Intermec
Technologies Corporation

6950 Enterprise Gateway Server

USER'S GUIDE

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Acknowledgments

▼ CAUTION: Intermec Technologies Corporation suggests you buy cables from us to connect with other devices. Our cables are safe, meet FCC rules, and suit our products. Other cables may not be tested. They may cause problems from electrostatic discharge or induced energy. Our warranties do not cover loss, injury, or damage from other cables.

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FIGURES

TABLES

Section 1

Read This First

▶ ▶

Scope

This document covers installation, configuration, and upgrade of the 6950 Enterprise Gateway Server (EGS). It also describes the information available through logs to assist in isolating communication problems.

▶ **NOTE:** *We continue to use the NORAND® name in this guide. It was retained to eliminate confusion since the 6950 EGS operates with wireless network devices that still carry the NORAND label.*

Purpose

To aid the person installing, configuring, upgrading, or troubleshooting the 6950 EGS.

Assumptions

This guide assumes you already know how to cut, splice, and attach connectors to cabling. It also assumes you know the basics of internet addressing and TCP/IP.

Limitation

The 6950 EGS is a conduit between wireless stations and a host application. We provide minimal information about writing host applications. Developers can find extensive assistance about writing to and reading from the wireless stations by consulting the programmer's guide for their data stream. We also offer a guide for addressing wireless stations in their native mode.

Content Summary

This guide tells:

- ▶ How to perform a quick start, what comes with the 6950 EGS, optional mounting brackets, and where to call for support — *Section 2, "Introduction"*
- ▶ How to install the 6950 EGS and other devices on your Ethernet network — *Section 3, "Installation"*
- ▶ How to connect to the 6950 EGS via telnet, a video monitor and keyboard, or a dumb terminal — *Section 4, "Connecting to the 6950 EGS"*
- ▶ How to configure your network-specific parameters, including IP addresses, host names and addresses, and static routing — *Section 5, "Configuring Network Options"*
- ▶ How to configure RF communications — *Section 6, "Configuring Radio Frequency Communication"*
- ▶ How to stop, reboot, or restart the 6950 EGS — *Section 7, "Halting, Rebooting, or Restarting the 6950 EGS"*
- ▶ How to monitor the 6950 EGS and the system — *Section 8, "Monitoring the System"*

▶ How to update the 6950 EGS's software and what information to save before you begin — *Section 9, "Updating the 6950 EGS Software"*

▶ The basic information you must know to develop a host application or adapt an existing one — *Section 10, "Host Application Program"*

Related Publications

To order a printed manual, contact your Intermec Sales Representative. Several online manuals are also available in Portable Document Format (PDF) on the Intermec web site. The list of online manuals is at:

http://www.intermec.com/manuals/english.htm

Or, choose "Products" then "Manuals" and "English" from the opening page.

You must download the free Adobe Acrobat Reader to view the PDF manuals. Instructions are at:

http://www.intermec.com/manuals/manuals.htm#reader

Following are related INTERMEC manuals and part numbers (PN).

▶ *6710 Access Point User's Guide* PN: 961-047-081

▶ *2100 Universal Access Point User's Manual* PN: 067150

▶ *RB4030 Radio Base User's Guide* PN: 961-047-057

▶ *RCB4030 Spread Spectrum Base and Base/Controller User's Guide* PN: 961-047-075

▶ *RC3240/RC3250 Network Controller User's Guide* PN: 961-047-040

▶ User's guide for any base radio the RC3250 Network Controller supports.

▶ User's guides for these wireless stations:

5055	PN: 961-054-017
6400	PN: 961-047-093
6500/6550	PN: 961-047-099
RT1100	PN: 961-047-069
RT1700	PN: 961-047-068
RT5900	PN: 961-047-121

▶ Programmer guides for writing the host application for the wireless stations:

3270 Terminal Emulation Programmer's Reference Guide PN: 977-047-040

5250 Terminal Emulation Programmer's Reference Guide PN: 977-047-039

Native Terminal Emulation Asynchronous Programmer's Reference Guide PN: 977-047-038

UNIX Network Programming by W. Richard Stevens ISBN 0-13-94876-1

VT220 Terminal Emulation Programmer's Reference Guide PN: 977-047-037

Section 2

Introduction

▸ ▸

About the 6950 EGS

The 6950 EGS is a communication gateway between applications running on your host computer or computers and an Enterprise Wireless LAN by INTERMEC®. It connects your hand-held wireless stations and enterprise host via a TCP/IP telnet session. The 6950 EGS supports communications from wireless stations to multiple host applications.

The Enterprise Wireless LAN is the portion of the network that handles communication between INTERMEC® wired and wireless products. A wireless network includes the 6950 EGS; RC3250 Network Controller, RCB4030 Base/Controller, or RC4030E Gateway; 2100 UAPs, 6710 Access Points, or RB4030 Base Radios; and wireless stations.

The 6950 EGS connects to the RF network by one of these methods:

- ▸ A 2100 UAP or 6710 Access Point on the Enterprise Wireless LAN, connected (without a controller) via one of its Ethernet ports to the Ethernet network at a remote location from the 6950 EGS.

- ▸ An RB4030 Radio Base connected (without a controller) via one of its Ethernet ports to the Ethernet network at a remote location from the 6950 EGS.

► An RCB4030 Base/Controller connected through the 6950 EGS serial (COM1) port to its host port.

► A RC3250 Network Controller connected through the 6950 EGS serial RS-232 port (COM1) to its host port. The base radio connects to the network controller. This method supports UHF radio systems using RS-485 or RS-232 communication with the controller.

The 6950 EGS simultaneously supports 3270, 5250, and VT220 terminal emulation by the wireless stations. The wireless station's firmware sets the type of terminal emulation. Messages between the wireless station and the 6950 EGS set the communication method.

Quick Start

► **NOTE:** *For help with configuring the wireless station, RB4030 Base Radio, or RC3250, RC4030, or RCB4030 serial controller, refer to the device's user guide for instructions.*

Enterprise Wireless LAN Systems (Non-RB4030 Base Radio) Over Ethernet

(Page 3-3 shows an example of this type of system.)

1. Set the wireless stations' host name to "HOST".

2. Set the wireless stations' LAN ID to match the LAN ID for the 2100 Universal Access Point (UAP) or 6710 Access Point.

3. Set the wireless stations' terminal emulation type to 3270, 5250, or VT220.

4. If running 3270 or 5250, enable the wireless stations' "Telnet" option.

5. Configure the 6950 EGS's IP setup *(see Section 5 for help)*.

SST Systems (RB4030 Base Radio) Over Ethernet

(Page 3-3 shows an example of this type of system.)

1. Set the wireless stations' host name to "HOST".

2. Set the wireless stations' LAN ID to 0 (zero).

3. Set the wireless stations' terminal emulation type to 3270, 5250, or VT220.

4. If running 3270 or 5250, enable the wireless stations' "Telnet" option.

5. Set one RB4030 Base Radio to be the "root" by setting dip switches 5 or 6 (or both).

6. Configure the 6950 EGS's IP setup *(see Section 5 for help)*.

UHF or Asynchronous (RS-232) Systems

(Pages 3-5 through 3-7 show examples of these systems.)

1. Configure the RC3250, RC4030, or RCB4030 serial controller.

2. Configure the 6950 EGS to be "RS-232," and set the RS-232 settings to match those of the serial controller *(see Section 6 for help)*.

3. Set the wireless stations' host name to match the serial controller's host name.

4. Set the wireless stations' LAN ID to match the serial controller's LAN ID.

5. Set the wireless stations' terminal emulation type to VT220.

6. Disable the wireless stations' "Telnet" option.

7. Configure the 6950 EGS's IP setup *(see Section 5 for help)*.

Open the Box and Inspect Contents

The box should have one 6950 EGS, a 7 foot ac power cable, and (if you ordered an internal modem) a telephone cord with RJ11 plugs. If you ordered an optional mounting bracket, it is packaged separately.

1. Remove the 6950 EGS from its shipping container and inspect it for damage.

2. If it has been damaged in shipping, record the model number, part number, and serial number of the damaged unit.

3. Save any paperwork pertaining to the shipment, and immediately notify the transport company of the damaged item(s). Follow their instructions for filing a claim on the damaged item.

Customer Support

Customer Support's on-going objective is to provide quality support to all of our customers worldwide.

Factory Service

If your unit is faulty, you can ship it to the nearest authorized Service Center for factory-quality service. The addresses and telephone numbers are included in the Warranty Card shipped with your product.

Customer Response Center

The Customer Response Center (technical support) telephone number is 800-755-5505 (U.S.A. or Canada) or 425-356-1799. The facsimile number is 425-356-1688. Email is *support@intermec.com*.

If you email or fax a problem or question include the following information in your message: your name, your company name and address, phone number and email to respond to, and problem description or question (the more specific, the better). If the equipment was purchased through a Premier Solution Partner, please include that information.

Web Site

The Customer Support File Libraries, including Hot Tips and Product Awareness Bulletins, are available on the Internet. New users start at the Intemec web site: www.intermec.com. Choose "Support," then "Product Support," then "Conference Area." Look on the main page for a link to register new customers.

Bulletin Board Service

The Customer Support Bulletin Board (BBS), maintained by the Norand Mobile Systems Division of Intermec Technologies Corporation, provides software and documentation:

▶ **Phone number:** 319-369-3515 (14.4 Kbps modem)
                    319-369-3516 (28.8 Kbps modem)

▶ **Protocol:** Full duplex, ANSI or ANSI-BBS; 300 to 28,800 bps; v.32bis; 8 bits, no parity, 1 stop bit. *For high-speed modems, disable XON/XOFF and enable RTS/CTS.*

This is the same location available via the web site. If your web access uses high-speed phone lines, the web interface provides a faster response.

Specifications

For information about electrical and environmental specifications for the 6950 EGS, refer to the specifications provided with it.

Section 3

Installation

▶ ▶

You must successfully establish two connections with the 6950 EGS after it powers up — one to the wireless equipment and one to the host. The 6950 EGS supports communication from wireless stations to multiple host applications. To establish connections, do the following:

▶ Connect the Ethernet port on your 6950 EGS to the network.

▶ Connect other network devices as follows:

▶ Connect a 2100 UAP, 6710 Access Point, or RB4030 Base Radio through a direct connection to the Ethernet network. These devices do not require a controller.

▶ Connect an RCB4030 Base/Controller, RC4030E Gateway, or RC3250 Network Controller through an RS-232 serial connection to the 6950 EGS. An RB4030 Base Radio or RB3000 Base Station directly connects to the controller.

This section describes some different configurations for the 6950 EGS and then shows how to install each one.

Site Consideration

Consider the following when preparing for the 6950 EGS.

▶ Security: Isolate the 6950 EGS from anyone who might tamper with it.

▶ Environment: Use an electrical circuit that does not already carry a heavy load. Protect the power switch so the 6950 EGS cannot be accidentally bumped and turned off. Make sure the room is well-ventilated to protect from overheating.

▶ Access: Place it where you can easily check or change the cables and see the "Power" and "HD" lights.

▶ Cables: Ensure they are defect free. Keep cable lengths short to reduce electrical interference.

▶ Fault tolerance: Consider an uninterruptable power supply. If the 6950 EGS serves a critical function, consider a spare.

Intermec strongly recommends that Intermec or certified providers conduct a site survey to determine the ideal locations for all of your network components. A proper site survey requires special equipment and training. A site survey provides an installation recommendation that addresses various factors that can affect the performance of your Enterprise Wireless LAN.

Connecting an Access Point or Radio Base

Figure 3-1 shows a configuration where the 6950 EGS and the radio link have been independently attached to the Ethernet network.
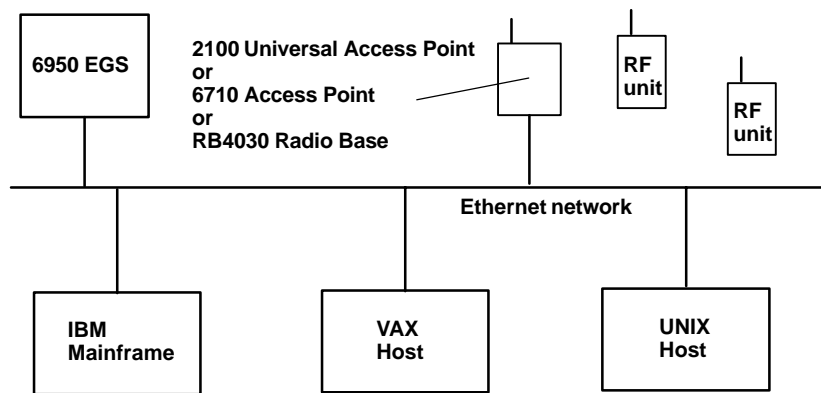
Figure 3-1
6950 EGS and Access Point or Radio Base Directly Connected

In this example, access points attached to the Ethernet backbone communicate with wireless stations with 2.4 GHz OpenAir or 900 MHz radios.

Figure 3-2 shows the 6950 EGS and access point connected to an IBM host through a router. The AS/400 host could be the default host supplying an application the terminals run with telnet 3270 or 5250 sessions. The mainframe could serve as the Domain Name Server (DNS).
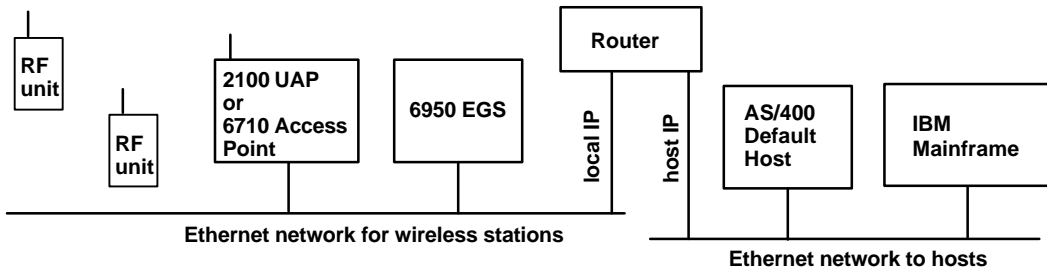
Figure 3-2
6950 EGS and Access Point Linked to Host Via Router

Connecting a Controller or Gateway

An RCB4030 Base/Controller, RC4030E Gateway, or RC3250 Network Controller can directly connect to the 6950 EGS. A controller such as the RCB4030 or RC3250 is only required when you need a UHF radio solution or do not want to attach the base radios to your Ethernet network.

