
# T1H–PBC
# Profibus DP
# Base Controller
# User Manual

Manual Number T1H–PBC–M

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# Manual Revisions

*If you contact us in reference to this manual, be sure to include the revision number.*

**Title:** Terminator I/O Profibus DP Base Controller User Manual
**Manual Number:** T1H–PBC–M

| Edition | Date | Description of Changes |
|---|---|---|
| Original | 5/02 | Original issue |

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# 1

# Introduction

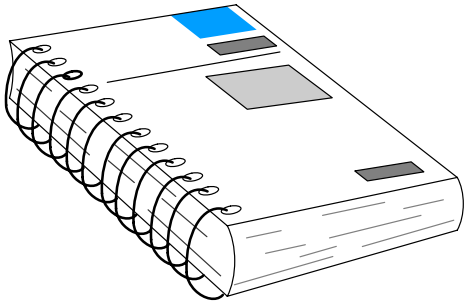
In This Chapter. . . .

- — Manual Overview
- — Introduction to PROFIBUS
- — Terminator I/O System
- — T1H–PBC Profibus Base Controller

# Manual Overview

**Overview of this Manual**

This manual describes the installation and operation of the Terminator I/O Profibus DP Slave module (T1H–PBC).



**Supplemental Manuals**

The following manuals are essential to the proper use of your Terminator I/O Profibus DP Slave module.

- *Terminator Installation and I/O Manual* part number **T1K–INST–M**

  This manual contains very important information, including a complete I/O Module Memory Map. The Memory Map is crucial in designing and implementing a Terminator I/O system.
- The PLC/PC software manual
- The PROFIBUS software (if separate) manual
- The PROFIBUS networks manual

**Who Should Read this Manual**

If you have a working knowledge of the PROFIBUS network, the PROFIBUS software and PLC or PC which you are using, this manual will help you configure and install your T1H–PBC Profibus DP Slave module.

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## Symbols Used

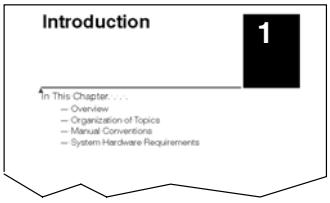
The “light bulb” icon in the left-hand margin indicates a **tip** or **shortcut**.

The “note pad” icon in the left–hand margin indicates a **special note**.

The “exclamation mark” icon in the left-hand margin indicates a **warning** or **caution**. These are very important because the information may help you prevent serious personal injury or equipment damage.

## Key Topics for Each Chapter

The beginning of each chapter will list the key topics that can be found in that chapter.



# Introduction to Profibus

Profibus (Process Field Bus) is a vendor–independent, open field bus standard that is supported by leading manufacturers of automation products. A host of certified Profibus products are available, offering an array of products including sensors, motor drives and starters, PLCs, remote I/O systems, etc.

**PROFIBUS Concepts**

Here are some Profibus concepts that you may find helpful.

- Profibus offers three types of profiles.
  - Process Automation (PA)
  - Fieldbus Message Specification (FMS) communication profile
  - Decentralized Periphery (DP)
- Profibus – DP is the most frequently used communication profile.
  - The T1H–PBC is a DP slave
  - Master and slave devices, max. 126 stations on one bus
    - Connection oriented communication
    - Transmission rate up to 12 Mbps
  - Peer–to–peer (user data communication) or multicast (control commands)
  - Cyclic master–slave user data communication
  - Control commands allow synchronization of I/O
- Methods for diagnostic and error detection are built into the system

**PROFIBUS International**

PROFIBUS International (PI) maintains the PROFIBUS standard and provides certification to EN 50170 and IEC 61158 standards for devices. The main purpose of certification is to provide users with the assurance that devices from different manufactures will work in the same network. Certification is issued by the PROFIBUS Certification Centre in Karlsruhe, Germany.

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**PROFIBUS Trade Organization**

The PROFIBUS Trade Organization (PTO) is a member of PROFIBUS International. For more detailed information about Profibus, visit the PTO website where technical descriptions and Profibus specifications are available.

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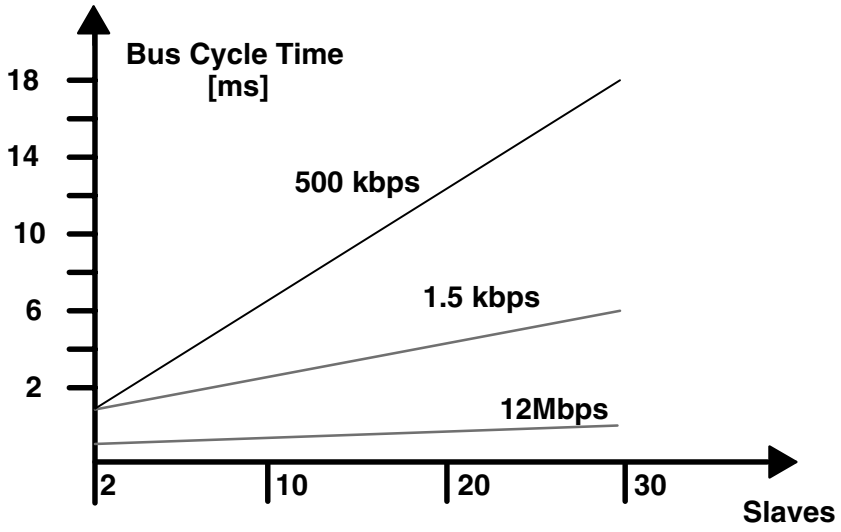
Their website is: **www.profibus.com**

# DP Communication Profile

The DP Communication Profile is designed for efficient data exchange at the field level. The central automation devices, such as PLC/PC or process control systems, communicate through a fast serial connection with distributed field devices which can be I/O, drives and valves, as well as measuring transducers. Data exchange with the distributed devices is mainly cyclic.

The master controller cyclically reads the input information from the slaves and cyclically writes the output information to the slaves. The bus cycle time should be shorter than the program cycle time of the central automation system, which for many applications is approximately 10 msec. In addition to cyclic user data transmission, DP provides powerful functions for diagnostics and commissioning. Data communication is monitored by monitoring functions on both the master and slave side.

DP requires only about 1 msec at 12 Mbit/sec for the transmission of 512 bits of input data and 512 bits of output data distributed over 32 stations. The chart below shows the typical time, depending on number of stations and transmission speed. Transmitting the input and output data in a single message cycle with DP, results in a significant increase in speed compared to FMS.

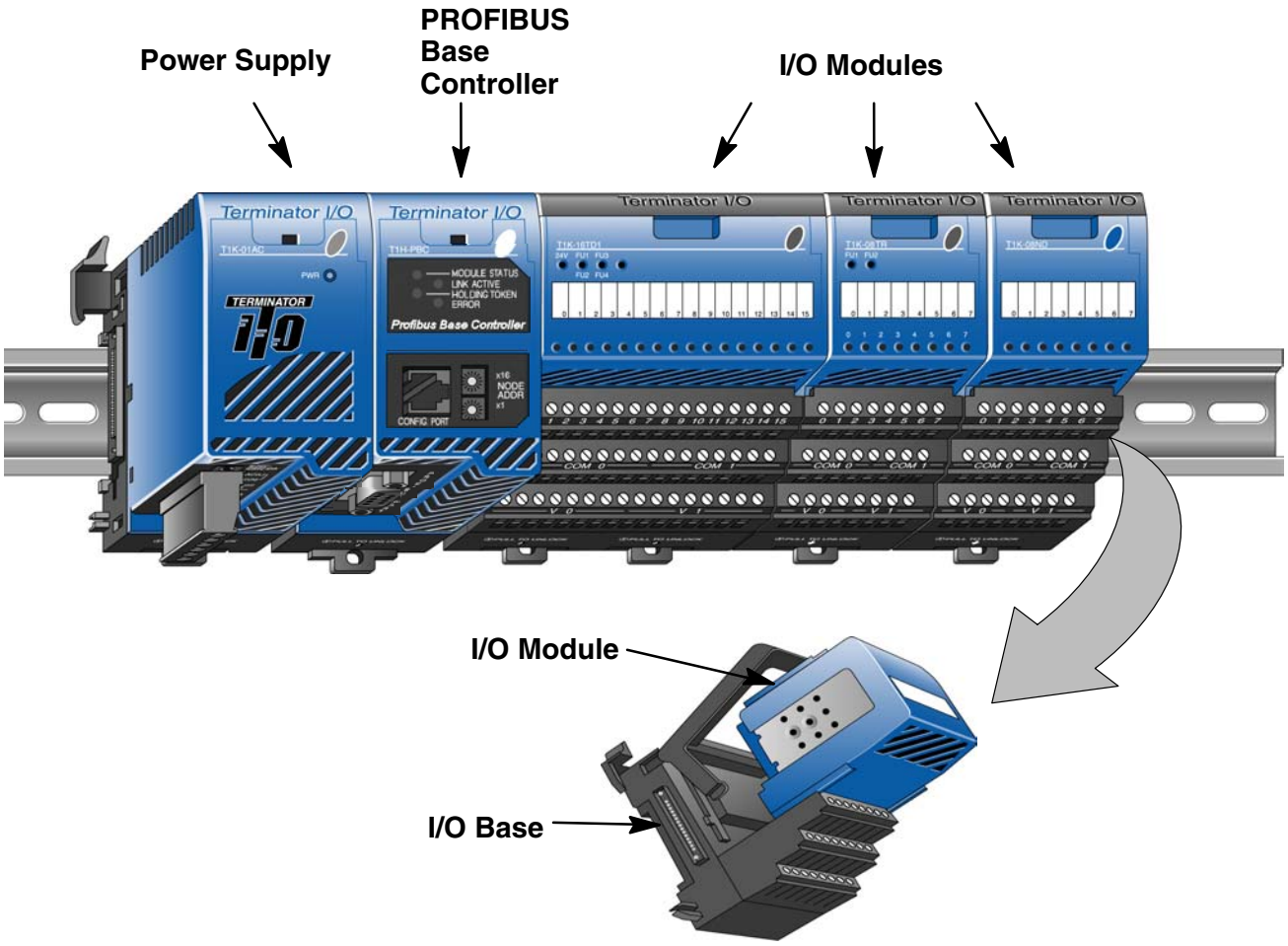



Bus cycle time of a DP mono–master system.

For a more complete description and specification of the Profibus DP communication profile. visit the Profibus Trade Organization web site, **www.profibus.com.**

# Terminator I/O System

Terminator I/O is a modular system which combines the functions of terminal blocks and I/O modules for distributed I/O. Each Terminator I/O system has the following components: a Power Supply, a Base Controller, and one or more I/O Module(s).



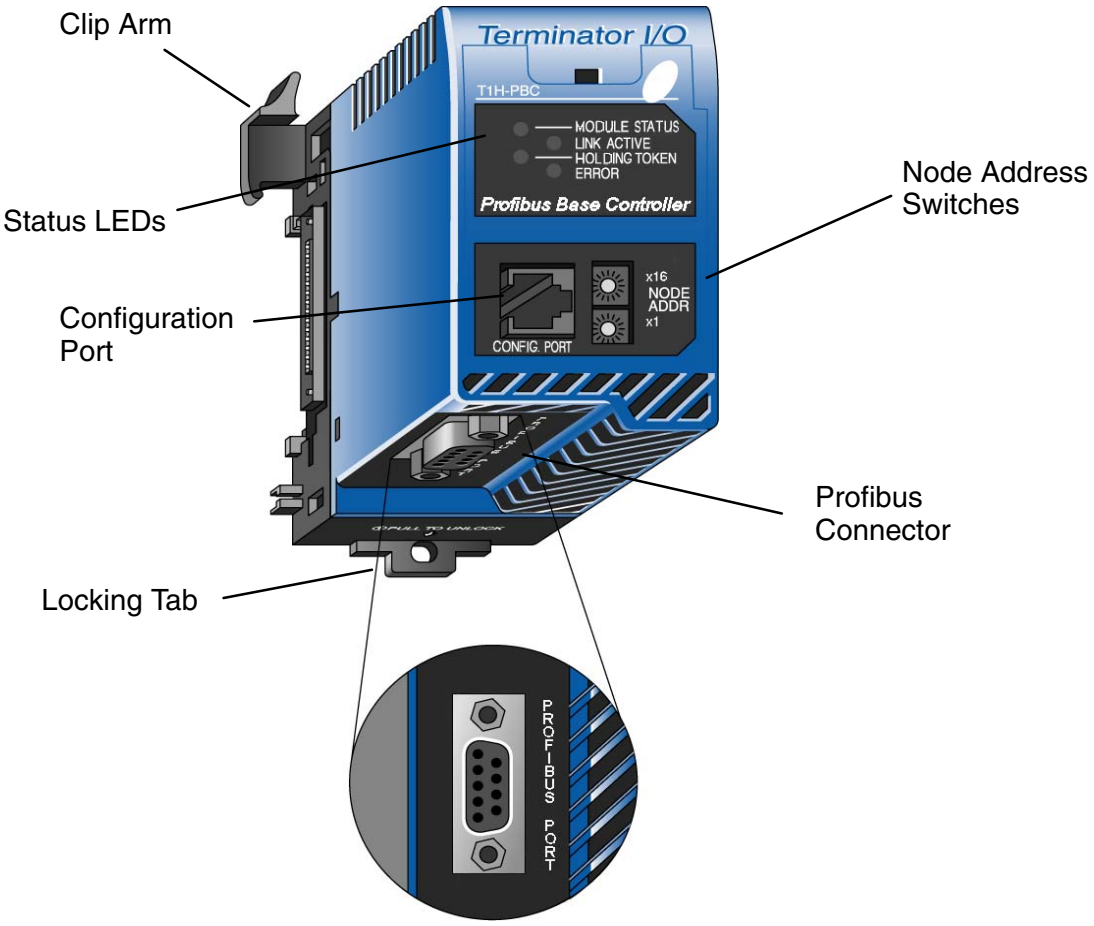
# T1H–Profibus Base Controller

The T1H–Profibus Base Controller is a slave module that functions as a controller for Terminator I/O modules on a Profibus network.

**T1H–PBC Base Controller Features**

The Controller has the following features:

- Status LEDs (Module and Network)
- Configuration Port
- Node Address Switches
- Profibus Connector



## Mini Glossary

Below is a small glossary of terms used in this manual.

**Mono–Master** — Only one Profibus master active on the bus during operation of the bus system of which the T1H–PBC is a slave. This can be either a PLC module or a card in your PC. Profibus DP is usually a mono–master system.

**Multi–Master** — Several Profibus masters are connected to one bus. These masters represent either independent subsystems or additional configuration and diagnostic devices.

**Slave** — A peripheral device (I/O devices, drives, HMI, valves, measuring transducers) which collects input information and sends output information to the peripherals. The T1H–PBC is a slave which is also referred to as a controller in a Profibus I/O sub–system.

**Segment** — One bus structure with a maximum of 32 stations (master or slaves) or nodes. A maximum of 9 segments is possible with the use of repeaters.

**Station** — A node. Can be a master or a slave.

**Repeater** — An RS485 device that amplifies data signals on bus lines and is the link between individual bus segments. Used to increase the number of nodes or to extend the cable lingth between two nodes.

**Node Address** — The unique device address on a Profibus network. There are a maximum of 126 (0–126). The master is usually node 0.

**Token** — The bus access right which is assigned to each master within a precisely defined timeframe.

# 2

# Installation and Setup

In This Chapter. . . .

— Installing the T1H–PBC
— The Profibus Network
— Configuring the Controller
— Terminator I/O Backplane Communications

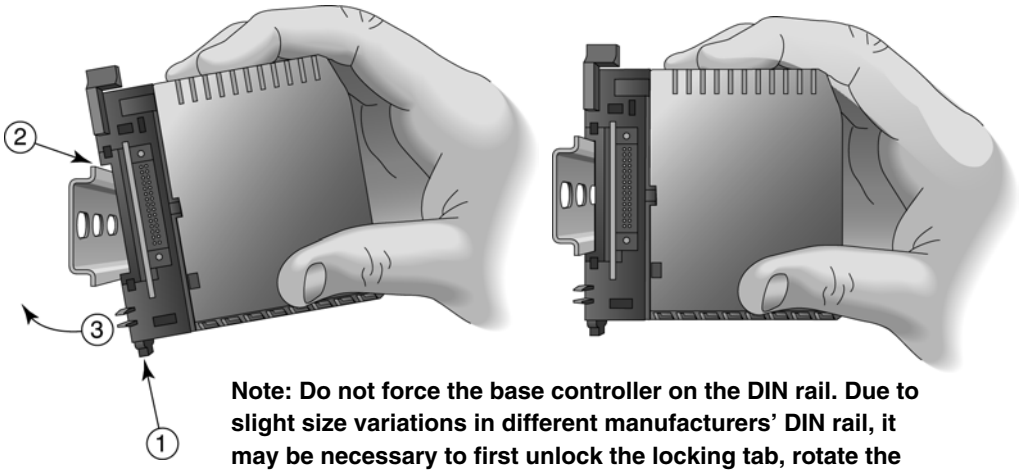
# Installing the T1H–PBC



### Mounting on DIN Rail

The T1H–PBC 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.

