MCN Monitoring and Control Network
Comparator Display System

Host Computer Interface Module
HIB
Hardware Reference Manual

S2-60427-210

NOTE: This module must be configured before being installed in your system. Refer to section 4 and 7 for information about the module configuration.

CTi Products Inc.

FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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 his own expense.

Warning: 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.

DOC Statement

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Computer Software Copyrights

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Manual Revisions

Rev.	Description
205	Covers Rev 200 of HIB Module
210	Added Windows NT, 2000, XP information, FixMouse for Win 2K, Rev 250 of HIB hardware

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If you have questions about the MCN comparator display system, call us at:
(513) 595-5900. (8:30 to 5:00 Eastern)

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1.   Introduction

The Host Computer Interface Module (HIB) is a member of the Monitoring and Control Network (MCN™) family of **User Interface Modules**.   Hardware specifications and configuration information are described in this manual.

The HIB module connects a PC, running CTI Product's MCN Remote Comparator Display software (MCN RCD) to the MCN network. The HIB is used with the MCN RCD software and a Comparator I/O Module (such as a CIB or AIB) to create a comparator display system. The comparator display system provides monitoring and control functions for your communications system.
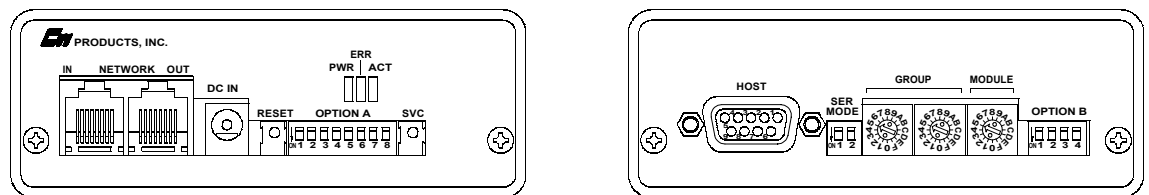
Figure 1 - HIB Front and Rear View

This manual applies only to HIB modules with the unit number S2-60081-xxx, where 'xxx' is the number 200 or greater. Earlier versions of the HIB module ('xxx' is 100 or 101) are not covered by this manual. Manual number S2-60427-110 describes the earlier version HIB modules.   This unit number can be found on the rear panel of the module.

1.1   Reference Documents

1. Monitoring and Control Network Comparator Display System Manual
        Part Number S2-60425

2. Monitoring and Control Network Remote Comparator Display Software
        Part Number S2-60428

2.   Theory of Operation

The HIB module does not provide any direct monitoring or control functions. Its purpose is to bridge the MCN network and the PC's serial COM port.

The HIB module is used along with CTI Product's MCN Remote Comparator Display (MCN RCD) software (reference 2) to provide a PC based operator station. The monitoring and control functions are performed by the MCN RCD software.

The HIB supports multiple baud rates from 9600 baud up to 38400 baud, selectable from the front panel.

The HIB has two modes of operation. One is local mode, where the HIB is connected directly to the PC's COM port. The second mode is remote mode, where the HIB is at another location and a modem link is used to connect the HIB to the PC's COM port.

3.   Specifications

Size	5.5" x 4.2" x 1.5" (140 x 107 x 38 mm)
Weight	16 oz (455 gm)
Temperature	0 - 50 ºC
Humidity	10 - 95% non-condensing
Module Power	10 - 32 VDC / 2 Watts max.
PC Connector	9 pin D-SUB, female
Network Connector	(2) RJ-45 (1 in, 1 out)
Safety Approvals	UL 1950 CSA 1950 EN 60950-1992
Emissions Compliance	FCC Part 15, Class A DOC Class A EN55022
Susceptibility Compliance	IEC 801-2 IEC 801-3 IEC 801-4 EN50082-1

Table 1 - Module Specifications

4.   Option Switches

Five sets of option switches are provided for module configuration. The module must be power cycled or reset after these switches are set so that the options will take effect. Table 2 describes the option switches and shows the factory defaults.

SWITCH	MODULE DESCRIPTION	DEFAULT
GROUP	unit address setting refer to the MCN System Manual	00
MODULE	unit address setting refer to the MCN System Manual	0
OPTION A position 1	baud rate select 0 (see Table 3)	UP
position 2	baud rate select 1 (see Table 3)	DOWN
position 3	baud rate select 2 (see Table 3)	UP
position 4	reserved	DOWN
position 5	HIB mode select	DOWN
position 6	reserved	DOWN
position 7	reserved	DOWN
position 8	reserved	DOWN
OPTION B position 1	reserved	DOWN
position 2	reserved	DOWN
position 3	reversed	DOWN
position 4	reserved--**Must be Down**	DOWN
SER MODE position 1	reserved-- **Must be UP**	UP
position 2	reserved-- **Must be UP**	UP

Table 2 - HIB Option Switches

The Group and Module selector switches are used to set the unit address during module installation. See reference 1 for more information about setting these switches.

