LBC-H/O-R-ICP

LINK BRIDGE™ HBASET/HDMI
RECEIVER WITH
INLINE CONTROL PROCESSOR

BROADATA COMMUNICATIONS, INC.

SAFETY INSTRUCTIONS AND COMPLIANCE DECLARATIONS

PLEASE OBSERVE THE FOLLOWING SAFETY PRECAUTIONS

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.

TABLE OF CONTENTS

1.0 PRODUCT DESCRIPTION

Overall

- A selectable HDBT or HDMI receiver with multiple control I/O ports
- Provides in-line control I/O paths

Receiver

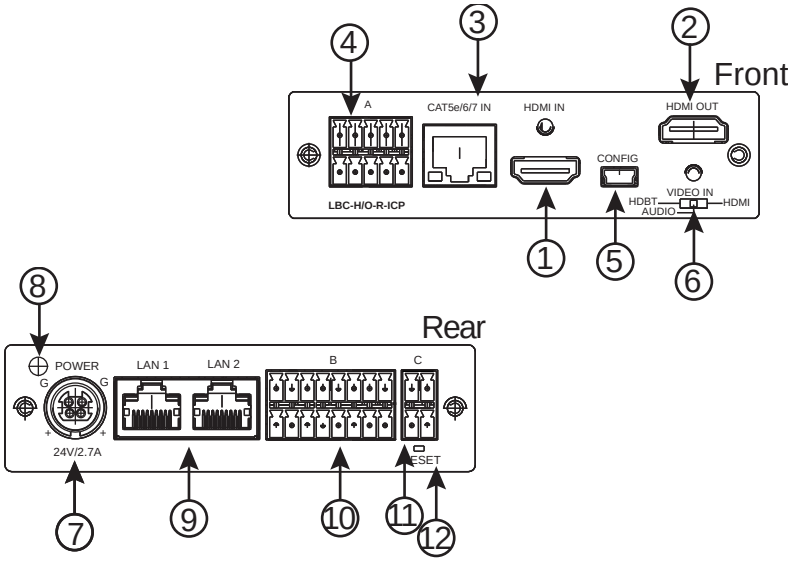
- Receive HDMI, audio, IR, and RS-232 up to 100 meters over 1 CAT-5e/6 cable
- Supports video resolutions up to 1080p 60Hz and 1920 x 1200@60Hz, as well as 4K@30Hz
- Optional 1080p scaler
- Supports HDMI w/embedded audio extraction
- EDID pass-through support, automatically detects the factory setting of the connected display
- HDCP 2.2 support

Control

- Control I/O ports contain:
  - three (3) 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

2.0 OPERATION CONTROLS AND FUNCTIONS

2.1 Receiver Front and Rear Panel



1. HDMI Input connector – Connect an HDMI cable from this port to the HDMI output port of the video source. The connected source can be selected to be displayed on the HDMI Output connector.

2. HDMI Output connector – Connect an HDMI cable from this port to the HDMI input port of the display.

3. HDBT RJ-45 connector – Connect a CAT5e/6/7 cable from this port to the HDBT output port of a compatible transmitter. The yellow LED indicates that the unit has a good HDBT connection with the transmitter. The green LED indicates the port is active.

4. Terminal Block A

Audio In L/R - Connect a stereo audio source to the Audio In (L), Audio In (R) and GND pins. This audio input can be selected as a source for the Audio Out.

Audio Out L/R - Connect the Audio Out (L), Audio Out (R) and GND to the audio input of the receiver/amp. The Audio output can be the de-embedded HDMI audio or Audio Input.

Relay 1 - Connect to a device for relay control. N/O is normally open with respect to COM.

IR+/IR- : Connect to an IR blaster. The IR port can transmit internally stored IR codes or act as an IR pass-through.

5. Configuration connector – Connect a PC to this connector to update the firmware.

6. Video In switch – Select Auto for normal operation. Select HDBT to manually select the video from the transmitter. Select HDMI to manually select the video from the local HDMI Input.

7. Power input connector – Connect to the included +24V supply.

8. Power LED – The green LED indicates the unit is powered up.

9. LAN 1 & LAN 2 RJ-45 connectors - Connect a CATx cable from either LAN 1 or LAN 2 port to a LAN connection. The LAN connection will pass-through to the transmitter. Conversely, if the LAN port of the transmitter is connected to a LAN connection, the LAN connection will pass-through to LAN 1 and LAN 2 ports.

10. Terminal Block B

    Relay 2 – Connect to a device for relay control. N/O is normally open with respect to COM.

    Digital IO 1 & 2 – Each digital IO can be configured as an input or output. When configured as an input, the digital input can be used as a contact closure input to trigger automated actions. When configured as an output, the digital output can drive a 5V TTL level signal to an external device.

    RS-232 1, 2, 3 & 4 - Connect the Tx, Rx and GND pins to the Rx, Tx and GND pins, respectively, of the device to be controlled. RS-232 Ch-4 is a control channel by default, but can be configured as a pass-through channel.

    +24V Out – Connect to an external device that requires +24V power, such as an occupancy sensor.

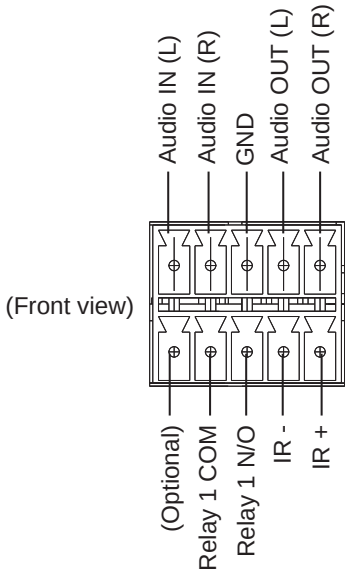
11. Terminal Block C

    Connect a cable, terminated per Figure 3-5, in order to connect to an LB-KP8/LB-KP4 keypad.

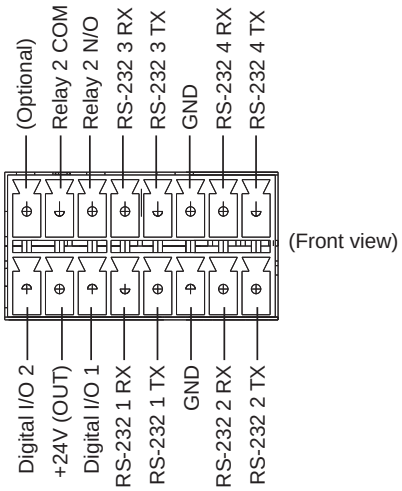
12. Reset button – Press button to reset unit to factory default settings.

3.0 CONNECTOR PINOUT ASSIGNMENT

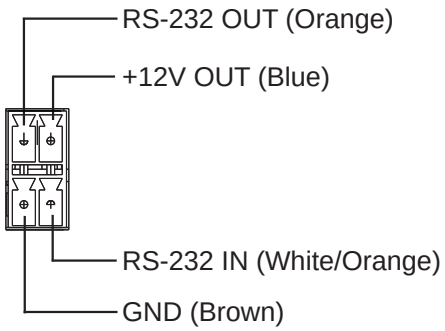
3.1 Terminal Block A



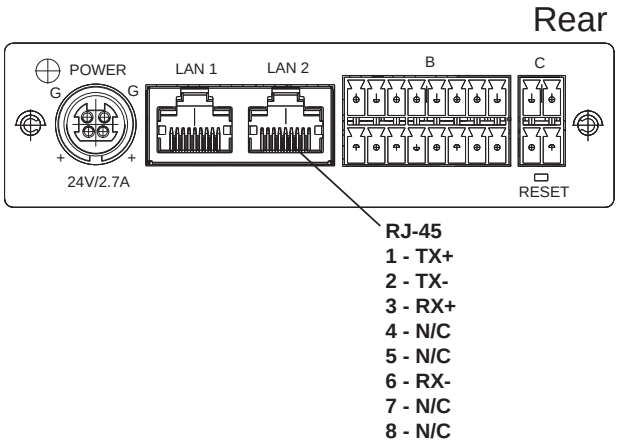
3.2 Terminal Block B



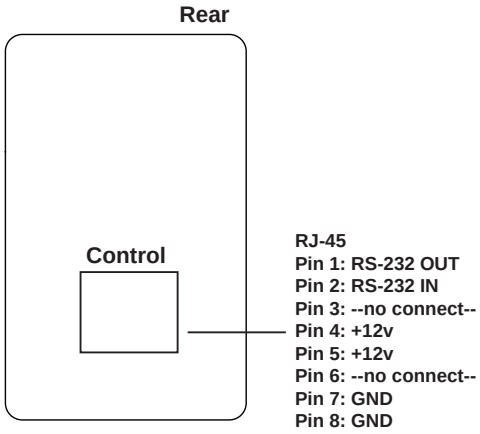
3.3 Terminal Block C



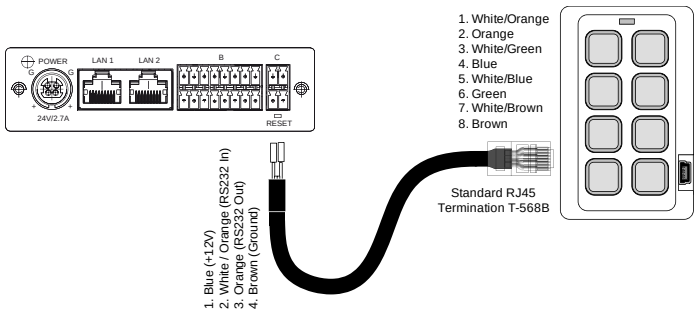
3.4 LAN 1 and 2



3.5 LB-KP8/LB-KP4



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 a user friendly and intuitive web interface to configure the various controller and automation functions of the ICP. It also provides web pages to control video switching, audio settings and IR code management. An external 8 button or 16 button keypad can be easily set up using the web interface. Web pages are also provided for setting up a custom multi-page GUI for a tablet or touch panel. 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.**