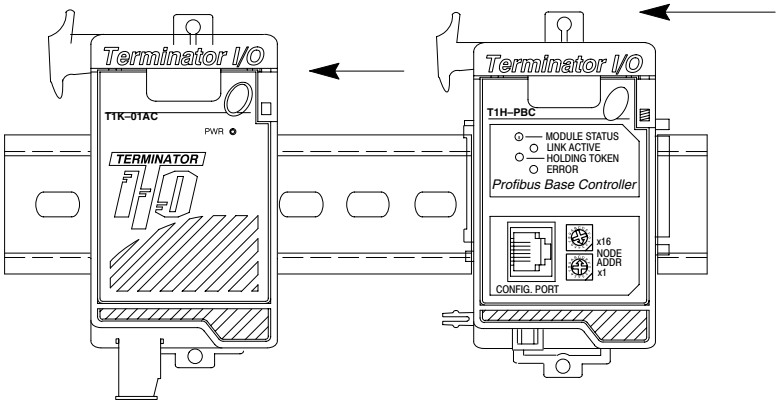



**Note: Do not force the base controller on the DIN rail. Due to slight size variations in different manufacturers' DIN rail, it may be necessary to first unlock the locking tab, rotate the module into place, then latch the locking tab.**

**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 T1H–PBC has clamped the two modules together.

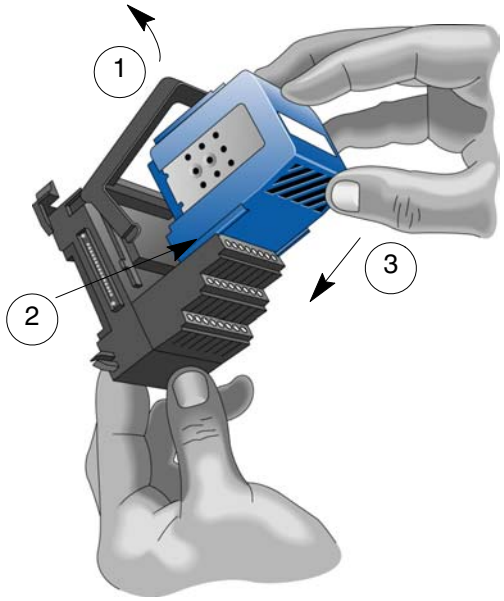
### Connecting the Controller to a Power Supply




**WARNING:** Power to the T1K Power Supply **must** be disconnected before installing or removing the T1H–PBC. Failure to disconnect power could result in serious damage to the module, to the power supply or both.

Continue to add I/O modules to the right of the T1H–PBC 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.

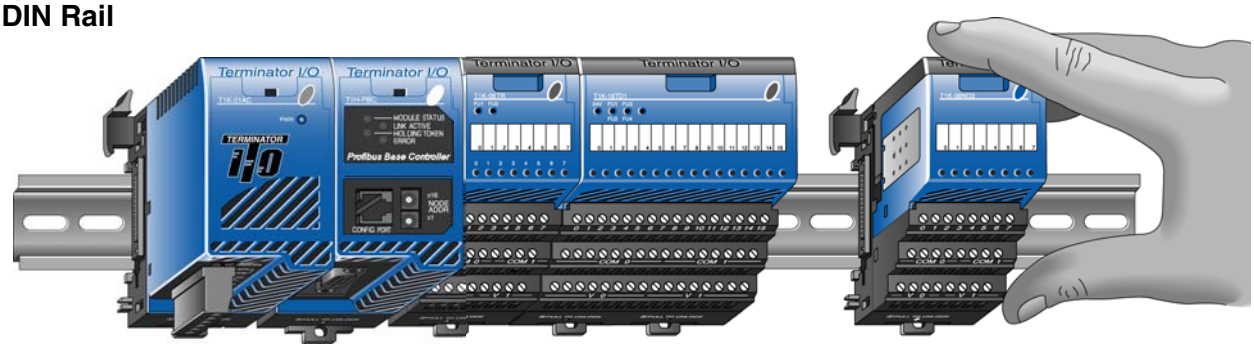
## Assembling the I/O Modules and Bases




**Insert Module into Base**

1. Pull base arm back to allow space for module to enter base
2. Align module slides with base track
3. Press module firmly into base

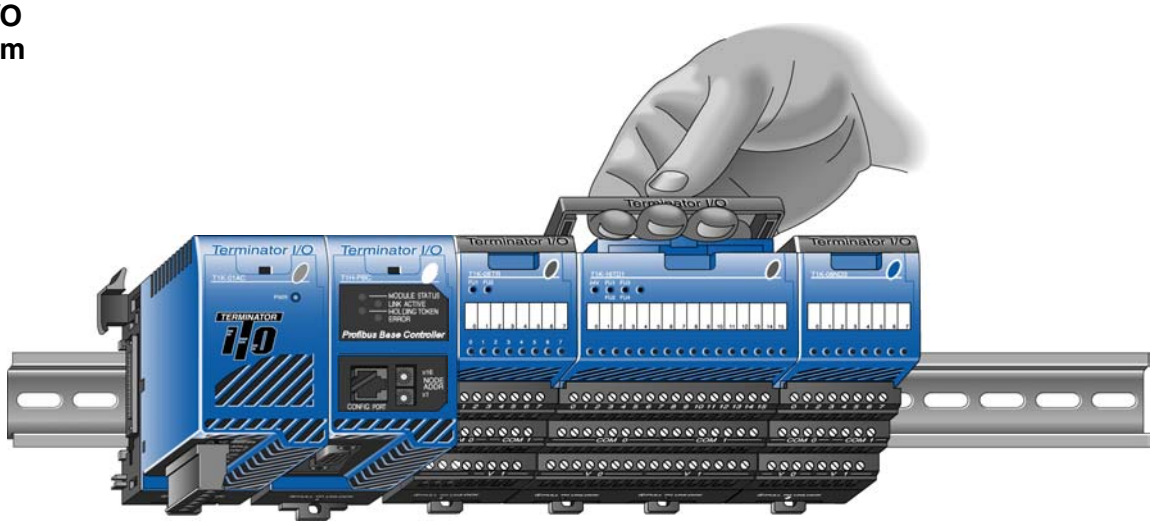
## Connecting the Components on the DIN Rail




Slide the module assembly onto the DIN rail until the clip arm attaches securely to the adjacent module.

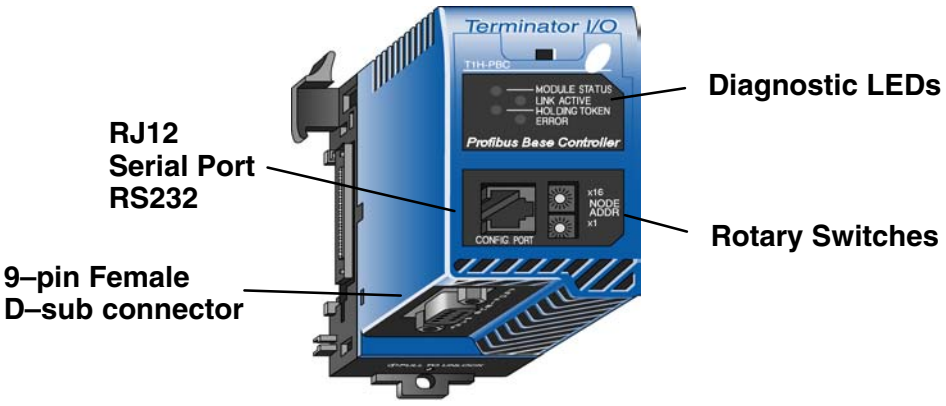
**WARNING:** Again, be sure that the power to the T1K Power Supply is **disconnected** before installing or removing the module assemby. Failure to disconnect power could result in serious damage to the modules, to the power supply or to the entire assembly.

**Removing I/O Modules from the Base**




To remove the module from the base, grip the center of the base arm and rotate outward releasing the module.

To remove the module assembly from the DIN rail, lift the clip arm up and slide the module assembly away from the adjacent module. Pull the locking tab down (out) and lift the assembly off the DIN rail. Refer to the “I/O Module Hot Swap Feature”, page 3–17, in the *Terminator I/O Installation and I/O Manual* (**T1K–INST–M**), to remove an I/O module with Terminator I/O system power ON.




**Serial Port (RS–232)**

The T1H–PBC Serial Port (Config. Port) is only used to update the firmware of the base controller when necessary.

**Use AutomationDirect cable part number D2–DSCBL to connect your PC to the RJ12 serial port,** or use the following information to make a cable.


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

**DIP Switch Settings**

The T1H–PBC base controller has a DIP Switch located on the side of the unit, opposite the power supply. This DIP switch is reserved for future use.

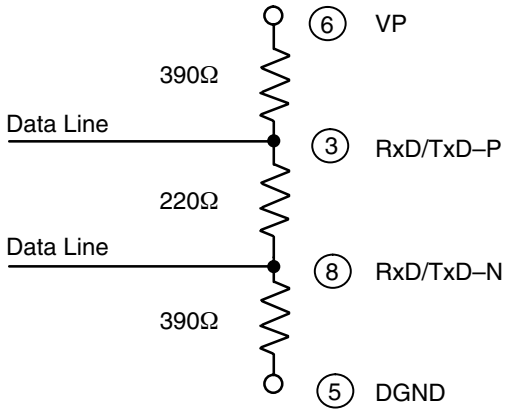
# The Profibus Network

RS–485 serial communication is most frequently used by Profibus. Twisted pair shielded copper cable with one conductor pair is the most common cable used for the Profibus network. Installation of this cable does not require expert knowledge. The bus structure permits addition and removal of stations or step–by–step commissioning of the system without interfering with the other stations. Later expansions will not effect the stations which are already in operation. It is important to follow the RS–485 installation guidelines, for 90% of the problems which occur with Profibus networks can be attributed to incorrect wiring and installation.



**Wiring the Controller to a PROFIBUS Network**

All devices are connected in a bus structure (line) in a Profibus network. It can be built in several segments with a segment consisting of the maximum number of stations (32) and/or the maximum length of the network. A repeater must be added if there is a need to have more than 32 stations (126 maximum). The bus is terminated by an active bus terminator at the beginning and end of each segment. See the diagram of the termination network below. Both bus terminators should be powered at all times to insure error–free operation. The bus terminator can usually be switched at the device or in the bus terminator connections.




Bus termination showing the 9–pin D sub connector pin assignment.

Communication speeds between 9.6 kbps and 12 Mbps are available. One unique baud rate is selected for all devices on the bus when the system is commissioned. The baud rate selected will depend upon the cable length.

The following table shows the maximum network cable lengths for the available baud rates that can be obtained with copper wire.

| Baud Rate (bits per second) | Max. Segment Length | Max. Expansion |
|---|---|---|
| 9.6k | 1,000m / 3,278 feet | 10,000m / 32,786 feet |
| 19.2k | 1,000m / 3,278 feet | 10,000m / 32,786 feet |
| 93.75k | 1,000m / 3,278 feet | 10,000m / 32,786 feet |
| 187.5k | 1,000m / 3,278 feet | 10,000m / 32,786 feet |
| 500.0k | 400m / 1,311 feet | 4,000m / 13,114 feet |
| 1,500.0k | 200m / 655 feet | 2,000m / 6,557 feet |
| 3,000.0k | 100m / 327 feet | 1,000m / 3,270 feet |
| 6,000.0k | 100m / 327 feet | 1,000m / 3,270 feet |
| 12,000.0k | 100m / 327 feet | 1,000m / 3,270 feet |

To use baud rates greater than 1.5 Mbps, special connectors are required. The connectors have built in inductors in order to run with higher baud rates (refer to the diagram on page 2–9). Branch lines are not permitted when using baud rates greater than 1.5 Mbps. The minimum recommended cable length between two stations is 1m/3 feet.

The standard EN 50170 specifies the cable for use with Profibus. The following table specifications must be met for Profibus cables.

| Cable Specification – Profibus DP | |
|---|---|
| Impedance | 135 to 165Ω / 3 to 20 MHz |
| Capacitance | < 30 pf / m |
| Resistance | < 110 Ω / km |
| Wire gauge | > 0.64 mm |
| Conductor area | > 0.34 $mm^2$ |

There are several types of Profibus cable available. The most common cable used has solid conductors for the Profibus line. Some recommended cables are: two with solid conductors, Belden Profibus 3079A and Siemens 6XV1 830 0AH10, one with flexible conductors, Bosch Comnet DP #913 548.

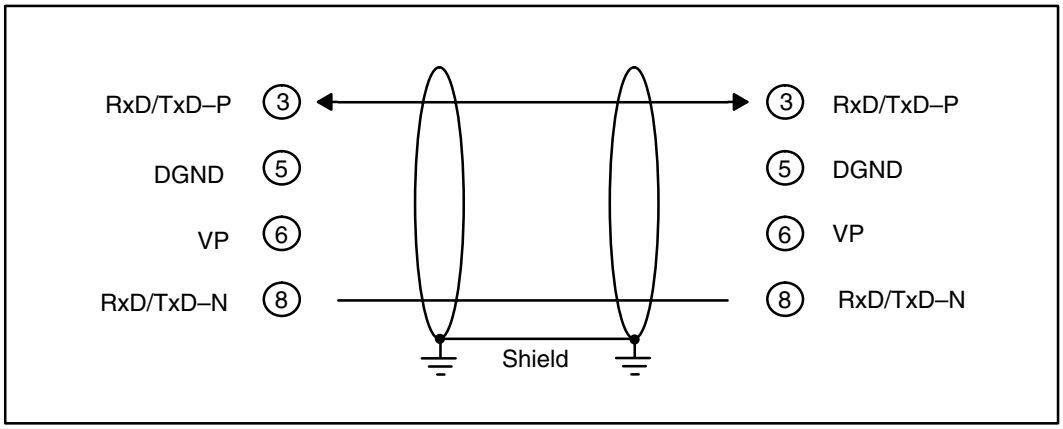
The Profibus network is generally connected with a shielded, twisted pair, cable. The shield must to be connected to the protective housing of the connector which is then brought to ground through the connection on the device. Care must be taken when connecting the wires to the connectors that the shield and wires are properly installed.

In many automation control systems, the I/O bus cables are the most important connections between individual components in the system. Damage to the cable or improper cable installation can lead to problems and often to a breakdown of the entire control system.

To avoid damage to the Profibus cables, install them where they will be clearly visible and separate from all other cables. This will improve EMC characteristics. Install the cables in their own cable trays or conduit separate from all A/C power wiring.

The standard Profibus cable is intended for permanent installation in buildings or in an environment which is protected form the climate. The cable should only be used in applications where there is a minimum of cable flexing and where it will not be exposed to a wet environment.

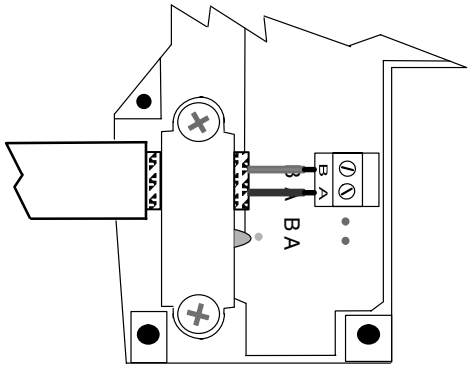
A 9–pin D–sub connector is required for connecting to Profibus networks using RS–485 for communication. The connector pin assignment and the wiring is shown in the following diagram.




The two wires are usually color coded. Typically red and green are used. Red is used for the **B** Transmit/Receive line and Green for the **A** transmit/receive line. It is important to keep A and B line consistent throughout the network to avoid improper operation. ***This is the most common connection mistake in the field.***

It is recommended that a IP20 protective connector, such as, the Vertical Termination shown in the diagram on the next page, be used for making all terminations for the Profibus network. This is the best way for a quick and easy solution to terminating each end of your Profibus network. AutomationDirect offers two certified connectors for the Profibus DP Base Controller, one for a standard termination and one for a node termination.

Standard vertical termination
AutomationDirect Part No. 103659.




Termination showing the cable connection to points A (Red) and B (Green).

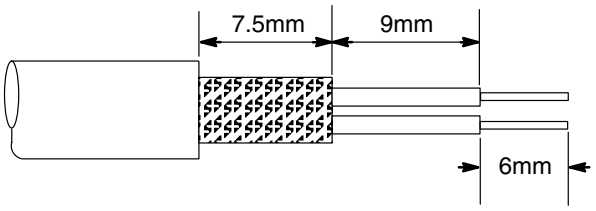
Note: The insulation has been removed exposing the shield. It is connected to ground by the metal clamp holding the cable in place.



Proper preparation of the cable is important for good Profibus network installation. When removing the cable insulation cover, make sure that the braided cable shield is not damaged. Strip the ends of the cable conductors as shown below.

Recommended preparration of the Profibus network cable.

Use either Belden Profibus 3079A or Siemens 6XV1 830 0AH10 cable.




After preparing the cable, insert the green and the red conductors in the appropriate screw terminals of the bus connector.

**WARNING:** The cable shield is not always connected to protective ground within all Profibus devices; therefore, make sure the cable shield is connected to ground before it enters the enclosure.

