LBC-HDBT-T/R-ICP

LINK BRIDGE™ HBASET HDMI TRANSMISSION SYSTEM WITH INLINE CONTROL PROCESSOR

BROADATA COMMUNICATIONS, INC.

SAFETY INSTRUCTIONS AND COMPLIANCE DECLARATIONS

PLEASE OBSERVE THE FOLLOWING SAFETY PRECAUTIONS AS OUR

PRODUCTS CONTAIN

CLASS I LASER PRODUCTS

WARNING

This product is a **CLASS I LASER PRODUCT** only when the units are connected with a fiber optical cable. Do not disconnect the fiber optic connector while the unit is powered up. Exposure to laser radiation is possible when the laser fiber optic connector is disconnected while the unit is powered up. It should be noted that when the fiber is disconnected, the product will have **CLASS IM INVISIBLE LASER RADIATION.**

Although the fiber optic connectors in this product emit only Class 1 energy that is below the levels considered to be hazardous, one should never stare directly into a fiber optic connector or an unconnected fiber end unless one can be certain that no exposure to laser energy could occur.

CAUTION

Only service personnel are intended to access the interior of the units. It should be cautioned that CLASS 3 INVISIBLE LASER RADIATION WHEN OPEN, AVOID EXPOSURE TO THE BEAM. The use of controls, making adjustments, or performing operations other than those specified may result in hazardous radiation exposure. This product has operating wavelengths at 778nm, 800nm with average -0.5dB to 0dBm optical power per wavelength, 825nm, 911nm, and 980nm. The laser is operated in pulse mode within 1 KHz frequency and ¼ duty cycle.

The following label or equivalent is located on the surface of laser products. This label indicates that the product is classified as a CLASS 1 LASER PRODUCT.

SURGE PROTECTION DEVICE RECOMMENDED

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

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1.0 PRODUCT DESCRIPTION

LBC-HDBT-T/R-ICP

- An HDBaseT HDMI extender with multiple control I/O ports
- Not only extend HDMI video, but also provide in-line control I/O paths, over HDBaseT link

EXTENDER

- Extend HDMI, IR, LAN, and RS-232 up to 100 meters over 1 CAT 5e/6 Cable
- Full HDTV video resolutions for 4K2K and 1080p/1080i/720p
- Fully uncompressed video and audio, provides zero loss of quality
- Supports True DDC/EDID/HDCP transmission
- Bi-directional POH

INLINE CONTROL PROCESSORS (ICP)

- Control I/O ports contain:
  - two (2) RS-232
  - two (2) Relay
  - two (2) Digital I/O
  - one (1) IR
  - one (1) Ethernet
- Control and monitor AV devices using a standard Ethernet network (Smart phone or PC) or RS-232 (keypad)
- Front panel port status indicators
- User friendly customizable control configurations via built-in web server

Figure 1-1 shows a typical application diagram.

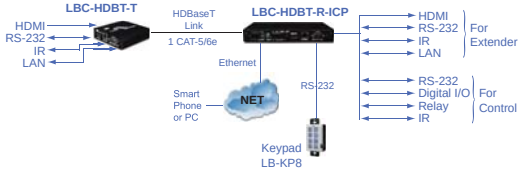


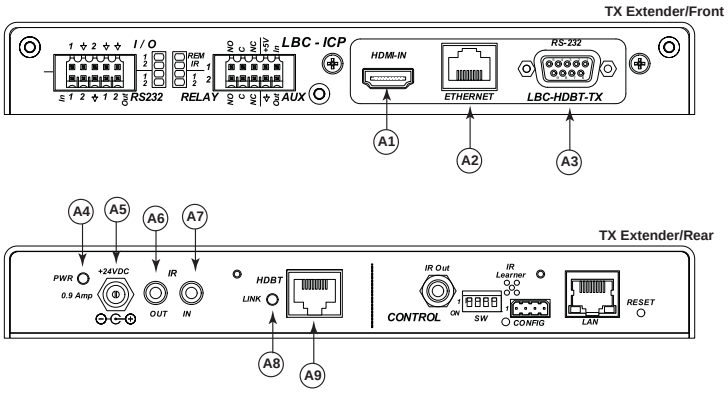
Figure 1-1

ORDERING INFORMATION

LBC-HDBT-T-ICP Link Bridge Transmitter w/IR/RS-232/Ethernet and Control I/O Ports
LBC-HDBT-R-ICP Link Bridge Receiver w/IR/RS-232/Ethernet and Control I/O Ports

2.0 OPERATION CONTROLS AND FUNCTIONS

2.1 Transmitter Extender Front and Rear Panels



A1. HDMI In: Connect to HDMI source equipment such as a DVD or Blu-ray player.

A2. LAN: Connect to an internet or network connection.

A3. RS-232 In: Connect to a PC or laptop with D-Sub 9 pin male cable for the transmission of RS-232 commands.

A4. Power LED: This blue LED will illuminate when the device is connected to a power supply.

A5. DC 24V: Plug the 24 V DC power supply into the unit and connect the adaptor to an AC outlet. Only one side of power needs to be connected to activate both transmitter and receiver.

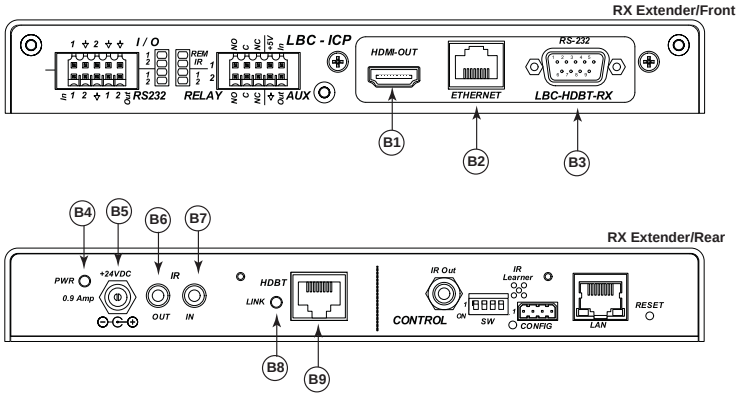
A6. IR 1 Blaster: Connect to the supplied IR blaster cable for IR signal transmission. Place the IR blaster in direct line-of-sight of the equipment to be controlled.

A7. IR 2 Extender: Connect to the supplied IR receiver cables for IR signal reception. Ensure that remote being used is within the direct line-of-sight of the IR extender.

A8. Link LED: The yellow LED will illuminate when both the input and output signals are connected.