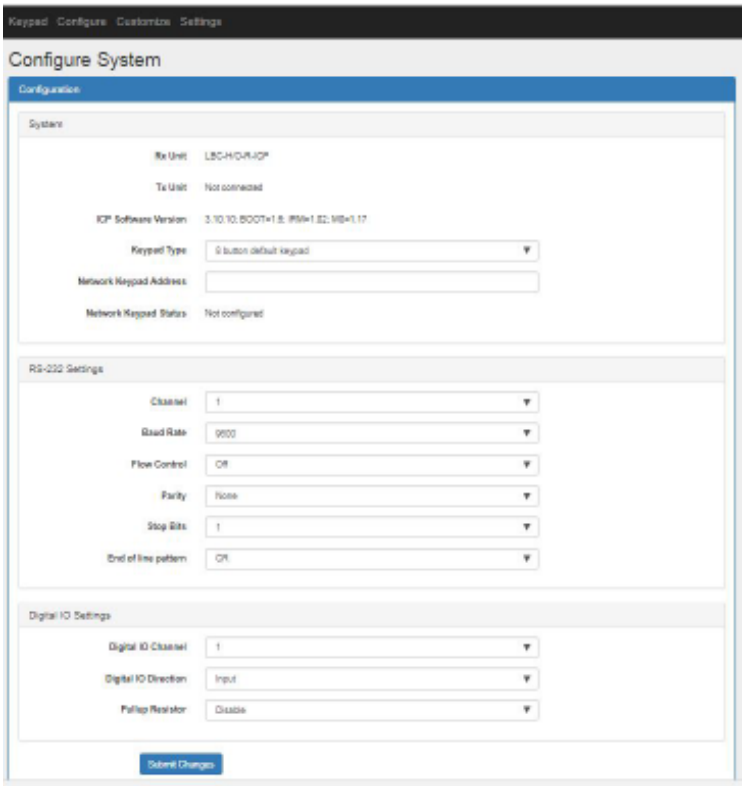
Type in the unit's IP address in the web browser's address bar. The following login window will pop up.

Type in **admin** for the Username and **admin** for the Password and then click the **OK** button. After log in, the browser will be directed to the **Configure System** page. See the following section for **Configure System** page details. At this point the user is free to navigate to any of the **Configure** or **Settings** pages. The default Password can be changed using the **BCI Product Configuration** program.

Configure System

The **Configure System** page is used to configure the external keypad type, RS-232 channels, and Digital IO channels.

On the menu bar, click **Configure** and then click **System.** The following page will be displayed:



System

The first three lines in this panel show the LBC-H/O-R-ICP model number, the Tx unit model number if one is connected and the software version. Below that is the keypad type selection menu and the Network Keypad address setup and status.

Rx Unit: Shows the LBC-H/O-R-ICP model number.

Tx Unit: Shows Tx model number and connection status.

ICP Software Version: Shows the ICP software version.

Keypad Type: Select **8 button, 16 button** or **Custom**. Select the 8 button or 16 button option if an external keypad is used for controlling the ICP. Both the 8/16 button options support up to 10 actions per key. Select the custom option if a tablet or touchpad is used for controlling the ICP. See end of this section for instructions on how to setup an 8 button keypad.

Network Keypad Address: Enter the IP address of the network keypad (LB-KP8E or LB-KP16E) if one is present in the system. Use the **BCI Product Configuration** program to discover the network keypad's IP address.

Network Keypad Status: Shows model of network keypad connected to ICP.

RS-232 Settings

This panel is used to configure the RS-232 channels.

Channel: Select channel 1, 2, 3, 4 or 5 (Tx). Channel 4 can be configured to operate in control (ICP) or pass-through mode. If pass-through mode is selected, channel 5 (RS-232 port in the Tx) will pass-through to channel 4. Channel 4 and 5 can no longer be used as control channels.

Baud Rate: Select a baud rate from 9600 to 115200 baud.

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.

Parity: Select None, Odd or Even.
Stop Bits: Select 1 or 2.

End of Line Pattern: Select CR, LF, CR+LF or None for end of line termination.

Digital IO Settings

The 3 pull down menus in this panel 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**.

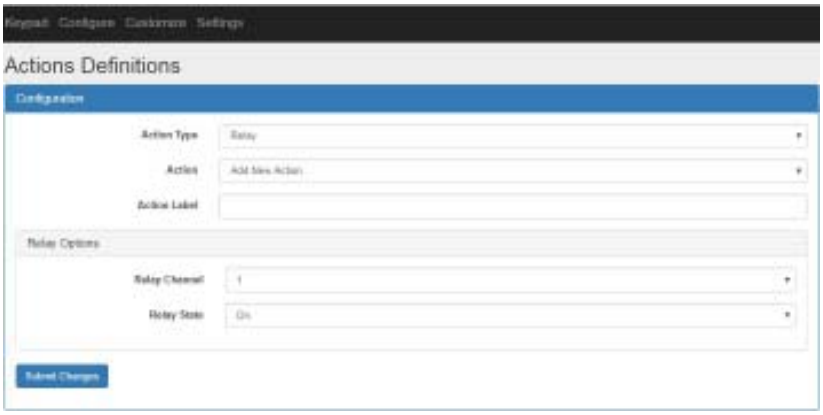
If the Digital IO Direction is set to **Input**, there is an option for **Pullup Resistor**.

Pullup Resistor: Select **Enable** or **Disable** pull-up resistor.

Configure Actions Definitions

The **Configure Actions Definitions** page is used to configure actions that can be triggered by an external keypad, custom keypad or automation triggers. Actions are grouped into 8 action types: Relay, Digital Output, RS-232, IR, Telnet, Keypad, Video Control and Audio Control. The Digital Output actions are only available if Digital IOs are configured as outputs in the **Configure System** page. Each action can be given a unique label, which is referenced in the **Customize Buttons Definition** page.

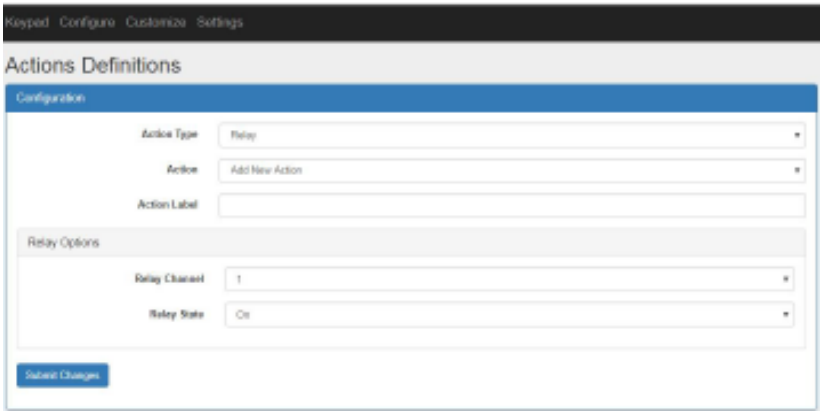
On the menu bar click **Configure** and then click **Actions Definitions**. The following page will be displayed:



Action Type: Select the action type. Available types are **Relay**, **Digital Output, RS-232, IR, Telnet, Keypad, Video Control and Audio Control**. The options panel will change according to the selected action type.

Action: Select **Add New Action** to create a new action. Once a new action is added, it will appear in this menu.

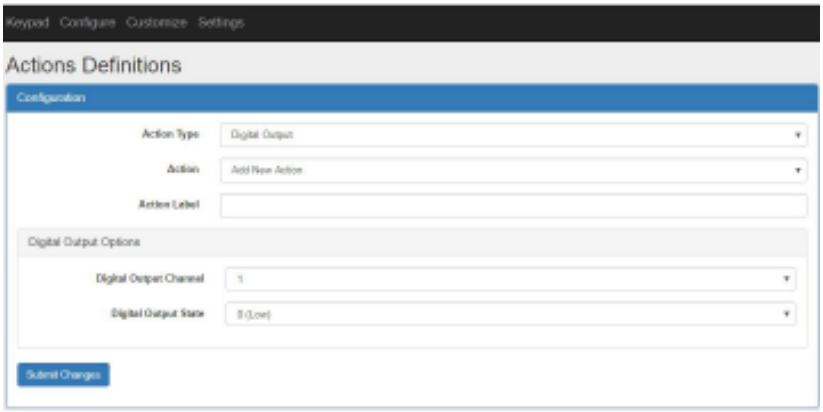
Action Label: Type in the desired label name for the new action.



Relay Options

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

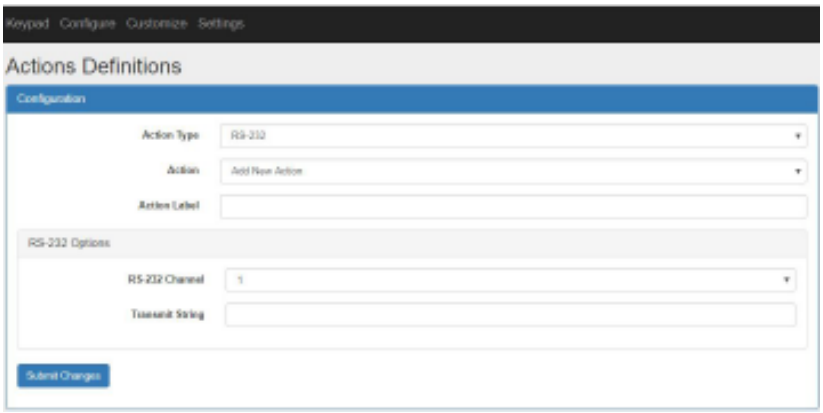
Relay State: Select relay channel state, **On** (energized) or **Off** (de-energized).