RC3250 Network Controller

In Figure 3-3, an RC3250 Network Controller host port connects to COM1 on the 6950 EGS with a serial RS-232 connection. The controller sends and receives its radio messages via the RB3000 Base Station. The base radio communicates with UHF RF wireless stations.
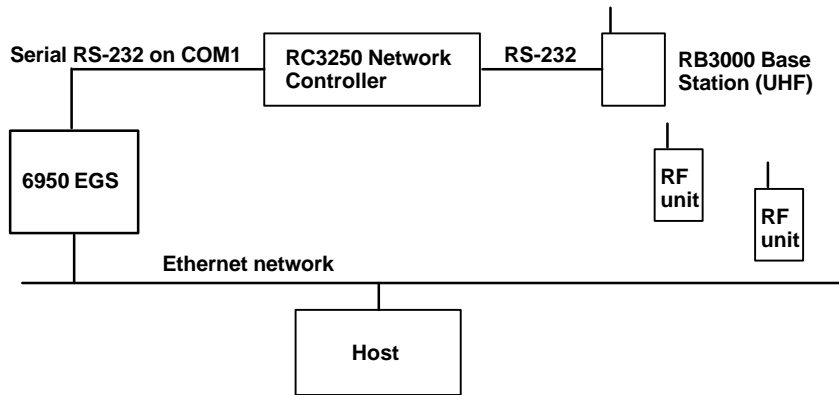
Figure 3-3
RC3250 Network Controller Connected to 6950 EGS

In Figure 3-4, the serial connection with the RC3250 Network Controller uses modems. The local modem attaches to COM1 on the 6950 EGS with a serial RS-232 connection. The base radio attaches to the network controller. The controller-to-base connection is RS-232 for UHF radios.
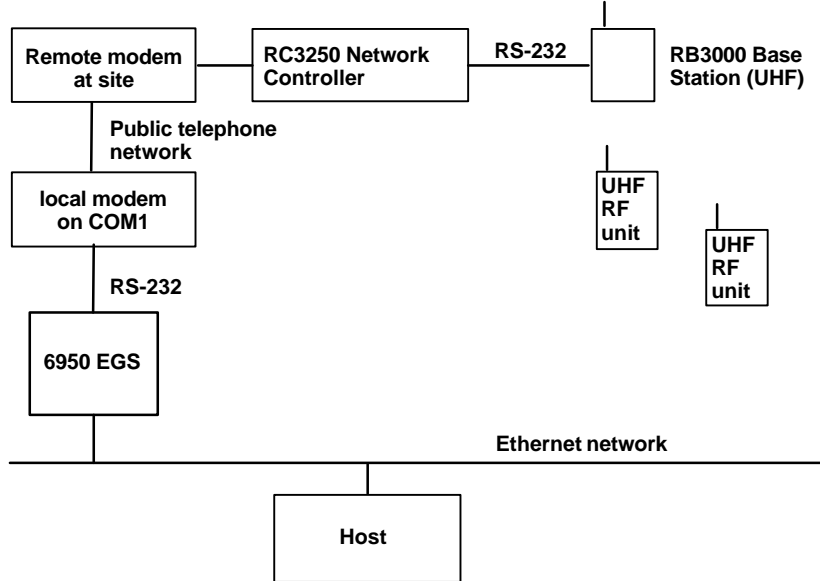
Figure 3-4
**RC3250 Network Controller Attached with Modem to
6950 EGS**

You can use a modem with either type of serial connection
and any base the controller supports. A modem
configuration suits when the 6950 EGS is remote from the
wireless network.

RCB4030 Base/Controller

In Figure 3-5, the 6950 EGS uses a serial connection to an
RCB4030 Base/Controller. The RCB4030 Base/Controller
communicates with the RB4030 Base Radio via radio. The
controller sends and receive radio messages with SST RF
wireless stations.
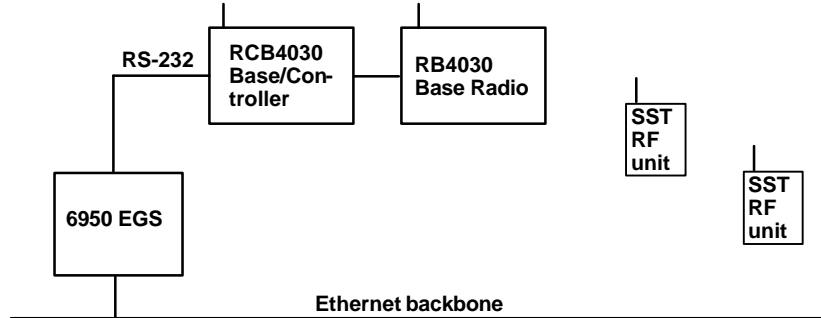
Figure 3-5
6950 EGS Connected to RCB4030 Base/Controller

RC4030E Gateway

In Figure 3-6, the 6950 EGS uses a serial connection to an RC4030E Gateway, which can communicate via Ethernet with a 6710 Access Point. Radio links the synthesized UHF RF wireless stations. The gateway could be removed, since the controller functions are integrated in the 6950 EGS.
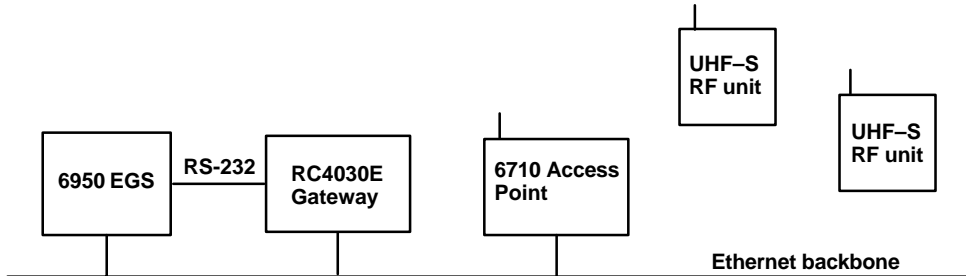
Figure 3-6
6950 EGS Connected to RC4030E Gateway

Front Panel

The 6950 EGS has two indicators on the front panel (Figure 3-7). The "Power" indicator lights when the 6950 EGS is plugged in. The "HD" indicator flashes when the hard disk drive is being accessed.
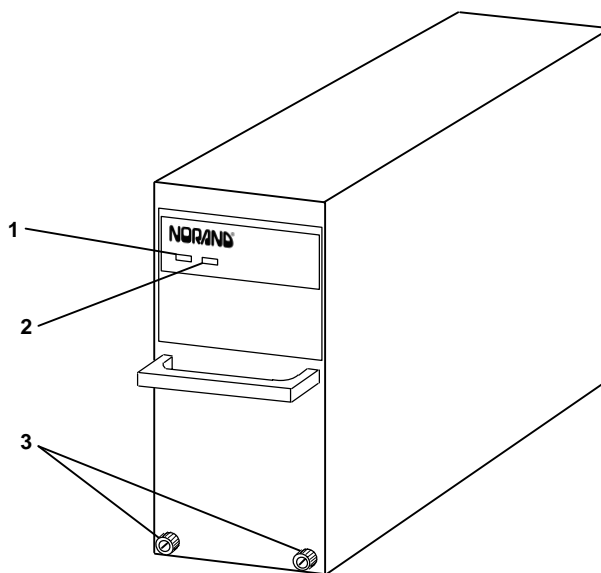
1. Power light — "Power"
2. Hard drive light — "HD"
3. Thumb screws

Figure 3-7
Front Panel

The front panel also has thumb screws for the mounting bracket.

Back Panel

The 6950 EGS has only one operating control, the power switch, on its back panel. Two models of the 6950 EGS have been produced. Both models have the following connectors:

▶ 25-pin for external disk drive (updates only)

▶ 15-pin video monitor

▶ 2 9-pin serial communication ports, both configured for RS-232 communication

▶ RJ45 jack for Ethernet 10BASE-T

▶ PS/2 keyboard

▶ "LINE/PHONE" jacks to a V.32 and V.42 internal modem set to autoanswer for remote 6950 EGS configuration. (Modems are optional.)

▶ Switchable 110, 220, or 240 V ac power supply

Figure 3-8 shows the rear panel of the current model. Note that on the current model, the RJ45 jack is also the connector for 100BASE-T.

Early models of the 6950 EGS also have these components:

▶ 15-pin AUI port for Ethernet 10BASE5

▶ BNC connector for Ethernet 10BASE2

Figure 3-9 shows the rear panel of the early model.
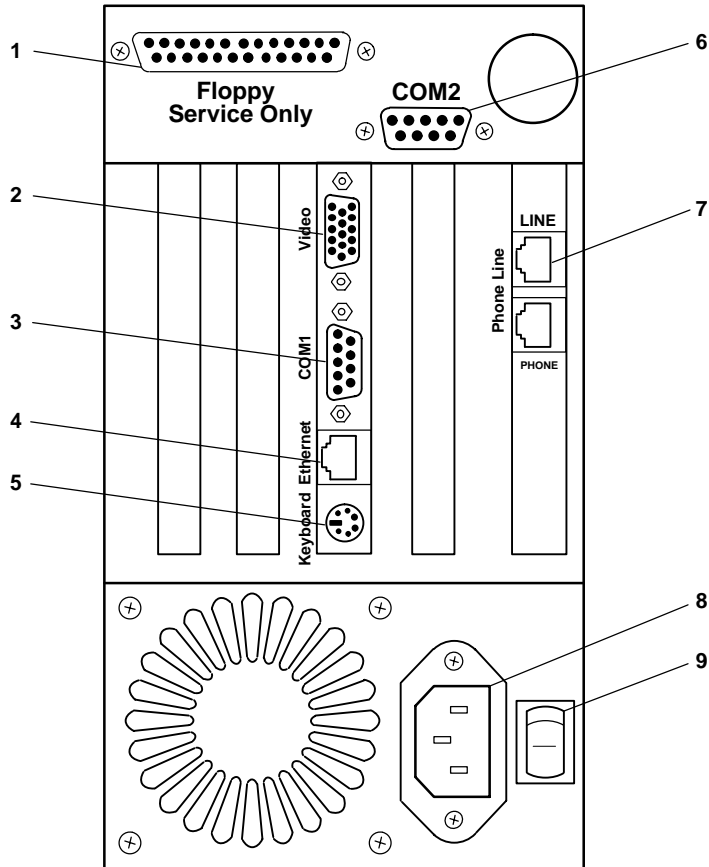
1. External disk drive connector
2. Video connector (dumb terminal)
3. COM1 connector
4. RJ45 jack for 10BASE-T or 100BASE-T Ethernet connection
5. PS/2 keyboard connector (dumb terminal)
6. COM2 connector (dumb terminal)
7. Modem jacks
8. Power supply socket
9. Power switch

Figure 3-8
Back Panel of Current Model of 6950 EGS
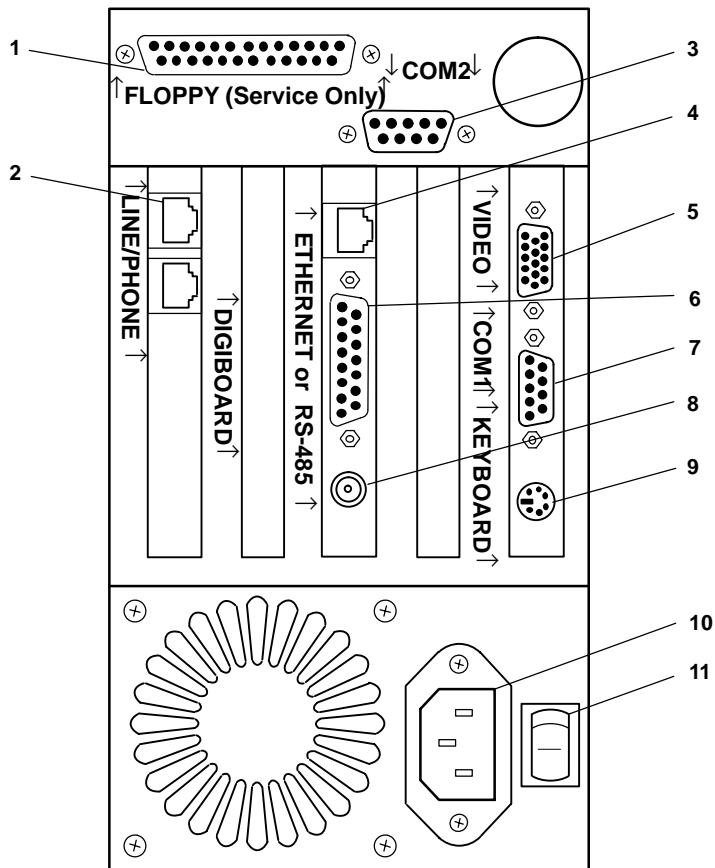
1. External disk drive connector
2. Modem jacks
3. COM2 connector (dumb terminal)
4. RJ45 jack for 10BASE-T Ethernet connection
5. Video connector (dumb terminal)
6. AUI jack for 10BASE5 Ethernet connection
7. COM1 connector
8. BNC connector for 10BASE2 Ethernet connection
9. PS/2 keyboard connector (dumb terminal)
10. Power supply socket
11. Power switch

Figure 3-9
Back Panel of Early Model of 6950 EGS

During normal Ethernet operation, you do not use the floppy drive, video, keyboard, or either of the communication ports.

On the early model of the 6950 EGS, only one of the Ethernet connectors can be used at a time.

If configured for RS-232 communication, the 6950 EGS can use one communication port (COM1) to connect to an RC3250 Network Controller, RCB4030 Base/Controller, or RC4030E Gateway. The COM2 port is always reserved for dumb terminal operation and cannot operate RF equipment.

Location

Locate the 6950 EGS indoors within 7 running feet of an electrical outlet so the alternating current power cord reaches the power supply. Choose a location where you can see the LEDs on the the front panel and reach the power switch on the back panel.

Mounting Brackets

The 6950 EGS can stand free on a counter or shelf, or you can mount it on a shelf or wall bracket. If you choose to use a bracket, you need one of three optional mounting brackets. The bracket part numbers (PN) follow.

PN	Description	Dimensions
850-529-102	Wall mount bracket	16.8 x 12.75 x 5.25 inches 42.7 x 32.4 x 13.3 cm
850-529-101	Shelf mount bracket for single 6950 EGS	16.8 x 5.4 x 3.75 inches 42.7 x 13.7 x 9.5 cm
850-529-103	Shelf mount bracket for two 6950 EGSs (double width)	16.8 x 9.8 x 3.75 inches 42.7 x 24.9 x 9.5 cm

To install a bracket for the 6950 EGS:

1. Use holes in the bracket as a template to mark wall or counter holes for mounting hardware (purchased locally).

2. Drill holes and install anchors (if used).

3. Position bracket and install mounting hardware.

4. Remove two thumb screws on the lower front panel of the 6950 EGS.

5. Slide the 6950 EGS into position.

6. Thread thumb screws through the 6950 EGS and mounting bracket.

7. Tighten thumb screws.

8. Attach cables.

Cabling

The cable required for the Ethernet connection is a standard device cable for your network. We sell the cable for connecting the RC3250 Network Controller's host port to the 6950 EGS's COM1 port. Its part number is 216-772-0xx, where "xx" indicates the cable length. Contact your representative for details.

Collecting the Equipment

Before you install the 6950 EGS, collect the equipment you need. The early model of the 6950 EGS directly connects to 10BASE2 or 10BASE-T Ethernet medium. The current model connects to 10BASE-T or 100BASE-T.

10BASE2 Components

10BASE2 components include the proper lengths of 10BASE2 coax cable, a T-connector, and a cable terminator. On the early model of the 6950 EGS, the 10BASE2 T-connector (Figure 3-10*)* attaches to the 6950 EGS's 10BASE2 port, and connects the 6950 EGS to the middle or end of 10BASE2 cable.
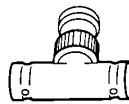
Figure 3-10
T-connector

A cable terminator (Figure 3-11) attaches to the T-connector. It is required for a device connected to the end of 10BASE2 cable. The terminator properly terminates the network cable to maintain proper impedance. Proper termination is necessary for reliable network communications.
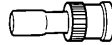
Figure 3-11
Cable Terminator

10BASE-T or 100BASE-T Component

The 10BASE-T or 100BASE-T component is a cable that can extend up to 328 feet (100 meters) in length. The cable has an RJ45 plug at each end (Figure 3-12). Typically, the cable from the 6950 EGS to the RJ45 jack is less than 10 feet long.
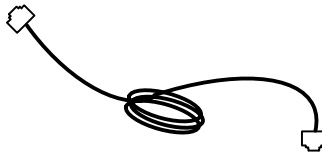
Figure 3-12
Cable With RJ45 Plugs

Connecting to Ethernet

The following pages show how to connect the 6950 EGS to 10BASE-2 (early model only), 10BASE-T, and 100BASE-T (current model only).

