HIB-IP 8002™ Module

Remote Network Interface
MCN™
Monitoring and Control Network

Hardware Reference Manual

S2-61808-102

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Location:	**CTI Products, Inc.**
	1211 West Sharon Road
	Cincinnati, OH 45240 USA
Phone:	+1.513.595.5900
Fax:	+1.513.595.5983
Web:	www.ctiproducts.com
E-mail, Sales:	info@ctiproducts.com
Technical Support:	support@ctiproducts.com

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Revision History

S2-61808-100   Initial Release

S2-61808-101   Release Update   Added information about viewing the HIB-IP parameters and
                                             using the wink feature as a diagnostic tool.

                                             Added section to discuss the Type of service field for HIB-IP

                                             Added section to discuss Testing of the HIB-IP unit

                                             Added information Backup & Restore procedures in
                                             Appendix B

                                             Added the Security and information Assurance
                                             Recommendations in **Appendix C**

S2-61808-102   Update   Deleted 10Base-T references. Minor cleanup.

1. INTRODUCTION

WHAT IS A HIB-IP 8002 MODULE?

The HIB-IP 8002 module provides a remote network interface to an MCN™ (Monitoring & Control Network) system. It is used with the MCNRCD (MCN Remote Comparator Display) software in a PC. The HIB-IP 8002 module connects to the MCN network on one side and to a PC via an Ethernet connection.

The HIB-IP 8002 module is a new version of the older HIB-IP and HIB-IP 8000 modules. While the older modules had a common hardware platform, the HIB-IP 8002 module is built on a new redesigned hardware platform.
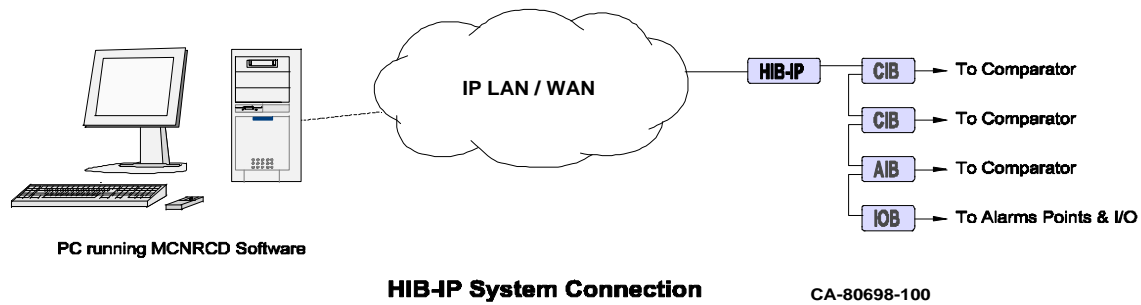
Figure 1 MCN System with HIB-IP Module

Software compatibility**:**

MCNRCD (Windows) Version 7.20 & up	Can connect to 1 HIB-IP 8002 module.
MCN Server Version 7.20 & up	Can connect to 1 HIB-IP 8002 module.
MCN Advanced Server Version 7.20 & up	Can connect to 4 HIB-IP 8002 modules (Can expand to 64 modules with additional licenses.)
MCN Server 8000 Version 7.20 & up	Can connect to 1 HIB-IP 8002 module (Can expand to 64 modules with additional licenses.)

Note: If a HIB-IP 8002 module is added to an existing system or is to replace an older HIB-IP or HIB-IP 8000 module, the MCN software must be updated to Version 7.20 or higher.

Model Number

The HIB-IP module is identified by the model number and version number found on the rear panel of the module.

Model   **Description**
S2-61795   MCN HIB-IP 8002 module 78K

HIB-IP 8002 module versus older units

The following table shows some of the differences between HIB-IP type modules:

Model Number	Version	Module Name	UDP Ports Configurable	(WAN Media)	MCN Network Transceiver
S2-61151	100–349	HIB-IP (Legacy)	Legacy only	10Base-T & AUI *	78 Kbps
S2-61151	350-399	HIB-IP (Legacy)	Legacy only	10Base-T only	78 Kbps
S2-61151	400 up	HIB-IP 8000	HIB-IP 8000 & Legacy	10Base-T only	78 Kbps
S2-61795	100 up	HIB-IP 8002	HIB-IP 8000 & Legacy	100Base-TX	78 Kbps

*AUI port not used for HIB-IP application.

Additional differences in the HIB-IP type modules are included in the following Table:

Feature/Function	HIB-IP 8002 module	HIB-IP & HIB-IP 8000 modules
Ethernet	100Base-TX FDX Auto MDIX	10Base-T HDX
Configuration Port	USB (requires driver)	RS-232 COM Port
Power	Front DC Jack and MCN Daisy-Chain	Rear DC Jack No MCN Daisy Chain Power
Configuration Password	Yes	No
Minimum MCN Software	Version 7.20	HIB-IP 8000: Vers. 6.10 HIB-IP: Pre 6.10
Supported in MSI Astro 25® 25 RNI starting in:	A7.15	A7.13 (HIB-IP 8000)
HTTP Status Page	Not available	Yes. May be disabled by user

In this manual, "HIB-IP" may be used in general to refer to either the older HIB-IP or HIB-IP 8000 modules or the new Legacy or HIB-IP 8002 module.

REFERENCE DOCUMENTS

The following additional information is available.

Part Number	Document
S2-60425	Monitoring and Control Network Comparator Display System Manual
S2-60426	CIB Comparator Interface Manual
S2-61043	MCNRCD for Windows Manual
S2-61170	MCN Server Software Manual
DDN1290 (S2-61600)	MCN Server 8000 Software Manual

FRONT PANEL

MCN Network RX & TX LEDs
RX   Indicates that a packet has been received from
         the MCN network (from either connector).
TX   Indicates that a packet has been sent to the MCN
         network connectors.

Reset / Service Toggle Switch & LEDs
Press down for Reset. Up for Service
LEDs indicate state

HIB-IP 8002

MCN NETWORK Connections
    RJ-45 MCN Network connections.
    NOT Ethernet
*** See MCN Network Notes 1 & 2***

DC Power Connector

USB Programming Connector
    Used with PC running MCNConfig
    to configure IP address
    parameters

LED Indicators

ERR LED	Indicates an error condition (*see* Error Codes & Appendix F. Troubleshooting	**WINK LED**	Blinks when a Wink command is sent from the MCN software. *(see page 20)*
ACT LED	Indicates that a PC has connected to the unit.	**ETH TX LED**	Indicates that an Ethernet packet is being sent from the unit.
PWR	Indicates power is present	**ETH RX LED**	Indicates that an MCN Ethernet packet has been received by the unit. (Does not blink for Pings.)

Figure 2 HIB-IP 8002 module Front Panel

MCN Network Note 1 – Daisy-Chain Power

The HIB-IP 8002 module does support MCN Daisy Chain Power. It will accept power from upstream modules feeding it on the Network In connector. It will also pass MCN power to downstream modules through the Network Out connector. (Earlier version HIB-IP modules did not support this.)

MCN Network Note 2 – NOT Ethernet Ports

Although the MCN Network connectors are RJ-45s, THEY ARE NOT ETHERNET CONNECTORS. Because the MCN network connectors on the front of the units may have DC power on them, DO NOT CONNECT THE NETWORK IN OR OUT CONNECTORS TO ETHERNET PORTS. THIS CAN DAMAGE THE ETHERNET DEVICE. The Ethernet cable should be connected to the Ethernet RJ-45 connector on the rear of the HIB-IP unit.

ERR LED (Red) – Indicates a possible error condition:

ON Solid: Low Voltage on DC input connector or MCN Network In connection.
             In configuration mode, the module can be powered from the USB port even if the Power and
             Network connectors are disconnected. In this case a solid ERR LED is acceptable.

Blinking: **See Appendix F. Troubleshooting** for a list of Error Codes.

