on Close will close the Logic Input & Button Definitions screen.

CONFIGURATION OPTIONS SCREEN

The Configuration Options screen is used to select options which customize the operation of the DDL12. At the top of the Configuration Options screen, the Serial Number and Firmware Version of the DDL12 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 DDL12, by entering up to 30 characters of text. The Device Name will be stored in the DDL12 memory, and will be displayed on the title bar of the Main screen whenever that DDL12 is accessed with the software. Double-clicking the Temperature window will allow the expected average air temperature for the install location to be entered. Left-clicking degrees C allows temperature to be entered in either Celsius or Fahrenheit. The resultant Velocity of Sound is then displayed underneath. The Power-up status section provides a choice of settings the DDL12 will recall from memory each time power is cycled off & on. Left-clicking on Restore Defaults will set all Configuration Options back to their factory defaults. Left-clicking Help provides additional instruction. Left-clicking Close will close the Configuration Options screen.

Eight Logic Inputs are available on a rear panel 9-pin Sub-D (female) connector. Logic Inputs allow remote control of the DDL12 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, each Logic Input may be assigned different 'recall preset actions'., using the PC Control Software and serial cable provided with the DDL12 (see Setup on pg. 4).   Since Logic Inputs are controlled by switches, contact-closures, etc., each Logic Input may be assigned two functions (one for switch 'closed' and one for switch 'open').

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

```
  5   4   3   2   1
    9   8   7   6
```
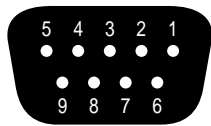
pin #1 = Logic Input 1   **pin #6** = Logic Input 6
pin #2 = Logic Input 2   **pin #7** = Logic Input 7
pin #3 = Logic Input 3   **pin #8** = Logic Input 8
pin #4 = Logic Input 4   **pin #9** = ground
pin #5 = Logic Input 5

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 may be wired in parallel to a single Logic Input (see diagram below). 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.

multiple switches to single Logic Input
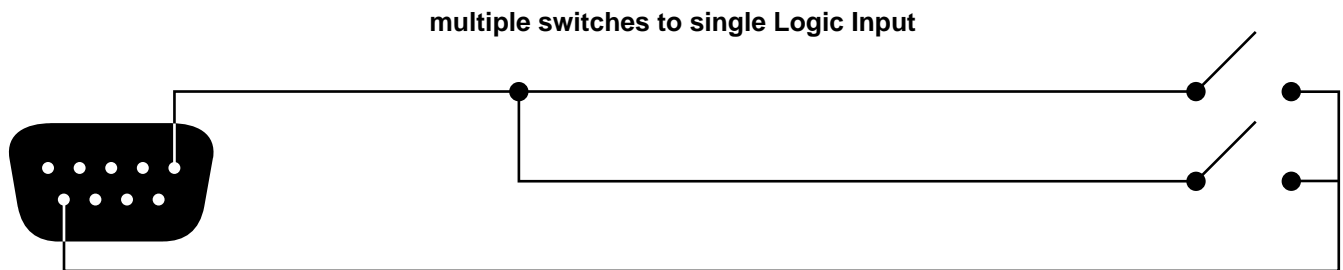
The DDL12 has an RS-232 Serial Port, which allows it to be controlled by a computer (see Front & Rear Panel Features on pg. 2). In addition to the PC Control Software, the DDL12 offers two other methods of computer control.

Control Button Emulation: This method allows the computer to imitate the operation of an infrared transmitter or wall-mount control panel. Although the DDL12 does not accept infrared or wall-mount remote controls itself, it can still receive ASCII characters (via RS-232) which emulate the buttons on these types of remote controls. From the factory, remote control buttons have equivalent ASCII characters permanently assigned to them (see table below). Therefore, recall preset actions can be assigned to remote control buttons in the same way they are assigned to Logic Inputs. Then, using this method, the computer can output ASCII characters which are equivalent to the commands generated by those standard remote control buttons. 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 level & delay settings, as well as 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 level & delay settings.

This manual only describes the Control Button Emulation method of computer control. For complete details about using the DDL12 with a computer, including Advanced Computer Control, contact Biamp Systems for the manual "Computer Control of ADVANTAGE® DDL12".

