Read This First!

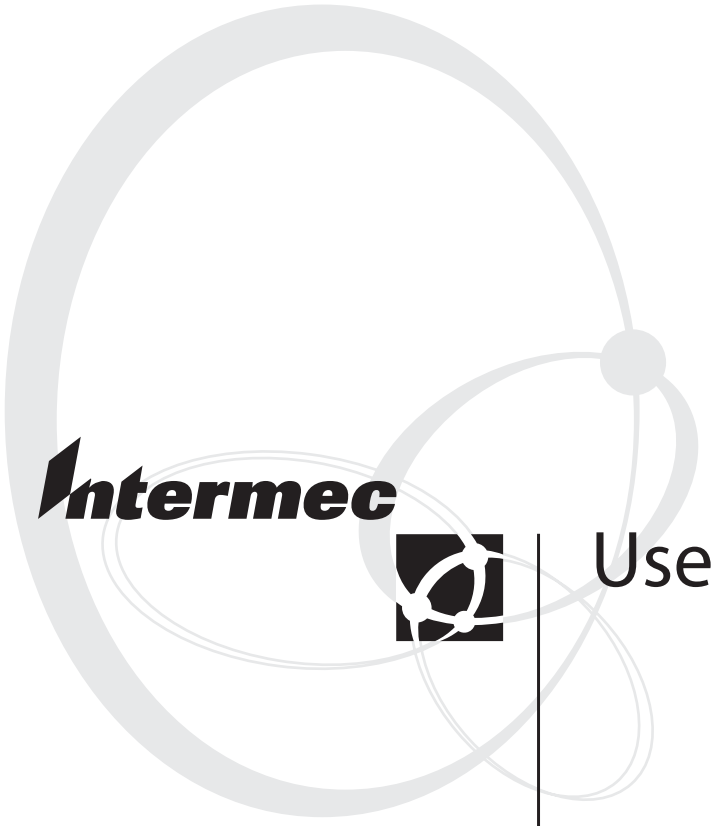
This manual contains information about the terminal's features, installing the terminal, learning about the menu system, operating the terminal in a network, and troubleshooting problems.

If you need to learn how to configure the terminal, develop and use applications, run diagnostics, use reader commands and configuration commands, or use default and optional applications, you also need to download the *Trakker Antares 2400 Family System Manual* (P/N 071389).

Intermec

User's Manual

Trakker Antares® 248X Stationary Terminal



Intermec

User's Manual

Trakker Antares® 248X Stationary Terminal

Intermec Technologies Corporation

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Document Change Record

This page records changes to this document. The document was originally released as version 001.

Version	Date	Description of Change
002	02/1999	Removed the *Terminal Emulation User's Guide* (P/N 066694-003) from this user's manual. You can now order this user's guide separately. Added the *Important Terminal Emulation Information Sheet* (P/N 069993-001) to this user's manual.
003	06/2000	Added the *Important Data Collection Browser Information Sheet* (P/N 070012-002) to this user's manual
004	06/2001	Divided the manual into a 248X user's manual and a *Trakker Antares 2400 Family System Manual*. The user's manual contains information about how to operate the 248X, and the terminal system manual contains configuration and reader commands and other information that applies across the Trakker Antares 2400 Family. Removed *Important Terminal Emulation Information Sheet* (P/N 069993-001) and *Important Data Collection Browser Information Sheet* (P/N 070012-002), and added this information to the terminal system manual. Also added information about the DOS option to the terminal system manual. Added several new chapters including Troubleshooting and Diagnostics. Also added an Index. Explained the new features and changes for firmware versions 4.X through 6.20: • Changed all references from the Model 200 Controller to the DCS 30X, the new data collection server that replaces the Model 200 Controller. • Added keypad illustrations for the Time and Attendance, French, German, Italian, Portuguese, and Spanish keypads. • Added information about the IEEE 802.11b High Rate (HR) radio parameters. • Updated the instructions for screen mapping to match the DCS 300 enhancements for screen mapping. • Added information about using the auto-trigger feature. • Made minor corrections and changes throughout the manual to support firmware version 6.20.
005	12/2002	Added information to support the 802.1x security option in firmware version 7.14.
006	03/2004	Incorporated information from the *Trakker Antares 2400 Family System Manual Addendum* (P/N 073395-001). Referenced the following new feature for firmware version 8.01: • Trakker Antares support on the Wavelink Avalanche client management system.

Contents

Before You Begin

This section provides you with safety information, technical support information, and sources for additional product information.

Safety Summary

Your safety is extremely important. Read and follow all warnings and cautions in this document before handling and operating Intermec equipment. You can be seriously injured, and equipment and data can be damaged if you do not follow the safety warnings and cautions.

Do not repair or adjust alone

Do not repair or adjust energized equipment alone under any circumstances. Someone capable of providing first aid must always be present for your safety.

First aid

Always obtain first aid or medical attention immediately after an injury. Never neglect an injury, no matter how slight it seems.

Resuscitation

Begin resuscitation immediately if someone is injured and stops breathing. Any delay could result in death. To work on or near high voltage, you should be familiar with approved industrial first aid methods.

Energized equipment

Never work on energized equipment unless authorized by a responsible authority. Energized electrical equipment is dangerous. Electrical shock from energized equipment can cause death. If you must perform authorized emergency work on energized equipment, be sure that you comply strictly with approved safety regulations.

Safety Icons

This section explains how to identify and understand dangers, warnings, cautions, and notes that are in this document. You may also see icons that tell you when to follow ESD procedures and when to take special precautions for handling optical parts.

A warning alerts you of an operating procedure, practice, condition, or statement that must be strictly observed to avoid death or serious injury to the persons working on the equipment.

Avertissement: Un avertissement vous avertit d'une procédure de fonctionnement, d'une méthode, d'un état ou d'un rapport qui doit être strictement respecté pour éviter l'occurrence de mort ou de blessures graves aux personnes manupulant l'équipement.

A caution alerts you to an operating procedure, practice, condition, or statement that must be strictly observed to prevent equipment damage or destruction, or corruption or loss of data.

Attention: Une précaution vous avertit d'une procédure de fonctionnement, d'une méthode, d'un état ou d'un rapport qui doit être strictement respecté pour empêcher l'endommagement ou la destruction de l'équipement, ou l'altération ou la perte de données.

Note: Notes either provide extra information about a topic or contain special instructions for handling a particular condition or set of circumstances.

Global Services and Support

Warranty Information

To understand the warranty for your Intermec product, visit the Intermec web site at http://www.intermec.com and click **Service & Support.** The **Intermec Global Sales & Service page appears.** From the **Service & Support** menu, move your pointer over **Support**, and then click **Warranty**.

Disclaimer of warranties: The sample code included in this document is presented for reference only. The code does not necessarily represent complete, tested programs. The code is provided "as is with all faults." All warranties are expressly disclaimed, including the implied warranties of merchantability and fitness for a particular purpose.

Web Support

Visit the Intermec web site at http://www.intermec.com to download our current documents in PDF format. To order printed versions of the Intermec manuals, contact your local Intermec representative or distributor.

Visit the Intermec technical knowledge base (Knowledge Central) at http://intermec.custhelp.com to review technical information or to request technical support for your Intermec product.

Telephone Support

These services are available from Intermec Technologies Corporation.

Service	Description	In the U.S.A. and Canada call 1-800-755-5505 and choose this option
Factory Repair and On-site Repair	Request a return authorization number for authorized service center repair, or request an on-site repair technician.	1
Technical Support	Get technical support on your Intermec product.	2
Service Contract Status	Inquire about an existing contract, renew a contract, or ask invoicing questions.	3
Schedule Site Surveys or Installations	Schedule a site survey, or request a product or system installation.	4
Ordering Products	Talk to sales administration, place an order, or check the status of your order.	5

Outside the U.S.A. and Canada, contact your local Intermec representative. To search for your local representative, from the Intermec web site, click **Contact**.

Who Should Read This Document?

This manual provides you with information about the features of the Trakker Antares® 2480, 2481, 2485, and 2486 stationary terminals, and how to install, configure, operate, maintain, and troubleshoot them. Use this manual in conjunction with the *Trakker Antares 2400 Family System Manual* (P/N 071389), which contains detailed information about configuring, operating, and programming all terminals in the 2400 Family.

Before you install and configure the 248X, you should be familiar with your network and general networking terms, such as IP address.

Related Documents

The Intermec web site at http://www.intermec.com contains our current documents that you can download as PDF files.

To order printed versions of the Intermec manuals, contact your local Intermec representative or distributor.

1 Learning About the Terminal

This chapter introduces the Trakker Antares® 2480, 2481, 2485, and 2486 stationary terminals and their features. It also describes the back panel, power, memory, drives, and input devices.

This chapter covers these topics:

- What are the Trakker Antares 248X terminals
- What's new
- Using the terminal for the first time
- Unpacking the terminal
- Learning about the back panel
- Learning about the power supply and backup battery
- Using the terminal's keypad
- Using the terminal's screen
- Using the status lights
- Understanding the terminal's audio signals
- Using the badge scanner and other input devices
- Defining the terminal's memory and drives

What Are the Trakker Antares 248X Terminals?

The Trakker Antares 248X terminals (2480, 2481, 2485, and 2486) are compact stationary data collection terminals that are designed for a range of applications including process tracking, labor collection, and time and attendance applications.

The Trakker Antares 248X family of terminals includes the following models.

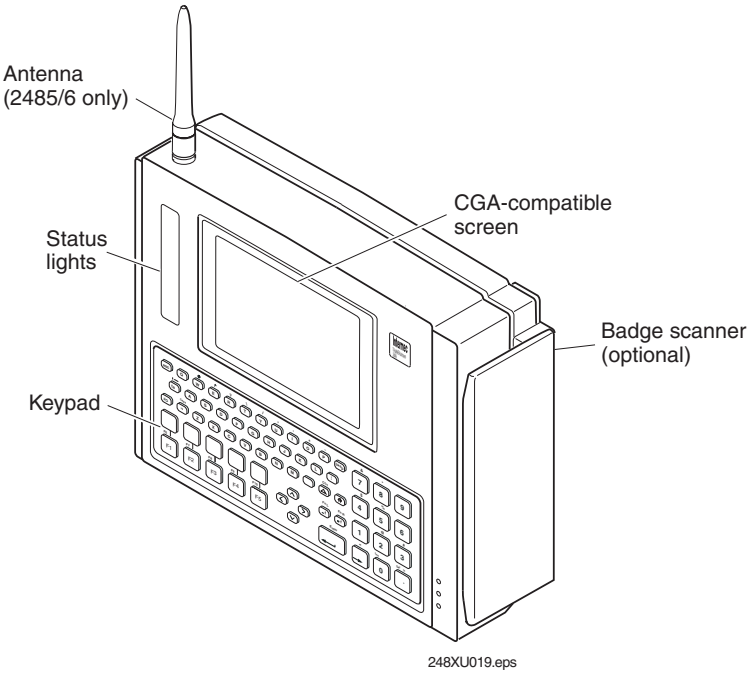
248X Models

Model	Description
2480	The 2480 is a programmable data collection terminal. The 2480 has a serial port to transmit data to and accept data from a host or PC through RS-232 serial communications. With the optional Ethernet card, the 2480 can also transmit and receive data through Ethernet communications. The 2480 has a 4-line by 40-character screen.
2481	The 2481 has the same functionality as the 2480. The only difference between these two models is the screen size. The 2481 has a 12-line by 40-character screen that is configurable up to 25 lines.
2485	The 2485 is a programmable data collection terminal with the additional ability to communicate in the RF network. The 2485 provides wireless communications to a host either through the access points and DCS 30X or directly through the access points. The 2485 has a 4-line by 40-character screen. The 2485 is also supported by the Wavelink Avalanche client management system. For more information, see Chapter 2, "Configuring and Managing the Terminals," in the *Trakker Antares 2400 Family System Manual* (P/N 071389).
2486	The 2486 has the same functionality as the 2485. The only difference between these two models is the screen size. The 2486 has a 12-line by 40-character screen that is configurable up to 25 lines.

Trakker Antares 2485 and 2486 terminals with an IEEE 802.11b radio installed are Wi-Fi™ certified for interoperability with other 802.11b wireless LAN devices.

Learning About the Terminal's Features

The Trakker Antares 248X terminals are designed to make data collection easy and include these features:



248X features: *This illustration points out the key features of the 248X. See the next table for a description of each feature.*

248X Features

Feature	Description
CGA-compatible screen	The CGA-compatible screen contains a graphics LCD. The 2480 and 2485 terminals have a 4 line by 40 character screen while the 2481 and 2486 terminals have a 12 line by 40 character screen that is configurable up to 25 lines.
Badge scanner (optional)	The badge scanner is available for visible or infrared light and is a convenient method for collecting bar code data.
Keypad	There are four keypad options for data collection: alphanumeric (PC-style layout), time and attendance, oversized function numeric, or terminal emulation keypad. The terminal ships with a keypad to match the application or language you ordered.
Status lights	The status lights provide power, keypad, data, network, and scanning information.
Antenna (2485/6 only)	The 2485 and 2486 support radio frequency communications.

The 248X also ships with these standard features:

- 512K RAM reserved for applications
- 750K flash drive to store user applications and files
- Scanner port for an integrated badge scanner
- Scanner port to attach a wand, laser scanner, or linear imager
- Serial port for RS-232 communications between the terminal and host

Options for the Terminals

Use the next table to determine which options are available for the 2480, 2481, 2485, and 2486.

248X Options

Terminal	Options

248X	• Enhanced input/output (I/O) board with these features:
	  • Additional serial port (COM2) for RS-232/422/485 communications or multi-drop (CrossBar®) network connectivity
	  • Additional serial port (COM4) for RS-232 communications
	  • Four sense inputs to monitor events, four output relays to activate external devices (for example, open doors or gates), and connectors for an amplified external speaker
	• 2MB or 4MB extended storage drive, used for custom applications or files

2480/2481	• Ethernet (10BaseT) connectivity for the 2480/1
2480/1 with Ethernet connectivity and 2485/6	• Extended SRAM storage drive (2MB or 4MB) to store files • UDP Plus (Intermec Gateway or DCS 30X to host), WTP (Intermec Gateway or DCS 30X to host), or TCP/IP (direct connect to host) communication protocols • IBM 3270, IBM 5250, and VT100/220/320/340 and ANSI TE 2000™ terminal emulation application with keypad and overlay • Data Collection Browser™ (dcBrowser™) application • Trakker Antares ROM-DOS™ support
2485/2486	• 4MB flash memory configured as an additional 2MB flash drive for custom applications (except .BIN files) and files or pre-loaded with different Asian fonts. • WLI Forum OpenAir radio or IEEE 802.11b radio

This manual explains how to use the features and options available on all models of the Trakker Antares terminals.

For additional help using terminal emulation, see the appropriate TE 2000 guide:

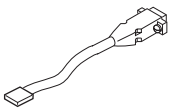
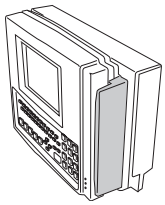
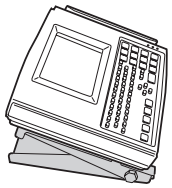
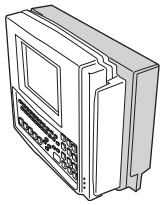
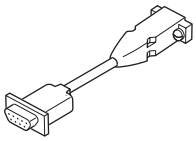
- *TE 2000 5250 Terminal Emulation Programmer's Guide* (P/N 977-055-004)
- *TE 2000 3270 Terminal Emulation Programmer's Guide* (P/N 977-055-003)
- *TE 2000 VT/ANSI Terminal Emulation Programmer's Guide* (P/N 977-055-005)

For additional help using dcBrowser, see the online help that ships with the dcBrowser gateway software, or see the *Data Collection Browser Client User's Guide* (P/N 070011).

Accessories for the Terminal

You can use these accessories (sold and ordered separately) with the Trakker Antares 2480, 2481, 2485, and 2486 terminals:

248X Accessories

Accessory	Description
 Adapter cable	The adapter cable (P/N 067185) allows you to use an additional serial port (COM4) on the optional enhanced input/output board. You can attach the adapter cable to the 10-pin COM4 connector and configure the terminal to use an additional serial communications port.
 Badge scanner	The badge scanner on your 248X terminal allows you to easily scan bar codes from badges or other cards. You can use either a visible (P/N 067102) or infrared light badge scanner (P/N 067101) with the 248X.
 Desk-mount bracket	The desk-mount bracket (P/N 066709) attaches to your 248X terminal. The bracket can be either seated on or mounted to your desk or tabletop.
 Wall-mount bracket	The wall-mount bracket (P/N 066708) attaches to your 248X terminal, enabling you to secure your terminal to a wall. The bracket opens so you can work on the back of the terminal without taking it out of the bracket.
 CrossBar adapter	The CrossBar adapter (P/N 069447) connects the 9154 or 9161 to the Multi-Drop cable (P/N 047653), which connects to the terminal in a CrossBar network. For help, see "Connecting to an Intermec CrossBar Network" on page 35.

What's New?

With this user's manual revision, the following changes were made to support software on Trakker Antares 248X terminals with firmware version 8.01:

- Software was added to the Trakker Antares terminals to support the Wavelink Avalanche client management system. For more information, see Chapter 2, "Configuring and Managing the Terminals," in the 2400 Family System manual.
- Information from the *Trakker Antares 2400 Family System Manual Addendum* was incorporated: 802.1X security enhancements to provide new functionality to the current TTLS security and support for Cisco's LEAP security. For more information, see "Configuring the 802.1x Security Parameters" on page 82.

Using the Terminal for the First Time

Before you can use the terminal for the first time, you need to perform certain steps, such as setting the time and date. You can find this information throughout this user's manual and the accompanying 2400 Family system manual.

To use the terminal for the first time

1. Unpack the terminal and documentation. For a list of shipping box contents, see "Unpacking the Terminal" on page 7.
2. Install the terminal. For help, see Chapter 2, "Installing the Terminal."
3. Charge the backup battery. For help, see "Learning About the Power Supply and Backup Battery" on page 9.
4. Press [⏻] to turn on the terminal. For help, see "Using the Suspend/Resume Key" on page 14.
5. Set the time and date. For help, see "Time and Date" in Chapter 6, "Configuration Command Reference," in the 2400 Family system manual.
6. (Optional) Configure the serial port parameters. For help, see "Using Serial Communications on the Terminal" on page 73.
7. (2485/6 only) Configure the RF parameters. For help, see "Using RF or Ethernet Communications on the Terminal" on page 77.
8. (2485/6 with 802.1x security only) Configure the 802.1x security parameters. For help, see "Configuring the 802.1x Security Parameters" on page 82.

9 (2480/1 with Ethernet option only) Configure the Ethernet parameters. For help, see "Using RF or Ethernet Communications on the Terminal" on page 77.

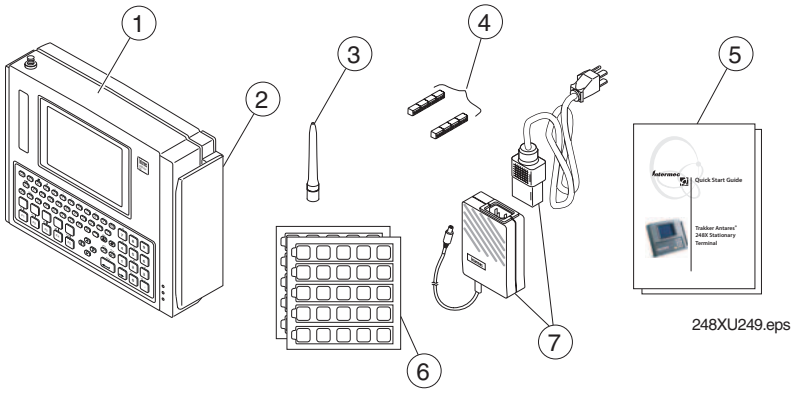
10 Enable the bar code symbologies that you want to be able to scan. For more information, see Chapter 6, "Configuration Command Reference," in the 2400 Family system manual.

11 Exit the menu system and save your configuration changes to flash memory. For help, see "Exiting the Menu System" on page 61.

When you are done with these steps, the default application or TE application that is loaded on your terminal will start. You are ready to use the terminal.

Unpacking the Terminal

When you remove the terminal from its box, save the box and shipping material in case you need to ship or store the terminal. Check the contents of the box against the invoice for completeness and contact your local Intermec service representative if there is a problem.

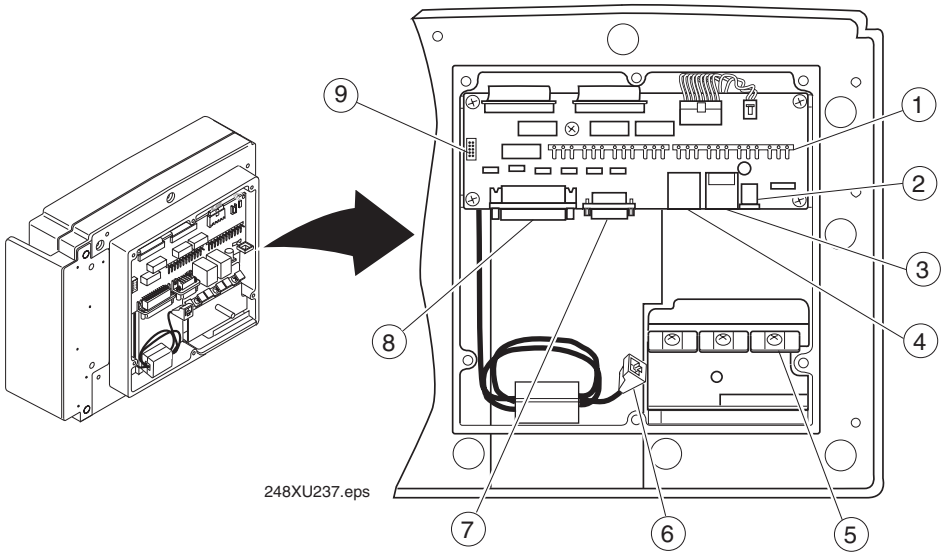


248X Shipping Box Contents

Number	Description
1	Trakker Antares 2480, 2481, 2485, or 2486 stationary terminal
2	Badge scanner, visible or infrared light (optional)
3	Antenna (2485/6 only)
4	Terminal blocks to connect sense inputs, output relays, and an amplified external speaker (enhanced input/output board option only)
5	Quick start guide, safety supplement, and other documentation
6	Labels for custom function key labels
7	Intermec power supply and North American power cord. If you are using the terminal outside North America, you need to purchase the appropriate power cord for your local power supply.

Learning About the Back Panel

To install the 248X, you need to remove the back panel to connect power, input devices, and communications ports.



2480/1 with an enhanced input/output board and the ethernet option: *This illustration shows all the connectors on a 2480 or 2481 with an enhanced input/output board and the Ethernet option. For a description of each connector, see the next table.*

2480/1 Enhanced Input/Output Board and Ethernet Connectors

Number	Connector	Description
1	Terminal block connectors (248X with enhanced I/O board only)	The terminal blocks (shipped with the terminal) let you connect four sense inputs, four output relays, or an amplified external speaker to the terminal. You use the sense inputs to monitor events, such as opening or closing a door. You use the output relays to actuate external devices, such as a door lock.
2	12V power supply connector	The terminal operates using an external power supply. It has a backup battery that is designed to back up all memory and the real-time clock only in case of a power failure. You must have a power supply connected to operate the terminal.
3	Badge scanner (6-pin) connector	You can order the terminal with an integrated badge scanner already installed or order the badge scanner accessory to install at a later date. You can also attach an input device instead of the badge scanner.
4	External scanner (Stewart 10-pin) connector	You must use an interface cable to connect an input device to the terminal. For a list of Intermec input devices, see “Input Devices for the External Scanner Port” on page 110.
5	Cable restraint	You use the cable restraint to secure the power supply cable, terminal block wires, and Ethernet cable.
6	Ethernet connector	The optional 10BaseT Ethernet connector lets you connect the 2480/1 directly to an Ethernet network.
7	COM1	You can communicate with other RS-232 devices, such as scales, PCs, and printers, through the COM1 serial port.

2480/1 Enhanced Input/Output Board and Ethernet Connectors (continued)

Number	Connector	Description
8	COM2 (248X with enhanced I/O board only)	You use the COM2 serial port for: • RS-232, RS-422, or RS-485 serial communications. • Multi-Drop (CrossBar) network connectivity.
9	COM4 (248X with enhanced I/O board only)	You can attach an adapter cable accessory (P/N 067185) to the 10-pin COM4 connector to use an additional serial port for RS-232 serial communications. For help ordering the adapter cable, contact your local Intermec service representative.

Learning About the Power Supply and Backup Battery

The Trakker Antares 248X terminal operates using an external power supply. It has a rechargeable Nickel-Cadmium (NiCad) backup battery that is designed to back up all memory and the real-time clock while AC power is not supplied. You must have a power supply connected to operate the terminal.

An Intermec power supply and North American power cord ship with the terminal. If you are using the terminal outside North America, you need to purchase the appropriate power cord for your local power supply.

Learning About the Backup Battery

The NiCad backup battery provides protection for power surges, sags, spikes, and dropouts. The backup battery includes these features:

- During a power loss, the terminal uses backup battery power to continue operating for 3 seconds. If power is still not restored, the terminal saves all data and turns off. However, if the backup battery charge is low, the terminal cannot protect the data against a power loss and will turn off immediately.
- The backup battery is rechargeable. The power supply provides the power to charge the backup battery when required with the terminal turned on or off. The terminal continuously monitors the backup battery voltage level and charges the backup battery whenever the voltage level gets low.
- The backup battery will last for a minimum of 3 years before its capacity is reduced. Battery life depends on the age of the backup battery, your usage, and RF duty cycle factors. If you are using the terminal in extreme environments (very hot or very cold), battery life will be reduced and you may need to replace the backup battery more often.

Note: The NiCad backup battery is **not** user-serviceable. You must return the Trakker Antares 248X terminal to Intermec to replace the backup battery.

- The backup battery will provide backup battery power for a minimum of 2 weeks with a fully-charged backup battery pack installed and no AC power. If you plan to store the terminal for a long period of time, save any data stored in RAM to another drive on the terminal.

  If the backup battery is still providing power when you reconnect the power supply and turn the terminal on, the terminal resumes exactly where it was when you turned it off, or restarts your application.

Note: If the Resume Execution command is set to Allowed, the terminal will resume the application when you turn on the terminal. Otherwise, the terminal boots and the application restarts.

Charging the Backup Battery

The backup battery is shipped inside the terminal, but it may not be fully charged when you initially unpack your terminal. You need to fully charge the backup battery after you install the terminal.

To charge the backup battery

1. Make sure the power supply is connected to the terminal and a powered electrical outlet.
2. Let the power supply charge the backup battery for 24 hours to fully charge the backup battery.

You can operate the terminal while the backup battery is charging.

Note: The backup battery charger operates from 0°C to 40°C (32°F to 104°F). If you continuously use the terminal in an environment that is outside this temperature range, the backup battery will not charge. You may need to protect the terminal and create an environment that is within the charging temperature range for a few hours every week to keep the backup battery charged.

Recognizing a Low or Discharged Backup Battery

The terminal continuously monitors the backup battery voltage level and charges the backup battery whenever the voltage level gets low.

There are two ways to find out if the backup battery charge is low:

- Check to see if the Power status light on the left side of the screen is blinking. For help, see "Using the Status Lights" on page 20.
- Check the status of the backup battery using the Backup Battery/PIC Status diagnostic. For help, see "Battery/PIC Status" in Chapter 4 of the 2400 Family system manual.

If the backup battery charge is low, you need to charge the backup battery. For help, see the previous section, "Charging the Backup Battery."

Note: If you use the terminal in a very cold or very hot temperature environment, battery life will be reduced or the backup battery may not charge. For more information, see "Learning About the Backup Battery" on page 9.

Caution

When you replace the backup battery, all data stored in RAM is lost.

Attention: Lors du remplacement de la batterie de secours, toutes les données stockées dans la mémoire vive (RAM) sont perdues.

Using the Terminal's Keypad

The next table describes the 248X keypad options.

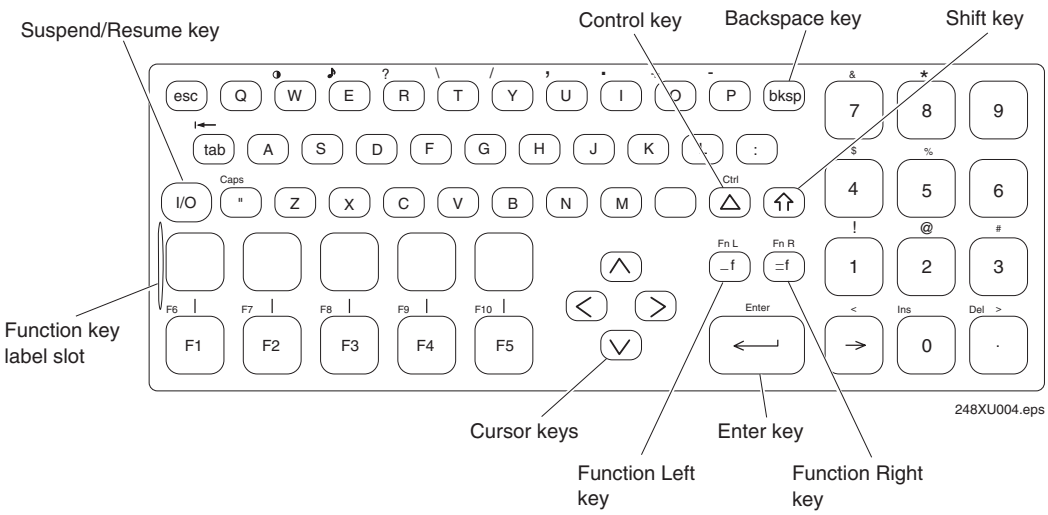
248X Keypad Options

Keypad	Description
Alphanumeric	The 59-key alphanumeric keypad is available in English, French, German, Italian, Portuguese, and Spanish. Although the keypad is smaller than a desktop terminal keyboard, you use special keys on the 248X keypad to access all the keys and functions you need.
Oversized function numeric	The oversized function numeric keypad has 35 keys and 10 separate function keys. The number keys are larger to make it easier to enter a lot of numeric data. There are no alphanumeric keys.
Time and attendance	The time and attendance keypad has 35 keys and 10 separate function keys. The number keys are larger to make it easier to enter a lot of numeric data. There are no alphanumeric keys.
Terminal emulation alphanumeric	The terminal supports 3270 TE, 5250 TE, and VT100/220/320/340 and ANSI TE. When you order a TE 2000 application, you also receive the appropriate TE keypad overlay. Each TE keypad is similar to the standard English alphanumeric keypad, but it contains additional keys that are available on an IBM 3270, IBM 5250, or VT/ANSI keyboard. For additional help using terminal emulation, see the appropriate TE guide.