Baud Rate	baud rate select 0	baud rate select 1	baud rate select 2
9600 bps	UP	UP	DOWN
14400 bps	DOWN	DOWN	DOWN
19200 bps	DOWN	DOWN	UP
38400 bps	UP	DOWN	UP

Table 3 - Baud Rate Selector Switches

Option A, switch 5 is used to set either local (HIB is connected directly to the PC) or remote (HIB is connected through modems to the PC) operation.

Option A Switch 5	HIB mode selection
DOWN	Local
UP	Remote

Table 4 - Option A, Switch 5 Definition

When operating in remote mode, the HIB, after a reset, will send a programmable initialization string to the modem. See reference 2 for more information about programming the HIB's modem initialization string.

5.　　Connectors

The **NETWORK IN/OUT** ports on the front of the HIB are used to connect the HIB with other MCN modules. These ports carry both the network data signals and the DC power for power distribution with other modules. Table 5 gives the pinout for these connectors. Figure 2 shows the location of pin 1 for each port.
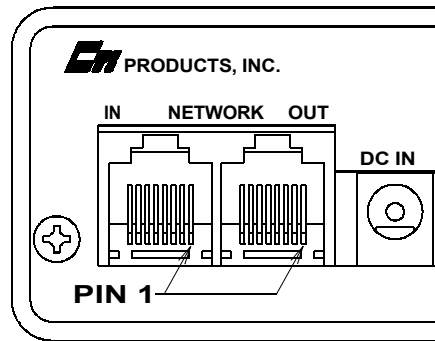
CA-80068-100

Figure 2 - Network IN/OUT Ports

Pin	Function
1	DATA +
2	DATA -
3	+ POWER
4	No Connect
5	No Connect
6	- POWER
7	- POWER
8	+ POWER

Table 5 - Network Connector Pinout

The **DC IN** port provides the primary power connection to the module. Power is distributed through the **NETWORK OUT** connector to provide power to the **NETWORK IN** connector of the MCN unit it is connected to. Each power supply can power up to four units total. See reference 1 for complete details of connections to the network and DC IN connectors.

Table 6 gives the wiring list for the PC to HIB cable, with both DB25 or DB9 connections to the PC. This cable is used when the HIB's OPTION A, switch 5 is set for local mode operation.

HIB HOST Connector DE9-female Signal Name	HIB HOST Cable Connector DE9-male	Direction	PC Cable Connector DB25-male	PC Cable Connector DE9-male
DCD	1	<	8	1
RXD	2	>	3	2
TXD	3	<	2	3
DTR	4	<	20	4
Ground	5		7	5
DSR	6	>	6	6
RTS	7	<	4	7
CTS	8	>	5	8
RI	9	<	22	9
Chassis Gnd	shell		shell	shell

Table 6 - HIB <--> PC COM Port Cable

Table 7 gives the wiring list for the HIB to modem cable. This cable is used when the HIB's OPTION A, switch 5 is set for remote mode operation.

HIB HOST Connector DE9-female Signal Name	HIB HOST Cable Connector DE9-male	Direction	Modem Cable Connector DB25-male
DCD	1	<	8
RXD	2	>	2
TXD	3	<	3
DTR	4	<	6
Ground	5		7
DSR	6	>	20
RTS	7	<	5
CTS	8	>	4
RI	9	<	22
Chassis Gnd	shell		shell

Table 7 - HIB <--> Modem COM Port Cable

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6.　　Mounting

Please refer to reference 1, *Mounting Options,* for details of mounting the HIB module.

CAUTION

Make sure that any mounting screws used to secure unit to a bracket do not protrude into the unit's enclosure more than 1/8 inches from the bottom surface of the unit.

Using a larger screw that touches the pc board inside the unit may damage the unit when it is powered. Doing so will void the unit's warranty.

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7.   Device Driver Installation

For the HIB module to operate with the MCNRCD software, the CTIHIB.SYS device driver must be loaded by CONFIG.SYS or CONFIG.NT as shown below:

OS	Configuration File
DOS	c:\config.sys
Windows 9x	c:\config.sys
Windows NT, 2000	c:\winnt\system32\config.nt
Windows XP	c:\windows\system32\config.nt

The CTIHIB.SYS device driver provides the communication interface between the HIB and the MCNRCD software. If this device driver is not loaded properly, MCNRCD.EXE will not function. The name of the device driver is **CTIHIB.SYS**, and it can be found on your *CTI MCN Remote Comparator Display* disk.

Use a text editor to insert the following line in CONFIG.SYS or CONFIG.NT:
        DEVICE=C:\CTI\CTIHIB.SYS *{options}*

If no options are specified, the device driver will use COM1 as the default COM port.