One important point when setting up a Profibus network is where and how to place the termination. Each Profibus peer–to–peer network, or last segment, needs to be terminated at the beginning and end of a segment (must be at the last device). The termination is usually built into the connector. Power must be supplied to the terminating resistors at the device. This means the last device needs to be powered at all times. If you have to replace the last device, the whole network could become unstable. It is preferred that the master device be installed at the beginning of the network and as a termination point.

Each segment is allowed to have a maximum of 32 stations, and a maximum of 9 segments is possible.

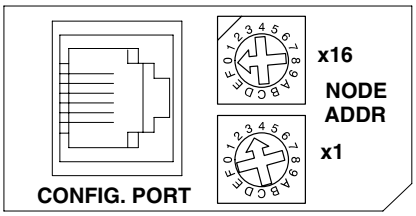
For installation applications where there is electromagnetic interference or to cover longer distances, fiber optic cable can be used for the Profibus field bus networks. Refer to Profibus guideline 2.022 for the specification of the Profibus fiber optic transmission method. For an overview of the fiber optic components available for Profibus, refer to a current Profibus Product Guide which can be found at the Profibus website, www.profibus.com.

**Setting the Node Address**

Profibus DP is usually a mono master system. Since Profibus is based on a token principle, more than one active station (masters) is allowed. The overall controlling master of the network should be node address “1”. The master should be placed at the beginning of the network. Network address “0” should be reserved for monitoring and diagnostic devices.

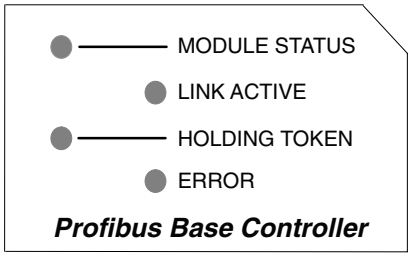
It is recommended that slave devices begin with address “3”. The slave devices need to be addressed in consecutive order by bus location moving away from the master.

Use a small flat screwdriver to set the Node Address to an available Node Address, from 3 – 125. Node Address 0 is normally reserved for the Profibus network master. Note that x16 represents the sixteens place and x1 represents the units place.




**Status Indicators**

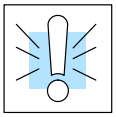
The Controller has four Status Indicators: Module Status, Link Active, Holding Token and Error.




| Indicator | Action | Status |
|---|---|---|
| **MODULE STATUS** | ON | Powerup check passed |
| | OFF | Powerup check failed |
| | Blinking | I/O in base does not match configuration |
| **LINK ACTIVE** | ON | Connected to network |
| | OFF | Not connected to network or incorrect configuration |
| **HOLDING TOKEN** | ON | Correct configuration and running |
| | OFF | Incorrect configuration |
| **ERROR** | ON | Watchdog timer timeout |

**Hot–Swapping I/O Modules**

The Hot–Swap feature allows Terminator I/O modules to be replaced with Terminator I/O system power ON so that the other I/O modules can continue to function. Be careful not to touch the terminals with your hands or any conductive material to avoid the risk of personal injury or equipment damage. ***It is always best to remove power if it is equally convenient to do so***. The T1H–PBC Hot–Swap parameter is configured in the GSD file which is loaded in the master controller. These parameters are set to Automatic I/O reconfiguration by default. If Manual I/O reconfiguration is desired, this can be selected during configuration of the Master.



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

**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.** 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 the I/O module from the base. If necessary, refer to the ***Terminator I/O Installation & I/O Manual*** for steps on removing an I/O module.
2. The T1H–PBC Module Status indicator will begin to blink, and scanning of the other I/O modules will continue to scan.
3. After the new I/O module has been installed, the Module Status indicator will turn ON with Auto I/O reconfiguration Hot–Swap enabled, and scanning of the I/O module will automatically begin. If Manual I/O reconfiguration Hot–Swap was enabled, the Module Status indicator will continue to blink, and the T1H–PBC will need to be manually reset by toggling the first bit in the first output byte within the user program in order to begin scanning the I/O module again (refer to Memory Map, page 2–14).

**Note:** It is good safe practice to disable outputs before Hot–Swapping modules if the application allows this.

# Configuring the Controller

Use the Profibus configuration tool (this should come with the master unit) to configure the master and the T1H–PBC for your network. ***Refer to the software Help file and/or the manual for assistance with the configuration***.

**GSD File**

The actual configuration of the T1H–PBC takes place whenever the Profibus master is configured. The characteristic communication features of the T1H–PBC are defined in the form of an electronic device data sheet, GSD file. The defined file format permits the configuration system to simply read in the GSD files of the T1H–PBC and automatically use this information when configuring the bus system. The GSD file is installed in the Profibus master during the configuration of the master.

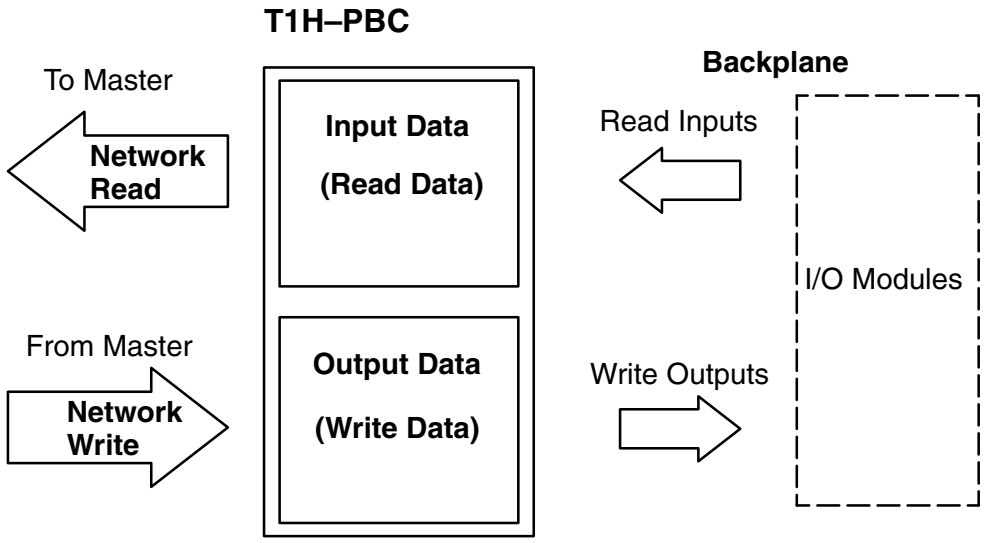
**T1H–PBC Configuration**

The configuration tool made available with the master controller will allow you to achieve a simple Plug and Play configuration for your Profibus network. Based on the GSD files, the network can be set up with devices from different manufacturers.

4. **Set the Controller Node Address:**
   Make sure that the T1H–PBC DP Base Controller node address is set to an available node number on the Profibus network (from 3 to 125).
5. **Configure the Profibus master:**
   Configure the Profibus master with the Profibus Configuration Tool that was supplied with the master controller to configure the T1H–PBC and the Terminator I/O.
6. **Add the GSD file:**
   When configuring the Profibus master, add the T1H–PBC slave GSD file from the disk which came with this manual or from our web site **www.automationdirect.com**.
7. **Commission the Node:**
   Use the Profibus Configuration Tool used to configure the master to put the system on line.
8. **Scan the I/O:**
   Use the monitor utility that comes with the configuration tool to scan the Terminator I/O.
9. **View Indicators on the T1H–PBC module:**
   Refer to the Status Indicators when connecting to the network.

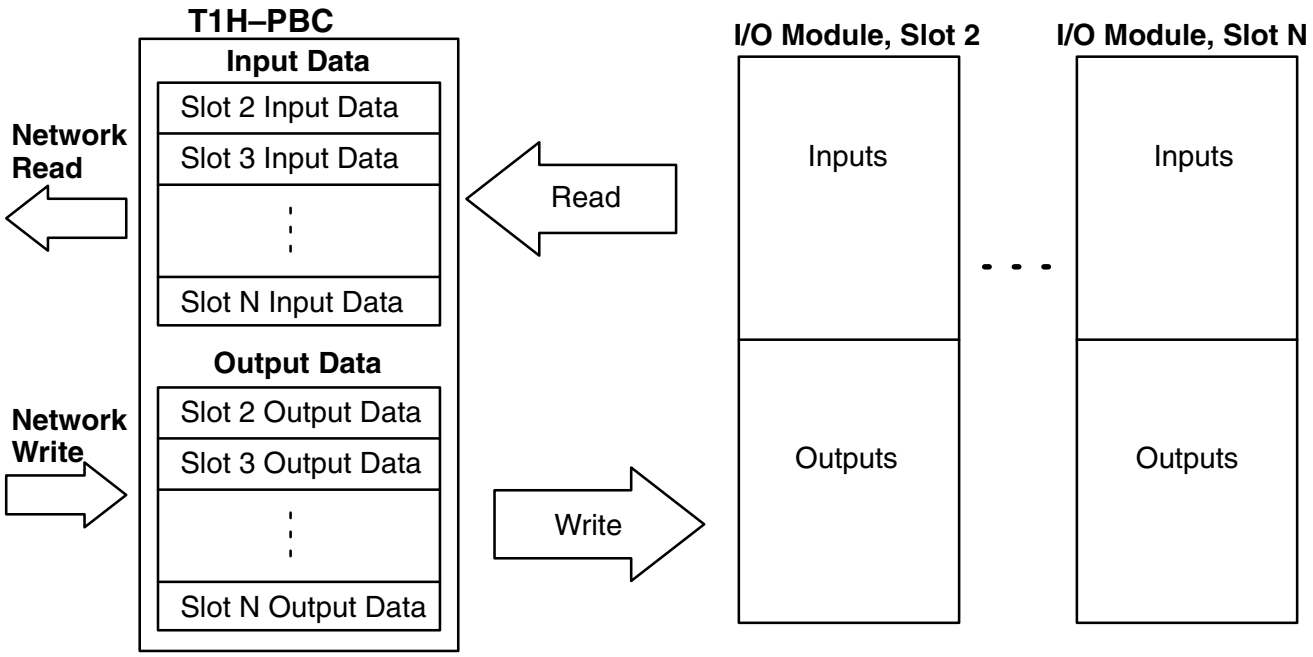
# Master/Slave Communications

The T1H–PBC DP base controller (slave) communicates with the DP master by sending Input Data and receiving Output Data. The DP master *reads* Inputs from I/O Modules and *writes* Outputs to I/O Modules.



# Terminator I/O Backplane Communications

The Controller communicates with its I/O modules over the backplane. The I/O is mapped in consecutive order as shown.




# T1H–PBC Memory Map

**T1H–PBC Memory Map**

The Profibus DP slave memory map specification per station will allow up to 244 bytes of input data and 244 bytes of output data to be transmitted. The maximum amount of I/O memory per T1H–PBC station is 244 input bytes and 242 output bytes. The maximum 244 output bytes are not available because the first two output bytes are reserved as control bits for system functions. Only one control bit, the first bit in the first output byte, is available while the rest are reserved for future use. The bit that is available is used for manual I/O reconfiguration during Hot–Swap (refer to page 2–11).

**Terminator I/O Memory Map**

TheTerminator family of I/O modules is available in many types and I/O densities. Discrete I/O modules are available in 8 point and 16 point input and output types. The 8 point modules consume 1 byte of I/O memory, and the 16 point modules consume 2 bytes of I/O memory. Analog I/O modules, when used in a T1H–PBC station, consume 2 bytes per channel and are offered in 8 channel and 16 channel input and output types, as well as combination modules of 8 channel in / 4 channel out. In order to determine if your system is within the maximum I/O that can be used by a single T1H–PBC station (244 input bytes and 242 output bytes), you must calculate the amount of I/O memory consumed by each station.

### Calculate I/O Memory Consumption

The following charts will show how a typical Terminator station is configured, and the amount of I/O memory consumed.

| Input Type | Bytes/Module | Modules/Station | Total Bytes |
|---|---|---|---|
| **8 point discrete** | 1 | 1 | 1 |
| **16 point discrete** | 2 | 1 | 2 |
| **8 channel analog** | 16 | 4 | 64 |
| **16 channel analog** | 32 | 4 | 128 |
| **TOTALS** | | 10 | 195 |

| Output Type | Bytes/Module | Modules/Station | Total Bytes |
|---|---|---|---|
| **8 point discrete** | 1 | 0 | 0 |
| **16 point discrete** | 2 | 2 | 4 |
| **8 channel analog** | 16 | 2 | 32 |
| **16 channel analog** | 32 | 2 | 64 |
| **TOTALS** | | 6 | 100 |

The total amount of input bytes consumed is 195, the total amount of output bytes consumed is 100 and there are a total of 16 I/O modules in the example Terminator station.

**Note:** It is important to consider the Terminator I/O power budget when configuring your T1H–PBC system. Refer to the ***Terminator I/O Installation Manual*** **(T1K–INST–M)**.

# Specifications

A

In This Appendix. . . .

— Specifications

# Specifications

## T1H–PBC Profibus Base Controller

| | |
|---|---|
| Module Type | Profibus Network Interface Module |
| Maximum Expansion | 32 stations per segment, 9 repeaters max./segment, 126 stations maximum |
| Communications | RS–485 |
| Auto-configuring | GSD file in Master |
| Profibus Profile | DP |
| Profibus Port | 9–pin D–shell |
| Node Address | 1 to 125 (decimal)<br>set by rotary switches (0 used by the Master) |
| Segment distance | 100 meters (327 feet) to 1200 meters (3270 feet) |
| Baud Rate | Selectable from 9.6 kbps to 12 Mbps |
| LED Indicators | MODULE STATUS:<br>ON = module power-up check passed<br>OFF = module power–up check failed<br>Blinking = I/O in base does not match configuration<br>LINK ACTIVE:<br>Blinking = Network is active<br>HOLDING TOKEN:<br>ON = PBC is configured correctly and running<br>ERROR:<br>ON = watchdog timer timeout represents hardware, communications, or network fault; power-on reset or reset within master device software |
| Communications Port | RJ12, RS232C (used for firmware upgrade only) |
| Base Power Requirement | 530mA @ 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<br>(UL 840) |
| Vibration | MIL STD 810C 514.2 |
| Shock | MIL STD 810C 516.2 |
| Noise Immunity | NEMA ICS3–304<br>Impulse noise 1us, 1000V<br>FCC class A<br>RFI (144MHz, 430MHz, 10W, 10cm) |
| Manufacturer | Host Automation Products |

## Cable Specifications

| Permitted Ambient Conditions | |
|---|---|
| Operating Temperature | 32° F to 131° F (–40° C to 60° C) |
| Storage Temperature | –4° F to 158° F (–40° C to 60° C) |
| Installation Temperature | (–40° C to 60° C) |
| **Bending Radius** | |
| First and final bend | >= 75 mm |
| Repeated bending | >= 150 mm |

# B

# T1H–PBC Profibus DP Base Controller GSD File

In this Appendix. . . .

