2

Installation and Setup

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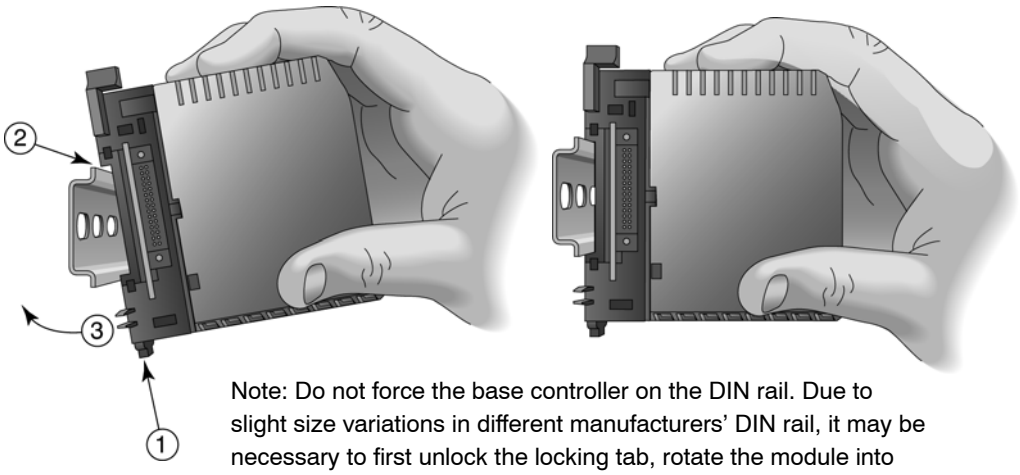
Installing the Ethernet Base Controller

The EBC installs to the *right* of the first power supply. To mount the module on the DIN rail, follow steps 1 through 3 below.

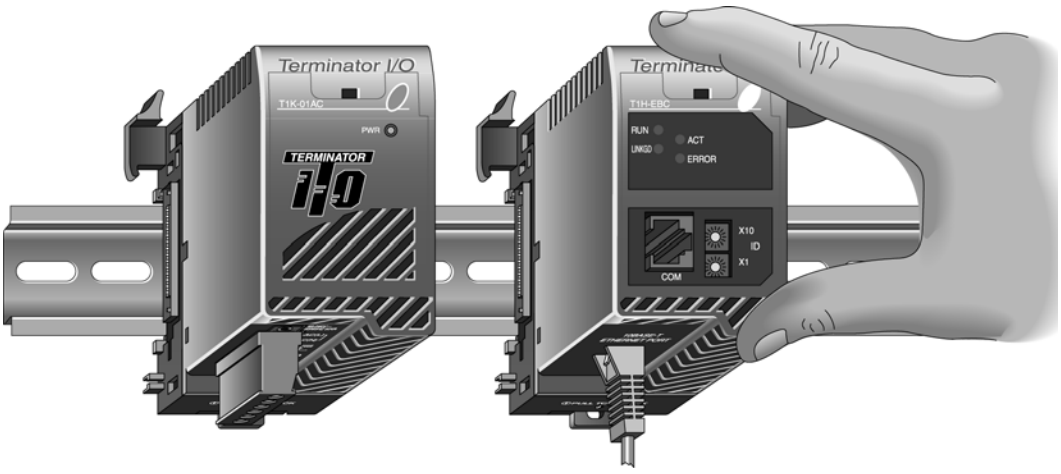
1. Push in the locking tab on the bottom of the module.
2. Hook the upper tab over the upper flange of the DIN rail.
3. Tilt the module toward the DIN rail until it snaps securely into place.



Note: Do not force the base controller on the DIN rail. Due to slight size variations in different manufacturers' DIN rail, it may be necessary to first unlock the locking tab, rotate the module into place, then latch the locking tab.

Assure that power wiring is not connected.

When the module is securely attached to the DIN rail, push the module toward the power supply until the connectors are joined and the release arm of the EBC has clamped the two modules together.



Continue to add I/O modules to the right of the EBC as necessary for your application. More information about power wiring and power budgeting is available in the Terminator I/O Installation Manual, T1K-INST-M.