Options available for this driver include:

/Pn   **COM Port Number**
        Set the COM port that the HIB is connected to. The value "n" is 1 through 4 to specify COM1 through COM4 respectively. When you select the COM port to use, make sure that no other device is using that port. Also, make sure that the COM port's interrupt is not being used by any other device. If so, you must also specify the /Un option described below.

/Un   **Use a Different IRQ**
        Change the COM port interrupt request number (IRQ) to the IRQ "n", where "n" is between 1 and 7. If the serial port in use is COM3 or COM4, you may want to use a unique, unused IRQ for that port. Many serial ports and internal modems allow the selection of a non-standard IRQ such as IRQ2 or IRQ5. The table below shows the standard COM ports supported in a PC, along with their standard IRQ numbers.

Device	IRQ
COM1	4
COM2	3
COM3	4
COM4	3

For example, if your mouse is using COM1 and IRQ4, and you want the HIB connected to COM3, you will need to change the IRQ number used by the device driver (possibly to 5) so that the device driver's interrupt will not conflict with the mouse's interrupt.

NOTE: System operation can become very slow or may be inoperable if the interrupt used by CTIHIB.SYS is also used by another device in your PC.

Warning -- COM Port Conflicts
1.   Be sure to use a COM port that is different from your serial mouse port or other device.
2.   The PC COM1 port shares an interrupt with COM3. COM2 shares an interrupt with COM4. You may have problems using COM1 and COM3 at the same time. The same holds for COM2 and COM4.
If your mouse or other serial device is on COM1, use COM2 or COM4 for the device driver.
If your mouse or other serial device is on COM2, use COM1 or COM3 for the device driver.

/Wnnn   Transmit Character Delay
This option is rarely used. This option adds a delay of <nnn> microseconds between each character transmitted by the COM port. This option is used to slow down the rate at which characters are sent because some PC COM ports are not able to keep up with the device driver's transmission speed.

7.1   CTIHIB.SYS Versions
The old version of CTIHIB.SYS (dated 11/20/96) had a timing issue with NT, 2000, and XP. The new version of this file dated 4/30/02 or later solves this problem.

7.2　　　Command Line Examples for CTIHIB.SYS

Below are a few examples of the CONFIG.SYS or CONFIG.NT command lines that will load the device driver CTIHIB.SYS.

DEVICE = C:\CTI\CTIHIB.SYS
　Loads the device driver and tells the driver to that the HIB is connected to COM1. Interrupt 4 is used for this COM port.

DEVICE = C:\CTI\CTIHIB.SYS /P2
　Loads the device driver and tells the driver to that the HIB is connected to COM2.

DEVICE = C:\CTI\CTIHIB.SYS /P3 /U5
　Loads the device driver and tells the driver to that the HIB is connected to COM3 and that the COM3 interrupt has been moved to IRQ 5. The COM3 serial port hardware needs to changed so that it uses IRQ 5 also.

7.3　　　Device Driver Testing

After the device driver has been loaded, you will want to run a simple test to verify that the device driver is properly configured and communicating with the HIB module. Connect the HIB module to the COM port that you specified on the CTIHIB.SYS command line of CONFIG.SYS (make sure the HIB's OPTION switch 5 is DOWN, for local mode operation). Run the file **TESTHIB.BAT** (this BAT files can be found on your *CTI MCN Remote Comparator Display* disk). This file will execute tests on the HIB and device driver to verify proper operation. The following message will be displayed at the end if everything is configured and operating properly:

　　　###　Device driver is properly installed and configured　###

If anything other than this message appears when the file completes, there is a problem with your device driver configuration. Try the following to correct the problem:
- Review your CTIHIB.SYS command line in CONFIG.SYS. Make any necessary changes and reboot your PC.
- Verify the cabling between the COM port and the HIB.
- Verify the HIB option switches (including the baud rate). Make any necessary changes and reset the HIB.

8.   PC Modem Support

8.1   DOS
The MCNRCD.exe Remote Comparator Display program runs on laptop and desktop PCs under DOS with external modems. It will also support some internal modems that are real modems (not WIN Modems).

8.2   Windows 95 & 98
The MCNRCD.exe Remote Comparator Display program runs on laptop and desktop PCs using Windows 95 & 98 with external modems only. In Windows 95 & 98, Microsoft restricted DOS driver access to some of the resources like internal modems.

8.3   Windows NT, 2000, & XP
Microsoft changed things back in Windows NT, 2000 & XP. MCNRCD.EXE supports dial-up operation on these platforms with external or some internal modems.

Please note that some modems may not operate properly with MCNRCD.EXE. Some modems may require updated drivers. See the file:
         "MCNRCD Modem Compatability.DOC"
on the distribution disk for the current list of modems that have been tested.