REAR PANEL
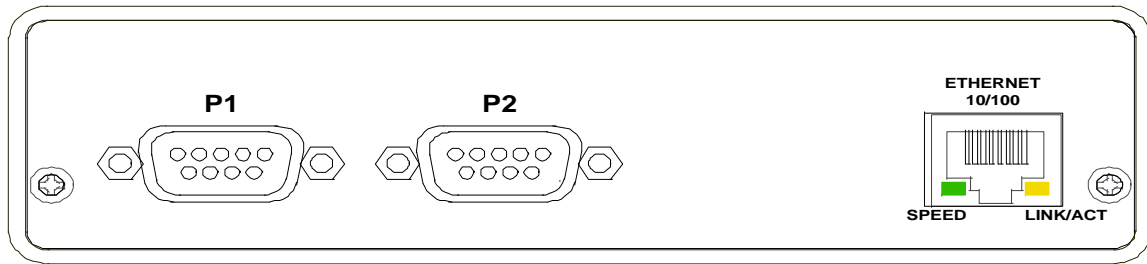
P1 & P2	Serial RS-232 Connectors. Reserved for future use.
Ethernet	Ethernet port. 100Base-TX FDX Auto MDIX
Speed LED	On: 100 Mb/Sec. Off: 10 MB/Sec (link not supported)
Link/Act LED:	On: Link to Ethernet switch is active Off: Link disconnected Blink: Data is being transferred

Ethernet Connector Warning

**Do not connect the Ethernet Connector to an MCN Network connector.
Damage could result.**

2. HARDWARE CONFIGURATION

This section describes the IP address parameters that must be set for the HIB-IP 8002 module.

> *NOTE: DO NOT connect the HIB-IP 8002 module to a live IP network until the factory default programming has been reconfigured with compatible settings for the network on which it will be used. Network-wide problems could arise from connecting devices to a network without coordination of addressing information. For usage with dedicated fiber segments, see the note below.*

Each system is different. Refer to the system documentation for the proper IP addresses, subnets, and gateways that are assigned in your system.

IP ADDRESS CONFIGURATION

IP address parameters for the HIB-IP 8002 unit are downloaded into the module using the MCN Config software that is automatically installed with all versions of the MCNRCD software. The IP parameters are loaded into the unit through the USB Programming connector on the front of the HIB-IP 8002 Module:

Connect a standard 4 pin A/B male USB Cable between the PC's USB standard 'A' connector and the USB standard 'B' Programming connector on the HIB-IP 8002, using the following cable: 89-12368 Cable Assy USB A Male – B Male.
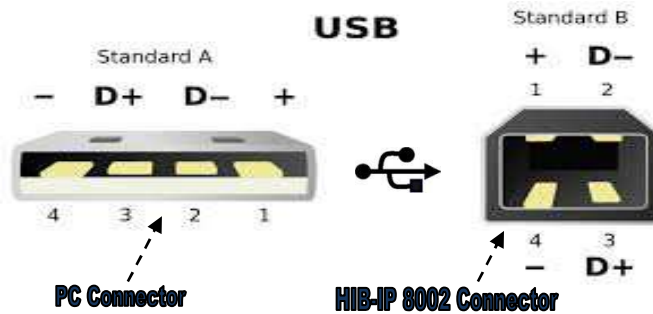
See the Loading the IP Parameters under the Installation section for the steps

When used in this manual, MCN Config refers to the version shipped with the MCN software and could be any of the following:

Software	MCN Config
MCNRCD	MCN Config.exe
MCN Server	MCN Config Server.exe
MCN Advanced Server	MCN Config Server.exe
MCN Server 8000	MCN Config Server.exe

Support for the HIB-IP 8002 module was added in software version 7.20. Earlier versions of software must be upgraded to support it.

- § The MCN Config software will be used in configuring all HIB-IP units for a particular system.

- § The standard MCNRCD or MCN Server software, supports up to (1) HIB-IP type unit.

- § The MCNRCD Advanced Server or MCN Server 8000 software may support multiple HIB-IP type units, depending upon your license.

The MCN Config program maintains and tracks the list of:

- Addressing parameters for all HIB-IP 8002 units in the system (including the MCN Group & Module)

- Authorized PC List

Each HIB-IP unit must be configured with:

- Its own HIB-IP addressing information

- Authorized PC information

- UDP Port:

    - Configurable for HIB-IP 8002 units (Version 400 & up):
      Choice of: HIB-IP (Legacy), HIB-IP 8000, or HIB-IP 8002*

The HIB-IP module configuration information is saved in the configuration files generated by the MCN Config software. Additionally, HIB-IP 8002 units require a password to allow configuration of the units. **Appendix H. IP Addressing** provides an overview of IP addressing concepts.

The following image is a screenshot from the McnConfig Server 8000 V7.20 showing the configuration screen for the HIB-IP 8002 Network interface.

IP SETTINGS WORKSHEET

Gather the following IP information for the system. IP information must be obtained for **each** HIB-IP module to be used (from the network administrator responsible for the IP network to which the HIB-IP module will be attached):

Individual HIB-IP 8002 Module Parameters:

For each HIB-IP 8002 module in the system, gather the following information:

HIB-IP 8002 Module Number	
Name	
HIB-IP 8002 Module IP Address (Host IP Address)	_____._____._____._____
Subnet Mask	_____._____._____._____
Gateway IP Address	_____._____._____._____
MCN Group (00-FE) (Default = F0)	
MCN Module Number (00-7F) Typically values of 10 – 7F are used.	_____
IP Type of Service (TOS) [0-255] Typically 0. Set to 2 for MSI RNIs (Requires MCN Software Vers 7.20 or above.)	_____

Subnet Restrictions:

Class	First Octet	Standard Subnet Size	Standard Subnet Mask
A	1-127	16,777,214	255.0.0.0
B	128-191	65,543	255.255.0.0
C	192-223	253	255.255.255.0
D	224-239	Multicast – Do not use.	
E	240-255	Experimental – Do not use.	

Note: The HIB-IP 8002 units can accept a more restrictive or less restrictive subnet mask (with either more or less 1's set, in the Subnet Mask).

The Gateway address is the address of the router used to communicate with PCs in other subnets. The Gateway subnet must be the same as the HIB-IP 8002 unit's subnet. If it is left Empty, the HIB-IP 8002 unit will not be able to communicate to PCs outside of its subnet.

Type of Service Field:

The HIB-IP 8002 supports a configurable IP Type of Service or TOS field to allow traffic priority across a network. This is supported with MCN software version 7.20 and later. The TOS field is associated with Quality of Service (QOS) and Differentiated Services Code Point (DSCP). TOS, QOS and DSCP values are related and use the same byte in the IP header. How that byte is interpreted is determined by your network router and switch settings. Do not assume that a higher value will always give you higher priority. Consult your network administrator for the proper value to use.

Standard values typically used are:
- **0** No Priority (default)
- **2** For Motorola Solutions, Inc. (MSI) ASTRO® 25 Version 7.16 and up Radio Network Infrastructures (RNI).

The HIB-IP 8002 module uses the TOS setting since it is the most configurable. If your network uses the QOS or DSCP interpretation you can convert those values to the proper TOS value and enter it into the HIB-IP 8002 configuration. Contact your system administrator or see http://en.wikipedia.org/wiki/Type of service for more information on converting between these values.

Authorized PCs:

For each PC in the system that will connect to the HIB-IP 8002 module, collect the following information:

PC Name	
PC IP Address (Host IP Address)	_____._____._____._____

See the MCN series Software manual for instructions on:
- Entering this data into the configuration files using MCN Config series of software. **See** Load the IP Parameters section of this manual for instructions on loading the IP Parameters in to the unit.