EBC Network Identifiers

Each Ethernet Base Controller module must be assigned at least one unique identifier to make it possible for PCs or other clients (masters) to recognize it on the network. Two methods of identifying the EBC module give it the flexibility to fit most networking schemes.

The identifiers are:

- Module ID (IPX protocol only)
- IP Address (for TCP/IP and MODBUS TCP protocols); see Chapter 3

Setting the Node Address

Each Ethernet Base Controller residing on a network must have a Node Address, and each Node Address must be unique. **Duplicate Node Addresses** on the same network will cause unpredictable results and **must be avoided**.

Several Methods for Setting Node Address

There are several methods for setting the Node Address:

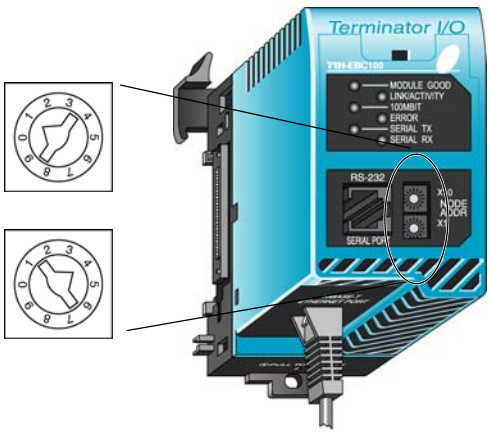
- The **rotary switches** on the face of the EBC module
- The **NetEdit3** software utility (described in Chapter 3)
- HTML Confguration (after IP address is assigned to module using NetEdit3; described in Chapter 5)
- The software utility in your **PC-based Control software** (if a utility is provided)

Setting the Node Address Using the Rotary Switches

Two rotary switches, each labeled 0 – 9, are located on the face of the EBC. Use a small screwdriver to set the switches to a two-digit number.

The upper switch sets the *tens* position and the lower switch sets the *ones* position. Setting the upper switch to 1 and the lower switch to 4 yields a Node Address of 14.

Do not use Node Address “0” *for communications*. Node Address “0” is used only to allow communications with a PC while changing the Node Address (Module ID) in software. If the rotary switches are set to a number greater than 0, the software tools are disabled from setting the Node Address.



NOTE: The rotary switch settings are read only at powerup. You must cycle power if you change the rotary switches. If you change the rotary switches and cycle power, the rotary switch setting will override any previous software setting.

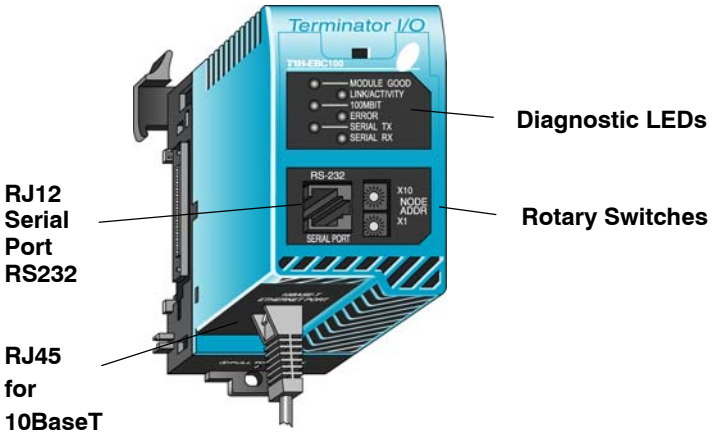
Setting Node Address with Software Tool

Software changes to the Node Address do not require cycling power. To set the Node Address using one of the available software tools, do the following:

- Check to be sure both rotary switches are set to the “0” position
- Connect module to the Ethernet network
- Apply power
- Link to the module and change the Node Address using the software of your choice. Remember to “update” the module before exiting the software.

10BaseT / 100BaseT Network Cabling

The T1H-EBC module supports the Ethernet 10BaseT standard. The T1H-EBC100 module supports the Ethernet 10/100BaseT standard. The standards call for twisted pairs of copper wire conductors.