10BASE2

The early model of the 6950 EGS can connect to the end or middle of the 10BASE2 cable segment.

▶**NOTE:**   *Cable lengths between network devices on the 10BASE2 Ethernet LAN must meet ANSI/IEEE standards.*

End of Segment

See the following procedure and Figure 3-13.

1. Plug the T-connector (2) into the BNC port.
2. Plug one end of the Ethernet cable (3) into an open end of the T-connector. Align the notches in the cable end with the posts on the T-connector, push the cable in, and twist one-fourth turn.
3. Plug the cable terminator (1) into the other end of the T-connector.

Middle of Segment

See the following procedure and Figure 3-14.

1. Plug the T-connector (2) into the BNC port.
2. Plug one end of the Ethernet coaxial cable (1) into an open end of the T-connector. Align the notches in the cable end with the posts on the T-connector, push the cable in, and twist about one-fourth turn.
3. Plug the end of another Ethernet coaxial cable segment into the other open end of the T-connector.
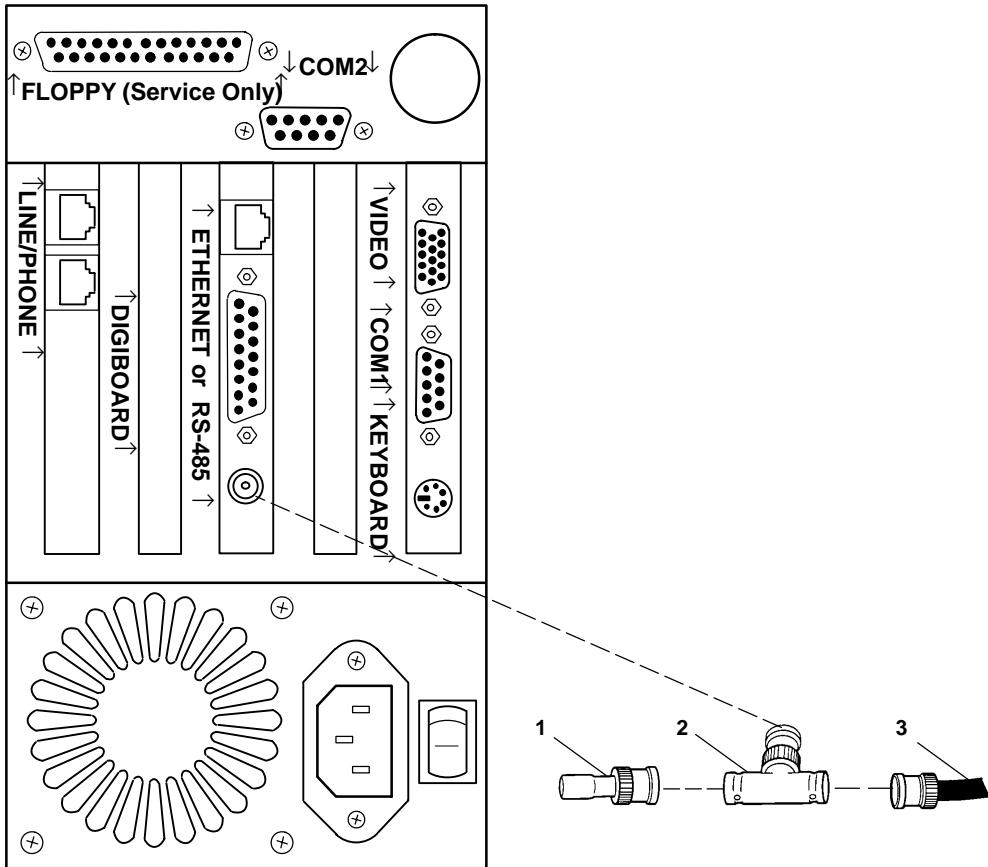
1. Cable terminator (50 ohm)
2. T-connector
3. 10BASE-2 cable

Figure 3-13
6950 EGS at End of 10BASE2 Segment
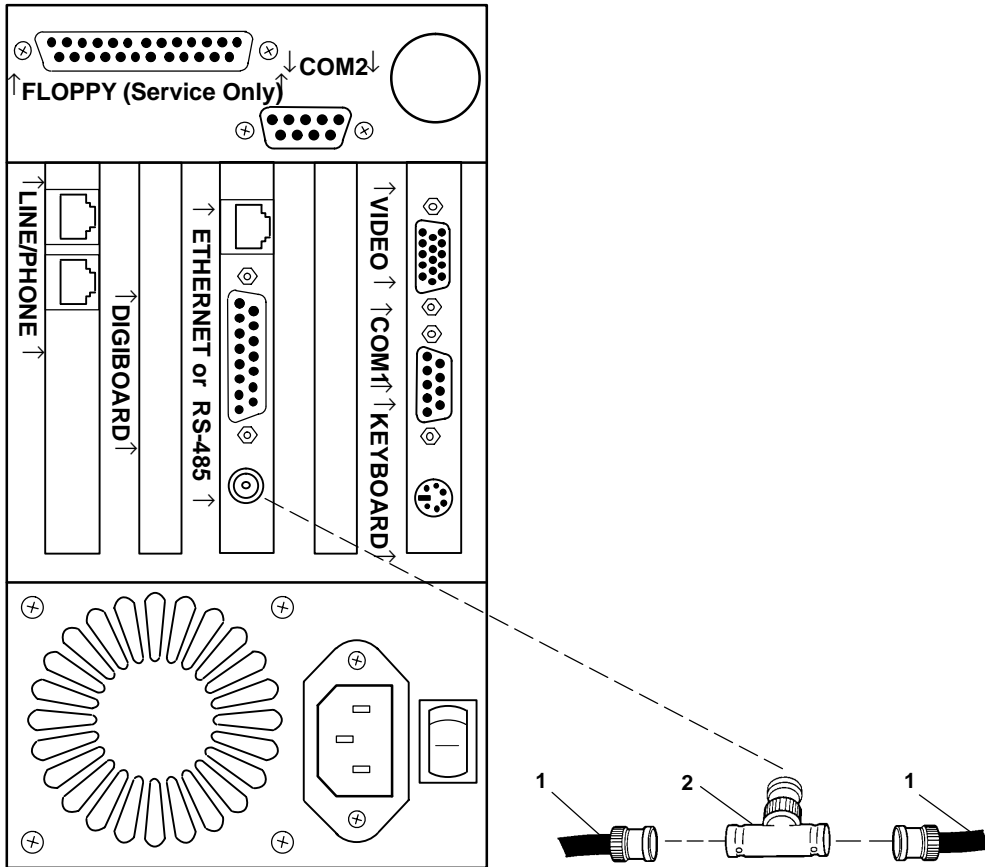
1. **10BASE2 cable**
2. **T-connector**

Figure 3-14
6950 EGS in Middle of 10BASE2 Segment

10BASE-T or 100BASE-T

See the following procedure and Figure 3-15.

1. Plug the cable with RJ45 jacks (1) into the 10BASE-T port.

2. Plug the other end of the cable into the RJ45 jack or hub port (2).
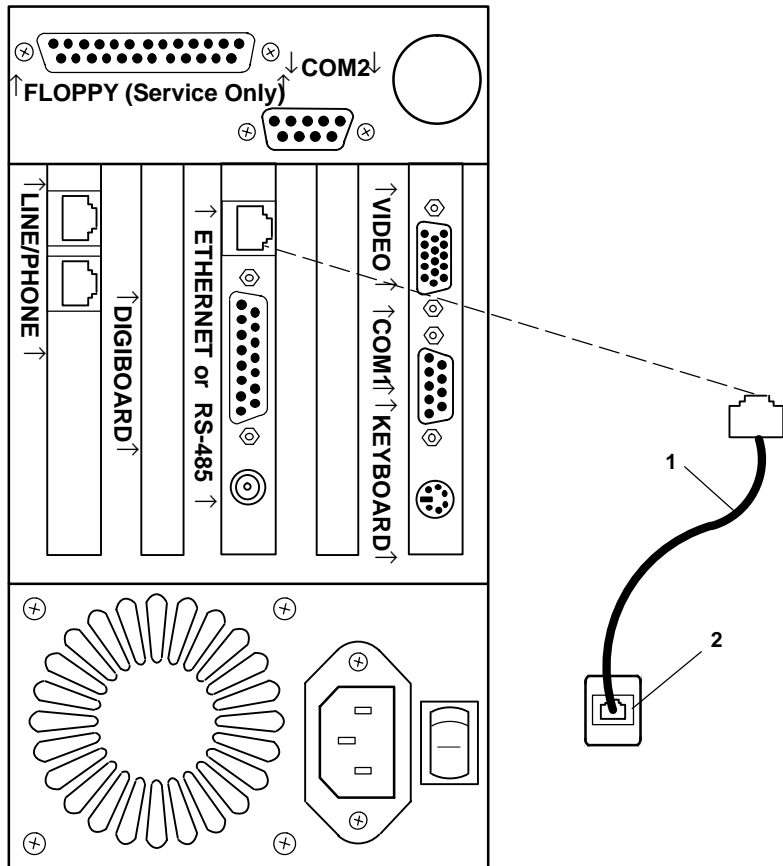
1. Cable with RJ45 plugs
2. RJ45 jack (or hub port)

Figure 3-15
6950 EGS Connected to 10BASE-T or 100BASE-T

Applying Power

Power is applied to the 6950 EGS through the grounded ac input socket. To apply power, see Figure 3-16 and follow this procedure:

1. Plug the receptacle end of the power cord (1) into the ac input socket.
2. Insert the three-prong plug on the other end of the power cord (2) into a grounded power outlet.
3. Switch on the power. The "Power" indicator on the front panel should light.

If the 6950 EGS loses power during normal operation, it restarts operation when power returns. The power loss causes no harm to the 6950 EGS or the wireless network.
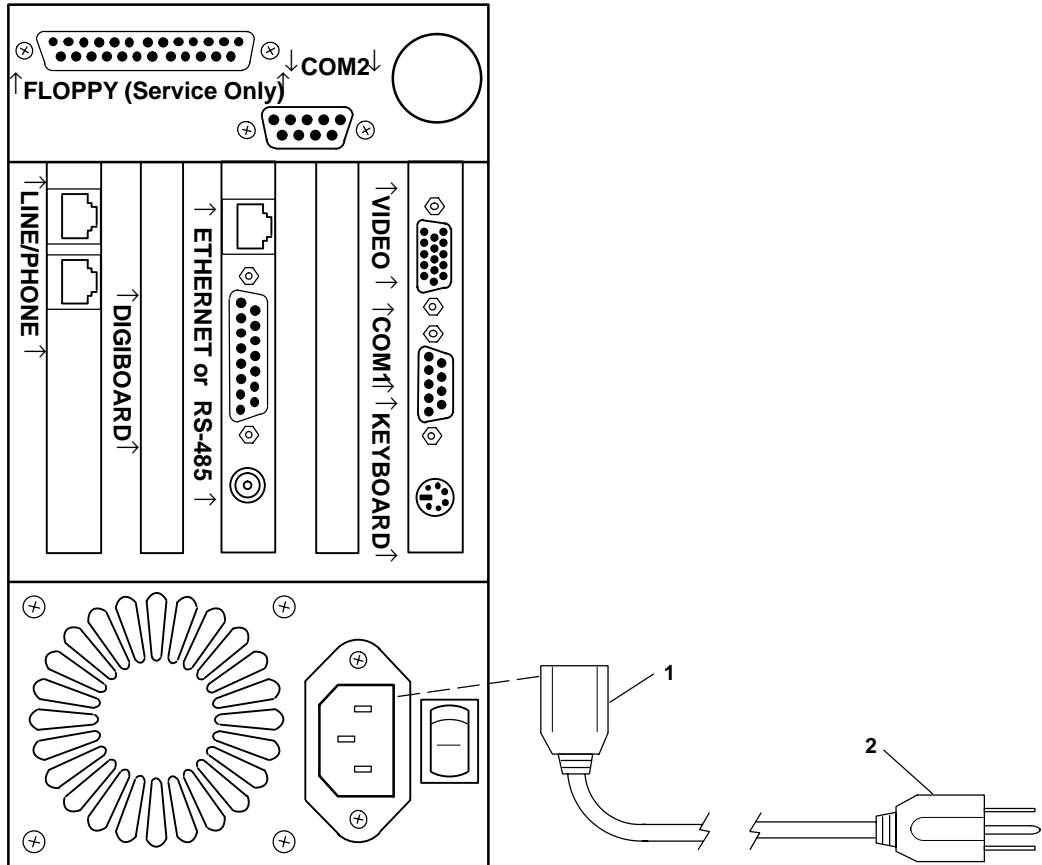
1. Receptacle on power cord
2. Three-prong plug

Figure 3-16
AC Power Connection

Section 4

Connecting to the 6950 EGS

► ►

You can configure the 6950 EGS through one of these connection methods:

- ► Telnet session from another device on the network (see page 4-2)

- ► Video monitor and keyboard attached to the 6950 EGS (see page 4-4)

- ► Dumb terminal plugged into COM2 (see page 4-5)

Version 6.02 or greater of the wireless station's firmware provides VT220, TN3270, and TN5250 terminal emulation; and NORAND® Native using sockets. That means that once you set up the 6950 EGS with your network information, a wireless station can telnet to any application on a VAX, UNIX, or IBM host that uses one of these data streams.
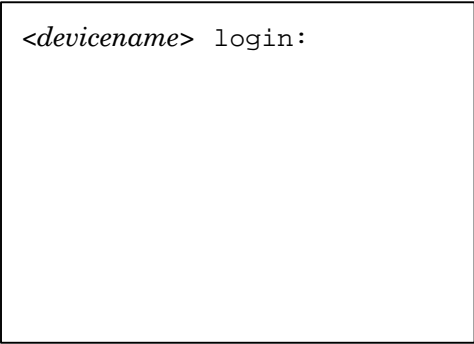
Telnet

1. Open a telnet session with the 6950 EGS. For initial configuration, you need the addresses set at the factory:

   Default IP address: 198.70.37.28
   Subnet mask: 255.255.255.0
   Network address: 198.70.37.0

   After initial configuration, use the IP address, subnet mask, and network address you set up for subsequent telnet sessions.

   The login screen appears:

   ```
   <devicename> login:
   ```

2. Enter this user name: **config**

The following screen appears:

```
<devicename> login:
Password:




```

3. Enter this password: **10425rc** (password characters do not appear). The System Menu appears:

```
EGS Version <version>
- - System Menu - -

  1 = Config
  2 = Control
  3 = Monitor
  4 = Update
  E = Exit

Option->
```

The System Menu sets the conditions for the network.

4. Press:

1   To configure network specific parameters such as IP addresses and host names, configure RF parameters and wireless stations, ping a host, open a telnet session, and set the date and time. See Section 5, "Configuring Network Options" and Section 6, "Configuring Radio Frequency Communication."

2   To halt or reboot the 6950 EGS, or restart without rebooting. See Section 7.

3   To monitor the system, view log files on the 6950 EGS, and test the throughput of the RF link. See Section 8.

E   To exit the System Menu.