— T1H-PBC GSD File

# T1H–PBC Profibus DP Base Controller GSD File

This appendix shows the contents of the GSD file for the T1H–PBC Profibus DP Base Controller. It is included for reference only. The electronic data diskette is included with this manual. The latest GSD file is always availabe for download on the **www.AutomationDirect.com** website. It can always be downloaded from the GSD Library located on the Profibus Trade Organization website **www.profibus.com**.



```
;=======================================================
; GSD File For AutomationDirect.com T1H–PBC
; using the SPC3 ASIC
; Version:  V0.1
;=======================================================
#Profibus_DP
GSD_Revision=2

;General parameters
Vendor_Name         = ”AutomationDirect.com”
Model_Name          = ”T1H–PBC”
Revision            = ”V1.0”
Ident_Number        = 0x0607
Protocol_Ident      = 0
Station_Type        = 0
FMS_supp            = 0
Hardware_Release    = ”REV. A”
Software_Release    = ”REV 1.1.10”
9.6_supp            = 1
19.2_supp           = 1
45.45_supp          = 1
93.75_supp          = 1
187.5_supp          = 1
500_supp            = 1
1.5M_supp           = 1
3M_supp             = 1
6M_supp             = 1
12M_supp            = 1
MaxTsdr_9.6         = 60
MaxTsdr_19.2        = 60
MaxTsdr_45.45       = 250
MaxTsdr_93.75       = 60
MaxTsdr_187.5       = 60
MaxTsdr_500         = 100
MaxTsdr_1.5M        = 150
```

```
MaxTsdr_3M          = 250
MaxTsdr_6M          = 450
MaxTsdr_12M         = 800
Redundancy          = 0
Repeater_Ctrl_Sig   =0
24V_Pins            = 0
Implementation_Type= ”ASIC, SPC3”
Bitmap_Device       = ”Bitmap1N”
Bitmap_Diag         = ”Bitmap1D”
Bitmap_SF           = ”Bitmap1S”
; Slave–Specification:
Freeze_Mode_supp    = 1
Sync_Mode_supp      =
Set_Slave_Add_Supp  = 0
Auto_Baud_supp      = 1
Min_Slave_Intervall = 1
Fail_Safe           = 0
Max_Diag_Data_Len = 244
Modul_Offset        = 1
Slave_Family        = 3@Terminator
Modular_Station     = 1
Max_INPUT_Len       = 244
Max_Output_Len      = 244
Max_Data_len        = 488
Max_Module          = 32

; UserPrmData: Length and Preset:
Max_User_Prm_Data_Len= 160 ; 32 Bytes reserved for profibus module + 4 bytes per slot

PrmText=0
Text(0)=”Outputs Disabled”
Text(1)=”Outputs Enabled”
EndPrmText
PrmText=1
Text(0)=”Unipolar”
Text(1)=”Bipolar”
EndPrmText
PrmText=2
Text(0)=”5V Range”
EndPrmText
```

```
PrmText=3
Text(0)=”0..20mA”
Text(1)=”4..20mA”
EndPrmText
PrmText=4
Text(0)=”Auto”
Text(1)=”Manual”
EndPrmTextText(1)=”10V Range”

ExtUserPrmData=0 ”Status”
Bit(0) 1 0–1
Prm_Text_Ref=0
EndExtUserPrmData

ExtUserPrmData=1 ”Unipolar/Bipolar”
Bit(1) 0 0–1
Prm_Text_Ref=1
EndExtUserPrmData

ExtUserPrmData=2 ”Voltage Range”
Bit(2) 0 0–1
Prm_Text_Ref=2
EndExtUserPrmData

ExtUserPrmData=3 ”Current Range”
Bit(3) 0 0–1
Prm_Text_Ref=3
EndExtUserPrmData

ExtUserPrmData=4 ”Hot–Swap Mode”
Bit(0) 0 0–1
Prm_Text_Ref=4
EndExtUserPrmData

ExtUserPrmData=5 ”Reserved”
Unsigned8 0 0–255
EndExtUserPrmData

ExtUserPrmData=6 ”System Use”
Unsigned8 0 0–255
EndExtUserPrmData

Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0)=6

Ext_User_Prm_Data_Const(1) = 0x00
Ext_User_Prm_Data_Ref(1)=4

Ext_User_Prm_Data_Const(2) = 0x00
Ext_User_Prm_Data_Ref(2)=5
```

Ext_User_Prm_Data_Const(3) = 0x00
Ext_User_Prm_Data_Ref(3)=5

Ext_User_Prm_Data_Const(4) = 0x00
Ext_User_Prm_Data_Ref(4)=5

Ext_User_Prm_Data_Const(5) = 0x00
Ext_User_Prm_Data_Ref(5)=5

Ext_User_Prm_Data_Const(6) = 0x00
Ext_User_Prm_Data_Ref(6)=5

Ext_User_Prm_Data_Const(7) = 0x00
Ext_User_Prm_Data_Ref(7)=5

Ext_User_Prm_Data_Const(8) = 0x00
Ext_User_Prm_Data_Ref(8)=5

Ext_User_Prm_Data_Const(9) = 0x00
Ext_User_Prm_Data_Ref(9)=5

Ext_User_Prm_Data_Const(10) = 0x00
Ext_User_Prm_Data_Ref(10)=5

Ext_User_Prm_Data_Const(11) = 0x00
Ext_User_Prm_Data_Ref(11)=5

Ext_User_Prm_Data_Const(12) = 0x00
Ext_User_Prm_Data_Ref(12)=5

Ext_User_Prm_Data_Const(13) = 0x00
Ext_User_Prm_Data_Ref(13)=5

Ext_User_Prm_Data_Const(14) = 0x00
Ext_User_Prm_Data_Ref(14)=5

Ext_User_Prm_Data_Const(15) = 0x00
Ext_User_Prm_Data_Ref(15)=5

Ext_User_Prm_Data_Const(16) = 0x00
Ext_User_Prm_Data_Ref(16)=5

Ext_User_Prm_Data_Const(17) = 0x00
Ext_User_Prm_Data_Ref(17)=5

Ext_User_Prm_Data_Const(18) = 0x00
Ext_User_Prm_Data_Ref(18)=5

Ext_User_Prm_Data_Const(19) = 0x00
Ext_User_Prm_Data_Ref(19)=5

Ext_User_Prm_Data_Const(20) = 0x00
Ext_User_Prm_Data_Ref(20)=5

```
Ext_User_Prm_Data_Const(21) = 0x00
Ext_User_Prm_Data_Ref(21)=5

Ext_User_Prm_Data_Const(22) = 0x00
Ext_User_Prm_Data_Ref(22)=5

Ext_User_Prm_Data_Const(23) = 0x00
Ext_User_Prm_Data_Ref(23)=5

Ext_User_Prm_Data_Const(24) = 0x00
Ext_User_Prm_Data_Ref(24)=5

Ext_User_Prm_Data_Const(25) = 0x00
Ext_User_Prm_Data_Ref(25)=5

Ext_User_Prm_Data_Const(26) = 0x00
Ext_User_Prm_Data_Ref(26)=5

Ext_User_Prm_Data_Const(27) = 0x00
Ext_User_Prm_Data_Ref(27)=5

Ext_User_Prm_Data_Const(28) = 0x00
Ext_User_Prm_Data_Ref(28)=5

Ext_User_Prm_Data_Const(29) = 0x00
Ext_User_Prm_Data_Ref(29)=5

Ext_User_Prm_Data_Const(30) = 0x00
Ext_User_Prm_Data_Ref(30)=5

Ext_User_Prm_Data_Const(31) = 0x00
Ext_User_Prm_Data_Ref(31)=5

FixPresetModules=1

Module=”ON–BOARD–IO 16 DO” 0x21
Preset=1
EndModule

; DISCRETE INPUT MODULES
Module=”8 POINT DISCRETE INPUT” 0x10
EndModule
Module=”16 POINT DISCRETE INPUT” 0x11
EndModule

; DISCRETE OUTPUT MODULES
Module=”8 POINT DISCRETE OUTPUT” 0x20
EndModule
Module=”16 POINT DISCRETE OUTPUT” 0x21
EndModule
```

```
; ANALOG INPUT MODULES
Module="8 CHANNEL ANALOG INPUT" 0x57
EndModule
Module="14 CHANNEL ANALOG INPUT" 0x5F
EndModule
Module="16 CHANNEL ANALOG INPUT" 0x5F
EndModule

; ANALOG OUTPUT MODULES
Module="8 CHANNEL ANALOG VOLTAGE OUTPUT" 0x67
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 1
Ext_User_Prm_Data_Ref(0) = 2
EndModule
Module="8 CHANNEL ANALOG CURRENT OUTPUT" 0x67
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 3
EndModule
Module="16 CHANNEL ANALOG VOLTAGE OUTPUT" 0x6F
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 1
Ext_User_Prm_Data_Ref(0) = 2
EndModule
Module="16 CHANNEL ANALOG CURRENT OUTPUT" 0x6F
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 3
EndModule

; COMBINATION ANALOG INPUT/ANALOG OUTPUT MODULE
Module="8 IN / 4 OUT VOLTAGE ANALOG" 0xC0,0x43,0x47
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 1
Ext_User_Prm_Data_Ref(0) = 2
EndModule
```

```
Module=”8 IN / 4 OUT CURRENT ANALOG” 0xC0,0x43,0x47
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 3
EndModule

; INPUT MODULES
Module=”T1K–08ND3 8PT DISCRETE INPUT” 0x10
EndModule
Module=”T1K–16ND3 16PT DISCRETE INPUT” 0x11
EndModule
Module=”T1K–08NA–1 8PT DISCRETE INPUT” 0x10
EndModule
Module=”T1K–16NA–1 16PT DISCRETE INPUT” 0x11
EndModule

; OUTPUT MODULES
Module=”T1K–08TD1 8PT DISCRETE OUTPUT” 0x20
EndModule
Module=”T1K–16TD1 16PT DISCRETE OUTPUT” 0x21
EndModule
Module=”T1K–16TD2 16PT DISCRETE OUTPUT” 0x21
EndModule
Module=”T1K–08TA 8PT DISCRETE OUTPUT” 0x20
EndModule
Module=”T1K–08TAS 8PT DISCRETE OUTPUT” 0x20
EndModule
Module=”T1K–16TA 16PT DISCRETE OUTPUT” 0x21
EndModule
Module=”T1K–08TR 8PT DISCRETE OUTPUT” 0x20
EndModule
Module=”T1K–16TR 16PT DISCRETE OUTPUT” 0x21
EndModule
Module=”T1K–08TRS 8PT DISCRETE OUTPUT” 0x20
EndModule

; ANALOG INPUT MODULES
Module=”T1F–08AD–1 8CH ANALOG INPUT” 0x57
EndModule
Module=”T1F–08AD–2 8CH ANALOG INPUT” 0x57
EndModule
Module=”T1F–16AD–1 16CH ANALOG INPUT” 0x5F
EndModule
Module=”T1F–16AD–2 16CH ANALOG INPUT” 0x5F
EndModule
```

```
Module="T1F–14THM 14CH THERMOCOUPLE" 0x5F
EndModule
; ANALOG OUTPUT MODULES
Module="T1F–08DA–1 8CH ANALOG OUTPUT" 0x67
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 3
EndModule

Module="T1F–08DA–2 8CH ANALOG OUTPUT" 0x67
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 1
Ext_User_Prm_Data_Ref(0) = 2
EndModule

Module="T1F–16DA–1 16CH ANALOG OUTPUT" 0x6F
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 3
EndModule

Module="T1F–16DA–2 16CH ANALOG OUTPUT" 0x6F
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 1
Ext_User_Prm_Data_Ref(0) = 2
EndModule

; COMBINATION ANALOG INPUT/ANALOG OUTPUT MODULE
Module="T1F–8AD4DA–1 8I4O CURRENT ANALOG" 0xC0,0x43,0x47
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 3
EndModule
Module="T1F–8AD4DA–2 8I4O VOLTAGE ANALOG" 0xC0,0x43,0x47
Ext_Module_Prm_Data_Len = 1
Ext_User_Prm_Data_Const(0) = 0x00
Ext_User_Prm_Data_Ref(0) = 0
Ext_User_Prm_Data_Ref(0) = 1
Ext_User_Prm_Data_Ref(0) = 2
EndModule
```

```
; T1H–CTRIO Counter MODULE
; 48 Bytes Output and 40 Bytes Input
Module=”T1H–CTRIO Counter Module” 0xC0,0xAF,0xA7
EndModule
```

# C

# Terminator I/O Modules

In This Appendix. . . .

— Supported Terminator I/O Modules

# Supported Terminator I/O Modules

## Terminator Discrete I/O Modules

### Input Modules

T1K–08ND3
T1K–16ND3
T1K–08NA–1
T1K–16NA–1

### Output Modules

T1K–08TD1
T1K–16TD1
T1K–16TD2
T1K–08TA
T1K–08TAS
T1K–16TA
T1K–08TR
T1K–16TR
T1K–08TRS



## Terminator Analog I/O Modules

### Input Modules

T1F–08AD–1
T1F–08AD–2
T1F–16AD–1
T1F–16AD–2
T1F–14THM

### Output Modules

T1F–08DA–1
T1F–08DA–2
T1F–16DA–1
T1F–16DA–2

### Combination Modules

T1F–8AD4DA–1
T1F–8AD4DA–2

## Terminator Specialty Modules

### Counter Module

T1H–CTRIO

# D

# Think & Do Profibus Network Setup with the T1H–PBC

In This Appendix. . . .

— Think & Do Profibus Network Setup
— Hot–Swap Setup

# Think & Do Profibus Network Setup with T1H–PBC

For those who are using the T1H–PBC as a slave with Think & Do, the following steps will guide you through the setup for your Think & Do Profibus network.

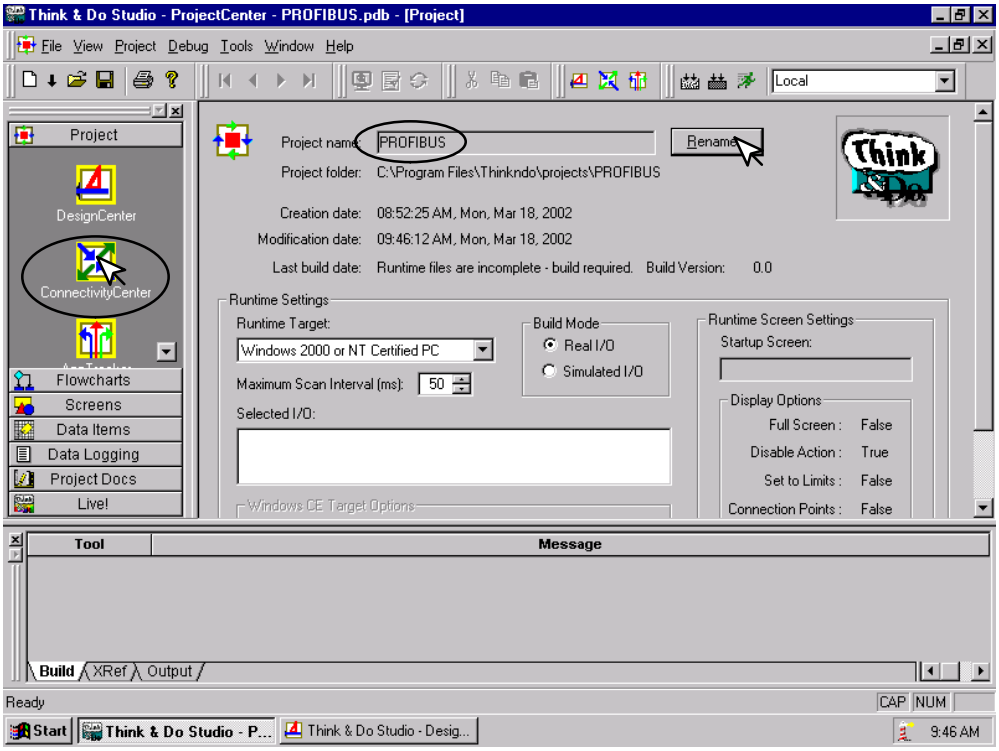
**Getting the T & D Network Started**

The first thing that will be needed for the Think & Do Profibus network is a Profibus interface card for your PC. We use the SST™ Interface Card for Profibus, produced by Woodhead Industries, Inc.. More information about the purchase of this card can be obtained from their website, www.mySST.com. The PC used for the setup procedure explained here uses this interface card. Whenever this card has been installed, run the SST Profibus Configuration Tool to configure the Profibus card before beginning the Think & Do setup. The following setup uses Think & Do Studio; however, if you have Think & Do LIVE installed on your PC, you will use I/O View instead of the Connectivity Center to setup the T1H–PBC DP Slave on the network.

**T & D Studio setup for PC control**

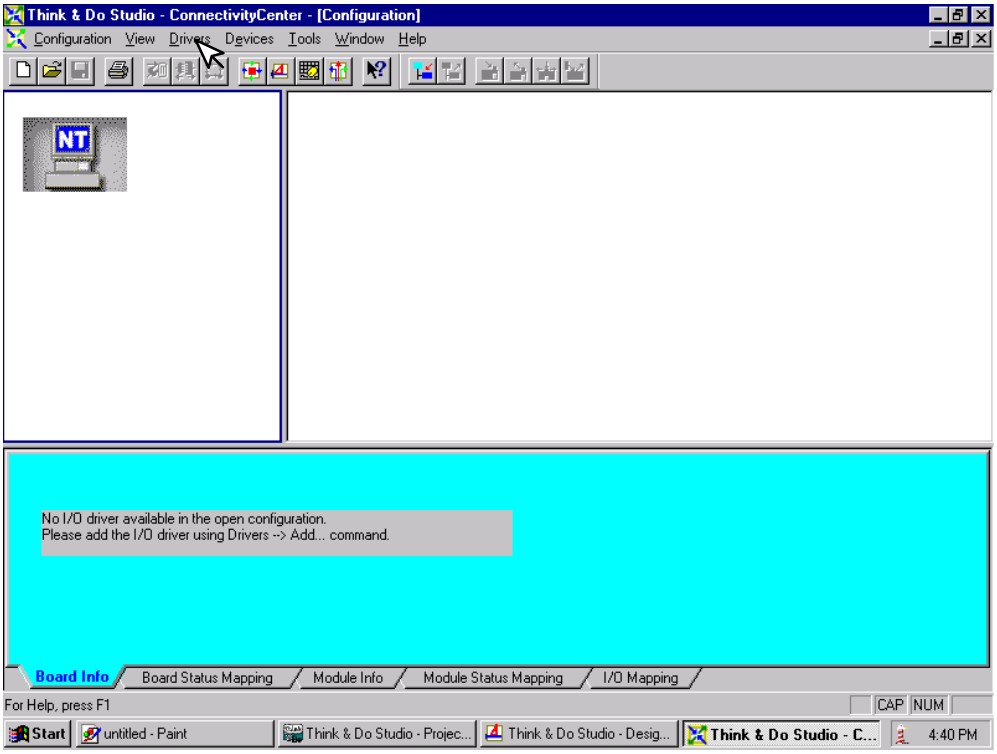
First, Be sure that the Node Address has been set to a proper address (3 to 126). Next, open Think & Do Studio and select **File** > **New** in the Project Center window. Use the following procedure to setup the T1H–PBC with Think & Do Studio. The procedure assumes that the Profibus cable is connected from the SST card to your T1H–PBC Profibus Base Controller with Terminator I/O installed.