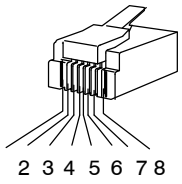


10BaseT/100BaseT connections

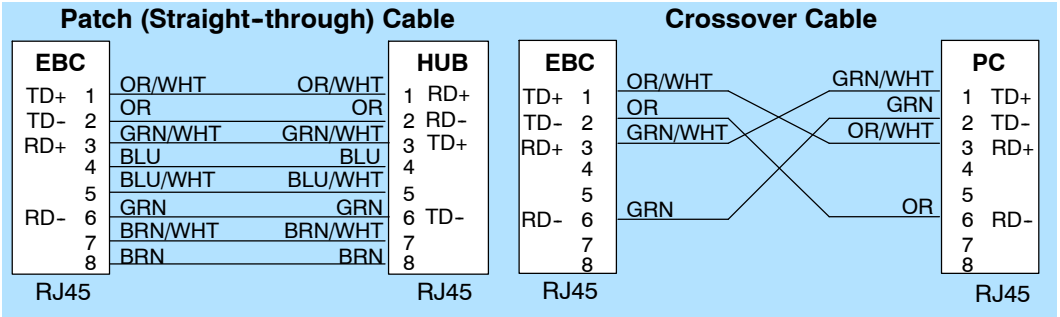
The EBC has an eight-pin modular jack that accepts RJ45 connector plugs. UTP (Unshielded Twisted-Pair) cable is rated according to its data-carrying ability (bandwidth) and is given a "category" number. We strongly recommend using a Category 5 (CAT5) cable for all Ethernet 10BaseT/100BaseT connections. For convenient and reliable networking, we recommend that you purchase commercially manufactured cables (cables with connectors already attached).

To connect an EBC (or PC) to a hub or repeater, use a **patch cable** (sometimes called a straight-through cable). The cable used to connect a PC *directly* to an EBC or to connect two hubs is referred to as a **crossover cable**. Some hubs provide a crossover port which eliminates the need for a crossover cable.

10BaseT/100BaseT



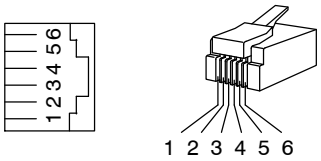
8-pin RJ45 Connector (8P8C)



This diagram illustrates the standard wire positions in the RJ45 connector. We recommend that you use only **Category 5**, UTP cable.

Serial Port (RS-232)

Serial Port



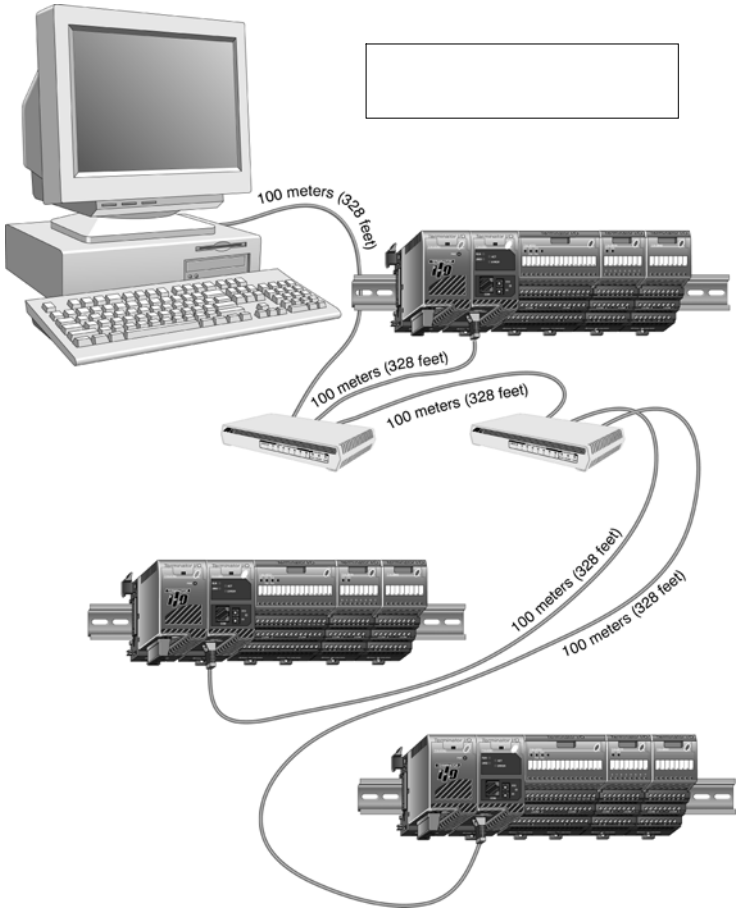
The Serial Port on the EBC can be used to communicate with operator interfaces or ASCII devices. The T1H-EBC100 also supports MODBUS RTU serial protocol.