3. INSTALLATION

PHYSICALLY INSTALL HIB-IP UNIT ONTO THE IP NETWORK

A) *Mount the HIB-IP 8002 units (See Appendix B for Mounting Option details):*

Rack or Wall Mounting

Mounting kits are available for:
- EIA 19" Rack mounting
- Wall mounting

See Appendix D. Mounting Options for available mounting kits and instructions for mounting.

B) *Make electrical connections (See Appendix C for connector details):*

Grounding

- When wall or rack mounting the HIB-IP unit, a suitable safety and protective earth ground should be provided to the metal enclosure. The protective earth ground provides a path to ground for electrostatic discharge (ESD) energy. This connection is most conveniently made directly to the wall mount bracket or the rack mounting screws on the front of the rack-mount plate.

DC Power Connection
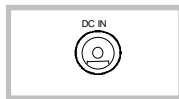
DC power can be applied to the HIB-IP 8002 module via the **DC IN** connector. A wall plug-in style power supply designed for the HIB-IP 8002 module is available as a separate item.

The HIB-IP 8002 module may also receive power from:

- Other upstream MCN Modules via the Network In connector or

- USB Port (for configuration only).
  Note that the ERR LED will light when the unit is powered from the USB port if there is no DC power on the DC In or Network In connectors.

LOAD THE IP PARAMETERS WITH THE MCNCONFIG PROGRAM:

The following outlines the generic process for loading the HIB-IP 8002 module parameters through the USB port. The actual process and screens may vary with different versions of the MCN Config software.

1. Start the MCN Config program and create or open the appropriate system.

2. Be sure all the HIB-IP 8002 module and Authorized PC parameters have been entered into the PC configuration files using MCN Config series software as described in Section: 2. Hardware Configuration.

3. IP traffic can interrupt programming or viewing the data on a HIB-IP 8002 unit.
   Remove IP traffic by disconnecting the Ethernet cable from the Ethernet port on the rear of the HIB-IP 8002 unit.

4. Connect a standard USB A Male to B Male cable (CTI # 89-12368) between the PC and the USB connector on the front of the HIB-IP 8002 module.

   USB PROGRAM

   Note: The first time you connect the PC to the USB port of a HIB-IP 8002 module, the USB Driver for the module will need to be installed. You may need the appropriate MCN software CD for this. See the manual for your MCN software for details.
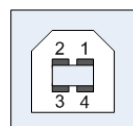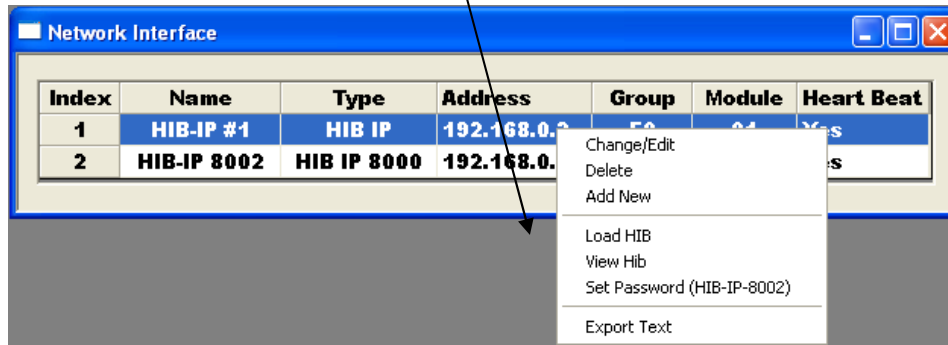
5. Go to the Network Interfaces window and select the proper HIB-IP 8002 unit.
    (See MCN Config: Loading System files in the MCN software manual for det

Right-Click here on the HIB-IP 8002 module

6. Right-click on the desired unit and select "Load HIB" from the pop-up window.

7. From the Program HIB-IP 8002 window, click the "Load" button.
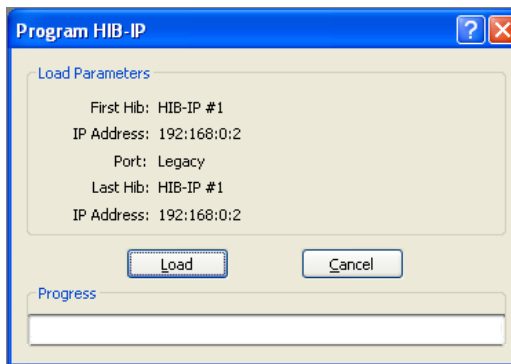
You can also read or verify the information in the HIB-IP 8002 module by selecting the "View HIB" menu item from the previous pop up window. This will read and display the configuration data within the HIB-IP 8002 unit.

8. You will be instructed to connect the cable.

9. After you have connected the cable, press the "OK" button.

10. The program will then scan for COM Ports and HIB-IP 8002 module USB Ports in your system.
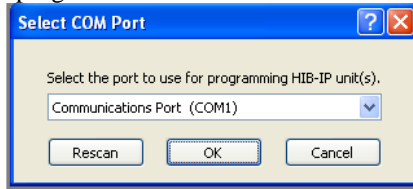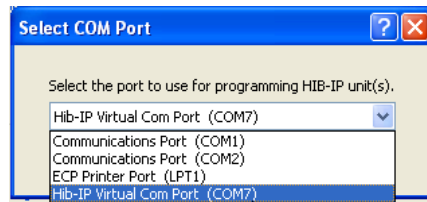

The program will find the serial COM ports in the system.

A HIB-IP Virtual Com Port should be displayed if you have the HIB-IP 8002 module properly connected, and the USB drivers are properly loaded:

(COM Port numbers may be different in your system):

If you don't see the Virtual Com Port, you could have one of the following problems:
    - HIB-IP 8002 module is not connected
    - HIB-IP 8002 module USB Driver is not installed.

If the driver is not installed, see your MCN software manual for details.

11. Entering the Password:
HIB-IP 8002 modules require a configuration password initially, each time the program is started or restarted, in order to view or Load the configuration. Also the password window will reappear if the password has been entered incorrectly due to error or if it has been changed.
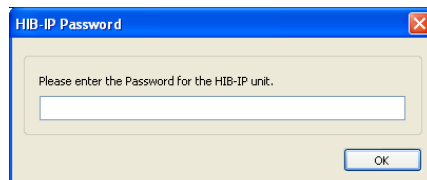
    Enter the password and hit "OK".

The Factory Default Password is:
    ▶ **Initial-Password!**
Passwords are case sensitive.

12. If the same Network Interface (NI) is used to configure more than one HIB-IP 8002 unit, a *Caution* window prompt requesting permission to overwrite the last recorded Mac address for that NI will be displayed.
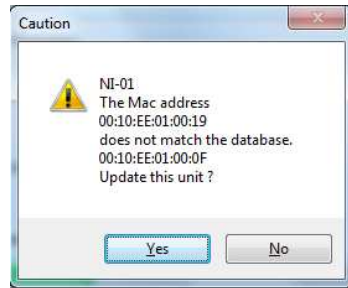
Choosing **Yes** will overwrite the existing Mac address saved for the NI.
Choosing **No** will abort the write/update process as shown in the next image.
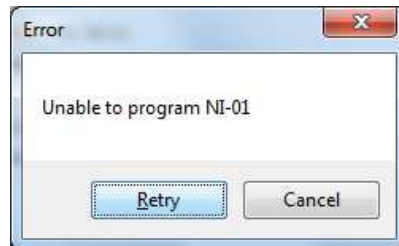
Choosing **Retry** will retry the Write/Update process.

