

LB-ICP

LINK BRIDGE™
INLINE CONTROL PROCESSOR



LB-KP8

KEYPAD, 8 KEYS WITH RS-232 INTERFACE



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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

LB-ICP

- An inline control processor with multiple control I/O ports
- 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 or a keypad
- Front panel port status indicators
- User friendly customizable control configurations via built-in web server

LB-KP8

- 8-key keypad with RS-232 interface
- Powered by LB-ICP
- User configurable buttons with dual color and backlit
- Replaceable button labels

Figure 1-1 shows a typical application diagram.

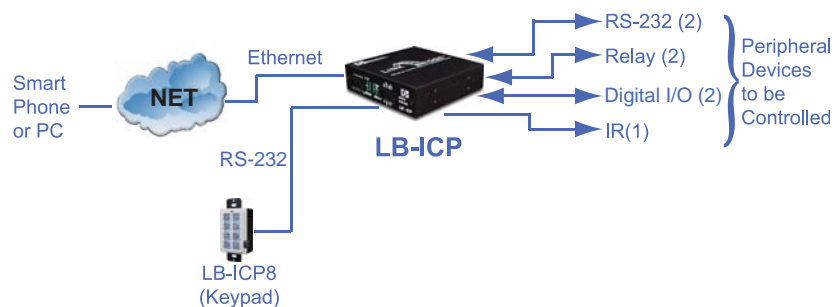


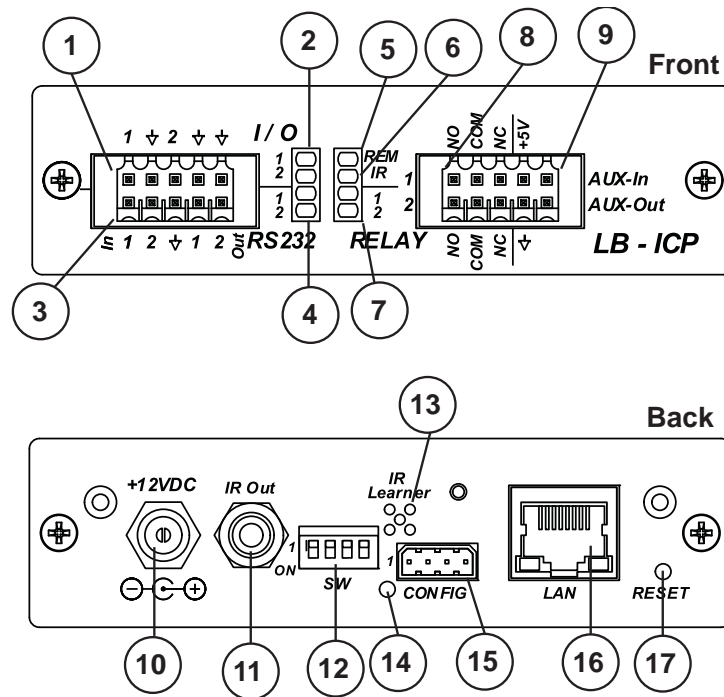
Figure 1-1

ORDERING INFORMATION

LB-ICP Link Bridge Inline Control Processor
LB-KP8 Link Bridge Keypad, 8 Keys, RS-232 Interface