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.

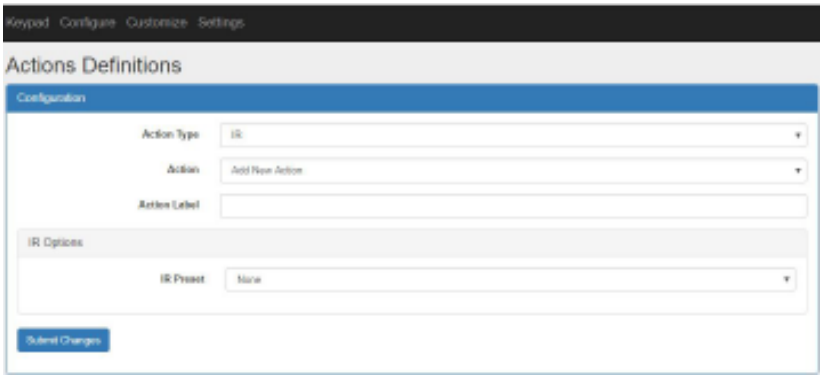
Digital Output State: Select the digital output state: **1 (High)** or **0 (Low)**.



RS-232 Options

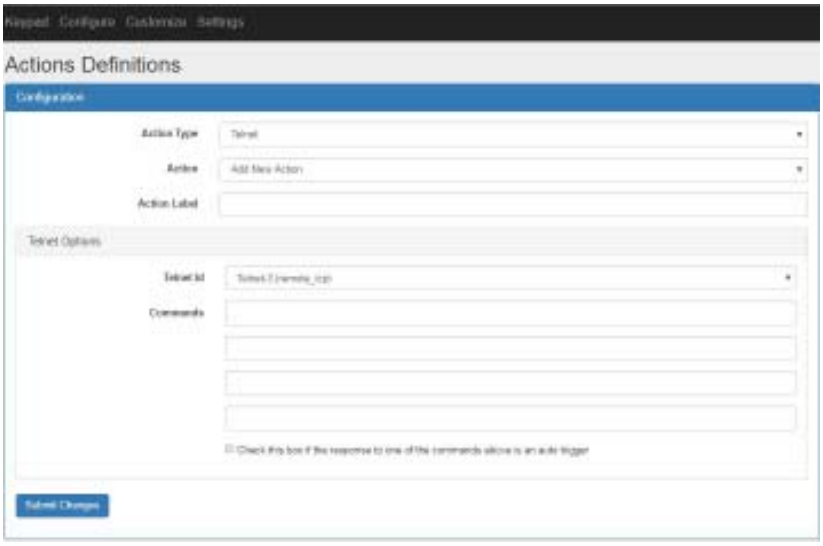
RS-232 Channel: Select channel 1, 2, 3, 4 or 5 (Tx).

Transmit String: Type in the text string to be transmitted. Strings are terminated with CR, CR+LF or no termination, depending on the selection made in Configure System page. Characters enclosed by <> will be treated as hex. For example to transmit the string “8C 00 00 02 00 8E” in hex, enter <8C><00><00><02><00><8E>.



IR Options

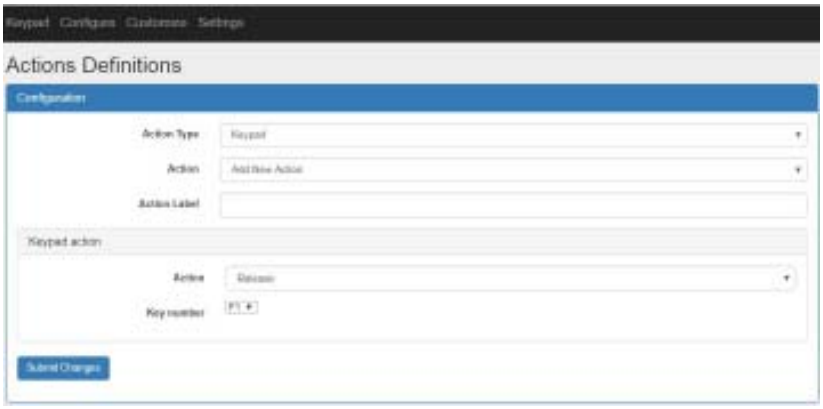
IR Preset: Select from list of IR commands stored in memory. IR commands can be imported via Configure IR Codes Management page.



Telnet Options

Telnet ID: Select the telnet connection desired for telnet actions. The connections defined in Configure Telnet Connections page appear in this menu.

Commands: Enter the command strings to be transmitted. Up to 4 different command strings can be defined. The combined maximum number of characters for all 4 strings is 100.
Select the check box if the response to one of the commands is to be used as an auto trigger.



Keypad Action

Action: Select Press, Release, Press (no actions), Release (No actions), Release All Toggle Buttons, Lock Buttons or Unlock Buttons.

Press: This action presses the key selected in Key Number menu. All associated actions for the key press state will be executed.
Note: When the keypad type is **custom touch panel,** only defined touch panel buttons will appear in the Key Number menu.

Release: This action releases the key selected in Key Number menu. All associated actions for the key release state will be executed.

Press (no actions will be triggered): This action presses the key selected in Key Number menu, but none of associated actions for the key press state will be executed.

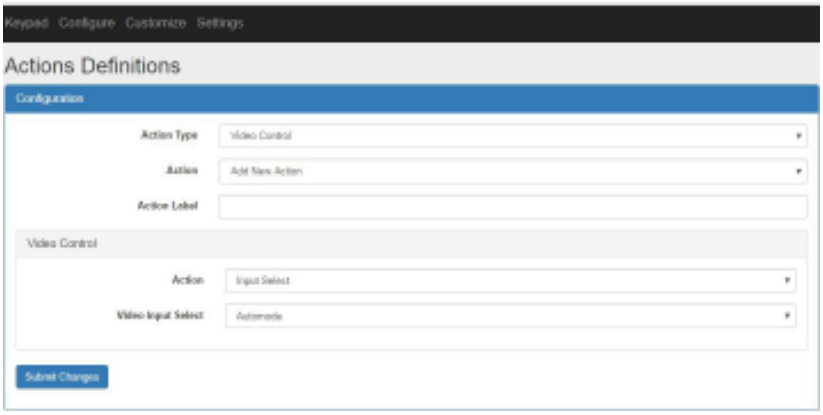
Release (no actions will be triggered): This action releases the key selected in Key Number menu, but none of associated actions for the key release state will be executed.

Release All Toggle Buttons: This action sets all toggle keys to the release state without executing any actions.

Lock Buttons: This action locks designated buttons so that they become inactive.

Unlock Buttons: This action unlocks designated buttons that were previously locked.

Key Number: Select a key number that the selected keypad action will be applied to.



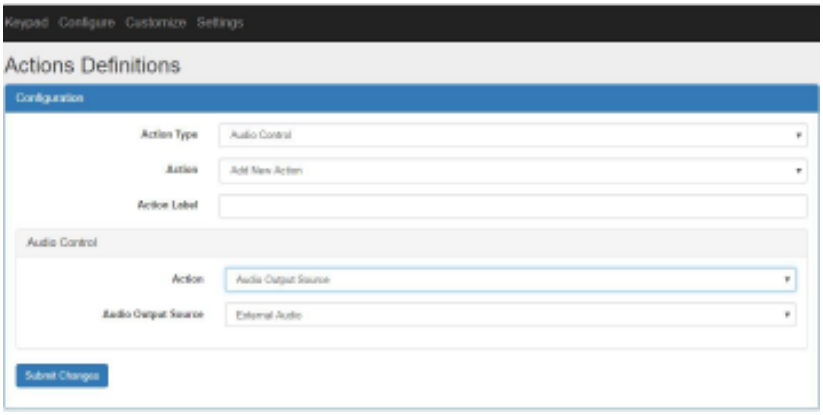
Video Control

Action: Select Input Select, Output On, Output off

Input Select: This action selects automode (auto switching) or manually selects the Tx HDMI (HDBT) or local HDMI.

Output On: This action turns on the video output.

Output Off: This action turns off the video output.



Audio Control

Action: Select Audio Output Source, HDMI Audio Mute, HDMI Audio Unmute, Analog Audio Mute, Analog Audio Unmute, Volume Up, Volume Down, Set Volume.

Audio Output Source: This action selects the source for the analog audio output. HDMI Audio is the de-embedded audio from the HDMI video. External Audio is the analog audio input. Mixer Output is the audio mix of the HDMI and external audio.

HDMI Audio Mute: This action mutes the HDMI audio.

HDMI Audio Unmute: This action unmutes the HDMI audio.

Analog Audio Mute: This action mutes the analog audio output.

Analog Audio Unmute: This action unmutes the analog audio output.

Volume Up: This action increases the analog audio output volume by one step.