Each control button on an infrared transmitter or 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 possible buttons, their button numbers, their ASCII code equivalents, and their factory default button definitions (no operation assigned).

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

When a control button is first pressed, the DDL12 receives the character which corresponds to that button. If the control button is pressed longer than 110 milliseconds, the DDL12 receives a "repeat code", indicating the control button is still being pressed. The DDL12 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). However, the DDL12 recall preset actions do not utilize repeat codes.
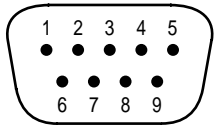
The computer can initiate any functions or actions that a standard control can, by simply transmitting the equivalent control button ASCII character. When interfacing the DDL12 to a computer, the computer must be aware that the DDL12 will 'echo' all characters it receives (both from computer and Logic Inputs) via the Serial Port Transmit Data (TXD) output signal. However, from the factory, the DDL12 Logic inputs are programmed with no 'echo character' assigned to them.

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 Front & Rear Panel Features on pg. 2). 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 table below). Only those units whose Device #s are specified will respond to the command which follows. If a command is not 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

Serial Port: The 9-pin Sub-D (male) connector on the DDL12 rear panel provides the RS-232 compatible serial interface signals used for computer control. The DDL12 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 DDL12 power is on. ***NOTE:*** *The Serial Port may also transmit commands which are received via the Logic Inputs, depending upon the echo character assignments (see Setup on pg. 4).*
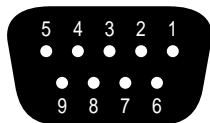
```
 1  2  3  4  5
 ●  ●  ●  ●  ●
   ●  ●  ●  ●
   6  7  8  9
```

pin #1 = not used
pin #2 = Receive Data (RxD) input
pin #3 = Transmit Data (TxD) 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

serial port

The DDL12 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 DDL12 serial interface ground is also tied (indirectly) to the analog signal ground, undesirable ground loops may occur when the DDL12 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 DDL12 should be at the same potential, and the PC should get AC power from the same source as the DDL12 (and any other audio equipment which is connected to the DDL12).
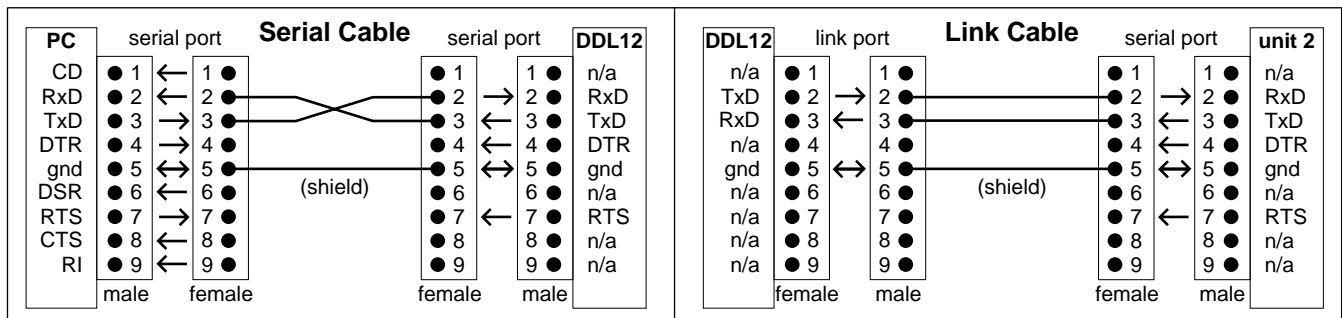
Serial Port Data Communications Parameters: The DDL12 communicates through the Serial Port at the factory selected rate of 9600 bits per second, with 8 data bits, 1 stop bit, and no parity. The DDL12 utilizes a subset of the standard 7-bit ASCII character set. The eighth data bit of each character (the most significant bit) should always be 0. The computer should not echo the characters t 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 DDL12 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 Front & Rear Panel Features on pg. 2). The Link Port will also transmit commands which are received via the Logic Inputs.*

```
 5  4  3  2  1
 ●  ●  ●  ●  ●
   ●  ●  ●  ●
   9  8  7  6
```

