Control System Isolator

v1.3.0

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Point of Contact:
Freeport Technologies Help Desk
571-262-0422
866-226-4125
TechSupport@freeporttech.com

1 Precautions and Warnings

The Freeport Technologies Room Control Isolator (CSI) contains no user serviceable or adjustable parts. Only an authorized Freeport service technician should make repairs when necessary.

Electrical

Please note that high voltage is present inside of the Freeport CSI when power is applied to the unit. To prevent electric shock, do not remove the cover of any of the system components or change any of the internal cables or wiring.

Requirements for a valid power input source are given on the rear of the unit below the power connector. This equipment is intended to be used with a primary power source with a grounded neutral conductor. The ground connector (third wire) on the AC input must be connected to earth ground. The ground connector is connected to the unit case. This provides physical safety and helps in the attenuation of the transmission of electromagnetic fields in and out of the unit.

Cooling

Air vents are provided on the unit for cooling where required. Do not insert any objects into the vents as dangerous voltages are present inside of the components and damage to the electronics is possible. Installation of the components in a rack should be such that the vents are open to a source of conditioned air. The amount of air flow required for safe operation should not be compromised.

Security

The CSI typically will have access to a device operating on a secure network. No information from the isolated device is stored in non-volatile memory. Once power is removed, any program settings or isolated device information that might be stored in the CSI's CPU B is lost. Memory can be reset by unplugging AC power to the unit or by disabling the CPU B Enable for a period of five seconds. The local security officer should be contacted before a CSI is removed from a secure area for transport or return to Freeport for service to ensure that local security policies are followed.

2 Overview

The Control System Isolator (CSI) provides the means to program an isolated device and receive status from the device without exposing to the control system any data that might be in the isolated device or on the network to which the device is connected. This protects the security of the network to which the device is attached and prevents the control system from taking on the security level of the network.

The CSI CPU B provides two-way serial communications with an isolated device. The CSI CPU A provides two-way serial communications with the transmit only providing status to the control system. The CSI is built as two independent circuits. One circuit, CPU A, is for the control system and one circuit, CPU B, is for the isolated device. Each side of the device has its own independent processor. Communications between the CPU A and CPU B is only via air gap techniques. Serial data flows from the CPU A to the CPU B via a photo isolator device. Serial data flow from the CPU B back to the CPU A is prohibited. However, photo isolated logic outputs provide status feedback from the CPU B to the CPU A.

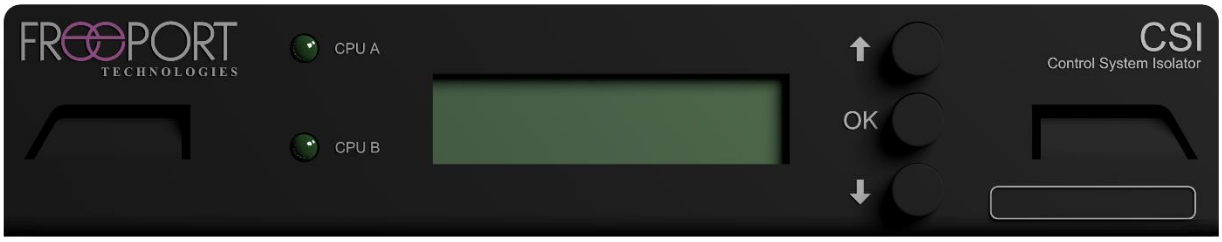
Messages are sent from the control system to the CSI that contain information required for the control and management of the isolated device. Most of the fields in the message are intended to be used by the CSI itself. One of the fields contains the control string that is to be sent to the isolated device.

Please note that settings that are sent to the CSI CPU B are stored in volatile RAM memory. This means that the Baud rate, the time out delay, the success string, the failure string, and the custom response strings are all lost when the CPU B Enable is turned off or main power is removed. By using only volatile memory on the CPU B the classified CPU B is always at factory default after power is cycled. There is no possibility of sensitive data being retained in the unit.

3 Front Panel

3.1 LED Indicator Lights

There are two front panel indicator lights.



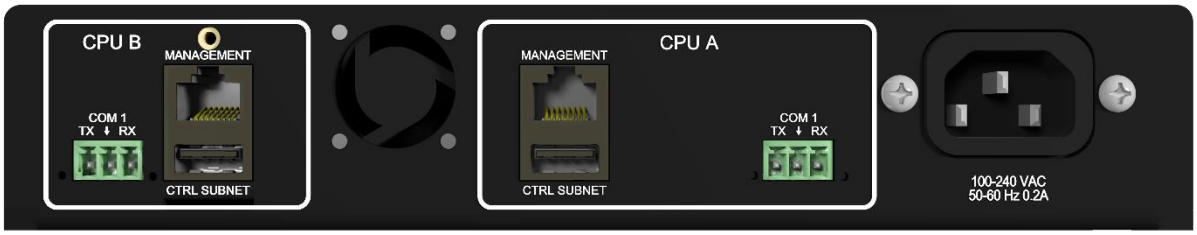
CPU A light indicates that main power is on and the CSI A-side is running.