Use Automationdirect.com cable Part Number D2-DSCBL to connect your PC to the RJ12 Serial Port.

Serial Port Pinout	
Pin	**Signal**
1	0V
2	+5V
3	RXD
4	TXD
5	RTS
6	CTS

Maximum 10BaseT / 100BaseT Cable Length

The **maximum distance** per **10BaseT**/**100BaseT** cable segment is **100 meters** or **328 feet**. Repeaters extend the distance. Each cable segment attached to a repeater can be 100 meters long. Two repeaters connected together extend the total range to 300 meters.



T1H-EBC Specifications

T1H-EBC Ethernet Base Controller

Module Type	Ethernet slave
Communications	10BaseT
Auto-configuring	I/O type/position automatically identified during power-up
Ethernet Protocols	UDP/IP, IPX
Ethernet Port	RJ45
Node Address	1 to 99 (decimal) set by rotary switches or software (0 used for setting address via software only)
Link Distance	100 meters (328 feet)
Data Transfer Rate	10Mbps
LED Indicators Note: All indicators re-initialize during power-up.	MODULE GOOD (green): On = module passed diagnostic check during last power-up Fast blink = configured I/O module no longer reporting (see auto-configuring, above) Slow blink = unconfigured I/O module added to system (see auto-configuring, above) LINK GOOD (green): On = 10Base-T link pulses are being received ACTIVITY (red): On= Ethernet network activity detected ERROR (red): On = watchdog timer timeout represents hardware, communications, or network fault; power-on reset or reset within master device software
Serial Communications Port	RJ12, RS232C K-Sequence protocol, ASCII (not functional when used with H2-ERM / H4-ERM)
Base Power Requirement	350mA @ 5VDC

General Specifications

Installation Requirements	mounts to right of first power supply
Operating Temperature	32° F to 131° F (0° C to 55° C)
Storage Temperature	-4° F to 158° F (-20° C to 70° C)
Relative Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases, pollution level = 2 (UL 840)
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304 Impulse noise 1us, 1000V FCC class A RFI (144MHz, 430MHz, 10W, 10cm)

T1H-EBC100 Specifications

T1H-EBC100 Ethernet Base Controller

Module Type	Ethernet slave
Communications	10/100BaseT
Auto-configuration	I/O type/position automatically identified during power-up
IP Configuration	-Obtain an IP address from a DHCP Server automatically at power-up (Default); -Dedicated IP address using NetEdit3 or HTML configuration
Ethernet Protocols	TCP/IP, UDP/IP, IPX, MODBUS TCP/IP
Ethernet Port	RJ45
Node Address	1 to 99 (decimal) set by rotary switches or software (0 used for setting address via software only)
Link Distance	100 meters (328 feet)
Data Transfer Rate	10/100Mbps
LED Indicators Note: All indicators re-initialize during power-up.	MODULE GOOD (green): On = module passed diagnostic check during last power-up Fast blink = configured I/O module no longer reporting (see auto-configuring, above) Slow blink = unconfigured I/O module added to system (see auto-configuring, above) LINK/ACTIVITY (green): On= Ethernet network activity detected 100MBIT (green): On= Ethernet activity is auto-detected at 100bps Off = (with LINK/ACTIVITY On) Ethernet activity is auto-detected at 10Mbps ERROR (red): On = watchdog timer timeout represents hardware, communications, or network fault; power-on reset or reset within master device software SERIAL TX (green): On= EBC RJ12 serial port is transmitting SERIAL RX (green): On= EBC RJ12 serial port is receiving
Serial Communications Port	RJ12, RS232C K-Sequence protocol, ASCII, MODBUS RTU serial (not functional when used with H2-ERM / H4-ERM at this time)
Base Power Requirement	350mA @ 5VDC