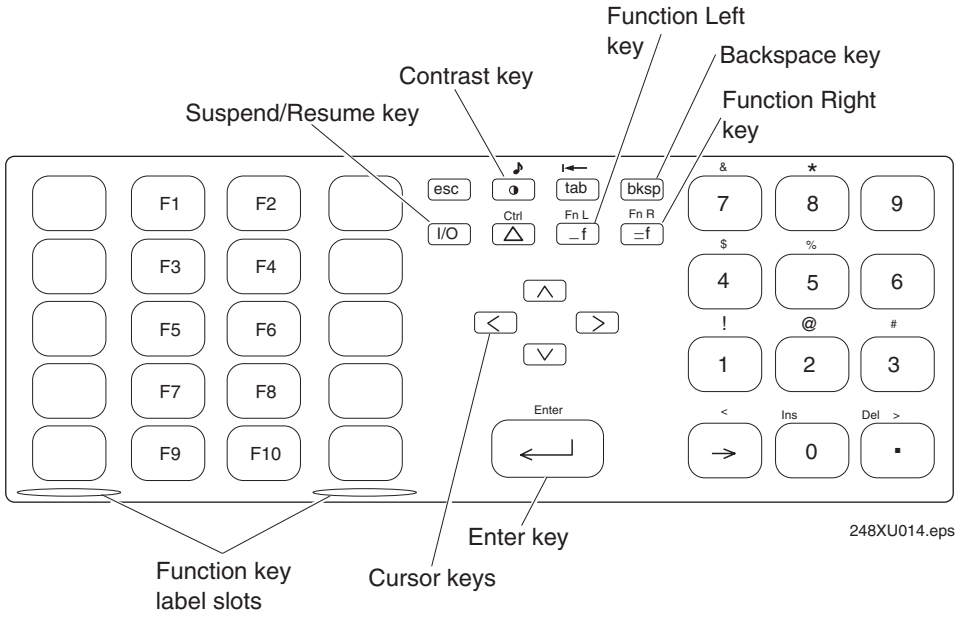
Finding the Special Keys

Before you use the terminal's keypad, make sure you can find all of the different types of keys on the keypad. You need to use these special keys on all keypad options.

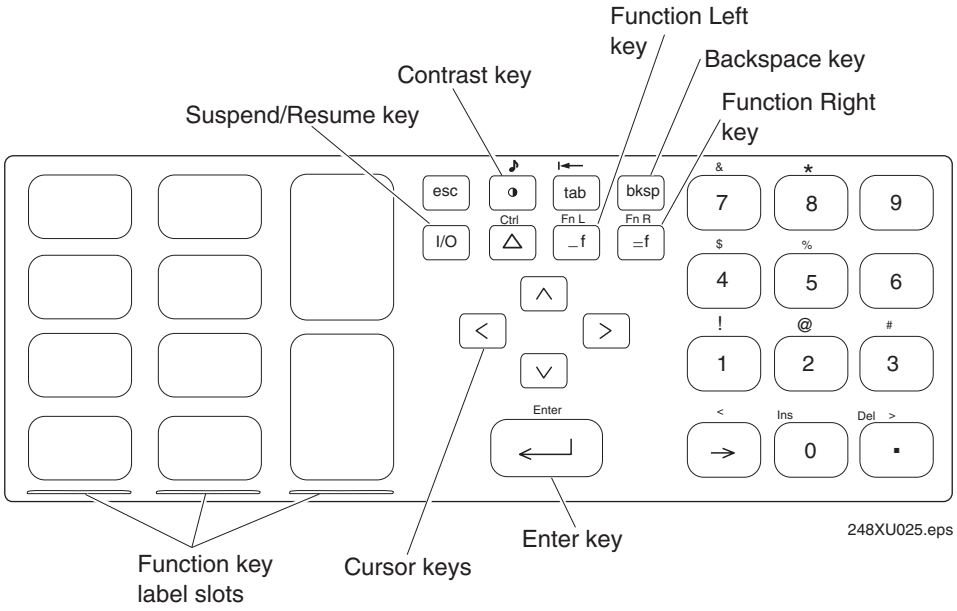
The special keys that you use to type characters or perform functions are explained in the next sections. Use the following illustrations to identify the special keys.



Finding the Special Keys on the English Alphanumeric Keypad



Finding the Special Keys on the Oversized Function Numeric Keypad



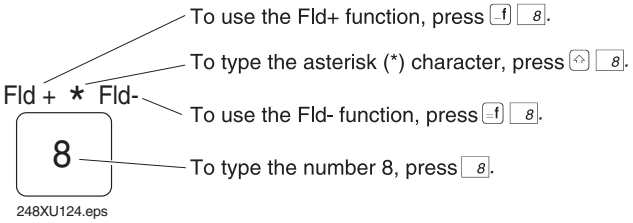
Finding the Special Keys on the Time and Attendance Keypad

Typing the Characters Printed on the Keypad

Characters, symbols, and functions are printed in four places on or above the keys. The keys are also color-coded to make it easier to remember key combinations.

Typing the Characters Printed on the Keypad

Position on the Keypad	Color	To Type the Character
Middle of the key or centered above the key		Press the key.
Left side above the key	Orange	Press the orange _f key, then the key.
Centered above a numeric key	Green	Press the green key, then the key.
Right side above the key	Blue	Press the blue =f key, then the key.



Typing Characters Using the Keypad

Using the Suspend/Resume Key

The terminal's Suspend/Resume key is the ⅟₀ key on the keypad. When you press ⅟₀ to turn off the terminal, the terminal does not actually shut off, but goes into a Suspend mode. In Suspend mode, the terminal continues to power all memory and turns off the power to most of the hardware. This mode is referred to as "off" in the rest of this manual.

When you press ⅟₀ to turn on the terminal, the terminal either resumes exactly where it was when you turned it off, or the terminal boots and restarts your application. If you are using 802.1x security, the terminal may reauthenticate before it starts your application. Resume is controlled through the Resume Execution command. For help, see "Resume Execution" in Chapter 6 of the 2400 Family system manual.

Note: The terminal displays the boot menu the first time you turn it on. Press 1 to initialize the firmware and boot the terminal.

Using the Function Left, Function Right, Control, and Shift Keys

The keypad does not have a physical key for every character and function available. You use the Function Left (FnL), Function Right (FnR), Control (Ctrl), and Shift keys to access characters or perform functions that do not have a physical key on the keypad. You also use the Shift key to type uppercase alphabetic characters.

When you press _f, =f, △, or ⇧, the key is held in a buffer until you press another key. The Modifier Key status light on the left side of the terminal's screen turns on to remind you that the key is being held in the buffer. When you press another key, the key combination is entered into the terminal. The Modifier Key status light turns off unless the second key that you pressed is another modifier key that is different from the first one that you pressed.

To flush the _f, =f, △, or ⇧ key from the buffer without performing any action, just press the key again. The Modifier Key status light turns off.

To use the FnL, FnR, Ctrl, and Shift keys

1. Press _f, =f, △, or ⇧. The Modifier Key status light turns on.
2. Press the second key. The Modifier Key status light turns off.

For example, to type the uppercase letter A, press ⇧. The Modifier Key status light turns on. Press A. The Modifier Key status light turns off, and an uppercase letter A appears on the screen.

Capitalizing All Characters

To type all alphabetic characters as uppercase letters, you can:

- press ⇧ before every letter you type.
- enable the Caps Lock feature. For help, continue with the next procedure.

Note: The oversized function numeric keypad and the time and attendance keypad do not have a Caps Lock feature.

- use the Keypad Caps Lock configuration command. For help, see "Keypad Caps Lock" in Chapter 6 of the 2400 Family system manual.

To enable Caps Lock

1. Press f. The Modifier Key status light turns on.
2. Press ". If you have a German alphanumeric keypad, press Y.

   The Caps Lock status light turns on and the Modifier Key status light turns off.
3. Type an alphabetic character. The letter appears as an uppercase character on the terminal's screen. The Caps Lock feature remains on until you disable it.

To type a lowercase letter with Caps Lock enabled

- Press ⇧ and an alphabetic character.

To disable Caps Lock

1. Press f. The Modifier Key status light turns on.
2. Press ". If you have a German alphanumeric keypad, press Y.

   The Caps Lock and Modifier Key status lights turn off.
3. Type an alphabetic character. The letter appears as a lowercase letter on the terminal's screen.

Adjusting the Contrast and Beep Volume From the Keypad

There are two special features built into the terminal's keypad. You can use a key or key sequence to:

- adjust the display contrast.
- change the volume of the terminal's audio signals.

For a detailed description of the Display Contrast and Beep Volume commands, see Chapter 6, "Configuration Command Reference," in the 2400 Family system manual.

Note: When you use the keypad to change the display contrast or beep and keyclick volume, the changes are not saved permanently in flash memory. You can save the changes in flash memory later. For help, see "Save Configuration Changes in Flash Memory" in Chapter 5 of the 2400 Family system manual.

To change the display contrast

- Press the ◑ key or the appropriate key sequence to change the display contrast.

Type of Keypad	Press
English, Italian, Portuguese, Spanish, IBM 3270, IBM 5250, and VT/ANSI	_f W
German	_f E
French	_f Z
Oversized Function Numeric, Time and Attendance	◑

Each time you press the keys to change the display contrast, it changes the contrast by one level. There are eight contrast levels. If the contrast is at the darkest level and you press the ◑ key or the appropriate key sequence, the contrast changes to the lightest contrast level. For help, see Chapter 6, "Configuration Command Reference," in the 2400 Family system manual.

To change the volume of the audio signals

- Press the appropriate key sequence to change the volume of the terminal's audio signals.

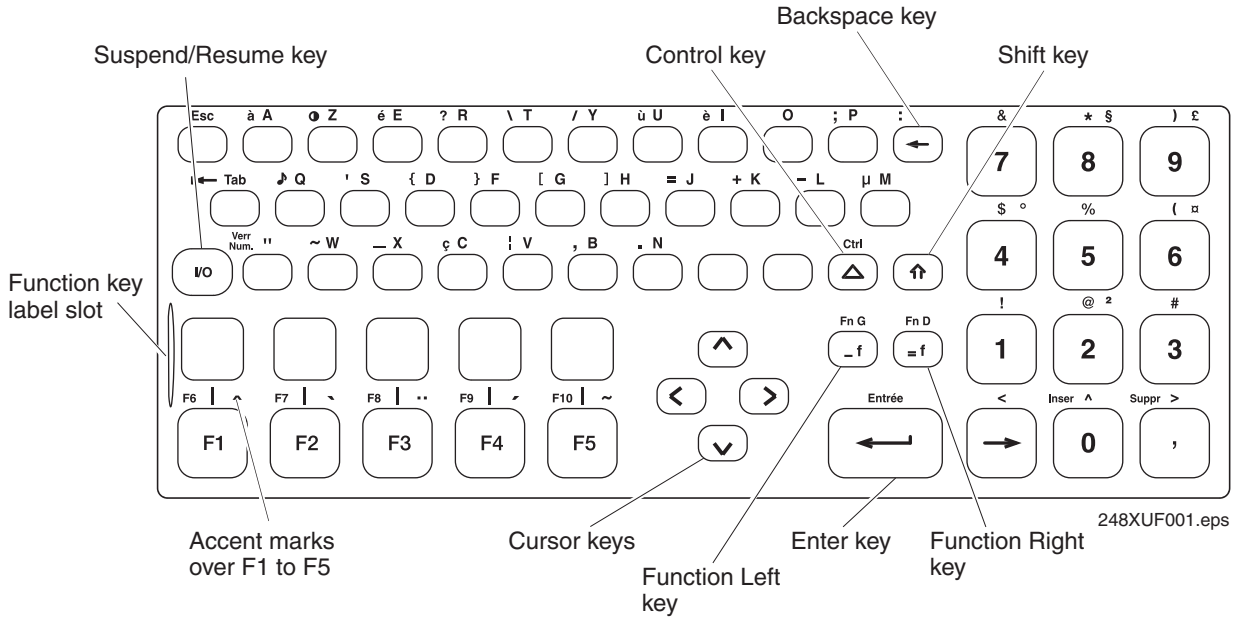
Type of Keypad	Press
English, IBM 3270, IBM 5250, and VT/ANSI	_f E
French, German, Italian, Portuguese, and Spanish	_f Q
Oversized Function Numeric, Time and Attendance	_f ◑

Each time you press the key sequence, it makes the beep volume and keypad volume one level louder. There are five volume levels including off. If the volume is at the loudest level and you press the appropriate key sequence, the beep and keyclick volume change to the lowest level, which is off. For help, see Chapter 6, "Configuration Command Reference," in the 2400 Family system manual.

Using the International Keypads

The 248X has an option for a French, German, Italian, Portuguese, or Spanish keypad. Like the alphanumeric keypad, you use the international keypad to enter all the characters printed on or above the keys. For help, see "Typing the Characters Printed on the Keypad" on page 13. You can also use the accent marks above the F1 through F5 keys to enter a character that does not have a key on the keypad. For example, you can type the character é.

Although the 248X with the English alphanumeric keypad does not show all the characters that are available on the French, German, Italian, Portuguese, and Spanish keypads, you can type the same characters on all keypads. The next illustration shows the 248X with the French keypad.



French Keypad

To type characters with an accent mark

1 Press [=f]. The Modifier Key status light turns on.

2 Press the function key that the accent mark appears above. For example, press [F3] to type the umlaut (¨).

To type	Press
ˆ (circumflex)	F1
` (grave)	F2
¨ (umlaut)	F3
´ (acute)	F4
~ (tilde)	F5

To flush the accent mark from the keypad buffer without entering any key, press [=f] twice. The Modifier Key status light turns off.

3 There are three types of characters you can enter:

- To accent a lowercase character, press the character. For example, press [A] to type the ä character.
- To accent an uppercase character, press the [⇧] key. Next, press the character you want to accent. For example, press [⇧] and release the key, and then press [A] to type the Ä character.
- To type the accent mark by itself, press the [→] key.

The accented character or accent mark appears on the screen and the Modifier Key status light turns off.

If you try to accent a character and the resulting character is not supported on the terminal, the plain (unaccented) character displays on the terminal screen. For a complete list of the international characters available in the terminal font, see Appendix C, “International Character Support,” in the 2400 Family system manual.

Using the Function Key Labels

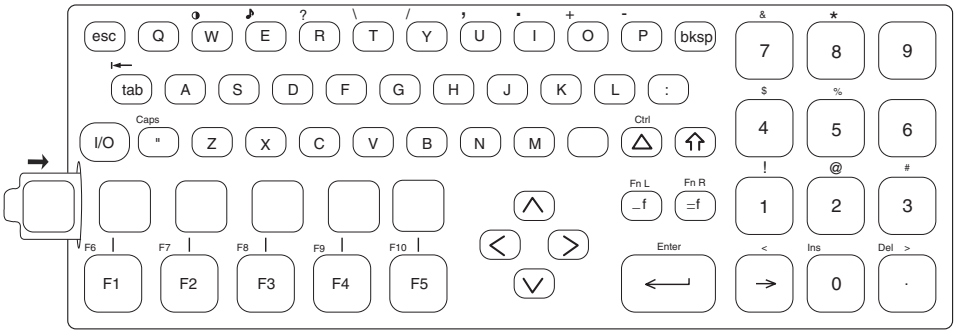
Your terminal ships with strips of function key labels. You can use the labels to identify custom function keys. Write the name for each function key on a strip of five labels. Insert the strip into the slot or slots on the keypad.

There are four sizes or types of function key labels:

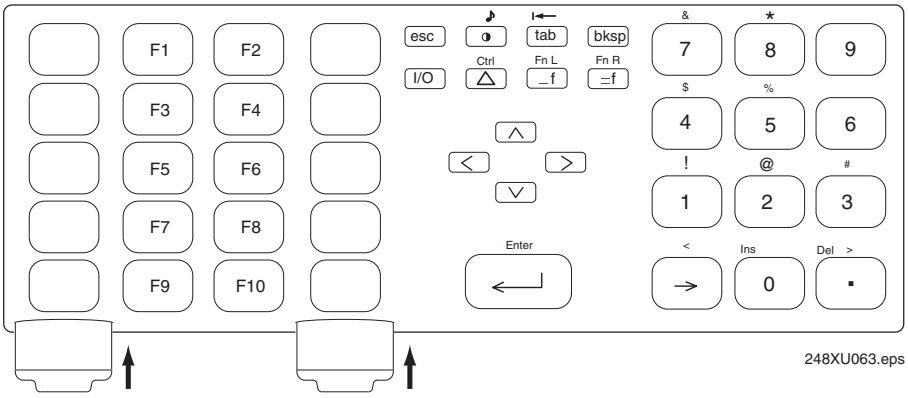
- Strips of five small, square labels for alphanumeric keypads
- Strips of five medium-size labels for the oversized function numeric keypad
- Strips of five colored labels for the time and attendance keypad

- Strip of two labels marked IN and OUT for the time and attendance keypad

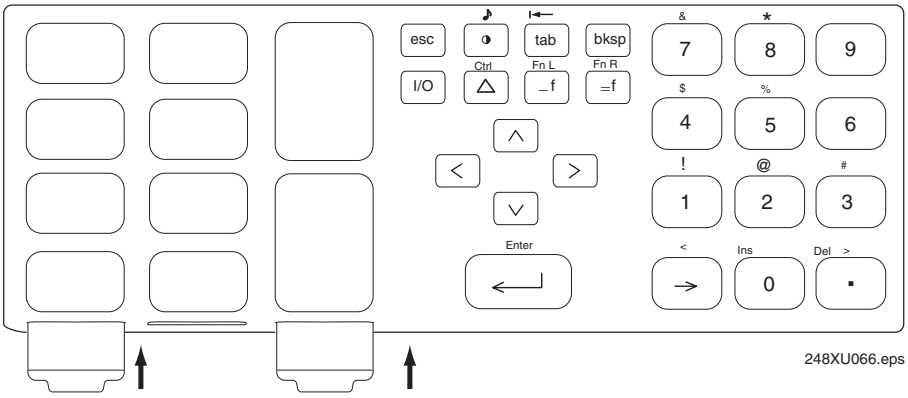
Use the labels that fit your keypad. You can create your own pre-printed function key labels. For the exact function key label measurements, see Appendix B, "Keypads and Terminal Mounting Templates."



Inserting Function Key Labels into an Alphanumeric Keypad



Inserting Function Key Labels into the Oversized Function Numeric Keypad



Inserting Function Key Labels into the Time and Attendance Keypad

Using the Terminal's Screen

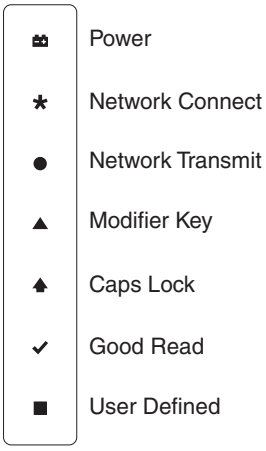
You can use the terminal's screen to view data, run applications, monitor the terminal's status, and perform many other functions. The screen is a backlit LCD that is CGA-compatible.

Note: If you are using the terminal in a cold environment, the LCD may respond and display information more slowly than in a warm environment.

Depending on the model and configuration of the terminal, the screen displays 4 lines by 40 characters up to a maximum of 25 lines by 80 characters of data at one time. The versatile display features allow you to resize the screen based on operator preference and work environment. For help, see "Display Spacing" in Chapter 6 of the 2400 Family system manual.

Using the Status Lights

You can use the terminal's status lights to monitor the status of backup battery power, RF and network communications, special keys, and bar code scanning. The status lights only flash or turn on to indicate the current status. The Power status light is amber and all other lights are green. When you have the terminal turned off (Suspend mode), the status lights are also off.



248XU219.eps

248X Status Lights

Status Light Descriptions

<table>
<tr><th>Icon</th><th>Name</th><th>Description</th></tr>
<tr><td></td><td>Power</td><td>This status light remains off when you have power to the terminal, a charged backup battery, and the terminal is on. The light blinks when the backup battery has a low power charge or if you try to turn on the terminal with no external power supply connected to the terminal. The Power status light turns off once the backup battery is charged. For help, see “Learning About the Backup Battery” on page 9.</td></tr>
<tr><td>*</td><td>Network Connect</td><td>This status light tells you if the 2480/1 is connected to your Ethernet network or if the 2485/6 is connected through RF communications to your RF network. The Network Connect status light may be turned off, blinking, or turned on.
<table>
<tr><th>Protocol</th><th>Status Light Off</th><th>Status Light Blinks</th><th>Status Light On</th></tr>
<tr><td>2480/1: Ethernet & TCP/IP</td><td>Not connected to the Ethernet network.</td><td>Not used.</td><td>Connected to the Ethernet network.</td></tr>
<tr><td>Ethernet & UDP Plus or WTP</td><td>Not connected to the Ethernet network.</td><td>Not connected to the Intermec Gateway or DCS 30X.</td><td>Connected to the Intermec Gateway or DCS 30X.</td></tr>
<tr><td>2485/6: TCP/IP</td><td>Not connected to an access point.</td><td>Not used.</td><td>Connected to an access point.</td></tr>
<tr><td>UDP Plus or WTP</td><td>Not connected to an access point.</td><td>Not connected to the Intermec Gateway or DCS 30X.</td><td>Connected to an access point and the Intermec Gateway or DCS 30X.</td></tr>
</table>
When the Network Connect status light is turned off, you are either not connected to the network or the terminal is not configured. Make sure the Network Activate command is enabled and that the terminal is configured correctly for your network. If your 2485/6 is configured correctly, you may be out of range of an access point.

In a UDP Plus or WTP network, the Network Connect status light is not instantaneously updated but does tell you the communications status the last time data was sent or received from the terminal. For help with network communications, see Chapter 4, “Operating the Terminal in a Network.”</td></tr>
<tr><td>●</td><td>Network Transmit</td><td>This status light turns on when data is buffered in the RF or Ethernet network interface. The data is either waiting to be transmitted to the DCS 30X or host, or received data has not been accepted by the application on the 248X. When no data is being buffered in the interface, the Network Transmit status light is off.</td></tr>
<tr><td>▲</td><td>Modifier Key</td><td>This status light turns on when you press one of the four modifier keys: [△], [↶], [_f], or [=f]. The modifier key is stored in the keypad buffer until you press another key. When you press a second key, the key combination is entered into the terminal and the status light turns off. You can also use the Status Lights Control reader command to turn this status light on and off. For help, see “Status Lights Control” in Chapter 5 of the 2400 Family system manual.</td></tr>
<tr><td>⬆</td><td>Caps Lock</td><td>This status light turns on when you press [_f] ["] to enable the Caps Lock feature. On a German alphanumeric keypad, you press [_f] [Y]. When you press [_f] ["] to disable Caps Lock, the light turns off. You can also use the Status Lights Control reader command to turn this status light on and off. For help, see “Status Lights Control” in Chapter 5 of the 2400 Family system manual.</td></tr>
<tr><td>✔</td><td>Good Read</td><td>This status light turns on when you successfully scan a bar code label with an input device, such as a badge scanner or a laser scanner that is connected to the terminal. The status light turns off after 2 seconds. You can also use the Status Lights Control reader command to turn this status light on and off. For help, see “Status Lights Control” in Chapter 5 of the 2400 Family system manual.</td></tr>
</table>

Status Light Descriptions (continued)

Icon	Name	Description
■	User Defined	The function of this status light is defined by the user. You can program this status light to turn on and off for any task or error within your application. You can also use the Status Lights Control reader command to turn this status light on and off. For help, see "Status Lights Control" in Chapter 5 of the 2400 Family system manual.

Understanding the Terminal's Audio Signals

The Trakker Antares 248X terminal has an internal speaker to sound audio signals and beep sequences as you use the terminal. For example, a low beep tone sounds each time you enter or scan a valid command.

You can change the audio volume to meet the needs of your working environment. For example, use a quiet beep in a library or a loud beep in a manufacturing plant. There are three ways to change the audio volume:

- Use the keypad (press _f E, _f ◑, or _f Q depending on your keypad). For help, see "Adjusting the Contrast and Beep Volume From the Keypad" on page 15.
- Use the Beep Volume command. For help, see "Beep Volume" in Chapter 6 of the 2400 Family system manual.
- Use the TRAKKER Antares 2400 Menu System. For help, see "Configuring the Terminal With the Menu System" on page 55.

Note: If the Beep Volume is turned off, you will not hear any audio signals including the keyclick.

If you have a 248X with an enhanced input/output board, you can attach an amplified external speaker to amplify the terminal's audio signals. For help, see "Attaching an External Speaker" on page 49.

The next table explains the purpose of the audio signals you may hear.

Audio Signals

Audio Signal	Situation
Low beep	You entered a valid command or the data you entered was stored.
High beep	You entered valid data, the terminal decoded a label, or the terminal decoded the last row of a two-dimensional symbology.
Three low beeps	You entered or scanned an invalid command or data.
Four low beeps	When you boot the terminal, you hear four low beeps once the power-on self test (POST) has executed successfully.

Audio Signals (continued)

Audio Signal	Situation
Low beep, high beep, low beep, high beep	You hear this beep sequence when POST failed and did not execute successfully. For help, see "Problems While Operating the Terminal" on page 88.
Low beep, high beep	Your 802.1x terminal has been authenticated.
High beep, low beep	Your 802.1x terminal is not authenticated. For help, see "Problems While Configuring 802.1x Security" on page 94.
Click	When you press a key, the terminal sounds a click. You can disable the keyclick. For help, see "Keypad Clicker" in Chapter 6 of the 2400 Family system manual.

Using the Badge Scanner and Other Input Devices

You use the badge scanner and other bar code input devices that are connected to the Trakker Antares 248X terminals to scan and enter bar code data. The terminal decodes the bar code label and enters the data or command you scanned.

The 248X has two bar code input ports:

- Badge scanner (6-pin) connector
- External scanner (Stewart 10-pin) connector

Note: Although you can have two bar code input devices connected to the terminal at the same time, the terminal can only process data from one input device at a time.

When you unpack the terminal and begin using it, only three bar code symbologies are enabled: Code 39, Code 128, and UPC/EAN. If you are using bar code labels that are encoded in another symbology, you need to enable that symbology on the terminal. For help, see Chapter 3, "Configuring the Terminal," or find the symbology in Chapter 6, "Configuration Command Reference," in the 2400 Family system manual.

For help connecting an input device, see "Connecting Power and Input Devices" on page 32, or see your badge scanner accessory instruction sheet.

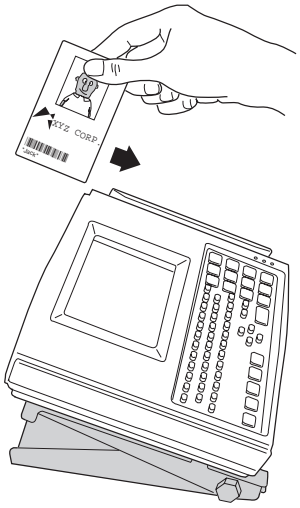
Using the Badge Scanner

You can order the 248X with an infrared or visible light badge scanner. You can also order the badge scanner as an accessory and attach the scanner to your terminal. The badge scanner is always on and ready to read bar code data.

To use the badge scanner

1 Press ⏻ to turn on the terminal.

2 Hold the bar-coded object, such as an identification badge with the bar code facing toward the terminal.



248XU021.eps

3 Slide the bar-coded object through the badge scanner slot in either direction. When the bar code is scanned successfully, the Good Read status light turns on for 2 seconds.

The scanning beam in the badge scanner must pass through the entire bar code. The beam path is 1.27 cm (0.5 in) from the bottom of the scanning slot. The bar code label must be:

- at least 0.51 cm (0.2 in) tall with a center line 1.27 cm (0.5 in) from the edge.
- parallel to the edge of the card or object that passes through the scanner.

Note: You can also attach an input device to the 6-pin connector instead of the badge scanner.

Using a Wand, Laser Scanner, or Linear Imager

You can attach a wand, laser scanner, or linear imager to the external scanner connector on the terminal. Because the external scanner port is a Stewart 10-pin connector, you must use an interface cable to connect an input device. For a list of Intermec input devices, see "Input Devices for the External Scanner Port" on page 110.

Intermec is always testing and developing new input devices. For an updated list of Intermec-approved input devices for the 248X, see your Intermec sales representative.

After you attach the input device, you can use the scanning options that are described in the next section to customize bar code input. For help scanning with your input device, see the instructions for the input device.

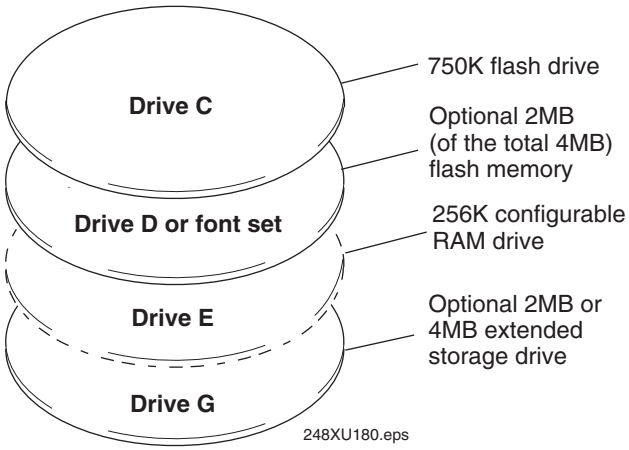
Scanning Options

You can modify the following scanner command options to meet your needs:

- Decode Security
- Scan Ahead
- Scanner Mode
- Scanner Redundancy
- Scanner Selection
- Scanner Timeout
- Scanner Trigger

Defining the Terminal's Memory and Drives

The terminal comes with the following memory and drives. On each drive, filenames are customer defined using eight characters with a three-character extension. You cannot define any subdirectories.



248X Terminal Drives

Drive C

Drive C is a 2MB flash drive. You can use up to 750K of this flash drive to store up to 128 files on drive C. Applications must be stored on drive C. You use standard ANSI C library interface definitions to access the information on this drive.

Drive D or Font Set

Drive D or font set is an optional 2MB of flash memory. If you order the 4MB flash memory option, you can configure 2MB as drive D. Use this flash drive to store large lookup tables and data files. You can store up to 128 files on drive D. You can also use the 4MB flash memory option to store double-byte fonts. To configure this flash memory, see "Configuring Drives and Memory on the Terminal" on page 63.

Note: If you have a terminal with the 802.1x TTLS security option, drive D is not available to store files or double-byte fonts. For more information about configuring 802.1x TTLS security, see "Configuring 802.1x TTLS Security" on page 82.

Drive E

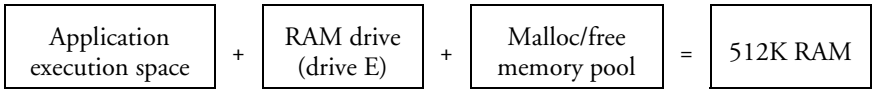
Drive E is a configurable RAM drive (up to 256K). The contents of this drive are erased when you boot or reset the terminal or change the backup battery. You use standard ANSI C functions to access the files on this drive. You can store up to 128 files on drive E. By default, the RAM drive is not configured and the memory is available for programmable (Malloc) memory allocations. To configure the RAM drive, see "Configuring Drives and Memory on the Terminal" on page 63.

Drive G

Drive G is an optional 2MB or 4MB extended storage drive that is available for 2480/1 terminals with Ethernet connectivity or 2485/6 terminals. Use this drive to store large lookup tables and data files. You can store up to 128 files on drive G.

Malloc or Free Memory

On the terminals, applications are customer defined. You have 512K total RAM that you can use for the application execution space. You can also configure this RAM to be the RAM drive (up to 256K). The remaining RAM is the Malloc/free memory pool.



2 Installing the Terminal

This chapter explains how to install the 248X, how to connect the 248X to serial devices and networks, and how to connect external devices to the 248X terminal blocks.