2.0 OPERATION CONTROLS AND FUNCTIONS

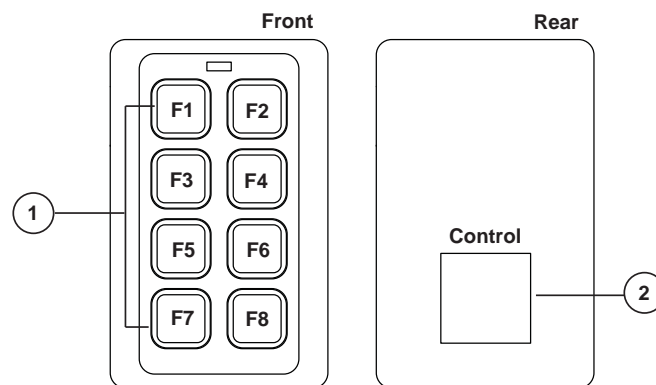
2.1 LB-ICP Front and Rear Panel



1. Digital I/O: Digital input/output ports.
2. Digital I/O LEDs: Light when the corresponding ports are active high.
3. RS-232: Serial port to control devices.
4. RS-232 LEDs: Light when the corresponding RS-232 ports are active.
5. REM LED: Light when the unit is set as a remote unit.
6. IR LED: Light when the IR out are active.
7. RELAY LED: Light when the corresponding, normally open pins, are closed.
8. RELAY: Normally open and normally closed relay ports.
9. AUX-In and AUX-Out: Reserved.

10. DC12V: DC power input connector.
11. IR Out: IR blaster port.
12. SW: The unit configuration dip switch
13. IR Learner: Built-in IR receiver for IR learning.
14. IR Learner LED: Lighted when the unit is IR learning mode.
15. CONFIG: Configuration/keypad port
16. LAN: Ethernet connector.
17. RESET: Press the button to reset the device back to factory default settings.