▶ **NOTE:**   *The ability to update the 6950 EGS software through option 4, "Update," is currently unavailable.*

Video Monitor and Keyboard
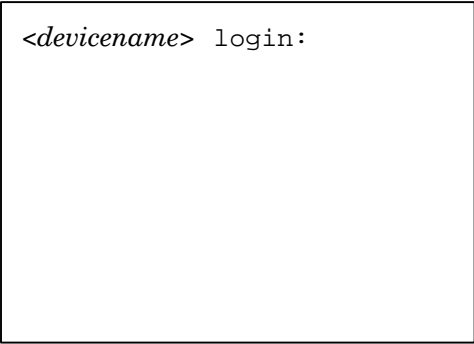
1. Attach the video cable to the connector marked "Video" and the keyboard to the "Keyboard" socket.

2. Begin a communication session. The login screen appears:

```
<devicename> login:
```

3. Follow the steps beginning with step 2 on page 4-2.

Dumb Terminal

1. Connect a dumb terminal (for example, a PC running
    a communication package) to COM2 with a null
    modem cable. Communication settings are:
    ▶ Speed = 9600 bits per second
    ▶ Parity = none
    ▶ Data bits = 8
    ▶ Stop bit = 1

2. Begin a communication session. The login screen
    appears:

    ```
    <devicename> login:
    ```

3. Follow the steps beginning with step 2 on page 4-2.

Section 5

Configuring Network Options

▶ ▶

This section describes how to set the network specific information the 6950 EGS uses to communicate with the network, including:

▶ IP addresses

▶ Host names

▶ Netmasks

▶ Domain Name Server (if used)

We have provided space for you to record this information as you set up the 6950 EGS. We encourage you to do so. If the network configuration is not successful, you have a convenient record for troubleshooting.

Required Information

You need the following information to configure the 6950 EGS. Contact your network administrator for assistance. You also need the information to update the 6950 EGS software. Names are case sensitive.

6950 EGS IP address _____ . _____ . _____ . _____

6950 EGS domain name_____

Network IP address _____ . _____ . _____ . _____

Subnet mask _____ . _____ . _____ . _____

Default host IP address_____ . _____ . _____ . _____

DNS host name (optional) _____

DNS IP address (optional) _____ . _____ . _____ . _____

Secondary
DNS IP address (optional) _____ . _____ . _____ . _____

(900 MHz RB4030 Base Radio system only) LAN ID _____

Wireless network host name _____

Static route:
Router local address (optional)_____ . _____ . _____ . _____
(if host is on the other side)

Router destination
 address (optional)_____ . _____ . _____ . _____
(if host is on the other side)

Subnet mask (optional) _____ . _____ . _____ . _____

Default gateway IP address (optional) _____ . _____ . _____ . _____

Ethernet frame types:
Network devices must be enabled to pass the following DIX 2.0 Ethernet frame types
(between the 6950 EGS and the access points only): 875a, 875b, and 875c. The
network devices must also be enabled to pass multicast frames.

For help with setting frame types, refer to the network device's user manual.

Getting Started

When you log in to the 6950 EGS, you see the System Menu:

```
EGS Version <version>
- - System Menu - -

  1 = Config
  2 = Control
  3 = Monitor
  4 = Update
  E = Exit

Option->
```

1. To configure network options, press "1" and then [Enter]. The Config Menu appears:

```
- - Config Menu- -

  1 = IP
  2 = RF Comm
  3 = RF Units
  4 = Date
  E = Exit

Option->
```

2. Press:

1   To use the IP Menu to configure and view your network specific parameters (for example, IP addresses and host names), ping a host, and open a telnet session. See "Using the IP Menu."

2   To configure RF communication parameters (for example, LAN ID [900 MHz RB4030 Base Radio systems only], host name, reconnect, automatic connect, and debug levels). See Section 6, "Configuring Radio Frequency Communication," for details.

3   To configure each wireless station; for example, its wireless station number, the host it logs in to, and the user ID it logs in as. Also use this option to copy one setup to other wireless stations. See "Setting Up the RF Units" later in this section.

4   To set the date and time on the 6950 EGS. You need this information for log files that are date and time stamped. See "Setting the Date and Time" later in this section.

E   To exit the Config Menu.

Using the IP Menu

▶**NOTE:**   *Contact your network administrator for help with TCP/IP addresses, subnet masks, default gateways, and static routes. If one of these items is incorrect, communication between the 6950 EGS and host computer will not work.*

1. At the Config Menu, press "1." The IP Menu appears:

```
IP Menu
1 = View
2 = Config
3 = Ping
4 = Telnet
E = Exit
->
```

2. Because you must configure IP addresses before option 1, "View" and option 3, "Ping" are useful, press "2" for the Config Menu and then [Enter]. The IP Config menu appears:

```
- IP Config -
1 = IP
2 = Hosts
E = Exit


Option->
```

3. Press:

    1   To configure IP addresses. See "Configuring IP Addresses."

    2   To add or delete host names and matching IP addresses. See "Configuring Host Names" later in this section.

    E   To exit.

Configuring IP Addresses

▶ **NOTE:**   *Before you configure IP settings, ensure that you have the IP information listed on page 5-2.*

When you press "1" at the IP Config menu, the following screen appears:

```
Norand EGS
Configuration
Version <version>

1. Enter the
hostname for
this EGS:
->
```

<version> represents the 6950 EGS's current version.

To configure IP settings:

Complete the configuration steps on the following pages. If you make a mistake, you can press <Ctrl> <C> to start over.

The first two steps construct a name for this 6950 EGS that can be used by a DNS. It takes the form *<hostname> <domain>*. If you do not use a DNS, you must still type something for each request; for example use "Intermec" for host, and "radios" for domain. Your network uses the IP addresses, supplied following the names.

1. Type the host name for this 6950 EGS (for example, "Intermec") and press [Enter]. The host name may be up to 8 characters long. Alphanumeric characters are acceptable in upper or lowercase. The underscore is acceptable, but spaces are not.

▶ **NOTE:**   *Do not use this host name for your wireless stations. Their host name identifies a radio controller (such as the 3250 Network Controller or RCB4030 Base/Controller). Do not confuse this IP host name with the name of the host to which the wireless stations telnet. The host name requested here is for the 6950 EGS.*

The following screen appears:

```
2. Enter domain
name for <hostname>
without the '.':
->
```

<hostname> is the name from the previous step. The domain name sets the domain within the host network that the 6950 EGS can reach. For initial testing, use this default name: NORAND

The period "." referred to in this prompt is the period that falls between host name and domain in the full address. Do not begin the domain name with a period. For example, use "company.com" instead of ".company.com" to construct the name "hostname.company.com".

2. Type the domain name and then press [Enter]. The
    following screen appears:

```
Unit name is
<hostname>.<domain>

3. Enter IP
address for this
EGS:
->
```

3. Type the IP address assigned to this 6950 EGS by
    your network administrator (for example,
    "111.111.111.111") and press [Enter]. The following
    screen appears:

```
4. Enter IP
address for
this network:
->
```

4. Type your network IP address (for example,
    "111.111.111.0") and press [Enter]. The following
    screen appears:

```
5. Enter network
netmask:
->
```

A subnet mask takes the form ###.###.###.###, where each "###" segment represents a decimal address from 0–255.

5. Type your network mask (subnet mask) (for example, "255.255.255.0") and then press [Enter]. The following screen appears:

```
6. Enter default
host IP address:
->
```

Your default host is the first host the 6950 EGS attempts to connect with on wireless station start-up. When the 6950 EGS detects a wireless station powering on, it tries to open a telnet connection to this host. For example, your most commonly used application program might reside there. Choose the first host you want the 6950 EGS to connect with when a wireless station powers on.

6. Type your default host IP address (for example, "111.111.111.5") and press [Enter].

The next screen appears:

```
7. Use default
gateway? Y/N
->
```

If you have a specific gateway you always want the 6950 EGS to attempt its first connection through, use a default gateway. If the 6950 EGS fails to connect to the default gateway, it tries other routes. Consider Figure 5-1.
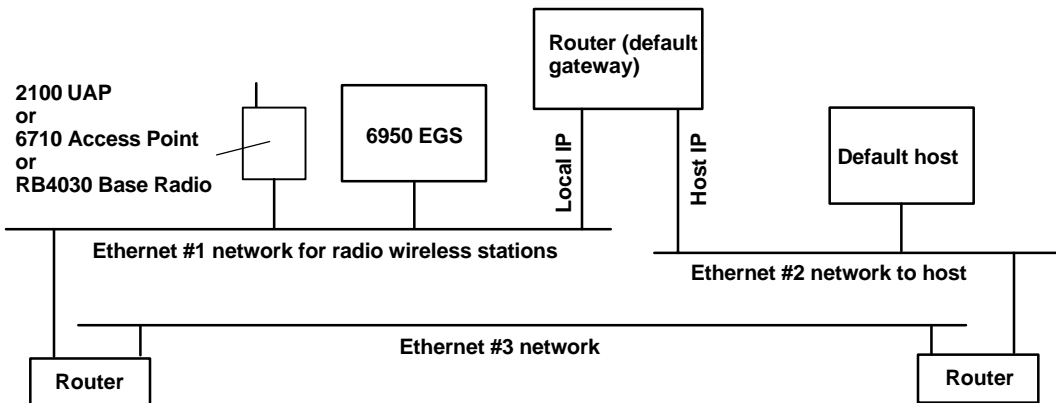
Figure 5-1
Default Gateway to Host

In this example, the 6950 EGS can reach the default host by two different routes:

- ▶ Through the default gateway
- ▶ Through Ethernet network #3

If you use a default gateway, the 6950 EGS always attempts first to reach the default host through the default gateway.

If an attempt to reach the default gateway fails, the 6950 EGS attempts any other available path. In the example, the alternate route passes along Ethernet network #3.

7. If you are not using a default gateway, press "N." The next screen asks if you want to use a static route. Skip to step 8.

    If you are using a default gateway, press "Y" and then [Enter]. The following screen appears:

```
Enter
Default
Gateway:
->
```

Type the default gateway address and press [Enter]. This address too takes the form "111.111.4.3." Be sure to use the IP address for the wireless network side of the gateway; "local IP" as shown in Figure 5-1.

The following screen appears:

```
8. Use static
route? (Y/N)
->
```

Reserve static routes only for a single fixed path from the 6950 EGS to a larger network. A static route is a single, fixed path between the 6950 EGS and the host computer. Static routes keep the network from attempting other routes if the static route is unsuccessful or fails during operation. Typically a router must pass along all traffic for an otherwise isolated wireless network. See the example in Figure 5-2.
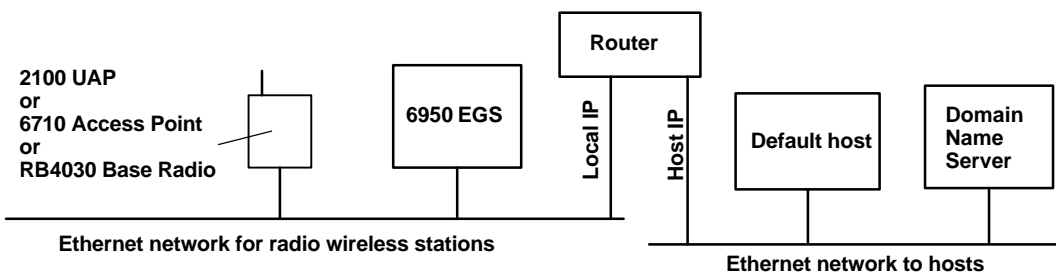
Figure 5-2
Static Route to Host

8. If you are not setting a static route, press "N." You
    are asked if you want to use a DNS. Skip to step 9.

    If you are using a static route, press "Y" and then
    [Enter] to set a new static route for the 6950 EGS to
    use. The following screen appears:

```
Enter
Destination
Address:
->
```

Type your destination address. This is the network
you are reaching through the router (for example
"198.70.37.0").

Press [Enter]. The following screen appears:

```
Enter Gateway
Address:
->
```

Type the gateway address for the static route. This is usually the address of the router (for example, "136.179.76.3"). Be sure to use the IP address on the side of the router with the RF equipment. In Figure 5-2 on page 5-12, the connection is marked "local IP."

Press [Enter] after typing the address. The following screen appears:

```
Enter Static
Route Netmask:
->
```

Type the subnet mask for the static route and press [Enter]. The subnet mask must give the 6950 EGS access to the default host. This completes the static route.

▶ **NOTE:** *After you complete setup and reboot the 6950 EGS, you can check the static route by pinging the host from the 6950 EGS. The host can check the return path by pinging the 6950 EGS.*

The following screen appears after you enter the netmask:

```
9. Use Domain
Name Server?
Y/N
->
```

A DNS is a specially configured computer that does name resolution. If you type a host name, it translates that into the IP address of that host.

9. If you are not using a DNS, press "N" and then [Enter]. Skip to step12.

   To use a DNS, press "Y" and then [Enter]. The following screen appears:

```
NAMESERVER setup for:
<IP> <hostname> <domain>

10. Enter IP
address of the
Name Server for
domain <domain>:
->
```

10. Type the DNS host IP address and press [Enter]. The following screen appears:

```
NAMESERVER setup for:
<IP> <hostname> <domain>

11. IP Address of
Secondary Domain
Name Server:
<ENTER if none>
->
```

11. If you are using a secondary (fallback) DNS, enter its
     IP address. If you are not using one, press [Enter].

12. The following message confirms the configuration was
     saved and is complete:

```
Configuration is
complete.

Restart for
changes to take
effect.

Press any key:
```

13. Press [Enter] to restart the 6950 EGS. The following
screen appears:

```
Are you sure
you want to
reboot?  (y/n)
->
```

You must reboot the 6950 EGS before the changes you
made can take effect.

14. Do one of the following:

▶ To not reboot, press "N" and [Enter]. The Config
Menu returns. The 6950 EGS continues to
operate but without the configuration changes
taking effect. They do not take effect until you
reboot the 6950 EGS.

▶ To reboot, press "Y" and then [Enter]. It takes
about half a minute to a minute for the 6950
EGS to reboot.

Allow about 3 minutes for the wireless network to restart. Messages like the following build one after the other on the display as the restart occurs:

```
Reboot in
Progress. . .
Terminal will
stop.
Wait for reconnect
prompt.

Stopping RF.
```

When the reboot is complete, the wireless station beeps and the message "RF Server Ready!" returns. The 6950 EGS is now configured and ready for regular operation. If the message does not appear, the wireless station may be out of range of the 2100 UAP, 6710 Access Point, or RB4030 Base Radio.

Configuring Host Names

Use the IP addresses and host names supplied with option 2 on the IP Config menu to build a local host table. Wireless station users can then supply the host names instead of IP addresses during connection.

Local host tables are useful when a DNS is not present on the Ethernet network. A name is less cumbersome and prone to fewer errors than an IP address.

The 6950 EGS keeps a table of each host name and IP pair. When users supply a host name, it substitutes the IP address. For example, assume the host name "IRV" has been added with the IP address 192.168.5.40. When users supply the host name "IRV," the 6950 EGS translates that to address 192.168.5.40 and opens a connection to the host.

The 6950 EGS checks its local host table for IP addresses before checking the DNS.

To configure host names:

1. Press "2" at the IP Config menu. The HOST Menu appears:

```
HOST Menu
1 - Add
2 - Delete
E - Exit

Option ->


```

2. Press:

    1   To add a host by supplying the IP address. See "Adding a Host."

    2   To delete a host by supplying the IP address. See "Deleting a Host."

    E   To exit the menu.