A9. CAT5e/6 Out: Connect to the reciever unit with a Single CAT5e/6 cable for tranmission of all data signals.

2.2 Receiver Extender Front and Rear Panels



B1. HDMI Out: Connect to a HDMI equipped TV/monitor for display of the HDMI input source signal.

B2. LAN: Connect to a PC or Laptop to the Internet or network connection.

B3. RS-232 Out: Connect to the device that is to be controlled (via D-Sub 9 pin female cable) by RS-232 commands.

B4. Power LED: This blue LED will illuminate when the device is connected to a power supply.

B5. DC 24V: Plug the 24 V DC power supply into the unit and connect the adaptor to an AC outlet. Only one side of power needs to be connected to activate both transmitter and receiver.

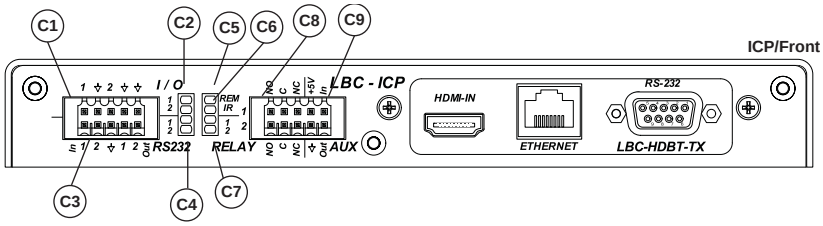
B6. IR 2 Blaster: Connect to the supplied IR blaster cable for IR signal transmission. Place the IR blaster in direct line of sight of the equipment to be controlled.

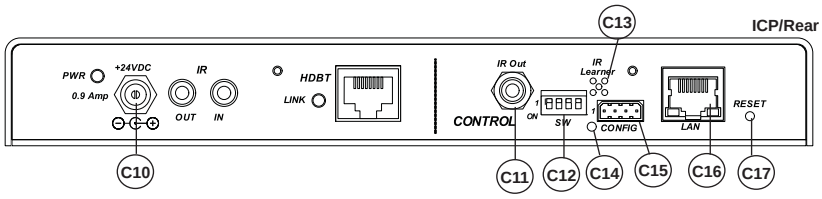
B7. IR 1 Extender: Connect to the supplied IR receiver cables for IR signal reception. Ensure that remote being used is within the direct line-of-sight of the IR extender.

B8. Link LED: The yellow LED will illuminate when both the input and output signals are connected.

B9. CAT5e/6 In: Connect to the transmitter unit with a Single CAT5e/6 cable for tranmission of all data signals.

2.3 ICP Front and Rear Panel





C1. Digital I/O: Digital input/output ports.

C2. Digital I/O LEDs: Light when the corresponding ports are active high.

C3. RS-232: Serial port to control devices.

C4. RS-232 LEDs: Light when the corresponding RS-232 ports are active.

C5. REM LED: Light when the unit is set as a remote unit.

C6. IR LED: Light when the IR out are active.

C7. RELAY LED: Light when the corresponding, normally open pins, are closed.

C8. RELAY: Normally open and normally closed relay ports.

C9. AUX-In and AUX-Out: Reserved.

C10. DC24V: DC power input connector.

C11. IR Out: IR blaster port.

C12. SW: The unit configuration dip switch

C13. IR Learner: Built-in IR receiver for IR learning.

C14. IR Learner LED: Lighted when the unit is IR learning mode.

C15. CONFIG: Configuration/keypad port

C16. LAN: Ethernet connector.

C17. RESET: Press the button to reset the device back to factory default settings.