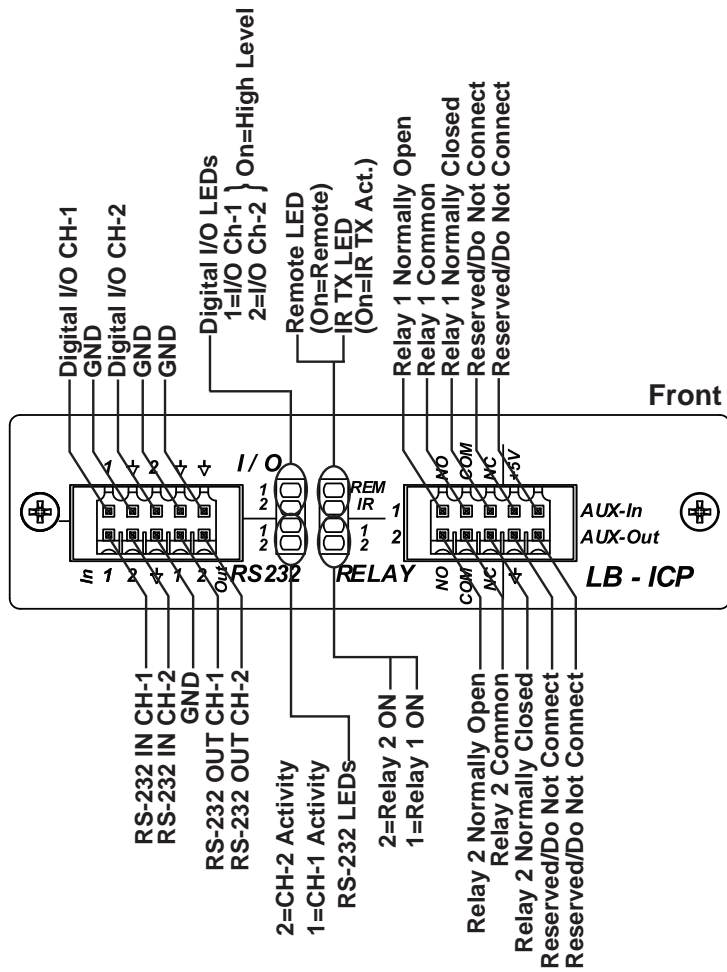
2.2 LB-KP8 Front and Rear Panel

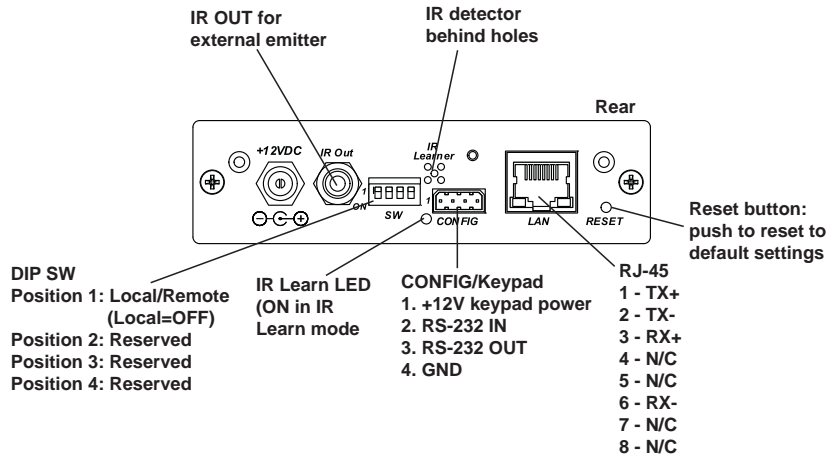


1. F1 - F8: Functional keys for activating user-defined control functions.
2. Keypad control port (RJ-45), connects to LB-ICP CONFIG port (labeled 15 in LB-ICP).
3. Cable connection between LB-ICP and LB-KP8.

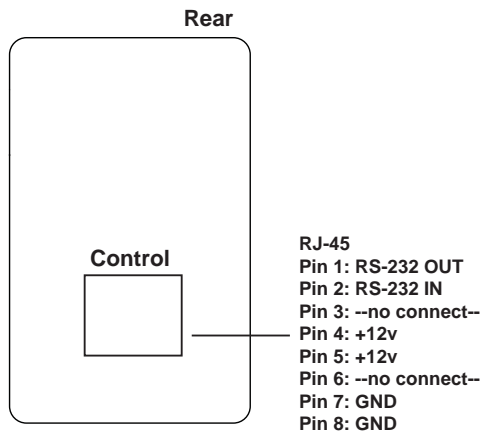
3.0 CONNECTOR PINOUT ASSIGNMENT

3.1 LB-ICP

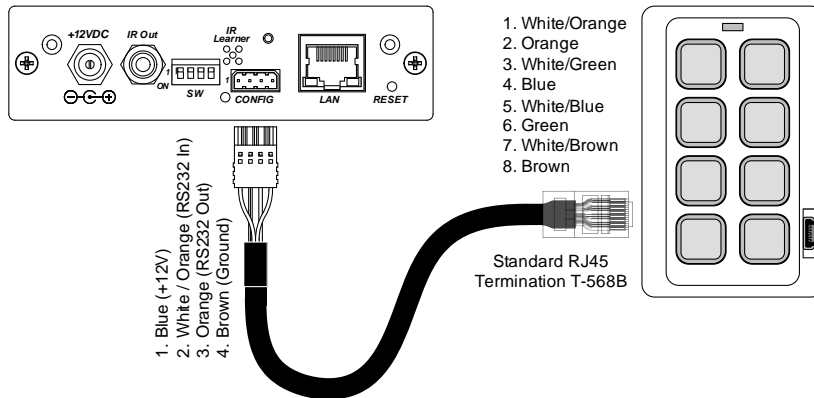




3.2 LB-KP8



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



4.0 LB-ICP WEB SERVER DESCRIPTION

Introduction

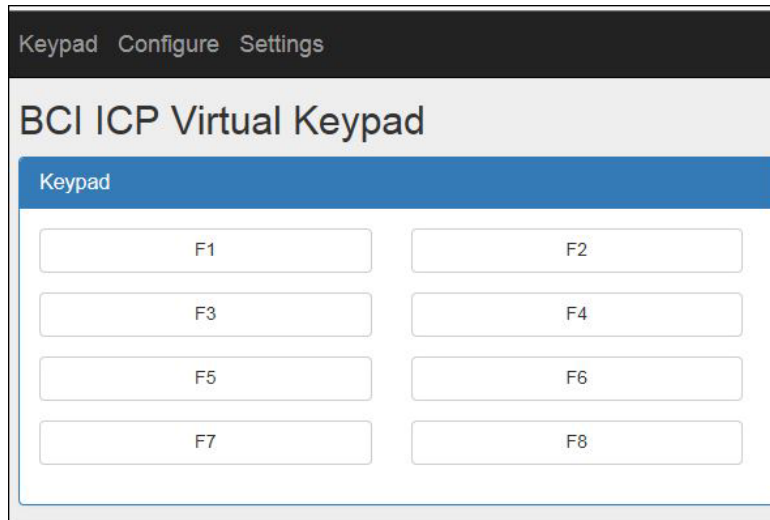
The ICP Web Server provides user friendly and intuitive web pages to configure the 8-button virtual keypad and automation functions within the ICP. It also provides a web page to manage the IR Learner. A standard web browser can be used to access the web pages.

