9150
Wireless Gateway

User Manual

March 17, 2000 **Part No. 80440.D**

TEKLOGIX

ISO 9001
Certified

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Declaration Of Conformity

Product:	**9150 Wireless Gateway**
Application of Council Directives:	EMC Directive: 89/336/EEC Low Voltage Directive: 73/23/EEC
Conformity Declared to Standards:	EN 55022: 1994; Class B; ETS 300 328: 1996 EN 50082-1: 1997; ETS 300 683: 1997 EN 61000-4-2; ±4kV CD; ±8kV AD EN 61000-4-3; 3V/m, 80-1000 MHz EN 61000-4-4; ±1kV Signal lines; ±2kV Power lines EN 61000-4-5; ±1kV Common; ±0.5kV Differential mode EN 61000-4-6; $3V_{RMS}$, 150kHz-80 MHz EN 61000-4-11; AC Mains Ports EN 60950: 1992 + A1 + A2 + A3 + A4 + A11
Manufacturer:	Teklogix Incorporated 2100 Meadowvale Blvd. Mississauga, Ontario; Canada L5N 7J9
Year of Manufacture:	1998
Manufacturer's Address in the European Community:	Teklogix S.A. Parc Club Du Golf - Bat 1. 13856 Aix-En-Provence Cedex 3; France
Type of Equipment:	Information Technology Equipment
Equipment Class:	Commercial and Light Industrial

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CAUTION TO USERS

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user is required to correct the interference at personal expense. The transmitters supplied are not to be operated within the frequency band 406 - 406.1 MHz.

RF EXPOSURE

Warning: ***To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.***

Changes or modifications not expressly approved by Teklogix Inc. can void the user's authority to operate the equipment.

An unshielded plug or cable may cause radiation interference. All peripheral devices must be used with properly shielded interface cables and external filters as required. The shield must be connected directly to the chassis of the peripheral device.

Important Safety Instructions

This safety information is for the protection of both operating and service personnel.

Do Not Operate In An Explosive Atmosphere

Operating Teklogix equipment where explosive gas is present may result in an explosion.

Do Not Remove Covers Or Open Enclosures

To avoid injury, the equipment covers and enclosures should only be removed by qualified service personnel. Do not operate the equipment without the covers and enclosures properly installed.

Do Not Hold Antenna

To avoid discomfort due to the local heating effect of radio frequency energy, do not touch the antenna when a 9150 is transmitting.

Connection to Outdoor Antenna

Outdoor antenna to be earthed in accordance with International Standard EN 50083-1 (1993), “Cabled Distribution Systems for Television and Sound Signals - Safety Requirements”.

Anschluß an Antennennanlagen

Außenantennennanlagen müssen nach nationalen oder internationalen Normen (z.B. EN50083-1(1993) geerdet werden.

1 INTRODUCTION

1.1 About This Manual

This manual contains information about the installation, basic operation, and configuration of the 9150 Wireless Gateway.

Chapter 1: Introduction
describes the 9150 and the radio protocols it supports.

Chapter 2: Installation Requirements
describes the physical installation of the Teklogix 9150 Wireless Gateway and how to connect to the 9150 for configuration and diagnostics.

Chapter 3: 9150 Main Configuration
describes the options available from the main configuration menus.

Chapter 4: Base Station Configuration
describes the configuration for a 9150 used as a base station linked to a network controller.

Chapter 5: Mini-Controller Configuration
describes the configuration for a 9150 used as a mini-controller.

Chapter 6: Access Point Configuration
describes the configuration for a 9150 used as an access point device between wired and wireless networks.

Chapter 7: Specifications
outlines the performance specifications for the 9150.

Appendix A: Port Pinouts And Cable Diagrams
includes pinouts and diagrams of the ports and cables for the 9150.

Appendix B: MAC Bridge Protocol Filters and OUIs
presents tables of values for Ethernet II and DSAP/SSAP types, and OUI.

1.2 Text Conventions

Note: *Notes highlight additional helpful information.*

Important: *These statements provide particularly important instructions or additional information that is critical to the operation of the computer and other equipment.*

Warning: ***These statements provide important information that may prevent injury, damage to the equipment, or loss of data.***

1.3 About The 9150

The 9150 Wireless Gateway is designed to support a wide variety of system configurations. Using the IEEE 802.11 Wireless LAN Standard, the 9150 is capable of operating as a transparent bridge (access point) between wireless and wired networks. This allows wireless clients to access the network and also move seamlessly between the 9150s in the network. The 9150 can also operate as a Teklogix base station or a mini-controller.

The 9150 supports Type II PCMCIA cards so that multiple radio interfaces are possible. The 9150 also has dual-radio functionality. It can support several combinations of radio types to function as both a mini-controller and base station, access point and base station, or access point and mini-controller. For details, see “Radio Options” on page 7.

The 9150 Flash memory holds the boot code, configuration parameters and firmware. The 9150 Configuration program allows various parameter settings to be changed, added or deleted. The Flash can be reconfigured remotely via the network using a standard HTML Web Browser such as Netscape or MS Internet Explorer (for instructions, see Chapter 3: “9150 Main Configuration”).

Figure 1.1 The 9150 Wireless Gateway - Front View

Figure 1.2 The 9150 Wireless Gateway - Bottom View

1.3.1 Base Station Functions

As a base station, the 9150 provides a link between the local area network and the wireless network consisting of Teklogix mobile terminals, and base stations such as the 9140 Wireless Gateway. The 9150 and 9400/9300 Network Controller (or host using a Teklogix Software Development Kit) communicate using the 9010 proprietary protocol with TCP/IP over Ethernet, Token Ring or serial connectivity. Wlan protocol enables the 9150 to communicate with 9140s without cable attachments (see Figure 4.1 on page 47).

For information on configuring the 9150 as a base station, see Chapter 4: “Base Station Configuration”. For details on Wlan, see “Wlan Protocol” on page 8.

1.3.2 Mini-Controller Functions

The 9150 is equipped with some emulation capabilities, allowing it to act as a mini-controller. When a 9150 is configured as a mini-controller, Teklogix terminals can emulate an ANSI, 5250 or 3274 terminal via a 9150 rather than through a 9400/9300 Network Controller.

To configure the 9150 as a mini-controller, see Chapter 5: “Mini-Controller Configuration”. For a generalized system diagram, see Figure 5.1 on page 78.

1.3.3 Access Point Functions

As an access point, the 9150 Wireless Gateway forms a communication link between Teklogix RF terminals or wireless access point clients and a Teklogix Network Controller or a host computer. It communicates over an IEEE 802.11 RF data link with terminals and over a cable with a network controller or a host computer. The 9150 can be connected to the network through an Ethernet or Token Ring connection. The diagram in Figure 6.1 on page 125 illustrates a 9150 access point connection between a Teklogix 9400 Network Controller on Ethernet and IEEE 802.11 wireless devices. Figure 1.4 on page 12 shows a generalized Token Ring configuration.

For information on the 9150 as an access point, see “IEEE 802.11 Protocol” on page 10 and Chapter 6: “Access Point Configuration”.

1.4 Radio Options

The 9150 supports Type II PCMCIA cards so that multiple radio interfaces are possible. There is one internal and one external PC card slot available. The type of PCMCIA radio card installed in the 9150 is dependent on your wireless network. Currently supported radios are:

- TRX7370 Narrow Band DSP.
- TekLAN 902 MHz DS Spread Spectrum (TRX7410).
- TekLAN 2.4 GHz DS Spread Spectrum (TRX7425).
- Proxim RangeLAN802 IEEE 802.11 FHSS 2.4 GHz (TRX7440).
- Lucent WaveLAN IEEE 802.11 DSSS 2.4 GHz (TRX7430).

The 9150 has dual-radio functionality. It can support several combinations of radio types to function as both a mini-controller and base station, access point and base station, or access point and mini-controller. The 902 MHz, 2.4 GHz (802.11 and TekLAN) and Narrow Band radios can be used in any combination, with the exception of dual TekLAN or dual Narrow Band radios.

Important: *The radio in the terminal must match the radio in the 9150 Wireless Gateway. If changing radio types in the 9150,* ***DO NOT*** *"hot swap" the PC cards: Turn the 9150 off before changing the radio.*

1.5 Radio Protocols

RF protocols allow terminals to communicate with a base station by sharing the use of a radio channel in an efficient way. Teklogix systems use one of three types of RF protocols: the Teklogix Adaptive Polling/Contention protocol, the Teklogix Wireless LAN (Wlan) protocol, or the non-proprietary IEEE 802.11 protocol.