This chapter covers these topics:

- Preparing to install the terminal
- Installing the terminal and connecting external devices

Preparing to Install the Terminal

Make sure you have the necessary equipment to install the 248X and connect it to your network. You need the following equipment that ships with the terminal:

- 2480, 2481, 2485, or 2486 terminal
- Antenna (ships only with the 2485/6)
- Terminal blocks (ship only with the enhanced input/output board option)
- Power supply
- North American power cord
- Badge scanner (only installed on the terminal if you ordered this option)

You may also need the following equipment (not shipped with the 248X) to install the terminal:

- Power cord for terminals used outside of North America
- Mounting bracket (desk-mount or wall-mount)
- Input device (badge scanner, wand, laser scanner, or CCD scanner)
- RS-232 or RS-232/422/485 serial communications cables
- Multi-Drop cable
- Ethernet (10BaseT) cable
- Wiring for sense inputs, output relays, and external speakers

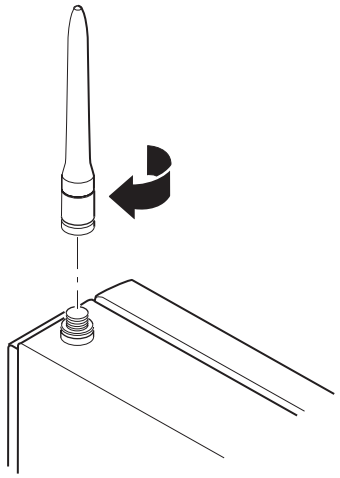
Before you install the terminal, you should:

1. Attach the antenna to the 2485/6.
2. Choose a location to mount the terminal.
3. Mount the terminal to a vertical or horizontal surface.

These topics are covered in the next sections. You should also make sure you are familiar with the connectors and equipment inside the terminal's rear enclosure. For help, see "Learning About the Back Panel" on page 8.

Attaching the Antenna

On the 2485/6, the antenna is shipped separately. Remove the antenna from the shipping box and attach the antenna as shown.



248XU211.eps

Attaching the Antenna

You can use an Intermec-approved accessory antenna to improve RF communications. For more information, see your Intermec sales representative.

Note: See your Intermec sales representative for information about and a list of Intermec-approved accessory antennas for the 2485/6.

Caution

Make sure all components with antennas are at least 0.3 m (1 ft) apart when power is applied. Failure to comply could result in equipment damage.

Attention: Assurez-vous que la distance entre tous les éléments avec antennes soit d'au moins 0.3 mètres (un pied) avant de faire la connexion avec l'alimentation électrique, faute de quoi vous risquez d'endommager votre installation.

Choosing a Location

You can mount the 248X on a horizontal surface, such as a desktop or table-top, or on a vertical surface, such as a wall. Choose a mounting location for the 248X that provides:

- easy access to the badge scanner or other input devices.
- easy access to the keypad.
- an unobstructed view of the screen.

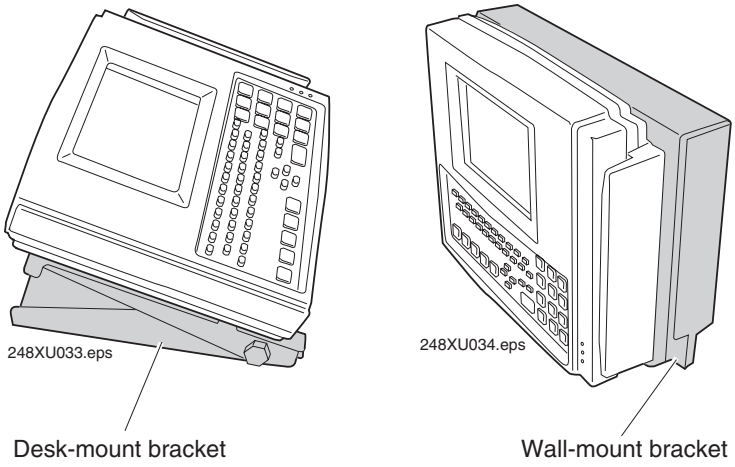
- clearance for the cables.
- access to a powered AC electrical outlet.
- an effective communication range for the antenna. Do not place the terminal where the antenna is too close to a metal wall.

To plan for and prepare a mounting location, use the actual size (1:1 scale) mounting templates provided in Appendix B, "Keypads and Terminal Mounting Templates."

Mounting the Terminal

The easiest way to mount the 248X is to use one of Intermec's mounting brackets:

- Trakker Antares 248X Desk-Mount Bracket (P/N 066709)
- Trakker Antares 248X Wall-Mount Bracket (P/N 066708)



Trakker Antares 248X Mounting Brackets

To install the desk-mount bracket

1. Connect power and all other devices through the back panel of the terminal.
2. Install the desk-mount bracket and the terminal. For help, see the accessory instruction sheet.

To install the wall-mount bracket

1. Install the wall-mount bracket and the terminal. For help, see the accessory instruction sheet.
2. Connect power and all other devices through the back panel of the terminal.

Learning About the Power Supply

The 248X and the power supply are dust and moisture protected to IEC 60529/IP53 only when installed properly in the Intermec desk-mount or wall-mount bracket. The brackets use a power supply holder to effectively protect the power supply from dust and moisture. For help, see the accessory instruction sheets.

Intermec recommends that you use the desk-mount or wall-mount bracket to mount the 248X and protect the power supply. You can use other mounting brackets or enclosures. However, without the Intermec desk-mount or wall-mount bracket, the power supply is only intended for indoor use. Use of any other mounting brackets or enclosures will void the environmental protection ratings of the terminal.

Installation of the power supply must be performed strictly in accordance with the procedures contained in the Trakker Antares 248X desk- and wall-mount bracket instruction sheets. Failure to protect the power supply in areas of high dust and moisture may result in injury or death due to electric shock.

Avertissement: L'installation de la source d'alimentation doit être exécutée en respectant de façon stricte les procédures décrites dans les feuilles d'instruction du Trakker Antares 248X de bureau et monté au mur. L'échec de la protection de la source d'alimentation dans des zones de grande poussière et d'humidité peut entraîner des blessures ou la mort en raison d'un choc électrique.

Installing the Terminal and Connecting External Devices

Once your terminal is mounted to a vertical or horizontal surface, you can connect your terminal to external devices and networks. The steps to connect your 248X depend on the options you purchased and the type of network or devices to which you want to connect the terminal.

To install your 248X

1. Connect the power supply and input devices to the 248X. See page 32.
2. Connect the 248X to serial devices or networks. See page 33.
3. Install the 248X in an existing Intermec CrossBar network. See page 36.
4. Connect the 2480/1 directly to an Ethernet network. See page 38.
5. Connect sense inputs, output relays, an unattended scanner, or an amplified external speaker to the 248X terminal blocks. See page 39.
6. Route all the cables and secure the back panel. See page 51.

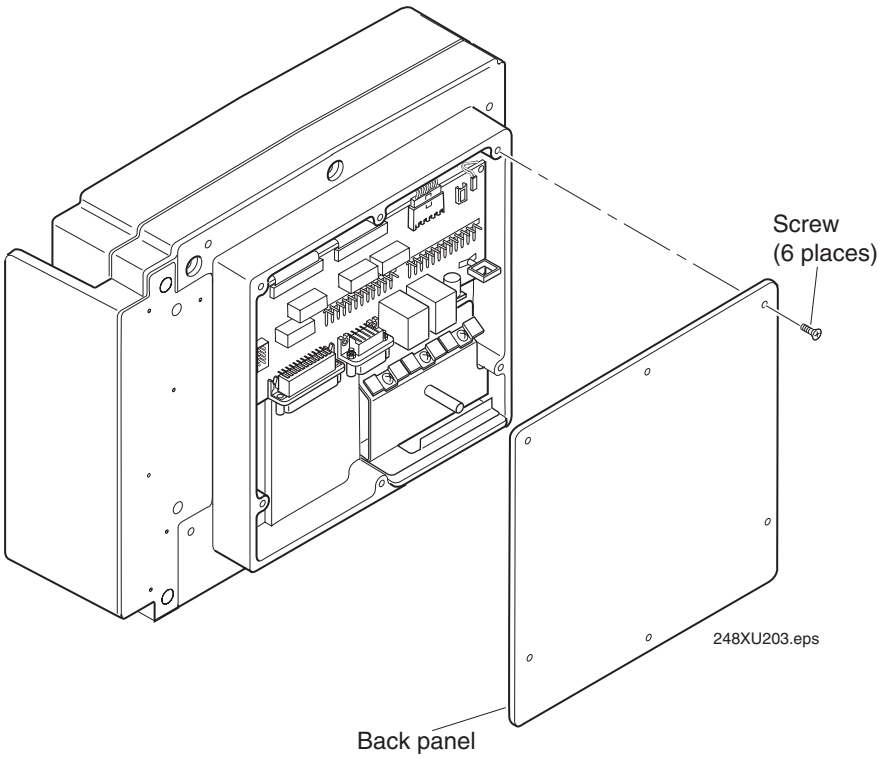
These steps are described in detail in the next sections.

Connecting Power and Input Devices

You connect power and input devices through the rear enclosure of the Trakker Antares 248X terminal.

To connect the power supply and input devices

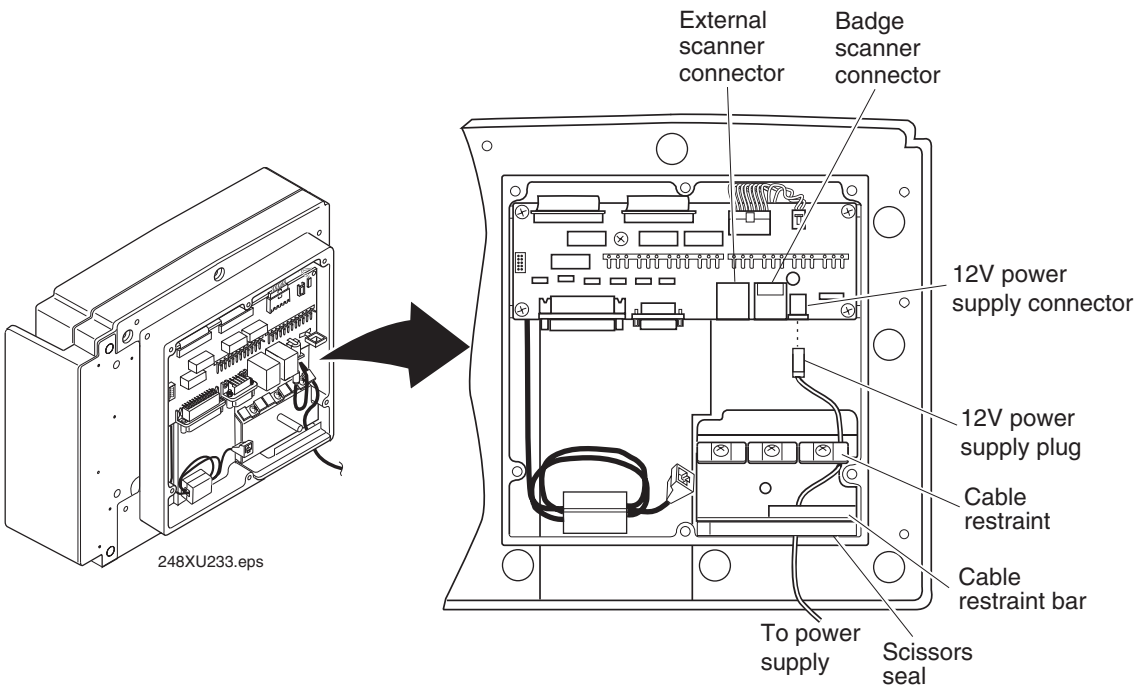
1 Use a Phillips screwdriver to remove the six screws on the back panel.



2 Remove the back panel and place it on a clean surface.

3 Connect the power supply and input devices to the back of the terminal.

- Connect the power supply plug to the 12V power supply connector. Next, connect the power cord from the power supply to a powered electrical outlet.
- Connect the badge scanner 6-pin connector to the badge scanner connector.
- Connect the Stewart 10-pin connector from the input device to the external scanner connector.



4 Use a Phillips screwdriver to loosen one of the screws on the cable restraint. Route the power supply cable under the cable restraint. Tighten the screw to secure the cable.

5 Route all the cables under the cable restraint bar and through the scissors seal.

6 To install other devices, leave the back panel off and continue with the next instructions in this chapter.

If you are not installing any other devices, continue with the instructions for "Routing Cables and Securing the Back Panel" on page 51.

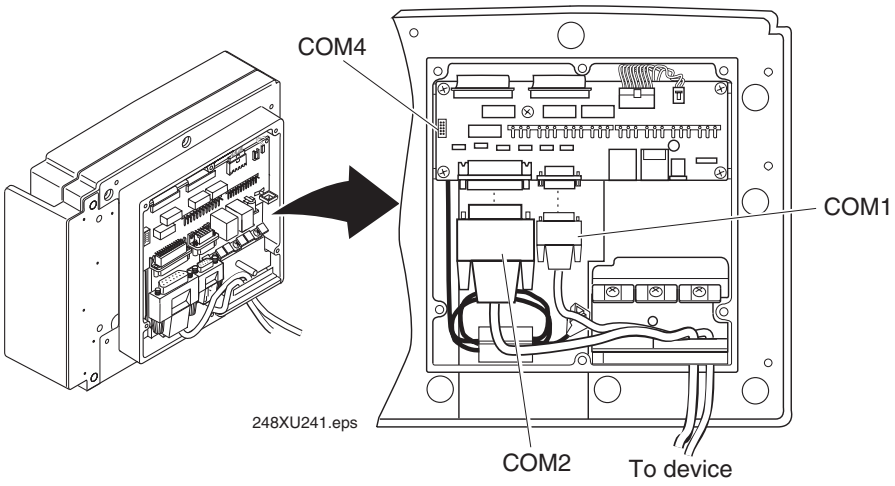
Connecting to Serial Devices and Networks

You can use the terminal's serial ports to transfer data between the terminal and a serial device. Every 248X has one serial port (COM1) that supports RS-232 communications. You can use COM1 to connect to a serial device, such as a printer, scale, or PC.

The terminal has an option for an enhanced input/output board that provides two additional serial ports. COM2 supports RS-232/422/485 communications. You can use COM2 to connect to a serial device, a wired network, or an Intermec CrossBar network. COM4 supports RS-232 communications. You need the adapter cable accessory (P/N 067185) to use COM4.

To connect the COM ports

1 Connect the 9-pin RS-232 connector from a serial device to the COM1 connector on the back of the terminal.

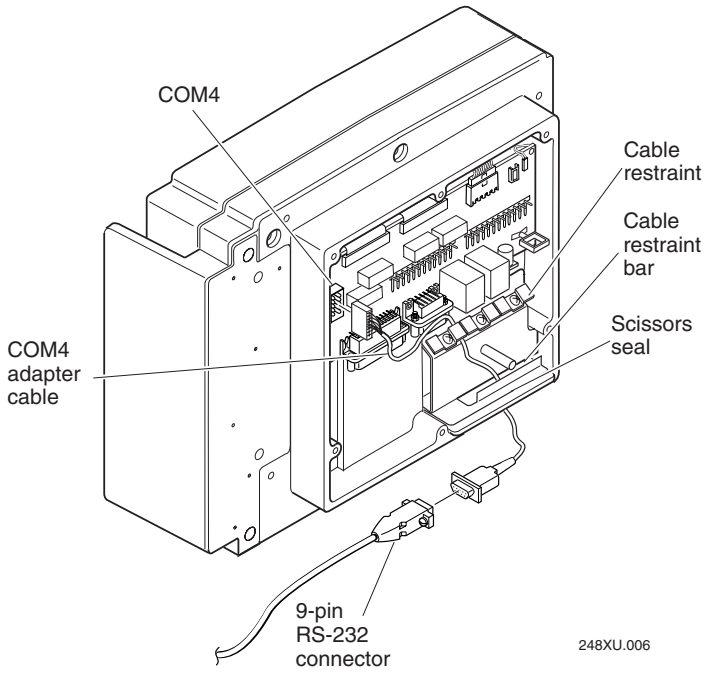


2 (Optional) Connect the 25-pin serial or Multi-Drop connector from a serial device or network to the COM2 connector on the back of the terminal.

3 (Optional) Connect to COM4.

a Connect the COM4 adapter cable to the COM4 connector on the back of the terminal.

b Connect the 9-pin RS-232 connector from a serial device to the COM4 adapter cable.



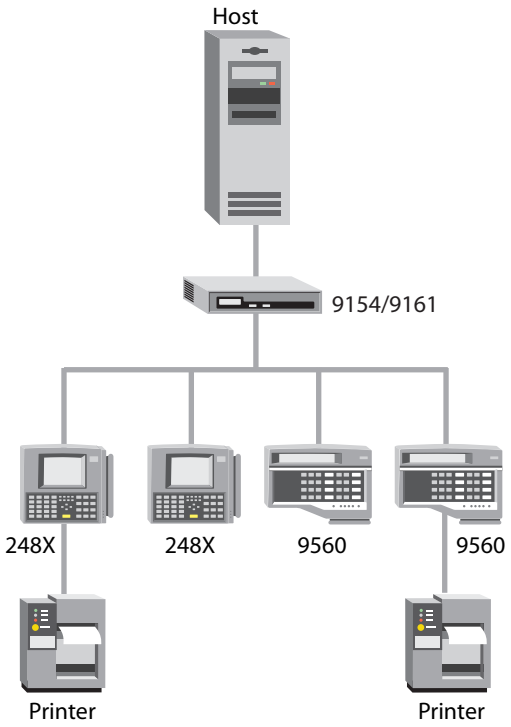
4 Route the cables under the cable restraint bar and through the scissors seal.

5 Plug the other end of the serial or Multi-Drop cable into the serial device or network.

6 To install other devices, leave the back panel off and continue with the next instructions in this chapter. If you are not installing any other devices, continue with the instructions for "Routing Cables and Securing the Back Panel" on page 51.

Connecting to an Intermec CrossBar Network

If you have a 248X with an enhanced input/output board, you have a second serial port (COM2) that supports RS-232/422/485 communications. With COM2, you can install the 248X in an existing CrossBar network. The 248X can communicate with a 9154 or 9161 controller using Multi-Drop protocol.



248X Terminals in an Intermec CrossBar Network

The main difference between 248X terminals and the 9560 terminals in a CrossBar network is that 248X terminals run C/C++ applications while 9560 terminals run IRL® programs. To run IRL data collections programs on your 248X, you must either convert the IRL programs to Microsoft C/C++ applications or write new C/C++ applications. For help, see "Converting IRL Programs Between the 95XX and Trakker Antares" in

Chapter 3 of the *Trakker Antares 2400 Family System Manual* (P/N 071389).

The application needs to send and receive data through COM2. After your application is converted, you can download the application to the 248X and begin using it in your CrossBar network. Follow the next instructions to install and configure the terminal for a CrossBar network.

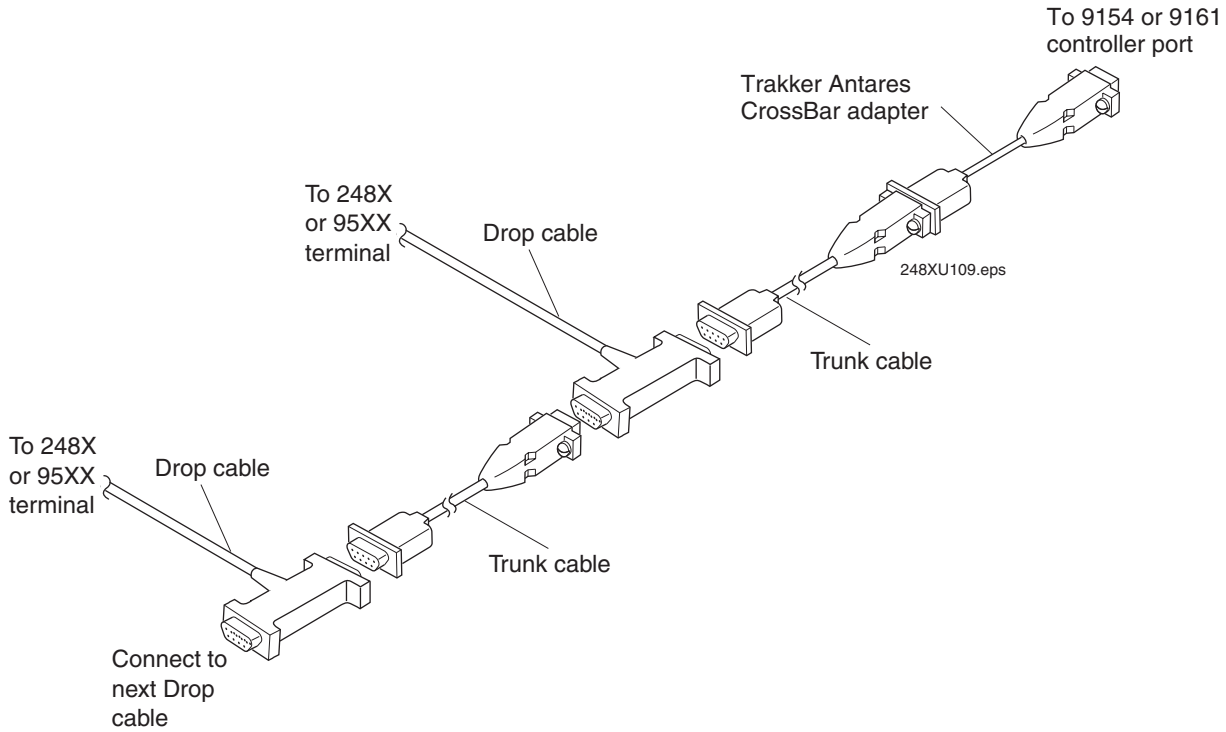
Installing the 248X in an Existing CrossBar Network

Make sure you have the following equipment before you begin:

- One Multi-Drop (or Drop) cable (P/N 047653) for each 248X terminal.
- One Trakker Antares CrossBar adapter (P/N 069447) for each 9154 or 9161 controller.

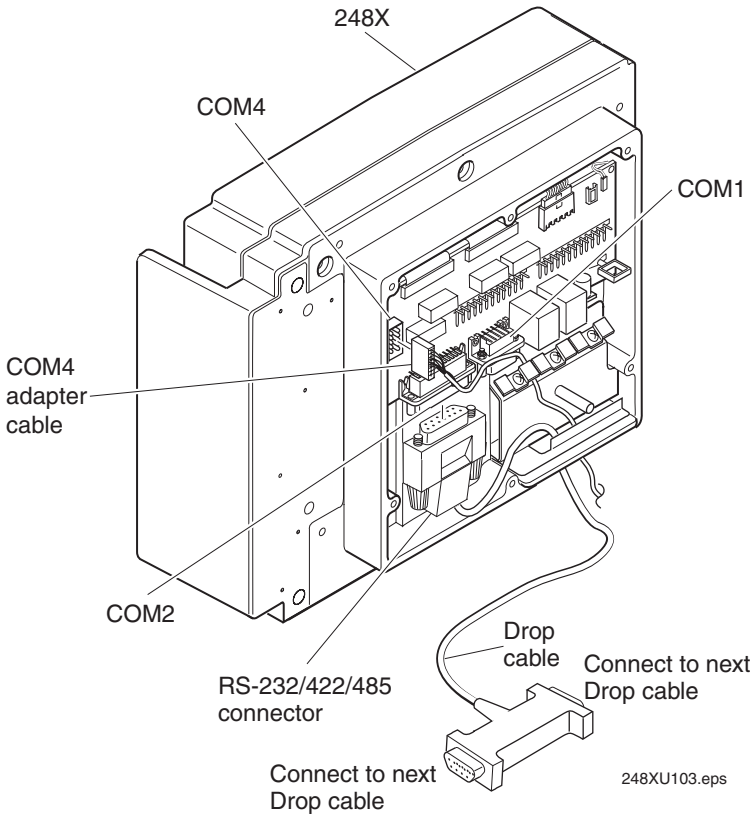
To install the Trakker Antares CrossBar adapter

1. On the 9154 or 9161 controller, disconnect the Multi-Drop network cable.
2. Connect the Multi-Drop network cable to one end of the Trakker Antares CrossBar adapter.
3. Connect the other end of the Trakker Antares CrossBar adapter to the 9154 or 9161 controller.



To install the 248X in the CrossBar network

1 Insert the 25-pin Multi-Drop connector of the Drop cable (P/N 047653) into the COM2 port on the back of the terminal.



2 Use a small straight-slot screwdriver to tighten the two screws in the Multi-Drop connector.

3 Attach the 9-pin connectors on the other end of the Drop cable into your Multi-Drop network.

4 (Optional) If you want to connect the 248X to a PC, connect the 9-pin RS-232 connector from the PC to the COM1 connector or the COM4 adapter cable (sold separately) on the back of the terminal.

5 If you want to install other devices, leave the back panel off and continue with the following instructions.

If you are not installing any other devices, continue with the next instructions, and then follow the instructions for "Routing Cables and Securing the Back Panel" on page 51.

Using the Terminal in a CrossBar Network

After the 248X is installed and configured, you can download an application to your terminal using:

- COM1 or COM4 and RS-232 communications.
- COM2 through the CrossBar network.

For help, see "Using the Serial Port to Transfer Applications and Files" in Chapter 3 of the 2400 Family system manual.

Once your terminal is loaded with your C/C++ application, you can begin using the terminal in your CrossBar network. The 248X will run the C/C++ application and send data to the 9154 or 9161 controller. If you have existing terminals like the 9560 or 9512, these terminals will run the equivalent IRL program and send data to the controller.

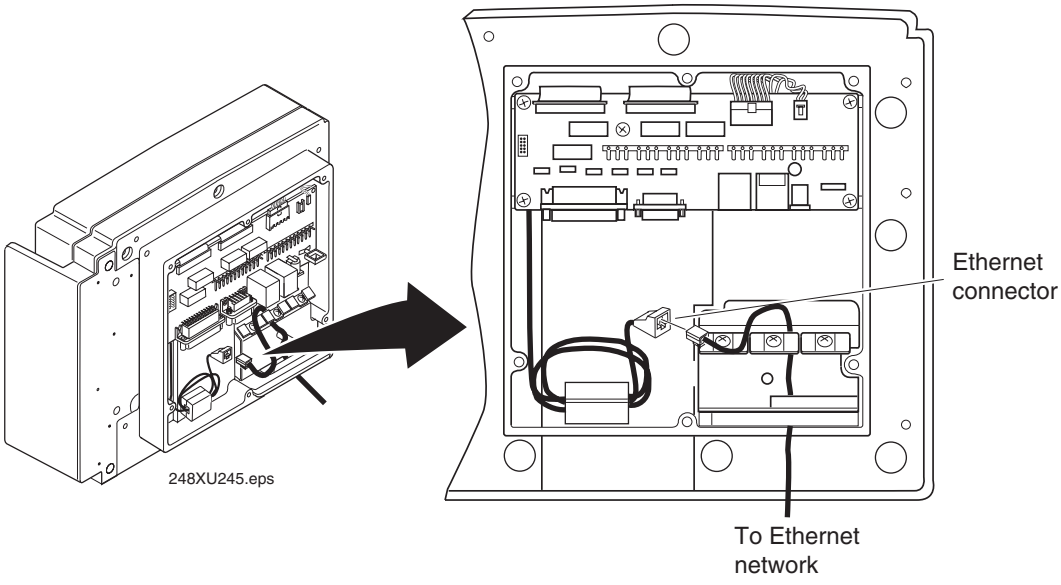
Note: You can use COM1 or COM4 to connect to another RS-232 serial device after you have downloaded the application.

Connecting Directly to an Ethernet Network

The Trakker Antares 2480/1 terminals have an option for an Ethernet (10BaseT) card. With this option, your terminal can communicate to a host or any device on an Ethernet network.

To connect to an Ethernet network

1. Configure your host computer and network. Assign an IP address for the 2480/1.
2. Connect the Ethernet jack to the Ethernet connector on the back of the terminal.



3 Use a Phillips screwdriver to loosen one of the screws on the cable restraint. Route the Ethernet cable under the cable restraint. Tighten the screw to secure the cable.

4 Route the cable under the cable restraint bar and through the scissors seal.

5 Plug the other end of the Ethernet cable into an Ethernet jack on your network.

6 To install other devices, leave the back panel off and continue with the next instructions in this chapter.

If you are not installing any other devices, continue with the instructions for "Routing Cables and Securing the Back Panel" on page 51.

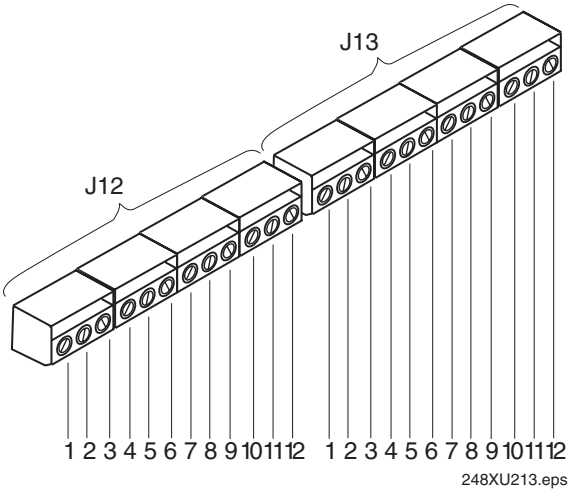
Connecting External Devices to the Terminal Blocks

If you have a 248X with an enhanced input/output board, your terminal shipped with two terminal blocks. You use the terminal blocks to connect:

- sense inputs (four) to monitor events, such as the opening of a door.
- output relays (four) to actuate external devices, such as a door lock.
- external speaker to amplify the terminal's audio signals.

You need to provide the wiring and electrical equipment to connect the terminal blocks to external devices. It is much easier to connect all your wiring to the terminal blocks before attaching them to the terminal block connectors on the back of the terminal.

The J12 and J13 terminal block connectors are located on the input/output board on the back of the terminal. Each relay on the terminal blocks is rated for 28V (AC or DC) maximum and 1A maximum.



J12 and J13 terminal block connectors: *This illustration shows the relay assignments for each block. See the next two tables for a description of each assignment.*

J12 Relay Descriptions

J12 Position	Type	Description
1	Output relay 1	Normally open contact
2	Output relay 1	Common
3	Output relay 1	Normally closed contact
4	Output relay 2	Normally open contact
5	Output relay 2	Common
6	Output relay 2	Normally closed contact
7	Output relay 3	Normally open contact
8	Output relay 3	Common
9	Output relay 3	Normally closed contact
10	Output relay 4	Normally open contact
11	Output relay 4	Common
12	Output relay 4	Normally closed contact

J13 Relay Descriptions

J13 Position	Type	Description
1	Sense input 1	Optically isolated input A
2	Sense input 1	Optically isolated input B
3	Sense input 2	Optically isolated input A
4	Sense input 2	Optically isolated input B
5	Sense input 3	Optically isolated input A
6	Sense input 3	Optically isolated input B
7	Sense input 4	Optically isolated input A
8	Sense input 4	Optically isolated input B
9	Reserved	Reserved
10	Reserved	Reserved
11	External speaker	Speaker output
12	External speaker	Speaker ground

The following sections explain how to connect and use the terminal blocks.

Activating External Devices With the Output Relays

The 248X has four output relays to actuate external devices, such as a door lock or a turnstile lock. You need to supply the wiring and electrical equipment. Each relay contact is rated for 28V (AC or DC) maximum and 1A maximum.