Accessing Web Server

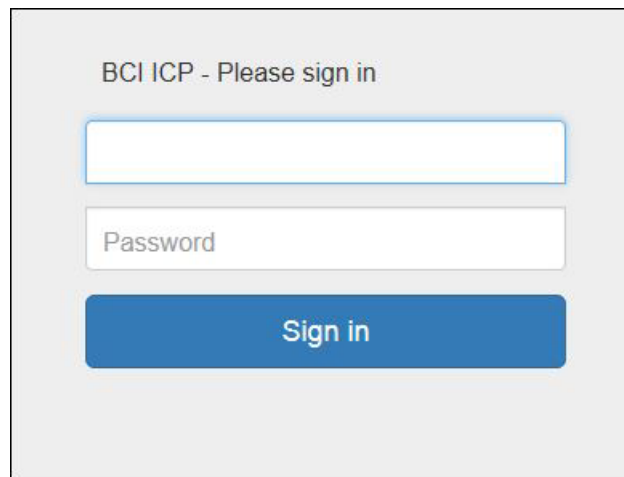
The IP address of the ICP must be obtained in order to access the Web Server. There are 2 ways to obtain the IP address of an ICP.

- 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.



The image shows a login form titled "BCI ICP - Please sign in". It contains two input fields: the first is empty, and the second is labeled "Password". Below the fields is a blue button labeled "Sign in".

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**.

Keypad Configure Settings

Configure System

Configuration

Auto Mode

Auto Mode: Enable

Local Unit

Local Unit: LBC with ICP

ICP Software Version: 1.03

Digital IO Channel: 1

Digital IO Direction: Input

Pullup Resistor: Disable

Remote Unit

Remote Connection: Enable

Remote Unit: LBC without ICP

Submit Changes

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**.

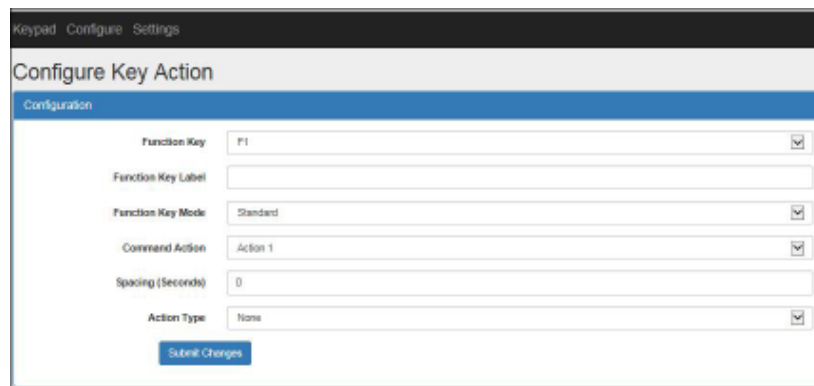
NOTE

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**.



The screenshot shows a web interface for configuring a key action. At the top, there is a navigation bar with 'Keypad', 'Configure', and 'Settings'. Below this is a header 'Configure Key Action' and a sub-header 'Configuration'. The form contains several fields: 'Function Key' (a dropdown menu with 'F1' selected), 'Function Key Label' (a text input field), 'Function Key Mode' (a dropdown menu with 'Standard' selected), 'Command Action' (a dropdown menu with 'Action 1' selected), 'Spacing (Seconds)' (a text input field with '0'), and 'Action Type' (a dropdown menu with 'None' selected). A blue button labeled 'Submit Changes' is located at the bottom of the form.

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**.