Since we cannot possibly test all combinations of PCs, Modems and operating systems, we appreciate your feedback. Please advise us of your results using various modems, PCs, and operating systems. We will use your feedback to update this list periodically to help all our customers.

9.   FixMouse for Windows 2000
Microsoft changed the way that that the mouse is handled in DOS windows in Windows 2000. By default, the "Quick Edit" "Feature" is turned on. This causes a problem with MCNRCD.EXE. Apparently, Microsoft has seen the error of their ways and has turned Quick Edit off in Windows XP.

FixMouse.EXE has is included in the MCNRCD distribution disks to fix this problem. Simply copy this program to the CTI directory and run FixMouse. This will turn off the Quick Edit. Since Windows 2000 enables or disables Quick Edit on a per-user basis, FixMouse must be run for each user.

10.   HIB Modem Support

When the HIB module is configured for remote mode operation (OPTION A switch 5 is in the UP position), a modem initialization string is sent to the modem each time the HIB is reset or power cycled. This initialization string is stored in the HIB's non-volatile memory. Modems that use different command sets, may require you to change the HIB's default initialization string.

Configuration files for various modems are shipped with the distribution disk. These are files with a ".HIB" suffix. See the README.TXT file on the distribution disk for any updates.

See "Programming the HIB's Modem Initialization String Using HIBCNFG.EXE" in Appendix B of the MCNRCD Software Manual for details about using the .HIB files with your modem.

Please note that when you run HIBCNFG.EXE, you must have the CTIHIB.SYS driver loaded.

11.   Troubleshooting

This table is a list of troubleshooting tips specific to the HIB module. For
additional troubleshooting tips, refer to the troubleshooting section found in the
Monitoring and Control Network System Manual, reference 1.

Due to the high percentage of surface-mount components, the HIB is treated as a
field replaceable unit. If any system problems are the result of a malfunctioning
HIB unit, the entire unit must be replaced and returned for repair.

PROBLEM	CAUSE

MCNRCD is not showing correct status
 	
OR
 	
Operator cannot FORCE VOTE or DISABLE the receivers
	Connect the cable between the HIB and the PC. Make sure Option A, switch 5 is in the DOWN position. If not, change the switch and reset the HIB.
	
	PC to HIB Data
	Verify that approximately every 5 seconds, a short burst of data occurs on the HIB HOST connector, pin 3, RXD (± 3 to ± 12 Vdc swing). If not, verify the continuity of the cable:
	            DE9 pin 3 to DB25 pin 2
	If the wire is OK, the PC COM port is not functioning properly.
	
	HIB to PC Data
	Verify that about every 5 seconds, a short burst of data occurs on the PC's COM port connector, pin 3, RXD (± 3 to ± 12 Vdc swing). If not, verify the continuity of the cable:
	            DE9 pin 2 to DB25 pin 3
	 If the wire is OK, the HIB is not functioning properly. Replace the HIB.
	
	Control Signals
	Verify that HIB HOST connector pins 4 (DTR) and 7 (RTS) are active (+6 to +12 Vdc). If not, verify the continuity of the cable:
	            DE9 pin 4 to DB25 pin 20
	            DE9 pin 7 to DB25 pin 4
	If the wires are OK, the PC COM port is not functioning properly.
	
	Verify that PC COM port connector pins 5 (CTS) and 6 (DSR) are active (+6 to +12 Vdc). If not, verify the continuity of the cable:
	            DE9 pin 8 to DB25 pin 5
	            DE9 pin 6 to DB25 pin 6
	If the wires are OK, the HIB is not functioning properly. Replace the HIB.

System doesn't work	Verify that you have the proper CTIHIB.SYS driver loaded.

PROBLEM	CAUSE
under Windows NT, 2000, or XP	These versions of Windows require CTIHIB.SYS dated 4/30/02 or later. After you change the file, be sure to re-boot the PC.

HIB Doesn't Work (HIB Versions 250 & up)	Verify the settings of switches.
	        Option B position 4 MUST be DOWN.
	        Ser Mode Positions 1 & 2 must be UP.
	(These switches have added functionality when the HIB module is used for other applications. The switches must be set as shown above to function as a HIB module.)

Internal Modem doesn't work Windows 95 & 98	In Windows 95 & 98, Microsoft restricted DOS driver access to some of the resources like internal modems. Internal modems are not supported under Windows 95 & 98.
Internal Modem doesn't work Windows NT, 2000, XP	Some modems do not support DOS mode under Windows. Some modems need an updated driver. See the "MCNRCD Modem Compatability" file on the distribution disk for the current list of modems that have been tested
Mouse Problems	The "Quick Edit" feature of Windows may be turned on. This feature causes problems with some DOS programs. Under Windows 2000, run FixMouse.exe for each user. For other versions of Windows, right-click on the MCNRCD & MCNCFG program shortcuts and turn off Quick Edit under Properties.