1. Rename the project (the example name is PROFIBUS).
2. Click on the **ConnectivityCenter** button.



This window will appear with a note to add the I/O driver.

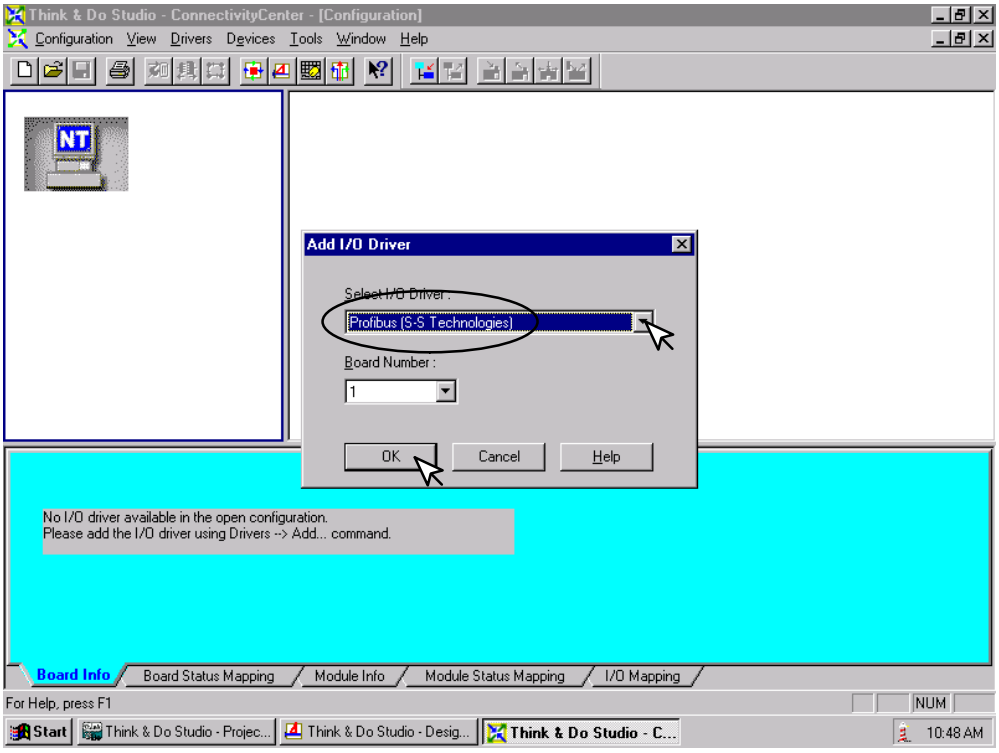
3. Click on **Drivers** > **Add** in the drop down window which appears.



The **Add I/O Driver** window will drop down.

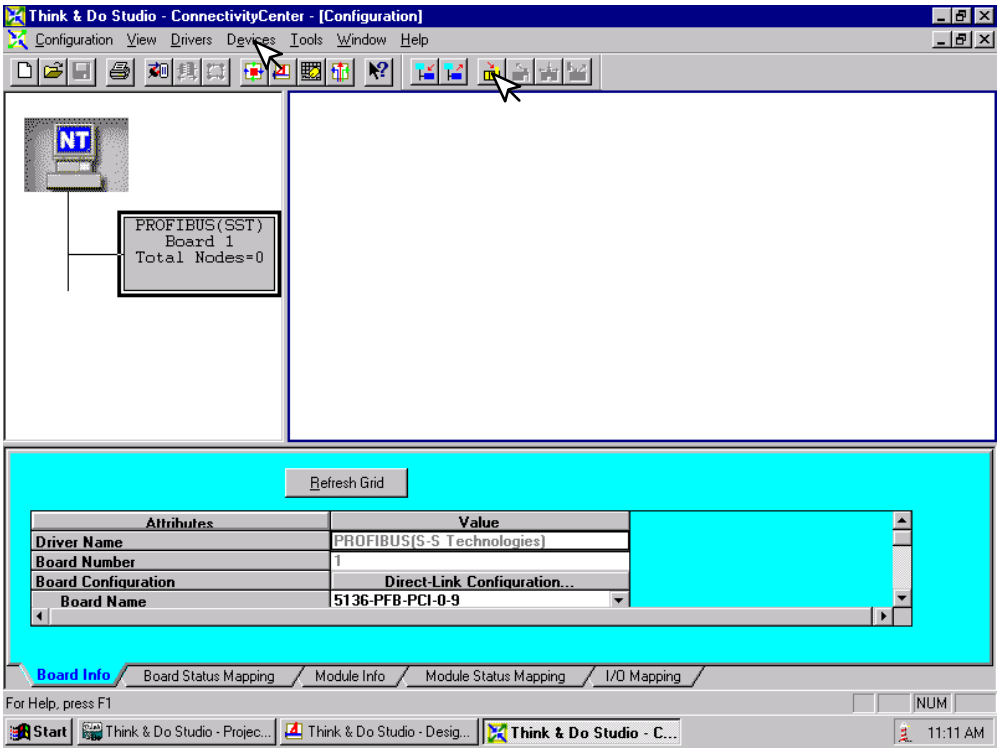
4. Click on the down arrow and select the Profibus driver that is in your PC.
5. Click **OK**.

This installs the SST driver to Think & Do configuration.



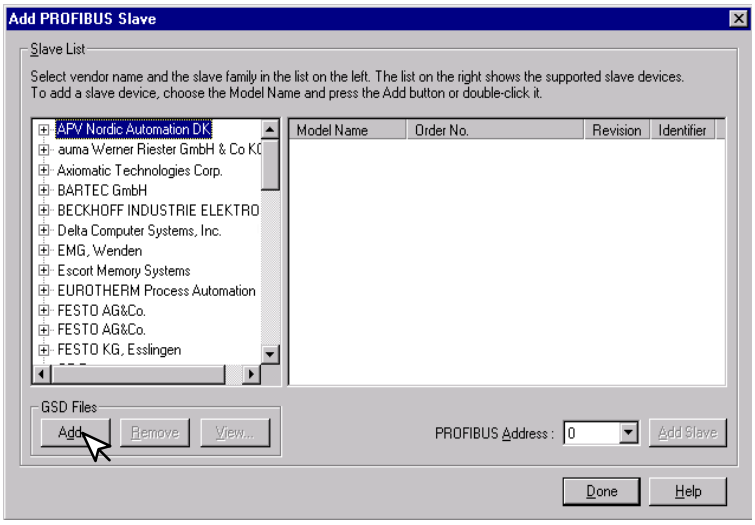
The T1H–PBC DP Slave must be added to the configuration next.

6. Click on **Devices** or the **Add Device** button in this window.



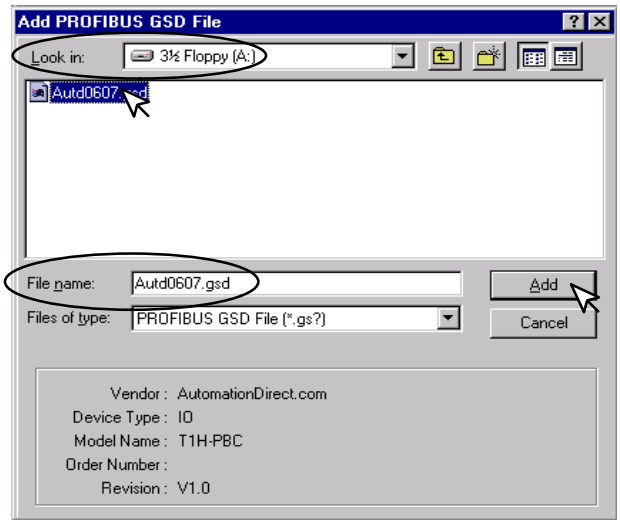

The following window will come into view. You will see a list of companies in the window on the left. Each of these have GSD files that are supported by Think & Do. if AutomationDirect is not in the list, you will need to install the GSD file from the diskette that was supplied with this manual.

7. Click the **Add** button.



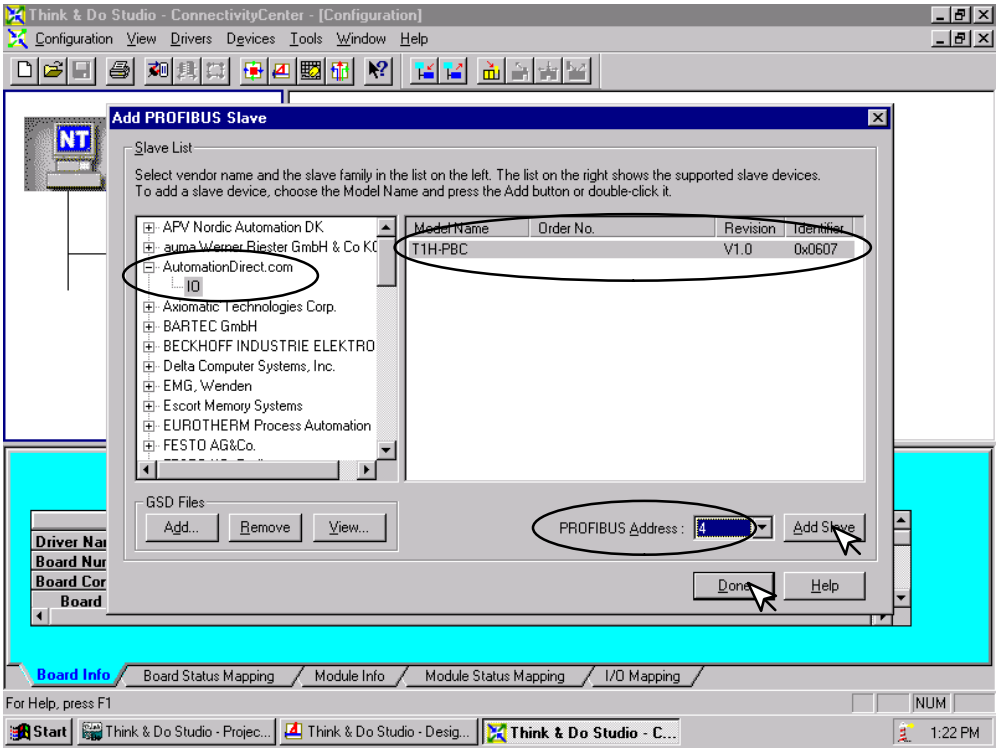
When this window comes into view, insert the diskette and select the A: drive in the **Look in:** window slot.

7. Click on **Auto0607.gsd** file to select the **File name**, then **Add**.



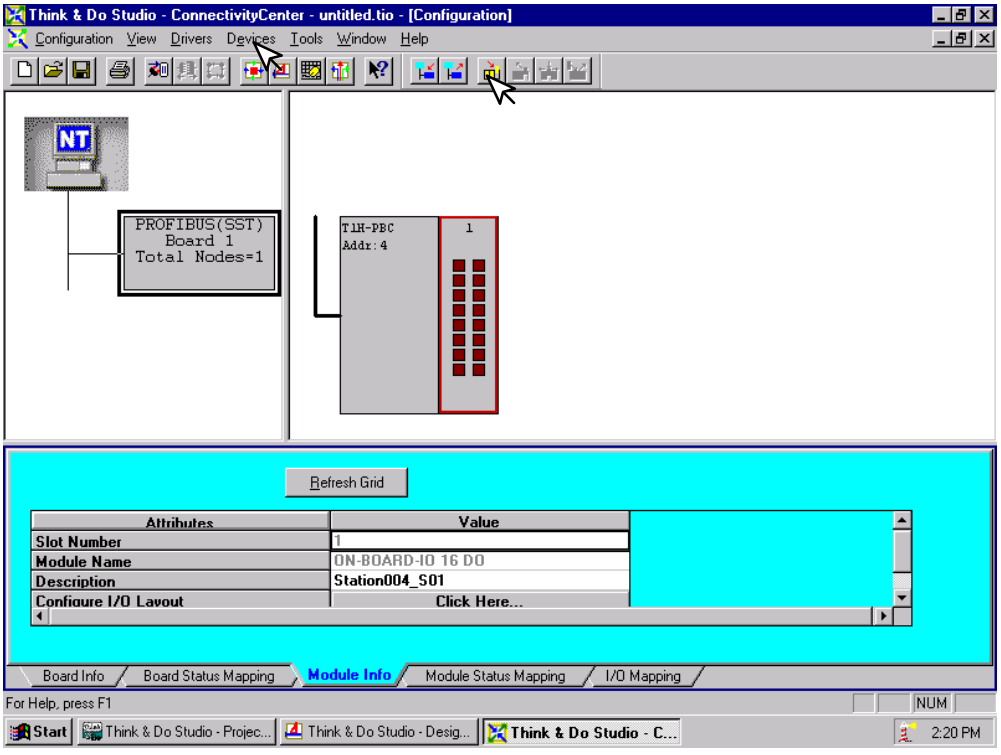

The window appears like the one shown below.

8. Click on **AutomationDirect.com**, then **IO**. This puts the available GSD file names in the window on the right.
9. Select T1H–PBC and enter the **PROFIBUS Address** dialed on the rotary switch.
10. Click on **Add Slave**, then **Done**.



Once the GSD file has been added, simply click the Connect button after installing the Profibus I/O driver the next time that a slave is configured. Think & Do Studio will search the network for all connected slaves and the modules for each slave. You will need to select the name for each module found.

The window now displays the T1H–PBC DP Slave with 16 output indicators. These outputs are the first two output bytes which are reserved for system functions, such as, Hot–Swap manual I/O reconfiguration (refer to Memory Map, page 2–11). The module name is **ON–BOARD–IO 16 DO** which is the name given to the module in the GSD file.

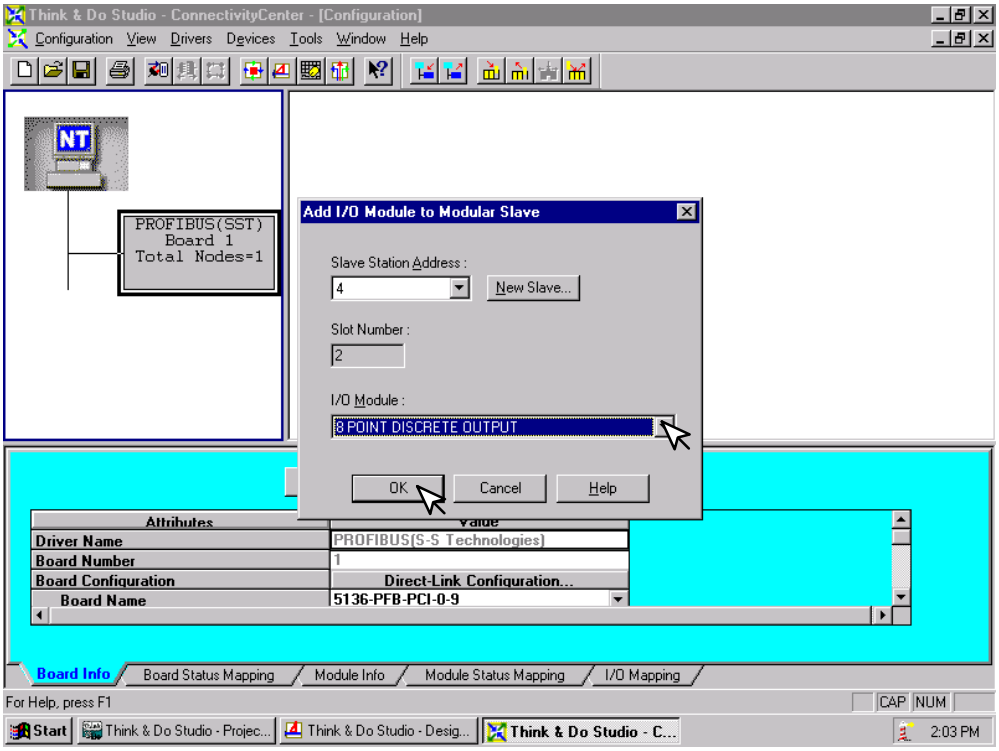



Now that the T1H–PBC DP Slave has been added to the configuration, add the Terminator I/O modules which are installed in the base.

11. Either click on **Devices** or the **Add Device** button.

The **Add I/O Module to Modular Slave** window will drop down. Select the module for Slot 2 by clicking on the down arrow next to the **I/O Module**. Then select the module description or the Terminator part number for the module located in that slot.