13. After hitting **Yes** at the *Caution* window prompt, the unit will then be programmed.

14. Re-connect the Ethernet cable to the port on the rear of the unit.

When the HIB-IP 8002 module resets, the USB port will go down and back up again. This could take up to 10 seconds. The MCN Config program will normally find the Virtual Com port when the unit resets, but if it is not present you may hit the "Rescan" button in the Select Com Port window.
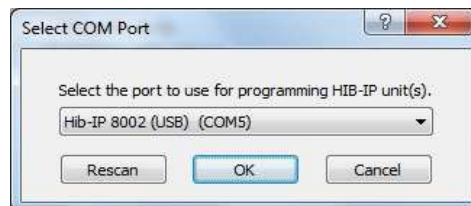
VIEWING CONFIGURATION DATA IN HIB-IP 8002 MODULES

You can view the configuration data in the HIB-IP units with the MCN Config program.

1. Connect the USB cable to the device as per the Loading section above.

2. From the Network Interface window, Right-Click on the desired unit.
   Select View HIB from the menu.
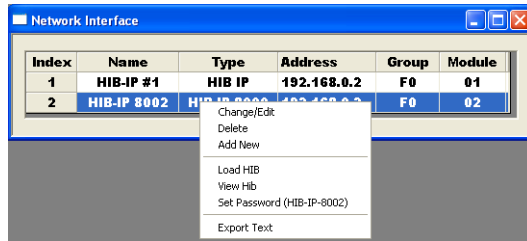
3. Select View
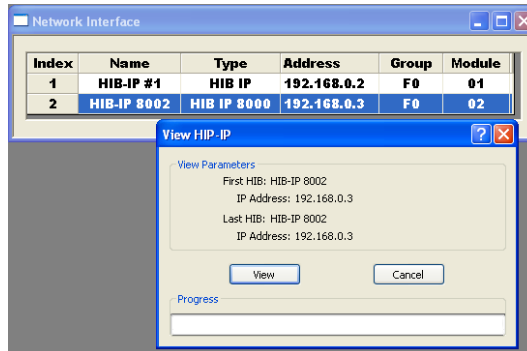
4. Select the Virtual COM port as previously shown in the Loading section.

5. The **HIB-IP Information** window will be displayed.
   The system configuration file information is on the left.
   The data in the HIB-IP unit is on the right.
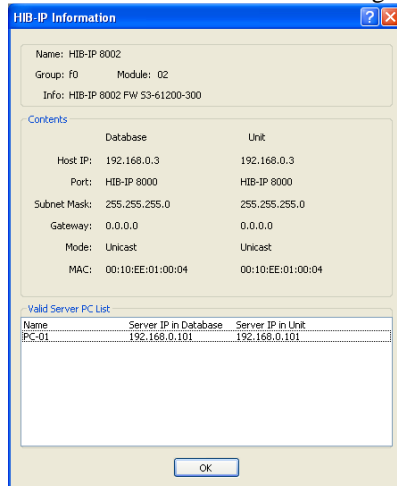
SETTING THE PASSWORD ON THE HIB-IP 8002 MODULE

To set the password on the HIB-IP 8002 module:
1. Connect the serial USB cable to the device as per the previous "*Loading the IP Parameters*" section.

2. Run the MCNConfig program and load your system.

3. From the Network Interface window, Right-Click on the desired unit.
    Select "View HIB" from the menu.
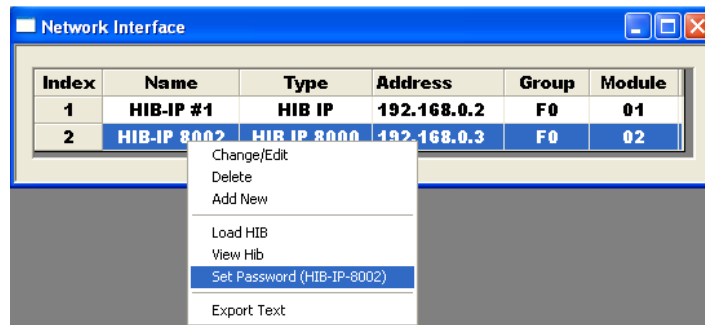
    Select Set Password (HIB-IP 8002 module):

4. In the Set Password window, press the "Set" button.
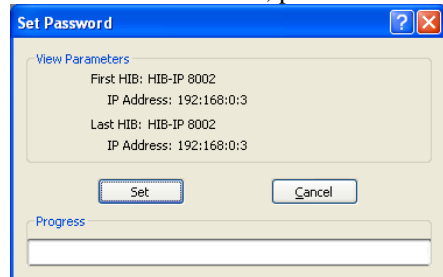
5. Connect the selected Physical or Virtual COM port as discussed in "*Loading the IP Parameters*" section.

6. Fill out the fields in the Change Password window

    Hit "OK".

Follow the appropriate password guidelines for your system or site.

See Appendix Default Password Value for instructions on resetting the Password to its default.

CONNECT TO THE MCN & IP NETWORKS

After the IP parameters are programmed, connect the HIB-IP unit to the MCN network and the IP network.

MCN Network Connection

- The local MCN network must be attached to the HIB-IP 8002 module via the "NETWORK" connector following standard guidelines as to cable type, cable length, and termination appropriate for the selected transceiver.
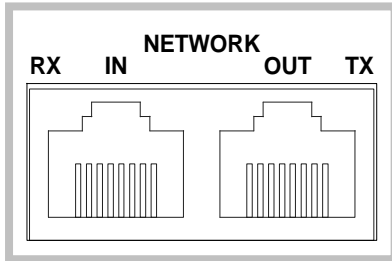
The dual RJ45 **NETWORK** connector allows a daisy-chained MCN network connection, as the network pins of the two RJ45 connectors are directly paralleled.

The HIB-IP 8002 module can also source and use power to/from the MCN Network connectors. This daisy-chain power method allows a HIB-IP 8002 module to be powered by an upstream MCN module feeding the Network In port. The Network Out connector will also pass DC power to downstream MCN modules.

Modules such as CIB, AIB TIB, IIB, IOB, GPIO, and other HIB-IP 8002 modules will accept daisy-chained power on their Network In connector. Modules such as EXB-IP, HIB-IP, and HIB-IP 8000 do not use daisy-chain power.

Ethernet Connection

- The Ethernet network must be attached to the HIB-IP 8002 module via the Ethernet Connector on the rear of the unit.

> **WARNING:** *DO NOT connect the HIB-IP module to a live Ethernet network until it has been reconfigured with its IP parameters. Network-wide problems could arise from connecting devices to a network without coordination of addressing information.*
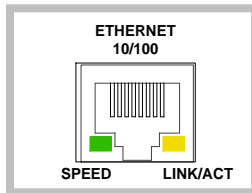
The **Ethernet** port utilizes a standard RJ45 connector. Cat 5 or Cat 6 unshielded twisted pair cable should be used between the HIB-IP 8002 module and the IP switch. The length of this cable should be less than 100 meters (328 feet).

RUN THE MCNRCD STANDARD OR SERVER PROGRAM

The Standard and Server Programs require a Mcn system to be configured with NI, Hardware and a valid display window using the McnConfig application. See the '*System Configuration Section*' of the Following Manuals:

　　　　　　　S2-61043　　**MCNRCD Standard**

　　　　　　　S2-61170　　**MCN Server / Advanced Server.**

　　　　　　　S2-61600　　**DDN1290A　MCN Server 8000.**

If All the Previous Steps Have Been Properly Followed,
The installation of the HIB-IP units is now complete.

4. TESTING

PINGING THE HIB-IP UNIT

The "Ping" function can be run from the PC as a diagnostic tool to determine if a particular IP address can be "seen" by a PC and the network infrastructure is configured to pass ICMP Ping messages and responses. The HIB-IP 8002 module will respond to ICMP Ping messages from the IP network.

Note: Some networks are configured to block the ICMP Ping messages and/or responses between certain network segments of subnets. The Ping function will not work if the ICMP Ping messages or responses are blocked by the network.

If ICMP Pings are blocked in the network, you may be able to log into a remote router or managed IP switch at the HIB-IP 8002 module's site and ping the unit from that router or IP switch.