CPU B light indicates that B-side power is on. This is turned on and off through the API using the “A” command to set CPU B Enable.

3.2 LCD Panel and Buttons

The push buttons are used to navigate the LCD menu system. The LCD provides the current firmware version and the CPU A Ethernet IP address.

4 Hardware Interface



4.1 Non-Operational Ports

1. CPU A CTRL SUBNET USB-A port
2. CPU B CTRL SUBNET USB-A port
3. CPU B MANAGEMENT 8P8C port

These ports, although physically present, are non-operational. There is no implemented functionality for these ports nor anyway to access internal data through these ports. The CPU B MANAGEMENT and CTRL SUBNET ports should have a metal cover plate attached to the chassis.

4.2 CPU A MANAGEMENT Port

The CPU A 8P8C port provides Ethernet access to a web application for managing the configuration of the CSI. The default IP address is 192.168.5.40. Due to the internal hardware separation and isolation between CPU A and CPU B sides no management of the CPU B side is possible through the CPU A MANAGEMENT port. The only caveat to this is for firmware updates. A single signed firmware package is loaded through the CPU A web application. CPU B firmware components are extracted, validated, and transferred through the one-way photo isolated data path to the CPU B. The CPU B will perform validation of the transferred firmware components and will signal CPU A with OK or FAIL as the result of the upgrade process. This single package firmware upgrade process insures both CPU A and CPU B are running compatible firmware.

4.3 CPU B COM 1 Serial Connector

This connector is used to provide two-way communications between the CSI and an isolated device. A three (3) position Phoenix connector is required to interface to the isolated device. The three connections are Rx from the isolated device, Tx to the isolated device and Ground.

Pin 1	Pin 2	Pin 3
Rx	Gnd	Tx

Common wiring between the CSI and a CODEC is shown below:

Device	CSI Cnx	Cisco CODEC
Cnx 1	Rx	Pin 3
Cnx 2	Gnd	Pin 5
Cnx 3	Tx	Pin 2
Cnx Type	3 Pin 3.81 Phoenix	DB-9 Male

Because the CSI "hides" system login information from the system controller, the isolated device must be configured to not require serial port login. Cisco CODECs require serial port login by default.

To disable the serial login for Cisco CODECs, use the following command:

xConfiguration SerialPort LoginRequired: Off.

Or using the Web UI, go to the Advanced configuration, SerialPort settings and change LoginRequired to Off.

4.4 CPU A COM 1 Serial Connector

This connector is used to receive commands from the control system and return the status of the isolated feedback outputs. A three (3) position Phoenix connector is required to interface to the control system. The three connections are Rx from the controller, Tx to the controller and Ground.

Pin 1	Pin 2	Pin 3
Rx	Gnd	Tx

The ground should be connected to the control system serial port ground, the Rx should be connected to the Tx of the controller port and the Tx should be connected to the Rx of the controller port.

4.4.1 Status Feedback

The CSI prevents the room controller from monitoring the output of the isolated device. This prevents the room controller from accessing logs, directories, sensitive network information or from accessing other resources on the network by going through the isolated device. However, status feedback is provided in order to know whether commands sent to the isolated device are being properly handled or not and the status of the isolated device. Status feedback is provided from the CSI to the control system via photo isolated digital outputs and the CPU A COM 1 serial line.

The CPU A COM 1 port (RS-232) to the control system will return text that indicates the status of these photo isolated digital outputs. This is NOT the text that is returned from the isolated

device. The text from the isolated device is not available to the CSI CPU A nor the control system. This text is generated by monitoring the status of the photo isolated digital outputs.

The text messages that are output on this line are:

OK
FAIL
LOGIN
R01 to R1000
RESET (reset/boot of the CSI CPU B processor)
BOOT (reset/boot of the CSI CPU A processor)

4.4.2 Boot Up Indicator

The RESET response indicates that the CSI CPU B has reset or rebooted. Data that is sent to the CSI from the control system and all data going to and from the isolated device is stored in volatile RAM on the CPU B side. When the CPU B is reset or powered down, all of the data in the RAM is lost. On a power up or reset all the settings are at their default values.

Cleared Setting	Default Value
B Baud Rate	115200
D Timeout Delay	10ds
F Device Failure String	*no value*
R01 – **R**1000 Custom Response String	*no value*
S Device Success String	*no value*

4.5 AC Power

AC power is required to operate the CSI. Single phase AC voltage between 100V RMS to 240V RMS with frequency between 49Hz and 61Hz is required. The maximum current draw is 0.2 Amps.

5 System Specifications

Size	9.85” x 8.7” x 1.68” (.5 rack width, 1U)
Weight	2 lbs.
Operating Temperature	-20º to +60º C (-4º to 140º F)
Storage/Transportation Temperature	-40 º to +85 º C (-40 to 185 º F) (Nonfreezing; non-condensing conditions)
Input Power	100-240VAC, 50/60 Hz, .20A
Heat Dissipation	5Watts typical, 20 Watts maximum