pin #1 = not used
pin #2 = Transmit Data (TxD) output
pin #3 = Receive Data (RxD) input
pin #4 = not used
pin #5 = ground

pin #6 = not used
pin #7 = not used
pin #8 = not used
pin #9 = not used

link port

Serial Cable

PC	serial port				serial port		DDL12
CD	● 1	←	1 ●		● 1	1 ●	n/a
RxD	● 2	←	2 ●		● 2 →	2 ●	RxD
TxD	● 3	→	3 ●		● 3 ←	3 ●	TxD
DTR	● 4	→	4 ●		● 4 ←	4 ●	DTR
gnd	● 5	↔	5 ●		● 5 ↔	5 ●	gnd
DSR	● 6	←	6 ●	(shield)	● 6	6 ●	n/a
RTS	● 7	→	7 ●		● 7 ←	7 ●	RTS
CTS	● 8	←	8 ●		● 8	8 ●	n/a
RI	● 9	←	9 ●		● 9	9 ●	n/a
	male		female		female	male	

Link Cable

DDL12	link port				serial port		unit 2
n/a	● 1		1 ●		● 1	1 ●	n/a
TxD	● 2	→	2 ●		● 2 →	2 ●	RxD
RxD	● 3	←	3 ●		● 3 ←	3 ●	TxD
n/a	● 4		4 ●		● 4 ←	4 ●	DTR
gnd	● 5	↔	5 ●		● 5 ↔	5 ●	gnd
n/a	● 6		6 ●	(shield)	● 6	6 ●	n/a
n/a	● 7		7 ●		● 7 ←	7 ●	RTS
n/a	● 8		8 ●		● 8	8 ●	n/a
n/a	● 9		9 ●		● 9	9 ●	n/a
	female	male			female	male	

main
speaker
system

60 feet (18.3m)

balcony

under-balcony
delayed speakers

narthex
delayed
speakers

5 feet
(1.5m)

5 feet
(1.5m)

altar

pews

listener

20 feet (6.1m)

listener

narthex

DDL12 -1 Advantage DDL12

Input
Sensitivity   DSP
Level
0
+6
+12
+18
+24
+0 dBu

Output 1
coarse fine
54.990
feet
Bypass
Level
Unity ☑ Gain   0 dB

Output 2
coarse fine
75.009
feet
Bypass
Level
Unity ☑ Gain   0 dB

Logic Inputs
1 2 3 4 5 6 7 8

Preset
1 2 3 4 5 6 7 8   Store

SPORTS FIELD

delayed
bleacher
speakers

delayed
field
speakers

main
speaker
system

45 feet
(13.7m)

96 feet (29.3m)

186 feet (56.7m)

170 feet (51.8m)