VIEWING PARAMETERS OF THE HIB-IP UNIT

The Hardware parameters of the HIB-IP Module can be read and viewed using the McnConfig. See also Viewing Configuration Data in HIB-IP 8002 modules on page 17.

It is no longer possible using a web browser to view the parameters that are configured in the HIB-IP 8002 Module, as was the case with previous models.

WINKING THE HIB-IP UNIT

What is a Wink
The wink is a feature where the module is made to generate five 1 second flashes on the Wink LED. This is a useful tool that allows a user to force the module to wink, so that units mounted or racked among similar or identical Hardware devices may be located. It may also be used as part of the process to verify that a module is online and has good network communication.

Performing a Wink
This function is accessible from within the McnServer application:
- Go to 'View'-> 'NI Status.
- Right click on the specific HIB-IP 8002 from the NI list and choose wink.
- Look for the hardware device with a flashing wink LED status light. *See Figure 2 HIB-IP 8002 module Front Panel*.

The process may be repeated as often as needed.

TROUBLESHOOTING

Error Codes

The HIB-IP Module is equipped with an error status LED to indicate the presence and type of error when detected by the unit.

ERR LED	Indicates an error and flashes to show the error type or condition (*see the following table &* Appendix F. Troubleshooting*).*
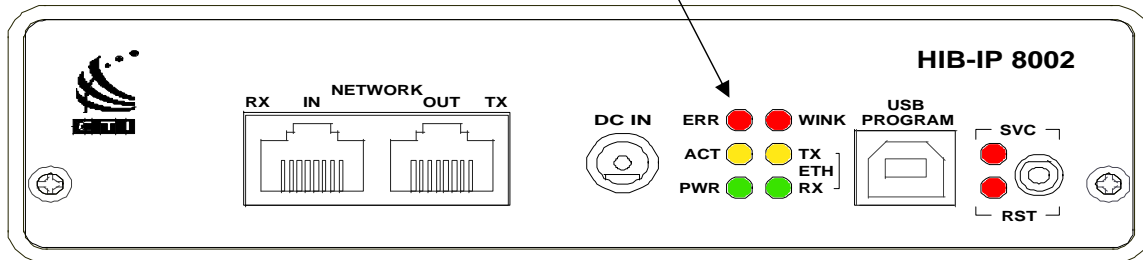
Note: The flash patterns are indicate by the RED Error LED cycling On and Off per 500ms for the specified Number of flashes, followed by a 1.5 second Pause where the LED is Off.

This table shows the 9 possible Error Flash patterns that may be identified from the error LED.

ERROR LED Status	ERROR DETECTED
Off (LED not illuminated)	None (Normal Operation)
Steady On (Old firmware) Flashing on-off in 1sec intervals (New firmware)	On USB Power Source
2 flashes <u>Pause</u> repeat	Socket Creation Failed
3 flashes <u>Pause</u> repeat	Ethernet Configuration Error
4 flashes <u>Pause</u> repeat	Failed Memory Operation
5 flashes <u>Pause</u> repeat	No Mac Address Assigned
6 flashes <u>Pause</u> repeat	Internal Processor Failure
7 flashes <u>Pause</u> repeat	Firmware Corruption
8 flashes <u>Pause</u> repeat	Firmware Corruption
9 flashes <u>Pause</u> repeat	Internal Hardware or Firmware Failed

5. SERVICING THE UNIT

USER SERVICING

There are no user serviceable parts inside, except for the battery. For service, contact CTI Products or a qualified electronics technician.

INTERNAL BATTERY

There is an internal battery used to maintain the time settings of the module when it is turned off or not connected to any power source. The internal battery is a (3-volt Lithium "coin cell" type CR2032) that is not rechargeable and designed to last 5 to 7 years with typical use. The battery is used only to keep the Real-Time clock running. The Real-Time Clock is used only for error-logging which is sent out the serial port. The other functions of the unit will not be affected if the battery dies.

REPLACING THE BATTERY

If the internal battery dies before you are able to replace it, the symptom will be indicated by the module not maintaining the correct time if it becomes disconnected from the power source. Maintenance and /or battery replacement should only be performed by CTI Products or a qualified electronics technician.

Caution: There could possibly be the risk of explosion if the battery is replaced with an incorrect type or inserted improperly.
- – Replace with only a UL Recognized CR2032 battery.
- – Insert with the (+) side up.

Replacement Steps

1. Remove the cables from the unit.
2. Support the unit from the rear and remove the two front-panel screws.
3. Remove the unit from the rack-mount bracket.
4. Slide the top cover off the unit.
5. Remove the old battery.
6. Insert the new battery (+) side up
   DO NOT FORCE.
7. Re-install the top cover.
8. Re-mount the unit to the panel and fasten with the two front panel screws.
9. Re-connect the cables.

BATTERY DISPOSAL

Note: Batteries containing Lithium are recyclable and should be recycled to be properly disposed.

Please dispose of unwanted used batteries according to the following Instructions.

- Locate a place that collects and recycles lithium ion batteries. To search online, go to www.call2recycle.org and enter your zip code; or if you prefer to locate a place by phone, dial 1-877-2-RECYCLE to find the nearest retailer that collects lithium ion batteries.

- Once you have chosen a retailer near you, call that facility to confirm that they still collect Lithium batteries at that location and make arrangements for delivery.

- Separate each battery individually using a plastic bag or other insulating container. There should only be one battery per plastic bag/container. If you do not have adequate plastic bags/containers, the batteries can be covered with electrical, duct or masking tape.

- It is advisable to deliver the lithium batteries to the recycling collection facility, as there are special regulations that apply for shipping these batteries. These battery shipments typically require hazardous materials shipping papers that are only accepted from contract hazmat shippers, and certain lithium batteries may not qualify for Parcel or Postal service.

FACTORY SUPPORT / REPAIR

If the unit requires factory repair, please contact CTI Products:
(513) 595-5900 or
(855) 284-8872.

APPENDIX

APPENDIX A. FACTORY DEFAULT CONFIGURATION

IP Address Parameters

The units are factory programmed as follows:
- IP Address: 192.168.1.100
- IP Address Mode: Unicast
- Subnet Mask: 255.255.255.0
- PC IP Address   192.1.1.201

Default Password

The factory default password is:

Initial-Password!

Passwords are case-sensitive.

Resetting the Password to the Factory Default Value

If you have forgotten the configuration password, it may be changed back to the factory default:

- Connect the HIB-IP 8002 module to the PC with the USB cable.

- Press SVC/RST toggle switch down (Reset).

- Immediately press the SVC/ RST up and hold it up for 10 seconds.
  The ETH TX LED should blink.
  Password is now set to the default value.

- All IP parameters will be cleared out of the unit.

- The password will be set to the default password.

- Reset the password to your desired password as described in the Setting the Password on the HIB-IP 8002 module Section on Page 18 of this Manual.

APPENDIX B. BACKUP & RESTORE PROCEDURES

The HIB-IP 8002 units are not part of any automatic Back-up And Restore (BAR) system.

The HIB-IP 8002 configuration information is saved in the configuration files generated by the MCN Config software. It is recommended that you back up those files as part of your standard backup procedures.

See the appropriate MCN Software Manual for your system for additional Backup & Restore information.

APPENDIX C.   SECURITY AND INFORMATION ASSURANCE RECOMMENDATIONS

Review these recommendations before installation and follow them during installation and operation:

1. Software Installation Locations
    Install the MCN software in default program directory recommended by Install-shield.

2. Configure the MCN software as described in the appropriate software manual.

3. Use the proper HIB-IP 8002 UDP ports as specified by your radio system provider or IP network provider for your network.

4. For all software, network and device configuration, additionally take into consideration commercially accepted practices, industry standards and the standards for your organization.