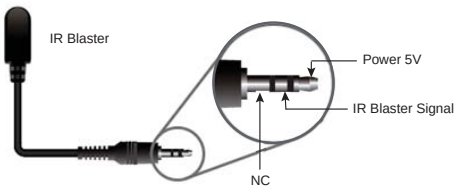
3.0 CONNECTOR PINOUT ASSIGNMENT

3.1 Extender

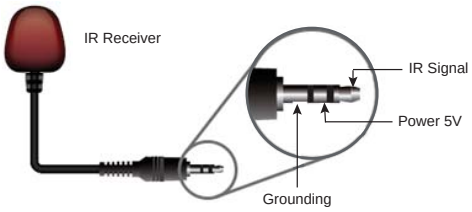
3.1.1 D-Sub Pin Assignment

Pin	Define TX/RX
1	N/C
2	TxD/RxD
3	RxD/TxD
4	N/C
5	GND
6	N/C
7	N/C
8	N/C
9	N/C

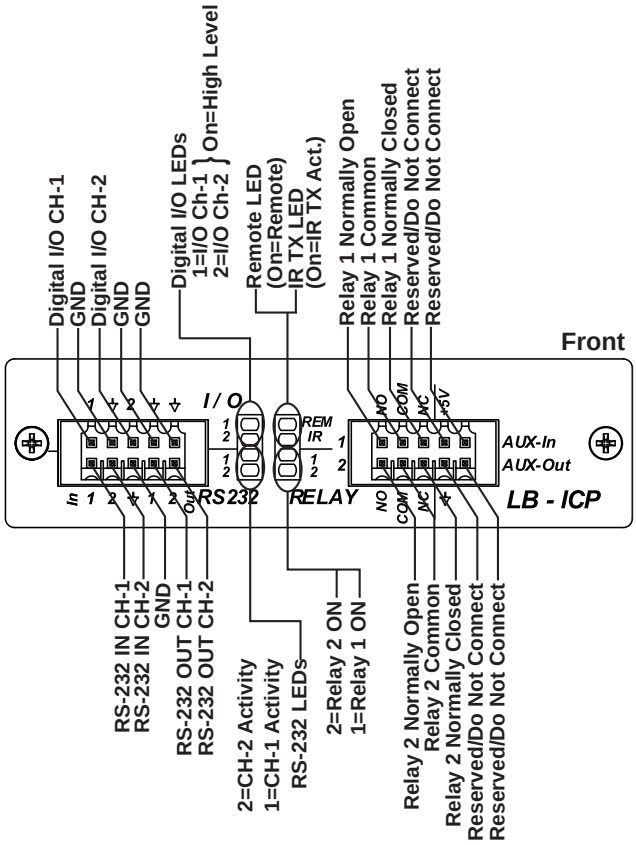
3.1.2 IR Blaster Cable Pin Assignment

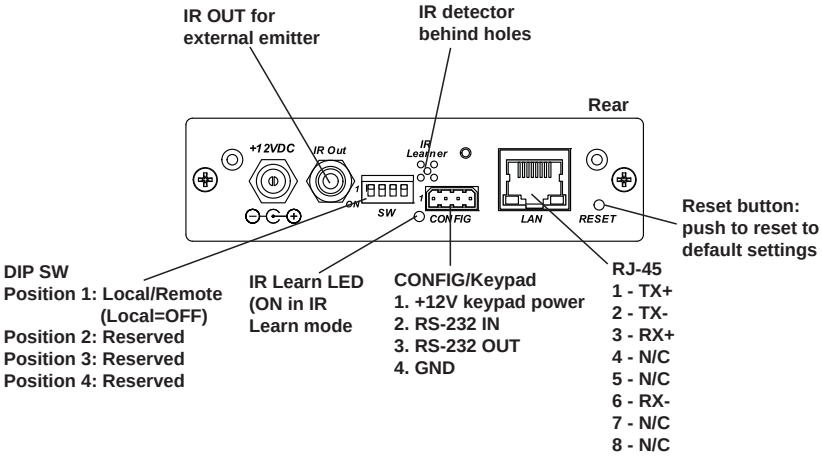


3.1.3 IR Receiver Cable Pin Assignment



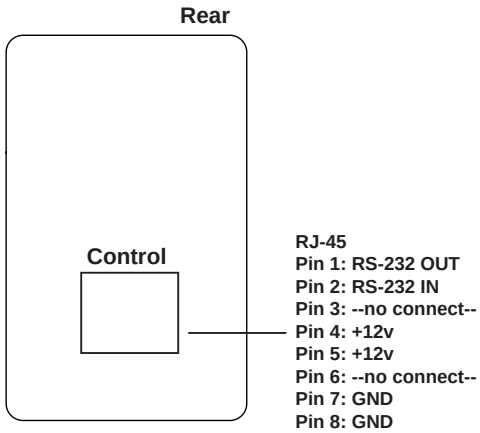
3.2 ICP



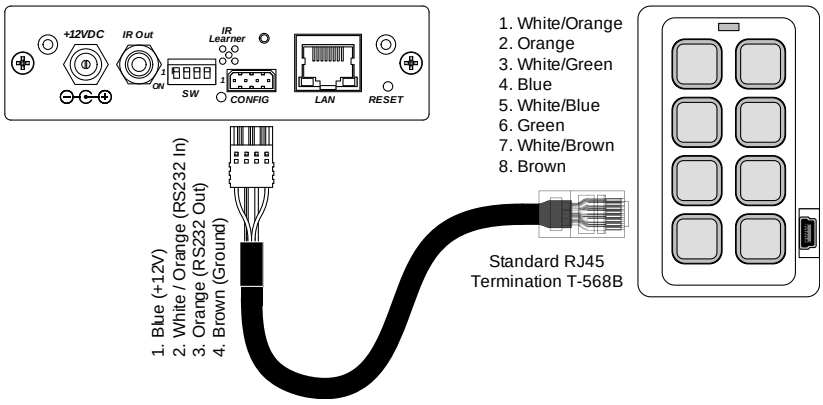


3.3 LB-KP8 Keypad

In many cases, LBC-HDBT-T/R-ICP will need a keypad (LB-KP8) to trigger the preset control function. The following is the connection diagram between LBC-HDBT-T/R-ICP and LB-KP8.



The cable connection between LB-KP8 and LB-ICP is shown below.



4.0 LB-ICP WEB SERVER DESCRIPTION

Introduction

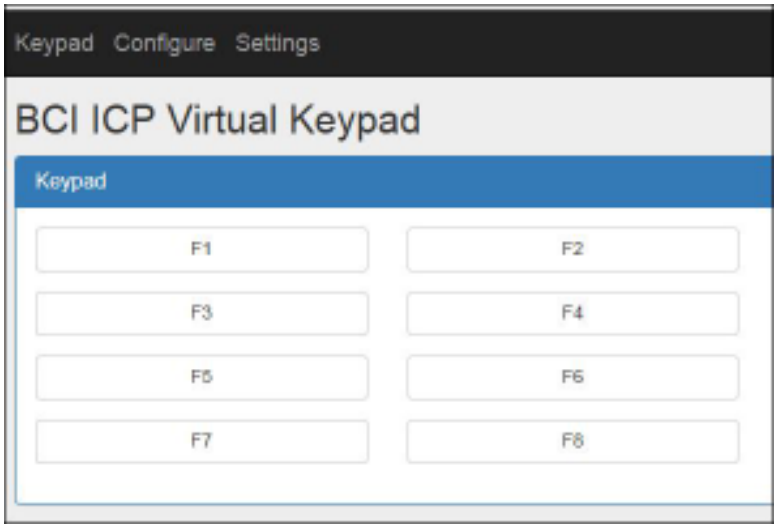
The ICP Web Server provides user friendly and intuitive web pages to configure the 8-button virtual keypad and automation functions within the ICP. It also provides a web page to manage the IR Learner. A standard web browser can be used to access the web pages.

Accessing Web Server

The IP address of the ICP must be obtained in order to access the Web Server. There are 2 ways to obtain the IP address of an ICP.

1) Use the **IPCONFIG** command in the Configuration Port Command Line Interface to display the unit's IP address.
2) Use the **BCI PC Configuration Program** (see Appendix)

Type in the unit's IP address in the web browser. The **ICP Virtual Keypad** page will be displayed. All 8 keys of the Virtual Keypad are un-programmed by default. The keys are configured in the **Configure Key Action** page.