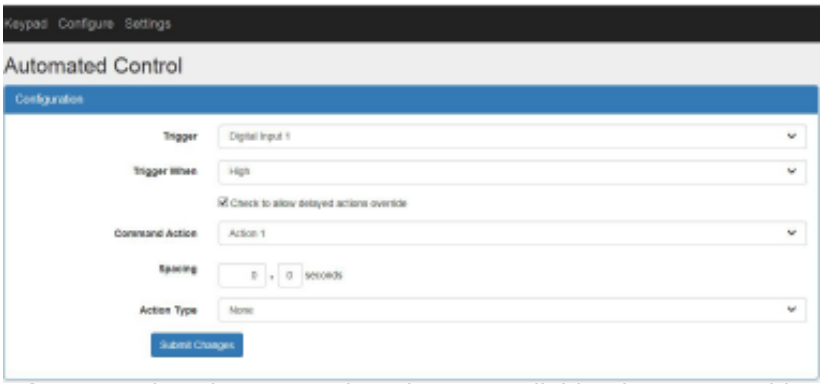
Volume Down: This action decreases the analog audio output volume by one step.

Set Volume: This action sets the analog audio output volume to a specific level between 0 and 80.

Configure Automated Control

The **Configure Automated Control** page is used to configure a set of automated actions based on a selected trigger. Available triggers are Video Detects (Local HDMI, Remote HDMI and Combined), Digital Input 1, Digital Input 2, RS-232 Channel 1, RS-232 Channel 2, Telnet Trigger 1 and Telnet Trigger 2. The available actions are Relay, RS-232, IR, Telnet, Keypad, Video Control and Audio Control. Digital Output actions are only available if Digital IOs are configured as outputs in the **Configure System** page. All auto triggers work independently and can be triggered simultaneously.

On the menu bar click **Configure** and then click **Automated Control**. The following page will be displayed:



Trigger: Select the auto action trigger. Available triggers are Video Detect - HDMI, Video Detect - HDBT, Video Detect - Combined, Digital Input 1, Digital Input 2, RS-232 Channel 1, RS-232 Channel 2, Telnet Trigger 1 and Telnet Trigger 2. *Note*: Video Detect - VGA and Video Detect - DP are also available if the Tx unit supports these inputs.

Trigger When: For Digital Inputs, select **High** for the High signal trigger. Select **Low** for the Low signal trigger. For the Video Detect lines, the options are trigger when Video Detect line is **Asserted** or **De-asserted**. For RS-232 triggers, enter the trigger string. Up to 2 trigger strings can be defined for each RS-232 channel. For Telnet triggers, select the telnet trigger and enter the trigger string. Up to 2 trigger strings can be defined for each Telnet trigger.

Note: A telnet trigger needs to be associated with one or more telnet actions. The check box under the Commands box in Configure Key Action, Telnet Options panel must be selected.

Allow delayed actions checkbox: Select this box to allow a set of delayed actions to be overridden by the opposing trigger. For example: video detect asserted trigger overrides video detect de-asserted trigger actions.

Command Action: Select the action number to be defined. Up to 5 actions can be triggered.

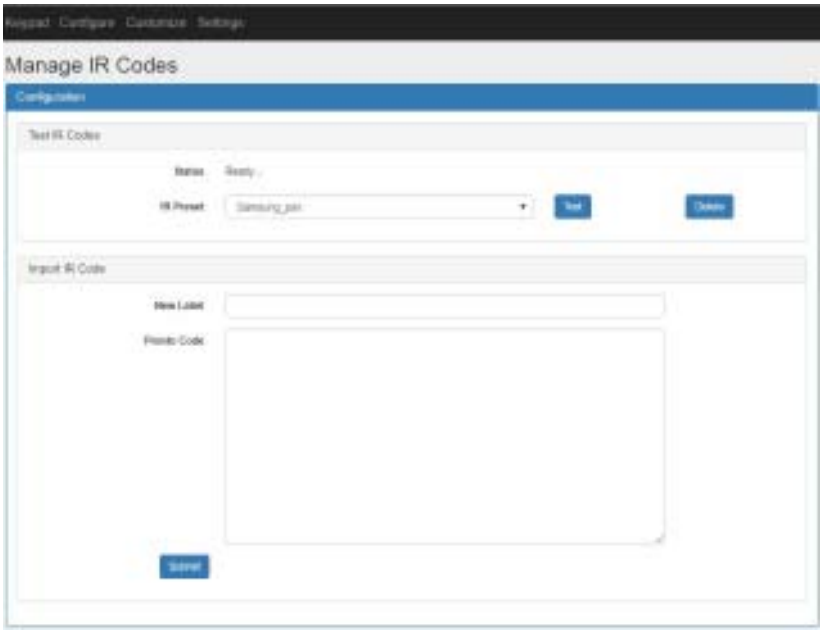
Spacing: Specify the desired delay before the specified action is executed. Enter 0.0 for no delay.

Refer to the **Configure Action Definitions** sections for the action type descriptions.

Configure IR Codes Management

The **Configure IR Codes Management** page is used to manage IR codes in the ICP. An IR code in pronto format can be imported and stored in memory for use as an IR action. An imported code can be tested on this page. Before testing an IR code, make sure that the IR emitter is connected to the +/- terminals of Terminal Block A. To test an IR code, select the IR code from the IR Preset menu and click the **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 menu bar click **Configure** and then click **IR Codes Management**. The following page will be displayed:



Test IR Codes

Status: Indicates the status of the IR test.

IR Preset: Select from list of user imported IR codes.

Test: Click this button to test the selected IR code.

Delete: Click this button to delete the selected IR code from memory.

Import IR Code

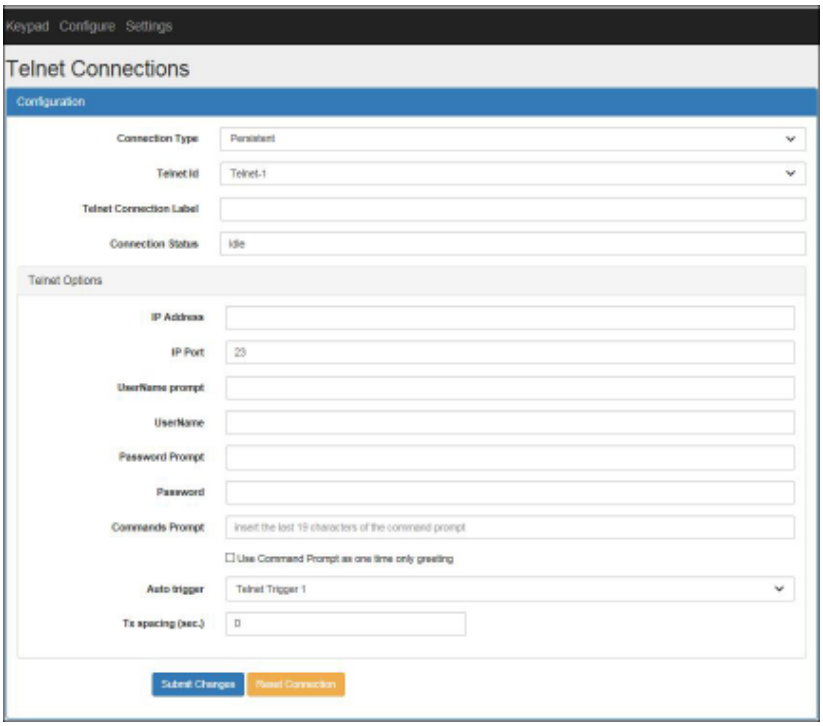
New Label: Enter a label for the IR code.

Pronto Code: Enter the pronto code to be imported.

Configure Telnet Connections

The **Configure Telnet Connections** page is used to setup the telnet connections for telnet key actions and auto actions. There are 2 telnet connection types: Persistent and Action. The Persistent connection is a permanent telnet connection between the ICP and the remote device. This type of connection is typically used for monitoring telnet status messages and triggering auto actions. Up to 2 Persistent connections can be defined. The Action connection is a temporary telnet connection. This type of connection is typically used for normal telnet actions. Up to 8 Action connections can be defined.

On the menu bar click **Configure** and then click **Telnet Connections**. The following page will be displayed:



Connection Type: Select Persistent or Action.

Telnet ID: Select Telnet-1, 2 (Persistent type); Telnet-3, 4, 5, 6, 7, 8, 9, 10 (Action type).

Telnet Connection Label: Enter a label for the telnet connection.

Connection Status: This box shows the status of a persistent connection.

Telnet Options

IP Address: Enter IP address of telnet server.

IP Port: Enter port number of telnet server. The default port number is 23.

UserName Prompt: Enter username prompt from telnet server. Leave blank if there is no username prompt.

UserName: Enter user name required for log in. Leave blank if there is no username.

Password Prompt: Enter password prompt from telnet server. Leave blank if there is no password prompt.

Password: Enter password required for log in. Leave blank if there is no password.

Command Prompt: Enter command prompt from telnet server. Only the last 9 characters of the command prompt are needed. Leave blank if there is no command prompt.
Note: Select check box below if string is used as a one-time only greeting.