Adding a Host

1. At the HOST Menu, press "1." The following screen appears:

```
Enter IP
to add
 ->
```

2. Enter the IP address and then press [Enter]. The following screen appears:

```
Enter Hostname
to add
->
```

3. Type the host name and then press [Enter]. You return to the HOST Menu.

Deleting a Host

1. At the HOST Menu, press "2." The following screen appears:

```
Enter IP
or Hostname
to delete
->
```

2. Type the IP address or host name you want to delete and press [Enter]. You return to the HOST Menu.

Viewing IP Addresses and Host Names

1. At the IP Menu, press "1" and then [Enter]. The IP View menu appears:

```
IP View
1 = IP
2 = Hosts
E = Exit
->
```

2. Press "1" and then [Enter] to view the current configuration. For example:

```
IP Address = <IP address>
Netmask = <netmask>
Network address = <IP address>
Static Route:
 Gateway =
 Destination =
 Netmask =
Default Gateway = <IP address>
Domain <domain>
Name Server <IP DNS>
Name Server <secondary DNS IP>
Press <Enter>
```

If you configured a static route or a DNS, its settings appear on this screen.

3. When finished, press [Enter].

4. At the IP View menu, press "2" to view the host set up. The IP address and host name for each host appear. For example:

```
198.70.37.30  test
198.70.37.31  new
198.70.37.32  Lynda
198.70.37.33  Joe
198.70.37.34  D_Doehr

Press <Enter>
```

5. When finished, press [Enter].

Pinging a Host

▶ **NOTE:**   *The ping feature will not function until you complete the IP network configuration and reboot the 6950 EGS. For instructions, see "Using the IP Menu" earlier in this section.*

To ping a host:

1. At the IP Menu, press "3." The following screen appears:

```
Enter hostname
or press
<ENTER> for
default host

HOST->
```

2. Type the IP address or host name and then press [Enter].

    If the response is successful, the response from the host appears and the 6950 EGS can communicate with the specified host. If the ping fails, review the network connections and configurations.

3. Press [Enter] to continue.

Opening a Telnet Session

The wireless station can telnet to any host that supports the VT/ANSI, TN3270, or TN5250 data stream.

To open a telnet session:

1. At the IP Menu, press "4" and then [Enter]. The following screen appears:

```
Enter hostname
or press
<ENTER> for
default host

HOST->
```

2. Type the host name or IP address to telnet to and press [Enter].

   The 6950 EGS attempts to connect to the host (it shows the IP address it is trying). If the host does not respond because of a faulty connection path, is not prepared for telnet, or is down, the 6950 EGS stops the attempt and suggests possible reasons.

   If you do not enter a name or an IP address, the default for the 6950 EGS is to connect to the host defined as the default host using port 23 (localhost=default host).

Setting Up the RF Units

Each wireless station is assigned a host to which it will connect. This assignment is made in the 6950 EGS. A network may consist of several access points, several 6950 EGS gateways, and several host computers. One 6950 EGS can assign wireless stations to multiple hosts. Each wireless station must be configured to have a unique terminal number and host name combination. Wireless stations may have the same terminal number, but they must then be assigned to different 6950 EGS gateways with different host names.

To set up the wireless station, press "3" at the Config Menu (shown on page 5-3). The following screen appears:

```
nui_cfg Wireless Network Access Server Configuration -- Modlvl <version>

RF Unit Setup:

1.  Unit number .: 1

3.  Comment......: VT220 terminal

5.  IP Host name.: localhost
6.  Port.........: 0023
7.  User ID......:
8.  Password.....:
9.  Copy Setup from unit ???
10. Duplicate this setup to unit ??? thru unit ???

CTRL->Enter option: (E=Exit,N=next,P=previous or item number to change)
HELP->
```

The following chart describes the options.

Option	Description
5. IP Host name	Default host to which the wireless station attaches. "Localhost" is the default host configured in the IP configuration.
6. Port	TCP port number the 6950 EGS tries to connect to when creating the telnet connection. Port 23 is the "well-known" standard telnet port. To connect to a different TCP port, supply the 4-digit number here.
7. User ID	If you supply this option and if you are using VT220 terminal emulation (without telnet), the 6950 EGS attempts a remote login to the IP host defined with User ID. Autologin works only if the end of the host prompts match any of the following. *For the autologin prompt from your telnet host:*

*sername:
*SERNAME:
*ogin:
*OGIN:

Option	Description
8. Password	Password supplied to the host when trying to connect. Autologin works only if the end of the host prompts match any of the following. *For the password prompt from your telnet host or from another unit to this unit:*
	*ASSWORD: *assword:
9. Copy Setup from unit ??? *and* 10. Duplicate this setup to unit ?? thru unit ???	Enable you to copy one setup to a group of other wireless stations in one step.

To configure the wireless stations:

1. Type the unit number (option 1) and the IP host name (option 5). Add a comment (option 3) if desired. Press [Enter].

2. To add remaining wireless stations, use one of these methods:

   ▶ For a single terminal, type the number from the desired terminal's setup at line 9.

   ▶ To copy the current set up to several terminals, type the range of terminal numbers at line 10.

3. Press [Enter].

Setting the Date and Time

1. At the Config Menu, press "4." The Date Menu appears:

```
-- Date Menu --
<date> <time>

1 = Change
E = Exit
Option ->
```

2. Press "1" to change the date or time:

```
Current Date:
<date>
New date:
<MM/DD>
```

3. To change the date, type a new date on the blank line
    in the same form as the current one. Use a one- or
    two-digit month (MM) and a one- or two-digit day of
    the month (DD), supplying a slash.

    To leave the date unchanged, press [Enter] and check
    the time:

```
Current Date:
<date>
New date:
<MM/DD>

Current Time:
<time>
New Time:
HH:MM

```

4. To change the time, type a new time (24-hour clock) on
    the blank line in the same form as the current one.
    Use a one- or two-digit hour (HH) and two-digit
    minutes (MM), supplying a colon between them.

    To leave the time unchanged, press [Enter] to return
    to the Date Menu.

Section 6

Configuring Radio Frequency Communication

▶ ▶

This section tells how to configure your RF-specific communication. You can control your communication options through the 6950 EGS's Ethernet connection or RS-232 serial connection (COM1). The 6950 EGS is shipped configured for an Ethernet connection.

To begin the configuration:

1. Start at the System Menu (for directions to the menu see Section 4, *Starting the 6950 EGS*):

```
Version <version>
-- System Menu --

  1 = Config
  2 = Control
  3 = Monitor
  4 = Update
  E = Exit

Option->
```

2. Press "1" and then [Enter]. The Config Menu appears:

```
-- Config Menu --

    1 = IP
    2 = RF Comm
    3 = RF Units
    4 = Date
    E = Exit

Option->
```

3. To configure the wireless network through Ethernet,
    see "Configuring Through an Ethernet Connection."
    To configure through RS-232, see "Configuring
    Through an RS-232 Connection" later in this section.

Configuring Through an Ethernet Connection

Press "2" at the Config Menu. The Comm Setup menu
appears:

```
Comm Setup

1. Type: E (E,R)
2. Lan : <LAN ID> (0-7)
3. Host: <host name>
4. Rec : 0 (0,1)
5. Auto: 0 (0,1)
6. Dbg : 0 (0-2)
Option:    (1-6,E)
```

The screen lists your current RF configuration. Characters within parenthesis show choices for the numbered option.

▶ **NOTE:** *If you are using a 900 MHz RB4030 Base Radio and change the LAN ID for the 6950 EGS, you must change the LAN ID for the wireless stations and the base radio to match before the wireless station lets you log in again.*

▶ **NOTE:** *If you change the host name for the 6950 EGS, you must change the host name for the wireless stations to match before the wireless station lets you log in again.*

The following chart describes the options.

Option	Name	Function
1	Type	Displays the type of network setting: E = Ethernet *(default)* R = RS-232 serial communication
2	Lan	Displays the LAN ID. The default is 0 (zero). If you are using a 2100 UAP or 6710 Access Point, use LAN ID 0 for the 6950 EGS regardless of the access point's LAN ID setting and type of radio (802.11, 2.4 GHz OpenAir, 900 MHz, or synthesized UHF). If you are using a 900 MHz RB4030 Base Radio, the 6950 EGS's LAN ID must match the base radio's LAN ID. ▶ **NOTE:** *The wireless stations' LAN ID must match the LAN ID for the 2100 UAP, 6710 Access Point, or RB4030 Base Radio regardless of the type of radio in these devices.*
3	Host	Displays the wireless network's host (controller) name. The default is "HOST." ▶ **NOTE:** *The host name is case sensitive. The wireless stations must be configured to match this host name.*

Option	Name	Function
4	Rec *(Non-telnet VT220 terminal emulation only)*	*Reconnect.* Controls whether the 6950 EGS reattaches to the previous session after a wireless station has been powered off then on. **NOTE:** *The wireless station's display does not refresh after reconnection.* Settings: 0 = off *(default)* 1 = on
5	Auto *(Non-telnet VT220 terminal emulation only)*	*Automatic login:* Controls whether the 6950 EGS automatically attempts to telnet to the host defined for RF Unit Setup (described on page 5-25). Settings: 0 = off *(default)* 1 = on
6	Dbg	*Debug:* Verbosity level (detail kept in the log file). See details for the log file in Section 8, "Monitoring the System." Settings: 0 = silent *(default)* — Reports no debug information during normal operation. Leave Debug in this mode unless otherwise instructed by our personnel. 1 = normal — Messages between 6950 EGS and wireless stations about processes running. 2 = debug — Debug information about processes named during "normal" mode. ▶ **NOTE:** *Under normal conditions use debug level zero, since the additional activity at the other two log levels degrades performance.*

To configure the options:

1. Press the number next to the item you must change, then make the change. Choices are shown in parenthesis.

    If you do not want to make any changes, press "E" to return to the Config Menu.

2. If you made any changes, you are asked to save them after you press "E" to exit. To discard the changes, press "N" (screen not shown here).

    To save the changes, press "Y." The following screen appears:

    ```
    !!! WARNING !!!
    Lan=<lan> Host=<host>
    Press the = key
    if you are very
    sure
    ->
    ```

3. Write down the LAN ID and host name listed here. They appear as *<lan>* and *<host>* respectively.

▶ **NOTE:**   *If you do not write down this information and your wireless station does not let you log back in, you must log in by another method to learn these values. For example, with the IP address you could begin a telnet session.*

4. Press "=" once you have the information. A second message tells you the configuration was saved (not shown here). Press [Enter].

5. You must reboot or restart the 6950 EGS before these changes take effect. See Section 7, *Halting, Rebooting, or Restarting the 6950 EGS*, for details.

Configuring Through an RS-232 Connection

You must use one of the following methods for the initial configuration:

▶ Keyboard and monitor attached to the 6950 EGS

▶ PC attached to COM2 on the 6950 EGS

▶ Modem

You must set the following parameters on the RCB4030 Base/Controller or RC3250 Network Controller, or they will not work with the 6950 EGS.

▶ HOST = ASYNC

▶ PARITY = NONE

▶ STOP BITS = 1

▶ DATA BITS = 8

▶ MULTIPLE BUFFERING ENABLED

▶ CHAINING DISABLED

▶ POLLING IS REGULAR

To begin, press "2" at the Config Menu. The Comm Setup menu appears:

```
Comm Setup

1. Type: E (E,R)
2. Lan : <lan> (0-7)
3. Host: <host>
4. Rec : 0 (0,1)
5. Auto: 0 (0,1)
6. Dbg : 0 (0-2)
Option:    (1-6,E)
```

Press "1" to change the type and then "R" to change to RS-232. The screen changes to the following:

```
Comm Setup

1. Type: R (E,R)
2. Config RS232

4. Rec:  0 (0,1)
5. Auto: 0 (0,1)
6. Dbg:  0 (0-2)
Option:    (1-6,E)
```

The following chart describes the options.

Option	Name	Function
1	Type	Displays the type of network setting: E = Ethernet *(default)* R = RS-232 serial communication
4	Rec *(Non-Telnet VT220 terminal emulation only)*	*Reconnect:* Controls whether the 6950 EGS reattaches to the previous session after a wireless station has been powered off then on. **NOTE:** *The wireless station's display does not refresh after reconnection.* Settings: 0 = off *(default)* 1 = on
5	Auto *(Non-Telnet VT220 terminal emulation only)*	*Automatic login:* Controls whether the 6950 EGS automatically attempts to telnet to the host defined for RF Unit Setup (described on page 5-25). Settings: 0 = off *(default)* 1 = on
6	Dbg	*Debug:* Verbosity level (detail kept in the log file). See details for the log file in Section 8, "Monitoring the System." Settings: 0 = silent *(default)* — Reports no debug information during normal operation. Leave Debug in this mode unless otherwise instructed by our personnel. 1 = normal — Shows wireless station power-up and connection information. 2 = debug — Shows detailed messages in and out of the 6950 EGS, plus information contained in "normal" mode. ▶ **NOTE:** *Under normal conditions use debug level zero, since the additional activity at the other two log levels degrades performance.*

To configure the options:

1. Select the number next to the items you must change, then make the changes. Choices for each numbered option appear in parenthesis.

2. Press "2" (for Config RS232) and then [Enter]. The RS-232 Setup menu appears:

```
RS232 Setup

1. Baud.: 5 1=1200 2=2400 4=4800 4=9600 5=19.2 6=38.4
2. Csign: none   UHF only
3. Enable ___ thru ___.
4. Disable ___ thru ___.
                  0        1        2        3        4        5        6
 00 – 063: YYYYYYYYYYYYYYYYYYYYYYYYNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
 64 – 126: NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
                      7        8        9        0        1        2
Option:    (1,2,3,4,E)
```

The rows of "Ys" and "Ns" below option 4 show which wireless stations are enabled: "Y" for yes and "N" for no. The first row shows wireless stations 00–63.

The following chart describes the options.

▶**NOTE:**   *You can change options 1–4 in any order.*

Press	To
1	Set the baud rate to match that of the RCB4030 Base/Controller or 3250 Network Controller. Valid options are: 1 = 1200 bps 2 = 2400 bps 3 = 4800 bps 4 = 9600 bps 5 = 19200 bps *(default)* 6 = 38400 bps Press the digit preceding your communication speed and then press [Enter].
2 *(United States only)*	Set your FCC call sign (up to 10 characters) if you are transmitting with UHF radio frequency, and then press [Enter].
3	Enable a range of wireless stations. Press "3" and then type the wireless station numbers in the underlined area to enable a range of wireless stations at once. Press [Enter] after each number in the range. The 6950 EGS asks you to confirm the change. Press "Y" or "N". Your changes appear in the rows of wireless station numbers.
4	Disable a range of wireless stations. Press "4" and then type the wireless station numbers in the underlined area to disable a range of wireless stations at once. Press [Enter] after each number in the range. The 6950 EGS asks you to confirm the change. Press "Y" or "N."
E	Exit this menu and return to the Comm Setup menu.

3. If you made any changes, you are asked to save them after you press "E" to exit. To save the changes, press "Y." To discard the changes, press "N" (screen not shown here).

4. You must reboot or restart the 6950 EGS for the changes to take effect. See Section 7, *Halting, Rebooting, or Restarting the 6950 EGS*, for details.

Section 7

Halting, Rebooting, or Restarting the 6950 EGS

▶ ▶

This section describes how to halt, reboot, or restart the 6950 EGS. Instructions for logging in to the host are provided later in this section.