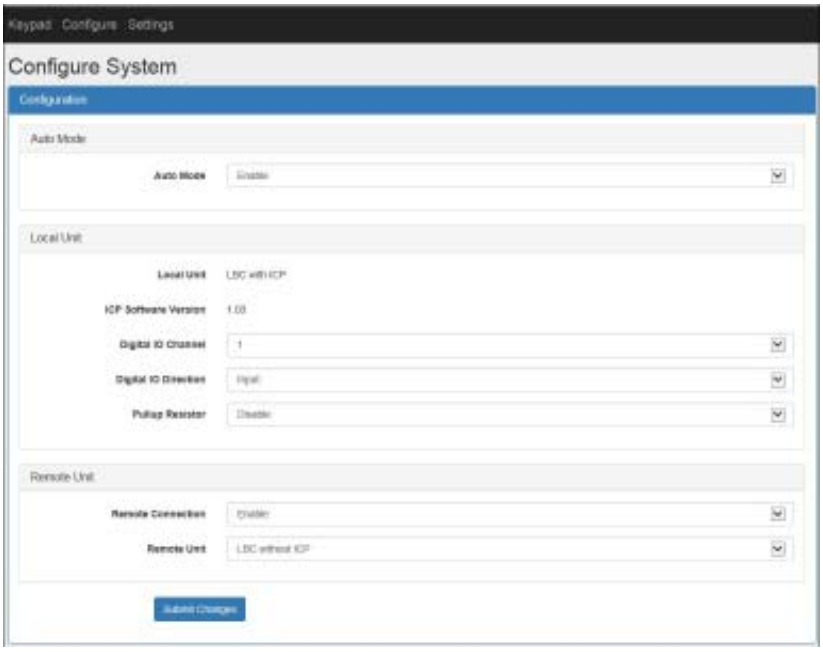
Before configuring the **Virtual Keypad**, the system first needs to be set up using the **Configure System** page. On the top menu bar, click **Configure** and then click **System.** This brings up the ICP Login page.

In the ICP Login type in **admin** for the Userid and **admin** for the Password and then click **Sign in** button. The **Configure System** page will appear. See the following section for **Configure System** page details. Once logged in, the user is free to open any of the **Configure** or **Settings** pages. The default Password can be changed using the **BCI Product Configuration** program (see Appendix).

Configure System

The **Configure System** page is used to configure the local unit and remote unit types. The digital IO settings on the local unit are also configured on this page.

On the top menu bar, click **Configure** and then click **System.**



Auto Mode

Select **Enable** to enable the auto mode triggers defined in the **Configure Auto Action** page. Select **Disable** to disable all auto mode triggers.

Local Unit

The first two lines show the Local unit type and software version. The next 3 pull down menus are used to configure the Digital IO settings. Digital IOs are inputs by default and show up as triggers in the **Configure Auto Actions** page.

Digital IO Channel: Select channel **1** or **2**.

Digital IO Direction: Select channel as a digital **Input** or **Output**.

If the Digital IO Direction is set to **Input**, there is an option for **Pullup Resistor**.

Pullup Resistor: Select **Enable** or **Disable** pull-up resistor.
If the Digital IO Direction is set to **Output**, there is an option for **Digital Output Mode**.

Digital Output Mode: Select **TTL** for a 5V compatible TTL type output or **Open Collector** for an open collector type output. An open collector type output can be used to implement a contact closure type output. For example, if a digital output is set to **Open Collector**, setting the Digital Output State to **1 (High)** will emulate a switch closure to ground**.** Setting the Digital Output State to 0 (Low) will emulate a switch being open. The Open Collector output also has an option for a Pullup Resistor.

Remote Unit
This panel enables the connection with the remote unit and selects the remote unit type. This panel is not available if the Local unit type is **Standalone ICP**.

Remote Connection: Select **Enable** to enable the connection with the remote unit. Select **Disable** to disable the connection with the remote unit and enable the RS-232 pass-through channel. None of the remote unit control outputs will be available once **Disable** is selected.

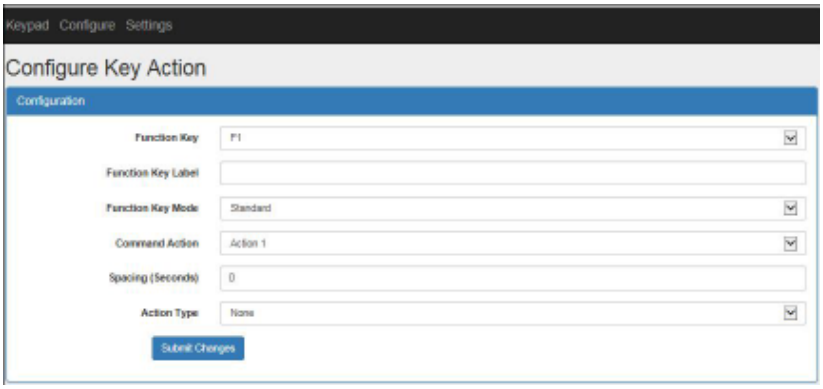
Remote Unit: Select the remote unit type. The available remote unit types are **LBC without ICP**, **LBC with ICP** and **EAD/SCL with ICP.**

NOTE **TO SAVE THE CONFIGURATION CORRECTLY, ONE MUST CLICK "SUBMIT CHANGES" BUTTONS PER EACH ACTION.**

Configure Key Action

The **Configure Key Action** page is used to configure the 8-key virtual keypad. Each function key can be defined to trigger up to 5 different actions.

On the top menu click **Configure** and then click **Key Action**.



Function Key: Select the function key F1 through F8 to be defined.

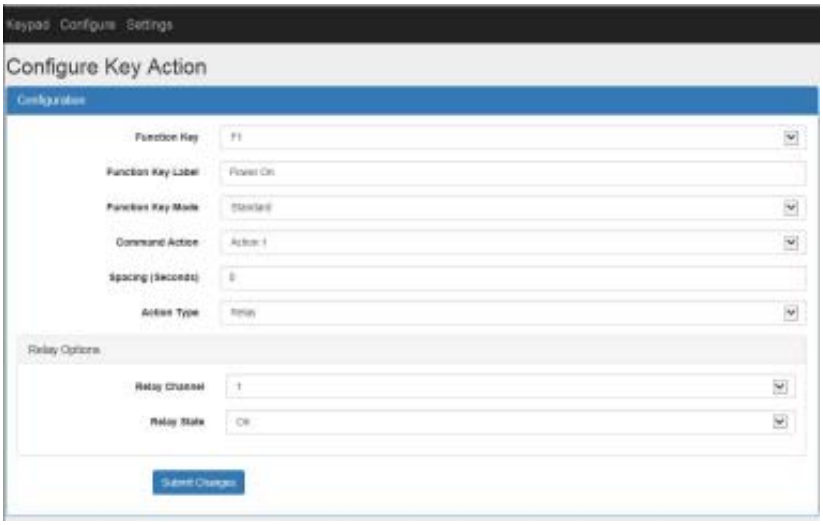
Function Key Label: Type in a label name for the selected function key.

Function Key Mode: Select **Standard** for a “momentary” type key. Only one action is assigned to a **Standard** key. Select **Toggle** for a “toggle” type key. A Toggle key has two states: **Press** and **Release**. One action is assigned to the **Press** state and one action is assigned to the **Release** state.

Command Action: Select the action number to be defined. Action 1 through Action 5 can be defined.