When used as a base station, the 9150 uses either the Adaptive Polling/Contention protocol or the Wlan protocol. These two protocol types *cannot* be mixed on a single system. When used as an access point device, the 9150 employs the IEEE 802.11 protocol. These protocols are described in the following sections.

1.5.1 Adaptive Polling/Contention Protocol

The Adaptive Polling/Contention protocol is always used on Narrow Band radio systems with baud rates of up to 19.2 kbps, and may also be used on Spread Spectrum systems at higher rates.

Terminals operating with this protocol do not transmit unless they receive polls from the 9150. Terminals are generally polled en masse. Following each poll, groups of terminals are assigned response windows in which they may respond to the poll. If a "collision" occurs – more than one terminal attempts to respond in a particular window – the 9150 that is polling divides and reassigns that group until the colliding terminals can respond without a collision.

Adaptive features of this protocol allow the response windows to be adjusted to accommodate high or low RF traffic conditions, and to prevent data from being queued too long when a particular terminal has a burst of data to send or receive.

Systems using adaptive polling/contention can use the cellular option so that terminal operators can roam the site, maintaining uninterrupted communication as they pass between coverage areas.

If cellular base is not enabled, a "RESET: Press Enter" message appears on the terminal screen each time an operator moves from one base station coverage area to another. (Pressing <ENTER> restores communication, but some data may be lost.)

1.5.2 Wlan Protocol

The Wlan (Wireless LAN) protocol is used only on Spread Spectrum radio systems at baud rates of 122 kbps and higher. The Wlan protocol allows base stations to be added to a system without cable connections. A Wlan system consists of a minimum of one wired base station and zero or more wireless base stations. It can operate on either one channel – usually the case – or on multiple channels.

When a Wlan system is operating, base stations do not send out polls. Instead, both wired and wireless base stations regularly broadcast routing information, indicating the available routes back to the controller. Both terminals and wireless base stations receive these broadcasts, determine the best communication route, and send their messages. If a better route becomes available, the terminal or wireless base will change communication paths.

Only one base station or terminal may transmit at one time. When the channel is clear, a combination of preset priorities and random choices determines who "goes next". Even if two transmitters attempt to send at the same time, message acknowledgements and retransmissions prevent any data from being lost.

Terminals moving through the Wlan communicate with the base stations that provide the best communication path to a wired base station. If multiple channels are used, the terminal looks for a better channel only if it cannot find an acceptable path back on its current channel.

Note: *For detailed information on configuring the 9150 as a base station, please see Chapter 4: "Base Station Configuration". For a generalized system diagram, see Figure 1.3, below.*

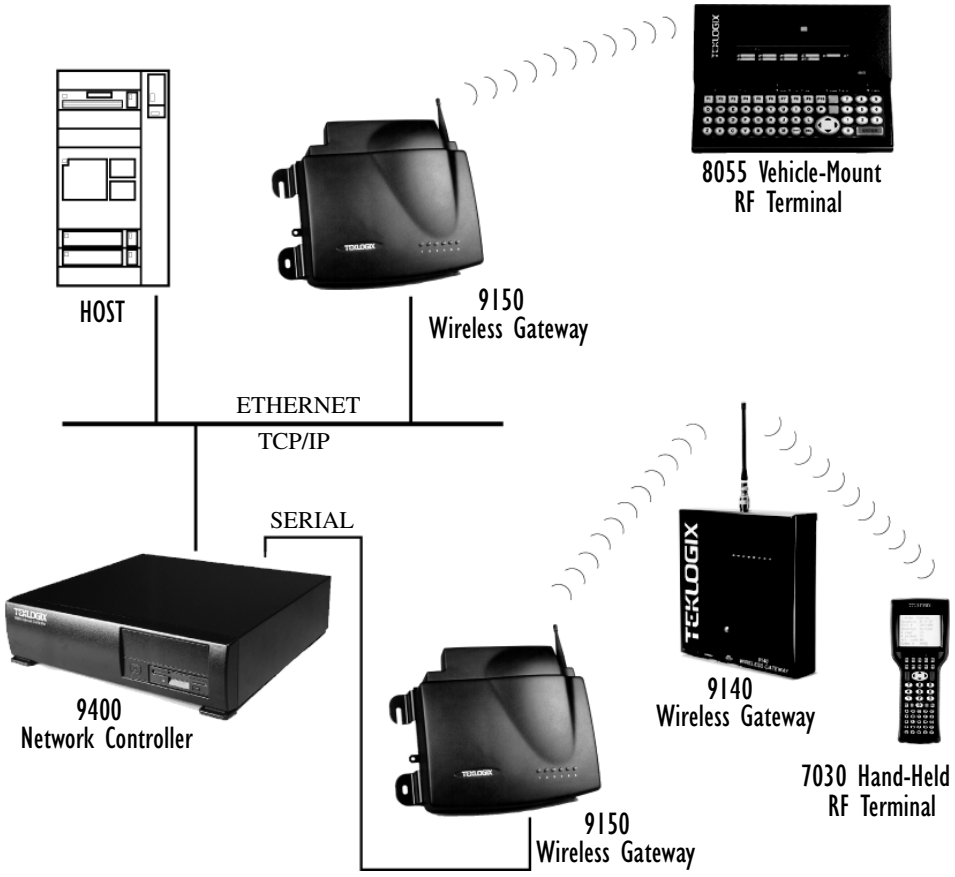


Figure 1.3 9150 LAN And Serial Configuration

1.5.3 IEEE 802.11 Protocol

The IEEE 802.11 protocol is an OSI standard for Wireless Local Area Networks (WLANs). With this standard, any IEEE 802.11 radio can communicate with any other similarly-equipped device. However, IEEE 802.11 does not provide a standard for a total WLAN system. IEEE 802.11 solely standardizes two communications layers: Physical (PHY) and Medium Access Control (MAC). Three different PHY layer media are covered: 2.4 GHz Direct Sequence Spread Spectrum radio, 2.4 GHz Frequency Hopping Spread Spectrum radio, and infrared. Each station in a WLAN system has its own unique MAC address.

Important: *Equipment using one physical medium (e.g. Frequency Hopping versus Direct Sequence) will not interoperate with equipment using a different physical medium.*

IEEE 802.11 uses 2.4 GHz radios of relatively low power. The range is limited to no more than a hundred feet or so, depending on the conditions, and is usually restricted to “line of sight” operation. Therefore, most wireless networks need more than one coverage area, with terminals moving between the areas. To integrate those areas, systems using IEEE 802.11 protocol for their wireless networks require an IEEE 802.11-equipped *bridge* device (or *access point*), such as the 9150 Wireless Gateway.

Using bridging software, the 9150 Wireless Gateway enables communication between any wireless IEEE 802.11-equipped stations and LAN stations operating on Ethernet or Token Ring. The 9150 itself is resident on the LAN and functions as a MAC bridge, providing transparent integration between the stations on the wireless and wired networks.

Each terminal is associated with one 9150. A frame from an RF terminal is sent to the 9150 that the terminal is associated with. The terminal puts a destination MAC address in the frame, which specifies a hardware address on the wired LAN side. Because the receiving 9150 is connected to an Ethernet or Token Ring network, it encapsulates the data in an Ethernet or Token Ring frame, respectively, including the destination MAC address specified by the terminal. The 9150 then sends the frame onto the physical network; the frame is picked up by whichever device is at the destination hardware address.

When sending frames from the LAN side, the sending device puts the MAC address of the terminal in the frame header. Whichever 9150 has that terminal associated with it, takes the frame and passes it over the RF to the terminal. By passing frames in this way, the 9150 is acting as a MAC bridge.

1.5.3.1 Inter-Access Point Protocol (IAPP)

The Inter-Access Point Protocol (IAPP) is an extension to the IEEE 802.11 protocol. IAPP facilitates roaming of mobile stations across different Basic Service Sets (groups of stations and their access points), and specifies how access points communicate with each other.

In a multiple-9150 system, IAPP informs the other 9150 Wireless Gateways when a new 9150 becomes active, and enables the awareness of the 9150s of each other. With IAPP, an IEEE 802.11 system can operate on one or more channels, with terminals moving between the 9150s. Although each terminal is associated with one 9150, it can reassociate with another 9150 to maintain uninterrupted communications. The newly-associated 9150 will receive the terminal's data frames and pass them onto the LAN. Returning frames are no longer accepted by the original 9150, which has disassociated from that terminal. The returning frames are now accepted by the newly-associated 9150 and passed over the RF to the terminal.