To halt, reboot, or restart the 6950 EGS:

1. Begin at the System Menu (see Section 4, *Starting the 6950 EGS*, for instructions on how to access the System Menu):

```
- - System Menu - -

  1 = Config
  2 = Control
  3 = Monitor
  4 = Update
  E = Exit

Option->
```

2. Press "2" and then [Enter]. The Control Menu appears:

```
     -  Control Menu -

     1 = Halt
     2 = Reboot
     3 = Restart
     E = Exit


  Option->
```

3. Press:

   1   To halt the 6950 EGS. Halt stops all activity between the host application and the wireless stations, but does not reinitialize the 6950 EGS. Use this option if you need to turn off the 6950 EGS or move it. See "Halting the 6950 EGS."

   2   To reboot the 6950 EGS. Reboot reinitializes the 6950 EGS, but does not reset its configuration settings. Reboot is equivalent with the <Ctrl>+<Alt>+<Del> warm boot of a DOS personal computer. See "Rebooting the 6950 EGS" later in this section.

   3   To restart the software communicating with wireless equipment. See "Restarting the 6950 EGS" later in this section.

   E   To exit.

Halting the 6950 EGS

To halt the 6950 EGS, you can simply power if off or you can use the Control Menu. For information about the power switch and applying power, see Section 3, "Installation." To use the Control Menu, see the following instructions.

1. At the Control Menu, press "1" and then [Enter]. This message appears:

```
Are you sure
you want to
shutdown?
(y/n)
->
```

2. To cancel shutdown, press "N" and then [Enter].

    To shut down the 6950 EGS, press "Y" and then [Enter]. Please wait three minutes after selecting this option before powering the 6950 EGS off.

    The following messages appear as the 6950 EGS shuts down. They are the last responses from the wireless station:

```
Shutdown in
Progress...
Wait 3 minutes.
Terminal will
stop.

Stopping RF.
```

3. Restart the 6950 EGS by switching its power off and on.

4. Power the wireless station off and on. It takes about 3 minutes before the terminal shows its first screen.

5. When you see the message "RF Server Ready!" (VT220 wireless station) or the host login (TN3270 or TN5250 wireless station), the 6950 EGS and terminals have returned to normal operation.

   For information about logging in to the host, see "Logging in to the Host" later in this section.

Rebooting the 6950 EGS

1. At the Control Menu, press "2" and then [Enter]. The following message appears:

```
Are you sure
you want to
reboot? (y/n)
->
```

2. Press "Y" and then [Enter] to confirm you want to
    reboot. The following messages appear:

```
Reboot in
Progress...
Terminal will
stop.
Wait for connect
prompt.
```
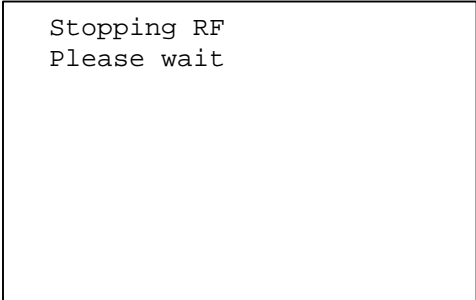
These messages show progress during shutdown. The
final message, "Stopping RF," shows completion of
shutdown. The wireless station does not respond
further. It takes about 3 minutes for the 6950 EGS to
respond to the wireless station after it starts back up.

3. The wireless station beeps. When you see the
    message "RF Server Ready!" (VT220 wireless station)
    or the host login (TN3270 or TN5250 wireless station),
    the 6950 EGS and terminals have returned to normal
    operation.

    For information about logging in to the host, see
    "Logging in to the Host" later in this section.

Restarting the 6950 EGS

1. At the Control Menu, press "3" and then [Enter]. It takes about three to five minutes to completely restart before the wireless stations receive their initial screen.

   The following messages appear:

   ```
   Stopping RF
   Please wait
   ```

   These messages show when the 6950 EGS shuts down. They are the last responses from the wireless station until the 6950 EGS restarts.

2. When you see the message "RF Server Ready!" (VT220 wireless station) or the host login (TN3270 or TN5250 wireless station), the 6950 EGS and terminals have returned to normal operation.

   For information about logging in to the host, see "Logging in to the Host" later in this section.

Logging in to the Host

Log in to the host after your wireless station is configured with the proper LAN ID, host name, and terminal emulation type. Note that for Ethernet systems, wireless stations with 3270 or 5250 terminal emulation must have telnet enabled.

Turn on the wireless station. If it is already on, turn it off then on. The host login screens that appear vary for the type of terminal emulation.

VT220 Terminal Emulation

1. When you turn on the VT220 wireless station, the following screen appears:

```
RF Server Ready!

Press '1' now to
connect.
->
```

2. Press "1" and then [Enter] to connect. The following screen appears:

```
Norand Corp.
Rf Terminal
Server V<version>
    (0003)

Enter telnet host
or press enter
for (localhost).
->
```

"Localhost" is the default IP host to connect to. *<version>* is the 6950 EGS version number. The number in parentheses is your wireless station's number.

3. To log in to the default host, press [Enter].

You can also type the IP address and press [Enter]. You can use the host name if you have a DNS and the IP address has a domain name in the 6950 EGS host table.

The following screen appears:

```
Trying <device>...
press 'x' to
stop trying.
```

<device> represents the host you have chosen.

4. You can press "x" to cancel the attempt. It will time out on its own if a connection could not be made. You are told if a connection could not be made and must press [Enter].

    If you do not cancel the attempt, the following screen appears (this screen represents your host login):

```
<devicename> login:
Password:
```

<devicename> shows the host you have logged in to.

5. Enter your login and password, and then press [Enter] after each. The first screen of your host application appears.

TN3270 or TN5250 Terminal Emulation

The first login screen that appears for a TN3270 or TN5250 wireless station is the default host login screen (shown on this page). Enter your login and password, and then press [Enter] after each. The first screen of your host application appears.

Section 8

Monitoring the System

▶ ▶
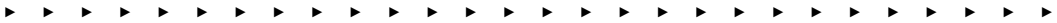
Use the 6950 EGS server's activity monitor to see recent processes run on the 6950 EGS and view its system log.

To monitor the system:

1. Begin at the System Menu (see Section 4, *6950 EGS*, for instructions on how to access the System Menu):

```
- - System Menu - -

 1 = Config
 2 = Control
 3 = Monitor
 4 = Update
 E = Exit

Option->
```

2. To monitor the system or view the log files on the 6950 EGS, press "3" and then [Enter].

The Monitor Menu appears:

```
– Monitor Menu –

   1 = System
   2 = Logs
   3 = Time Test
   E = Exit


Option->
```

3. Press:

   1   To see the wireless processes that are currently running. See "System Monitor."

   2   To see the log of activity for the 6950 EGS and its interaction with the wireless network. See "Logs" later in this section.

   3   To test the throughput of the RF link. See "Time Test" later in this section.

   E   To exit and return to the System Menu.

System Monitor

The System Monitor varies for Ethernet and RS-232 connections.

To view the monitor:

1. At the Monitor Menu, press "1" and then [Enter] to view the wireless processes. Following is an example of the processes for an RS-232 connection:

```
368 p 1 S N  0:00 sh ./nui.sh
374 p 1 S N  0:00 ./nui_serv
375 p 1 S N  0:00 ./nui_comm
```

Following is an example of the processes for an Ethernet connection:

```
 40 con S     0:00 ./nui_eth /dev/eth0
 42 con S     0:00 sh ./nui.sh
 47 con S     0:00 ./nui_serv
 52 con S     0:00 ./nui_pps
 66 con S     0:00 nui_mgr HOST 0
 70 con S     0:00 ./nui_pps
152 p 1 s     0:01 sh /nuiscripts /main
513 p 1 s     0:00 /nui/nuigrep nui
```

Processes and activities appear on the right following the numbers of the form "0:00." The numbers indicate CPU utilization.

2. Press [Enter] when finished.

Logs

Use the log files to view the activity for the 6950 EGS and its interaction with the wireless network. You can also view new information added to the logs, or clear the log file and then restart it.

For clarity, log messages show as they appear on a 24-line by 80-column monitor. The same information appears on a wireless station display, but you must scroll to read it.

The debug level controls the amount of information reported in the logs. For more information about setting debug levels, see page 6-4 (Ethernet connection) or 6-8 (RS-232 connection). For help with deciding which level of debug information you need, see "RS-232 Log Debug Levels" or "Ethernet Log Debug Levels" later in this section.

Each combination of access points or base radios, controllers, and wireless stations produces a different log. Your log may vary a lot and still be normal for your configuration.

To view, watch, or clear the log file:

1. At the Monitor Menu, press "2" and then [Enter]. The Log file menu appears:

```
      Log file
   1 - View
   2 - Watch
   3 - Clear & Restart
   E - Exit

Option->
```

2. Press:

    1   To view the log. See "Viewing the Log File."

    2   View new information added to the log. See "Watching the Log File" later in this section.

    3   Clear the log file and then restart it. See "Clearing the Log File" later in this section.

    E   To exit.

Viewing the Log File

1. At the Log file menu, press "1" and then [Enter]. The server log appears. Following is a sample server log for an Ethernet connection:

```
<date><time> nuiserv> WNAS -- Version <version>
<date><time> nuiserv> Copr. 1991-1999 Intermec. All rights reserved.
<date><time> nuiserv> System ID: LINUX norand 2.0.35 #15 <day><date><time> CDT 1999 i486
<date><time> nuiserv> Initialization in progress.
<date><time> nuiserv> Server files are in directory ./
<date><time> nuiserv> This is server number 0. Type E
<date><time> nuiserv> .. Opening message queue ...
<date><time> nuiserv> .. Spawning tty process...
<date><time> nuiserv> Child 000056: Exec 127, ./nui_pps. Type 2
<date><time> nuiserv> Server initialization complete.
<date><time> C000056> nui_func Modlvl 7.00: Parent process ID is 51.
<date><time> C000056> IPC OK! Server=0,Term=127,ID=2,Qid=0,rf lan=0,lancon=E
<date><time> C000056> nui_pps: Portable Protocol Stack Interface Modlvl 7.00
<date><time> C000056> Control channel created.
<date><time> C000056> .. Starting protocol stack daemons. RF Host HOST:0 io=0
<date><time> C000056> .. Starting nui_mgr ...
<date><time> C000056> Stack manager is started. Pid = 80
<date><time> C000056> PPS IO channel created. Waiting for mgr to connect...
<date><time> C000056> PPS manager has connected.
<date><time> C000056> Queue reader is started. Pid = 81
<date><time> C000056> .. SST init done.
<date><time> C000056>  Startup complete.
```

▶ **NOTE:**   *The log is circular and wraps to the top when it reaches its maximum size of 10 MB.*

2. Navigate through this (or any other) log as follows:

  ▶ Press [Enter] or [Spacebar] to scroll through the log until you see the last entry. Press [Enter] again to exit the log.

  ▶ Press "G" to go to the bottom of the log, and then press [Enter] to exit the log.

  ▶ Press "q" and then [Enter] to stop viewing the log.

For an Ethernet connection, a second screen shows the initiated sockets. For example:

```
<date><time>: Initiated socket 0
<date><time>: Initiated socket 1
<date><time>: Initiated socket 2
<date><time>: Initiated socket 3
<date><time>: Initiated socket 4
<date><time>: Initiated socket 5
<date><time>: Initiated socket 6
<date><time>: Initiated socket 7
<date><time>: Norand SST/OWL protocol interface Version <version>
<date><time> Trying to locate access point...
./nui_eth: Connecting server id 0
End of Ethernet Log. Press <ENTER>
```

<version> is the version of the wireless network protocol interface.

Watching the Log File

Use this option to view new information added to the log.

1. At the Log file menu, press "2" and then [Enter]. A screen similar to the following appears:

```
Press Ctrl-C to quit

nui_log: WNAS log utility. Modlvl=7.00.
nui_log: Realtime log request sent to server 0.
nui_log: Channel created. Waiting for nui_serv.
nui_log: Server has connected.
nui_log: Showing data for terminal (all
         terminals) realtime. Instance 0.
_
```

New messages appear on the screen as they are added.

2. Press Ctrl-C to stop watching the activity.

Clearing the Log File

1. At the Log file menu, press "3" and then [Enter]. The following message appears:

```
This will clear the
logfiles, stop and restart
the RF. Press 'C' to
continue.
```

2. To clear the log file, press "c" or "C" and then [Enter]. This option deletes the log file, stops the RF communication, restarts it, and then creates a new log file. Note that it may take up to 3 minutes for the software to restart.

    To return to the Log file menu without deleting the log file, press a key other than "c" or "C," and then press [Enter].

RS-232 Log Debug Levels

Each entry in the log begins with the date (month and day) followed by the time. These examples show the information following the time. An initial log for debug level 0 is followed by partial logs for levels 1 and 2.

Debug Level=0

A log similar to the following means the 6950 EGS is properly installed and ready to work:

```
nuiserv> WNAS – – Version <6.99>
nuiserv> Copr. 1991–1998 Intermec. All rights reserved.
nuiserv> System ID: LINUX egs8 1.1.73 #8 Fri Jan 12 13:47:02
CST 1997 i486
nuiserv> Initialization in progress.
nuiserv> Server files are in directory ./
```

Debug Level=1

Debug level 1 shows commands and responses from the access points, controllers, and base radios in the wireless network. It begins with the same information shown for debug level 0. Some additional information is provided and shown in the following example:

```
nuiserv> This is server number 0. Type R

nuiserv> .. Opening message queue ...
nuiserv> .. Spawning tty process...
nuiserv> Child 000375: Exec 128, ./nui_comm. Type 2
nuiserv> Server initialization is Complete.
```

Notice that the first entry shows type "R" (for RS-232). Also notice the child process 000375. Further activity with this process is identified in the log by "C000375" preceding the activity description.

In subsequent examples, Modlvl <6.99> shows the module level for the named function.

The following example show initialization of a controller. The controller version takes the form <name> V<#> where name is the name for the software installed on the controller and <#> is its version. The following example contains a controller name and version.

```
C000375> nui_func Modlvl <6.99>: Parent process ID is 374.
C000375> IPC OK! Server=0, Term=128, ID=2, Qid=512, rflan=1
C000375> nui_comm: Asynch driver Modlvl <6.99>
C000055> .. Opening RF tty ports...
C000055> .. Norand controller initialization...
C000055> ... Setting interactive mode ...
C000055> ... Setting response timer ...
C000055> ... Setting read response timer ...
C000055> ... Controller Version QXSASYNC V2.23 3250, 127
terminals
C000055> ... Sending terminal enable string ...
C000055> ... Resetting RF Units ...
C000055> .. Norand controller initialization complete.
```

The following portion of the log for debug level 1 shows activity with a wireless station.

```
C000055> .. rf power up -> 005P,071
nuiserv> Unit 5 Powered Up <P,071>
nuiserv> Child 000077: Exec 71, ./nui_tlnt. Type 3
C000077> nui_func Modlvl <6.99>: Parent process ID is 47.
C000077> IPC OK! Server=0,Term=5,ID=3,Qid=0,rflan=0,lancon=R
C000077> nui_tlnt: TELNET-RAW interface. Modlvl<6.99>. Buf=384.
C000077> nui_tlnt: Resetting unit 5. Reason:(Power Up <000>). 0
C000077> nui_tlnt: Unit 5 connected to (localhost).
```

Debug Level=2

Debug level 2 provides the most information. Initialization of the 6950 EGS and the controller shows more messages. Debug level 2 shows messages between the 6950 EGS and the wireless stations.