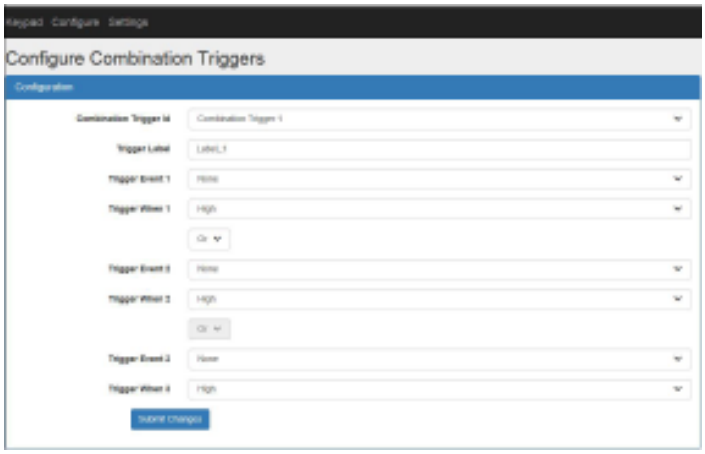
Auto Trigger: Select Telnet Trigger 1 or Telnet Trigger 2. This selection associates the telnet connection with Telnet Trigger 1 or Telnet Trigger 2 used in Auto Actions.

Tx Spacing: Enter the delay (seconds) before command is transmitted in Telnet Actions. Enter 0 if no delay is desired.

Configure Combination Triggers

The **Configure Combination Triggers** page is used to define up to 2 different combination triggers. Each combination trigger consists of the logical OR or AND function of up to 3 digital input or video detect trigger events. A combination trigger can only support a single logical function, OR or AND. A combination trigger is Asserted when the trigger statement evaluates to true. Once a combination trigger is defined, it will appear in the Configure Auto Action Trigger menu.

On the menu bar click **Configure** and then click **Combination Triggers**. The following page will be displayed:



Combination Trigger ID: Select Combination Trigger 1 or 2.

Trigger Label: Enter name of combination trigger.

Trigger Event 1/2/3: Select the desired trigger from pull-down menu.

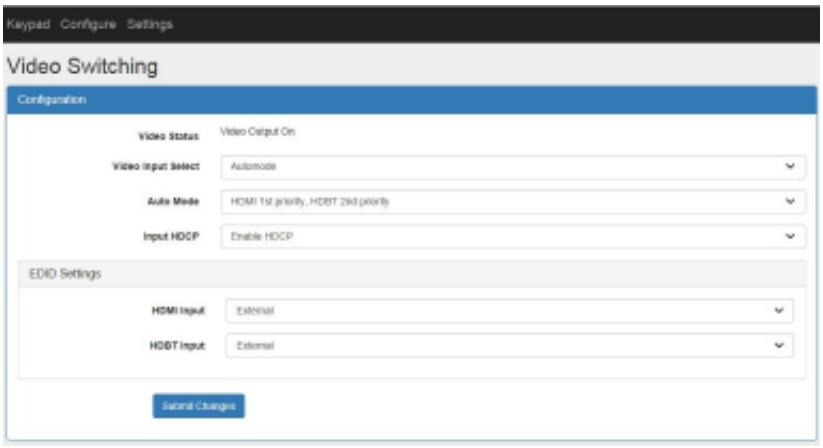
Trigger When 1/2/3: Select High or Low for digital input triggers. Select Asserted or De-asserted for video detect triggers.

OR/AND: Select the logical OR or AND function.

Configure Video Switching

The **Configure Video Switching** page is used to manually select the video input. The video inputs can be automatically selected if Automode is selected. HDCP and EDID management functions are also configured on this page.

On the menu bar click **Configure** and then click **Video Switching**. The following page will be displayed:



Video status: Indicates the video output status.

Video Input Select: Select the video input to be displayed on the HDMI output. Selecting **Automode** enables the auto video selection logic. The auto selection logic will operate according to the mode selected in the **Auto Mode** selection box.

Auto Mode: Select the desired auto mode.
Note: Not all auto modes below are available for all transmitters.

HDMI 1st priority, HDBT 2nd priority: The local HDMI port has priority. If video is detected on the local HDMI port, this port will be automatically selected to be displayed, regardless if video is plugged in at the transmitter. If the video source is removed from the HDMI connector, the output will automatically switch to the source connected at the transmitter, if present.

HDBT 1st priority, HDMI 2nd priority: The remote video port in the transmitter has priority. If video is detected on the remote port, this port will be automatically selected to be displayed, regardless if video is plugged in at the receiver. If the video source is removed from the remote port, the output will automatically switch to the source connected at the local HDMI port, if present.

Last In First Out: The last video source plugged in will be selected and displayed on the HDMI output.

If the current selected video source is removed, the last video source plugged in will be selected.

Input HDCP: Select Enable HDCP or Disable HDCP.

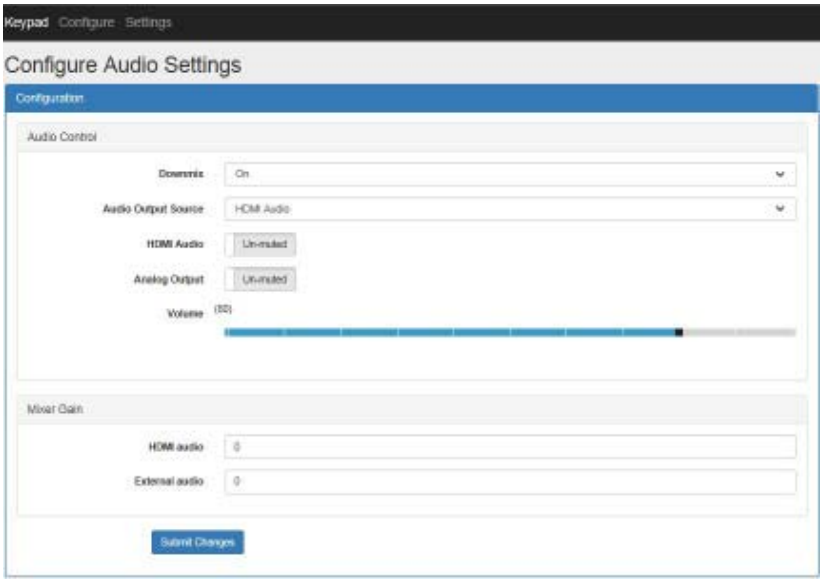
EDID Settings - HDMI Input: Select the desired EDID for the local HDMI input from the drop down menu.

EDID Settings - HDBT Input: Select the desired EDID for the HDBT input port from the drop down menu. The selected EDID will pass through to the remote transmitter.

Configure Audio Settings

The **Configure Audio Settings** page is used for configuring the audio settings of the analog audio output available in Terminal Block A. The analog audio output source selection, down mix, volume, muting and mixer functions are controlled on this page. The mixer function “mixes” the de-embedded HDMI audio and the external analog audio input at different gain levels.

On the menu bar click **Configure** and then click **Audio Settings**. The following page will be displayed:



Downmix: Select On to enable the down mix feature. Multi-channel HDMI audio will be down mixed to 2-channel stereo before outputting to the analog audio output.

Note: Down mix is enabled by default. Only multi-channel PCM audio can be down mixed. Multi-channel audio such as Dolby Digital or DTS cannot be decoded.

Audio Output Source: Select the audio source for the analog audio output. The sources are the de-embedded HDMI audio, the external analog audio input or the mixer output.

HDMI Audio: Select Mute or Unmute to mute or unmute the HDMI audio.

Analog Output: Select Mute or Unmute to mute or unmute the analog audio output.

Volume: Drag the slider left or right to decrease or increase the analog audio output volume.

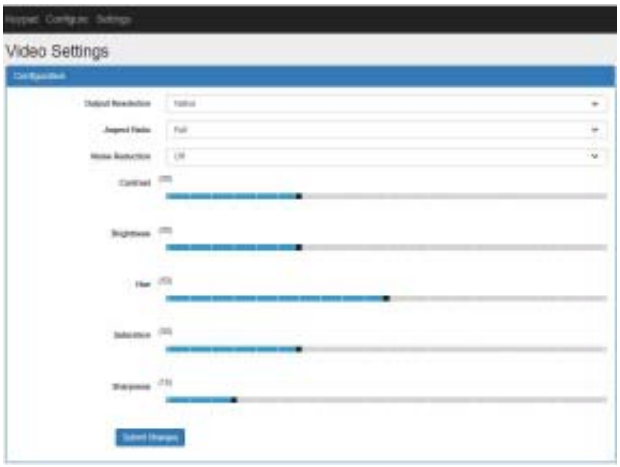
Mixer Gain - HDMI audio: Set the gain level for the de-embedded HDMI audio input to the mixer. The gain range is 0 to 15 dB.

Mixer Gain - External audio: Set the gain level for the external analog audio input to the mixer. The gain range is 0 to 15 dB.

Configure Video Settings

The **Configure Video Settings** page is only available on the LBC-H/O-R-ICP-SCL model. This page is used to configure the various video settings of the scaler.

On the menu bar click **Configure** and then click **Video Settings**. The following page will be displayed:



Output Resolution: Select the output resolution from the drop down menu.

Aspect Ratio: Select the output aspect ratio from the drop down menu.
Noise Reduction: Select the level of noise reduction.

Contrast: Drag the slider left or right to decrease or increase the Contrast level.

Brightness: Drag the slider left or right to decrease or increase the Brightness level.