Note: *For detailed information on configuring the 9150 as an access point, please see Chapter 6: "Access Point Configuration". For a generalized system diagram, see Figure 1.4 on page 12.*

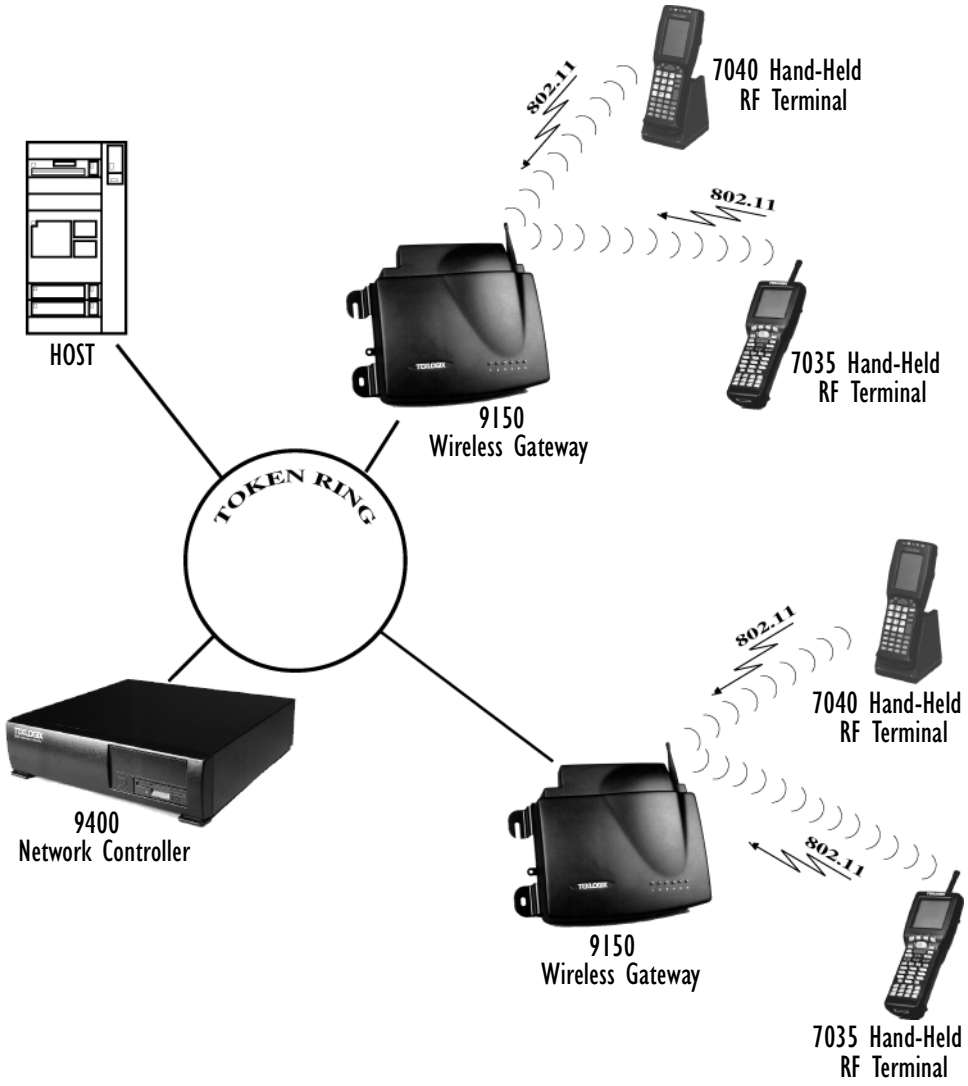


Figure 1.4 9150 Access Point Configuration

INSTALLATION REQUIREMENTS 2

Warning: The 9150 must be installed by qualified Teklogix personnel.

2.1 Choosing The Right Location

Typically, Teklogix conducts a site survey in the plant and then recommends the preferred locations for the 9150s. These locations provide good radio coverage, minimize the distance to the host computer or network controller, and meet the environmental requirements.

2.1.1 Environment

The 9150 should be located in a well-ventilated area and should be protected from extreme temperature fluctuations (i.e. direct heater output, shipping doors or direct sunlight). If a protective cover is required, it must have enough ventilation to maintain the 9150's surface at or near room temperature. The 9150 should be situated away from the path of vehicles and free from water or dust spray.

The 9150 should only be mounted in the upright position, as shown in Figure 2.1, below. This orientation minimizes the risk of water entering the 9150, should the unit accidentally be sprayed. The 9150 is attached to a vertical surface using four fasteners on the rear plate (type of fasteners are dependent on mounting surface). The top two holes in the rear plate are slots, allowing the unit to be hung in position before the remaining bolts are installed, thus easing installation. The bolts used for installation are SAE 1/4-20.

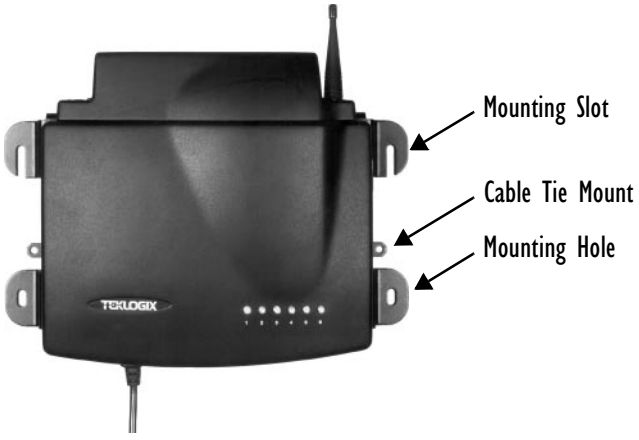


Figure 2.1 9150 Installation Position

Refer to Chapter 7: “Specifications” for a more detailed description of environmental requirements. Keep in mind that the long term stability of this equipment will be enhanced if the environmental conditions are less severe than those listed in this manual.

2.1.2 Maintenance

The 9150 has no internal option switches and does not require physical access; all configuration settings are done remotely (see Chapter 3: “9150 Main Configuration”). Environmental and radio communication considerations do, however, still apply.

2.1.3 Power And Antenna Cables

To prevent accidental disconnection and stress on the 9150, antenna and power cables should be secured within 30 cm of the unit. Secure the cables with ties to the cable tie mounts on the 9150 (see Figure 2.1 on page 15). A single phase power outlet (range 100 to 240 VAC rated 1.0A minimum) should be installed within one metre (3.1 feet) of the 9150. The 9150 automatically adjusts to input within that power range. The power cable is removable and is available in the power type specific to your location.

Warning: ***To avoid electric shock, the power cord protective grounding conductor must always be connected to ground.***

There are several omnidirectional antennas available from Teklogix. The type of antenna required for each installation depends on the coverage requirements and the frequencies used. Generally, a site survey determines the appropriate antenna. Teklogix can also provide special, directional antennas. Consult Teklogix service personnel for more information.

Warning: ***Never operate the 9150 without a suitable antenna or a dummy load.***

Connection to Outdoor Antenna: Outdoor antenna to be earthed in accordance with International Standard EN 50083-1 (1993), “Cabled Distribution Systems for Television and Sound Signals - Safety Requirements”. The antenna must be installed by a qualified service person and installed according to local electrical installation codes.

Teklogix supplies the coaxial cable required to connect the 9150 to the antenna. When determining the location of the antenna, the coverage requirements of the antenna are considered in conjunction with the environmental requirements of the 9150.

The coaxial cable must be routed and secured using wire anchors and/or coaxial nail clips. A few extra inches of cable are required near the antenna and the 9150 to make disconnection easier.

2.2 Connecting To External Devices

This section contains general guidelines for connecting the 9150 to external devices such as network controllers, base stations, host computers, PCs and video display terminals.

2.2.1 Ports

Figure 2.2 below shows the locations of the port and power connectors on the underside of the 9150. The port pinouts are described in Appendix A: “Port Pinouts And Cable Diagrams”.