5. Do not save user files or system configuration files in the program directory.

6. Save system configuration files to a directory that requires Administrator rights so that users cannot delete or edit the configuration files.

7. Always run the configuration software with the lowest permission set possible.
    Note: The MCN Config Server software must be run with Administrator rights.

8. When configuring a system, do not enter Sensitive or Confidential information into the system configuration files.

9. For MSI ASTRO® 25 systems, the configuration files generated by MCN Config Server software are not backed up as part of the ASTRO® 25 Back UP & Restore (BAR) solution. Follow the Backup & Recovery procedures as listed in the MCN Server 8000 manual.

10. Follow the applicable Backup & Recovery procedures for your system, PCs, and operating systems as defined by your organization, the hardware and software vendors, and commercially acceptable practices.

11. Limit access to PCs, IP networks and MCN networks, both physically and through appropriate restrictions in routers and switches

12. Use strong passwords where applicable.

13. Follow your radio system provider's and your organization's recommendations on security and Information Assurance.

14. Use the appropriate Windows Hardening Kits for PCs in your system.

15. Use anti-virus and anti-malware packages on PCs in your system.

16. Install appropriate security patches for installed software and operating system on PCs in your system.

17. For ASTRO® 25 systems, use of multiple NIC cards (Dual-Home systems) is not approved by MSI in ASTRO® 25 RNIs due to Information Assurance (IA) security concerns.

APPENDIX D. MOUNTING OPTIONS

Wall mount and EIA 19" rack mount kits are available as options for the HIB-IP units from CTI Products, Inc. The wall mount kit includes brackets to allow a single HIB-IP module to be mounted to any flat surface. The rack mount kit includes an adapter allowing up to three HIB-IP modules to be mounted in a single rack unit height.

Rack Mount Option

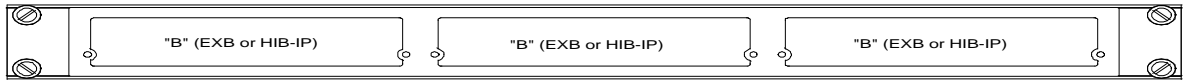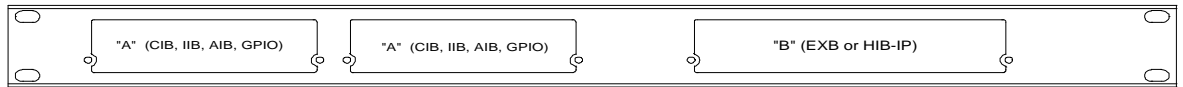| Mounting Kits	Part Number
Rack Mount – 3 B size modules (Triple B Rack Mount) 1 Rack Unit (1.75") High	S2-60472
Rack Mount - 2 A size modules plus 1 B size module (2A + B Rack Mount) 1 Rack Unit (1.75") High (Used to mount 2 I/O modules and 1 EXB or HIB-IP module.)	S2-60443

Figure 3 – Triple B Rack Mount Kit

Figure 4 – 2A + B Rack Mount Kit

Figure 5 shows an exploded view of the rack mount installation.
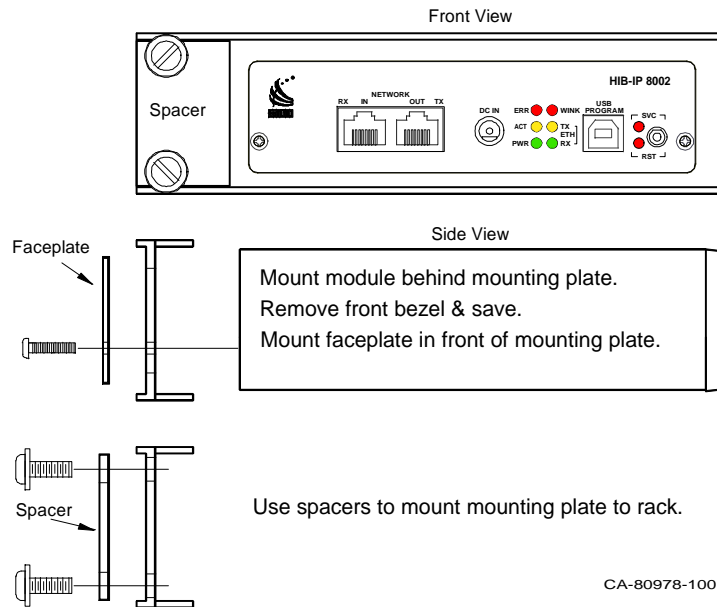

Figure 5 HIB-IP Module Rack Mounting

To attach a module to the rack adapter, and then mount the rack adapter into the rack, follow the steps below.

> **WARNING**
>
> Do not allow the PC board to slide out of the housing when the front panel is removed. If it does, **DO NOT** slide the PC board back into the housing from the front of the module. Doing so may damage the unit, causing the unit to malfunction when powered on. Doing so will void the unit's warranty. Return the PC board to the housing by sliding it only from the rear. (See instructions below.)

Rack Mounting Instructions

| Step	Operation
1	Remove the front panel from the module, including the bezel, by removing the two Philips head screws in the faceplate. The bezel is not used when rack mounting the module.
2	Position the module behind the rack adapter, lining up the holes in the rack adapter with the front panel screw holes on the module.
3	Position the front panel in front of the rack adapter, lining up the front panel with the module.
4	Fasten the front panel and module to the rack adapter with the Philips head screws that were previously removed.
5	Position the rack adapter into your rack, lining up the four mounting holes of the rack adapter with mounting holes in the rack frame.
6	Position the two spacers in the front of the rack adapter, aligning the cutouts in the spacers with the holes of the adapter.
7	Install mounting screws (customer provided) into the rack.

When the module's front panel is removed, do not allow the PC board to slide out of the housing. If the PC board does slide out of the housing, you must follow the steps below to replace the PC board in the housing. DO NOT RE-INSTALL THE PC BOARD FROM THE FRONT OF THE HOUSING!

Re-Installing a PC Board in its housing

Step	Operation
1	From the front of the module, slide the PC board out of the housing.
2	Remove the back panel of the module.
3	Attach either bezel and front panel or rack kit and front panel to the housing with two Philips head screws.
3	From the rear of the module, slide the PC board back into the housing (there are markings on the PC board to indicate which edge to insert into the rear of the housing first).
4	Attach bezel and rear panel to the housing with two Philips head screws.