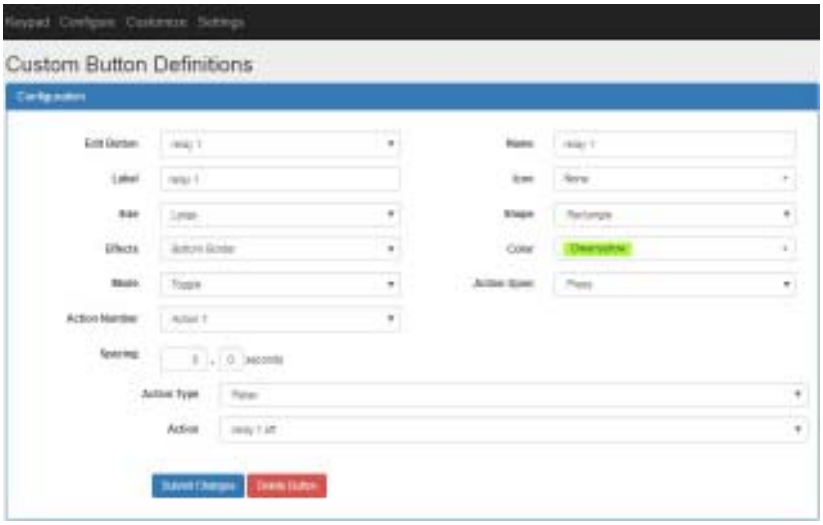
Hue: Drag the slider left or right to decrease or increase the Hue level.

Saturation: Drag the slider left or right to decrease or increase the Saturation level.

Customize Touch Panel Buttons

The **Customize Touch Panel Buttons** page allows custom buttons to be defined for the touch panel page. Various button parameters such as label, size, shape, color, mode and action can be customized.

On the menu bar click **Customize** and then click **Touch Panel Buttons**. The following page will be displayed:



Edit Button: Select **Add new button** from the drop down menu to create a new button or select an existing button for editing.

Label: Enter a label for the button. The label will appear on the button. The label is optional.

Name: Enter a name for the button. The button name will be referenced when adding a button on the custom touch panel page.

Icon: An icon from the drop down menu can be added to the button. Adding an icon is optional.

Size: Select the size of the button. The sizes are Small, Medium and Large.

Shape: Select the shape of the button. The shapes are Rectangle, Square and Circle.

Color: Select the color of the button.

Effects: Select the button effects. The effects are Standard, 3D and Bottom Boarder.

Mode: This drop down menu sets the functional mode of the button. The modes are Standard, Toggle and Navigation. Standard mode supports a single press state. Toggle mode supports 2 states, press and release. Navigation mode allows navigation to custom pages or web server setup pages.

Action Upon: This drop down menu will be available if the button mode is set to Toggle. Select **Press** and then select the action(s) for the press state. Next select **Release** and then select the action(s) for the release state.

Action Number: A total of 10 actions can be defined for a button. For a single action, select **Action 1**.

Spacing: This sets the delay before the selected action is executed. Set to 0.0 seconds for no delay.

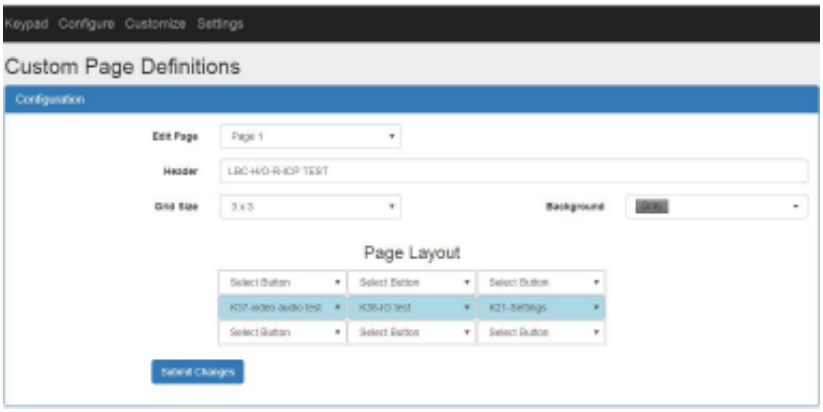
Action Type: Select an action type. Each defined action will be listed in one of the seven action types.

Action: This drop down menu lists all the defined actions for a particular action type.
Note: An action for a particular type must be defined on **Configure Actions Definitions** page before it appears in this menu.

Customize Touch Panel Pages

The **Customize Touch Panel Pages** page allows up to three custom touch panel pages to be defined. Various page parameters such as grid size, background color and page layout can be customized.

On the menu bar click **Customize** and then click **Touch Panel Pages**. The following page will be displayed:



Edit Page: Select the page to edit.

Header: Enter a text string to be used as the page header.

Grid Size: Select one of the three grid patterns for the page. Buttons are placed according to the grid pattern.

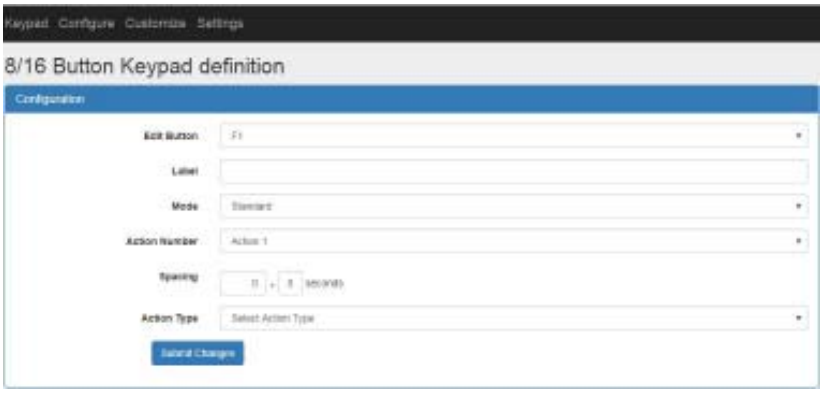
Background: Select from the menu of colors for the page background color.

Page Layout: This section shows the relative locations of the buttons to be placed on the page according to the selected grid. For each grid location, there is a drop down menu which contains all the custom buttons defined in the **Customize Touch Panel Buttons** page. The button selected from the menu, will be placed at that particular location. Locations that are occupied with a button are high-lighted blue. *Note*: custom buttons must first be defined before they appear in the menus.

Customize 8/16 Button Keypad

The **Customize 8/16 Button Keypad** page simplifies the setup of an external 8 or 16 button keypad. Buttons are located in fixed predefined locations that map directly to the physical keypad. Each Standard button supports up to 10 actions and each Toggle button supports up to 10 actions for the Press and Release states. Any of the actions defined in **Configure Actions Definitions** page can be assigned to a button.

On the menu bar click **Customize** and then click **8/16 Button Keypad**. The following page will be displayed:



Edit Button: Select one of the buttons from the drop down menu for editing.

Label: Enter a label for the button.

Mode: This drop down menu sets the functional mode of the button. The modes are Standard and Toggle. Standard mode supports a single press state. Toggle mode supports 2 states, press and release.

Action Number: A total of 10 actions can be defined for a button. For a single action, select **Action 1**.

Spacing: This sets the delay before the selected action is executed. Set to 0.0 seconds for no delay.

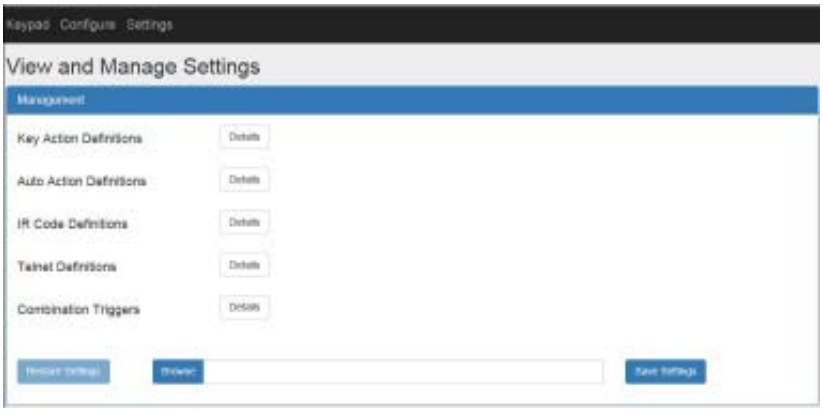
Action Type: Select an action type. Each defined action will be listed in one of the seven action types.

Action: This drop down menu lists all the defined actions for a particular action type.
Note: An action for a particular type must be defined on **Configure Actions Definitions** page before it appears in this menu.

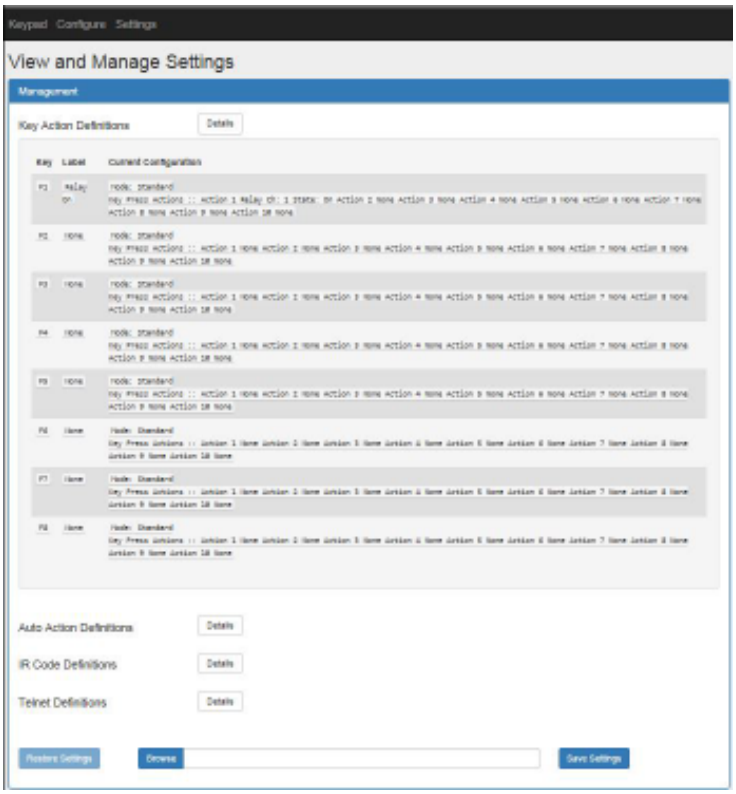
View and Manage Settings

The **View and Manage Settings** page shows the current settings of the **Key Action Definitions**, **Auto Action Definitions, IR Code Definitions, Telnet Definitions** and **Combination Triggers**. Click the **Details** button next to the associated Definitions to display the settings 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.