listener

listener

press
box

visitor
bleachers

home
bleachers

DDL 12 -1 Advantage DDL12

Input

Sensitivity   DSP
Level

0
+6
+12
+18
+24

+0 dBu
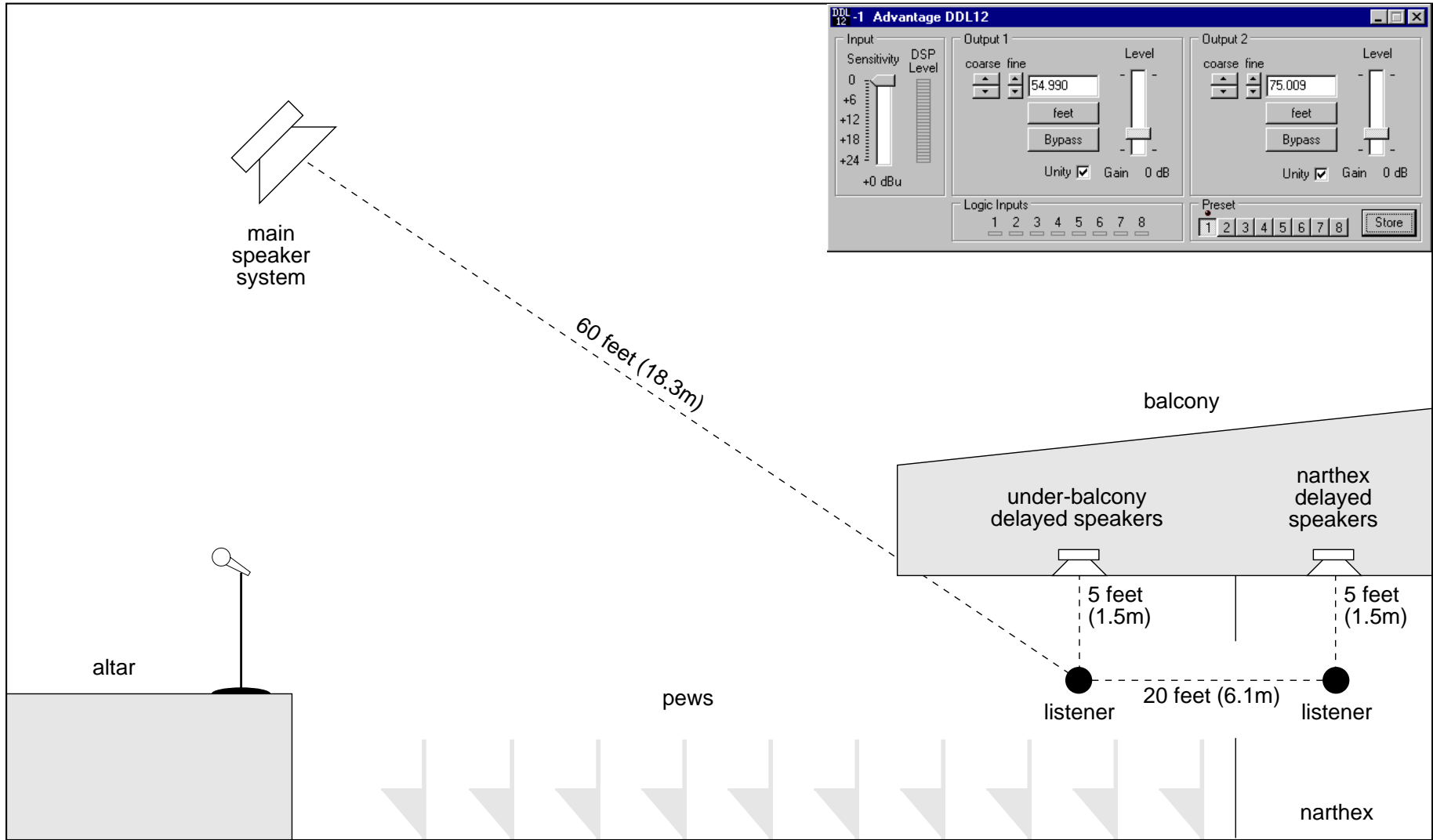
Output 1

coarse fine

90.006

feet

Bypass

Level

Unity ☑   Gain   0 dB

Output 2

coarse fine

310.997

feet

Bypass

Level

Unity ☑   Gain   0 dB

Logic Inputs
1 2 3 4 5 6 7 8

Preset
1 2 3 4 5 6 7 8   Store

Frequency Response (20Hz~20kHz @ +4dBu)**:**	+0/-0.5dB	**Analog-to-Digital Converter:**	64x oversampled 16-bit sigma-delta
THD + Noise (20Hz~20kHz @ +4dBu)**:**	< 0.01%	**Digital-to-Analog Converter:**	128x oversampled 16-bit sigma-delta
Dynamic Range (20Hz~20kHz)**:**	88dB	**Propagation Delay:**	1.25mSec
Input Impedance (balanced)**:**	20k ohms	**Power Requirements:**	115/230VAC 50/60Hz
Maximum Input (unity gain)**:**	+24dBu	**Power Consumption:**	< 10 watts
Output Impedance:	200 ohms	**Dimensions:**	
Maximum Output (2k ohm load)**:**	+24dBu	height (1 rack-space)	1.75 inches (44mm)
Delay Range:	1.25 mSec to 1.35 Sec	width	19 inches (483mm)
Delay Resolution (minimum increments)**:**	20.8 uS	depth	7 inches (178mm)
Sampling Rate:	48kHz	**Weight:**	5.8 lbs (2.63kg)