You control the relays with an application that uses the IM_GET_RELAY and the IM_SET_RELAY functions in the Trakker Antares Programmer's Software Kit. If you remove power to the 248X, the relays turn off. The

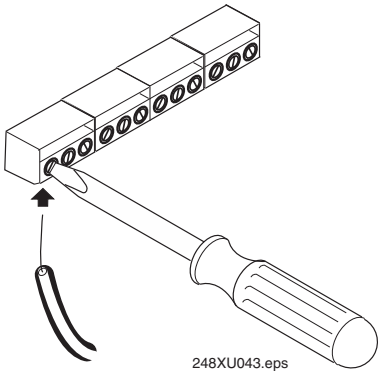
relays remain off until the 248X receives a command from the application. For help, see the *Trakker Antares Programmer's Software Kit Reference Manual* in the *Trakker Antares Application Development Tools System Manual* (P/N 064433).

The output relays are grouped in sets of three. There are three positions for each output relay on the J12 terminal block. You connect the external device to the appropriate positions depending on the type of default contact state you want to set for the device.

To connect an output relay

1 Use a straight-slot screwdriver to loosen the screws on a set of three output relay positions on the J12 terminal block.

For example, if you are connecting a single external device, you would loosen the screws for positions 1 and 2 or positions 1 and 3 on the J12 terminal block.

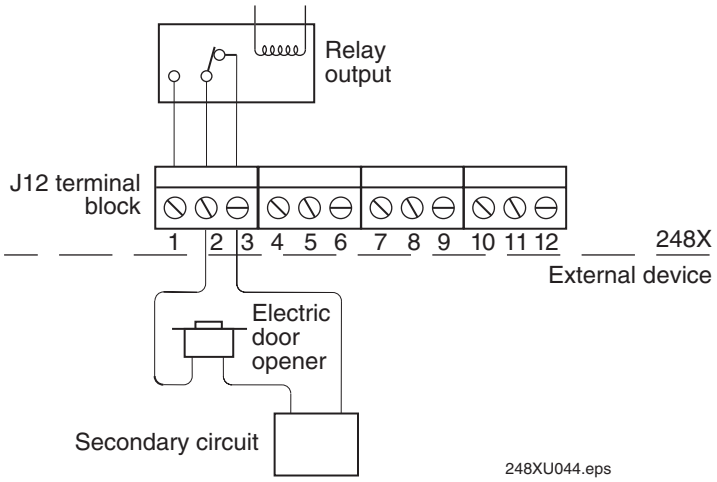


Note: If the terminal blocks are connected to the I/O board, you may need to remove them to connect the wires. For help, see "Removing the Terminal Blocks From the Input/Output Board" on page 50.

2 Insert the wires for the external device into the appropriate positions.

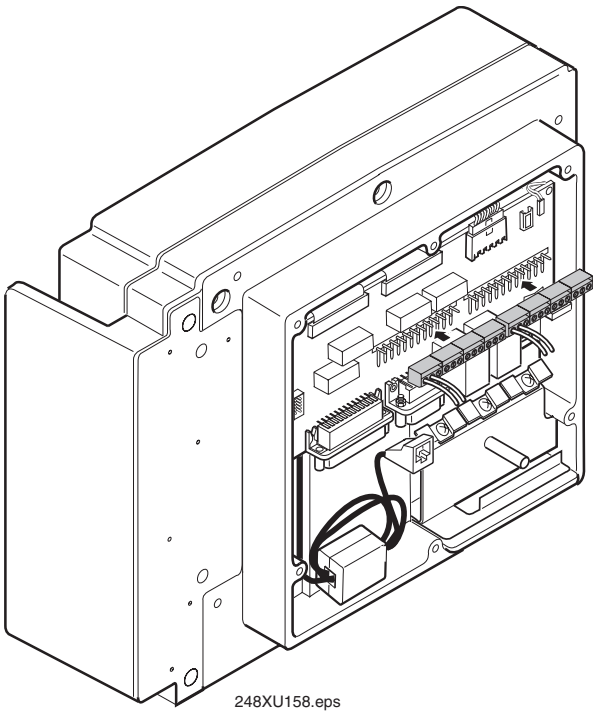
- **a** If the device requires a normally open contact, connect the wires to positions 1 and 2, 4 and 5, 7 and 8, or 10 and 11 on the J12 terminal block.
- **b** If the device requires a normally closed contact, connect the wires to positions 2 and 3, 5 and 6, 8 and 9, or 11 and 12 on the J12 terminal block.

3 Use a straight-slot screwdriver to tighten the screws and connect the wires.



4 Position the terminal block above the J12 terminal block connector on the I/O board. Gently push the terminal block onto the connector until it snaps in place.

Note: Do not attach the J13 terminal block if you still need to connect the sense inputs or an external speaker.



5 Route the wires through the snap-in plastic loop that is just to the right of the power supply connector.

6 Use a Phillips screwdriver to loosen one of the screws on the cable restraint. Route the wires under the cable restraint. Tighten the screw to secure the wires.

7 Route the wires under the cable restraint bar and through the scissors seal.

8 If you need to connect sense inputs or an external speaker, continue with the next instructions in this section.

If you are not installing any other devices, continue with the instructions for "Routing Cables and Securing the Back Panel" on page 51.

Monitoring Events With the Sense Inputs

The 248X has four sense inputs to monitor events, such as the opening of a door or the input from an unattended bar code scanner. You need to supply the wiring and electrical equipment. Each sense input monitors its line for an input signal at 5 to 28V (AC or DC) maximum. The terminal's current limiter circuitry limits the current to a nominal value of 900µA.

You monitor the sense inputs with an application that uses these two functions from the Trakker Antares Programmer's Software Kit:

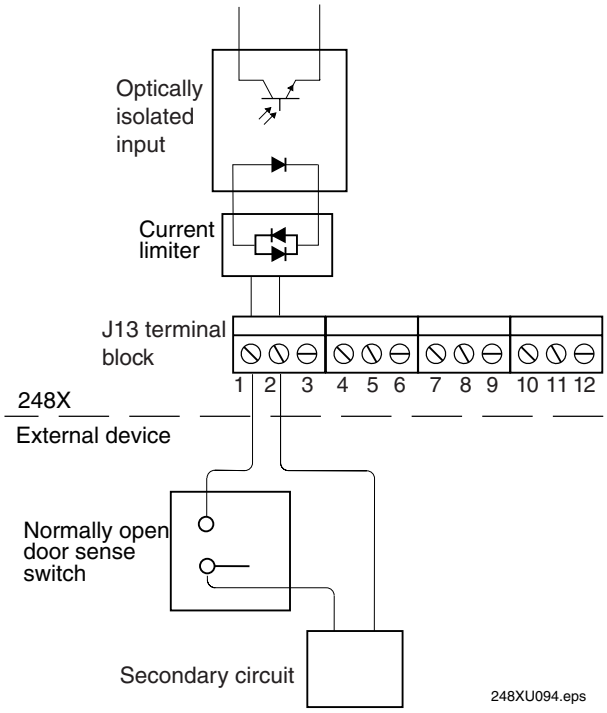
- IM_GET_SENSOR_ALL
- IM_GET_SENSOR_INPUT

When a sense input detects a signal, the circuitry goes into a "set" state. The circuitry remains set until the terminal application reads the status of the sense inputs. When the 248X executes one of the functions listed earlier, it records the current status and resets the circuitry. For help, see the *Trakker Antares Programmer's Software Kit Reference Manual* in the *Trakker Antares Application Development Tools System Manual* (P/N 064433).

The next illustration shows a typical connection to a sense input. In this example, a normally open door sense switch is wired in series with the sense input and a secondary power circuit. When the door switch is closed, the sense input detects the 5 to 28V output from the power circuit.

The sense input relays are grouped in pairs. There are two positions for each of the four sense inputs on the J13 terminal block. You connect the external device to the appropriate positions to monitor the device.

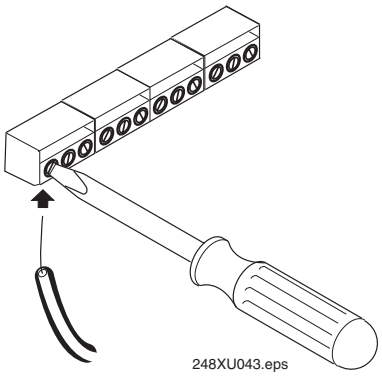
Note: Each sense input is optically isolated to protect the 248X from any damaging currents that may inadvertently enter through the input line.



Sample Sense Input Application

To connect a sense input relay

1 Use a straight-slot screwdriver to loosen the screws on a pair of sense input relay positions on the J13 terminal block.

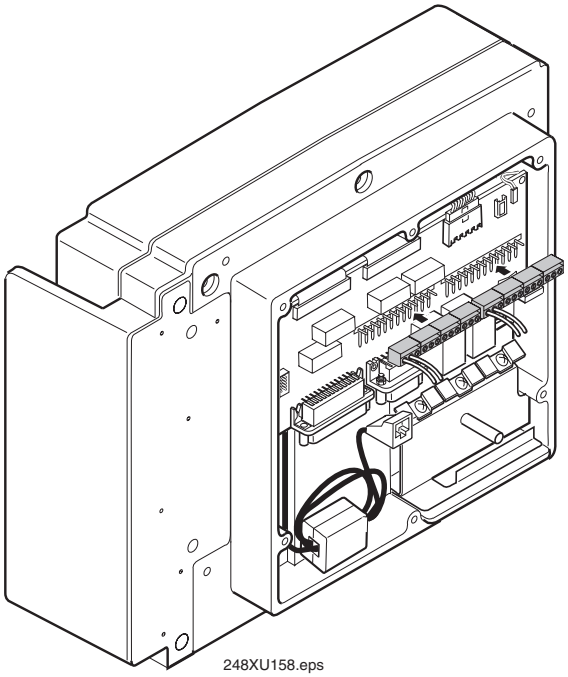


Note: If the terminal blocks are connected to the I/O board, you may need to remove them to connect the wires. For help, see "Removing the Terminal Blocks From the Input/Output Board" on page 50.

2 Insert the wires from the external device into the appropriate positions. The switch mechanism on each device should normally be open.

3 Use a straight-slot screwdriver to tighten the screws and connect the wires.

4 Position the terminal block above the J13 terminal block connector on the I/O board. Gently push the terminal block on to the connector until it snaps in place.



5 Route the wires through the snap-in plastic loop that is just to the right of the power supply connector.

6 Use a Phillips screwdriver to loosen one of the screws on the cable restraint. Route the wires under the cable restraint. Tighten the screw to secure the wires.

7 Route the wires under the cable restraint bar and through the scissors seal.

8 If you need to configure auto-triggering or connect an external speaker, continue with the next sections. If you are not installing any other devices, continue with the instructions for "Routing Cables and Securing the Back Panel" on page 51.

Using Auto-Triggering

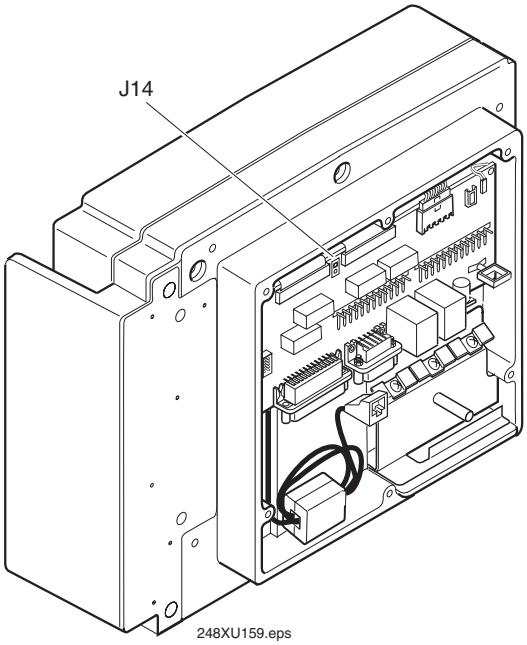
You can configure the 248X to accept input from an unattended laser scanner. For example, you can mount a laser scanner beside a conveyor line. Boxes with bar code labels pass in front of the scanner. You can set the scanner to automatically scan when an external sensor senses a label. This action is called auto-triggering.

There are two methods to set auto-triggering on the 248X:

- Physically set auto-triggering. When you physically enable auto-triggering, an external sensor controls when the scanner turns on and off. You must supply an external scanner, external sensor and wiring, and a 2-pin shorting connector (P/N 580213). You can also purchase the connector at a local electronics store. To physically enable auto-triggering on the 248X, continue with the next instructions.
- Use software commands. When you enable auto-triggering using software commands, you set a scanner timeout value to control when the scanner turns on and off. To enable auto-triggering on the 248X using software commands, see the instructions on page 48.

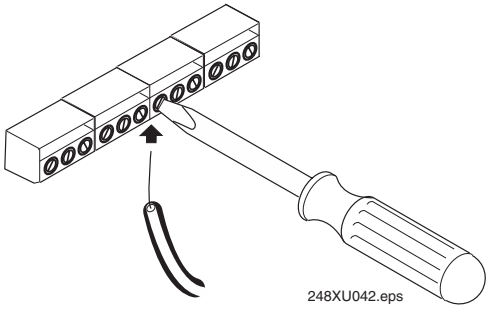
To physically enable auto-triggering

1 Short J14 with the 2-pin shorting connector.



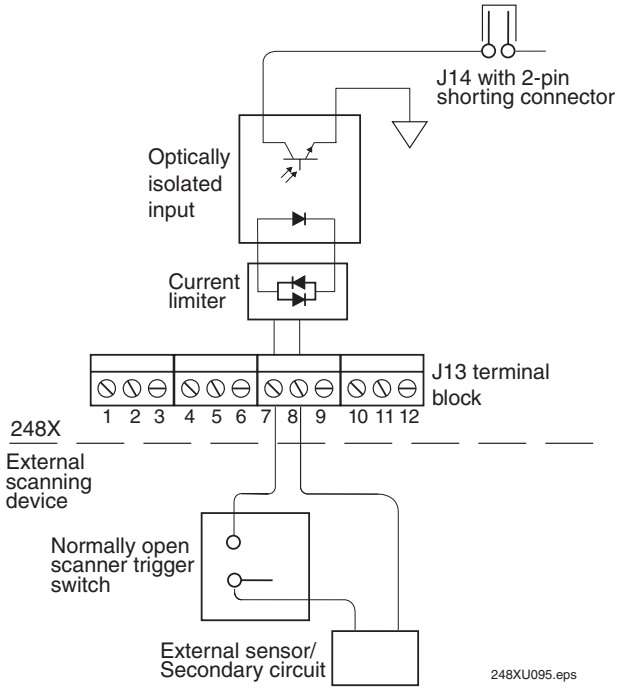
2 Use a straight-slot screwdriver to loosen the screws on positions 7 and 8 (sense input 4) on the J13 terminal block.

Note: If the terminal blocks are connected to the I/O board, you may need to remove them to connect the wires. For help, see "Removing the Terminal Blocks From the Input/Output Board" on page 50.



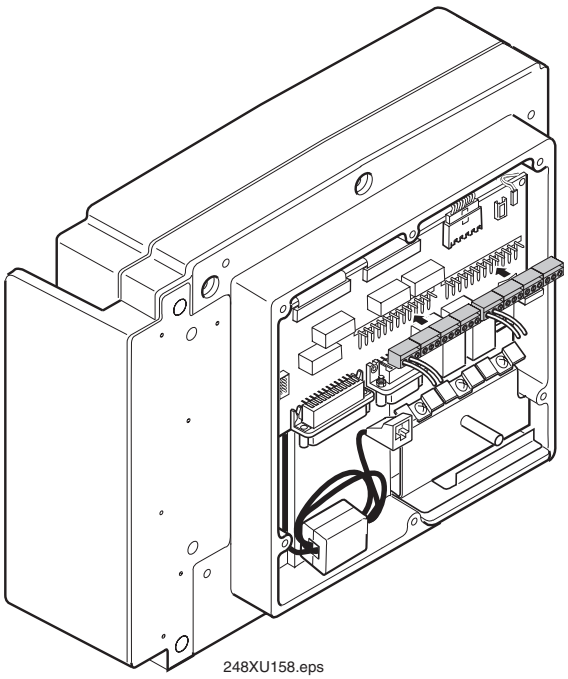
3 Insert the wires for the external sensor into positions 7 and 8. The switch mechanism on the external sensor should normally be open. The following illustration depicts the auto-triggering configuration.

Note: The connections on positions 7 and 8 are interchangeable.



4 Tighten the screws to connect the wires.

5 Position the terminal block above the J13 terminal block connector on the I/O board. Gently push the terminal block on to the connector until it snaps in place.



6 Route the wires through the snap-in plastic loop that is just to the right of the power supply connector.

7 Use a Phillips screwdriver to loosen one of the screws on the cable restraint. Route the wires under the cable restraint. Tighten the screw to secure the wires.

8 Route the wires under the cable restraint bar and through the scissors seal.

9 If you need to connect an external speaker, continue with the next instructions in this section. If you are not installing any other devices, continue with the instructions for "Routing Cables and Securing the Back Panel" on page 51.

To enable auto-triggering with software commands

- Set the following scanner commands to the indicated values:

Command	Value
Scanner Mode	Automatic mode
Scanner Trigger	Edge triggering
Scanner Timeout	Desired timeout value

For help setting the scanner commands, see Chapter 6, "Configuration Command Reference," in the 2400 Family system manual.

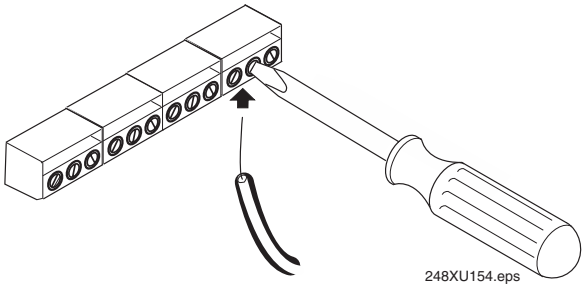
Attaching an External Speaker

The 248X terminal has a single internal speaker to sound both audio signals and beep sequences as you use the terminal. You can attach an amplified external speaker to hear the terminal's audio signals in a high noise work environment. The internal speaker continues to operate when an external speaker is connected.

You need to supply the wiring and the amplified external speaker. The terminal can drive an external speaker down to 100 ohms.

To attach an external speaker

1 Use a straight-slot screwdriver to loosen the screw on position 11 on the J13 terminal block.



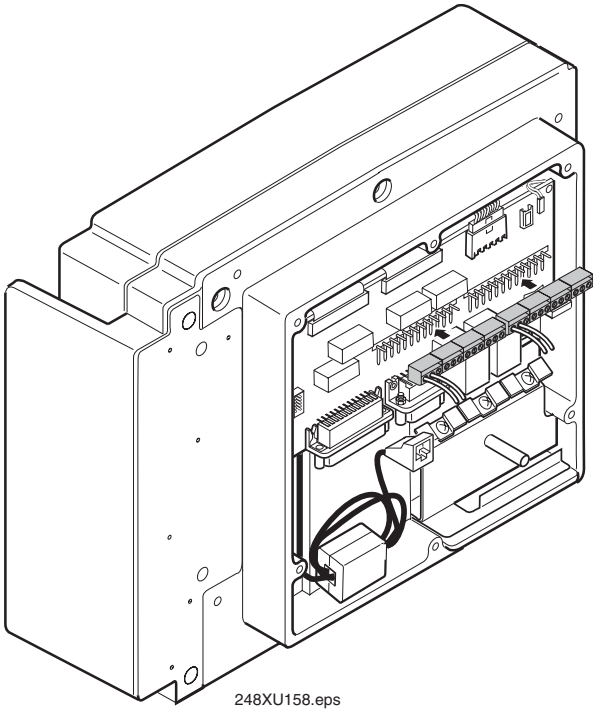
Note: You can connect your external speaker with or without the J13 terminal block attached to the I/O board.

2 Insert the wire from your speaker into position 11, and then tighten the screw to connect the wire.

3 Use a straight-slot screwdriver to loosen the screw on position 12 on the J13 terminal block.

4 Insert the ground wire for the speaker into position 12 and then tighten the screw to connect the wire.

5 If the J13 terminal block is not attached to the I/O board, position the terminal block above the J13 terminal block connector on the I/O board. Gently push the terminal block on to the connector until it snaps in place.



6 Route the wires through the snap-in plastic loop that is just to the right of the power supply connector.

7 Use a Phillips screwdriver to loosen one of the screws on the cable restraint. Route the speaker wires under the cable restraint. Tighten the screw to secure the cable.

8 Route the cable under the cable restraint bar and through the scissors seal.

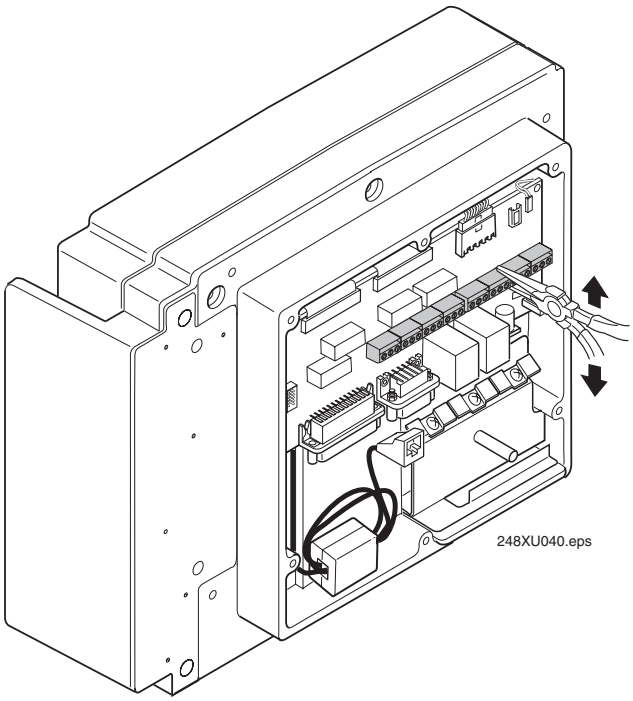
9 If you are not installing any other devices, continue with the instructions for "Routing Cables and Securing the Back Panel" on page 51.

Removing the Terminal Blocks From the Input/Output Board

You may need to remove the terminal blocks to make wiring changes. It is easier to connect all your wiring to the terminal blocks before attaching them to the terminal block connectors on the back of the terminal. You need a pair of needle-nose pliers that have a threaded grip to remove a terminal block.

To remove the terminal blocks

1 Starting at one end, use the pliers to grip one section of a terminal block and gently wiggle the pliers up and down to loosen the block.



2 Move the pliers to the next section of the terminal block and gently wiggle the pliers up and down to loosen the block. Repeat the procedure until you have loosened all sections of the terminal blocks.

3 Use your hand to pull the terminal block off the connector.

4 If some of the sections of a terminal block have come apart, slide the sections back together to make one block with four sections.

5 Use the instructions earlier in this section to connect an external device and attach the terminal blocks to the input/output board.

Routing Cables and Securing the Back Panel

After you connect power, input devices, Ethernet, and external devices, you can secure all the cables and attach the back panel.

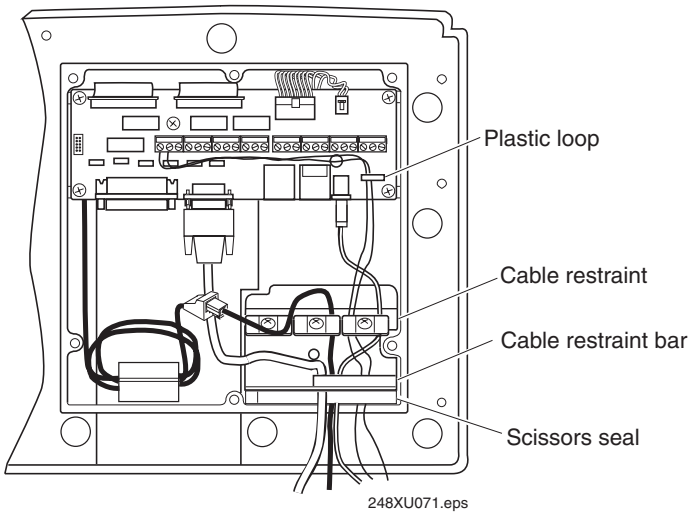
To route all cables and secure the back panel

1 Make sure the sense input wires, output relay wires, and external speaker wires are routed through the snap-in plastic loop that is just to the right of the power supply connector.

2 Make sure the cable restraint secures the power supply cable, Ethernet cable, sense input wires, output relay wires, and external speaker wires.

To secure cables and wires in the cable restraint, use a Phillips screwdriver to loosen the screws on the cable restraint. Route the cables and wires under the cable restraint. Tighten the screw to secure the cable.

3 Route all cables under the cable restraint bar and through the scissors seal.



4 With the seal facing toward the terminal, place the back panel on the back of the terminal.

5 Use a torque driver with a Phillips bit to tighten the six screws to 2.15 Nm (19 in-lb) torque.

6 Secure the mounting bracket.

- If you are using the desk-mount bracket, install the desk-mount bracket and install the terminal in the bracket.
- If you are using the wall-mount bracket, close and secure the bracket.

7 Turn on the terminal and configure the network parameters. For help configuring the terminal, see Chapter 3, "Configuring the Terminal." For more information about the network parameters, see Chapter 4, "Operating the Terminal in a Network."

3 Configuring the Terminal

This chapter describes the different methods that you can use to configure the 248X and its memory and drives. It also explains how to configure the terminals using the TRAKKER Antares 2400 Menu System.

This chapter covers these topics:

- How to configure the terminal
- Configuring the terminal with the menu system
- Configuring drives and memory on the terminal

How to Configure the Terminal

You can customize many operating characteristics of the 248X terminals, such as the volume of their audio signals and the bar code symbologies they decode. These characteristics are controlled by configuration parameters. The values you set for the configuration parameters determine how the terminal operates. To learn about each parameter, see Chapter 6, "Configuration Command Reference," in the *Trakker Antares 2400 Family System Manual* (P/N 071389).

You can configure the terminals by using any of these methods:

Use the TRAKKER Antares 2400 Menu System

With menus and screens, the TRAKKER Antares 2400 Menu System lets you view the current configuration and modify configuration parameters. For help, see "Configuring the Terminal With the Menu System" on page 55.

Scan Bar Code Labels

You can change the terminal's configuration parameters by scanning Code 39 or Code 93 bar code labels that contain configuration commands. This method is a fast, easy way to change the terminal's configuration. You can scan the bar code labels in this manual and the 2400 Family system manual, or you can create your own bar code labels. For help, see "Configuring the Terminal by Scanning Bar Code Labels" in Chapter 2 of the 2400 Family system manual.

Send Commands Through the Serial Port

You can change the terminal's configuration parameters by sending commands from a host computer or PC that is connected to the terminal's serial port. For help, see Chapter 2, "Configuring and Managing the Terminals," in the 2400 Family system manual.

Send Commands Through the Ethernet or RF Port

You can change the terminal's configuration parameters by sending commands through the UDP Plus, WTP, or TCP/IP network. This method lets you configure one or more terminals at the same time. For help, see Chapter 2, "Configuring and Managing the Terminals," in the 2400 Family system manual.

Use the Clone Application

You can set the terminal's configuration parameters by using the clone application to copy parameters from one 248X to another 248X. This method is a fast, easy way to configure your new 248X with the same parameters as your existing 248X. For help, see Chapter 2, "Configuring and Managing the Terminals," in the 2400 Family system manual.

Use the Wavelink Avalanche Manager

You can send configuration information to multiple terminals in your RF network using the Wavelink Avalanche client management system and the Intermec Settings application. For help, see Chapter 2, "Configuring and Managing the Terminals," in the 2400 Family system manual.

About the Configurations

The terminal uses three configurations: current, active, and default. Having separate current and active configurations lets you control the active configuration while letting each operator make some changes to the current configuration, such as scanning a bar code to change the beep volume.

Configuration Descriptions

Configuration	Description
Current	This configuration, also called the runtime configuration, uses the configuration that is saved in RAM. When you change a parameter by using the menu system, by scanning a bar code, by sending it from a host application, or by sending it from the Intermec Gateway or DCS 30X, the terminal updates the current configuration. The changes to the current configuration are lost when you boot or reset the terminal.
Active	When you update the flash memory, the terminal copies the current configuration to the active configuration. The active configuration is the configuration that the terminal uses when you boot or reset the terminal.
Default	This configuration is the factory default configuration. To restore the default configuration, see "Restoring the Terminal's Default Configuration" in Chapter 2 of the 2400 Family system manual.

Configuring the Terminal With the Menu System

The TRAKKER Antares 2400 Menu System is a menu-driven application that lets you configure the terminal, manage files, view system information, and run diagnostics. You can access the TRAKKER Antares 2400 Menu System while running any application.

When you are using the menu system, you may not see a parameter until you set a value for another key field. For example, EOM is a key field for the Configurable protocol. That is, several fields are invalid (do not appear) until you enable EOM. You also may not see a parameter if your terminal does not support a particular feature.

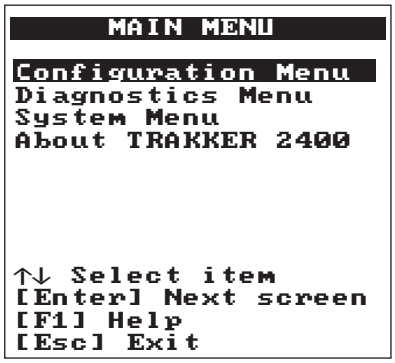
To access the TRAKKER Antares 2400 Menu System

- Press f ↵ 2 4 8 or scan this bar code:

  TRAKKER Antares 2400 Menu System

  ..-.

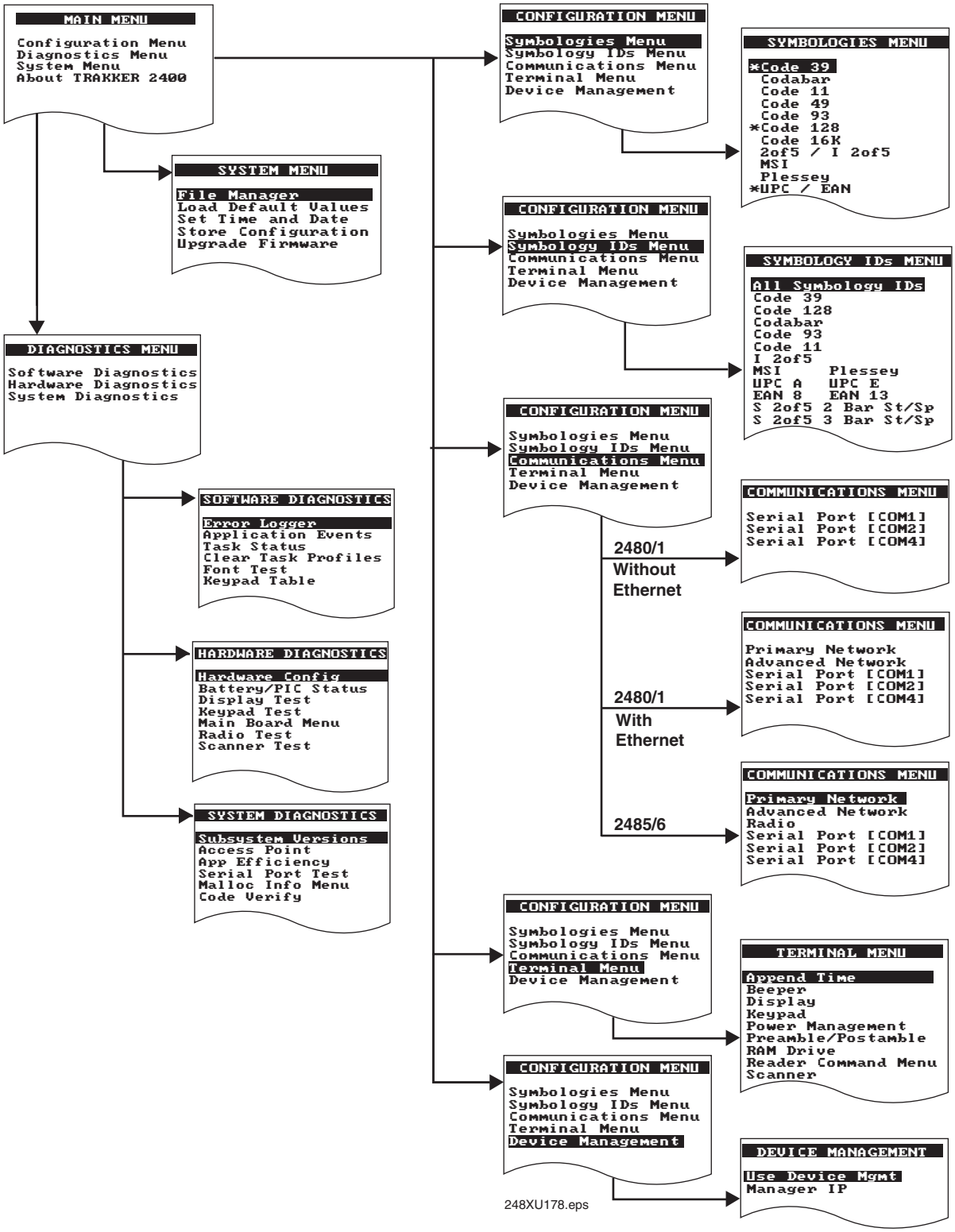
  The Main Menu appears, displaying four menu options.