For illustration, two portions of the log at debug level 2 are supplied here. Compare the following samples to the last part of the sample for level 1 to see the additional detail added. Note the original messages that appear.

```
C000055> nui_func Modlvl <6.99>: Parent process ID is 47.
C000055> IPC OK! Server=0,Term=127,ID=2,Qid=0,rflan=0
C000055> nui_comm: Async driver Modlvl <6.99>
C000055> .. Opening RF tty ports...
C000055> ... /dev/ttyS0 open, 38400 baud, N par, 8 bits.
C000055> .. Norand controller initialization...
C000055> ... Setting interactive mode ...
C000055> ... Controller command  CMT2,1
C000055> ... Controller response OK
C000055> ... Setting response timer ...
C000055> ... Controller command  CMT0,0
C000055> ... Controller response OK
C000055> ... Setting read response timer ...
C000055> ... Controller command  CMT1,0
C000055> ... Controller response OK
C000055> ... Getting controller type ...
C000055> ... Controller Version QXSASYNC V2.23 3250, 127
terminals
C000055> ... Sending terminal enable string ...
C000055> ... Controller command
EYYYYYYYYYYYYYYYYYYNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
NN
C000055> ... Controller response OK
C000055> ... Resetting RF Units ...
C000055> ... Controller command  G
C000055> ... Controller response OK
C000055> .. Norand controller initialization complete.
C000055>  Initialization complete.
```

Ethernet Log

A second log is available for an Ethernet connection to the wireless system. The following examples show the information following the time. A complete log for debug level 0 is followed by partial logs for levels 1 and 2.

Debug Level=0

An example of the information that appears for debug level 0 is on page 8-5.

Debug Level=1

Debug level 1 begins with the same information shown for level 0, but adds more information about radio power up and IP host connectivity. For example:

```
C000166> .. rf power up -> 014P,001,071 (BINARY)
nuiserv> Unit 1 Powered Up <P,001,071>
nuiserv> Child 000197: Exec 7, ./nui_tlnt.  Type 3
C000197> nui_func Modlvl <6.99>: Parent process ID is 165.
C000197> IPC OK! Server=0,Term=14,ID=3,QID=128,rflan=1,lancon=E
C000197> nui_tlnt: TELNET-RAW interface. Modlvl <6.99> Buf=3712
C000197> nui_tlnt: Resetting unit 1. Reason:(Power Up). 0
C000197> nui_tlnt: Unit 1 trying (localhost) ...
C000197> nui_tlnt: Unit 1 connected to (localhost).
nuiserv> Radio reboot, messaging multi-application
nuiserv> .. Found multiunit app
nuiserv> Started multiunit 71.  Type 3-P,071
```

Debug Level=2

Debug level 2 contains all the data contained in debug level 1, plus all the wireless data packets in and out of the 6950 EGS. The following excerpt shows activity for a single wireless station, "unit 14."

```
C000251 .. rf power up -> 014P,001, 071 (BINARY)
nuiserv> in unit 14: 014P,1,43449
nuiserv> Unit 14 Powered Up!
nuiserv> in unit 14: 014a
nuiserv> in unit 14: 014K
nuiserv> in unit 14: 014K
nuiserv> in unit 14: 014a
nuiserv> in unit 14: 014a
nuiserv> in unit 14: 014K1
nuiserv> Child 000265: Exec 71, ./nui_tlnt.  Type 3
C000265> nui_func Modlvl <6.99>: Parent process ID is 250.
C000265> IPC OK! Server=1,Term=14,ID=3,Qid=0,rflan=1,lancon=E
C000265> nui_tlnt: TELNET-RAW interface. Modlvl <6.99> Buf=3712
C000265> dbg-nui_tlnt< P,1,43449
C000265> nui_tlnt: Resetting unit 14. Reason:(Power Up). 0
C000265> dbg-nui_tlnt> D/^0D^0APower up^0D^0APress <ENTER>.
C000265> dbg-nui_tlnt> D/^0D^0A0x1B[0;0H0x1B[2J0x1B[7m Norand
Corp.  ^0D^0A Rf Terminal  ^0D^0A Server V6.06  ^0D^0A
(0014)     0x1B[0m^0D^0AEnter telnet host^0D^0Aor press
enter^0D^0Afor (localhost).  ^0D^0A>0x070x070x070x07
```

A more complete log would show commands and responses from other wireless stations interspersed within these entries. Note that *nuiserv* spawned child process 000265 for activity with unit 14. Later entries show this process as "C000265."

Also note the greater than or less than symbols in dbg-nui_tlnt entries. The symbols show the direction of the message, where > = outgoing and < = incoming.

Precise syntax for debug messages varies with they type of terminal emulation and Ethernet connection, but the sample shows the detail to expect at debug level 2.

Abnormal Conditions

The examples on the other pages show normal conditions. Abnormal conditions show more information that may help locate the source of the problem. If the logs and debug information are not enough to isolate the problem, call your Intermec representative or the Customer Response Center. Have documentation of your software maintenance agreement available, or a purchase order for support.

The following example shows the 6950 EGS having difficulty finding a root access point on the network.

```
<date><time>: Initiated socket 0
<date><time>: Initiated socket 1
<date><time>: Initiated socket 2
<date><time>: Initiated socket 3
<date><time>: Initiated socket 4
<date><time>: Initiated socket 5
<date><time>: Initiated socket 6
<date><time>: Initiated socket 7
<date><time> Norand SST/OWL protocol interface Version <version>
<date><time> Trying to locate access points...
<date><time> ./nui_eth: Connecting server id 0.
<date><time> Trying to locate access point...
<date><time> Trying to locate access point...
<date><time> Trying to locate access point...
!
```

The 6950 EGS logs this message about every 15 seconds until a root access point is located on the network.

Time Test

Use the time test to test the throughput on the RF link between the wireless station and the 6950 EGS. Use this option to test speed in the local environment. It sends blocks of data from the 6950 EGS to the wireless station and keeps track of how many seconds it takes.

You must run the test from a wireless station to produce useful results. To do this, use a VT220 wireless station and connect to the 6920 EGS as the host. Log in as "config" with the password "10425rc".

To run the time test:

1. At the Monitor Menu, press "3" and then [Enter]. The following screen appears:

```
nui_time – V<9.9>
VT220 Timer

How many test
cycles?
```

<9.9> represents the version number of the time test program.

1. Choose how many cycles for the wireless station to attempt and then press [Enter]. The wireless station reports the response time at the end of the test.

2. After you review the results, press [Enter] to exit the test.

The following factors can affect throughput on the RF link:

- Changes in the electromagnetic spectrum
- Your distance from the access point or base radio
- Building construction materials
- Proximity to sources of electromagnetic "noise" like electric motors or fluorescent lights
- Radio traffic from outside sources and your own radio network

Different radios in wireless stations produce significantly different responses in the same environment.

Troubleshooting tip:

A good benchmark may be 100 cycles. Note the time to complete 100 cycles when the system is running "normally." If users report throughput issues, perform the 100-cycle test again to see if the results significantly differ from your benchmark.

Section 9

Updating the 6950 EGS Software

▶ ▶

From time to time we release updates to the 6950 EGS software. To update the 6950 EGS, you use an update kit and an external disk drive attached to the 25-pin port marked "Service Only."

The update kit is a chargeable item. You may order disks as part of your software maintenance agreement. Or, you may order a separate kit with disks and an optional external disk drive for an additional cost. Without a software maintenance agreement, you may also order a kit at a higher cost. Contact your representative for details.

Before you update, record your current network and wireless settings.

To display your current network settings:

1. At the System Menu, press "1" (Config).
2. At the Config Menu, press "1" (IP).
3. At the IP Menu, press "1" (View).

You must have the information to restore the configuration after the update. Section 5 has a place to record it.

To display your current wireless settings:

1. At the System Menu, press "1" (Config).
2. At the Config Menu, press "2" (RF Comm).

To update the 6950 EGS software:

1. Turn the 6950 EGS off.
2. Plug the external disk drive into the port marked "Service Only."
3. Insert disk 1 into the disk drive.
4. Power the 6950 EGS on.
5. Follow the screens' prompts or the instructions provided with the upgrade kit.
6. Reconfigure the 6950 EGS.

You can complete the configuration through a telnet session to the 6950 EGS. The Ethernet connection for this purpose must be Ethernet 2.0. For initial configuration, you need the addresses set at the factory:

Default IP address:	198.70.37.28
Subnet mask:	255.255.255.0
Network address:	198.70.37.0

All wireless devices must be enabled to pass the following DIX 2.0 Ethernet frame types:

- ▶ 875a
- ▶ 875b
- ▶ 875c

Network devices must also pass multicast frames. Monitor the 6950 EGS with debug level=0 to check if others have been added.

Section 10

Host Application Program

▶ ▶

While the 6950 EGS provides two-way message services for the wireless network, it does not generate the messages. These come from a host program running independently of the 6950 EGS. In fact, the host application runs on a separate physical host.

This section has some general information for communicating to the wireless stations and specific directions for using internet sockets.

General

The 6950 EGS supports these communication methods:

- ▶ VT220
- ▶ TNVT
- ▶ TN3270
- ▶ TN5250
- ▶ NORAND® Native Sockets

The telnet terminal emulation methods use standard host programming for these emulation types. Application developers need to consider factors such as screen size in developing applications.

NORAND Native is a simple command language for controlling wireless stations from a host application. Native Sockets let a host computer running a Native application communicate to Native wireless stations through the 6950 EGS via a TCP/IP socket connection. Native Sockets support is included in the 6950 EGS version 6.04 and greater. The remainder of this section explains Native Sockets programming.

Native Sockets Overview

Supported Products

The 6950 EGS supports Native Sockets applications for 1100, 1700, 5055, 5900, 6400, and 6550 terminals, using INTERMEC® 2100 UAPs or 6710 Access Points. It supports synthesized UHF, 2.4 GHz OpenAir, and 900 MHz radio technologies.

The 6950 EGS does not support Native Sockets for crystal UHF and 900 MHz SST systems that use RC4000 Series Base Stations or RC3250 Network Controllers.

Communication Basics

You can write Native Sockets programs for any host PC or workstation supporting Ethernet and TCP/IP. Initiate communication between the host and the 6950 EGS by configuring both with a common port number (see "Configuration" later in this section). The 6950 EGS uses this designated TCP port number to communicate with the host.

You must to meet two requirements to set up communication:

1. Configure wireless stations and 6950 EGS with a common host name. This defines wireless stations to 6950 EGS communication sessions.

2. Configure each wireless station for Native emulation and assign it a unique wireless station number.

As each wireless station powers on, the host application opens a unique socket between the 6950 EGS and the host for the wireless station. The 6950 EGS keeps an internal table mapping wireless stations to socket numbers. However, wireless station numbers are *not* available to the application. It must use socket numbers to identify each wireless station session.

Sockets remain open until the host application closes the session (see Reset command), or someone powers the wireless station off then on again, initiating a new session.

Host Programming

Software developers must be familiar with sockets programming to use the Native Sockets capability. We do not provide programming support for internet stream sockets. A good reference on sockets programming is *UNIX Network Programming* by W. Richard Stevens, ISBN 0-13-94876-1.

Coding the Application

See the *Native Terminal Emulation Asynchronous Programmer's Reference Guide* (hereafter called the programmer's guide) listed in Section 1 for details about Native Command Syntax. The 6950 EGS supports wireless station commands in the guide, but does not support the controller commands. The application reads and writes directly to the wireless stations through the 6950 EGS.

The Native protocol was originally written for early model INTERMEC controllers that supported serial host communications. Addition of the sockets communication capabilities to the 6950 EGS required use of a modified Native Syntax. A cross reference is provided in the table that follows. Letter conventions are excerpted from the programmer's guide. All commands are terminated with a carriage return <cr>. The 6950 EGS implementation maintains the 200 character maximum message length limitation documented in the guide.

Table 10-1
Abbreviated Commands

Command	6950 EGS Native Syntax	Original Syntax
Set Control Parameters	eDo/c	StDo/c
Write Terminal Audio	Bd	WtBd
Write Terminal Data *	D/	WtD/
	D/\	WtD/\
Reset Terminal	g	Gt
Get Terminal Version	V	DtV
Echo Back	not supported	DtE/

* All "D/" and "D/\" Command Extensions are supported except Send Multiple Write Displays, "D//".

Response Formats

The programmer's guide lists response formats for each command. However, with Native Sockets the wireless station numbers are not returned in the response string.

For example, a keyboard response to a "Do/x"<cr> command is not in the form "Krd"<cr>. A response with data from a bar code scanner is "Srbcm"<cr>. See the "WtDo/x" command in the programmer's guide for description of the parameters.

Error Messages

The Native command syntax is processed partly by the 6950 EGS and partly by the wireless station. For example the Write Display command has an options list "o" and message content "x" in the form "Do/x"<cr>. The 6950 EGS processes content preceding the forward slash while the wireless station processes content following the slash.

Error responses from the 6950 EGS take the form "?x"<cr>, where "x" is a numeric error code ranging from 1 to 11.

Table 10-2
Write Display Error Codes

Code	Error
1	Syntax error
4	Message plus commend exceeds 200 character limit
5	Message plus command sent to disabled wireless station
6	Gap error (timeout between start of message and carriage return)
8	Data check error
10	No more buffers available
11	Sequence error

The wireless station's error responses depend on the specific command. See the programmer's guide for the specific command that produced the error.

Normal Communication

Each wireless station is identified by its number and a separate host session is initiated for communication with it. This works regardless of the operating mode of the wireless station: terminal emulation or Native.

Coding the Application

Code does not need to be designed to handle multiple wireless stations. If two operators select the same application number, a copy of the application runs for each wireless station.

Syntax checking is not done on messages transmitted through the 6950 EGS to the wireless station. Check the response to an asynchronous command for error notifications from the controller.

NORAND Native Syntax for Wireless Stations

See the programmer's guide for details about the syntax.

Write Display

You may use any "WD" command specified in the programmer's guide. We strongly recommend that you familiarize yourself with these commands before writing any code.

For Write Display commands, the communication driver in the 6950 EGS adds the "W." If the "W" is included here, the message is rejected.

The 6950 EGS allows three additional abbreviated Native commands for: "StD", "DtV", and "Gt".

Other Commands and Responses

The following table shows commands you can send in Native mode and a description of the normal responses from the wireless station.

Table 10-3
Abbreviated Commands

Feature	Description
"e" or "s" = St	Sends the "St" command. Note that you need to send from the "D" on when issuing this. For example, if you were transmitting to wireless station number 2, sending "eD" would send "S002D". The next response would be "CO".
"v" = DtV	Sending a "v" requests the version number of the wireless station. That is, sending a "v" issues a DtV command to the wireless station. The next message from that wireless station should be its software version and wireless station number. Internet socket applications return only a version number.
"g" = Gt	Sending a "g" resets the wireless station. The next message from that wireless station should be a power-up message.

Responses received from the wireless stations follow the responses listed in the programmer's guide. (See the programmer's guide for more information about the format of incoming messages.) In addition, the 6950 EGS can return codes in the wireless station's number field. They are explained in the next topic.

Native Mode Responses from the 6950 EGS

The 6950 EGS sends the following codes in the wireless station number field returned to the application.