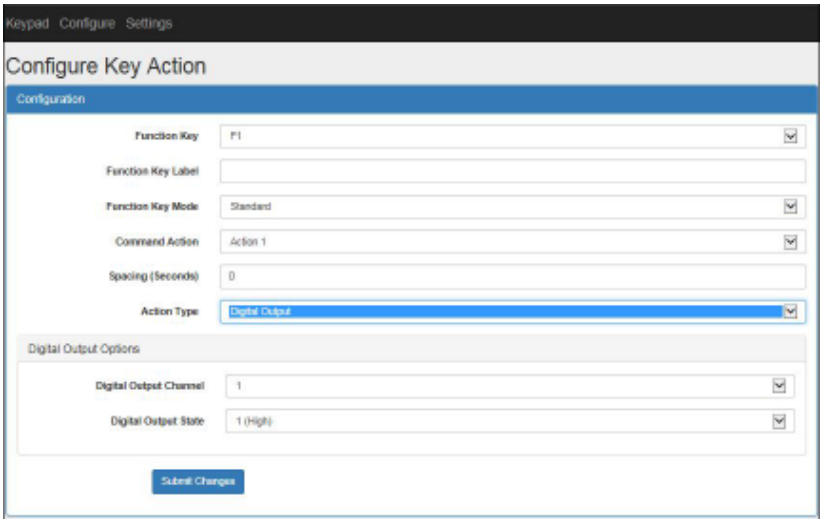
Spacing: Enter the delay (in seconds) desired following the command action.

Action Type: Select the action type. Available types are **None**, **Relay**, **Digital Output**, **RS-232** and **IR**.



Relay Options
Relay Channel: Select the relay channel **1** or **2**.

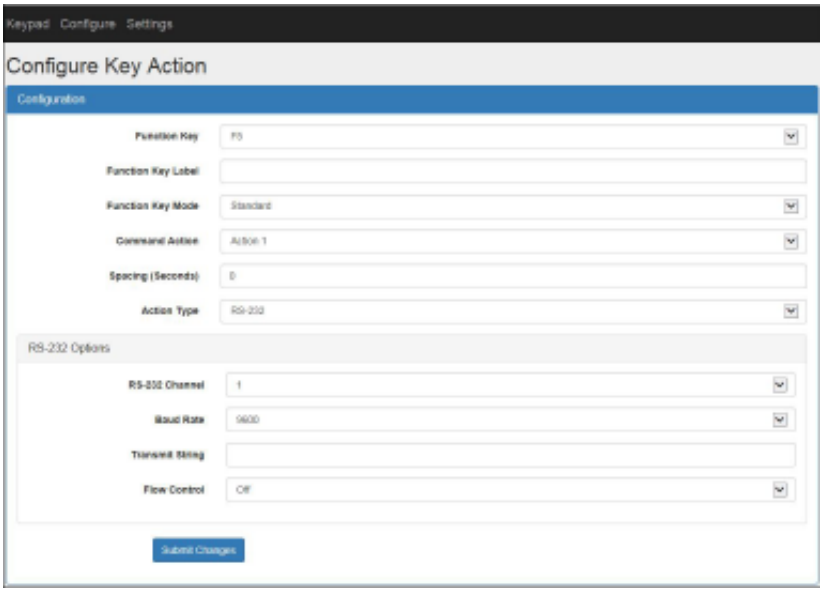
Relay State: Select the relay channel state, **On** (energized) or **Off** (de-energized).



Digital Output Options

Digital Output Channel: Select the digital output channel **1** or **2**. Note: this option is not available if both Digital IO channels are set to Inputs in Configure System page.

Digital Output State: Select the digital output state: **1 (High)** or **0 (Low)**.



RS-232 Options

RS-232 Channel: Select channel 1, 2, 3 or 4. Note: Channels 3 and/or 4 are only available on LBC-ICP (Channel 3 only) and EAD/SCL-ICP (Channel 3 and 4) units.

Channel 1/2: RS-232 control channels.

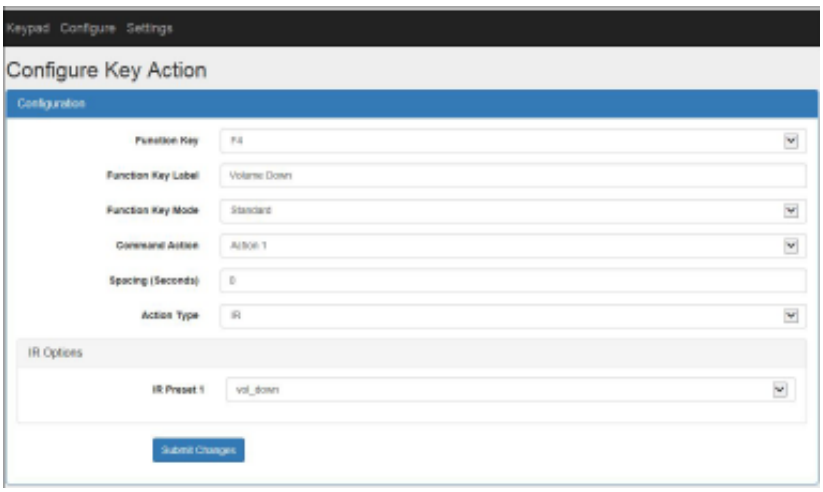
Channel 3: RS-232 control channel or pass-through channel. Channel 3 defaults as a control channel. Set Remote Connection (Configure System page) to Disable in order to configure Channel 3 as a pass-through channel.

Channel 4: Internal serial control channel for EAD or SCL units. This channel is for advanced users. Please consult factory for command line interface.

Baud Rate: Select a baud rate from 2400 to 115200 baud.

Transmit String: Type in the text string to be transmitted. Strings are automatically terminated with CR+LF. Characters enclosed by <> will be treated as hex. For example to transmit 00h enter <00>.

Flow Control: Select **On** to enable flow control and **Off** to disable flow control. Flow control is available only on Channel 1. If flow control is enabled, Channel 2 is no longer available.