Keypad > Configure > Settings

Configure Key Action

Configuration

Function Key: F1

Function Key Label: Power On

Function Key Mode: Standard

Command Action: Action 1

Spacing (Seconds): 0

Action Type: Relay

Relay Options

Relay Channel: 1

Relay State: On

Submit Changes

Relay Options

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

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

Keypad > Configure > Settings

Configure Key Action

Configuration

Function Key: F1

Function Key Label:

Function Key Mode: Standard

Command Action: Action 1

Spacing (Seconds): 0

Action Type: Digital Output

Digital Output Options

Digital Output Channel: 1

Digital Output State: 1 (High)

Submit Changes

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)**.

Keypad Configure Settings

Configure Key Action

Configuration

Function Key: F5

Function Key Label:

Function Key Mode: Standard

Command Action: Action 1

Spacing (Seconds): 0

Action Type: RS-232

RS-232 Options

RS-232 Channel: 1

Baud Rate: 9600

Transmit String:

Flow Control: Off

Submit Changes

RS-232 Options

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

Keypad > Configure > Settings

Configure Key Action

Configuration

Function Key: F4

Function Key Label: Volume Down

Function Key Mode: Standard

Command Action: Action 1

Spacing (Seconds): 0

Action Type: IR

IR Options

IR Preset 1: vol_down

Submit Changes

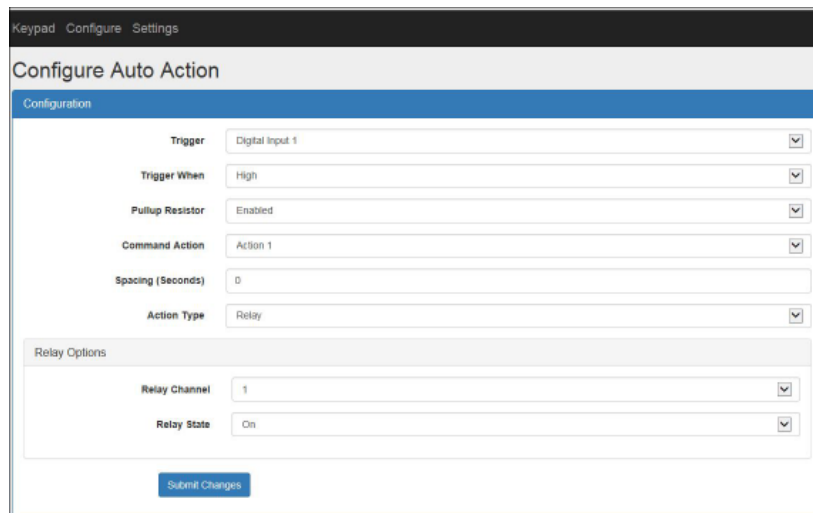
IR Options

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:



The screenshot shows a web interface for configuring an auto action. At the top, there is a navigation bar with 'Keypad', 'Configure', and 'Settings'. Below this is the title 'Configure Auto Action'. The main content area is titled 'Configuration' and contains several dropdown menus and input fields: 'Trigger' (set to 'Digital Input 1'), 'Trigger When' (set to 'High'), 'Pullup Resistor' (set to 'Enabled'), 'Command Action' (set to 'Action 1'), 'Spacing (Seconds)' (set to '0'), and 'Action Type' (set to 'Relay'). Below these is a section titled 'Relay Options' with 'Relay Channel' (set to '1') and 'Relay State' (set to 'On'). At the bottom of the form is a 'Submit Changes' button.

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:



Keypad Configure Settings

Configure IR Code

Configuration

Status Ready...

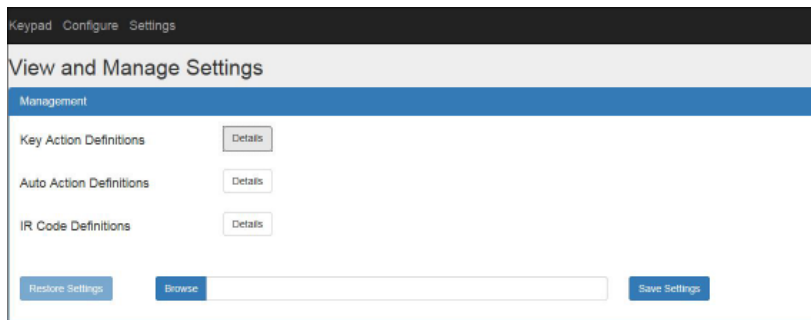
New Label Learn

IR Preset Test Delete

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:

The screenshot displays the 'View and Manage Settings' page. At the top, there are navigation tabs for 'Keypad', 'Configure', and 'Settings'. Below this is a 'Management' section with a 'Key Action Definitions' sub-section. A 'Details' button is visible next to the sub-section title. The main content is a table with the following structure:

Key	Label	Current Configuration
F1	None	Mode: Standard Key Press Actions : Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
F2	None	Mode: Standard Key Press Actions : Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
F3	None	Mode: Standard Key Press Actions : Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
F4	None	Mode: Standard Key Press Actions : Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
F5	None	Mode: Standard Key Press Actions : Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
F6	None	Mode: Standard Key Press Actions : Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
F7	None	Mode: Standard Key Press Actions : Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
F8	None	Mode: Standard Key Press Actions : Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None

Below the table, there are sections for 'Auto Action Definitions' and 'IR Code Definitions', each with a 'Details' button. At the bottom, there are buttons for 'Previous Settings', 'Done', a search input field with a magnifying glass icon, and 'Save Settings'.

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

The screenshot shows the 'View and Manage Settings' page with the 'Auto Action Definitions' section expanded. It contains a table with the following data:

Trigger	When	Current Configuration
Digital Input 1	High	Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
Digital Input 1	Low	Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
Digital Input 2	High	Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
Digital Input 2	Low	Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
Video Detect	asserted	Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None
Video Detect	De-asserted	Action 1 None Action 2 None Action 3 None Action 4 None Action 5 None

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

The screenshot shows the 'View and Manage Settings' page with the 'IR Code Definitions' section expanded. It displays a table with the following structure:

IR Present	Label
------------	-------

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:

The screenshot shows a web interface for configuring a key action. At the top, there are navigation links: 'Keypad', 'Configure', and 'Settings'. The main heading is 'Configure Key Action'. Below this is a 'Configuration' section with several fields: 'Function Key' (dropdown menu with 'F1' selected), 'Function Key Label' (text input with 'Relay 1'), 'Function Key Mode' (dropdown menu with 'Toggle' selected), 'Action Upon' (dropdown menu with 'Press' selected), 'Command Action' (dropdown menu with 'Action 1' selected), 'Spacing (Seconds)' (text input with '0'), and 'Action Type' (dropdown menu with 'Relay' selected). Below the configuration section is a 'Relay Options' section with two dropdown menus: 'Relay Channel' (with '1' selected) and 'Relay State' (with 'On' selected). At the bottom of the form is a blue button labeled 'Submit Changes'.

Click **Submit Changes**.

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

Keypad Configure Settings

Configure Key Action

Configuration

Function Key: F1

Function Key Label: Relay 1

Function Key Mode: Toggle

Action Upon: Release

Command Action: Action 1

Spacing (Seconds): 0

Action Type: Relay

Relay Options

Relay Channel: 1

Relay State: Off

Submit Changes

Click **Submit Changes**.

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

Keypad Configure Settings

BCI ICP Virtual Keypad

Keypad

Relay 1	F2
F3	F4
F5	F6
F7	F8

5.0 SPECIFICATIONS

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, TCP/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
<u>Relay (Control)</u>	
Channel Capacity	2 normally open/normally closed relays
Relay Contact Rating	24 VDC, 1A
Connector	Terminal block
<u>Physical (LB-ICP)</u>	
Dimensions	4.17" (W) x 4.10" (D) x 1.12" (H)
Power Consumption	12 VDC @ 0.5A
Operating Temperature	0 to 50-deg C
Humidity	0 to 95%, non-condensing
<u>KEYPAD (LB-KP8)</u>	
Dimensions	1.78" (W) x 1.66" (D) x 2.85" (H)
Configuration Port	RS-232, baud rate 19200 baud, 8 data bits, 1 stop bit, no parity
Power	12 VDC (powered by LB-ICP)

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 LB-ICP/LB-KP8 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

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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.

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60000-LB-ICP/LB-KP8