Table 10-4
Codes in Wireless Station Number Field

Code or Message	Meaning to the Application Program
800	No messages are available for the application. The application can perform housekeeping tasks or go back to waiting for a message (same as "NUI_TIMEOUT" that follows).
998	The wireless station has not passed a message for a predetermined length of time. The application can either ignore the message or act on it. For example, this code could be returned if the wireless station is left unattended with the application running (same as "NUI_DEAD" that follows).
999	The 6950 EGS wants it to terminate. If the application does not terminate within 15 seconds, it is terminated automatically. The application receives this message when the 6950 EGS shuts down or is reset, or if the 6950 EGS detects an error (same as "NUI_STOP" that follows).
NUI_OK	The 6950 EGS completion was normal.
NUI_STOP	The 6950 EGS wants to terminate (same as 999 — see preceding message).
NUI_DEAD	The associated wireless station has not been passed a message for a predetermined length of time (same as 998 — see preceding message).
NUI_TIMEOUT	No data available from the application to be read from the 6950 EGS (same as 800 — see preceding message).
NUI_BAD	A fatal error occurred which prevents continued execution.
NUI_BOOT	The associated wireless station is powered on and can be used to reload data into the wireless station or it can be ignored.

Program interfaces return the wireless station number and the controller or wireless station response. If one of these codes is not set, the field contains the number of the wireless station.

Configuration

You must configure IP, RF communication, and wireless station parameters to support Native Sockets.

To configure IP and RF communication parameters:

1. For IP setup, see page 5-4, "Using the IP Menu."

2. At the Config Menu, press "2" to configure RF communication. On the Comm Setup menu, do the following:

    ▶ Set the type to E for an Ethernet connection.

    ▶ Use the same host name configured in the wireless stations. The host name must be four or fewer letters and is case sensitive.

    ▶ Set automatic log in to the host.

    ▶ Set the LAN ID.

    The following RF communication setup is properly configured for internet sockets:

```
Comm Setup
1. Type: E (E,R)
2. Lan: 0 (0-7)
3. Host: HOST
4. Rec: 0 (0,1)
5. Auto: 1 (0,1)
6. Dbg: 0 (0,1)
Option: (1-6,E)
```

For help with setting these parameters, see Section 6, "Configuring Radio Frequency Communication."

3. Exit the Comm Setup menu and then press "3" to configure the RF units (wireless stations).

    Modify the IP Host and port information for each wireless station so it corresponds to the host where your NORAND Native application resides and the <portno> in the stream sockets application. "Portno" is the port defined on your host (usually in the services file) for the wireless stations.

    The following shows a setup for one wireless station, number 42.

```
nui_cfg--Wire Network Access Server Configuration--Modlvl <version>

RF Unit Setup:

 1. Unit number: 42

 3. Comment.....:Native Terminal

 5. IP Host name: DEMO
 6. Port........: 3325
 7. User ID.....:
 8. Password ...:
 9. Copy setup from unit ???.
10. Duplicate this setup to unit ??? thru unit ???.

CTRL-> Enter option: (E=exit, N=next,P=Previous or item number to change)
HELP->
```

Press:

1   To assign a unique number from 0–126 for each wireless station.

3   To enter a comment (optional) to identify the type.

5   To enter the name of the computer running the Native Sockets program.

6   To configure a different port number for Native Sockets. Port 23 is the well-known port for telnet. Supply the new number.

7 & 8   The user ID and password are not used with Native Sockets.

9   To use a configured wireless station number in option 9 to copy that configuration to this wireless station.

10   To copy this setup to other wireless station.

For help, see page 5-25, "Setting Up the RF Units."

Once everything is configured correctly and the wireless station is powered on, a unique connection (socket) is established between the wireless station and your sockets-based Native emulation program.

Commands to the wireless stations must be in appropriate syntax for their Native mode. A good source for these commands is the programmer's guide available from us. Contact your Intermec representative to order the guide. The instructions for the wireless stations are helpful, but the commands for the controllers and bases should be ignored.

The following Write Display command is a sample
startup menu for a wireless station with viewing
screen size set to 16.

```
DBCDNL1H2P15/01 – STDIO TEST 02 – DIRECT TEST
```

Notice that this message does not have the "W" at the
beginning, nor does it contain the wireless station
number. The communication driver in the 6950 EGS
adds the "W" and the wireless station number.

Demonstration Program

Following is a "C" demonstration host program for Native
sockets. The program uses internet sockets to send Native
mode syntax to an INTERMEC wireless station via the
6950 EGS. The program sends key presses made by a
wireless station user back to their display.

```
/*****************************************************************
******************************************************************
**                                                             **
**   nui_sock.c                                                **
**                                                             **
** This is a demo program that uses sockets to send/receive data**
** to/from a Native Mode terminal via the nui_tlnt redirector   **
** application.                                                 **
**                                                             **
**   Usage:  ./nui_sock <portno>                               **
**                                                             **
******************************************************************
*****************************************************************/
#include <stdio.h>
#include <errno.h>

#ifdef WIN32
#include <windows.h>
#define  FD_SETSIZE  256   /* set to number of sockets to open */
#include <winsock.h>
#else
#include <sys/time.h>
#include <sys/types.h>
#include <sys/socket.h>
#include <unistd.h>
#include <netinet/in.h>
#include <netdb.h>
#include <arpa/inet.h>
#endif

#define  VERSION  "1.00"

unsigned int   listen_fd;
unsigned short ipport;

char work_buf[1024];
char tdata[4096];

unsigned char param[]="eD/@  OG00";

int shut_down=0;    /* true if program shutdown requested */

struct sockaddr_in  cli_addr;
struct hostent      host_rec;

fd_set read_fd_set;
fd_set main_fd_set;
```

```
/*
**   linked list management stuff
*/
struct LIST {
        unsigned int    fdin;
        unsigned int    fdout;
        char            host[32];
        char            ip[32];
        char            sic[8];
        unsigned short  port;
        unsigned        msgcount;
        struct LIST     *next;
};
struct  LIST    *head;  /* first pointer in linked list */
struct  LIST    *tail;  /* last pointer in linked list */

struct  LIST    *curr;  /* always points to the current socket
                         pointer */
int  main(int argc,char **argv );
int  process_port(void);
int  process_socket(void);
int  add_fd(unsigned int fd,char *host,char *ip);
int  delete_fd(unsigned int fd);

/*****/

main(argc, argv)
int argc;
char  *argv[];

    {
    struct sockaddr_in  serv_addr;

    int x=0;

#ifdef WIN32
    WSADATA WsaData;
#endif
```

```
/*
**   check the command line arguments
*/
     if(argc < 2)
         {
         printf("\nnui_sock: Wrong number of arguments.");
         printf("\nnui_sock: Usage: nui_sock <portno>\n\n");
         fflush(stdout);
         exit(1);
         }
/*
**   get the port number
*/
     strcpy(work_buf,argv[1]);

     if(strlen(work_buf) < 1)
         {
         printf("\nnui_sock: Invalid portno! Must be numeric and >
          0.");
         printf("\nnui_sock: Usage: nui_sock <portno>\n\n");
         fflush(stdout);
         exit(1);
         }

     ipport=atoi(work_buf);
/*
** set up curses
*/
     for(x=0;x<53;x++)
         {
         printf("\n");
         }
     fflush(stdout);
     printf("\nnui_sock: Native Socket Demo – Version %s
       ",VERSION);
     fflush(stdout);
```

```
/*
**   startup sockets
*/
#ifdef WIN32
    x = WSAStartup (0x0101, &WsaData);
    if(x==SOCKET_ERROR)
        {
        printf("\nnui_sock: can't init winsock interface
         %d.",errno);
        fflush(stdout);
        exit(1);
        }
#endif

/*
* Open a TCP socket (an Internet stream socket).
*/
    FD_ZERO(&main_fd_set);
    if((listen_fd = socket(AF_INET, SOCK_STREAM, 0)) < 0)
        {
        perror("\nnui_sock: can't open local socket");
        exit(1);
        }

/*
* Fill in the structure "serv_addr" with the address of the
* server that we want to connect with.
*/
    memset(&serv_addr,0x00,sizeof(serv_addr));
    serv_addr.sin_family      = AF_INET;
    serv_addr.sin_addr.s_addr = htonl(INADDR_ANY);
    serv_addr.sin_port        = htons(ipport);

    if (bind(listen_fd, (struct sockaddr *) &serv_addr,
         sizeof(serv_addr)) < 0)
        {
        perror("\nnui_sock: can't bind to local socket");
        exit(1);
        }
    listen(listen_fd, 5);

/*
**   add this fd to our work list so we know when clients connect
*/
    FD_SET(listen_fd, &main_fd_set);
```

```
/*
**   we are connected, lets see if this thing can work
*/
     printf("\nnui_sock: Listen on Port %d\n",ipport);
     fflush(stdout);
     process_port();
/*
**   shut down the system
**   (traverse the "connected" list to shutdown each terminal)
*/
     curr = head;
     while(curr != NULL)
         {
         /* this will shutdown and reset the terminal */
         delete_fd(curr->fdin);
         curr = curr->next;
         }

     shutdown(listen_fd,2);
     close(listen_fd);

     printf("\nnui_sock: System Shutdown.");
     fflush(stdout);

     exit(0);
     }
/*****/
/*
**   main function loop for handling the socket calls from the
**   cradle server
*/
int process_port()
     {
     int hdrcnt=0;
     int x=0;
     int clilen=0;
     struct timeval seltime;
     int gotdata=0;
     struct hostent *host_rec;
     char host[32];
     char *ip;
     int sockfd;
     int incount=0;
```

```
/*
**   use the select to see if anything is waiting
*/
     for(;;)
         {
         if (shut_down)
             {
             break;  /* user requested shutdown, so goodbye */
             }
         memcpy((void *)&read_fd_set, (void *)&main_fd_set,
          sizeof(fd_set));
         seltime.tv_usec = 0;
         seltime.tv_sec = 15;   /* 15 second timeout */

         gotdata=select(FD_SETSIZE,&read_fd_set,0,0,&seltime);

         if(gotdata > 0)
             {
/*
**   it is a new connection, connect it
*/
             if(FD_ISSET(listen_fd,&read_fd_set))
                 {
                 clilen = sizeof(cli_addr);
                 sockfd = accept(listen_fd,(struct sockaddr
                     *)&cli_addr,&clilen);
                 if(sockfd < 0)
                     {
                     printf("\nnui_sock: Accept error. Port=%d
                     (%d)",ipport,errno);
                     fflush(stdout);
                     }

                 ip=inet_ntoa(cli_addr.sin_addr);
                 host_rec=gethostbyaddr((char *)
                     &cli_addr.sin_addr,4,AF_INET);
                 strcpy(host,host_rec->h_name);

                 printf("\nnui_sock: HEARD <%s:%s>",host,ip);
                 fflush(stdout);

                 FD_CLR(listen_fd,&read_fd_set);

                 add_fd(sockfd,host,ip);  /* add the connection to
                     our fd list */
```

```
                /* send terminal control parameters */
                strcpy(tdata,param);
                write(sockfd,tdata,strlen(tdata));

                sleep(1);  /* Wait, don't send the next one too
                    fast */

                /* send first entry prompt */

sprintf(work_buf,"DBSCQDEL0H16P16/%-16.16s%-16.16s","Enter data
                now:"," ");
                strcpy(tdata,work_buf);
                write(sockfd,tdata,strlen(tdata));
                }
            else
                {
/*
**  look for an active descriptor and process accordingly
*/
                curr = head;
                while(curr != NULL)
                    {
                    if(FD_ISSET(curr->fdin, &read_fd_set))
                        {
                        if(!process_socket())
                            {
                            /* this will shutdown/reset the
                              terminal */
                            delete_fd(curr->fdin);
                            curr = NULL;
                            break;
                            }
                        }
                    curr = curr->next;
                    }
                }
            }
        }
    return(1);
    }
```

```
/*
**   This function reads data from the socket (response from the
**   terminal) and writes to the socket (sends commands to the
**   terminal).
*/
int process_socket()
    {
    int datacnt=0;
/*
**   read the data from the socket
*/
    memset(tdata,0x00,sizeof(tdata));
    datacnt=read(curr->fdin,tdata,sizeof(tdata));
    if (datacnt < 1)
        {
        printf("\nnui_sock: Bad message. fd=%d,
         datacnt=%d",curr->fdin,datacnt);
        fflush(stdout);
        return(0);
        }
/*
**   we have a data message, process it
*/
    if(tdata[0]=='K' && tdata[1]=='Q')   /* stop and reset this
      terminal */
        {
        printf("\nnui_sock: Terminal requested stop.");
        fflush(stdout);
        return(0);
        }
    if(tdata[0]=='K' && tdata[1]=='X')
        {
        /* Stop this application and reset all connected terminals
         */
        printf("\nnui_sock: Program stop requested.");
        fflush(stdout);
        shut_down = 1;
        return(0);
        }
    if(tdata[strlen(tdata) - 1] == 13)  /* don't forget to strip
          cr */
        tdata[strlen(tdata) - 1] = 0;
```

```
/*
** I'm not doing anything with the incomming data but sending it
** back, thus I build my new output message from the input
** message
*/
    sprintf(work_buf,"DBSCQDEL0H16P16/%-16.16s%-16.16s%-16.16s
      %-16.16s","Enter data now:"," ","Previous data:",&tdata[1]);
    strcpy(tdata,work_buf);
/*
**   write the data to the socket
*/
    write(curr->fdin,tdata,strlen(tdata));

    return(1);
    }
/*
**   This function adds a new socket File Descriptor to our
**   linked list of connected FDs (which are actually terminals).
*/
int add_fd(unsigned int fd, char *host, char *ip)
    {
    struct LIST *ptr;

    ptr = (struct LIST *)malloc(sizeof(struct LIST));

    if(ptr == NULL)
        {
        printf("\nnui_sock: add_fd Cannot allocate buf ptr.");
        fflush(stdout);
        return(-1);
        }
    ptr->fdin = fd;
    strcpy(ptr->ip,ip);
    strcpy(ptr->host,host);
    ptr->next = NULL;
    if(tail != NULL)
        {
        tail->next = ptr;
        tail=ptr;
        }
```

```
     else
         {
         head = ptr;
         tail = ptr;
         }

     FD_SET(fd, &main_fd_set);

     return(1);
     }
/*
**   This function removes a socket File Descriptor from our
**   linked list and sends a reset to the terminal to shut
**   it down properly through the nui_tlnt program.
*/
int delete_fd(unsigned int fd)
     {
     struct LIST *before;
     struct LIST *ptr;
     int foundflag = 0;

     ptr = head;
     before = NULL;

     while(ptr != NULL)
         {
         if(ptr->fdin == fd)
             {
             foundflag = 1;
             break;
             }
         before = ptr;
         ptr = ptr->next;
         }

     if(!foundflag)
         {
         printf("\nnui_sock: delete_fd Tried to delete an fd not
          in list!");
         fflush(stdout);
         return(-1);
         }
      FD_CLR(ptr->fdin, &main_fd_set);
      if(ptr->fdin > 0)
          {
```

```
/*
**   sending a 'g' will reset the terminal and close connection
**   with nui_tlnt
*/
        tdata[0]='g';   /*  reset this radio only  */
        tdata[1]=0;
        write(ptr->fdin,tdata,strlen(tdata));
        sleep(1);  /* don't shutdown the socket too fast */
        shutdown(ptr->fdin,2);  /* shutdown this socket connection
         */
        close(ptr->fdin);
        }
    if(before != NULL)
        {
        before->next = ptr->next;
        if(ptr == tail)
            {
            tail = before;
            }
        }
    else
        {
        head = ptr->next;
        if(head == NULL)
            tail = NULL;
        }
    free(ptr);
    return(1);
    }
/*
*****  last line of program  */
```

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NOTES

Page numbers in italics are figures, those in bold are tables.

NUMBERS