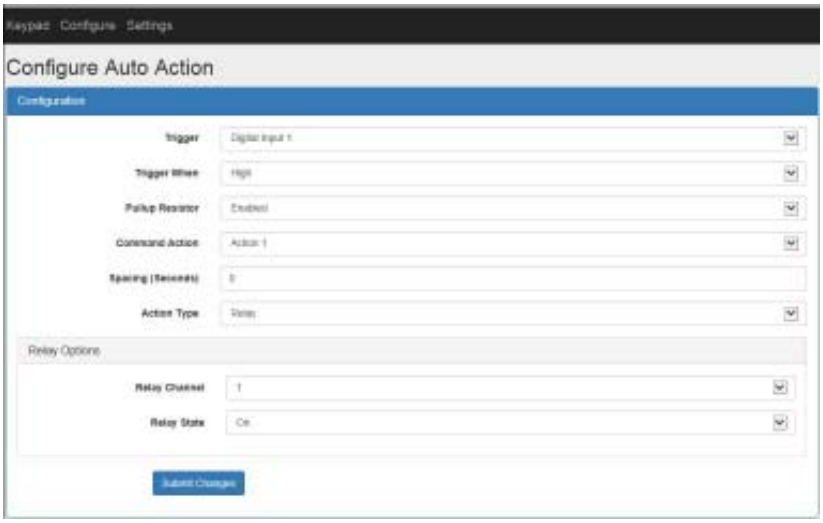


IR Options
IR Preset: Select from list of IR commands stored in memory.

Configure Auto Action

The **Configure Auto Action** page is used to configure a set of auto actions based on a selected trigger. Available triggers are Video Detect, Digital Input 1 and Digital Input 2. The available actions are Relay, RS-232 and IR. Digital Output actions are only available if Digital IOs are configured as outputs in the **Configure System** page. All three triggers work independently and can be triggered simultaneously.

On the top menu click **Configure** and then click **Auto Actions**. The following page will be displayed:



Trigger: Select the auto action trigger. Available triggers are Video Detect Line, Digital Input 1 and Digital Input 2.

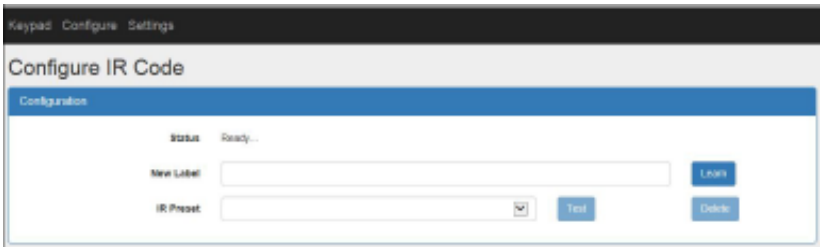
Trigger When: Select **High** for the High signal trigger. Select **Low** for the Low signal trigger. For the Video Detect Line, the trigger options are when Video Detect Line is **Asserted** or **De-asserted**.

Refer to the **Configure Key Action** sections for the rest of the pull down menu descriptions.

Configure IR Code

The **Configure IR Code** page is used to learn and manage IR codes in the ICP. To learn an IR code, type in the label of the IR code in **New Label** and click the **Learn** button. Once IR Learn mode is initiated, the user needs to present an IR signal to the IR receiver port within 30 seconds. If a valid IR code is not presented within 30 seconds, the IR learn process will timeout and the process will need to be re-initiated. After an IR code is learned successfully, it will be stored in memory and appear in the **IR Preset** drop down menu. To test a learned IR code, select the IR code from the IR Preset menu and click **Test** button. Verify that the IR code works correctly on the target device. To delete an IR code from the IR Preset menu, select the desired IR code and click the **Delete** button.

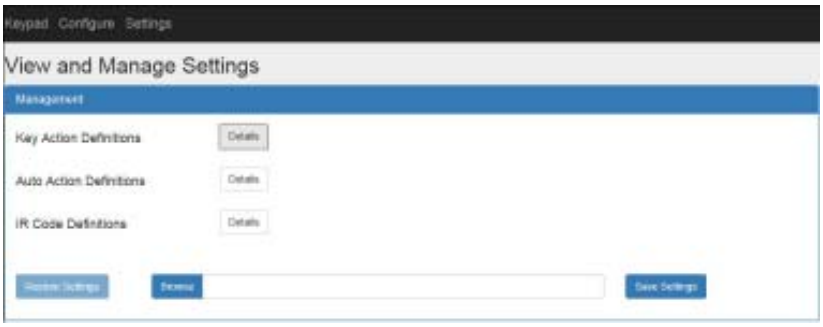
On the top menu click **Configure** and then click **IR Code**. The following page will be displayed:



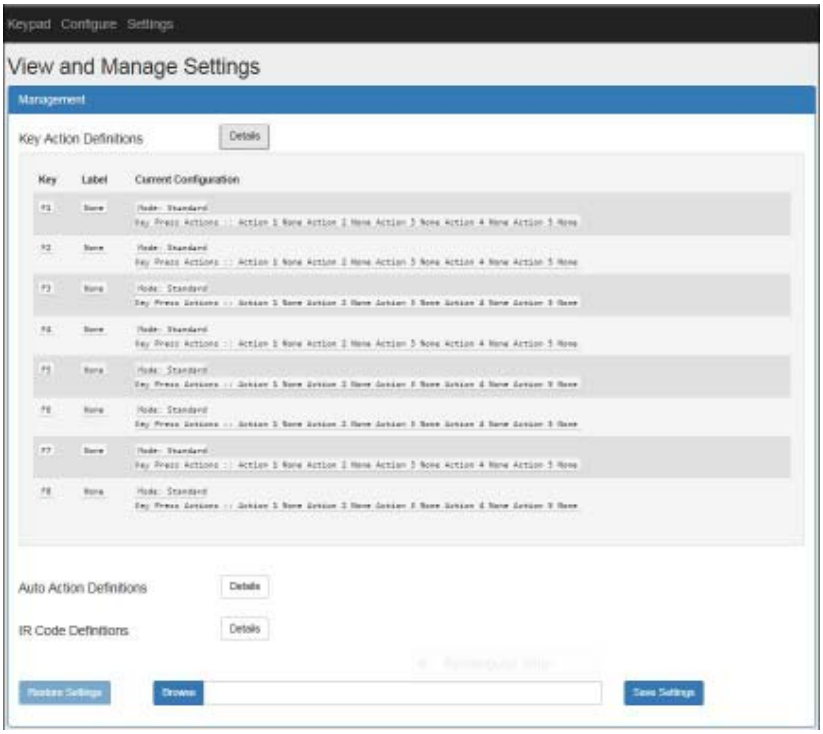
View and Manage Settings

The **View and Manage Settings** page shows the current settings of the **Key Action Definitions**, **Auto Action Definitions** and **IR Code Definitions**. Click the **Details** button next to Key Action Definitions to display the Key Action settings details. Click the **Details** button next to Auto Action Definitions to display Auto Action settings details. Click the Details button next to IR Code Definitions to display the IR Code details. ICP settings are saved to a file on the local PC using the **Save Settings** button. ICP settings are restored from a file using the **Restore Settings** button.