12. Click the **OK** button.

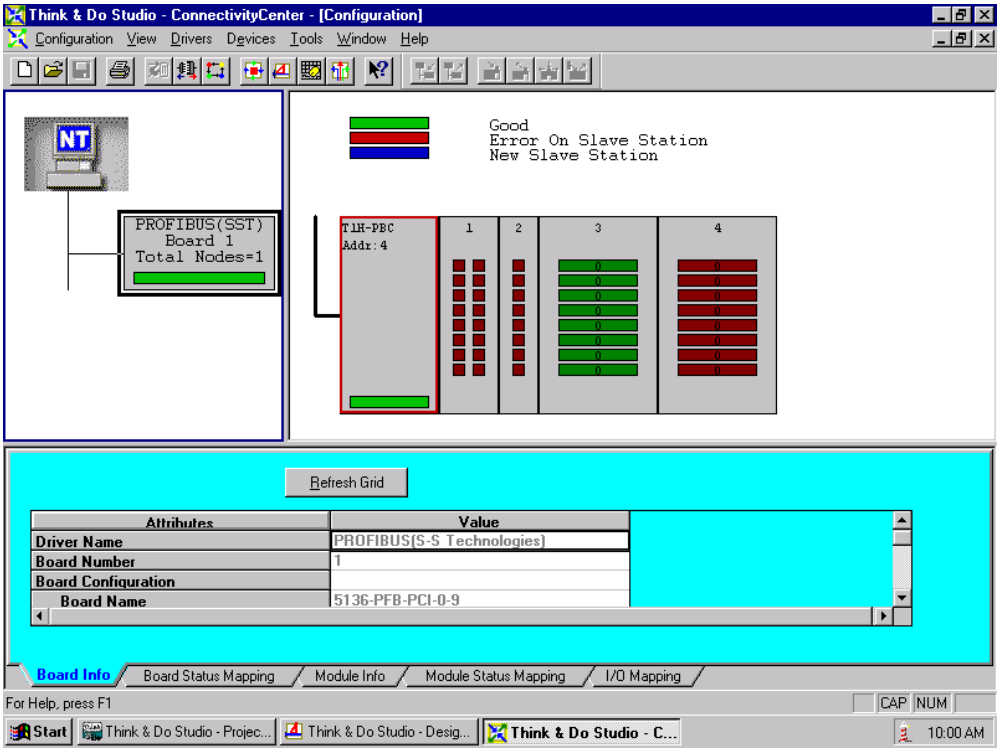



Continue these steps for each slot until all of the Terminator I/O modules for your T1H–PBC DP Slave have been configured.

The configuration window now shows the complete T1H–PBC DP Slave Terminator I/O base connected to the Think & Do network. It can now be connected and put on line.

13. Either click on **Configuration** > **Connect** or on the **Connect** button.
14. After it is connected either click on **Configuration** > **Scan** or the **Scan** button.

The system should now be running.



# Hot–Swap Setup

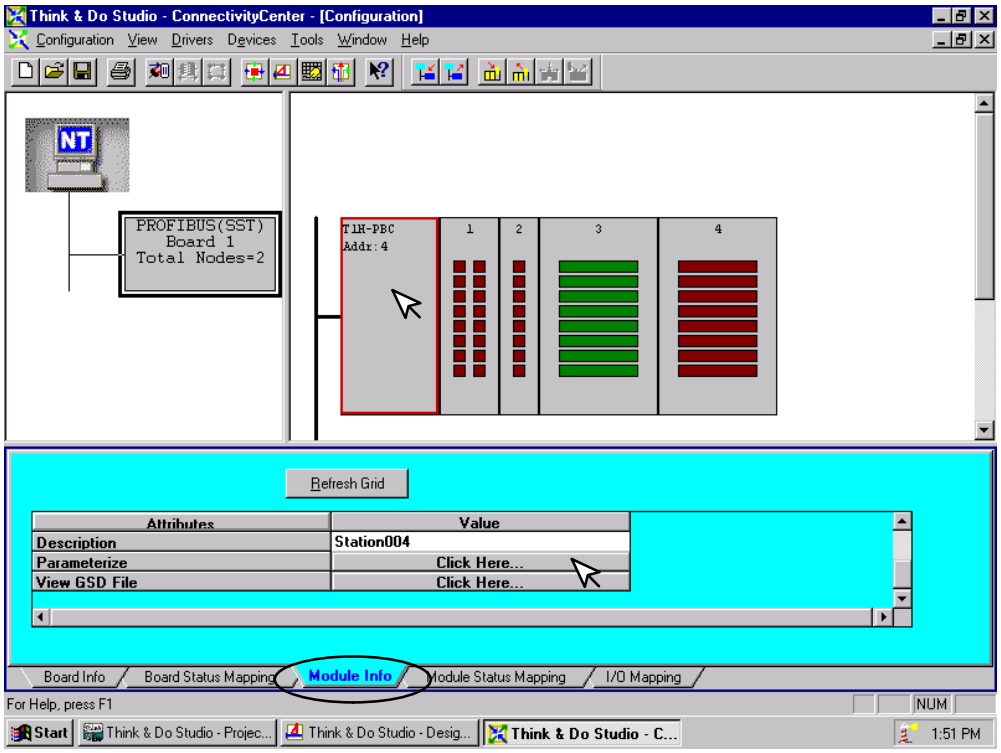
**Hot–Swap: Automatic Mode**

The Hot–Swap feature for the T1H–PBC DP Slave is set to Auto in the GSD parameters by default(refer to 2–11). Auto Hot–Swap I/O reconfiguration allows a Terminator I/O module to be removed from the base and replaced with a identical module without turning OFF the power to the Terminator base power supply. The T1H–PBC and the I/O will be automatically rescanned once a module has been “Hot Swapped”.

**Hot–Swap: Manual Mode Reset**

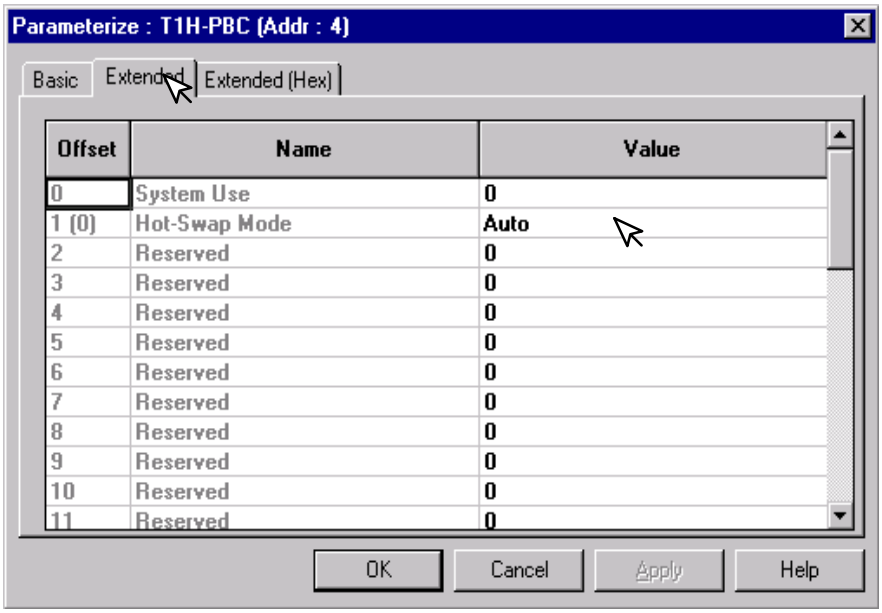
If your system requires the Manual Hot–Swap I/O reconfiguration feature, it will need to be selected during this initial setup process. This is done in the ConnectivityCenter window. The T1H–PBC must not be running. If the unit is running:

1. Either click on the **Disconnect** button or on **Configuration** > **Disconnect.**
2. Click on the **Module Info** tab, then **Click Here...** on the **Parameterize** line.

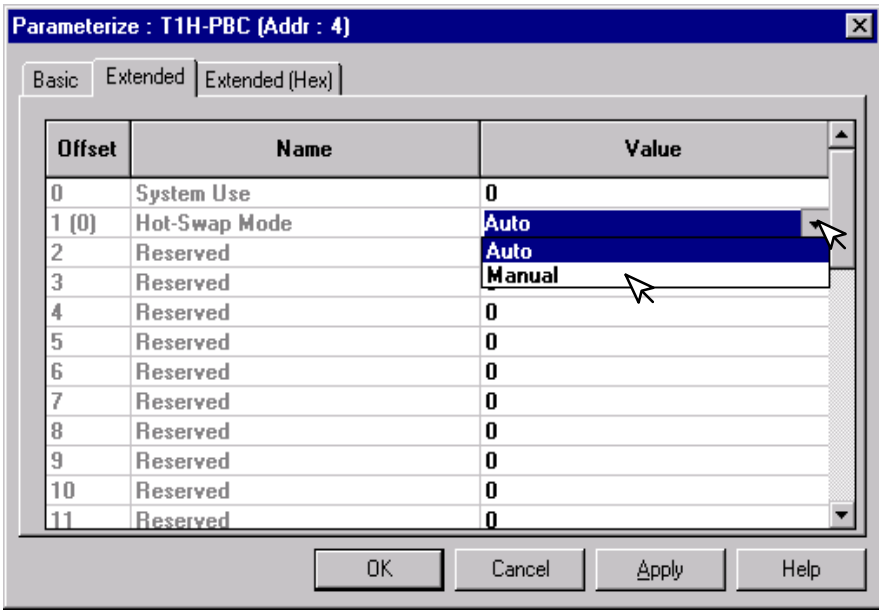


The Parameterize: T1H–PBC window will appear with Auto being the value of the Hot–Swap Mode.

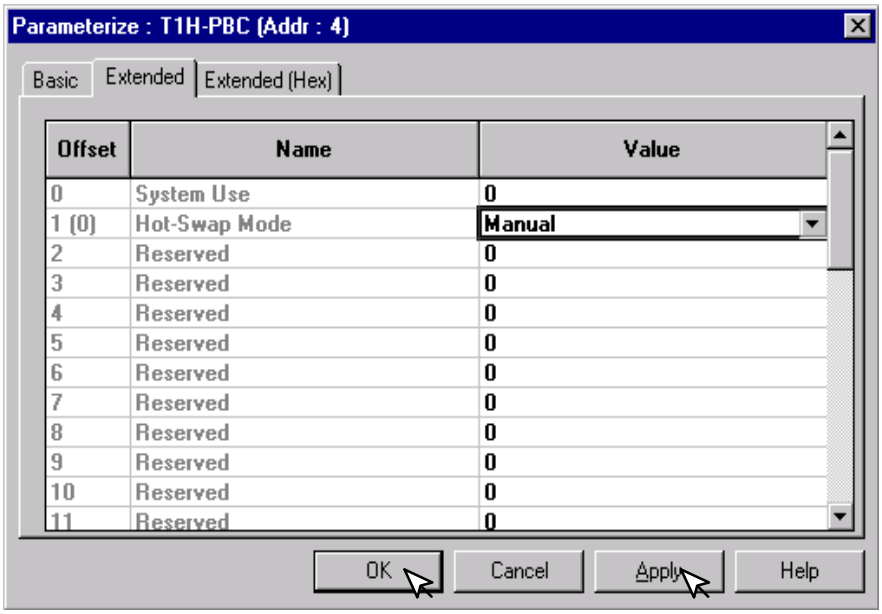
3. Click on the **Extended** tab.
4. Click on Auto to select the Manual Mode.




5. Now click on Manual.



6. Click on **Apply**, then **OK**.

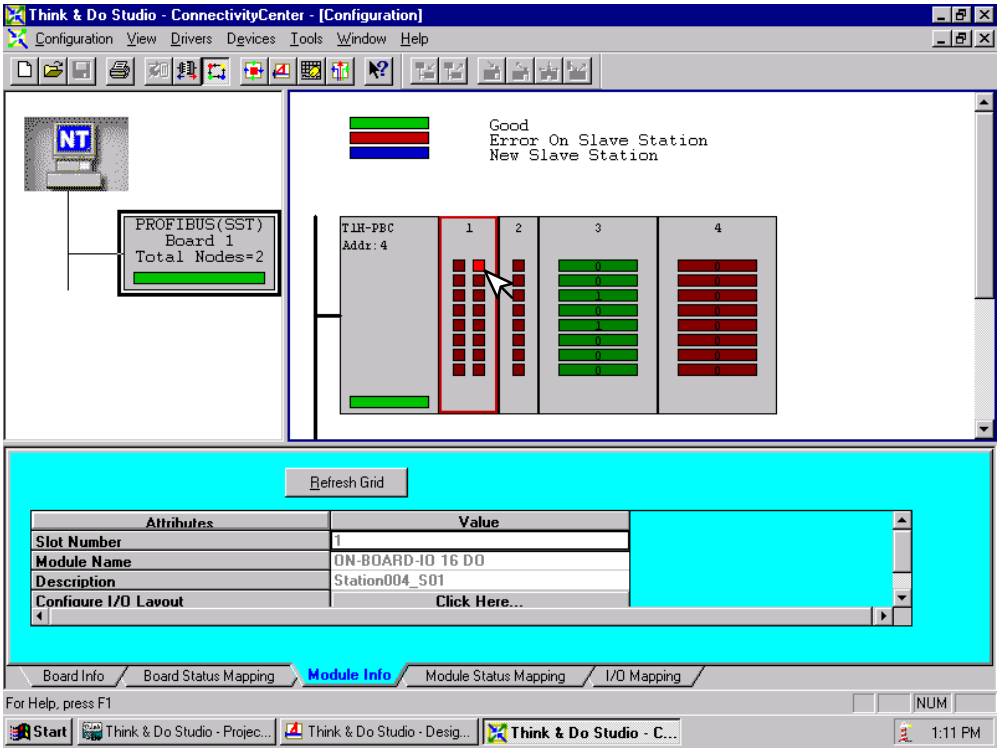



Now put the T1H–PBC on line by either clicking on the **Connect** button or on **Configuration** > **Disconnect**, then **Scan**.

With the T1H–PBC slave running, a I/O module can be Hot–Swapped. Whenever this is done, the Module Status led will continue to blink. To reset the condition and allow the Hot–Swapped module to be scanned again:

7. Toggle the first bit in the first output byte by clicking on the upper right–hand output indicator in slot 1. The indicator will turn ON and the Module Status led will turn ON. Click the indicator again to turn the indicator OFF. In normal operation, the first bit will be mapped to a tag in the user program. This bit will be used to toggle a safe I/O reconfiguration after a module has been Hot–Swapped.

The Hot–Swapped module is back in operation again.



# Siemens Profibus Network Set up with T1H–PBC

E

In This Appendix. . . .

— Siemens Profibus Network Setup with a T1H–PBC

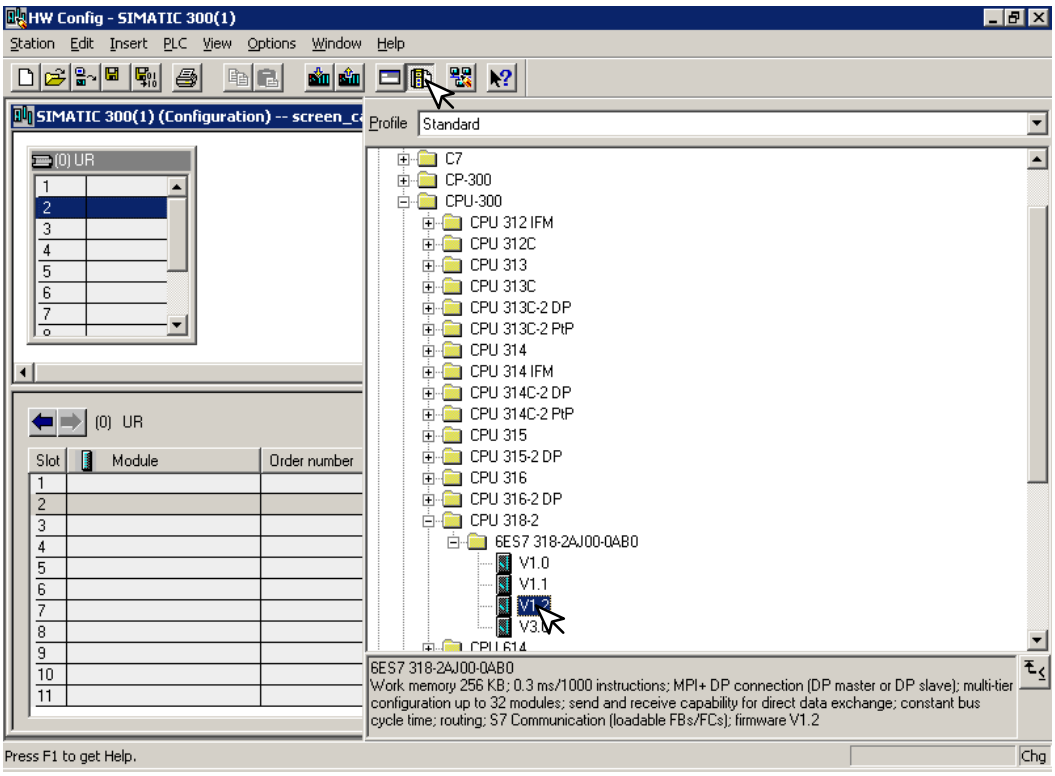
# Setup a T1H–PBC on Siemens Profibus Network

For those who are using the T1H–PBC slave on a Profibus network with a Siemens PLC, the examples on the following pages will step you through the process of setting up your network. The PLC used as the Profibus master in this example is a Simatic 300.