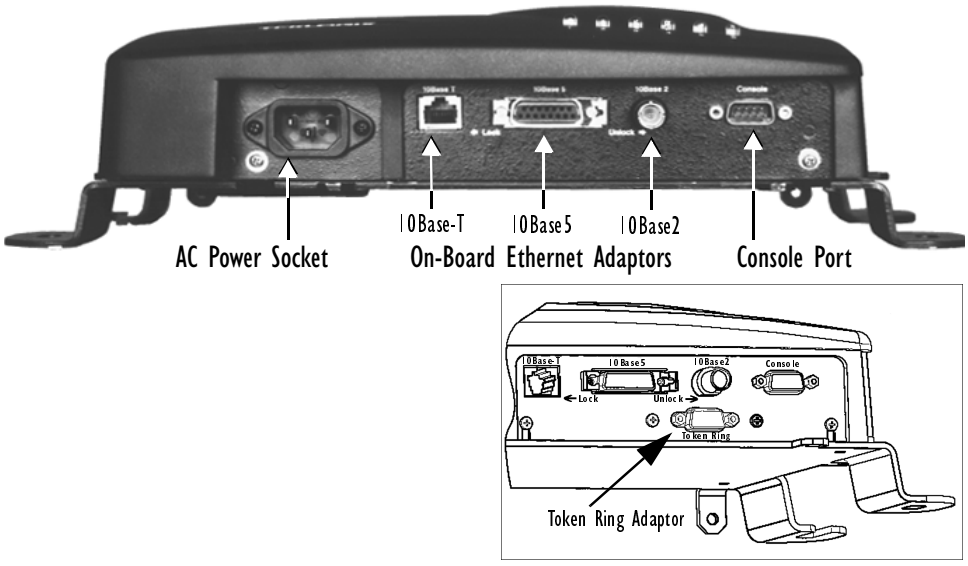


Figure 2.2 Base Of The 9150 (inset: optional Token Ring adaptor)

2.2.2 Status Indicators (LEDs)

The 9150 has six status indicators on the front of the enclosure. These numbered and coloured LEDs indicate the operating status for each port:

LED Number	Name	Function	Colour
1	Ethernet link[1]	Link indicator for 10base-T: ON = good link; OFF = no link	yellow
2	Ethernet activity	Ethernet LAN activity (Rx/Tx)	green
3	PC Card A status[2]	PC Card A activity (Rx/Tx)	yellow
4	PC Card B status[2,3]	PC Card B activity (Rx/Tx; Token Ring)	green
5	SLIM	SLIM card activity	yellow
6	Power	LED flashing = BIST[4] running/error detected LED On solid = BIST[4] Passed LED Off = no power to unit	green

[1] *For 10Base2 and 10Base5: LED 1 is always OFF when these connections are used.*

[2] *When a TekLAN 902 MHz radio is installed, the PC Card status LEDs blink only when data is received from or transmitted to a terminal. When a TRX7370 narrow band radio is installed, these LEDs blink for all received and transmitted data traffic.*

[3] *When a Token Ring PC card is installed, LED #4 shows Token Ring activity.*

[4] *Built-in Self-Test.*

Table 2.1 LED Functions

2.2.3 Preparing For LAN Installation

Because the 9150 provides Ethernet or Token Ring connectivity, it can be added to an existing LAN. Generally, LAN installations are handled with the help of the network administrators, as they are familiar with their network and its configuration.

Once the 9150 is installed, connected and powered on, the system administrator can access the unit to check the configuration and to assign the 9150 its unique IP address. This may be done through the Console port or through the network (see “Connecting A Video Display Terminal” on page 21 and “Changing The Configura-

tion With A Web Browser" on page 21). Subsequent changes in the network, such as the addition of stations or users, would also require that the 9150 configuration be changed.

Important: *Once the 9150 is configured and rebooted the first time, the "Employ bootp" parameter should be disabled (see page 38), unless the 9150 obtains its IP address from a bootp server or the system administrator intends to update the software through bootp.*

2.2.3.1 Ethernet

The 9150 is equipped with three variations of Ethernet connection: 10Base-T (RJ-45), 10Base2 (BNC coax), and 10Base5 (Dsub 15). See Figure 2.2 on page 17 for an illustration of the connector locations. Since these ports are auto-selecting, jumper or configuration settings are not required. The maximum packet size supported over the network is **1500 bytes**. This parameter is not set at the 9150, but should be set at the host.

For a description of port pinouts, please refer to Appendix A: "Port Pinouts And Cable Diagrams".

Note: *10Base2 termination is not required if the port is not used.*

2.2.3.2 Token Ring

To connect a 9150 to a Token Ring network, a Madge Token Ring Smart 16/4 Ringnode Adapter Type II PC card, 4 or 16 Mbps, is pre-installed in the internal PC card slot. The connector plate shown in the inset in Figure 2.2 on page 17 is fixed to the base of the 9150 to accommodate the Token Ring Dsub9 cable. This connection supports Shielded Twisted Pair (IBM STP) cables Type 1 or 6. The maximum packet size supported over the network is **1500 bytes**. This parameter is not set at the 9150, but should be set at the host.

For a description of port pinouts, please refer to Appendix A: "Port Pinouts And Cable Diagrams".

2.2.4 Preparing For Serial Installation

The 9150 offers serial connection as an option when a local area network is not used. Data cables are generally prepared after the site survey report is available and should be in place before the equipment arrives so that Teklogix can install them. The type of data cable used depends on the type of port required at the site. The type of port depends on the location of the 9150 and whether it is to be connected to a host computer or a network controller. Modems can be used to better accommodate long distances between the 9150 and the host computer or network controller.

Port options include RS-232 Plus and Current Loop. Connector pinouts are listed in Appendix A: "Port Pinouts And Cable Diagrams". The baud rate and the maximum length of the cable for each type of port is tabulated in Table 2.2, below. The cable lengths are based on a quality, 2-pair shielded cable (Belden #8723). The default baud rate for the 9150 serial connection is 19.2k.

Each method of connection has different advantages and capabilities:

- **RS-232/Current Loop** – This is a standard RS-232 asynchronous port with extra lines for synchronous communication. Cable length is limited by the RS-232 specification of 2500pF on the capacitance of the receiving stations. An optional current loop is available to extend the limits of this connection.
- **Optically isolated RS-232-Plus** – This is a standard RS-232 asynchronous port with an RS-423 driver. Cables connected to this port can span longer distances at higher baud rates than the RS-232/Current Loop option.

Port Options	Cable Part No.	Baud Rate	Max. Length
RS-232 Plus (asynchronous communications only)	16590, 16598, 19387	up to 19.2k	2250 ft.
		38.4k	2000 ft.
Current Loop 20 mA (asynchronous communications only)	16599	2400	6250 ft.
		9600	3250 ft.
		19.2k	1500 ft.
		38.4k	1000 ft.

Table 2.2 Maximum Cable Lengths For RS-232 Plus And Current Loop

Warning: ***Installation using an outdoor data cable between two buildings requires that transient protection (a lightning arrestor) be added to the data cable. The RS-232 Plus port is recommended in this situation because it provides optical isolation between the cable and the controller.***

To avoid ground problems (on the data cables), the 9150 should be connected to the same transformer/voltage distribution system as the network controller. If this is not possible, use Current Loop ports or a pair of modems.

2.2.5 Connecting A Video Display Terminal

An ANSI compatible video display terminal (e.g., DEC VT220 or higher), or a PC running terminal emulation, is used for diagnostic purposes and to configure the IP address for the first time before the 9150 can be accessed using a Web Browser (see “Configuring The IP Address” on page 25).

The terminal is connected to the port labelled “Console” on the 9150 (see Figure 2.2 on page 17). This port is normally set to operate at 19,200 baud, 8 bits, 1 stop bit, no parity. To comply with Part 15 of the FCC rules for a Class B computing device, only the cable supplied (Part no. 19387) should be used.

2.3 Changing The Configuration With A Web Browser

The 9150 Flash memory can be reconfigured remotely via the network using a standard HTML Web Browser such as Netscape Navigator (version 4.05 or later) or MS Internet Explorer (version 4.0 or later). See Chapter 3: “9150 Main Configuration” for instructions on changing the parameters.

When setting up the 9150 as an access point device, refer to Chapter 6: “Access Point Configuration” for additional information.

When setting up the 9150 as a base station, please refer to Chapter 4: “Base Station Configuration” for additional information.

When setting up the 9150 as a mini-controller, please refer to Chapter 5: “Mini-Controller Configuration” for additional information.