General Specifications

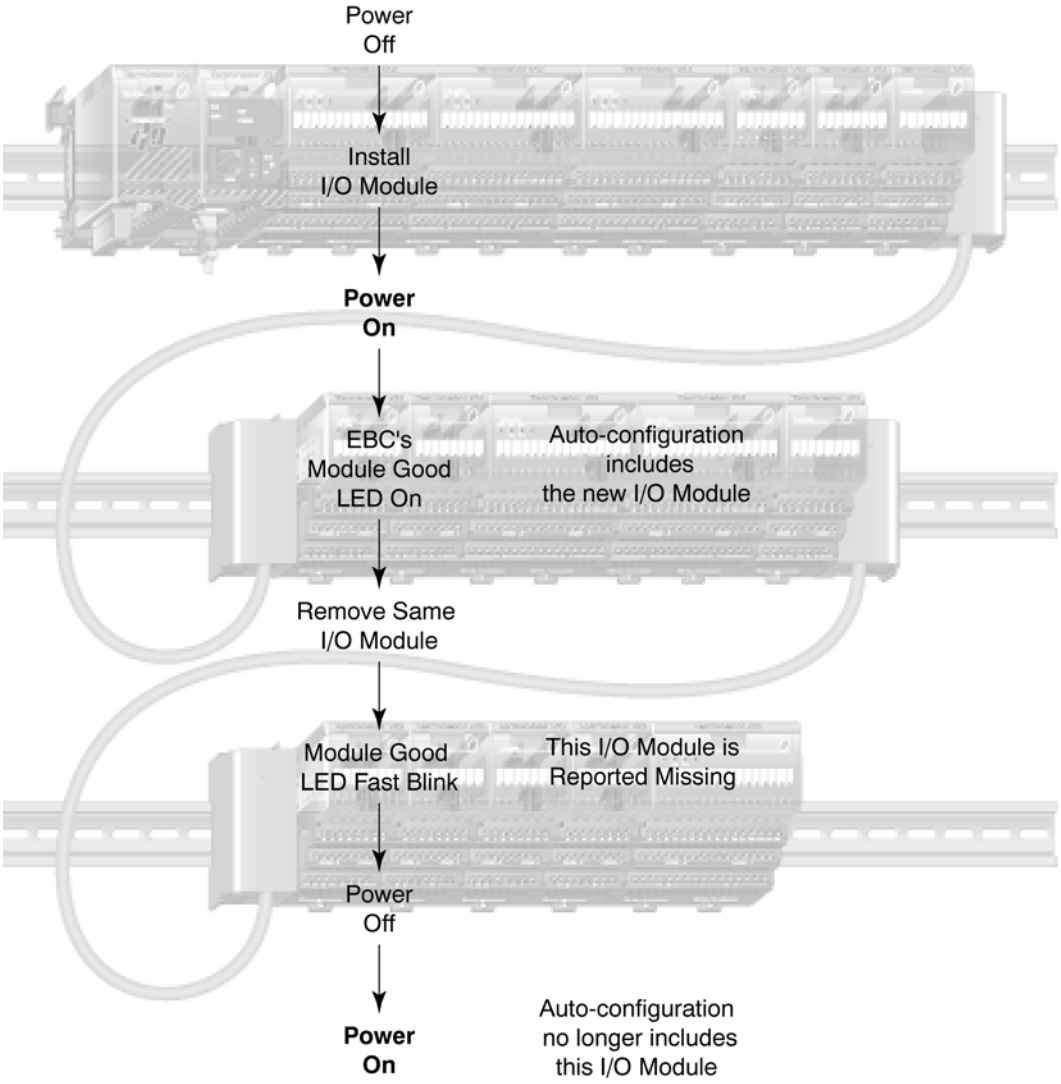
Installation Requirements	mounts to right of first power supply
Operating Temperature	32° F to 131° F (0° C to 55° C)
Storage Temperature	-4° F to 158° F (-20° C to 70° C)
Relative Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases, pollution level = 2 (UL 840)
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304 Impulse noise 1us, 1000V FCC class A RFI (144MHz, 430MHz, 10W, 10cm)