**Simatic Manager**

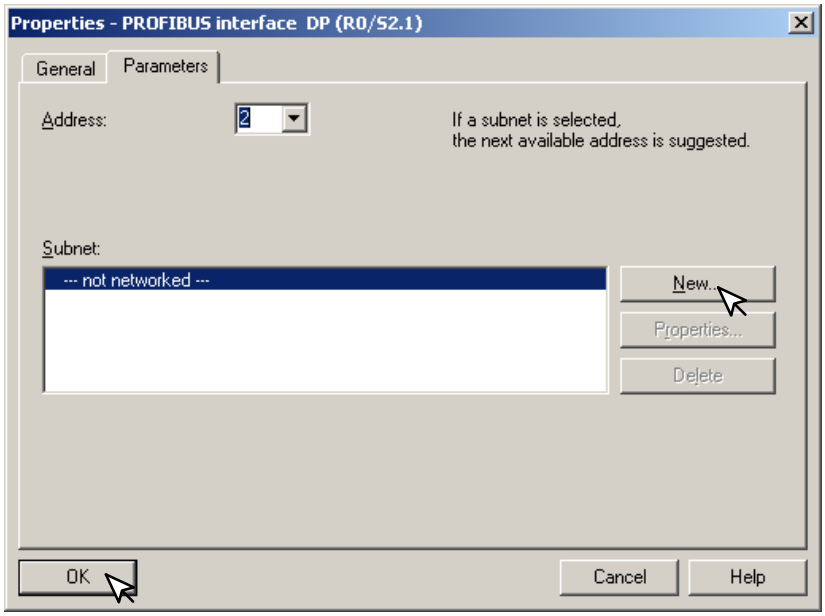
Begin by opening your SIMATIC Manager to configure the Profibus driver.

1. Use the hardware configuration to select the PLC processor.
2. Open the catalog window by clicking on the **Catalog** button, and select the proper S7 processor.



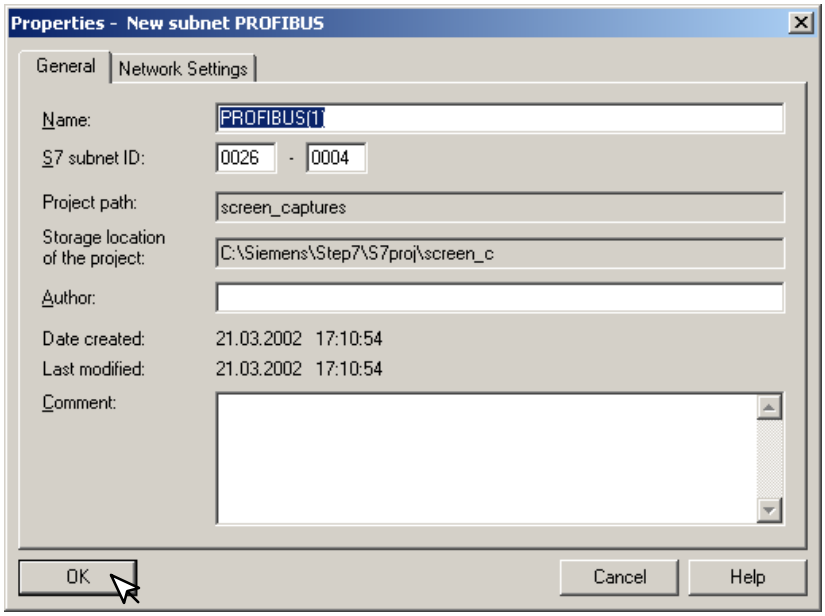
After selecting the processor, the DP interface properties window will pop–up.

3. Select **New**, and **OK**.

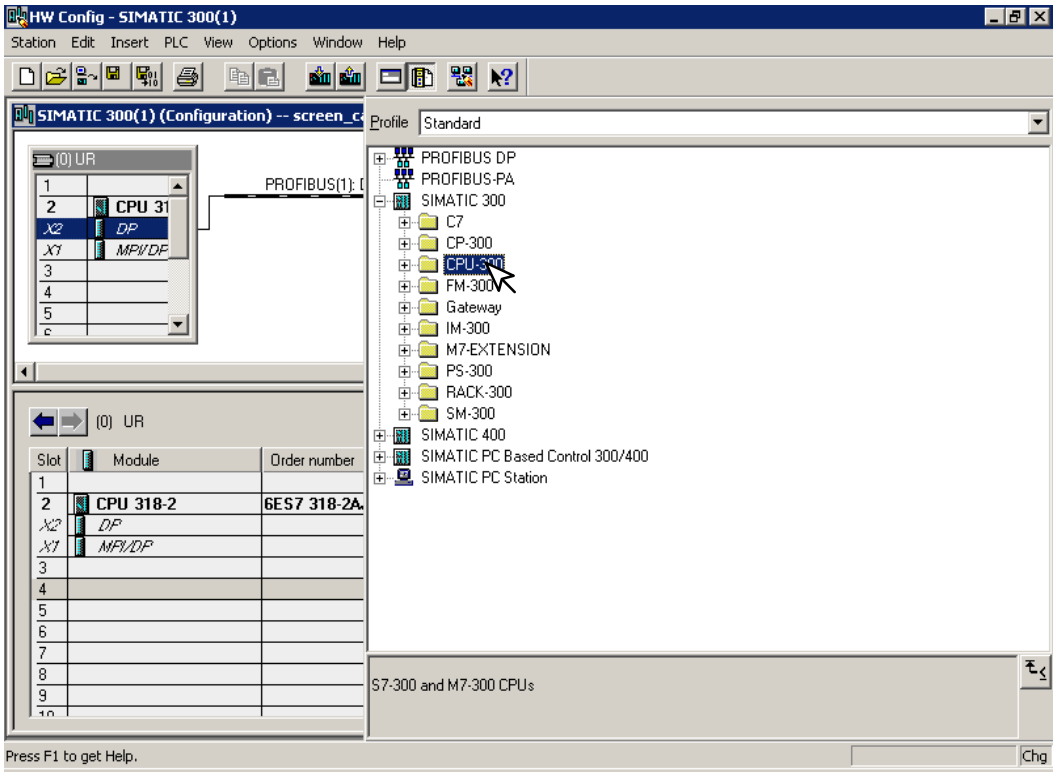



The New subnet window will appear allowing you to name the subnet. The new ID is also in the window.

4. Make the necessary entries, then click **OK**.

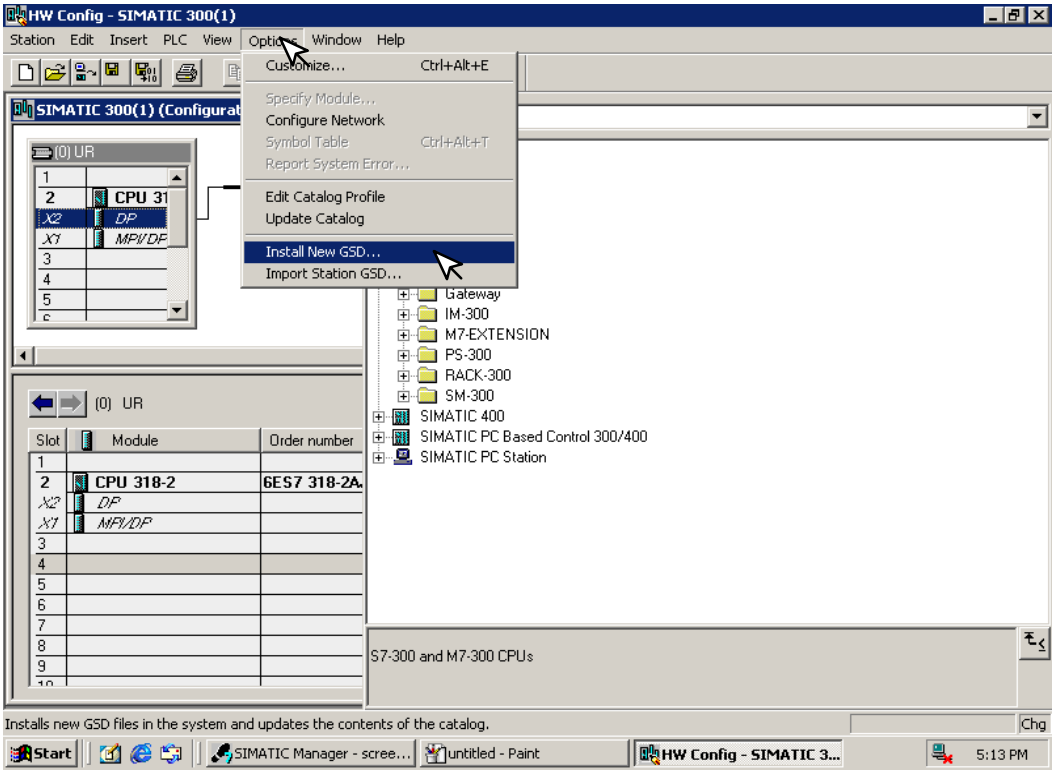


Once the processor has been selected and the DP network is enabled, the configuration window should look like the diagram below.



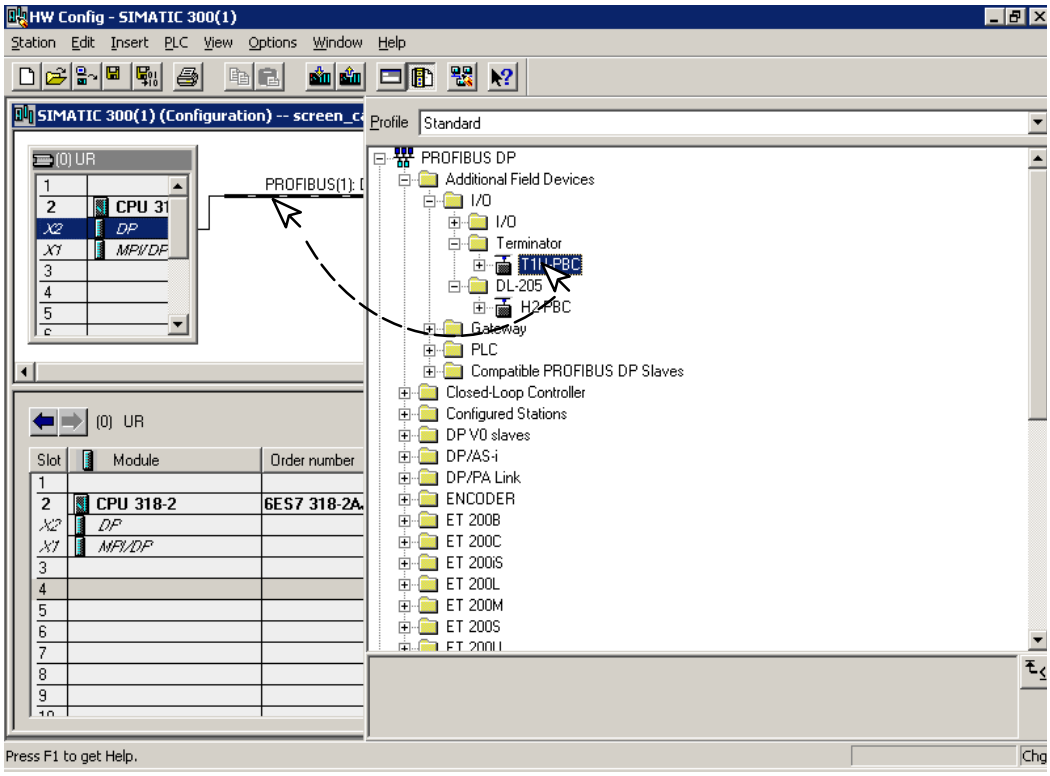
The GSD file will need to be installed now.

5. Click on **Options** and select **Install New GSD...** in the drop–down window.

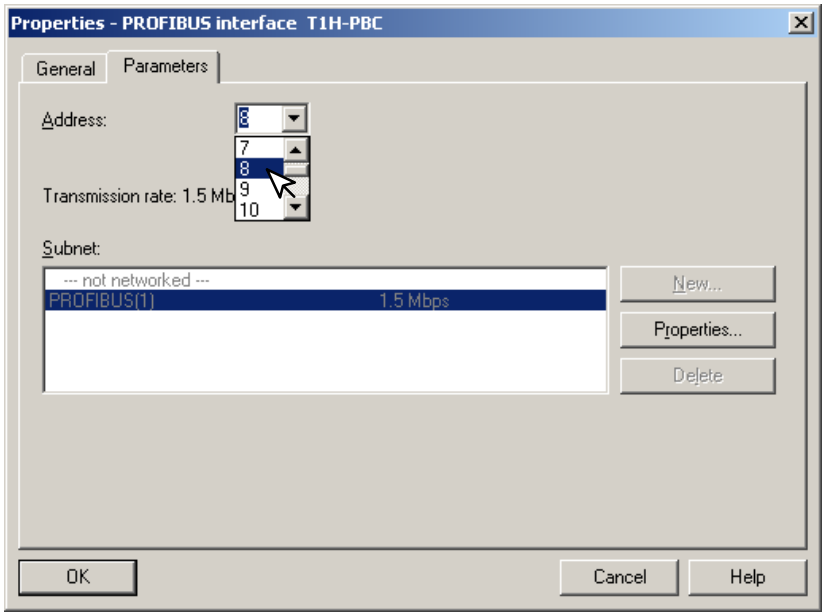


The Configuration window will look like the one below.

6. Now, click on the T1H–PBC and drag it to the Profibus network.

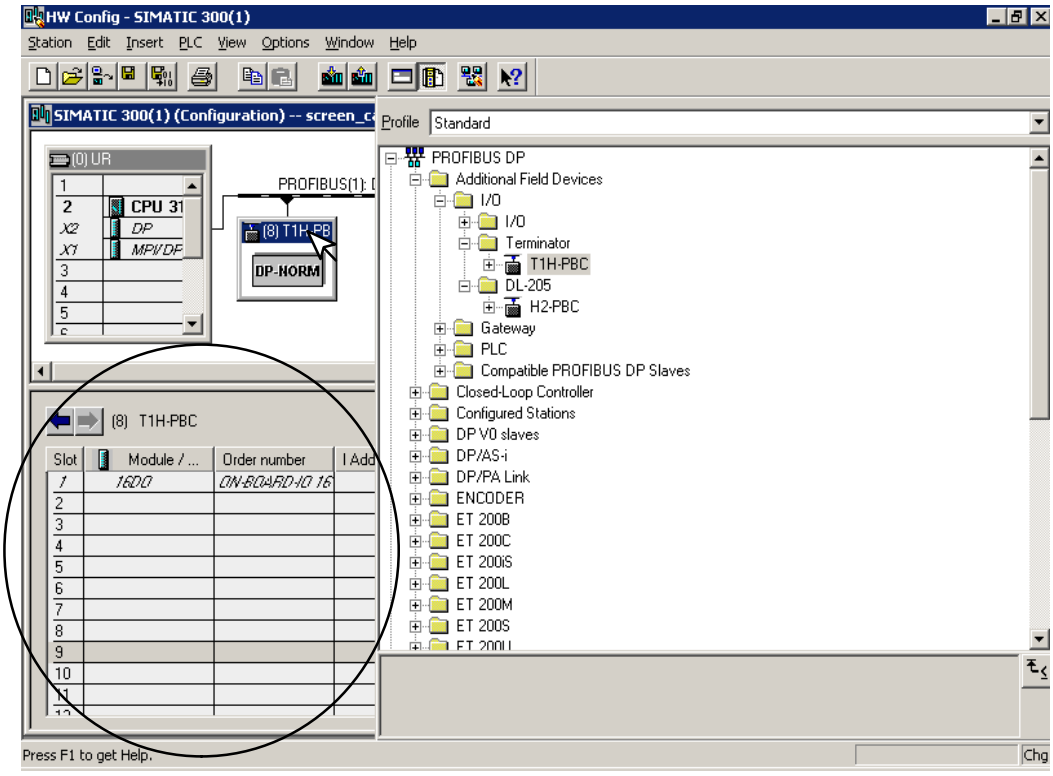



When the mouse button is released at the network node, the **Properties** window will appear so the correct node address can be entered. The transmission baud rate can be changed at this time also. Click **OK** when finished.