248XU001.eps

Main Menu Options

Menu	Description
Configuration Menu	Choose this menu to configure bar code symbologies, network and communications parameters, serial port parameters, and the terminal's operating characteristics. In the Symbologies Menu, active symbologies are noted with an asterisk (*).
Diagnostics Menu	Choose this menu to run hardware, software, or system diagnostics to help analyze and fix problems. You can also view battery and system information. For help, see Chapter 4, "Running Diagnostics," in the 2400 Family system manual.
System Menu	Choose this menu to manage files, load the default configuration, set the time and date, store the terminal's configuration in flash memory, and upgrade the firmware.
About TRAKKER 2400	Choose this option to see the part number, firmware version, radio, RF protocol (UDP Plus, WTP, or TCP/IP), and security (WEP, 802.1x TTLS, or 802.1x LEAP) loaded on the terminal. You may need this information if you are working a problem with an Intermec representative. If you are using a DHCP server, this menu option also displays the DHCP-assigned IP address.



The TRAKKER Antares 2400 Menu System at a Glance

Accessing Online Help

The TRAKKER Antares 2400 Menu System provides online help for the menus and commands.

To access a help screen

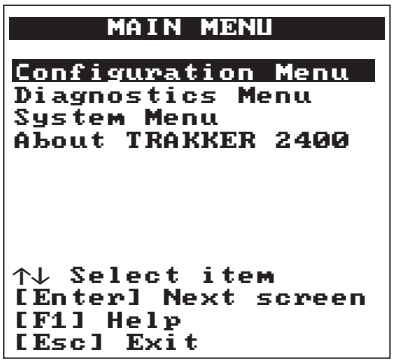
- Press F1 to access a help screen.

To exit a help screen

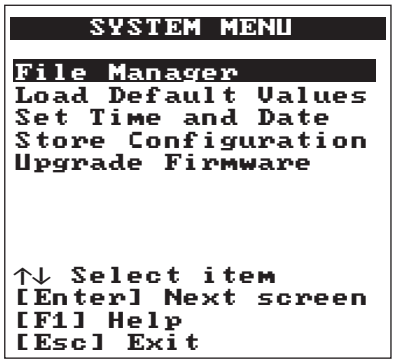
- Press esc to exit the help screen.

Selecting Menus and Commands

A menu consists of a list of secondary menu items or commands. From the Main Menu, you can press ^, v, or tab to select a menu, and then press ↵.



248XU001.eps



248XU051.eps

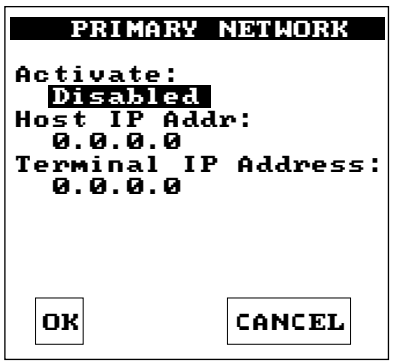
Selecting menus and commands: *For example, from the Main Menu, press v v ↵ to display the System Menu.*

Filling In Fields

Screens contain fields into which you can enter data. In the TRAKKER Antares 2400 Menu System, this data configures the terminal. You can press ^ , v , or tab to choose a field on a screen and then enter data.

There are two types of fields: toggle fields and entry fields.

- In a toggle field, press <, >, bksp, or → to view the options for that field.
- In an entry field, type a value into the field. To edit the data in an entry field, use the <, >, or → keys. You can also use the Delete (_f .) and Insert (_f 0) keys to edit an entry field.

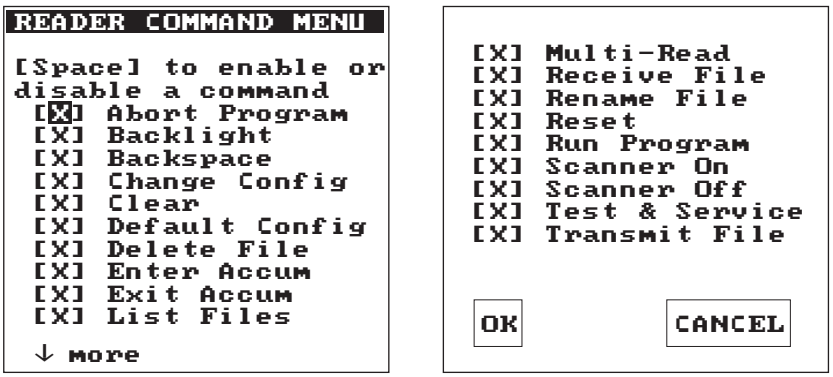


248XU.191

Toggle and entry fields: *For example, the Primary Network screen has toggle and entry fields. The Activate field is a toggle field. Press → to toggle between Disabled and 802.11 DS or OpenAir. The Host IP Address and Terminal IP Address fields are entry fields. You type a value into the field for each IP address.*

Marking Check Boxes

Screens may contain check boxes. Check boxes are used when you can select more than one option at a time. To mark or clear check boxes, press →.



248XU053.eps

Marking check boxes: *For example, press ↑, ↓, or tab to choose the Backspace check box and press → to clear the check box. The Backspace command is now disabled.*

Entering ASCII Control Characters

You can include ASCII control characters in a postamble or preamble by using the TRAKKER Antares 2400 Menu System. For a definition of the postamble or preamble, see Chapter 6, "Configuration Command Reference," in the 2400 Family system manual.

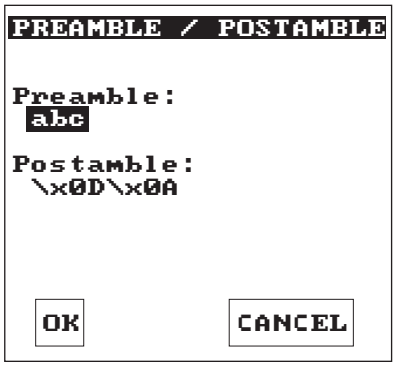
You can configure the postamble or preamble to be characters from the full or extended ASCII character sets. For example, the Field Exit code (Ü) for 5250 terminal emulation is an extended ASCII character that is often configured as the postamble.

To enter ASCII characters for a preamble or postamble

1 Decide which ASCII control character you want to set for the preamble or postamble. Look up the control character in the "Full ASCII Table" in Appendix B in the 2400 Family system manual. and find the two-digit hexadecimal number. For example, ETX in the Full ASCII Table is the hexadecimal value 03.

   To enter an extended ASCII character, look up the two-digit hexadecimal number for the character in the "Trakker Antares Terminal Font Set" in Appendix C of the 2400 Family system manual. For example, Ü (the 5250 Field Exit code) has the hexadecimal value 9A.

2 Use the TRAKKER Antares 2400 Menu System to configure a preamble or postamble. Choose **Main Menu** > **Configuration Menu** > **Terminal Menu** > **Preamble/Postamble**.



248XU057.eps

3 Move the cursor to the field for the preamble or postamble..

4 Type the control character, extended ASCII character, or escape character sequence in the preamble or postamble field.

   - To type a control character or extended ASCII character in the preamble or postamble field, use this syntax:

     `\x`*`hh`*

     where *hh* is the two-digit hexadecimal number for the control character or extended ASCII character. For example, to enter ETX as a preamble, type:

     `\x03`

   - To enter Ü (the 5250 Field Exit code) as the postamble, type:

     `\x9A`

- To type an escape character (backslash) in the preamble or postamble field, you must type two backslashes. The application ignores the first backslash (\) character and saves the next characters. For example:

Enter These Characters	Preamble/Postamble Saved
\\	\
\\k	\k
\	no data

5 Press ↵ or choose **OK** to save your changes and exit the screen.

For help exiting the menu system, see the next two sections, "Exiting Screens and Saving Changes" and "Exiting the Menu System."

Exiting Screens and Saving Changes

When you exit a screen, you can save or discard your changes:

Exiting Screens and Saving Changes

Task	Description
To exit a screen and save the changes	Choose **OK** and press ↵ . You can also press ↵ with the cursor positioned anywhere except on the **Cancel** button.
To exit a screen and discard the changes	Choose **Cancel** and press ↵ . You can also press esc with the cursor in any field.

Exiting the Menu System

1 Press esc until you exit the TRAKKER Antares 2400 Menu System. If you have made any changes to the current configuration, the next screen prompts you to save the configuration parameters that are currently enabled on the terminal to RAM.

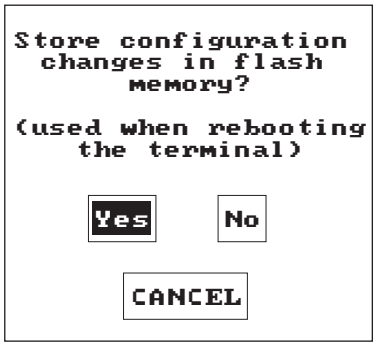
248XU059.eps

2 Choose **Yes** and press ↵ to save your changes in RAM and update the current configuration on the terminal. The Main Menu appears.

Or, choose **No** and press ↵ to exit without changing the configuration. The Main Menu appears.

Or, choose **Cancel** and press ↵ to return to the previous menu or screen.

3 From the Main Menu press esc. If you have made any changes, the next screen prompts you to store the changes in flash memory.



248XU054.eps

Note: You can also save the current configuration in flash memory by choosing the **Store Configuration** command from the System Menu. For help, see "Saving Configuration Changes in Flash Memory" in Chapter 2 of the 2400 Family system manual.

4 Choose **Yes** and press ↵ to save your changes in RAM and update the current configuration on the terminal. The Main Menu appears.

5 Choose **Yes** and press ↵ to save your changes in flash memory. The terminal saves the current configuration as the active configuration. The Exiting TRAKKER Antares 2400 Menu System screen appears.

Or, choose **No** and press ↵ to exit without saving. The terminal continues to use your changes until you boot or reset the terminal. The Exiting TRAKKER Antares 2400 Menu System screen appears.

Or, choose **Cancel** and press ↵ to return to the Main Menu.

248XU055.eps

6 Choose **OK** and press ↵ to exit the TRAKKER Antares 2400 Menu System.

Or, choose **Cancel** and press ↵ to return to the Main Menu.

After you exit the menu system, the terminal will resume the application you were running when you started the menu system.

Configuring Drives and Memory on the Terminal

The Trakker Antares 248X terminals come with a 750K flash drive (C) and 512K RAM reserved for applications. You can also order a 248X with an additional 2MB extended flash memory option. You can customize the terminal to your needs by configuring:

- up to 256K of the 512K RAM as a RAM drive.
- the additional 2MB flash memory to either store double-byte fonts or to use as a 2MB drive.

Configuring the RAM Drive

The 248X has a total of 512K RAM for the application execution space. You can configure up to 256K of the total 512K application execution space as a RAM drive. If the RAM drive is configured, your application execution space is reduced by the amount of the RAM drive.

For example, if your application size is 64K and drive E is configured as a 256K RAM drive, you are using 320K of the 512K application execution space. The application uses the remaining 192K of RAM as a Malloc/free dynamic memory pool.

By default, the RAM drive is not configured and the memory is available for applications. You can configure the size of the RAM drive (E) and use drive E to temporarily store data and files (up to 128 files).

After you disable or configure the RAM drive, you must save the configuration in flash memory and boot the terminal for the change to take effect. For help, see "Saving Configuration Changes in Flash Memory" in Chapter 2 of the 2400 Family system manual.

Note: When you boot or reset the terminal, all files on the RAM drive are destroyed.

For help configuring the RAM drive, see "RAM Drive Size" in Chapter 6 of the 2400 Family system manual.

Configuring Flash Memory

If you ordered the optional 4MB flash memory drive, you have an additional 2MB of extended flash memory. You can use this flash memory either to store double-byte fonts or to use as a 2MB drive. By default, the additional 2MB of flash memory is configured to store a double-byte font set (up to 2MB maximum).

Note: The 4MB flash memory is required for 802.1x TTLS security and is not available to store files or double-byte fonts. For more information about configuring 802.1x TTLS security, see "Configuring 802.1x TTLS Security" on page 82.

If you are not using double-byte fonts, you can configure the 2MB flash memory as a storage drive (D). If you configure the flash memory as drive D, use this drive to store large lookup tables and data files (up to 128 files).

You can only configure the 2MB flash memory as a drive or to store fonts. You cannot use the space for both. If you configure drive D, you cannot store a font in flash memory.

For help configuring flash memory, see "Flash Memory Configuration" in Chapter 6 of the 2400 Family system manual. For help loading double-byte fonts, see "Loading Double-Byte Fonts" in Chapter 2 of the 2400 Family system manual.

4 Operating the Terminal in a Network

This chapter describes serial networks, the RF network, and the Ethernet network. It also explains how the Trakker Antares 248X terminal fits into a particular network. It describes how to install and configure the terminal and how to use serial or network communications.

This chapter covers these topics:

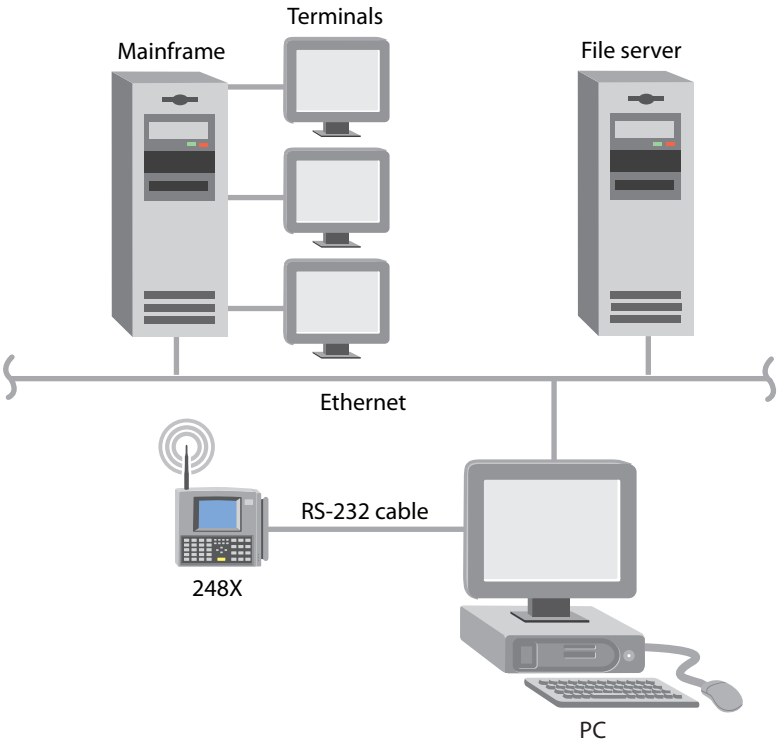
- How the terminals fit into your network
- Using serial communications on the terminal
- Using RF or Ethernet communications on the terminal

How the Terminals Fit Into Your Network

The Trakker Antares® 2480, 2481, 2485, and 2486 terminals are versatile stationary terminals that you can easily add to your network or distributed data collection system.

You can use the 2480 or 2481 with an Ethernet card option as an end device in your Ethernet network. You can use the 2485 or 2486 as an end device in the RF network.

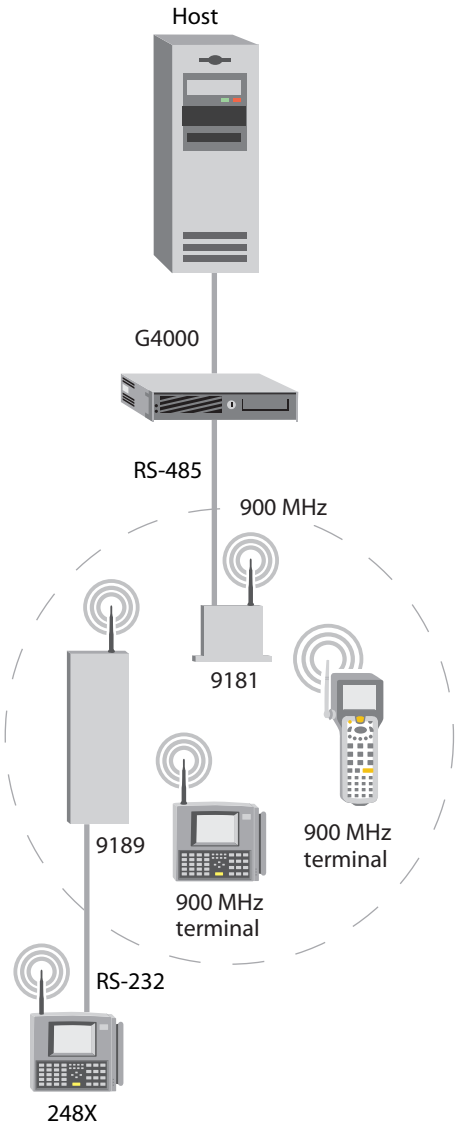
The terminals have a serial port to transmit data to and receive data from a host computer or PC through RS-232 serial communications.



248X in a Wired Network

900 MHz RF Network

You can also use the serial port to connect to a 900 MHz network using the 9189 RF Gateway. The terminal communicates with the 900 MHz network using Polling Mode D protocol.

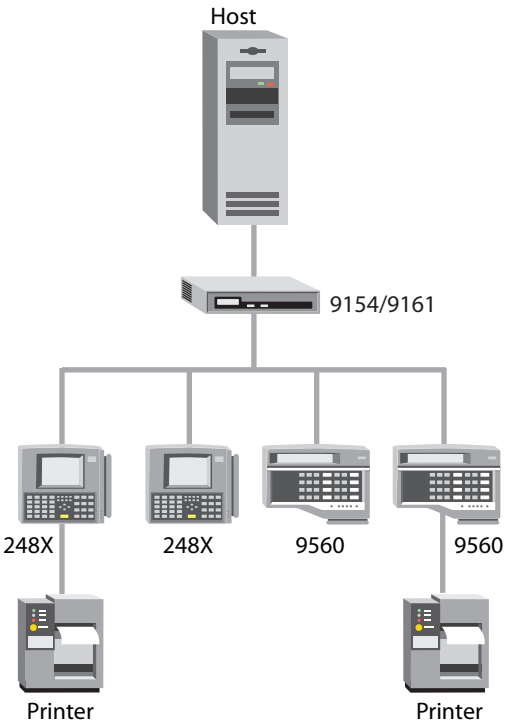


248X in a 900 MHz Network

Intermec CrossBar Network

With the enhanced input/output board, the terminals have an additional serial port (COM2) that supports RS-232/422/485 communications. You can use COM2 to connect to a serial device such as a printer, a wired network, or an Intermec CrossBar network. In a CrossBar network, the 248X transfers data to the 9154 or 9161 controller using Multi-Drop protocol.

You can also attach an adapter cable accessory (P/N 067185) to the enhanced input/output board to use an additional serial port (COM4) for RS-232 serial communications.



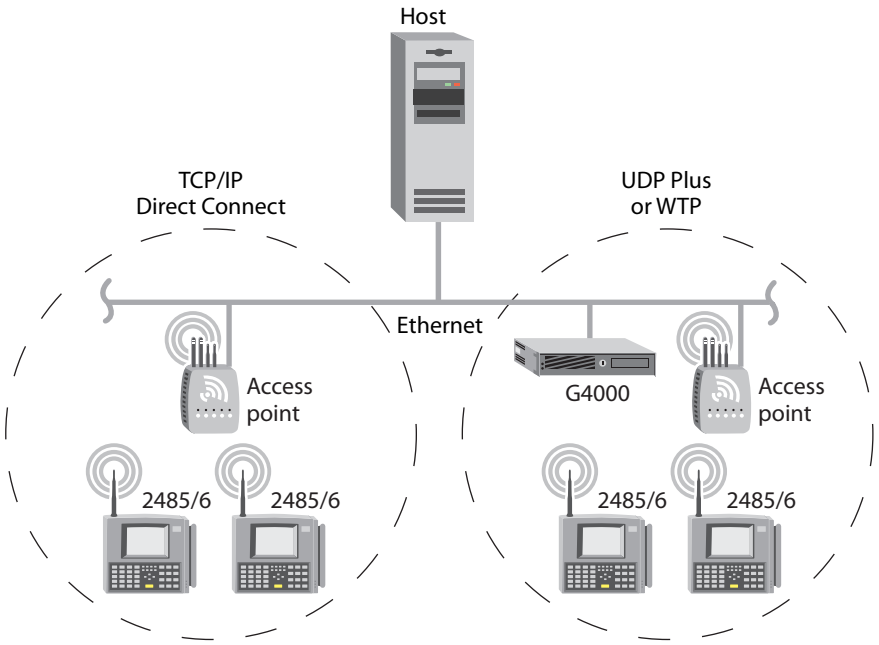
248Xs in an Intermec CrossBar Network

UDP Plus or WTP Network

In a UDP Plus or WTP network, the 2485/6 communicates with a host computer through the G4000. The UDP Plus or WTP packets are translated on the RF network into TCP/IP packets on the wired network and vice versa. The access point acts as a bridge to allow communications between the wired network and the RF network.

TCP/IP Direct Connect Network

In a TCP/IP network, the 2485/6 communicates with a host computer directly using TCP/IP for the RF protocol. The access point acts as a bridge to allow communications between the wired network and the RF network.



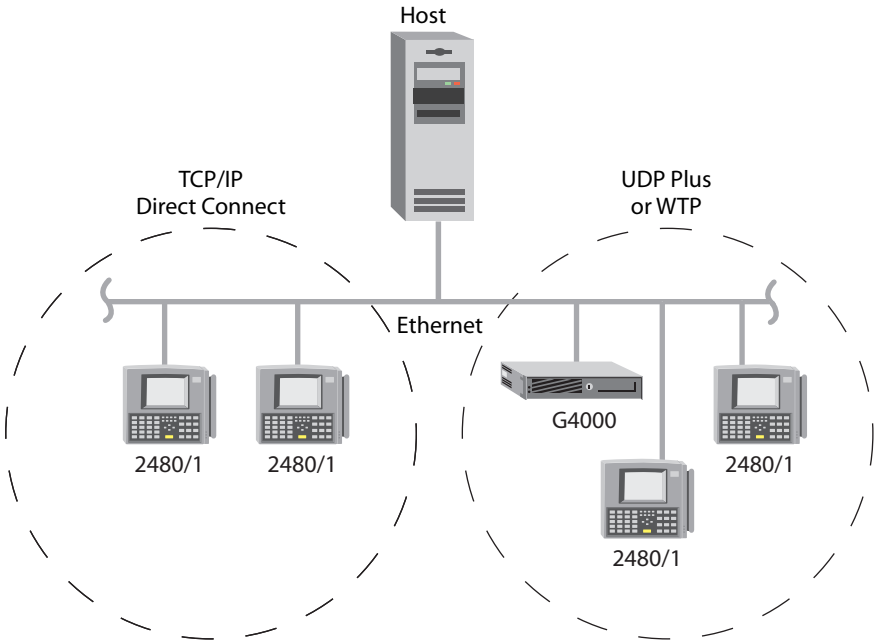
2485/6s in a UDP Plus Network, WTP, or a TCP/IP Direct Connect Network

Ethernet UDP Plus or WTP Network

In a UDP Plus or WTP Ethernet network, the 2480/1 with an Ethernet card communicates with a host computer through the G4000 using UDP Plus for the network protocol.

Ethernet TCP/IP Direct Connect Network

In a TCP/IP Ethernet network, the 2480/1 with an Ethernet card communicates with a host computer directly using TCP/IP for the network protocol.

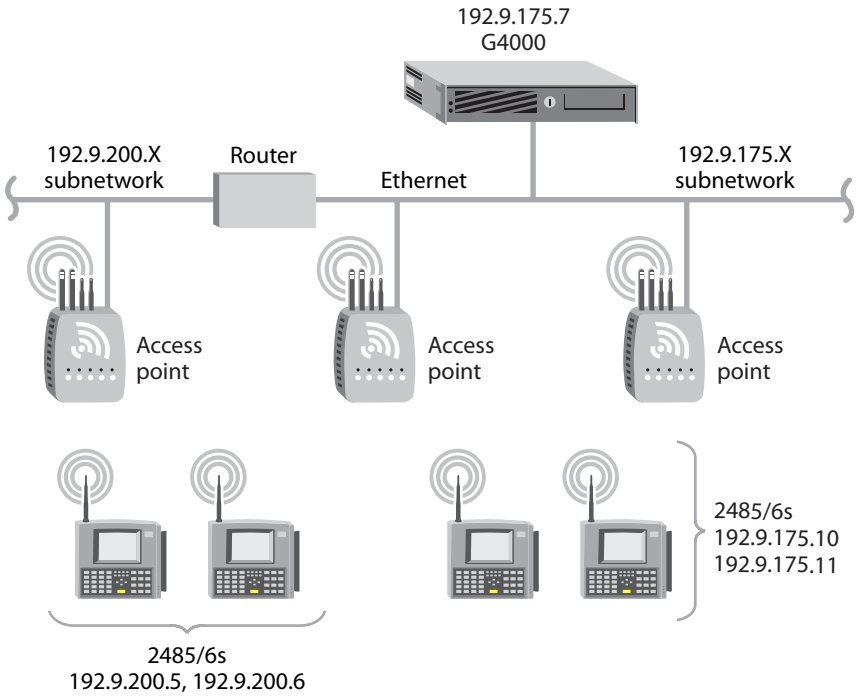


2480/1s in an Ethernet UDP Plus or WTP Network or in an Ethernet TCP/IP Direct Connect Network

Multiple Subnetworks (UDP Plus)

In a UDP Plus network, you can install the 2485/6s, access points, and the G4000 as shown in the next illustration. All the terminals and access points in this illustration communicate with the G4000 at IP address 192.9.175.7.

If you are using MobileLAN™access points, a terminal can roam across subnetworks. However, to roam across subnetworks, all terminal IP addresses must belong to the root IP subnet. In this illustration, if you were using MobileLAN access points, the root IP subnet was 192.9.175.X, and all terminals had a terminal IP address of 192.9.175.X, they could roam across subnetworks. For more information, see the *MobileLAN access System Manual* (P/N 067150).

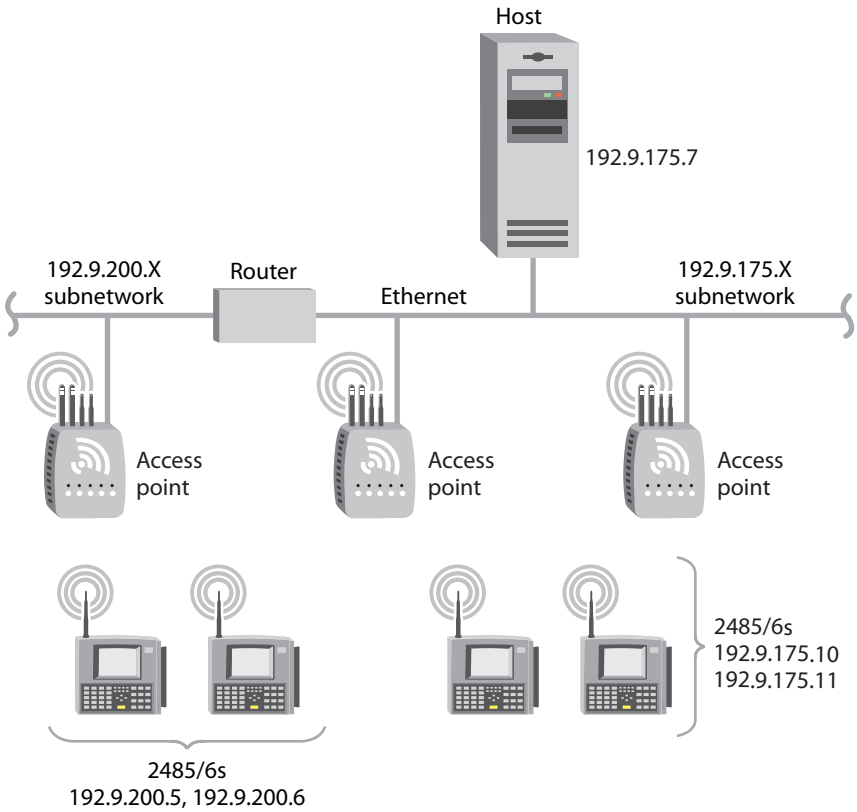


2485/6s in Multiple Subnetworks (UDP Plus)

Multiple Subnetworks (TCP/IP)

In a TCP/IP network, you can install the 2485/6s and access points as shown in the next illustration. All the terminals and access points in this illustration communicate with the host at IP address 192.9.175.7.

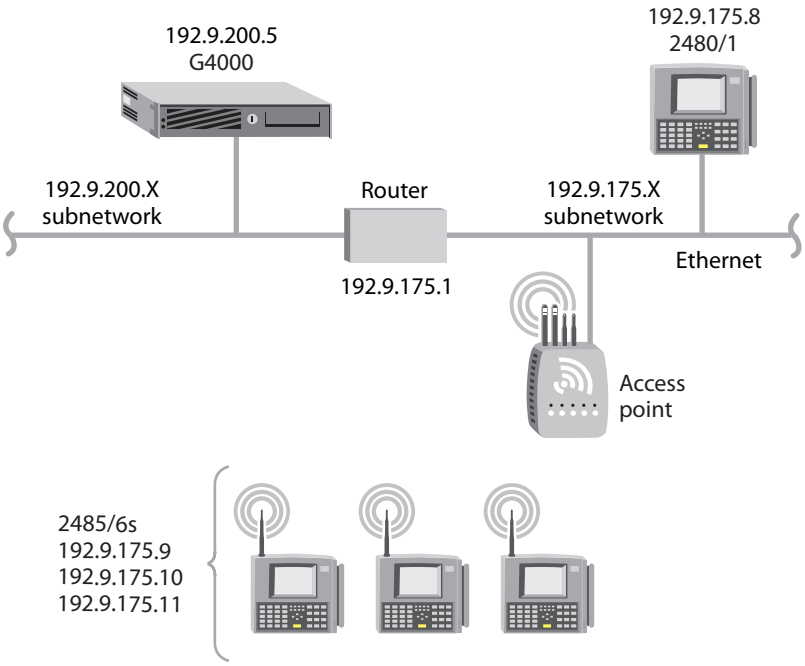
If you are using MobileLAN access points, a terminal can roam across subnetworks. However, to roam across subnetworks, all terminal IP addresses must belong to the root IP subnet. In this illustration, if you were using MobileLAN access points, the root IP subnet was 192.9.175.X, and all terminals had a terminal IP address of 192.9.175.X, they could roam across subnetworks. For more information, see the *MobileLAN access System Manual*.