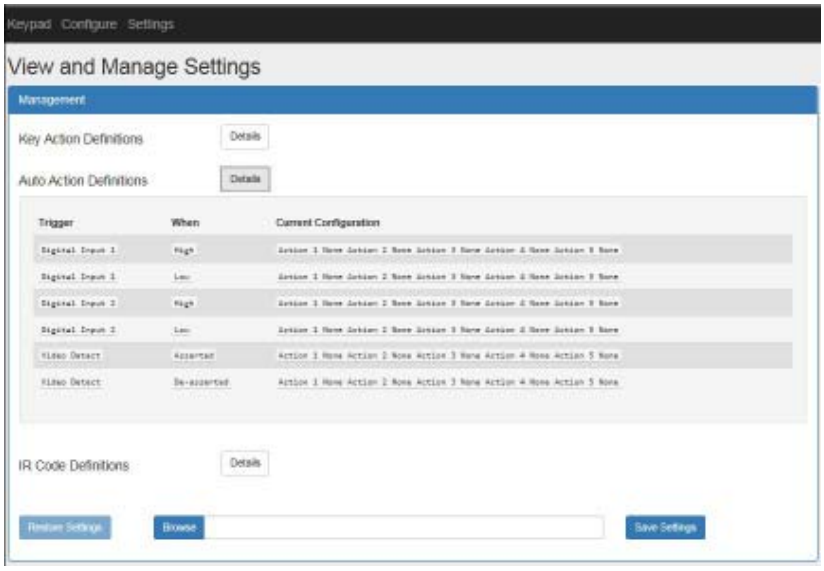
On the top menu click **Settings** and then click **View and Manage Settings**. The following page will be displayed:



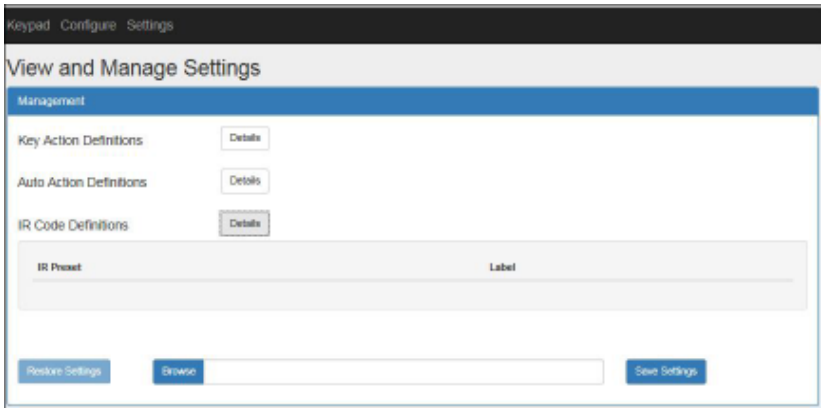
Click the **Key Action Definitions Details** button and the following will be displayed:



Click the **Auto Action Definitions Details** button and the following will be displayed:



Click the **IR Code Definitions Details** button and the following will be displayed:

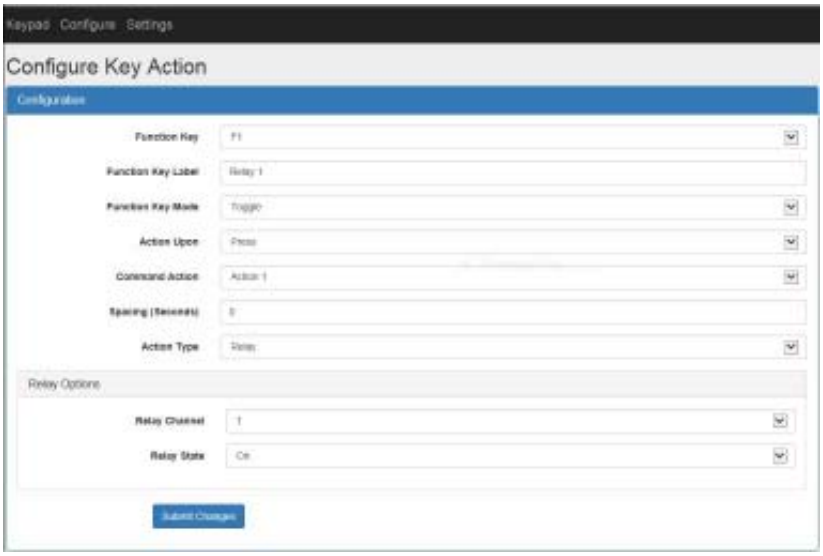


Examples

Example #1: This example configures the F1 key on the virtual keypad as a toggle key to turn on/off Relay channel 1.

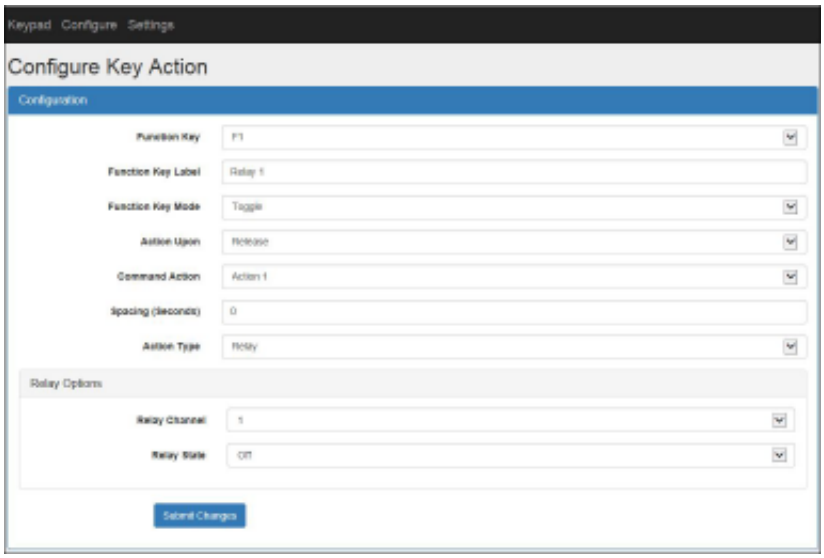
On the top menu click **Configure** and then **Key Action**.