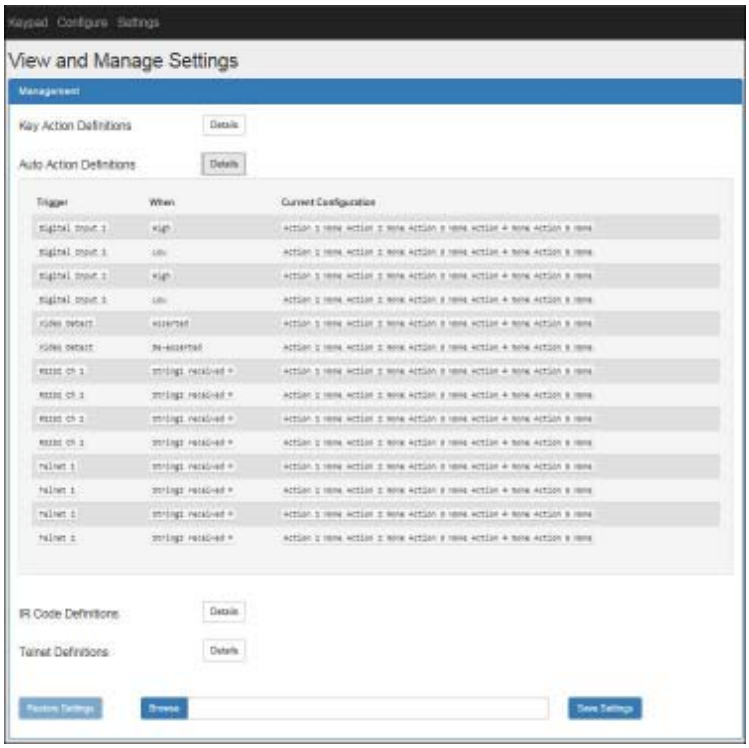
On the menu bar click **Settings** and then click **View and Manage Settings**. The following page will be displayed:



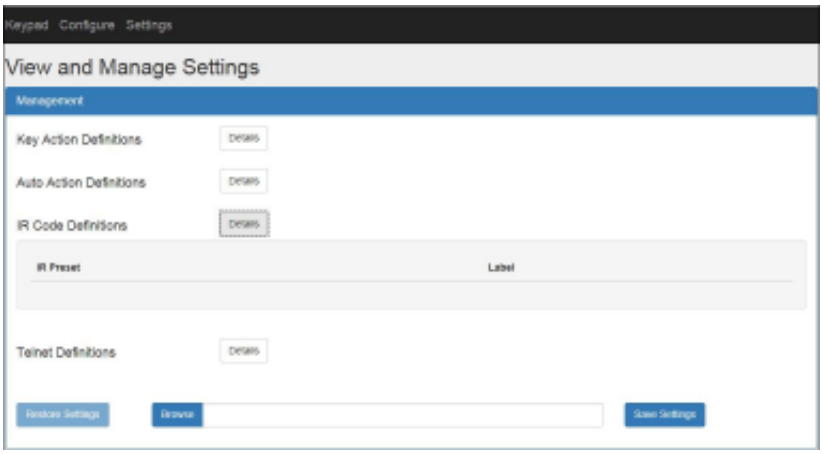
Click the **Key Action Definitions Details** button and the following will be displayed:



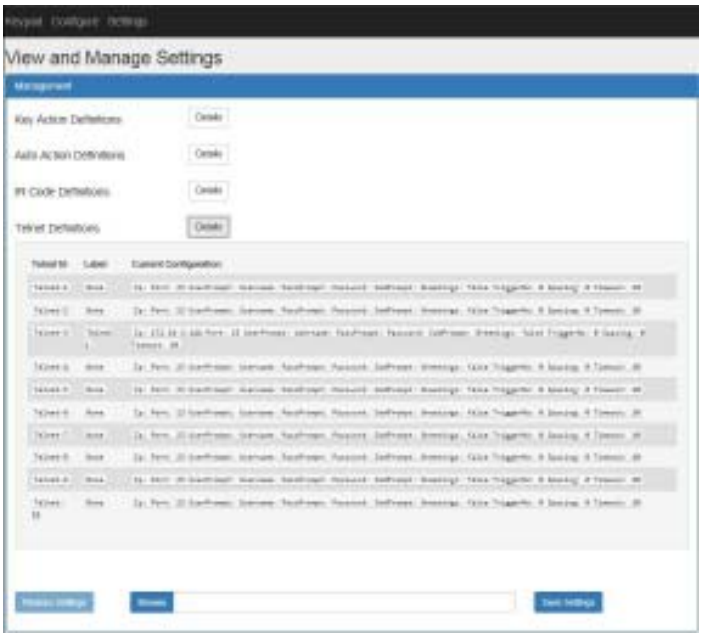
Click the **Auto Action Definitions Details** button and the following will be displayed:



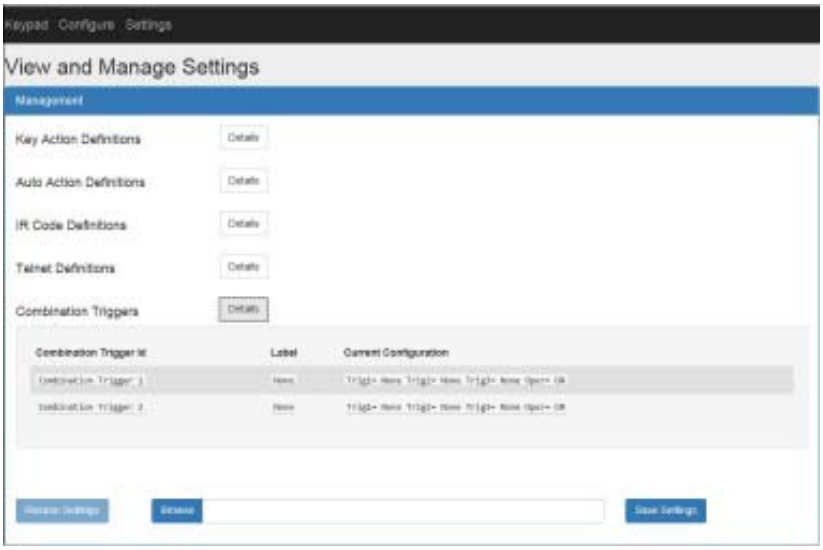
Click the **IR Code Definitions Details** button and the following will be displayed:



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



Click the **Combination Triggers Details** button and the following will be displayed:



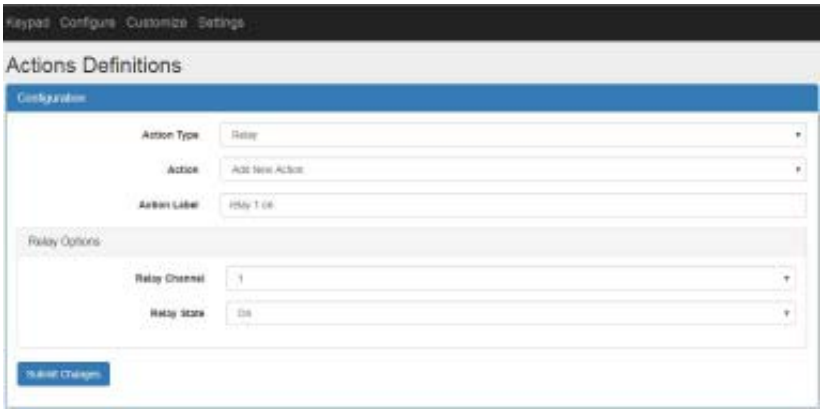
8 Button Keypad Example

Example #1: This example configures the F1 key on the 8-button keypad as a toggle key to turn on/off Relay channel 1.

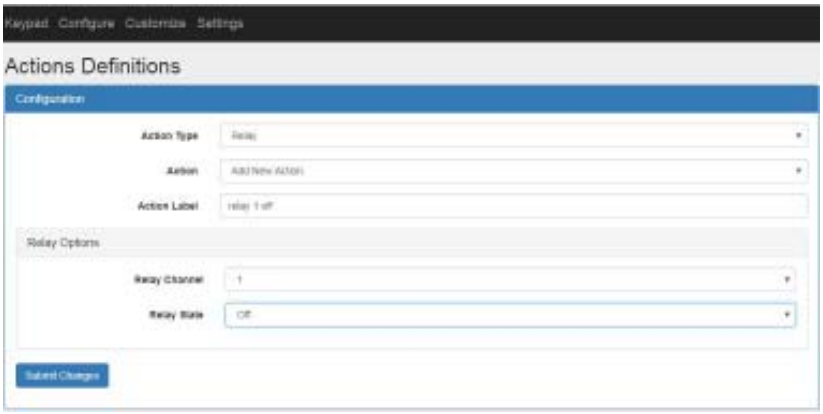
On the menu bar click **Configure** and then **System.** For **Keypad Type** select **8 button keypad** and then click **Submit Changes.**

On the menu bar click **Configure** and then **Actions Definitions**.