2485/6s in Multiple Subnetworks (TCP/IP)

Communicating Across Subnetworks (UDP Plus)

You can install the 248X terminals and access points in one subnetwork and install the G4000 or host in another subnetwork. If you have a 2480/1 with an Ethernet card, you can install the 2480/1 in one subnetwork and install the G4000 in another subnetwork. In this network, you need to configure additional network parameters (default router and subnet mask). The next illustration shows the G4000 in another subnetwork from the terminals.



248Xs Communicating Across Subnetworks (UDP Plus)

Using Serial Communications on the Terminal

The Trakker Antares 248X terminals have one or more serial ports to transfer data to and from another device using serial communications. Before you can use the serial port, you need to perform these steps:

1. Install the 248X and connect the terminal to a serial device or network. For help, see Chapter 2, "Installing the Terminal."
2. Choose a communications protocol. For help, see the next section, "Choosing a Communications Protocol."
3. Configure the serial port parameters for the particular communications protocol. For help, see Chapter 3, "Configuring the Terminal."

In a CrossBar network, you also need to configure your 9154 or 9161 controller to add the new multi-drop 248X device. For help, see your controller user's manual.

Choosing a Communications Protocol

After you connect the 248X to a host computer or other serial device, you are ready to configure the serial port parameters on the two devices. The terminal uses a communications protocol and XMODEM, XMODEM1K, or YMODEM to handle data communications through the serial ports.

You can configure a different communications protocol for each COM port. The terminal's built-in file operations use XMODEM, XMODEM1K, or YMODEM for file transfer.

Communications protocols determine exactly how data is transmitted between the terminal and the connected device. Each protocol has parameters you can set, such as baud rate and parity. Both the terminal and the connected device must use the same protocol and parameter settings to communicate properly. For help with protocols, see the *Data Communications Reference Manual* (P/N 044737).

If you are using your 248X terminal in a CrossBar network with 95XX terminals, you need to set up the 248X to match your 95XX configuration. For help, see "Compatibility With 95XX Communications Protocols" on page 113.

- Binary
- Configurable
- Master Polling
- Multi-Drop (COM2 only)
- Point-to-Point
- Polling Mode D

Binary Protocol

Binary protocol has no protocol. Characters are sent and received without being altered. The Data Link Escape character (DLE) is **not** inserted before any character. DLE characters are not stripped out of the incoming data stream and no characters such as EOM or SOM are added.

You can configure the following serial port parameters:

- Baud rate
- Data bits
- Parity
- Stop bits
- Flow control

Configurable Protocol

Configurable protocol is based on Intermec's Polling Mode D protocol except that you have the option to change some of the serial port protocol parameters or remove specific events from the protocol, such as Poll or handshake.

You can configure the following serial port parameters:

- Baud rate
- Data bits
- Parity
- Stop bits
- Flow control
- EOM (End of Message)
  - Configuration commands via serial port
  - LRC
  - SOM (Start of Message)
  - Handshake (enabled or disabled)
    - Poll (Polling) (enabled or disabled)
    - Timeout Delay

Configurable protocol uses EOM to determine the serial communications mode. When EOM is disabled, the terminal communicates in Character mode processing each character. Character mode supports both XON/XOFF and CTS/RTS flow control.

When EOM is enabled, the terminal communicates in Frame mode. When a terminal sends a packet, it adds protocol character. When a terminal receives a packet, it strips any protocol characters before it sends the information to the terminal application. Frame mode supports both XON/XOFF and CTS/RTS flow control. In Frame mode, you can also define these serial port parameters:

- Configuration commands via serial port
- Handshake
- LRC
- SOM

After you enable Handshake, you can define poll and timeout delay.

Master Polling Protocol

Master Polling Mode D protocol requires the terminal to ask the downline serial device for data it may have (polling) and to request to send data to the serial device (selecting). There is no automatic polling, so your application must poll periodically for data.

Before each transmit operation, the terminal issues the SEL sequence for the device addressed and sends the data if an acknowledge is received. Before each receive operation, the terminal issues a poll sequence and waits for data or the RES character (no data is available to send).

You can configure the following serial port parameter:

- Baud rate

Multi-Drop Protocol

Multi-drop uses protocol sequences similar to Polling Mode D with the extension of device addressing, which allows up to 32 devices on one 4-wire RS-485 line. Multi-Drop protocol is typically used in CrossBar networks. Due to timeout parameters, the baud rate must be 2400 or higher. Multi-Drop protocol is only available for COM2.

When you configure COM2 for Multi-Drop protocol, the serial port is automatically configured to communicate using RS-422/485. If COM2 is not configured for Multi-Drop protocol, the port communicates using RS-232.

You can configure the following serial port parameters:

- Baud rate
- Multi-drop device address

Point-to-Point Protocol

Point-to-Point protocol is not directly supported on the terminals. However, you can simulate this protocol by setting the protocol to Configurable and configuring these parameters:

- Baud rate
- Data bits
- Parity
- Stop bits
- Flow control
- EOM (Set EOM1 to \x0D, which is <CR>, and set EOM2 to \x0A, which is <LF>)
- LRC (Disable)
- Handshake (Disable)

If you use this protocol, you cannot configure values for intercharacter delay, turnaround delay, and timeout delay. This protocol supports CTS/RTS flow control only.

Polling Mode D Protocol

Polling Mode D requires the host computer to ask the terminal for data it may have (polling) and to request to send data to the terminal (selecting).

On the 248X, this protocol uses an RS-232 or RS-422 interface and implements the user interface through reader commands. Polling Mode D also supports XON/XOFF and CTS/RTS flow control.

You can use this protocol to connect to a 900 MHz RF network through the 9189 RF Gateway. You can configure the following serial port parameters:

- Baud rate
- Flow control

Using RF or Ethernet Communications on the Terminal

Make sure all components with antennas are at least 30 cm (1 ft) apart when power is applied. Failure to comply could result in equipment damage.

Attention: Assurez-vous que la distance entre tous les éléments avec antennes soit d'au moins 30 centimètres (un pied) avant de faire la connexion avec l'alimentation électrique, faute de quoi vous risquez d'endommager votre installation.

Before you can begin using the 248X to collect data, you need to install and configure each device in the RF or Ethernet network by performing these steps:

1. Plan and prepare your network. Make sure you have unique IP addresses for all devices in the network. Make sure you have all the equipment required to use the:
   - 2480/1 with an Ethernet card in the Ethernet network.
   - 2485/6 in the RF network.
2. (UDP Plus or WTP network only) Configure the Intermec Gateway or DCS 30X. For help, see "Configuring the Intermec Gateway or DCS 30X" on page 78.
3. Configure the access points and radios. For help, see "Configuring the Access Points" on page 79.
4. Configure the network parameters on each terminal. For help, see "Configuring the Network Parameters" on page 81.
5. (2485/6 with 802.1x security) Configure the 802.1x security parameters on each terminal in the network. For help, see "Configuring the 802.1x Security Parameters" on page 82.

Note: You can also configure parameters for multiple terminals in your RF network using the Wavelink Avalanche client management system and the Intermec Settings application. For help, see Chapter 2, "Configuring and Managing the Terminals," in the *Trakker Antares 2400 Family System Manual* (P/N 071389).

The set of network parameters you need to configure depends on whether you install the terminal on the same subnetwork as the Intermec Gateway or DCS 30X (UDP Plus or WTP), or host (TCP/IP) or on a different subnetwork. For help determining which network parameters you need to configure, see "Configuring the Network Parameters" on page 81.

When you begin using the 248X, you need to understand how to use the status lights to monitor communications. For help, see "Using the Status Lights to Monitor Network Communications" on page 86.

Planning the Network Connection

To use the 2480/1 with an Ethernet card in the Ethernet network, you need these minimum requirements:

- Intermec Gateway or DCS 30X (2480/1 with UDP Plus or WTP)
- Ethernet jack or connector in your network

To use the 2485/6 in the RF network, you need these minimum requirements:

- Intermec Gateway or DCS 30X (2485/6 with UDP Plus only)
- Access point

When you first consider purchasing a wireless data collection system, an Intermec representative works with you to perform a site survey at your facility. The site survey analyzes the range of radio frequency devices in your facility, determines the placement of the access points, and ensures that coverage of each access point overlaps to provide uninterrupted wireless access at any location within the building. This manual assumes that a site survey is complete and the access points are installed in your facility.

You need to work with your network administrator to plan and assign the IP address for each device in the RF or Ethernet network. You need to assign and set the IP address for each access point (RF) and each 248X terminal. For a 248X with UDP Plus or WTP, you also need to assign an IP address to the Intermec Gateway or DCS 30X.

Configuring the Intermec Gateway or DCS 30X

Note: The Intermec Gateway is pre-installed on the G4000 Server Appliance.

The Intermec Gateway or DCS 30X supports and manages communications with other devices in the RF network or Ethernet network. When you install and configure the Intermec Gateway or DCS 30X, you identify the host computers and 248X terminals in your network.

In a UDP Plus network, the terminals communicate using a reliable RF protocol (UDP Plus) through the access points to the Intermec Gateway or DCS 30X. The Intermec Gateway or DCS 30X translates UDP Plus to a reliable wired protocol (TCP/IP) and sends the data to the host. For more information, see the *Intermec Gateway User's Guide* (P/N 072245) or the user's manual for the DCS 30X.

In a WTP network, the terminals communicate to the Intermec Gateway or DCS 30X through the access points connected to the Ethernet network. For more information, see the appropriate TE 2000 guide.

Note: You can use a 248X running TCP/IP and the Intermec Gateway or DCS 30X in a pass-through network. You establish a direct TCP/IP socket connection from the 248X to the host through the server.

To allow the 248X communicate with the Intermec Gateway or DCS 30X, you need to perform these tasks on the server:

- Define the host communications parameters, which includes the physical connection (network adapter cards) to the host.
- Define the host environment parameters, which includes configuring for terminal emulation, screen mapping, or client/server applications.
- Configure the UDP Plus or WTP network.
- Assign an IP address to each 248X.

  If you are using a DHCP (Dynamic Host Configuration Protocol) server in a UDP Plus or TCP/IP network, you can leave the default terminal IP address as 0.0.0.0 to enable the 248X as a DHCP client. For help, see "DHCP (Terminal)" in Chapter 6 of the 2400 Family system manual.
- Enable all 248X terminals.

To use dcBrowser, you do not define the host environment parameters. You need to:

- create an HTML application.
- configure the dcBrowser gateway.

Configuring the Access Points

Access points act as bridges to provide communications between the Trakker Antares 2485/6 terminals and the Ethernet or token ring network. You may have multiple access points in your RF network to provide uninterrupted wireless communication at any location within your facility.

After you configure the network, you can collect data anywhere within range of the access points in the wireless network. When you move out of range of one access point, the terminal automatically polls the other access points to continue the network connection.

If you are out of range of all access points in the network, the data is stored in the terminal's radio buffer. The Network Transmit status light turns on. You can continue to collect data until the radio buffer is full. When the buffer is full, the application displays a communication timeout status. When you move back into range and network communications are re-established, the data in the radio buffer is transmitted to the access point and you can once again transmit data.

In a TCP/IP direct connect network with a terminal running a terminal emulation application, the application may disconnect from the host if you remain out of communications range too long or if the host sends "Keep Alive" messages while the terminal is in Suspend mode. You may need to restart the application and log back into the host to re-establish a terminal emulation session. In a UDP Plus or WTP network, the session is maintained any time the terminal is out of range or in Suspend mode.

To communicate through the network, all RF terminals must contain the same type of radio, either a WLI Forum OpenAir or an IEEE 802.11b radio. Depending on the radio in the terminal, you need to set certain parameters to the same configuration on both the terminal and the access points.

OpenAir Radio

To use OpenAir radios in your network, you need to configure:

- Domain. On the access points, the Domain parameter is called the LAN ID (Domain) parameter.
- Security Identification (ID). The Network Activate command must be configured to 2.4 GHz RF network before you can save any changes to the Security ID parameter.

These parameters must be set to the same values on the terminals and the access points. Each access point is configured with a different channel/subchannel combination.

802.11b Radio

To use 802.11b radios in your network, you need to configure:

- Network Name. On the access points, the Network Name parameter is called the SSID (Network Name) parameter. This parameter is case-sensitive.

  On the terminal, you can also set the Network Name parameter to "ANY" or leave the field blank, allowing the terminal to communicate with any access point that has the same radio and is within range. However, Intermec recommends that you define a unique network name.

- WEP Encryption. If you are using 802.1x security, you do not configure WEP Encryption.
- (802.1x security) User Name and Password. For more information about configuring the terminal for 802.1x security, see "Configuring the 802.1x Security Parameters" on page 82.

The Network Name and WEP Encryption parameters must be set to the same value on the terminals and the access points.

Configuring the Network Parameters

When you install the 248X terminal in a network, you need to configure the network parameters that control how the terminal communicates in the network.

The set of network parameters you need to configure depends on whether you install the terminal on the same subnetwork as the Intermec Gateway or DCS 30X or host (TCP/IP), or whether you install the terminal on a different subnetwork.

You need to configure:

- Network Activate.

  If you are operating the 248X in a WTP network, you only need to configure the Network Activate parameter.

  If you are operating the 248X in a TCP/IP or UDP Plus network, make sure that 2.4 GHz RF (OpenAir radio) or 802.11 DS (802.11b radio) appears in the Activate field.
- (UDP Plus) Controller IP Address.
- (TCP/IP) Host IP Address.
- Terminal IP Address (Non-DHCP environment only).
- Network Port.
- Default Router (Intermec Gateway, DCS 30X, or host on different subnetwork).
- Subnet Mask (Intermec Gateway, DCS 30X, or host on different subnetwork).

For help understanding these parameters and their syntax, see Chapter 6 in the 2400 Family system manual. For more information about network connectivity and protocols, see "About Network Connectivity and Protocols" in Chapter 1 of the 2400 Family system manual.

Configuring the 802.1x Security Parameters

Trakker Antares terminals with the 802.1x security option can operate in a protected network that provides secure data transmission. Authentication and authorization is provided using one of these Extensible Authentication Protocol (EAP) types:

- Tunneled Transport Layer Security (TTLS) is a standards-based authentication type with multiple vendor support.
- Lightweight Extensible Access Protocol (LEAP) is Cisco's proprietary authentication type.

This section describes how to configure both 802.1x TTLS and LEAP security. It also describes how the BASEDATE.TXT file is used.

Learning About BASEDATE.TXT

During authentication, TTLS security uses the date that is set on your Trakker Antares terminal to make sure that the terminal falls within the valid date range of the certificate received from the authentication server. Your terminal uses the BASEDATE.TXT file to set the current date. BASEDATE.TXT is originally set to the release date of the most recent version of firmware; however, it is now updated in these situations:

- When you download the latest version of firmware to your PC, BASEDATE.TXT is updated to reflect the current time and date on your PC.
- If BASEDATE.TXT is not loaded on your terminal, it will be created:
  - when you download the latest version of firmware to your PC. It will reflect the current time and date on your PC.
  - when you set the current time and date on your terminal.
- If BASEDATE.TXT is loaded on your terminal, the BASEDATE.TXT text is updated when you set the current time and date on your terminal.

Configuring 802.1x TTLS Security

To use 802.1x TTLS security, you need:

- a PC with the Funk Odyssey™ server software version 1.1 or later. This PC must also be configured with the current date and time, because the server uses these values when it authenticates the terminal.

Note: You can also use a MobileLAN access point with software release 1.80 or later as an authentication server. For help, see the *MobileLAN access System Manual*.

- an Intermec MobileLAN access point with an 802.11b radio and software release 1.80 or later that serves as an authenticator. The authenticator knows the IP address and secret key of the authentication server and translates EAP-TTLS frames to RADIUS frames and vice versa.
- a Trakker Antares terminal. Your terminal must have an 802.11b radio, the 802.1x TTLS security option (includes additional 4MB memory), and firmware version 7.14 or later.

Note: The CACERT.PEM file on the terminal's C drive is used for 802.1x TTLS security. Do **not** delete this file from your terminal. If this file is deleted, you will need to download the latest version of firmware to your terminal. For help, see "Upgrading the Firmware" in Chapter 2 of the 2400 Family system manual.

To enable 802.1x TTLS security on the terminal

1 Make sure that:

- your Funk Odyssey authentication server and MobileLAN access point are properly configured. For help, see the documentation for your authentication server and MobileLAN access point.
- the PC that the authentication server is loaded on is configured with the current date and time.
- your terminal is configured with the primary network, advanced network, and radio parameters.

2 Set the **User Name** and **Password** parameters.

a Scan this bar code label to access the TRAKKER Antares 2400 Menu System:

TRAKKER Antares 2400 Menu System

..-.

The Main Menu appears.

b Choose **Configuration Menu** > **Communications Menu** > **Radio**.

c Scroll to the 802.1x TTLS screen and set the **User Name** and **Password** parameters.

If you just want to make sure that your terminal can be authenticated, you can use the default values of "anonymous" and "anonymous." However, Intermec recommends that you set your permanent user name and password to unique values.

3 Exit the menu system and save all changes.

4 Turn the terminal off and then on again. If you have an application loaded on your terminal, an application screen appears. If you do not have an application loaded on your terminal, a cursor appears in the top left corner of the screen. An AUTHENTICATING message appears on the terminal screen.

Note: The terminal takes up to 60 seconds to authenticate; however, this process may take longer if there is interference in RF communications.

When the terminal is authenticated, it emits a low beep and then a high beep. The application that was running on the terminal, if any, resumes.

If authentication fails, the terminal emits a high beep and then a low beep. The terminal will wait 60 seconds and restart the authentication process. For help, see "Problems While Configuring 802.1x Security" on page 94.

Once you have successfully authenticated your terminal, you need to configure a unique user name, password, and at least one server certificate common name. For help, see Chapter 6, "Configuration Command Reference," in the 2400 Family system manual.

Configuring 802.1x LEAP Security

To use LEAP security on your terminal, you need:

- an authentication server that supports LEAP.
- a Cisco access point.
- a Trakker Antares terminal. Your terminal must have an 802.11b radio, the 802.1x LEAP security option, and firmware version 7.15 or later.

Note: Unlike TTLS security, LEAP security only requires the standard 2MB of memory on the terminal. It does not require the additional 4MB memory option.

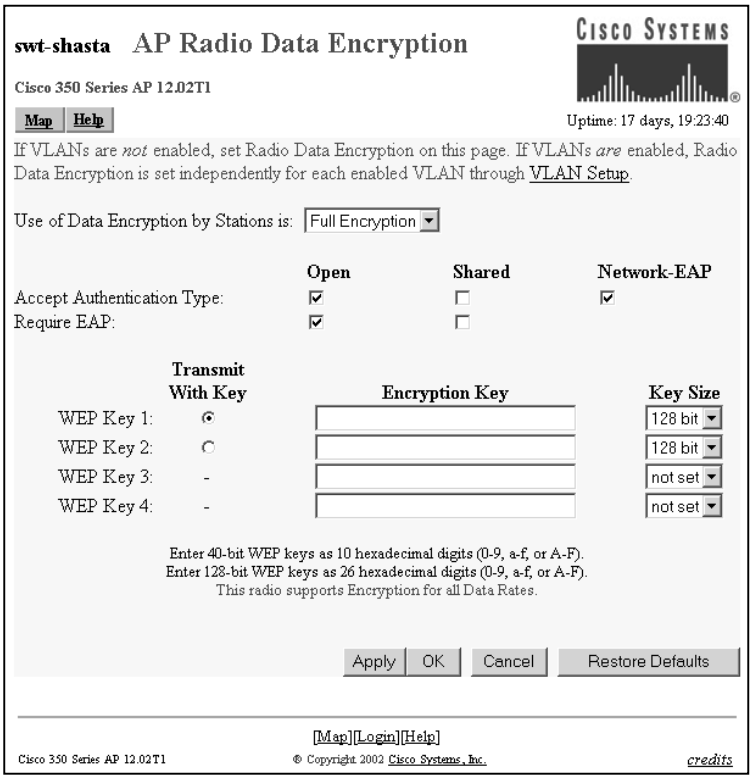
To enable 802.1x LEAP security on the terminal

1 Make sure that:

- your authentication server is properly configured. For help, see the documentation for your authentication server.
- your Cisco access point is properly configured for LEAP security. For help, see the documentation for your Cisco access point.
- your terminal is configured with the primary network, advanced network, and radio parameters.

2 Configure your Cisco access point to communicate with your Trakker Antares terminal using LEAP security.

a Access the AP Radio Data Encryption screen. For help, see the documentation for your Cisco access point.



Note: The AP Radio Data Encryption screen for your Cisco access point may look different than the one shown here.

b Check the **Open** check box for both **Accept Authentication Type** and **Require EAP**.

c Click **OK**.

3 On your Trakker Antares terminal, set the **User Name** and **Password** parameters.

a Scan this bar code to access the TRAKKER Antares 2400 Menu System:

TRAKKER Antares 2400 Menu System

..-.

The Main Menu appears.

b Choose **Configuration Menu** > **Communications Menu** > **Radio**.

c Use the arrow keys to scroll to the LEAP screen and set the **User Name** and **Password** parameters.

If you just want to make sure that your terminal can be authenticated, you can use the default values of "anonymous" and "anonymous." However, Intermec recommends that you set your permanent user name and password to unique values. For help, see Chapter 6, "Configuration Command Reference," in the 2400 Family system manual.

4 Exit the menu system and save all changes.

5 When the terminal is authenticated, it emits a low beep and then a high beep. The application that was running on the terminal, if any, resumes.

If authentication fails, the terminal emits a high beep and then a low beep. The terminal will wait 60 seconds and restart the authentication process. For help, see "Problems While Configuring 802.1x Security" on page 94.

Using the Status Lights to Monitor Network Communications

After you configure the devices in the RF or Ethernet network, you can begin using the application on the 248X to collect and transmit data through network communications. If the terminal is communicating with your host computer, the terminal will connect and begin running the application that shipped on the terminal.

As you use the 248X to collect data, status lights help you monitor network communications on the terminal. To learn how to use the Network Connect and Transmit status lights to monitor communications between the 248X and other devices in the RF or Ethernet network, see "Using the Status Lights" on page 20.

5 Troubleshooting and Maintaining the Terminal

This chapter lists problems you may encounter while using the terminal and provides some possible solutions. You will also find instructions that explain how to boot or reset the terminal and clean the terminal screen.

This chapter covers these topics:

- Problems and solutions
- Booting the terminal
- Troubleshooting a locked up application
- Resetting the terminal
- Cleaning the terminal screen

Problems and Solutions

If you have any problems with the Trakker Antares 248X terminal, use this table as a guide to find the problem and solution in this chapter:

Finding Problems and Solutions

You can also use the error numbers and messages table and the terminal diagnostics to help analyze and solve problems. For help, see Chapter 4, "Running Diagnostics," in the *Trakker Antares 2400 Family System Manual* (P/N 071389).

If you have problems with the 3270, 5250, or VT/ANSI terminal emulation application, see the appropriate TE 2000 guide.

If you send the terminal in for service, it is your responsibility to save the terminal data and configuration. Intermec is responsible only for ensuring that the keypad and other hardware features match the original configuration when repairing or replacing your terminal.

Problems While Operating the Terminal

If you are operating the terminal and have trouble, check these possible solutions.

Problems While Operating the Terminal

Problem	Possible Solution
You press ⏻ to turn on the terminal and the screen is blank and the status lights are not on.	The internal temperature of the terminal may be too warm. If the internal temperature is over 65°C (149°F), the terminal will not operate. Let the terminal cool down so that the internal temperature drops below 65°C (149°F).

Problems While Operating the Terminal (continued)

Problem	Possible Solution
You press ⏻ to turn on the terminal and the screen is blank and the Power status light is blinking. 	No external power supply is connected. Make sure that the power cable is plugged into the terminal and the outlet. For help, see Chapter 2, "Installing the Terminal."
You cannot scan bar code labels with a wand, badge scanner, laser scanner, or imager that is connected to the terminal.	See "Problems Scanning Bar Code Labels" on page 100.
You scan a reader command, such as Change Configuration, and nothing happens.	The reader commands are disabled. Scan the Enable Override command shown here to temporarily enable all of the reader commands. You can also enable or disable reader commands with the TRAKKER Antares 2400 Menu System. For help, see "Command Processing" in Chapter 6 of the 2400 Family system manual. When you are finished, remember to disable the override so that your data is not interpreted as a command. Enable Override  *$+DC3*
You scan a valid bar code label to enter data for your application. The data decoded by the terminal does not match the data encoded in the bar code label.	The terminal may have decoded the bar code label in a symbology other than the label's actual symbology. Try scanning the bar code label again. Make sure you scan the entire label. To operate the terminal quickly and efficiently, you should enable only the bar code symbologies that you are going to scan. If you enable multiple symbologies, the terminal may, on rare occasions, decode a bar code according to the wrong symbology and produce erroneous results.
The terminal shuts off, and you cannot turn it on again.	The internal temperature of the terminal may be too warm. If the internal temperature is over 65°C (149°F), the terminal will not operate. Let the terminal cool down so that the internal temperature drops below 65°C (149°F).
The terminal displays the Boot Menu.	The Boot Menu appears if you just upgraded the firmware on the terminal and POST failed. Press 1 to boot the terminal. Report the problem to your supervisor. For help with the Boot Menu, see "Booting the Terminal" on page 101.
The Power status light blinks and an external power supply is connected. 	The backup battery charge is low. Let the power supply charge the backup battery. The backup battery will be fully charged in approximately 24 hours. If you have been using the terminal in a cold temperature environment, move the terminal to a warmer environment to charge the backup battery. If the battery status on the Battery/PIC diagnostic screen is bad, or the battery is dead, you may need to replace the backup battery. The NiCad backup battery is not user-serviceable. You must return the Trakker Antares 248X terminal to Intermec to replace the backup battery. For help, contact your local Intermec service representative.

Problems While Operating the Terminal (continued)

Problem	Possible Solution
You want to restore the terminal's default configuration to start over configuring the terminal.	Scan this bar code label: Default Configuration  *.+* Or, use the TRAKKER Antares 2400 Menu System. For help, see "Restoring the Terminal's Default Configuration" in Chapter 2 of the 2400 Family system manual. After you load the default configuration, you may need to set the primary network communications parameters to communicate with other devices in the network.
The terminal appears to be locked up and you cannot enter data.	Try these possible solutions: • Wait at least 10 seconds and try again. If the terminal is still connecting to the Intermec Gateway, DCS 30X, or host, the terminal will ignore any input from the keypad or scanner. If the Network Connect status light appears and remains on, you can continue working. • Scan any bar code label to see if the terminal responds. • Follow the instructions in "Troubleshooting a Locked Up Application" on page 103. • If the terminal will not boot or reset, contact your local Intermec service representative for help.
The terminal is booting and you see a message that POST failed.	The screen displays the system that failed POST. Report the error message to your supervisor. Press esc to exit the error message. The Boot Menu appears. Press 1 to boot the terminal. Your application appears on the screen. If the terminal still will not boot, contact your local Intermec service representative for help.

Problems While Configuring the Terminal

If you have trouble configuring the terminal, check these possible solutions.

Problems While Configuring the Terminal

Problem	Possible Solution
On the 2485/6, you configure the security ID and the changes do not appear to be saved.	You can only set the security ID with the RF network enabled. The Network Activate configuration command must be configured to the RF network before you can save any changes to the security ID command.
You are configuring SOM or EOM in the Configuration Menu and cannot set two characters.	You may have a space in the SOM or EOM field. The space does not show, but it is a valid character. To clear a space from the field, put the cursor in the field and press ←. Now set the two-character value for SOM or EOM.

Problems While Configuring the Terminal (continued)

Problem	Possible Solution
You scan a configuration command, such as Keypad Caps Lock, and nothing happens.	There are two possible solutions: • One or more reader commands, such as Change Configuration, may be disabled, so that you cannot change the configuration. Enable all of the reader commands and try again. • The terminal may be waiting for another command to complete the configuration change. If you started by scanning the Enter Accumulate command, you must finish the command by scanning the Exit Accumulate command. For help, see Chapter 6 of the 2400 Family system manual. Scan Enable Override to temporarily enable all of the reader commands. When you are finished, remember to disable the override so that your data is not interpreted as a command. Enable Override  *$+DC3*
You scan a configuration command to set one of these parameters and hear three low beeps: • Controller IP Address (UDP Plus) or Host IP Address (TCP/IP) • Terminal IP Address • Default Router • Network Activate	If the Network Activate command is enabled (RF or Ethernet network enabled) and you are configuring the terminal, these addresses must define a valid network configuration. For example, an invalid network configuration would be a controller (or host) IP address set to 0.0.0.0 with the network enabled. To set these four parameters, follow these steps: **1** Disable the Network Activate (NA) configuration command. **2** Set the terminal IP address and the controller IP address or the host IP address. **3** Set the default router address (if necessary). **4** Enable the Network Activate command. You can change an IP address with the network enabled as long as it still defines a valid network configuration.
You scan a configuration command, such as Keypad Caps Lock, and you hear three low beeps.	If you are working in the TRAKKER Antares 2400 Menu System, you cannot scan configuration commands. Use the Configuration Menu to change the terminal's configuration, or exit the menu system to scan configuration commands. Check the command you are trying to scan. Make sure the command is set correctly for the options and network communications you are using with the terminal. For help, see Chapter 6 of the 2400 Family system manual.

You are configuring the serial port and see this error message when exiting the Configuration Menu:
`PG command failed.`
`Configuration was not updated.`
	PG is the Handshake configuration command. You need to change the value of Handshake or set other serial port parameters. Choose Serial Port from the Communications Menu.
	The order in which you set serial port protocol configuration commands is important. To use Frame mode, you need to set EOM first. Next, configure Handshake, LRC, SOM, and then Poll. To use Character mode, you need to disable these same parameters in reverse order. For help, see "Using Serial Communications on the Terminal" on page 73.

Problems While Configuring the Terminal (continued)

Problem	Possible Solution
You are scanning a configuration command to set one of the serial port parameters and hear three low beeps. For example, you are trying to set EOM or SOM.	The order in which you scan serial port protocol configuration commands is important. Configurable Serial Port (CSP) protocol uses EOM to determine the serial communications mode. When EOM is disabled, the terminal communicates in Character mode. When EOM is enabled, the terminal communicates in Frame mode. To use Frame mode, you need to set EOM first. Next, configure Handshake, Configuration Commands Via Serial Port, LRC, SOM, and then Poll. To use Character mode, you need to disable these same parameters in reverse order. For help, see "Using Serial Communications on the Terminal" on page 73.

You are configuring the serial port and see this error message when exiting the Configuration Menu:
`Serial port configuration error.`
`EOM #1 cannot equal EOM #2. Configuration was not updated.`
	EOM can be one or two ASCII characters, but you cannot set the first and second character to the same character. Also, you cannot set EOM to any of these values: AFF (ACK), DLE, NEG (NAK), Poll, RES (EOT), REQ (ENQ), SEL, XOFF, or XON. You need to change the value of EOM #1 or #2. Choose Serial Port from the Communications Menu.
	For help, see "End of Message (EOM)" in Chapter 6 of the 2400 Family system manual.