DDL12 Block Diagram
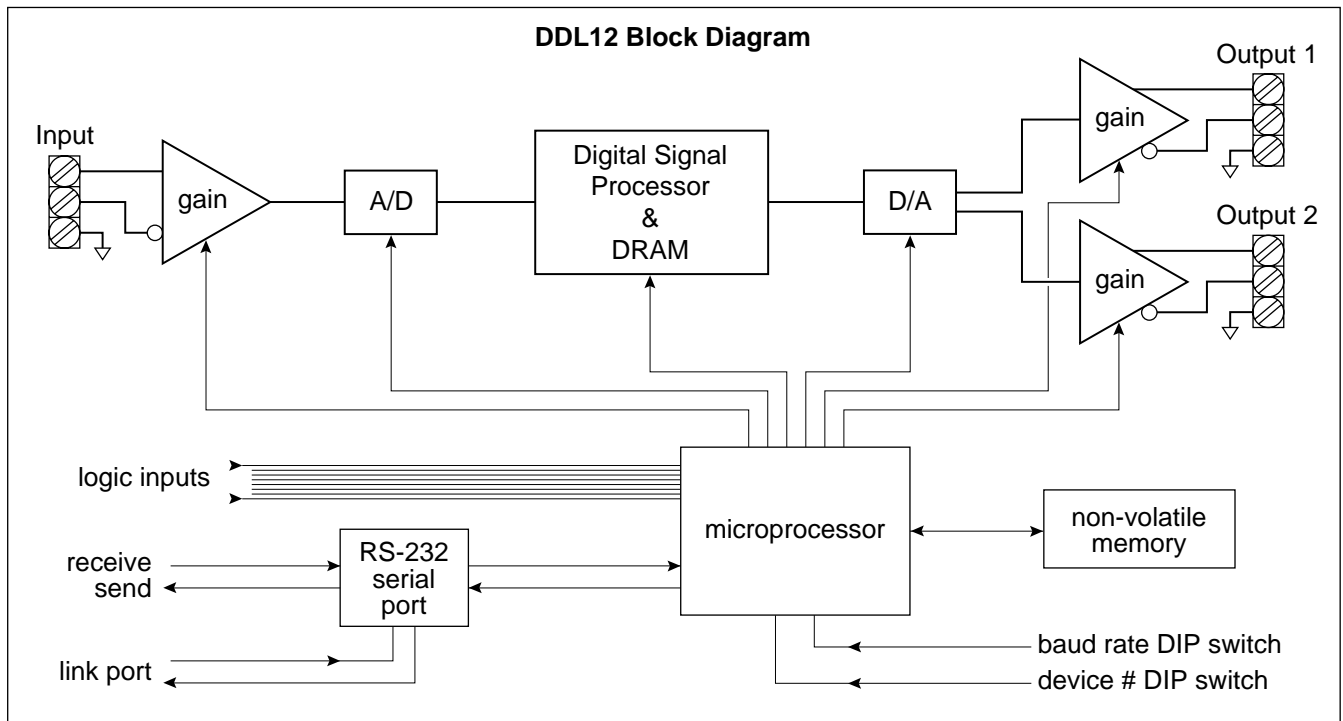
BIAMP SYSTEMS IS PLEASED TO EXTEND THE FOLLOWING 5-YEAR LIMITED WARRANTY TO THE ORIGINAL PURCHASER OF THE PROFESSIONAL SOUND EQUIPMENT DESCRIBED IN THIS MANUAL.

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

585.0144.00

Free Manuals Download Website

http://myh66.com

http://usermanuals.us

http://www.somanuals.com

http://www.4manuals.cc

http://www.manual-lib.com

http://www.404manual.com

http://www.luxmanual.com

http://aubethermostatmanual.com

Golf course search by state

http://golfingnear.com

Email search by domain

http://emailbydomain.com

Auto manuals search

http://auto.somanuals.com

TV manuals search

http://tv.somanuals.com