9150 Main Configuration 3

3.1 Configuration Main Menu

The 9150 Flash memory can be reconfigured remotely via the network using a standard HTML Web Browser such as Netscape Navigator (version 4.05 or later) or MS Internet Explorer (version 4.0 or later). The 9150 Configuration program allows various configuration parameter settings to be changed, added or deleted.

Important: *The 9150 must be warm rebooted after parameter changes are made , including configuring the IP address (see below), in order for the changes to take effect. For details, see "Reboot Unit" on page 43.*

3.2 Configuring The IP Address

Before the configuration menus can be accessed using your Web Browser, the 9150 must be assigned an IP address using a PC console connection. Virtually any PC can be connected to the console port of the 9150, provided that the PC has a terminal communication program such as the Windows "HyperTerminal" utility or "Procomm Plus" for Windows. These programs emulate an ANSI terminal such as VT220 or higher. Cable no. 19387 should be used to connect the PC to the 9150. Make sure the communications settings on your PC are set to 8 bits, 1 stop, no parity, and that the baud rate of the serial port matches that of the 9150 console port (19,200 baud).

After the PC is attached and turned on, press the <RETURN> key several times until the ">" prompt appears. The commands used to configure IP addresses are described here.

If your system uses a bootp server to assign IP addresses, make sure that "bootp" is **enabled**. Once enabled, and the 9150 is rebooted, you will be able to access the 9150 configuration menus through the Web Browser, using the IP address identified in the server's bootp table. If you do not use a bootp server, make sure that "bootp" is **disabled** and continue with the configuration commands to manually assign an IP address.

Important: *When your configuration is completed, the changes should be saved to flash by entering the following command (commands are case-sensitive):*

```
>cfg commitCache
```

To display the bootp setting:

```
>cfg get system.dobootp
```

To enable bootp:

```
>cfg put system.dobootp 1
```

To disable bootp:

```
>cfg put system.dobootp 0
```

To display the default IP address (xxx.xxx.xxx.xxx represents the IP address):

```
>cfg get interface.1.defaultipaddress
```

To configure the default IP address

```
>cfg put interface.1.defaultipaddress xxx.xxx.xxx.xxx
```

To display the default gateway:

```
>cfg get system.defaultgateway
```

To configure the default gateway:

```
>cfg put system.defaultgateway xxx.xxx.xxx.xxx
```

To display the default subnetmask:

```
>cfg get interface.1.defaultsubnetmask
```

To configure the default subnetmask:

```
>cfg put interface.1.defaultsubnetmask xxx.xxx.xxx.xxx
```

3.3 Accessing The Menus

When the Web Browser is pointed to the 9150's IP address, a name and password dialog box appears. The password is comprised of alphanumeric characters and is case-sensitive. If you change the password (see "Users" on page 34), set all 9150s to the same password, and write it down in a secure place.

A default user name "user" and the password "123456" are created on 9150 system startup *if no users are already configured*. You can use the default to enter the Configuration Main Menu for the first time. For security, change this default name and password immediately after entering the configuration menus. Should you accidentally delete your user names, re-booting the 9150 will re-create the default name and password so that you can get back in to the unit.

After the password is accepted, the Configuration Main Menu appears. The 9150 software automatically detects the system information of the unit, and most of the parameters have already been properly configured for each site.

Warning: ***Parameters should not be altered without a clear understanding of how they operate. Parameters that are incorrectly set can increase response time or cause communication difficulties.***

- To highlight and move through the different options, use the <TAB> key or mouse pointer.
- To view and select the items in the listboxes, either press the <UP> or <DOWN> arrow keys or click on the arrow at the side of the menu and highlight the item.
- To enter the related configuration sub-menu dialog box, highlight "Configure" and either press <ENTER> or click on the "Configure" button.
- Where string entry parameters are given in the menus, changes are keyed in. Numerical parameters can be entered as hexadecimal values. Precede hexadecimal values with "0x".
- To leave a menu page, select either the <OK> or <Cancel> button at the bottom of the page. Selecting <OK> will save your changes and exit the page, while selecting <Cancel> will exit the page without saving the changes.

Important: *Do not use the Web Browser's <Back> button to leave a page.*

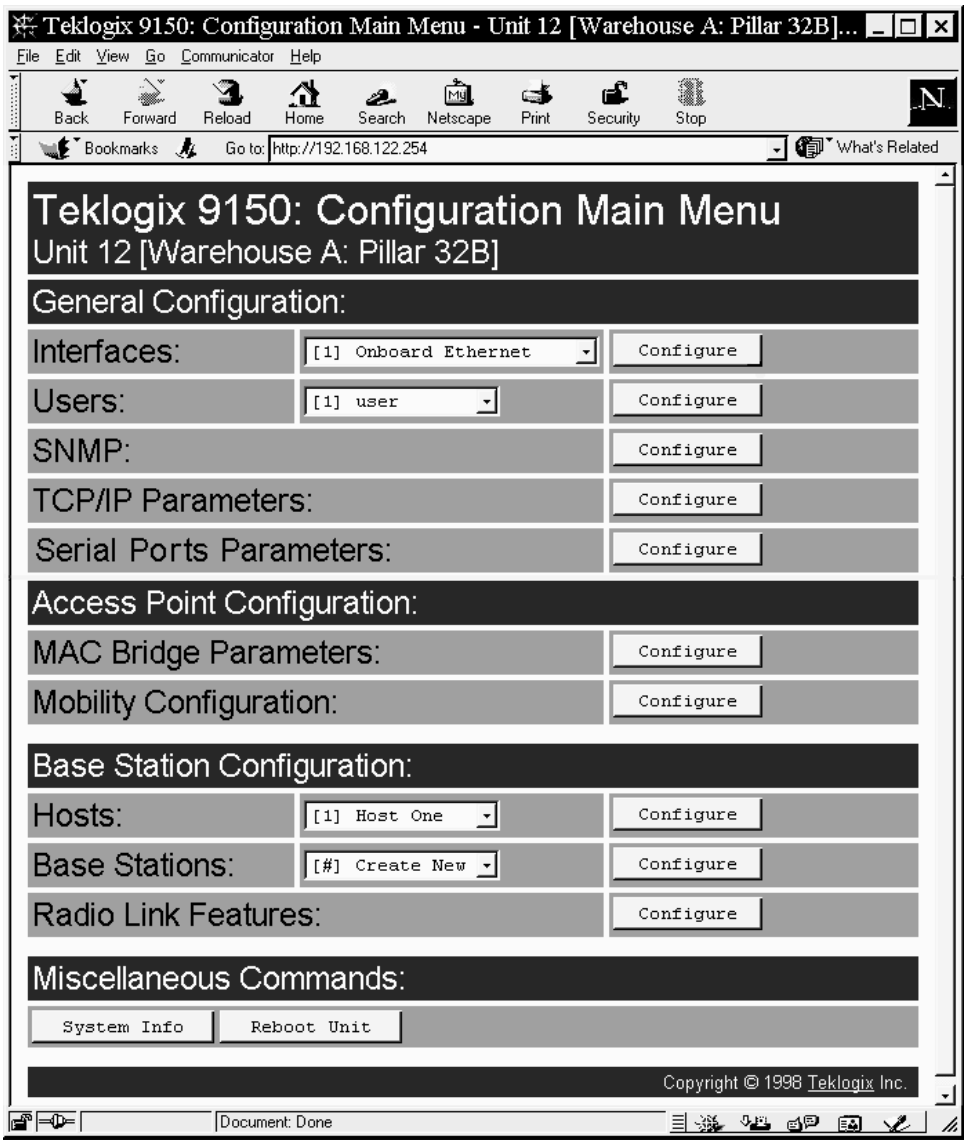


Figure 3.1 9150 Configuration Main Menu: View From Browser

3.4 General Configuration Options

The *General Configuration* menu on the *Configuration Main Menu* page presents five options of sub-menus: *Interfaces* , *Users*, *SNMP, TCP/IP Parameters*, and *Serial Ports Parameters*.