You are configuring the serial port and see this error message when exiting the Configuration Menu:
`Serial port configuration error.`
`SOM cannot equal EOM.`
`Configuration was not updated.`
	SOM cannot equal the same value that is set for EOM. You cannot set SOM to any of these values: AFF (ACK), DLE, NEG (NAK), Poll, RES (EOT), REQ (ENQ), SEL, XOFF, or XON. You need to change the value of SOM. Choose Serial Port from the Communications Menu.
	For help, see "Start of Message (SOM)" in Chapter 6 of the 2400 Family system manual.

You are configuring the serial port and see this error message when exiting the Configuration Menu:
`Serial port configuration error.`
`SOM is set. You must also set EOM.`
`Configuration was not updated.`
	You must configure a value for EOM before you can set SOM or disable SOM. You need to change the value of SOM. Choose Serial Port from the Communications Menu.
	Configurable Serial Port (CSP) protocol uses EOM to determine the serial communications mode. When EOM is disabled, the terminal communicates in Character mode. When EOM is enabled, the terminal communicates in Frame mode.
	To use Frame mode, you need to set EOM first. Next, configure Handshake, Configuration Commands Via Serial Port, LRC, SOM, and then Poll. To use Character mode, you need to disable these same parameters in reverse order. For help, see "Using Serial Communications on the Terminal" on page 73.

You see this error message when exiting the Configuration Menu: `Network configuration error. Network is enabled. Terminal IP address and Default Router address set to the same address. Configuration was not updated.`	The RF or Ethernet network is enabled and there is a problem with the network configuration. You need to change the terminal IP address or the default router address or both. Choose Primary Network or Advanced Network from the Communications Menu. The terminal IP address and the default router address are both set to the same address. Set a valid IP address for the terminal and the default router. For help, see "Using RF or Ethernet Communications on the Terminal" on page 77. If you cannot fix the addressing problem, check with your network administrator to get the IP addresses for each RF network device.

Problems While Configuring the Terminal (continued)

Problem	Possible Solution

You see this error message when exiting the Configuration Menu:
Commandname
`command failed.`
`Remainder of configuration not updated.`
	The two-character name (syntax) of the configuration command that failed is listed on the first line of the error message. For example, you may see this message:
	`SS`
	`command failed.`
	There may be a problem with the configuration due to a change made with the Scanner Selection (SS) command. Check the command listed in the message. To find the command, use the "Configuration Commands by Syntax" table in Appendix A of the 2400 Family system manual. Make sure the command is set correctly for the options and network communications you are using with the terminal. For help, see Chapter 6 of the 2400 Family system manual.

You see this error message when exiting the Configuration Menu: `Network configuration error. Network is enabled. Default Router address is not on the terminal's network. Configuration was not updated.`	The RF or Ethernet network is enabled and there is a problem with the network configuration. You need to change the default router address. Choose Advanced Network from the Communications Menu. The terminal and Intermec Gateway or DCS 30X (UDP Plus or WTP network), or host (TCP/IP network) are on different networks, and the terminal is not on the same network as the default router. When the terminal is on a different IP subnetwork from the Intermec Gateway, DCS 30X, or host, you need to set the Default Router and Subnet Mask commands. Set a valid IP address for terminal, Intermec Gateway or DCS 30X or host, and default router. For help, see "Using RF or Ethernet Communications on the Terminal" on page 77. If you cannot fix the addressing problem, check with your network administrator to get the IP addresses for each network device.
You see this error message when exiting the Configuration Menu: `Network configuration error. Network is enabled. Terminal IP address or Controller (Host) IP address set to the same address. Configuration was not updated.`	The RF or Ethernet network is enabled and there is a problem with the network configuration. You need to change the terminal IP address or the controller IP address (host IP address for a TCP/IP network) or both. Choose Primary Network from the Communications Menu. The terminal IP address and the controller/host IP address are both set to the same address. Set a valid IP address for the terminal and Intermec Gateway, DCS 30X, or host. For help, see "Using RF or Ethernet Communications on the Terminal" on page 77. If you cannot fix the addressing problem, check with your network administrator to get the IP address assigned to the terminal and the Intermec Gateway, DCS 30X, or host.

You are configuring the serial port and see this error message when exiting the Configuration Menu:
`Serial port configuration error. DLE, XON, XOFF are not valid values for either SOM or EOM.`
`Configuration was not updated.`
	You cannot set EOM or SOM to any of these values: AFF (ACK), DLE, NEG (NAK), Poll, RES (EOT), REQ (ENQ), SEL, XOFF, or XON. You need to change the value of EOM or SOM. Choose Serial Port from the Communications Menu.
	For help, see "End of Message (EOM)" or "Start of Message (SOM)" in Chapter 6 of the 2400 Family system manual.

Problems While Configuring 802.1x Security

If you have trouble configuring the terminal for 802.1x security, check these problems and possible solutions. For more error numbers and messages, see "802.1x Security Error Numbers and Messages" in Chapter 4 of the 2400 Family system manual.

This section references error numbers that are displayed on the Error Logger screen in the TRAKKER Antares 2400 Menu System. To view the Error Logger screen, from the Main Menu, choose Diagnostics Menu, Software Diagnostics, and then Error Logger.

Problems While Configuring 802.1x Security

Problem	Possible Solution
The "AUTHENTICATING" message does not appear on the screen, and the Network Connect status light is not on.	The terminal may not be communicating with your MobileLAN access point. Make sure that: • the network name on the terminal is the same as the network name (SSID) of the access point that you are trying to communicate with. The default network name is "INTERMEC." • the Network Activate command is enabled on your terminal. The 802.1x security network may not be active. Make sure that the Odyssey™ server software is properly loaded and configured on the server PC. For help, see the documentation that shipped with your server software.
The "AUTHENTICATING" message does not appear on the screen. The Network Connect status light turns on, but it does not stay on.	The terminal may not be communicating with the MobileLAN access point that you want it to communicate with. Make sure that the network name on the terminal is the same as the network name of the access point that you are trying to communicate with. The default network name is "INTERMEC." The MobileLAN access point that you are trying to communicate with may not be communicating with the Odyssey server. Make sure your MobileLAN access point is turned on, properly configured, and has 802.1x security enabled.
The terminal indicates that it is authenticated by emitting a low beep and a high beep, but it does not communicate with the host.	Make sure that the terminal IP address, host IP address, subnet mask, and default router are properly configured for your network. **Note:** Do not cold boot the terminal. Cold booting the terminal resets the time and date.
The "AUTHENTICATING" message appears on the screen, but the terminal does not emit a low beep and a high beep to indicate that it is authenticated.	The terminal takes up to 60 seconds to authenticate; however, this process may take longer if there is interference in RF communications. You may need to wait for the authentication process to finish. You may be out of range of the MobileLAN access point that you are trying to communicate with. Try moving closer to the MobileLAN access point.

Problems While Configuring 802.1x Security (continued)

Problem	Possible Solution
The terminal indicates that it is not authenticated by emitting a high beep and a low beep. This error code appears on the Error Logger screen: `0x377`	Make sure that: • the User Name and Password parameters on your terminal match the user name and password on your Odyssey server. You may need to re-enter the password on both your terminal and Odyssey server. • on your Odyssey server, the user and group are allowed and the group policy is allowed to log in to the Odyssey server. For help, see the documentation that shipped with your Odyssey server software. • the IP address and secret key for your MobileLAN access point must match the IP address and secret key on your Odyssey server. You may need to re-enter the IP address and secret key on both your MobileLAN access point and Odyssey server. • your Odyssey server is active and that it can communicate with your MobileLAN access point. You can use the PING command to determine communications. • the Odyssey server software is running on the server PC. • the UDP port (standard RADIUS port, 1812) on your Odyssey server is active. For help, see the documentation that shipped with your Odyssey server software.
The "AUTHENTICATING" message appears on the screen, but the terminal does not emit a low beep and a high beep to indicate that it is authenticated. This error code appears on the Error Logger screen: `0x37B`	The authentication process timed out. You may be out of range of the MobileLAN access point that you are trying to communicate with. Try moving closer to the MobileLAN access point.
The terminal indicates that it is not authenticated by emitting a high beep and a low beep. This error code appears on the Error Logger screen: `0x513`	The root Certificate Authority certificate on your terminal cannot validate the server certificate. • Make sure your Odyssey server is using a server certificate that matches the root certificate loaded on your terminal. • Verify the root certificate in the CACERT.PEM file on your terminal's C drive. For help, see the documentation that shipped with your Odyssey server software.
The terminal indicates that it is not authenticated by emitting a high beep and a low beep. This error code appears on the Error Logger screen: `0x542`	Neither of the server certificate common names configured on your terminal matches the server certificate common name in the active server certificate on your Odyssey server. • Delete both server certificate common names on your terminal to see if you can authenticate without checking the server certificate common name. • Change one or both server certificate common names on your terminal so that they match the server certificate common names in the active server certificate on your Odyssey server. For help, see "Server Certificate Common Name" in Chapter 6 of the 2400 Family system manual.

Problems While Configuring 802.1x Security (continued)

Problem	Possible Solution
The terminal indicates that it is not authenticated by emitting a high beep and a low beep. One of these error codes appears on the Error Logger screen: `0x50A` or `0x509`	The time and date on your terminal does not fall within the range of valid dates indicated on the server certificate. Modify the time and date so that it falls within the range of valid dates. For help, see "Time and Date" in Chapter 6 of the 2400 Family system manual. If this is a recurring problem, you may want to update the BASEDATE.TXT file on your terminal. **1** Make sure that your PC is configured with the correct date and time and that you have BASEDATE.TXT and LOADER.EXE on your PC. These files are available as part of the firmware upgrade that can be downloaded at no charge from the Intermec web site at www.intermec.com. **2** Follow Steps 1 through 5 of the procedure To transfer applications and files to the terminal using LOADER.EXE in Chapter 3, "Developing and Using Applications," in the 2400 Family system manual. **3** On your PC, type: `LOADER` *`pathname`*`\BASEDATE.TXT` where *pathname* is the path to the location of BASEDATE.TXT on your PC. The Loader screen appears. BASEDATE.TXT is set to the current time and date on your PC and is transferred to your terminal.

Problems Communicating With RF or Ethernet Network Devices

If the 2485/6 is not communicating with other devices in the RF or Ethernet network, check these possible problems.

Problems Communicating With RF or Ethernet Network Devices

Problem	Possible Solution
The Network Connect status light blinks on the terminal screen. 	In a UDP Plus or WTP network, the terminal is not connected to the Intermec Gateway or DCS 30X. You may need to check the terminal configuration or make sure the Intermec Gateway or DCS 30X is running and that data collection is started. The 2485/6 may be out of range of an access point or the access point may have recently been turned off. Make sure the access point is still turned on. Each device in the network must have a valid IP address. The IP addresses set on the terminal must match the addresses configured on the Intermec Gateway, DCS 30X, or host. For help, see "Using RF or Ethernet Communications on the Terminal" on page 77.
When you turn on the terminal after it was suspended for 10-15 minutes or longer, the terminal can no longer send or receive messages over the network.	The host may have deactivated or lost your current terminal emulation session. In a TCP/IP direct connect network, you need to turn off the "Keep Alive" message (if possible) from the host so that the TCP session is maintained while a terminal is suspended.

Problems Communicating With RF or Ethernet Network Devices (continued)

Problem	Possible Solution
The Network Connect status light remains on, but you cannot establish a terminal emulation session with the host computer. ✱	There may be a problem with the host computer, a problem with the connection between the Intermec Gateway or DCS 30X and the host computer, or a problem with the connection between the access point and the host (TCP/IP). Check with your network administrator to make sure the host is running and allowing users to login to the system.
The Network Connect status light is turned off. The 2480/1 with an Ethernet card is not communicating with the Ethernet network. The 2485/6 is not communicating with the access point.	Make sure the access point is turned on and operating. You may also be using the terminal out of the RF range of an access point. Try moving closer to an access point to re-establish communications. If you are using a 21XX access point with software release 1.34 or earlier, it may not be able to communicate with the terminal. For help upgrading your access point software, see the MobileLAN access System Manual (P/N 067150). In a TCP/IP direct connect network, you cannot scan or enter data when the 2485/6 is not communicating with an access point or you may lose your TCP session. Make sure the Network Activate command is enabled. For help, see "Network Activate" in Chapter 6 of the 2400 Family system manual. Make sure the terminal is configured correctly for your network. The radio parameters on the terminal must match the values set for all access points the terminal may communicate with. For help, see "Using RF or Ethernet Communications on the Terminal" in on page 77. If you have an 802.11b radio, the radio initialization process may have failed. Try resetting the terminal. For help, see "Resetting the Terminal" on page 104. If you have tried these possible solutions and the Network Connect status light is still off, you may have a defective radio card. For help, contact your local Intermec service representative.
The Network Connect status light remains on, but the host computer is not receiving any data from the terminal. ✱	There may be a problem with the connection between the Intermec Gateway or DCS 30X and the host computer. Check with your network administrator or see the documentation that shipped with the Intermec Gateway or the user's manual for the DCS 30X. In a TCP/IP network, there may be a problem with the connection between the access point and the host computer. Check with your network administrator or use your access point user's manual to troubleshoot any potential problems with the access point.

The Network Connect status light blinks on the terminal screen and you see this message:
`Unable to connect to controller. Error 102.`
`Unable to establish connection to host. Session ended.`
	The 2485/6 is connected to the access point but is trying to establish communications with the Intermec Gateway or DCS 30X and the host computer. Make sure the terminal is correctly configured for your network. Make sure the Intermec Gateway or DCS 30X is configured and running. Make sure the host computer is configured and running.
	If the network is configured correctly, try restarting the Intermec Gateway or DCS 30X to establish communications. You can also reset the terminal. For help, see "Resetting the Terminal" on page 104.

Problems Communicating With RF or Ethernet Network Devices (continued)

Problem	Possible Solution
The 2485/6 is connected to the host computer and you move to a new site to collect data. The Network Connect status light was on and now begins to blink or turns off. 	You may have gone out of range of an access point. Try moving closer to an access point or to a different location to re-establish communications. Once you are in range again, the Connect icon will appear and remain on. Any data you collected while you were out of range will be transmitted over the network.
You are having problems with your 802.11b RF network coverage.	Make sure that the Medium Density Distribution (MDD) command on your access point is not enabled. When MDD is enabled, the access point distributes values for these RF coverage parameters to your terminal: AP Density, Medium Reservation, and Microwave Robustness. Changes made by your access point are not reflected in the terminal menu system.

Problems While Running Applications

If you have trouble running applications on the terminal, check these possible solutions.

Problems While Running Applications

Problem	Possible Solution
There is not enough memory to load a program.	You need to free conventional memory.
You try to run a DOS application in the TRAKKER Antares 2400 Menu System and see this message: `Not a valid application.`	You tried to run a DOS .EXE application from the TRAKKER Antares 2400 Menu System. You can only run .BIN applications in the menu system. To run a DOS .EXE application, enter the filename at the DOS prompt. For help, see "Running DOS Applications and Using ROM-DOS Commands" in Appendix D of the 2400 Family system manual.
A DOS command does not work.	For a list of commands, see "Using ROM-DOS Commands" in Appendix D of the 2400 Family system manual.

You see one of these error messages while running a PSK or EZBuilder application:
`SCREEN ERROR: 30`
`Code: 9`
`Hit any key To exit!`
`SCREEN ERROR: 31`
`Code: 3`
`Hit any key To exit!`
	You must set the RAM Drive Size configuration command. For help, see "RAM Drive Size" in Chapter 6 of the 2400 Family system manual.

The terminal does not boot after you modified the CONFIG.SYS file to configure a ROM-DOS RAM drive.	Correct the error in CONFIG.SYS and use the DOS software tools to recreate drive A with the corrected CONFIG.SYS file.

Problems Transmitting Data Through the Serial Port

If you are having problems sending or receiving data through the serial port on the terminal, check these possible problems:

- Make sure the terminal is connected to the host computer or serial device through COM1, COM2, or COM4.
- Make sure you are using the appropriate 248X cable to connect the terminal to the host or serial device. For COM2, you need a compatible 25-pin serial cable or the CrossBar adapter cable (P/N 069447). For COM4, you need the adapter cable accessory (P/N 067185).
- Make sure the terminal's serial port parameters are configured to match the serial port configuration on the host computer or serial device.

For help connecting and configuring the serial port, see "Using Serial Communications on the Terminal" on page 73.

Problems Transmitting Data Through the Intermec Gateway or DCS 30X

If you have a problem while running the application on the terminal in a UDP Plus or WTP network, check these possible communications problems.

Problems Transmitting Data Through the Intermec Gateway or DCS 30X

Problems Transmitting Data Through the Intermec Gateway or DCS 30X

Problem	Possible Solution
Transaction Buffer Full.	The buffer holding transactions to be sent to the controller is full. Stop collecting data with this terminal. Make sure the terminal is communicating with the Intermec Gateway or DCS 30X and let the terminal send all the transactions in the buffer before you continue collecting data.
Sending Buffer Transactions.	This is an information message to tell you that buffered transactions are now being sent to the Intermec Gateway or DCS 30X. You can begin collecting data again once the message clears.
Transaction Aborted.	The transaction just sent to the Intermec Gateway or DCS 30X was not received. Try sending the transaction again.
Transmit Error XX, press Enter.	There is an error transmitting data to the Intermec Gateway or DCS 30X. XX represents the status code error. Note the error code listed in the message and contact your local Intermec service representative for help. Press ↵ to continue.
Receive Error XX, press Enter.	There is an error receiving data from the Intermec Gateway or DCS 30X. XX represents the status code error. Note the error code listed in the message and contact your local Intermec service representative for help. Press ↵ to continue.
Shutting down.	The Intermec Gateway or DCS 30X is shutting down. You may continue collecting data and buffer the transactions in the terminal until the Intermec Gateway or DCS 30X starts again or stop collecting data with the terminal.

Problems Transmitting Data Through the Intermec Gateway or DCS 30X (continued)

Problem	Possible Solution
Controller Shutdown.	The Intermec Gateway or DCS 30X has shut down. You may continue collecting data and buffer the transactions in the terminal until the Intermec Gateway or DCS 30X starts again or stop collecting data with the terminal.

Problems Scanning Bar Code Labels

If you cannot scan bar code labels or you are having problems with the scanner, check these possible solutions.

Problems Scanning Bar Code Labels

Problem	Possible Solution
An input device is not attached to the terminal.	You must install an input device before scanning bar code labels. Make sure an input device, such as a 1550 laser scanner, is installed correctly. For help, see "Using the Badge Scanner and Other Input Devices" on page 31.
You have an input device attached to the terminal and it cannot read any bar code labels.	You may not be using an input device that is supported by the 248X terminal. Make sure you are using one of the supported input devices listed in "Input Devices for the External Scanner Port" on page 110.
You cannot see a red beam of light from the wand, laser scanner, or CCD scanner.	There are two possible problems: • You may be too far away from the bar code label. Try moving closer to the bar code label and scan it again. • You may be scanning the bar code label "straight on." Try changing the scanning angle until the laser beam is the brightest. This is the best scanning angle.  Warning **Do not look directly into the window area or at a reflection of the laser beam while the laser is scanning. Long-term exposure to the laser beam can damage your vision.** **Avertissement: Ne regardez pas directement la réflexion d'un rayon laser ou dans la fenêtre du laser lorsque celui-ci est en opération. Si vous regardez trop longtemps un rayon laser, cela peut endommager votre vue.**
The input device connected to the module for cabled scanners does not appear to work well or read bar code labels very quickly.	Try setting the Scanner Selection command to the specific input device you have attached. For help, see "Scanner Selection" in Chapter 6 of the 2400 Family system manual. Check the bar code symbologies you have enabled on the terminal. Enable only the symbologies that you are using.
The input device does not read the bar code labels quickly, or the scanning beam seems to be faint or obscured.	The input device, such as a 1550 laser scanner, window may be dirty. Clean the scanner window with a solution of mild ammonia and water. Wipe dry. Do not allow abrasive material to touch the window.

Problems Scanning Bar Code Labels (continued)

Problem	Possible Solution
When you scan a bar code label using a wand or press the Scan trigger on a laser scanner or CCD scanner, the Good Read status light does not turn on.	Move within 0.61 m (2 ft) of a wall and press the Scan trigger again. Make sure the scanner emits the red laser beam. If the status light does not turn on, there may be a problem with them. For help, contact your local Intermec service representative. If the laser beam does not turn on, check the other problems in this section for a possible solution.
The input device will not read the bar code label.	If you are using a wand, laser scanner, or CCD scanner, try one of these solutions: • Make sure you aim the scanner beam so it crosses the entire bar code label in one pass. • The angle you are scanning the bar code label may not be working well, or you may be scanning the label "straight on." Try scanning the bar code label again, but vary the scanning angle. If you are using the badge scanner, try one of these solutions: • The bar code label print quality may be poor or unreadable. To check the quality of the bar code label, try scanning a bar code label that you know scans. Compare the two bar code labels to see if the bar code quality is too low. You may need to replace the label that you cannot scan. • Make sure the bar code symbology you are scanning is enabled. Use the TRAKKER Antares 2400 Menu System to check the symbologies. On the Symbologies Menu, each symbology that is enabled has an asterisk (*) next to the name of the symbology. If your bar code symbology is disabled, enable it and then try scanning the bar code label again.
When you release the Scan trigger on a laser scanner or CCD scanner, the Good Read status light does not turn off.	The status light remains on if you configure the terminal to use edge triggering. If you configure the terminal for level triggering and the Good Read status light remains on, there may be a problem with the status light. Press the Scan trigger again without scanning a bar code label. If the LEDs are still on, contact your local Intermec service representative.

Booting the Terminal

You seldom need to boot or reset the terminal. When you boot the terminal, it runs through power-on self test (POST) to test each major subsystem. The terminal uses the configuration currently saved in flash memory. Once the terminal is finished booting, your application appears on the screen.

You can boot the terminal using these two methods:

- Configure the ⏻ key to boot the terminal when you turn on the terminal.
- Use the Boot Menu.

Booting the Terminal on Resume

When you press ⏻ to turn off the terminal, it turns off and goes into Suspend mode. When you press ⏻ to turn on the terminal, it resumes or boots depending on the terminal configuration.

There are two ways to configure the ⏻ key using the Resume Execution configuration command:

- Resume Execution Not Allowed configures the terminal to boot and restart your application each time you press ⏻ to turn on the terminal. Use this option if you want to restart your application every time you turn on the terminal.
- Resume Execution Allowed configures the terminal to resume exactly where it was when you turned off the terminal. Use this option to resume working each time you turn on the terminal.

You can configure the Resume Execution command by using the TRAKKER Antares 2400 Menu System or by scanning these bar code labels. For help, see Chapter 3, "Configuring the Terminal," or see "Resume Execution" in Chapter 6 of the 2400 Family system manual.

Resume Execution Not Allowed

$+ER0

Resume Execution Allowed

$+ER1

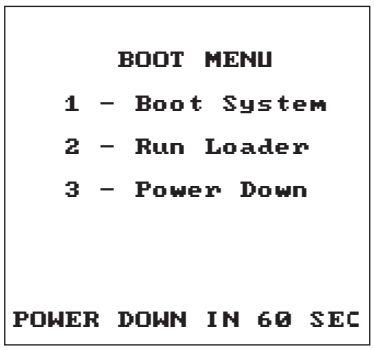
Using the Boot Menu

To access the Boot menu you can:

- reset the terminal.
- disconnect the power supply and the NiCad backup battery from the terminal, reconnect both the power supply and the NiCad backup battery, and turn on the terminal.

Note: The NiCad backup battery is NOT user-serviceable. You must return the Trakker Antares 248X terminal to Intermec to replace the backup battery.

- upgrade the firmware.



248XU104.eps

Boot Menu

The next table describes the Boot Menu options.

Boot Menu Options

Option	Description
Boot System	Press 1 to boot the terminal. Once the terminal is finished booting, your application appears on the screen.
Run Loader	Press 2 to load the terminal firmware. To upgrade or load the firmware, you should use the Firmware Upgrade option in the TRAKKER Antares 2400 Menu System. For help, see "Upgrading the Firmware" in Chapter 2 of the 2400 Family system manual.
Power Down	Press 3 to turn off the terminal. When you turn on the terminal, the Boot Menu screen appears again if POST passes.

Troubleshooting a Locked Up Application

If the terminal or application appears to be locked up, try these steps in order.

To troubleshoot a locked-up terminal or application

1. Press ⏻ to turn off the terminal. If it turns off, press ⏻ to turn on the terminal and continue working.
2. If the terminal does not turn off, scan the Reset Firmware label to restart the firmware and application.

   Reset Firmware

   -.

   You can also send the Reset Firmware command over the network. For help, see Chapter 5, "Reader Command Reference," in the 2400 Family system manual. If it works, you can continue working.

3 Scan the Boot Terminal label to reboot the terminal. If it works, you can continue working.

Boot Terminal

-.1

4 Configure the Resume Execution command to resume "not allowed." For help, see "Resume Execution" in Chapter 6 of the 2400 Family system manual. Each time you press ⏻ to turn on the terminal, the terminal boots and restarts your application.

5 If your terminal appears to boot but the application will not run or is locked up, press and hold the tab key immediately after you scan the Reset Firmware label or after you press ⏻ to turn on the terminal in Step 3. Continue to hold the tab key for at least 30 seconds after the Trakker Antares welcome screen has cleared.

The terminal has booted without loading an application. Use the TRAKKER Antares 2400 Menu System to load another application or download a new version of the application before you run it again.

6 If the terminal will not turn off or does not respond to the Reset Firmware command, reset the terminal as described in the next procedure. Make sure you have tried Steps 1 and 2 before you reset the terminal.

Resetting the Terminal

If you performed the steps in "Troubleshooting a Locked Up Application" and the terminal or application is locked up and the terminal will not respond to the Reset Firmware command, follow the steps in this section to reset the terminal.

If the terminal is turned on and you push the Reset button, you may lose data and you may have to reload the firmware.

Attention: Si le terminal est allumé et que vous appuyez sur le bouton de remise à zéro, vous risquez de perdre des données et d'avoir à recharger le microprogramme.

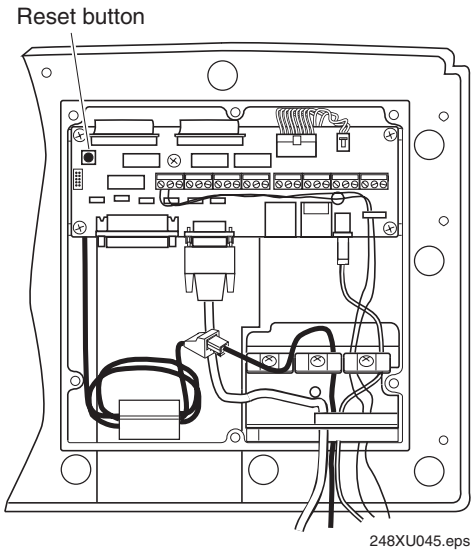
To reset the terminal

1 Press ⏻ to turn off the terminal. If it will not turn off, continue with the next step.

2 Use a Phillips screwdriver to remove the six screws on the back panel.

3 Remove the back panel.

4 Press the Reset button. The 248X will briefly turn on and then turn off.



5 Place the back panel on the back of the terminal.

6 Use a Phillips screwdriver to attach the six screws.

7 Press [⏻] to turn on the terminal. It boots all the systems and clears RAM memory. The Boot Menu appears.

8 Press [1] to boot the terminal and start your application.

If you keep returning to the Boot Menu or the terminal will not boot, try loading the firmware. For help, see "Upgrading the Firmware" in Chapter 2 of the 2400 Family system manual.

If the terminal will not boot or reset, contact your local Intermec service representative for help.

Cleaning the Terminal Screen

There are no user-serviceable parts inside the terminal. Opening the unit will void the warranty and may cause damage to the internal components.

Attention: La terminal ne contient pas de pièces révisibles par l'utilisateur. Le fait d'ouvrir l'unité annule la garantie et peut endommager les pièces internes.

The terminals are built for use in a rugged, industrial working environment. To keep the terminal in good working order, you need to clean the terminal screen. Clean this surface as often as needed or when it is dirty.

To clean the terminal screen

1. Press ⏻ to turn off the terminal.
2. Use a mild solution of ammonia and water.
3. Dip a clean towel or rag in the mild ammonia solution and wring out the excess solution. Wipe off the terminal screen. Do not allow any abrasive material to touch these surfaces.
4. Wipe dry.

A Specifications

This appendix lists the terminal's physical and environmental specifications and contains these topics:

- Terminal dimensions
- Power and electrical specifications
- Temperature and environmental specifications
- Screen
- Keypad options
- Application options
- Memory
- 802.11b radio specifications
- OpenAir radio specifications
- Wired data communications
- CrossBar networks
- Bar code symbologies
- Input devices for the external scanner port
- Pin assignments

Physical and Environmental Specifications

Terminal Dimensions

Dimension	Specification
Length:	27.2 cm (10.7 in) 28.7 cm (11.3 in) with a badge scanner installed
Height:	24.4 cm (9.6 in)
Depth:	9.9 cm (3.9 in)
Weight:	4.3 kg (9.5 lb)

Power and Electrical Specifications

Power	Specification
Operating (with power supply):	95 to 250 VAC, 50 to 60 Hz, 125 mA
Memory Backup:	Rechargeable NiCad 700 mA battery pack
Electrical Rating:	⎓ 12V, 750 mA

Temperature and Environmental Specifications

Type of Operation	Range (°C)	Range (°F)
Operating the terminal:	-20°C to +50°C	-4°F to +122°F
Storing the terminal:	-20°C to +60°C	-4°F to +140°F
Charging the backup battery:	0°C to +40°C	+32°F to +104°F
Relative humidity:	0 to 95% non-condensing	
Environmental rating:	IP53	

Screen

- CGA-compatible, backlit LCD
- 4 lines by 40 characters for 2480 and 2485
- 12 lines by 40 characters for 2481 and 2486, display up to 25 lines

Keypad Options

- Alphanumeric keypad with 59 keys, 5 separate function keys, PC-style layout, available in English, French, German, Italian, Portuguese, or Spanish
- Oversized function numeric keypad with 35 keys, 10 separate function keys
- Terminal emulation keypads for IBM 3270, IBM 5250, and VT/ANSI
- Time and attendance keypad

Application Options

- Programmable
- TE 2000
- Data Collection Browser (dcBrowser)

Memory

- 2MB programmable flash memory, 750K available for use
- 4MB flash memory option, configured as a 2MB flash drive, pre-loaded with double-byte fonts, or used for 802.1x TTLS security
- 1MB battery-backed RAM, 512K available for user
- Extended memory option on the 2480/1 with Ethernet connectivity or the 2485/6 for an additional 2MB or 4MB SRAM storage drive

802.11b Radio Specifications

Radio Feature	Specification
Radio type	Direct sequence, spread spectrum
Channels	11 (North America), 13 (Europe), 4 (France), 1 (Japan)
Data rate	11 Mbps (High), 5.5 Mbps (Medium), 2 Mbps (Standard), 1 Mbps (Low) with automatic fallback for increased range
Range (11 Mbps)	160 m (525 ft) open environment 50 m (165 ft) semi-open environment 24 m (80 ft) closed environment
Frequency band	2.4 to 2.5 GHz world-wide

OpenAir Radio Specifications

Radio Feature	Specification
Radio type	Frequency hopping, spread spectrum
Channels	15
Data rate	1.6 Mbps, 0.8 Mbps fallback
Range	Up to 150 m (500 ft) indoors Up to 300 m (1,000 ft) outdoors
Frequency band	2.4 to 2.5 GHz worldwide

Wired Data Communications

- RS-232C serial port (COM1)
- RS-232C/422/485 serial port (COM2) with enhanced input/output board
- RS-232C serial port (COM4) with adapter cable accessory (P/N 067185)
- Ethernet (10BaseT)

- Ethernet network protocol options: TCP/IP, UDP Plus, or WTP
- XMODEM, XMODEM1K, YMODEM protocol for data transfer
- Protocols: Binary, Configurable Serial Protocol, Master Polling, Multi-Drop, and Polling Mode D

CrossBar Networks

- CrossBar adapter (P/N 069447)
- Multi-Drop cable (P/N 047653)

Bar Code Symbologies

- Codabar
- Code 11
- Code 2 of 5
- Code 39
- Code 93
- Code 128
- Interleaved 2 of 5
- MSI
- Plessey
- UPC/EAN

Input Devices for the External Scanner Port

You must use an interface cable to connect an input device to the scanner connector. For help, contact your local Intermec service representative.