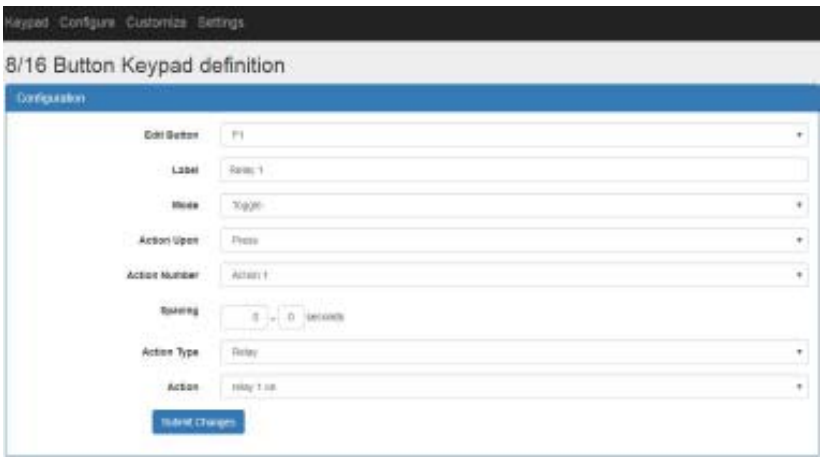
Define an action to turn on Relay channel 1 as follows and then click **Submit Changes**.



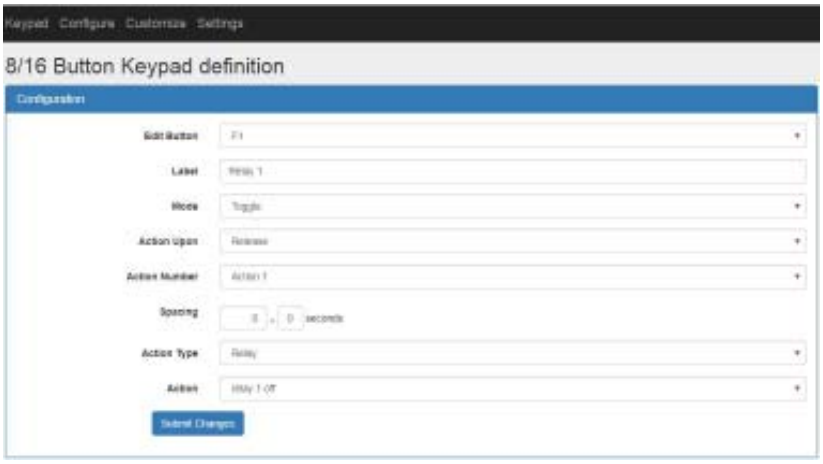
Define an action to turn off Relay channel 1 as follows and then click **Submit Changes**.



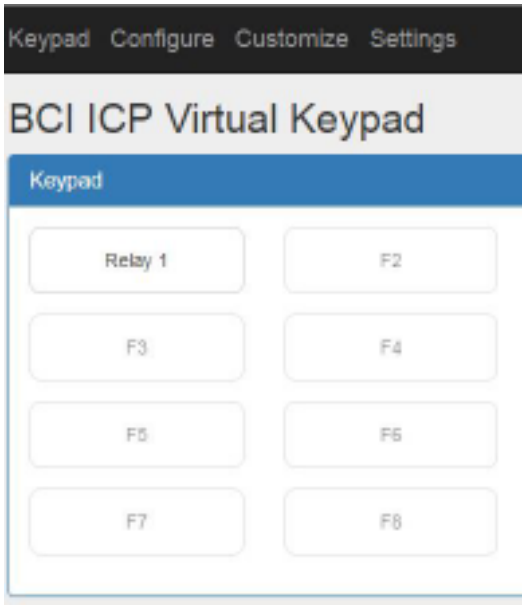
Configure F1 as a toggle key. Assign the “relay 1 on” action to the Press state.



Assign the “relay 1 off” action to the Release state and then click Submit Changes.



On the menu bar click **Keypad**. The following 8-button keypad should be displayed:



5.0 SPECIFICATIONS

VIDEO OUTPUT (TRANSMISSION)

HDMI	Up to 1080p @ 60Hz or 1920 x 1200 @ 60Hz or 4K@30Hz
Connector	HDMI Female Plug
Protocol	DDC/EDID/HDCP Capable

AUDIO INPUT/OUTPUT (TRANSMISSION)

Signal Format	L/R Analog
Audio Output Connector	Terminal Block

RS-232 (TRANSMISSION)

Data Rate	Up to 57.6kbaud
Connector	Terminal Block

IR (TRANSMISSION)

Data Rate	30-60KHz
Connector	Terminal Block

HDBT (TRANSMISSION)

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

ETHERNET (CONTROL)

Channel Capacity	2
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	3 (no flow control) or 2 (with RTS/ CTS flow control)
Baud Rate	2400 to 115200 baud
Connector	Terminal block

DIGITAL I/O (CONTROL)

Channel Capacity	2 digital input/output (configurable)
Digital Input	Input voltage range: 0 to 24VDC 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)
Connector	Terminal block

IR (CONTROL)

Channel Capacity	1 out
Connector	Terminal Block
Carrier Frequency	30 kHz to 60 kHz (Output)

RELAY (CONTROL)

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

PHYSICAL

Dimensions	8.36” (D) x 4.23” (W) x 1.12” (H)
Power Consumption	24 VDC @ 1.25A
Operating Temperature	0 to 40-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-H/O-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.

8.0 APPENDIX A: API SERIAL COMMANDS

Command	Description
AUD_MIX <x> 0= HDMI de-embedded audio 1= HDMI audio+Ext audio mix 2= reserved 3= Ext audio input	Set the source for the analog audio output
AUD_MIXER_DOWNMIX <x> x: 0=Off, 1=On	Enable analog audio output stereo downmix
AUD_MIXER_GAIN <x> <y> x: 1=HDMI, 2=External audio y: 0 to 15	Set mixer input channel gain
AUD_MIXER_OUT <x> x: 0=mute, 1=unmute	Mute the analog audio output
AUD_MIXER_VOL <x> x: 1 to 100	Set analog audio output volume
AUD_MUTE <x> x: 0=unmute, 1=mute	Mute the HDMI audio
DEFAULT	Reset to factory defaults
DHCPEN <x> x: 0=disable DHCP, 1=enable DHCP	Enable LAN port DHCP
GETIODAT <x> x: 1=input 1, 2=input 2	Get digital input state
GETSTATUS	Get link status
HEX <Y|N> Y: enable RS-232 transmission in hex. Note: characters enclosed by <> are converted to hex. N: disable RS-232 transmission in hex	Enable RS-232 transmission in hex

Command	Description
IODAT <x> <y> x: 1=output 1, 2=output 2 y: 0=logic low, 1=logic high	Set digital output line level
IODIR <x> <y> x: 1=IO 1, 2=IO 2 y: 0=input, 1=output	Set the digital IO mode
IOPULLUP <x> <y> x: 1=IO 1, 2= IO 2 y: 0=disable, 1=enable	Set IO line pullup enable
IPCONFIG	Report network address settings
IR_DEL <label>	Delete an IR code
IR_LIST	List IR codes
IR_SEND <label>	Send an IR code
LOCK <key# key# key#>	Lock keypad keys
QUIT	Close current telnet session
REQUIRE_PASSWORDS <Y|N> Y: telnet port requires login password N: telnet port does not require login password	Enable telnet passwords
RELAY <x> <y> x: 1=relay 1, 2=relay 2 y: 0=off, 1=on	Set relay state
SETGWADDR <gwaddr>	Set gateway address
SETIPADDR <ipaddr>	Set IP address
SETSNMASK <snmask>	Set subnet mask
SETKEY <x> <y> x: 1 to 16 (button number) y: p=press, r=release	Set state of toggle button
TELNET_TIMEOUT n n=1 to 30 (minutes)	Set telnet timeout

Command	Description
UARTBR <channel> <baud_rate> channel=1,2,3,4,5(remote Tx) baud_rate=2400|4800|9600|19200|38400|57600| 115200	Set UART baud rate
UARTEOL <channel> <EOL> channel=1,2,3,4,5(remote Tx) EOL: 0=CR, 1=CR+LF, 2=None, 3=LF	Set end of line termination
UARTMODE <x> x: 0=Mode 1 (RS-232 port 1 & 2 no flow control) x: 1=Mode 2 (RS-232 port 1 flow control, RS-232 Port 2 disabled)	Set RS-232 Port 1 flow control mode
UARTCM <channel> <parity> <stop> channel: 1,2,3,4,5(remote Tx) parity: N=None, O=Odd, E=Even stop: 1 or 2	Set UART character mode
UARTSTR <channel> <string> channel: 1,2,3,4,5(remote Tx) string: character string	Set UART character string
UNLOCK <key# key# key#>	Unlock keypad keys
VERSION	Report version number
VID_AUTOMODE <x> x: 1=HDMI priority, 2=HDBT priority, 3=Last In First Out priority	Set automode switching logic mode
VID_DETECT <x> x: 1=HDBT, 3=HDMI return status: video detect 0=video not detected video detect 1=video detected	Report video detect status of channel
VID_IN_HDCP <x> x: 0=enable HDCP, 1=disable HDCP	Set input HDCP mode
VID_MASK <x> x: 0=unmask video output, 1=mask video output	Set video output mask
VID_ROUT <x> x: 0=automode, 1=HDBT, 3=HDMI	Set video input switching mode

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