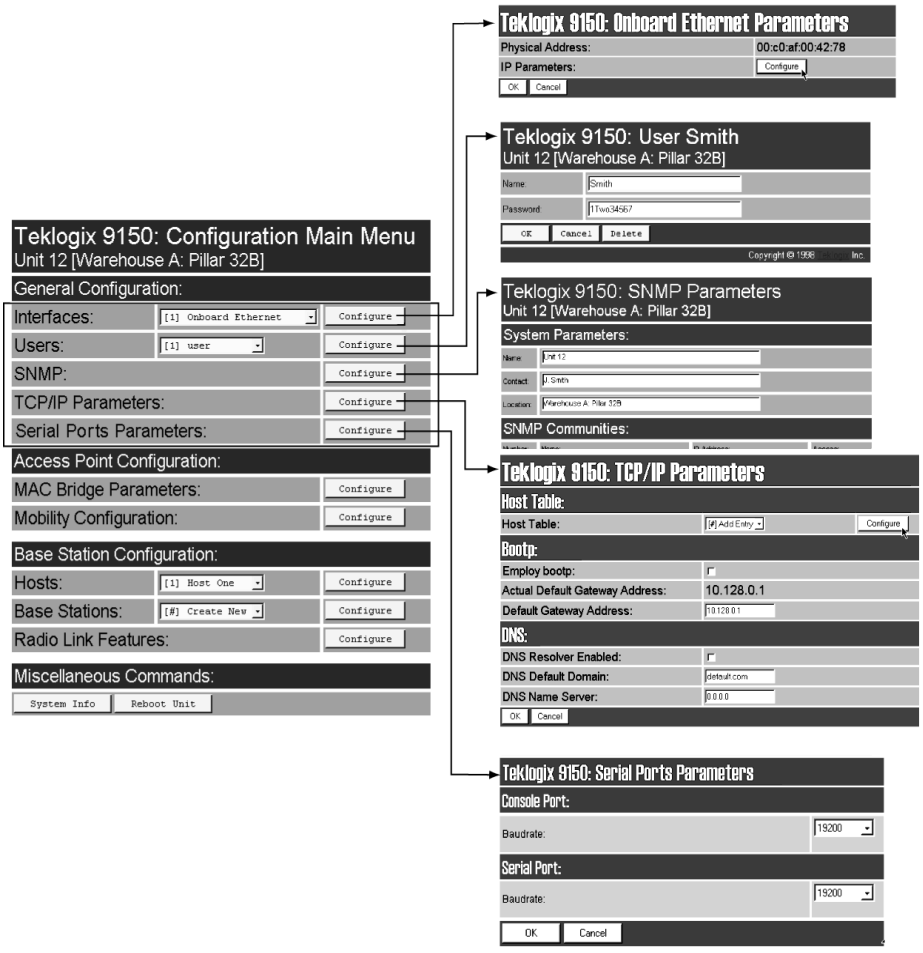
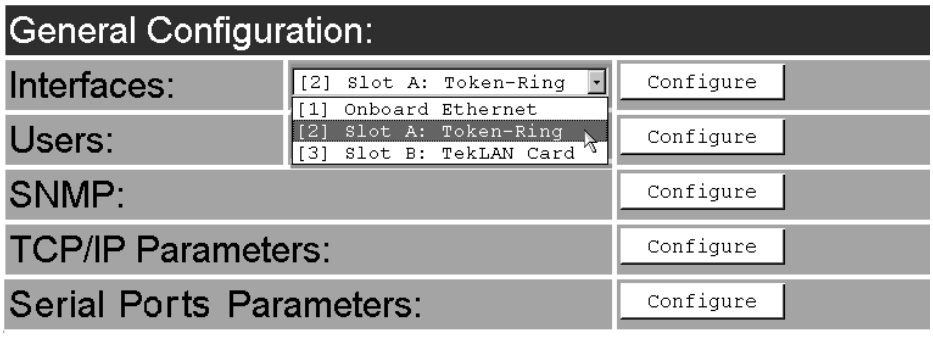


Figure 3.2 Overview Of General Configuration Menus

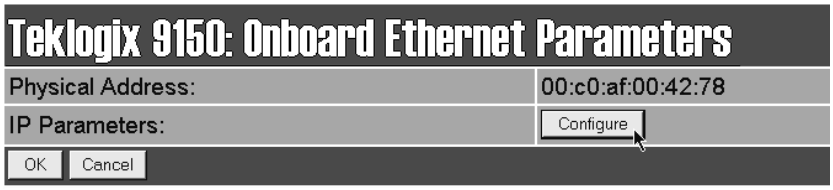
3.4.1 Interfaces

The pull-down menu shown for the Interfaces option indicates which interfaces have been detected in use by the 9150.



3.4.1.1 Onboard Ethernet

For the selection *Onboard Ethernet*, entering the "Configure" dialog box will open the parameters page for the Ethernet connection, which shows the 9150's physical (hardware) address and IP address parameters.



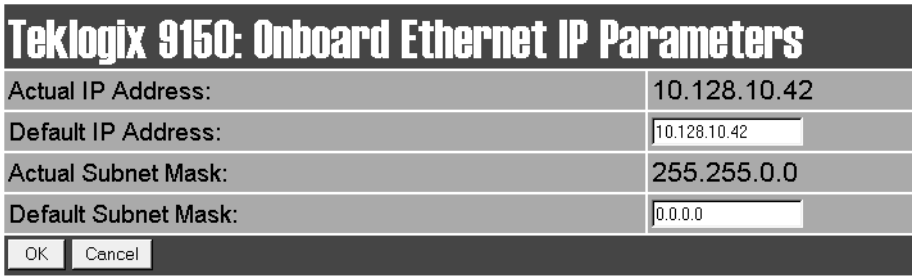
Physical Address

A unique *Physical Address* is assigned by Teklogix personnel for each 9150. The values entered for this parameter are presented in hexadecimal in descending order beginning with the MSB (Most Significant Byte), the highest value, and ending with the LSB (Least Significant Byte), the lowest value. The allowable value for each field ranges from **00** to **FF**.

Warning: ***It is not advisable to modify the* Physical Address*. However, if these values are changed, the Network Administrator must assign a unique address to each Ethernet station on the network, including all 9150s.***

IP Parameters

Each 9150 that is connected to a local network has a unique IP address designated for it. The *IP Parameters* used to assign the IP address are accessed by entering the "Configure" dialog box.



Actual IP Address

The *Actual IP Address* is the IP address currently set on the 9150.

Default IP Address

This parameter allows you to change the value of the IP address. The IP address must be a unique value on the network, including any Token Ring IP addresses being used, so that each 9150 in your system can be identified. The acceptable value ranges from **0.0.0.0** to **239.255.255.255**.

Note: *The value **255.255.255.255** is reserved for the broadcast address.*

Actual Subnet Mask

The *Actual Subnet Mask* is the subnet mask currently set on the 9150.

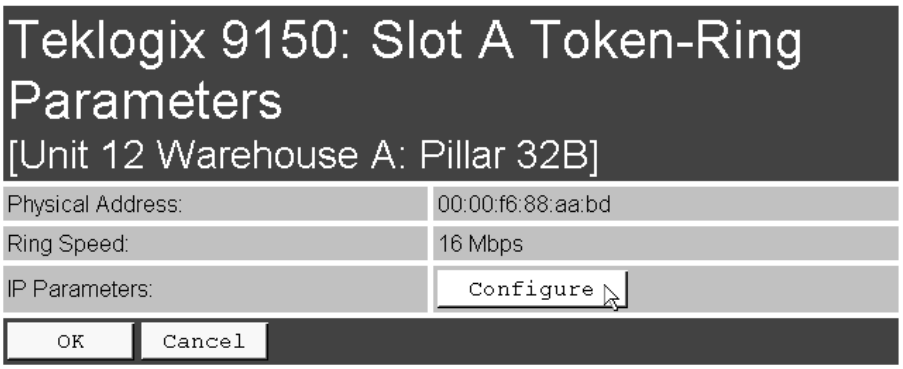
Default Subnet Mask

This parameter allows you to change the value of the subnet mask. The 9150 uses the *Default Subnet Mask*, its own IP address, and the destination IP address to determine if a packet should be sent on the local network or to a remote segment. If the destination is found on the local network, the packet is sent directly to its destination. If the destination resides on a remote network, the packet is routed to the gateway. Enter your subnet mask in "**xxx.xxx.xxx.xxx**" notation.

Important: *The maximum packet size supported is **1500 bytes**. This parameter is not set at the 9150, but should be set at the host.*

3.4.1.2 Slot n: Token-Ring

For the selection *Slot n: Token-Ring*, entering the "Configure" dialog box will open the parameters page for the Token Ring connection, which shows the 9150's physical (hardware) address, ring speed, and IP address parameters.