You can attach these Intermec input devices to the external scanner connector:

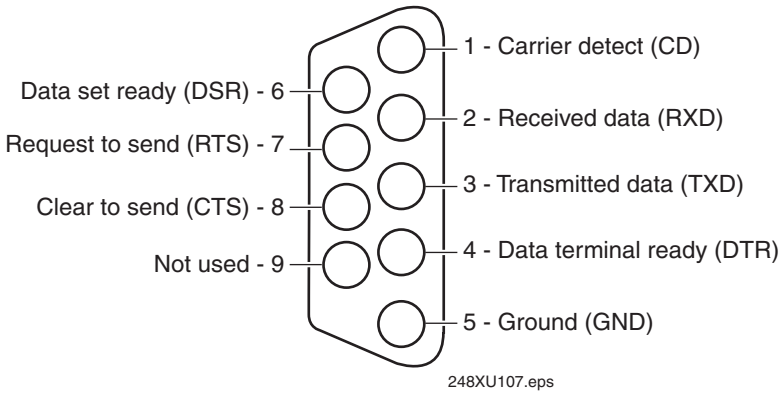
- 128X wands
- 1354 and 1355 badge scanners
- 1400 linear imager
- 1550 and 1551 laser scanners
- 1552 cordless laser scanner with 9745 base station

Intermec is frequently testing and developing new input devices. For an updated list of Intermec-approved input devices for the 248X or for help determining which cable you need, see your Intermec sales representative.

Pin Assignments

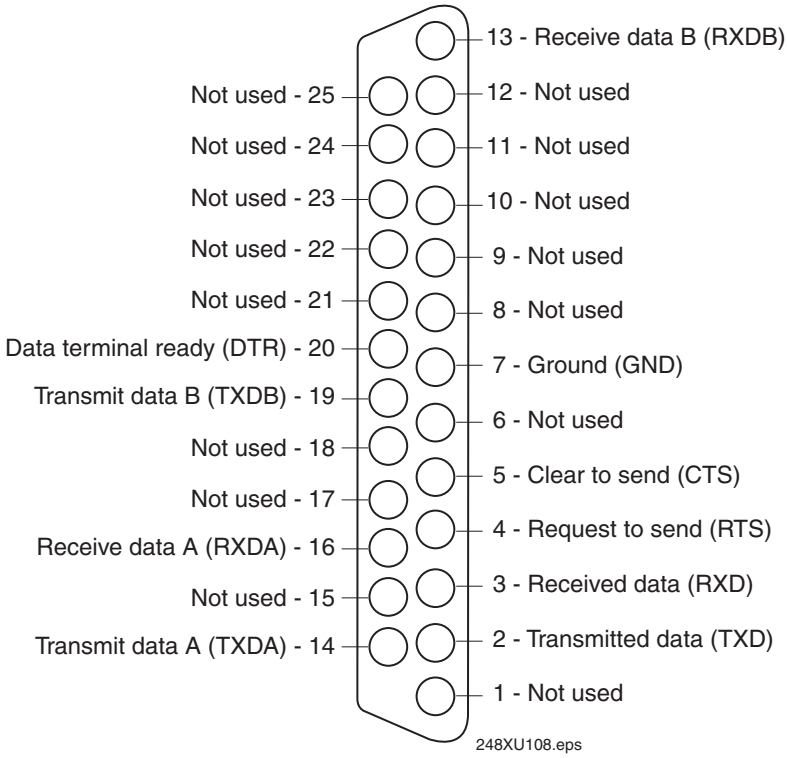
You can use these serial port pin assignments to make your own serial cables or troubleshoot problems.

Pin Assignments for COM1



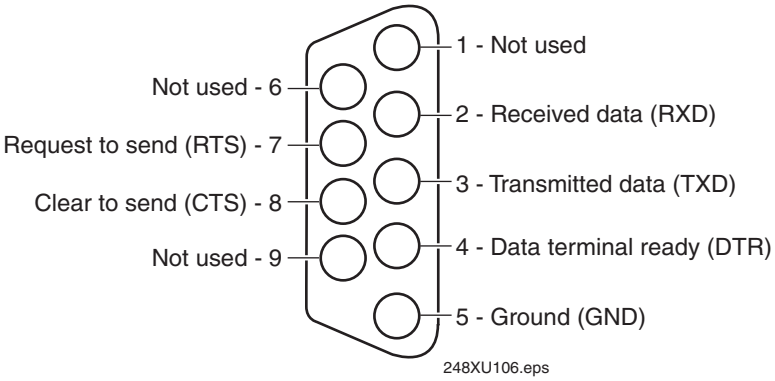
COM1: *This illustration shows the type of connector and the pin assignments for COM1.*

Pin Assignments for COM2



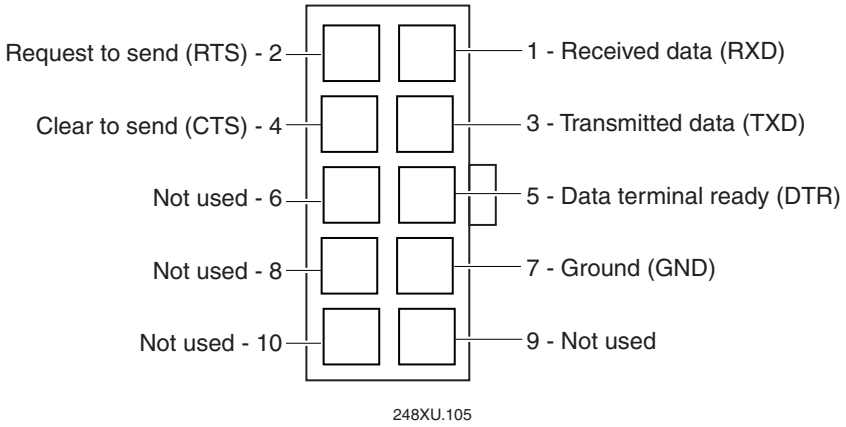
COM2: *This illustration shows the type of connector and the pin assignments for COM2.*

Pin Assignments for COM4



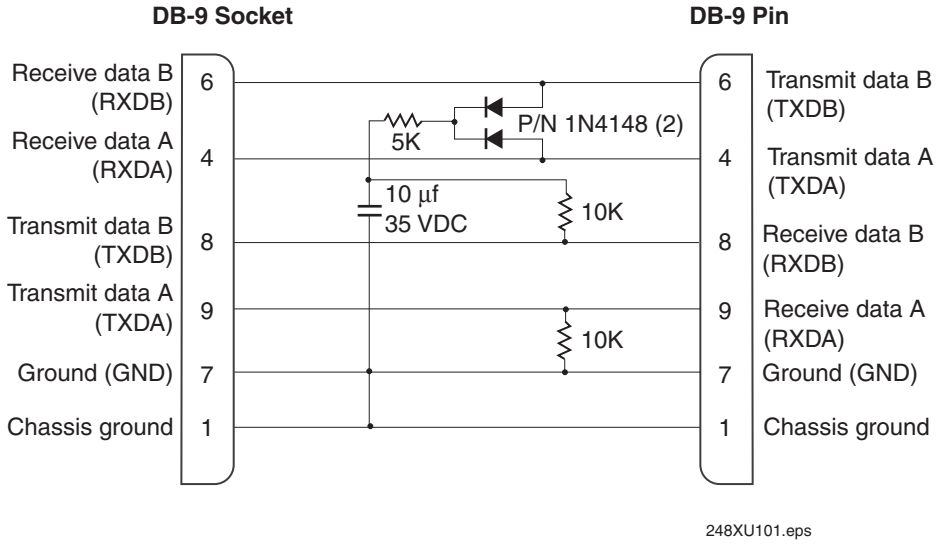
COM4: *This illustration shows the type of connector and the pin assignments for COM4.*

Pin Assignments for the COM4 Adapter Cable



COM4 adapter cable: *This illustration shows the pinout assignments for the 10-pin connector (terminal connection) on the COM4 adapter cable.*

Pin Assignments for the CrossBar Adapter



CrossBar adapter: *This illustration shows the pinout assignments for the Trakker Antares CrossBar adapter (P/N 069447).*

Compatibility With 95XX Communications Protocols

The 95XX terminals and the 248X terminals use very similar protocols. If you are using your 248X terminal in a CrossBar network with 95XX terminals, use the following table to convert communications protocols and set up the 248X to match your 95XX configuration.

248X Compatibility With 95XX Communications Protocols

95XX Protocol	248X Protocol
User-Defined	Configurable (See Note 1)
Point-to-Point	Configurable (See Note 1)
Polling Mode D	Polling Mode D
Multi-Drop	Multi-Drop (COM2 only)
User-Defined Multi-Drop	Multi-Drop (COM2 only) (See Note 2)

Note 1

Configurable protocol is a subset of the 95XX User-Defined or Point-to-Point protocol; however, it does not support all of the features of User-Defined or Point-to-Point protocol. You may need to reconfigure your host to match the capability of the Configurable protocol on the 248X.

Note 2

You can configure User-Defined Multi-Drop protocol on the 95XX so that it is compatible with standard Multi-Drop protocol on the 248X.

To operate the 248X in a CrossBar network, you must convert your IRL applications to Microsoft Visual C\C++ applications. For help, see "Converting IRL Programs Between the 95XX and Trakker Antares" in Chapter 3 of the *Trakker Antares 2400 Family System Manual* (P/N 071389).

B Keypads and Terminal Mounting Templates

This appendix contains the specifications for the function key labels. It also contains the terminal specifications to create your own mounting bracket and the actual size mounting templates for the desk-mount bracket and the wall-mount bracket.

Using the Label Specifications and Mounting Templates

This section contains the following specifications and templates:

- Function key label specifications for the oversized function numeric keypad
- Function key label specifications for the alphanumeric keypads
- Function key label specifications for the time and attendance keypads
- Trakker Antares 248X terminal mounting specifications
- Desk-mount bracket template (scale 1:1)
- Wall-mount bracket template (scale 1:1)

Function Key Label Specifications

Use the label specifications to create your own pre-printed function key labels. You can use the illustration to work with a vendor to create function key labels. Please note that there are two sizes of function key labels. The labels for a 248X with an oversized function numeric keypad are slightly larger.

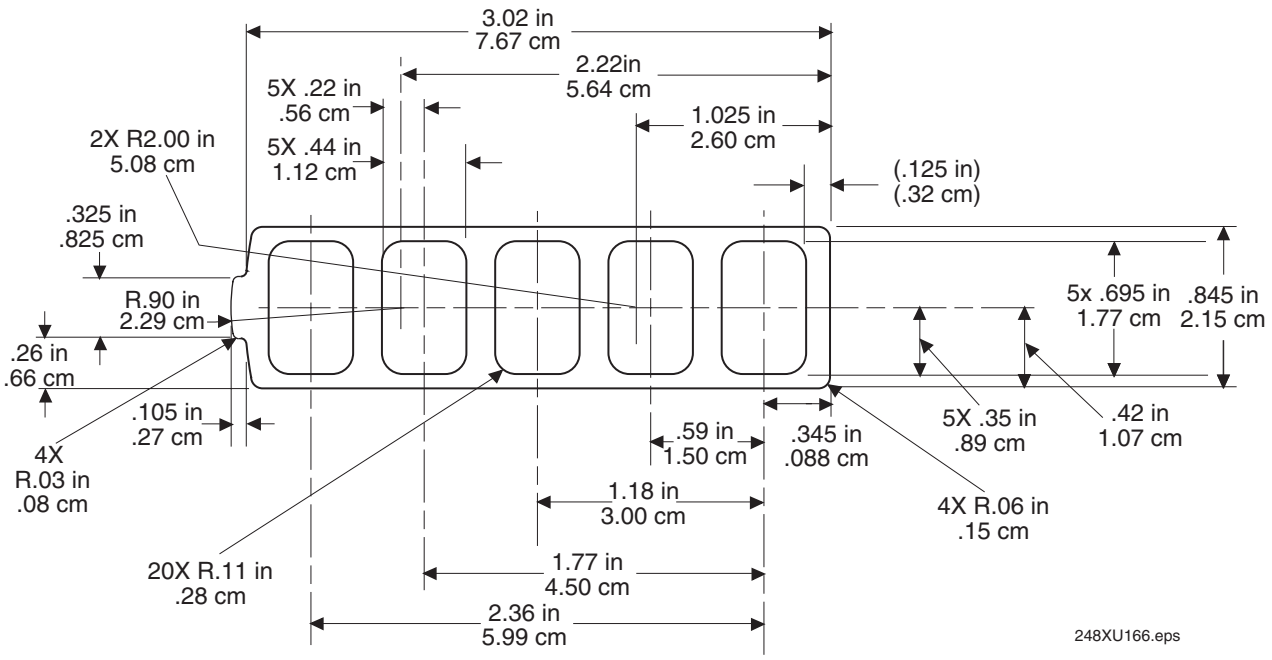
248X Terminal Mounting Specifications

Use the dimensions provided in the illustration to create your own mounting bracket or enclosure.

Note: Without the Intermec desk or wall-mount bracket, the power supply is intended for indoor use only. Use of any other mounting brackets or enclosures will void the environmental protection ratings of the terminal.

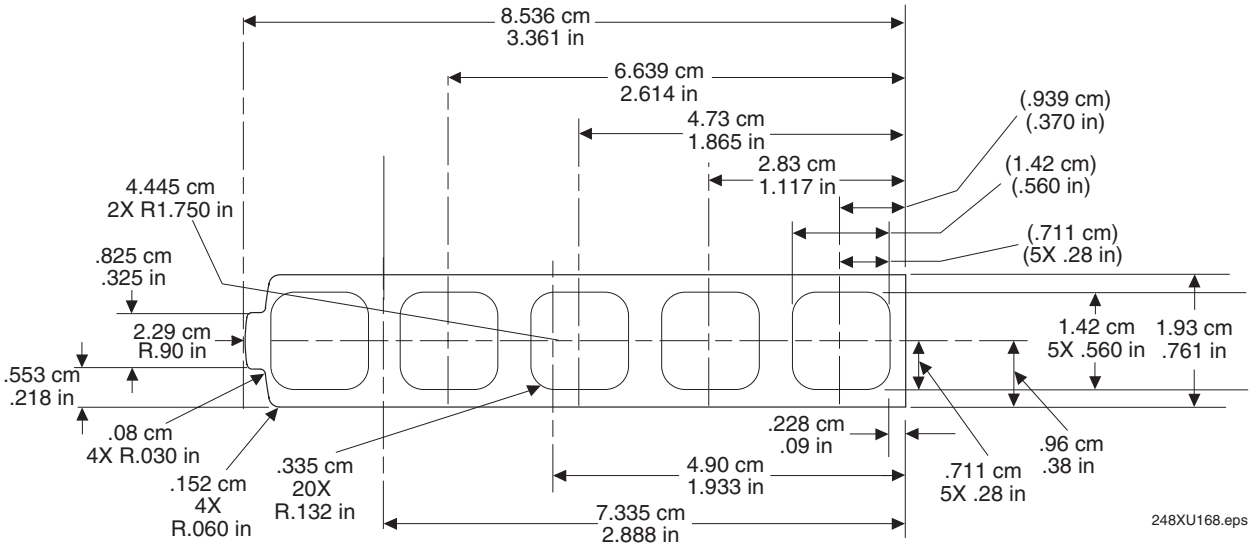
Desk-Mount and Wall-Mount Bracket Templates

Use these actual size (scale 1:1) mounting templates to plan for and prepare a mounting location. Remove the templates from the manual and use them to mark the mounting holes for each bracket.



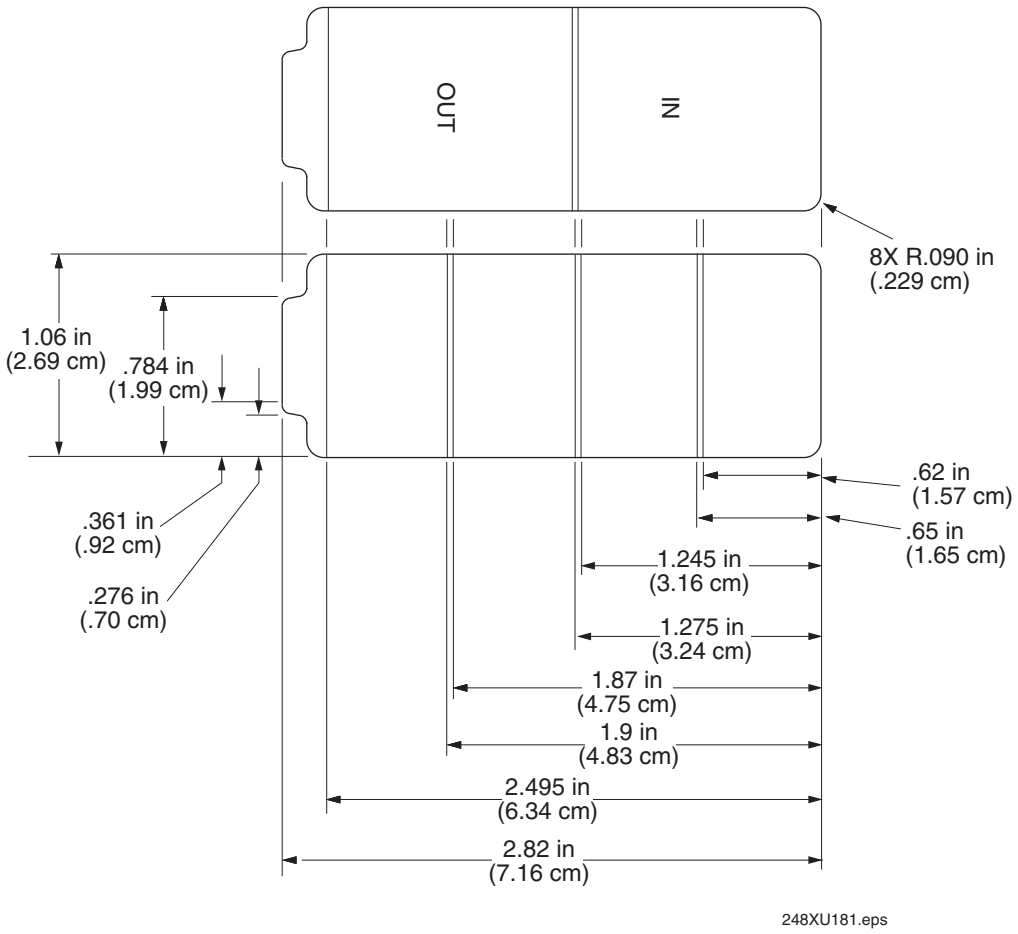
Function Key Label Specifications for the Oversized Function Numeric Keypad

Note: The function key label illustration is not shown to scale.



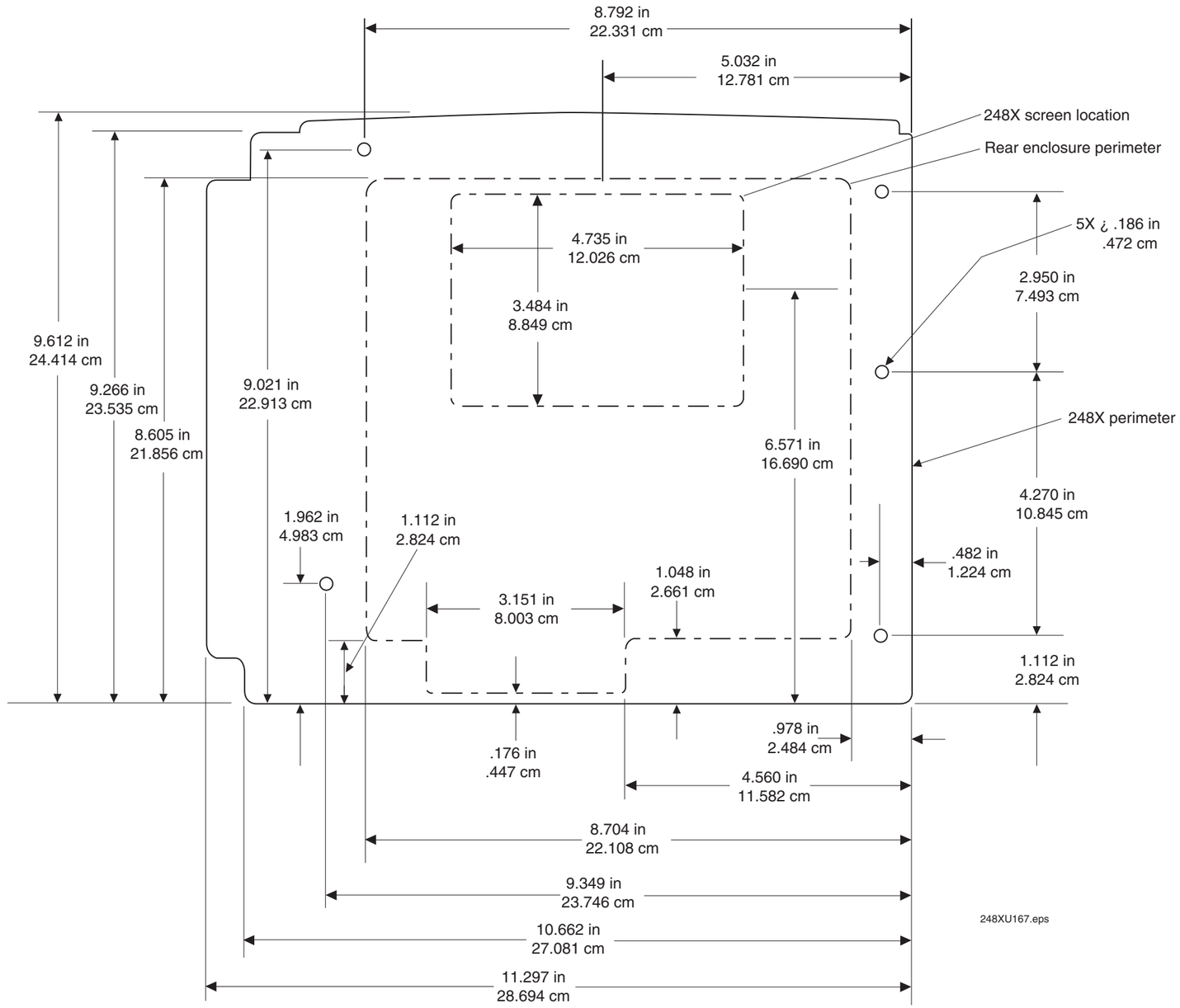
Function Key Label Specifications for the Alphanumeric Keypads

Note: The function key label illustration is not shown to scale.



Function Key Label Specifications for the Time and Attendance Keypad

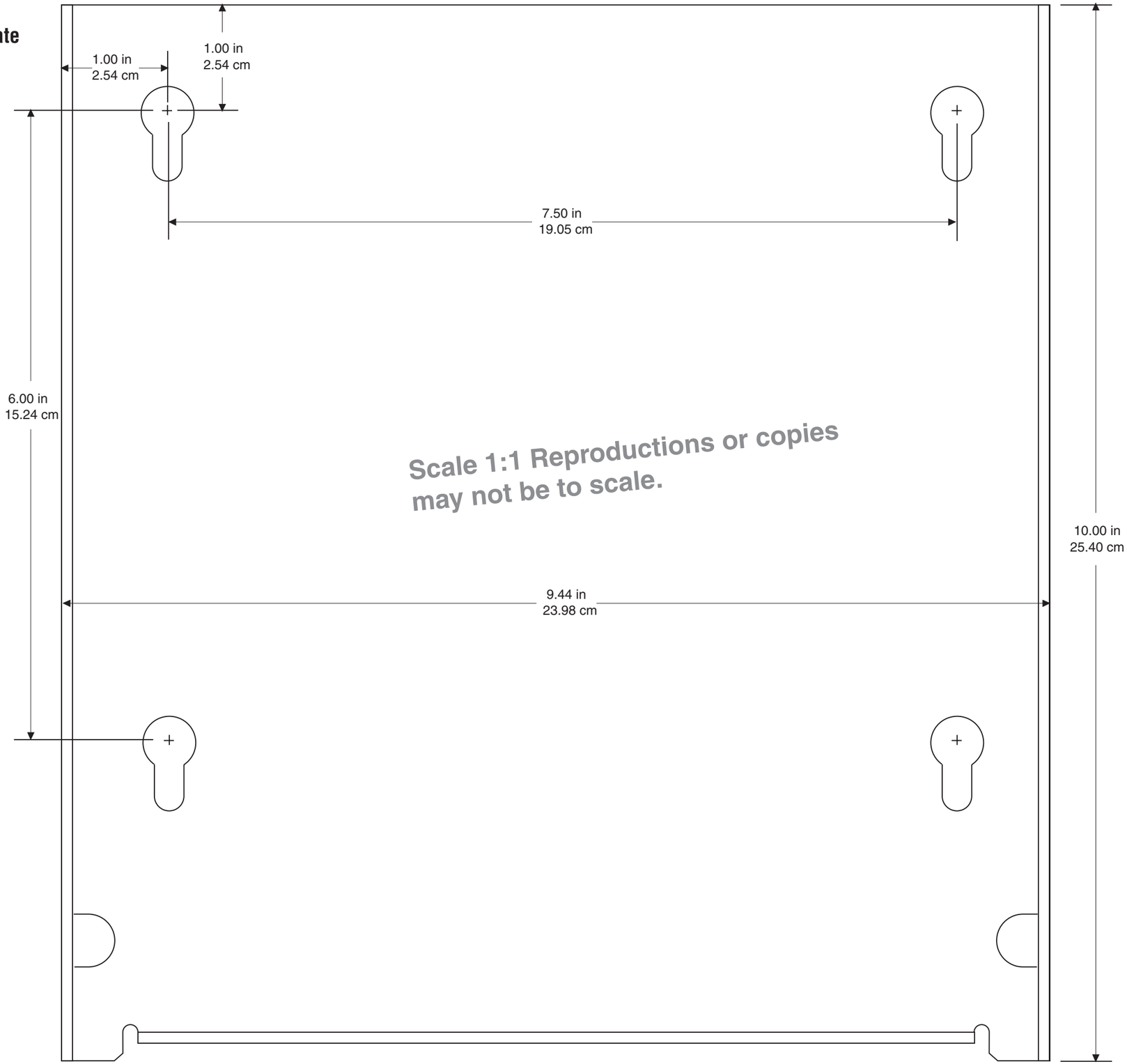
Note: The function key label illustration is not shown to scale.



Trakker Antares 248X Terminal Mounting Specifications (Rear View): *The depth of the 248X is 9.9 cm (3.9 in).*

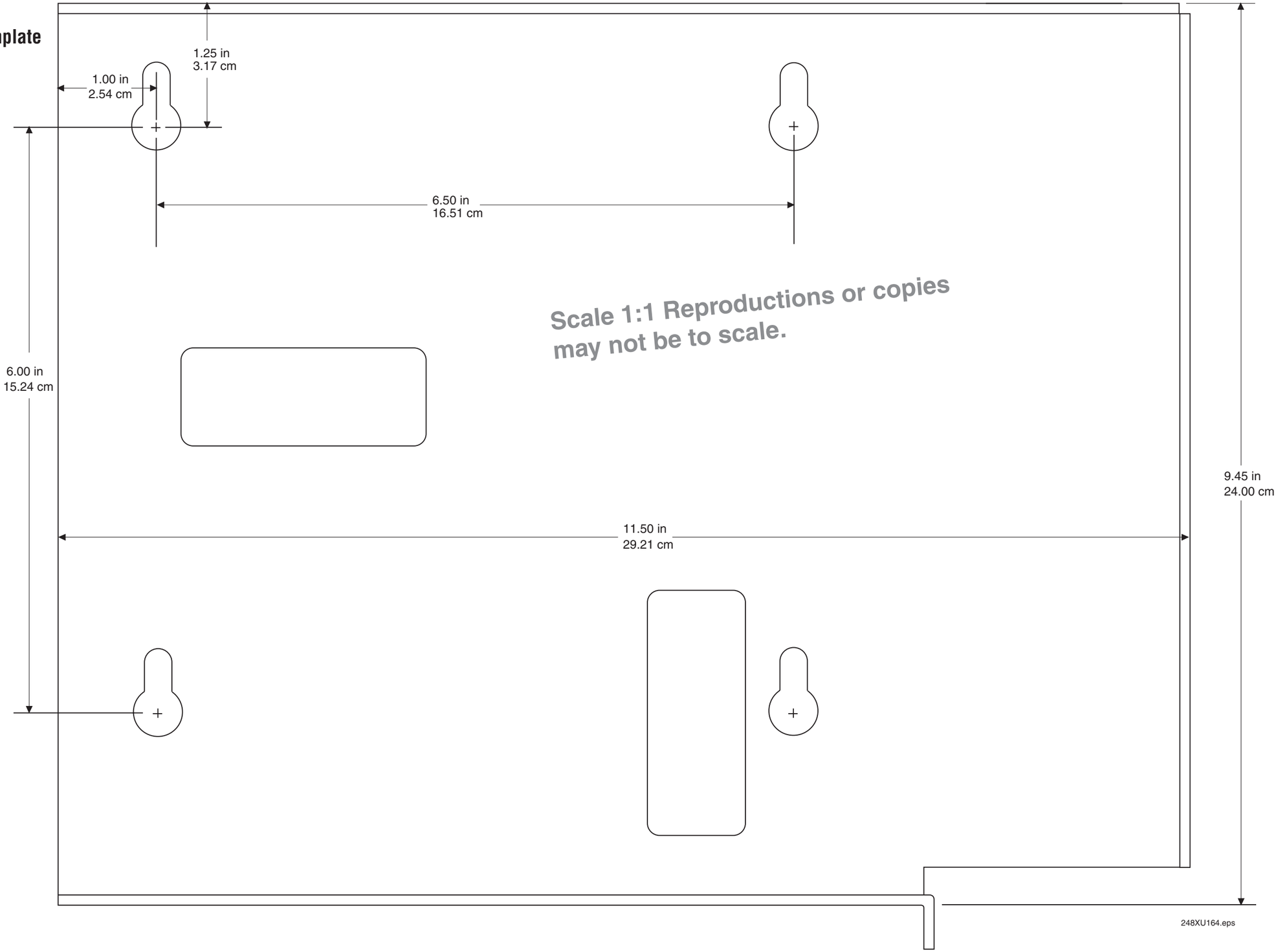
Note: The terminal illustration is not shown to scale.

Desk-Mount Bracket Template



248XU163.eps

Wall-Mount Bracket Template



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T

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Trakker Antares 248X Stationary Terminal User's Manual

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