Wall Mount Option

The wall mount option allows a "B" size (EXB or HIB-IP) MCN module to be mounted to any flat surface. The HIB-IP module has four screw holes on the bottom. Simply attach the two mounting plates to the bottom of the module using the four flat-head screws provided with the wall mount kit. This assembly is then attached to the flat surface with user-provided fasteners. Figure 6 shows a dimensioned view of the wall mount installation.
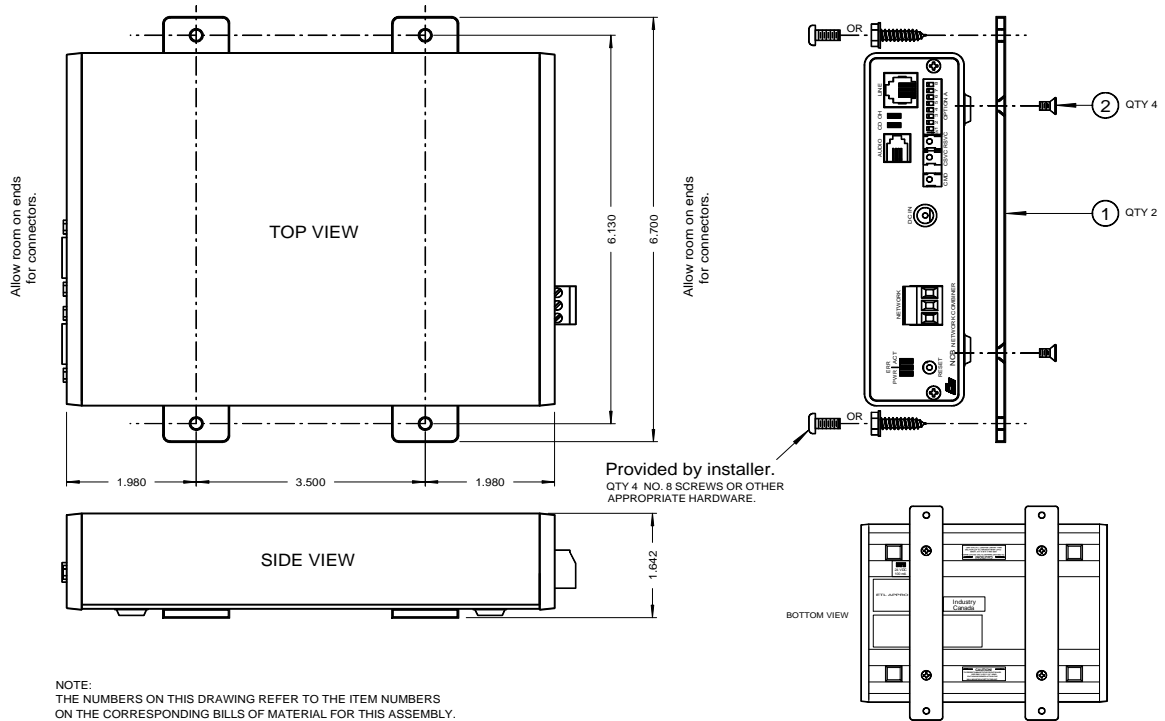
Figure 6 MCN "B" Size Module Wall Mounting

CAUTION

Be sure to use the flat head screws provided with the wall mount kit. If you are not using the wall mount kit from CTI Products, Inc., make sure that the screws do not protrude into the enclosure more than 0.125 inches from the bottom surface of the module.

Using a longer screw that touches the PC board inside the module may damage the module. Doing so will void the unit's warranty.

APPENDIX E.　CONNECTOR DETAILS

DC IN Connector

|	
Connector type:	2.5 x 5.5 mm coaxial
Mating Connector:	Switchcraft 760 or equivalent
Connector pinout:	CTI Products, Inc. standard power supply is wired with center pin positive. HIB-IP 8002 module can accept either pin positive.

DC IN

Front View　　　　Polarity

−　　　　　+
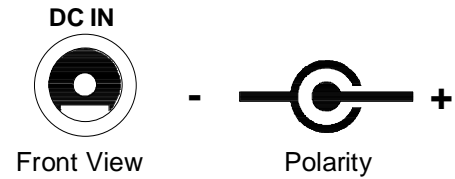
NETWORK Connectors

RJ45 Connectors:

Pins 1 and 2 of both RJ45 connectors as well as the screw-terminal connector are all wired in parallel.

Connector Type:　　Standard RJ45 connector, 8 position 8 contact.

IN　　NETWORK　　OUT

8 7 6 5 4 3 2 1
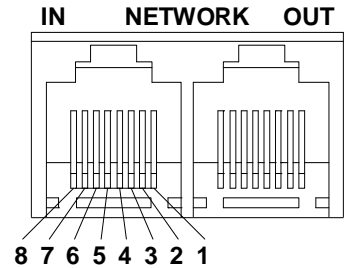
| Pin	Function	Notes
1	Network	Network connection is NOT polarity sensitive
2	Network	Pins 1,2 of IN and OUT connectors tied parallel
3	+ DC Power	In on the IN connector, Out on the OUT connector
4	No Connection	
5	No Connection	
6	- DC Power	In on IN connector, Out on OUT connector
7	- DC Power	In on IN connector, Out on OUT connector
8	+ DC Power	In on IN connector, Out on OUT connector

Ethernet Connector

Connector type: Standard RJ45 female 100 FDX Auto-MDIX.

Pin	Function
1	Ethernet TX
2	Ethernet TX
3	Ethernet RX
4	N/C
5	N/C
6	Ethernet RX
7	N/C
8	N/C

USB Programming Connector

Connector type: USB Type B Female

USB PROGRAM

Pin	Function
1	+5 VDC
2	Data -
3	Data +
4	Ground
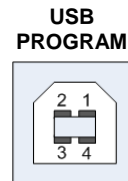
ASYNC Serial Connectors, P1 & P2

These ports are not used in this version of module.

Connector type: Standard D-Subminiature 9 pin male. DTE (Like IBM PC 9 pin)

Pin	Signal	Name	Input / Output
1	DCD	Data Carrier Detect	Input
2	RXD	Receive Data	Input
3	TXD	Transmit Data	Output
4	DTR	Data Terminal Ready	Output
5	GND	Signal Ground	Common
6	DSR	Data Set Ready	n/c
7	RTS	Request to Send	Output
8	CTS	Clear to Send	Input
9	RI	Ring Indicate	n/c

APPENDIX F. TROUBLESHOOTING

Table D1

If the **Green** PWR LED . . .	REASON	CORRECTIVE ACTION
Steadily illuminates	Normal operation indicating that HIB-IP unit is receiving proper DC input power.	Go to next Table.
Occasionally illuminates	Voltage low or power supply cannot supply the current needed for the HIB-IB 8002 unit	Check that power supply can deliver 5 watts at 11-30VDC.
Does not illuminate	HIB-IP unit is not receiving DC input power.	Check for proper voltage (11-30VDC) at "DC IN" connector or on the power pins or the Network IN connector.

Table D2

If the **Yellow** ETH TX LED . . .	REASON	CORRECTIVE ACTION
Occasionally flashes on, then off.	Normal operation indicating an MCN packet is being sent to the IP stack for transmission	Go to next Table.
Never illuminates	No MCN packets are being sent. May not be receiving messages on the Network In and Out port.	Check the integrity of the MCN network and cabling (Network In & Out). Verify that there is an MCN module attached and powered up..

Table D3

If the **Green** ETH RX LED . . .	REASON	CORRECTIVE ACTION
Occasionally flashes on, then off.	Normal operation indicating a message packet has been detected on the IP network.	Go to next Table.
Never illuminates	IP messages are not being received by the HIP-IP on the Ethernet port	Check the integrity of the IP network and cabling. Verify that the MCN software is running on the PC and that the proper configuration files are loaded. Verify that the PC can see the HIB-IP unit over the IP network. Ping commands can be used on some networks. However, other networks may have Ping traffic blocked through routers or IP switches.

Table D4

| If the Yellow ACT LED . . .	REASON	CORRECTIVE ACTION
Is steadily illuminated	Normal operation indicating a PC running MCNRCD or MCN Server software is connected to the HIB-IP module	None.
Never illuminates	1. PC not running MCNRCD or MCN Server Software 2. PC not configured to access HIB-IP module 3. No IP connection between PC & HIB-IP module 4 HIB-IP module IP parameters wrong or PC not in Authorized PC list.	1. Start the software 2. Use MCNConfig to Re-configure PC to access the HIB-IP module. Restart the MCNRCD or MCN Server software. 3. Check IP cabling. Try to Ping HIB-IP module from PC Check PCs IP address Check ETH RX LED for activity 4. Re-load the IP parameters & Authorized PC list in the HIB-IP module

To request RMA for return of product to CTI Products, call Customer Support at +1-513-595-590

APPENDIX G.   SPECIFICATIONS

HIB-IP 8002 module

DC Power Input:	12 to 24 VDC, 1A Max Polarity: Center Positive: − ─◉─ +
Unit Power Dissipation:	3 watts maximum internal dissipation; (with 950 mA @ 24v load on MCN Network Out connector).
Size:	7.5" D x 5.6" W x 1.6" H
Weight:	2 lbs. maximum (906g)
Operating Temperature:	0 to 60 °C
Humidity:	10-95% non-condensing
Mounting:	Desktop with integral non-slip feet Wall mount or 19" rack mount with optional adapters
Configuration:	Ethernet IP Parameters are programmed using MCN Config program supplied with MCN software.
Transceivers Supported:	*MCN* 78K
Ethernet:	100Base-TX FDX Auto-MDIX
IP Addressing Modes:	Unicast
IP Transport:	UDP

UDP Ports:	*HIB-IP Legacy mode:*	*Source 1283 (fixed)* *Dest:* 1100 dest. (fixed)
	HIB-IP 8002:	Source: *1283 (fixed)* *Dest: "HIB-IP 8002"*

"HIB-IP 8002" UDP Port for use with Motorola Solutions Inc. Astro25® Radio Network Infrastructure (RNI) Version 7.13 and up

IP Type of Service (TOS):	Configurable with MCN software Vers 7.20 and up.