Physical Address

Each Madge Token Ring PC card has a unique MAC address (*Physical Address)*, which is displayed here in the 9150 parameters. The MAC address is presented in standard hexadecimal format.

Ring Speed

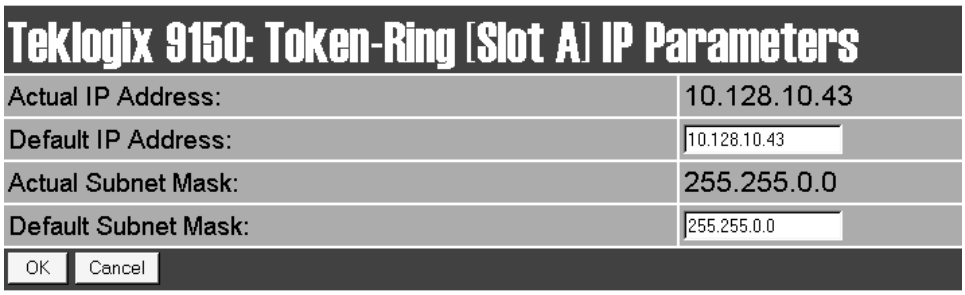
This parameter indicates the Token Ring network speed. The ring speed *must* be set through the console, *prior to installation*, using the configuration command line:

```
>cfg put interface.#.tokenring.datarate 16
```
(or `4` if the network is running at 4 Mbps)

The '#' depends on which slot the PC card occupies. Usually this is slot B, inside the 9150, so the # would be **3**. The default ring speed is **16 Mbps**.

IP Parameters

Each 9150 that is connected to a local network has a unique IP address designated for it. The *IP Parameters* used to assign the IP address are accessed by entering the "Configure" dialog box.



Actual IP Address

The *Actual IP Address* is the IP address currently set on the 9150.

Default IP Address

This parameter allows you to change the value of the IP address. The IP address must be a unique value on the network, including any Ethernet IP addresses being used, so that each 9150 in your system can be identified. The acceptable value ranges from **0.0.0.0** to **239.255.255.255**.

Note: *The value **255.255.255.255** is reserved for the broadcast address.*

Actual Subnet Mask

The *Actual Subnet Mask* is the subnet mask currently set on the 9150.

Default Subnet Mask

This parameter allows you to change the value of the subnet mask. The 9150 uses the *Default Subnet Mask*, its own IP address, and the destination IP address to determine if a packet should be sent on the local network or to a remote segment. If the destination is found on the local network, the packet is sent directly to its destination. If the destination resides on a remote network, the packet is routed to the gateway. Enter your subnet mask in "**xxx.xxx.xxx.xxx**" notation.

Important: *The maximum packet size supported is **1500 bytes**. This parameter is not set at the 9150, but should be set at the host.*

3.4.1.3 Slot n: PC Card Radio

Each PC (PCMCIA) card radio resident in the 9150 will be located in one of two Slots: A or B. Selecting a PC card will open the sub-menu for that radio.

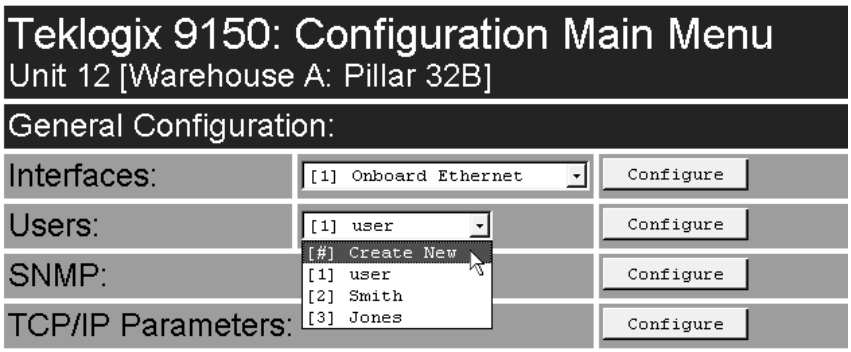
IEEE 802.11 FH or DS: See "IEEE 802.11 (Frequency Hopping Radio Parameters)" on page 126, or "IEEE 802.11 (Direct Sequence Radio Parameters)" on page 128 for details on setting the radio parameters for the PC card.

TekLAN Card: See "TekLAN Parameters" on page 49 for details on setting the radio and Wlan parameters.

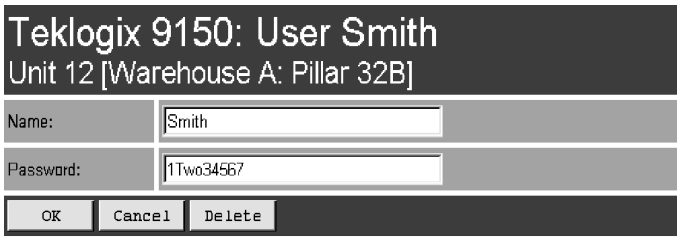
Teklogix Narrowband: See "Narrow Band Radio Parameters" on page 53 for details on setting the radio and polling parameters.

3.4.2 Users

The Users option provides security for access to the 9150 Configuration menus. New individuals can be added by selecting "[#] Create New" in the listbox before entering the "Configure" dialog box.

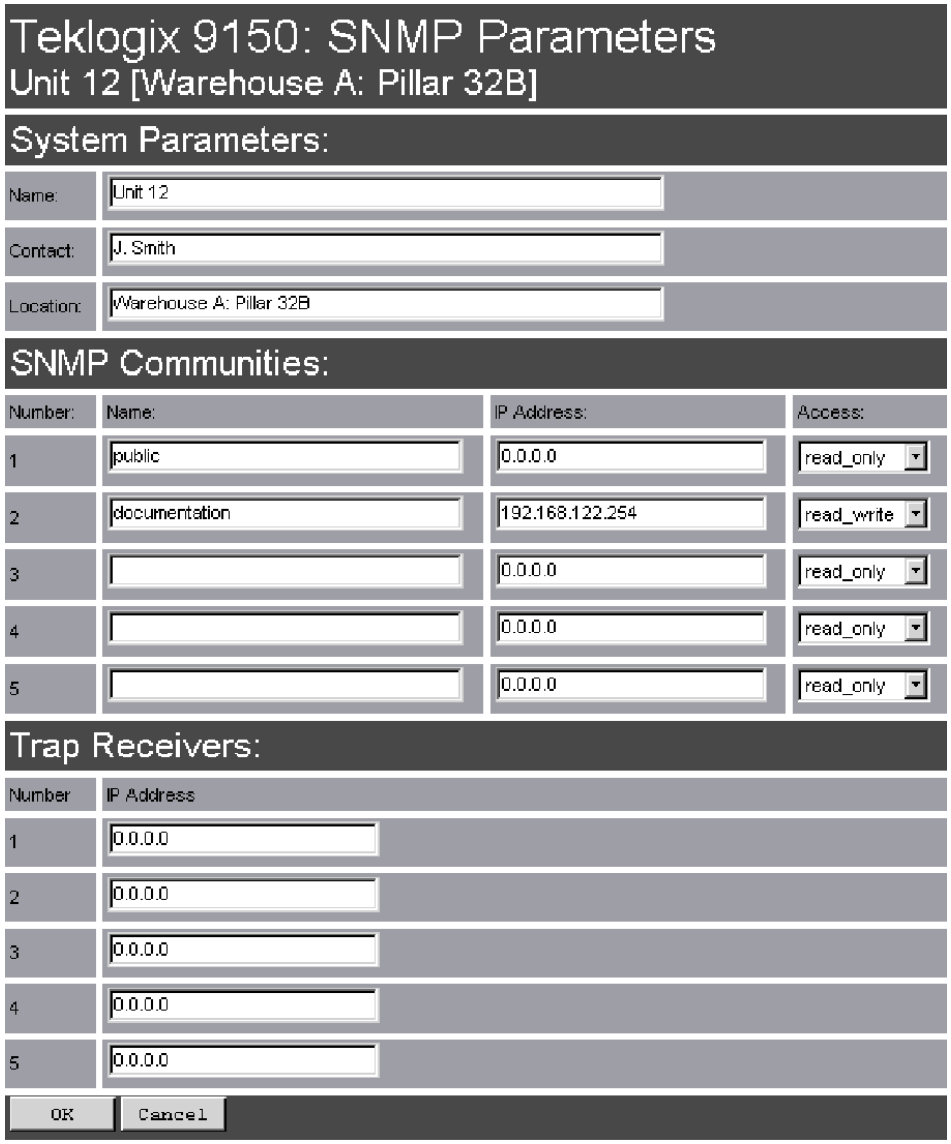


Individual names and their assigned passwords may be changed or deleted in the "Configure" dialog box for this option by selecting the name in the listbox and then opening the "Configure" dialog box. The password can be comprised of alphanumeric characters and is case-sensitive.