Configure F1 Key toggle-press action, to turn Relay channel 1 On as follows:



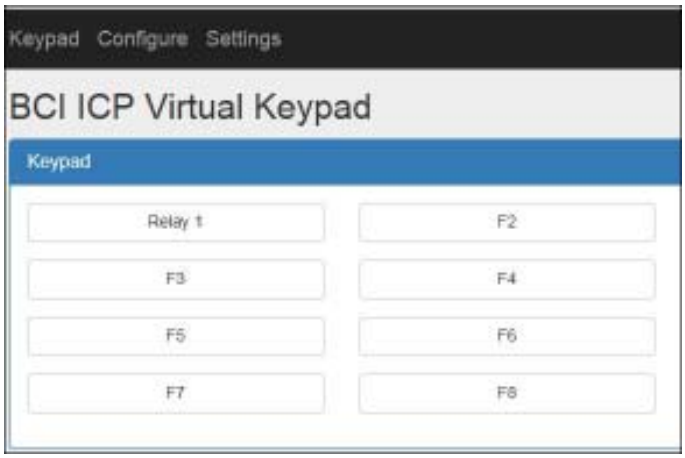
Click **Submit Changes.**

Configure F1 Key toggle-release action, to turn Relay channel 1 Off as follows:



Click **Submit Changes.**

On the top menu click **Keypad**. The following virtual keypad should be displayed:



5.0 SPECIFICATIONS

VIDEO/AUDIO (TRANSMISSION)

HDMI	Version 1.4 with 3D, up to 4K x 2K support
Protocol	DDC/EDID/HDCP Capable
Video Bandwidth	300MHz/10.2Gbps
Audio Formats	Supports up to 7.1CH & Dolby TrueHD, DTS-HD Master Audio
Audio Sampling Rate	32KHz to 192KHz
HDMI/Audio Connector	HDMI Female plug

DATA (TRANSMISSION)

Serial RS-232	
Data Rate	Up to 57.6Kbaud
Connector	DB9 Serial
IR Control	
Data Rate	30-50KHz
In/Out Connectors	3.5mm Stereo
LAN/Ethernet	
Ethernet Speed	100 Mbps
LAN Connector	RJ45

HDBT (TRANSMISSION)

Cable Type	CAT 5e/6 or higher
Number of Cables	1
Connector/Distance	RJ-45/Up to 100m

ETHERNET (CONTROL)

Channel Capacity	1
Connector	Female RJ-45 (integrated Activity and Link LEDs)
Data Rate	10/100Base-T, half/full duplex with autodetect
Protocols	DHCP, HTTP, TCIP/IP, UDP/IP, AUTOIP, Telnet

RS-232 (CONTROL)

Channel Capacity	2 (no flow control) or 1 (with RTS/CTS flow control)
Baud Rate	2400 to 115200 baud (9600 baud=default), 8 data bits, 1 stop bit, no parity
Connector	Terminal block

DIGITAL I/O (CONTROL)

Channel Capacity	2 digital input/output (configurable)
Digital Input	Input voltage range: 0 to 5 VDC Programmable pullup: 2.2k ohms to +5 VDC Threshold low to high: 2 VDC Threshold high to low: 0.8 VDC
Digital Output	Output voltage high: 3 VDC min Output voltage low: 0.55 VDC max (64 mA sink max) Programmable open collector
Connector	Terminal block

IR (CONTROL)

Channel Capacity	1 in and 1 out
Connector	3.5 mm jack (for IR blaster)
Carrier Frequency	30 kHz to 60 kHz (Output) 30 kHz to 60 kHz (IR learning)
IR Learning	2 inches capture distance from panel

RELAY (CONTROL)

Channel Capacity	2 normally open/normally closed relays
Relay Contact Rating	24 VDC, 1A
Connector	Terminal block

PHYSICAL

Dimensions	8.36” (W) x 4.23” (D) x 1.12” (H)
Power Consumption	24 VDC @ 1.25A
Operating Temperature	0 to 50-deg C
Humidity	0 to 95%, non-condensing

6.0 SERVICE PROCEDURE

6.1 Replacement Policy

Standard products found defective on arrival (DOA) will be replaced, based on availability, within 24 to 48 hours anywhere in the U.S. Please call Customer Service at **800-214-0222** for information.

6.2 Return/Repair Service

The Link Bridge LBC-HDBT-T/R-ICP System contains no user serviceable components. If you have a problem with your unit, please contact the Customer Service Department. To facilitate our return/repair processing please contact Broadata Communications, Inc. to obtain a Return Material Authorization (RMA). Please include the following information:

- Product model number
- Serial Number
- Complete description of problem
- Hardware installation description

Broadata Communications, Inc.
2545 West 237th Street, Suite K
Torrance, CA 90505
1-800-214-0222
(310) 530-1416
(310) 530-5958 (Facsimile)
e-mail: CustomerService@Broadatacom.com
Website: www.broadatacom.com

7.0 LIMITED WARRANTY

Broadata Communications, Inc. (BCI) warrants, for a period of one year from date of shipment, each product sold shall be free from defects in material and workmanship. BCI will correct, either by repair, or at BCI's election, by replacement, any said products that in our sole discretion prove to be defective and are returned to the manufacturing location within 30 days after such defect is ascertained. All warranties are limited to defects arising under normal use and do not include malfunctions or failure resulting from misuse, abuse, neglect, alterations, electrical power problems, usage not in accordance with product instructions, improper installation, or damage determined by BCI to have been caused by the Buyer or repair made by a third party. Limited warranties granted on products are to the initial customer end-user and are not transferable. OUR LIABILITY UNDER THIS WARRANTY SHALL IN ANY CASE BE LIMITED TO THE INVOICE VALUE OF THE PRODUCT SOLD AND BCI SHALL NOT BE LIABLE TO ANYONE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING FROM THE USE OF ITS PRODUCTS OR THE SALE THEREOF. We make NO WARRANTY AS TO THE MERCHANTABILITY OF ANY GOODS, OR THAT THEY ARE FIT FOR ANY PARTICULAR PURPOSE OR END APPLICATION NOR DO WE MAKE ANY WARRANTY, EXPRESSED OR IMPLIED OTHER THAN AS STATED ABOVE.

Broadata Communications, Inc.
2545 West 237th Street, Suite K
Torrance, CA 90505
1-800-214-0222
(310) 530-1416
(310) 530-5958 (Facsimile)
e-mail: CustomerService@Broadatacom.com
Website: www.broadatacom.com

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