EMC	US	FCC Part 15.109(b) Class A (Radiated) Part 15.107(b) Class A (Conducted)
	Canada	ICES-003 Issue 5 Aug 2012 Class A
	EU	EMC Directive 2004/108/EC EN 55022:2010 ITE RF Radiated & conducted Emissions Part B
	Aus/NZ	AS/NZS CISPR 11:2010

EN 55024 -ITE Immunity: EN61000-4-2   ESD
                               EN61000-4-3   Radiated
                               EN61000-4-4   EFT
                               EN61000-4-5   Surge
                               EN61000-4-6   Conducted
                               EN61000-4-8   Magnetic
                               EN61000-3-2 inc. A2:2009 Harmonic Current Emissions
                               EN61000-3-3   Flicker Voltage Fluctuation

Safety Agency Approvals: *UL 60950-1*
                               CSA   C22.2#60950-1
                               IEC   60950-1

ROHS :   Yes

APPENDIX H. IP ADDRESSING

Conventions

Any node connected to an IP (Internet Protocol) network must be identified with a unique 32-bit address. These 32-bit addresses are commonly written *in dotted decimal* notation as four decimal numbers (referred to as octets because each decimal number represents 8 bits) separated by decimal points. Each octet can be a number from 1 to 255. For example, 131.9.1.2 is a valid IP address. The IP address assigned to a network device is commonly called the *Host IP Address*. By having unique addresses on a network, individual stations (also called hosts or nodes) can be identified on the network.

IP Address Classes

There are five types of IP addresses. Three are associated with networks – Class A, B, and C.

- **Class A** addresses are for networks that have a large number of hosts, up to a maximum of 16,777,214 on a single IP network. The first octet is between 1 and 126. (127 is reserved for loopback and is used for internal testing on the local machine.)
- **Class B** addresses are for medium-sized networks. The first octet is between 128 and 191.
- **Class C** addresses are for small networks, up to 255 hosts. The first octet is between 192 and 223.
- **Class D** addresses are reserved for multicasting and the first octet is between 224 and 239. These are not used for Host (device) addresses.
- **Class E** addresses (240 to 255) are reserved and should not be used.

An IP address consists of two parts – one part identifies the network, and one part identifies the host (or node). The NetID portion of the IP address identifies the physical network segment. The HostID portion of the IP address identifies the node within the network segment. The following table lists the capacities of each IP address and the bits used as NetID and HostID.

IP Class	Net ID (Beginning Bits)	# of Networks	Host ID (Ending Bits)	# of Hosts or Subnets	1st byte Range
A	8	126	24	16.7 million	1-126
B	16	16,000	16	65,000	128-191
C	24	2 million	8	254	192-293

Subnetting using Subnet Masks

A portion of the host bits can be used to "subnet the network". The subnet mask identifies the "NetID" and "HostID" portions of the IP address in a bitwise fashion. The mask is constructed by placing a "1" in any bit that is part of a subnetwork address. So subnet mask bits that are SET define the NetID, and CLEARED subnet mask bits define the HostID.

A subnet mask of 255.255.255.0 defines the NetID as the first three octets, and the HostID as the last octet. For example, for the address 192.47.73.111 and the subnet mask of 255.255.255.0, the subnetwork can be identified as 192.47.73.0.

Summary of Important Networking Details

- A. A specific "NetID" can exist on only ONE port of ONE IP router.
- B. The "NetID" portion of the Host Address and the Gateway Address MUST BE THE SAME.
- C. If a functioning unit is moved to a different location, its Host IP Address and Default Gateway IP Address MUST BE CHANGED to match the "NetID" at the new location.

MAC Addresses

Whereas IP uses Logical Addresses to identify a host (node), other protocols use Hardware Addresses called Media Access Control addresses, or MAC addresses. MAC addresses are set at the factory at time of manufacture and cannot be changed. (IP addresses can be changed at any time.) A MAC address consists of six octets, in hexadecimal notation, separated by colons. An example would be: 00:10:EE:00:02:34.

The first three octets in a MAC address identify the manufacturer. In the above example, 00:10:EE identifies CTI Products as the manufacturer of this device. The last three octets are sequentially assigned by the manufacturer to form a type of serial number. In this way, no two devices have the same MAC address.

Address Resolution Protocol (ARP)

Since IP uses Logical Addresses at the OSI Network Layer (Layer 3) and Ethernet uses MAC addresses at the OSI Data Link Layer (Layer 2), Address Resolution Protocol is used whenever IP is used over the Ethernet. ARP is needed to convert an IP address to a MAC address. The client then stores this resolved address for a period of time in its ARP cache. An ARP cache is a lookup table, typically in a router, that will store a quantity of resolved addresses for devices that it must communicate with.

When a message is destined for an IP address whose MAC address has not yet been resolved, an ARP REQUEST is sent from the local host as a broadcast message, asking for MAC identification. A remote host with the IP address in question generates an ARP RESPONSE. This ARP RESPONSE contains the requested MAC address. The local host receives the message, and places the IP Address and the matching MAC Address in its ARP Cache. The original message is then sent using the MAC Address found previously. Any additional messages to this remote IP address will be sent using the MAC address found in the local host's ARP cache.

Ethernet Cables

Since the Ethernet port on the HIB-IP 8002 module has Auto-MDIX capability, the unit may be connected to an IP switch with either a straight-through or a crossover cable.

We recommend using straight-through cables since the MCN network requires straight-through cables. Using one type of cable throughout the system will minimize the chance of connecting the wrong type of cable to the MCN Network connectors.

The following table lists the connections for a straight-through cable.

Standard End				Standard End		
Signal Name	Wire Color	Pin		Pin	Wire Color	Signal Name
TD+	White/Orange	1	←→	1	White/Orange	TD+
TD-	Orange	2	←→	2	Orange	TD-
RD+	White/Green	3	←→	3	White/Green	RD+
Not used	Blue	4	←→	4	Blue	Not used
Not used	White/Blue	5	←→	5	White/Blue	Not used
RD-	Green	6	←→	6	Green	RD-
Not used	White/Brown	7	←→	7	White/Brown	Not used
Not used	Brown	8	←→	8	Brown	Not used

APPENDIX I. REGULATORY NOTES

<u>**Radio Frequency Emissions and Immunity**</u>

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Limits specified in the standards listed below are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

UNITED STATES:
This Class A device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
 (1) This device may not cause harmful interference, and
 (2) this device must accept any interference received, including interference that may cause undesired operation.

CANADA:
This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations CAN ICES-3 (A)/NMB-3(A).
Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada CAN ICES-3 (A)/NMB-3(A).

EUROPE: This equipment has been tested and found to conform with the following standards: EN60950, EN50082-1, IEC801-2, IEC801-3, IEC801-4, and EN55022. This equipment complies with the requirements of the following directives: Low Voltage Directive 73/23/EEC, EMC Directive 89/336/EEC, and 93/68/EEC Harmonization of CE Marking.

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