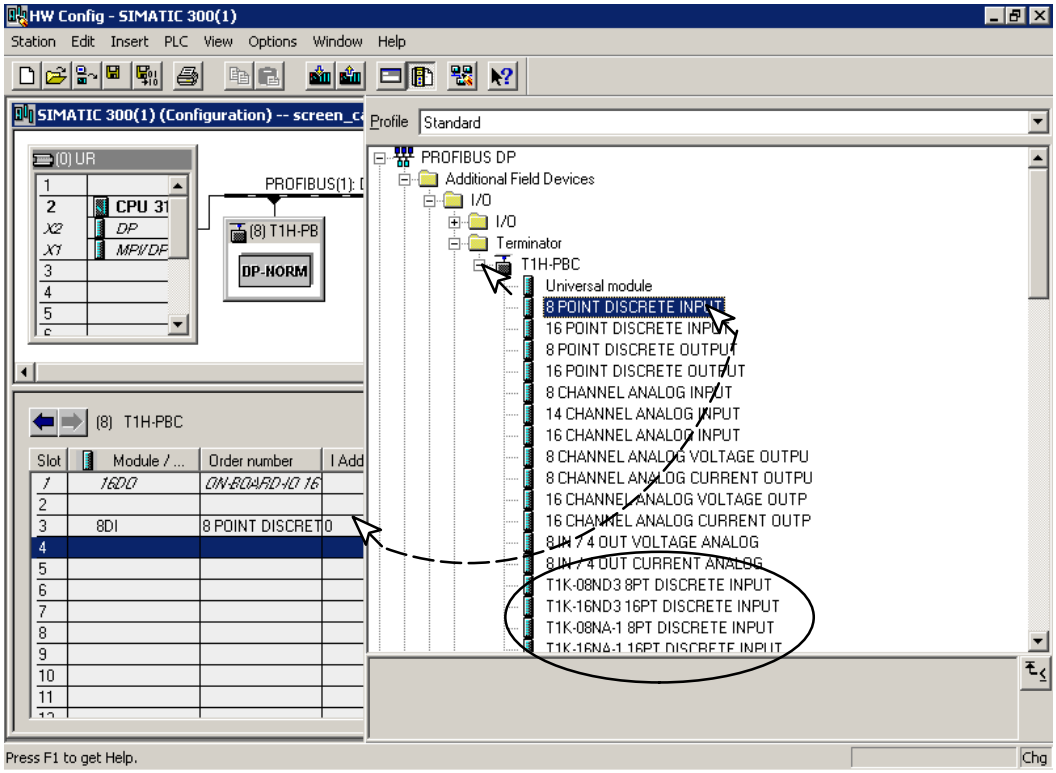
Now that the T1H–PBC is a node on the Profibus network, the Terminator I/O needs to be added to the DP Base Controller.

7. Open the T1H–PBC configuration window by clicking on T1H–PBC at the node.

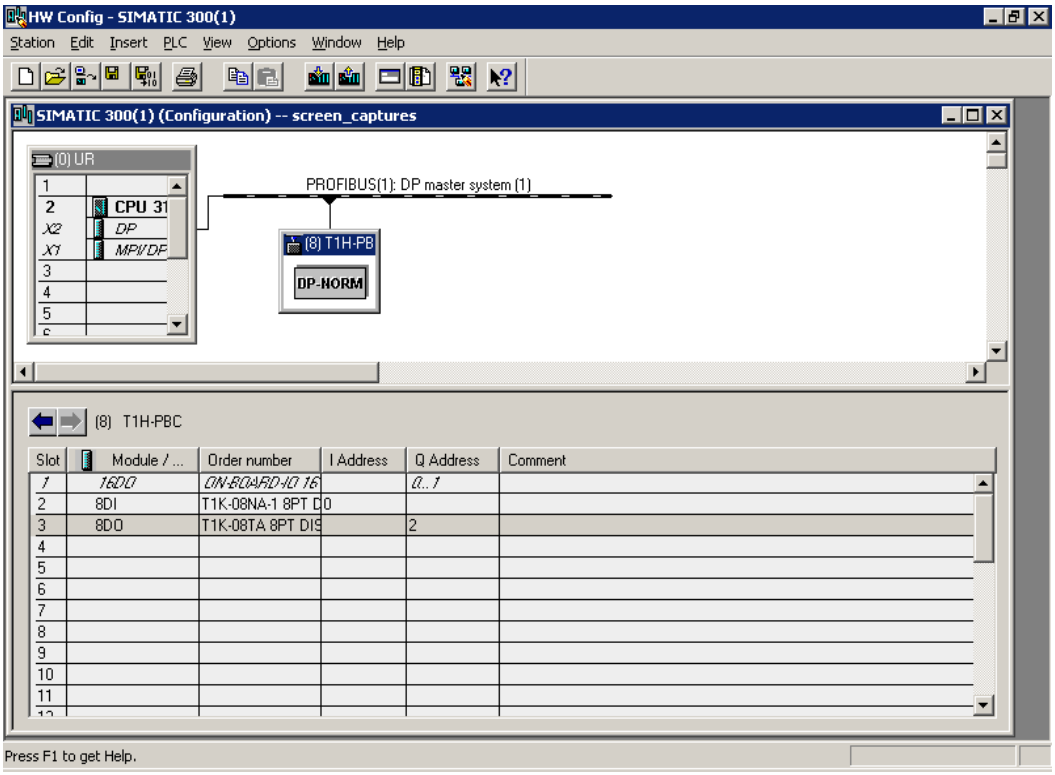


Open the T1H–PBC I/O list by clicking on the + sign next to T1H–PBC. Now you can chose the I/O modules which are installed in your Terminator base. You have the option of selecting the generic I/O or the Terminator I/O part number. The generic name is selected in this example.

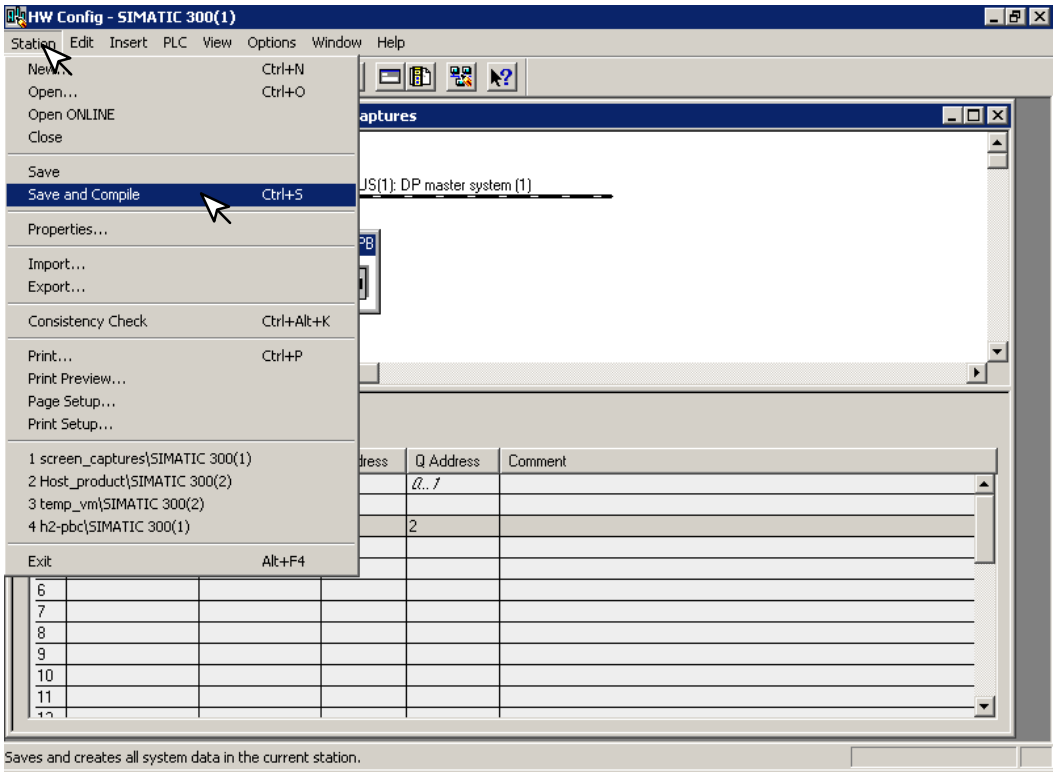
8. Either click on the I/O name that you want and drag it to the configuration table to the left or double click on the I/O name and it will automatically go to the configuration list.



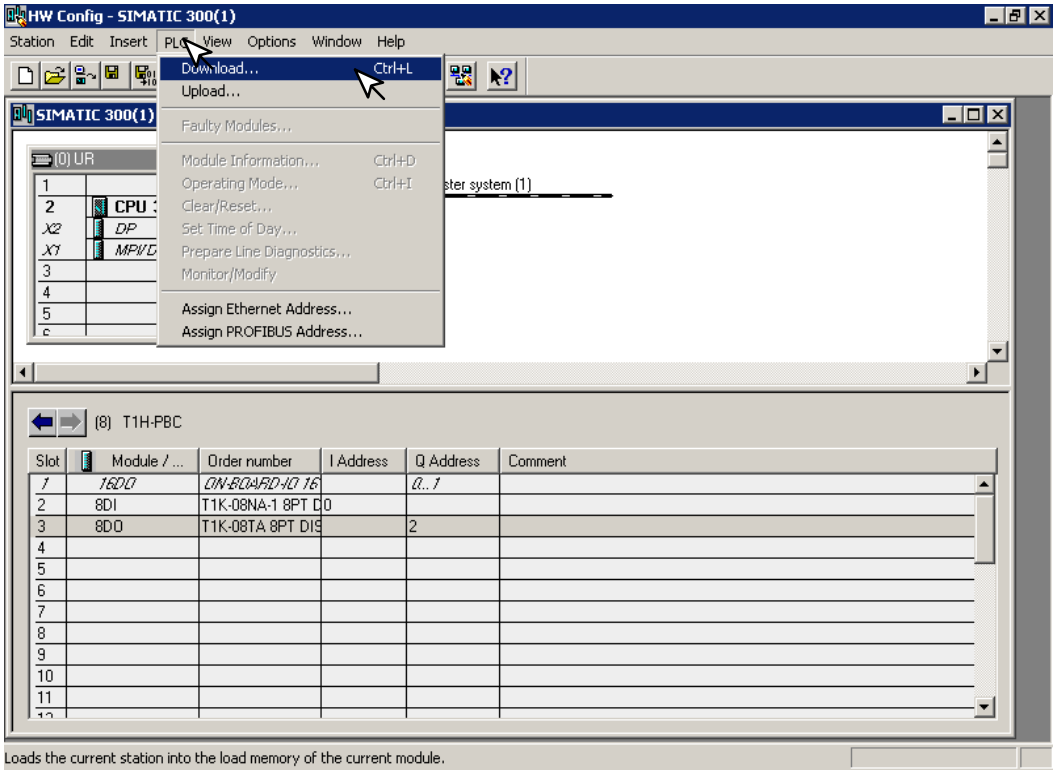
After you have finished configuring the I/O for the T1H–PBC DP Slave, the configuration window will look like the example below.



8. Now, click on **Station**, then click on **Save and Compile** update your project. This will save the project for downloading to the PLC.



9. Select **PLC** and **Download...** the hardware setup that was saved.



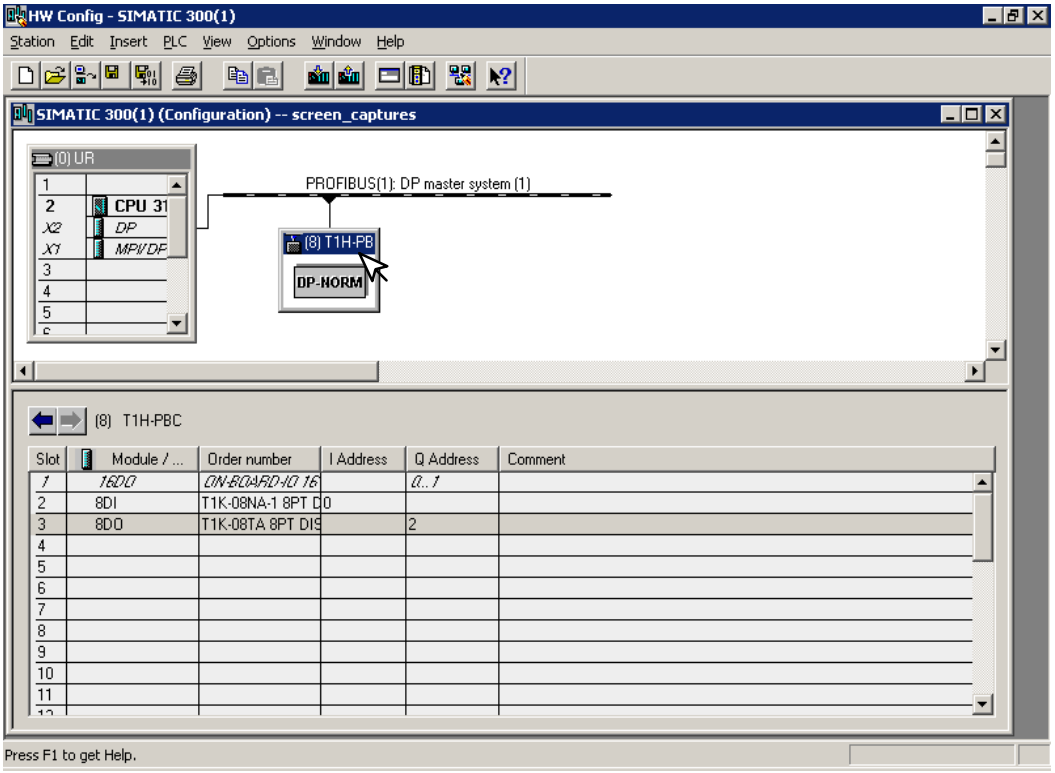
# Hot–Swap Setup

**Hot–Swap: Automatic Mode**

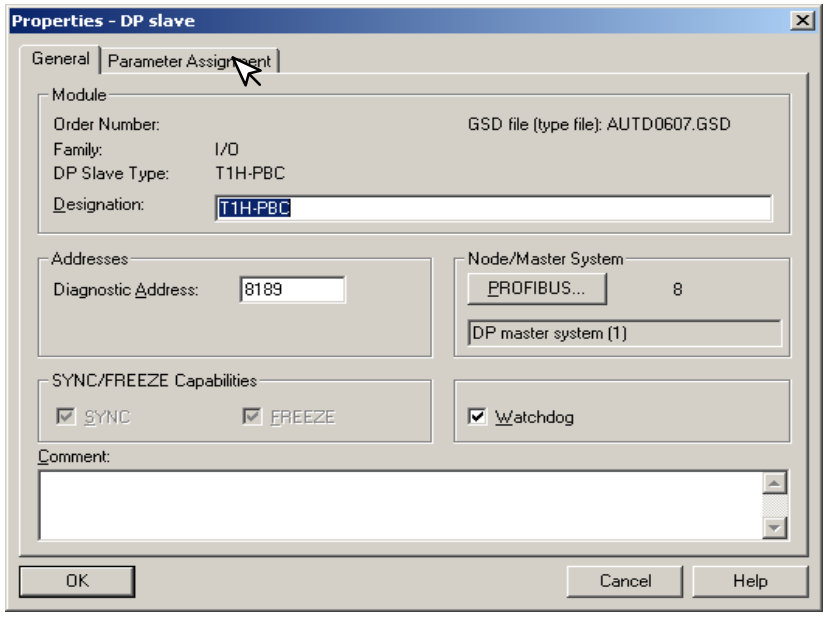
The Hot–Swap feature for the T1H–PBC DP Slave is set to Auto I/O reconfiguration in the GSD parameters by default (refer to 2–11). Auto Hot–Swap allows a Terminator I/O module to be removed from the base and replaced with a identical module without turning OFF the power to the Terminator base power supply. The T1H–PBC will automatically rescan once a module has been “Hot Swapped”.

**Hot–Swap: Manual Mode Reset**

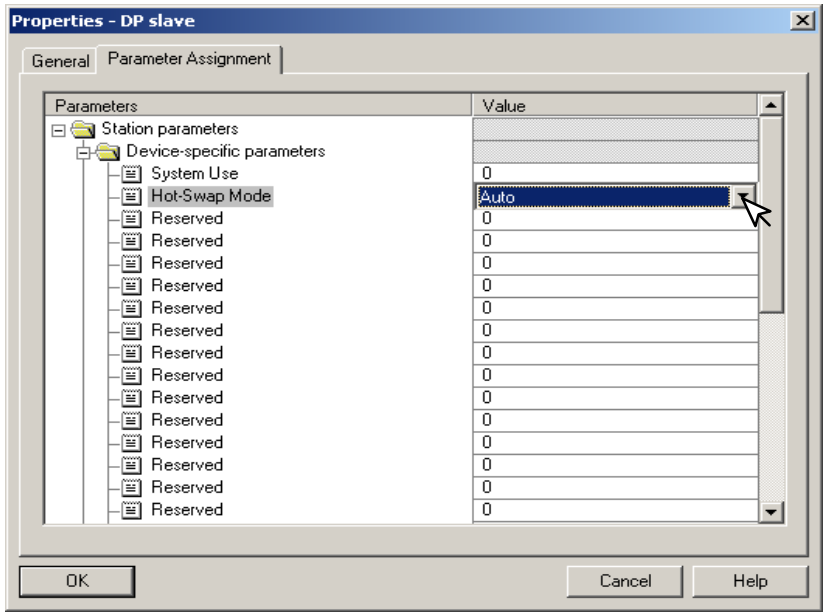
If your system requires the Manual Hot–Swap I/O reconfiguration feature, it will need to be selected during this initial setup proceedure. This is done in the DP slave properties window. To do this, double click on the T1H–PBC node in the Configuration window to open the Properties window.



Now select **Parameter Assignment** to open the window.




In the window **Parameter Assignment** window, click on **Hot–Swap Mode**. Auto will appear in the **Value** row opposite the selection. Click on the down arrow for a drop–down window to appear so that Manual can be selected. Click on **OK**. The T1H–PBC is now in the manual Hot–Swap Mode.




For manual Hot–Swap I/O reconfiguration to work properly, the user program will need to use 0bject Blocks 82, 86 and 122. Refer to the Siemens S7 manual for the proper use of these object blocks.