LED Indicators and Hot Swapping I/O Modules

The “Hot Swap” feature allows Terminator I/O modules to be replaced with Terminator I/O system power ON. Be careful not to touch the terminals with your hands or any conductive material to avoid the risk of personal injury or equipment damaged. *Always remove power if it is equally convenient to do so.*

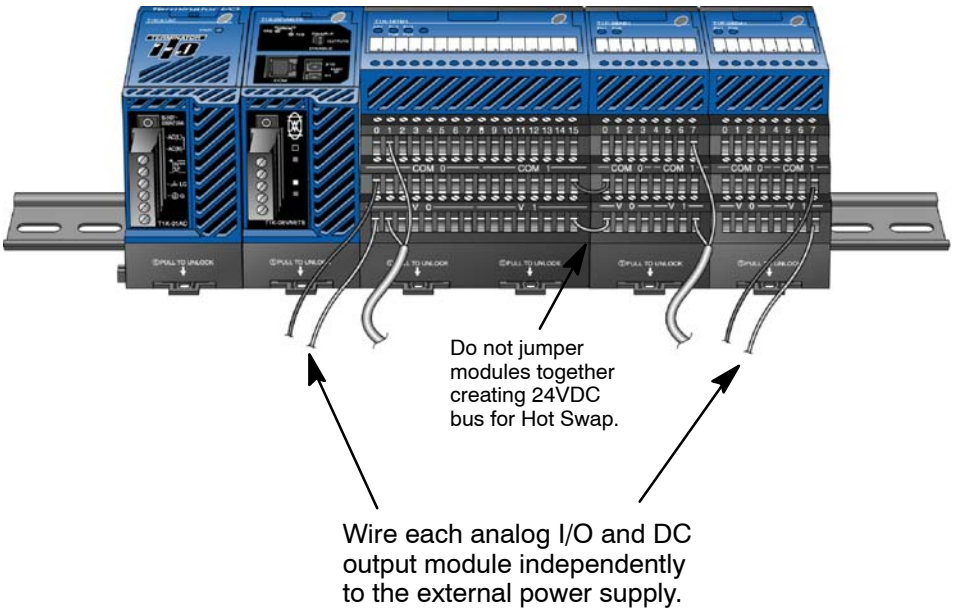
WARNING: Only authorized personnel fully familiar with all aspects of the application should replace an I/O module with system power ON.

LED Indicators when Hot Swapping an I/O Module



Check External 24VDC Wiring Before Hot Swapping

Before "Hot Swapping" an analog I/O module or a DC output module in a Terminator I/O system, make sure that each of the analog I/O and DC output module's 24VDC and 0VDC base terminals are wired directly to the external power supply individually (see diagram below). If the external 24VDC / 0VDC is jumpered from base to base in a daisy chain fashion, and an analog I/O or DC output module is removed from its base, the risk of disconnecting the external 24VDC to the subsequent I/O modules exists.



Hot Swap: I/O Module Replacement

The following steps explain how to "Hot Swap" an I/O module.

1. Remove I/O module from base. (If necessary, refer to the Terminator I/O Installation & I/O Manual for steps on removing an I/O module).
2. The EBC Module Good LED will begin to *fast blink*.
3. Install a new I/O module with the **exactly the same part number**.
4. Verify that the EBC LEDs have returned to normal.

Ethernet Standards

Various institutes and committees have been involved in establishing Ethernet data communication standards. These specification standards assure Ethernet network compatibility for products from a broad variety of manufacturers.

The EBC module complies with American National Standards Institute (ANSI) and Institute of Electrical and Electronic Engineers standard ANSI/IEEE 802.3, Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Methods and Physical Layer Specifications. This standard has been adopted by the International Organization for Standardization (ISO) as document ISO/IEC 8802-3.

The Electronic Industries Association (EIA) and Telecommunications Industries Commercial Building Telecommunications Wiring Standard designated EIA/TIA-568A defines implementation of 10Base-T (twisted pair) Ethernet communications.

The same two organizations produced EIA/TIA TSB40-Additional Transmission Specifications for Unshielded Twisted-Pair Connecting Hardware. The purpose of this document is to specify transmission performance requirements and connecting hardware requirements.