3.4.3 SNMP

The SNMP (Simple Network Management Protocol) "Configure" page allows various network management parameters to be set or changed.



3.4.3.1 System Parameters

The entries in these parameters set the name, contact and location identifiers for this specific 9150 Wireless Gateway. The name and location are then shown as the sub-heading of each Configuration page. In this example the identifier appears as "Unit 12 [Warehouse A: Pillar 32B]".

3.4.3.2 SNMP Communities

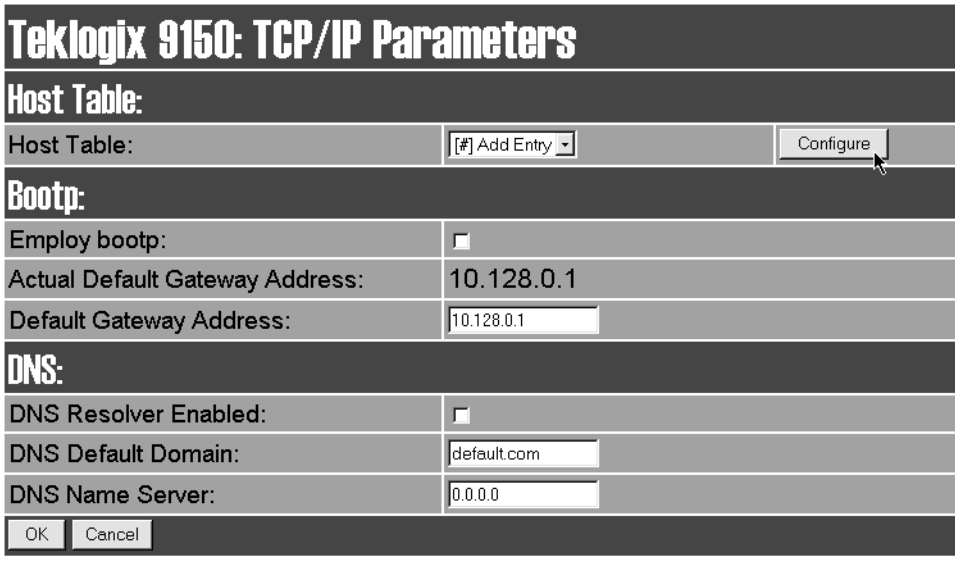
These parameter settings allow the network administrator to define the network environment and determine the type of access allowed (read-only, or read-write) for each area name and IP address.

3.4.3.3 Trap Receivers

These IP addresses determine which SNMP manager's stations will receive SNMP Traps from the 9150. The 9150 sends the "Cold Start" Trap on reboot or power up.

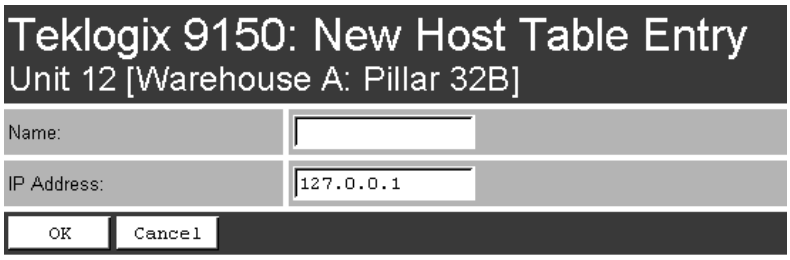
3.4.4 TCP/IP Parameters

The 9150 is situated on a wired network which uses TCP/IP. Both Bootp and DNS options are available to resolve IP addressing issues.

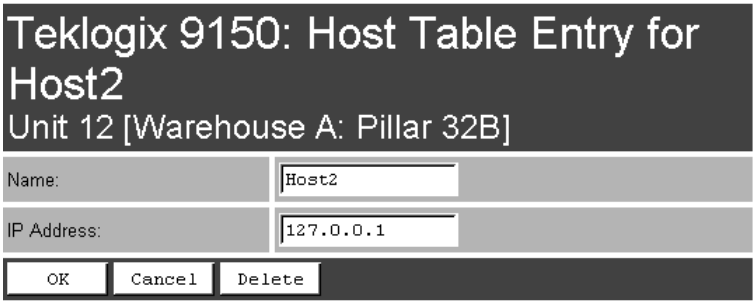


3.4.4.1 Host Table

If no external DNS server is available, the 9150 may resolve host names to IP addresses using its internal host table. Hosts are added to the table by selecting "Configure" beside "[#} Add Entry" in the listbox. This will open the *New Host Table Entry* menu.



An existing host's name and IP address may be edited in the *Host Table Entry* menu by selecting "Configure" beside the host name in the listbox. The host may also be deleted from the table.



Name

This is the designated name of the host.

IP Address

This is the assigned IP address for the host.

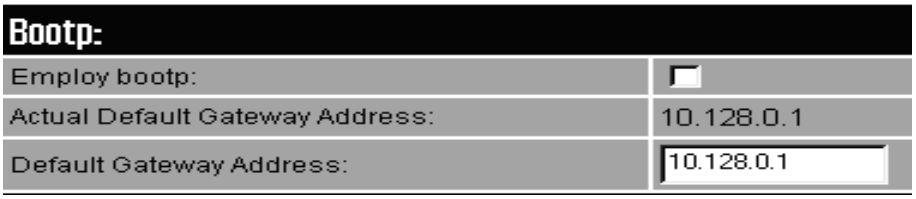
Note: *The name must not contain space characters.*

3.4.4.2 Bootp

The 9150 has designated default IP addresses for itself and the Gateway. Alternatively, the IP address of the 9150 can be assigned using a BOOTP Server.

The primary purpose of the Bootstrap Protocol (BOOTP) is to assign a designated IP address to the appropriate 9150 on the network. When *Employ bootp* is **enabled**, a request for address is automatically broadcast to all hosts on the local network.

BOOTP Servers search the *bootptab* files for a hardware address which matches that of the 9150 that initiated the request for address. (Bootptab files list each hardware address with a corresponding IP address.) The host with a matching hardware address in its bootp table replies to the request, sending the appropriate IP address to the 9150.



Employ bootp

Enable *Employ bootp* (√), to automatically broadcast a request for address to all hosts on the local network.

Important: *Once the 9150 is configured and rebooted the first time, the* Employ bootp *parameter should be* ***disabled****, unless the 9150 obtains its IP address from a bootp server or the system administrator intends to update the software through bootp.*

Actual Default Gateway Address

This parameter shows the Default Gateway address currently set for the 9150.

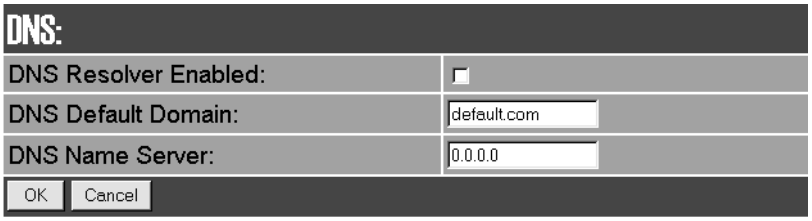
Default Gateway Address

The *Default Gateway Address* is assigned by the network administrator. This address creates an identifiable communication link between the 9150 and a network other than the one to which the 9150 is directly wired. The acceptable values for the Gateway IP address range from **0.0.0.0** to **239.255.255.255**.

Note: *Setting the Gateway IP Address to **0.0.0.0 disables** this feature. A communication link will not exist between sub-networks.*

3.4.4.3 DNS

Domain **N**ame **S**ystem allows users to locate destinations on the TCP/IP network by domain (host) name. The DNS server maintains a database of host names and their corresponding IP addresses. For example, if the server was presented with the name "www.teklogix.com", it would return the IP address: "207.219.2.3".



DNS Resolver Enabled

When this parameter is **enabled** (√), the 9150 will use the DNS Name Server identified by the IP address entered in the *DNS Name Server* parameter.

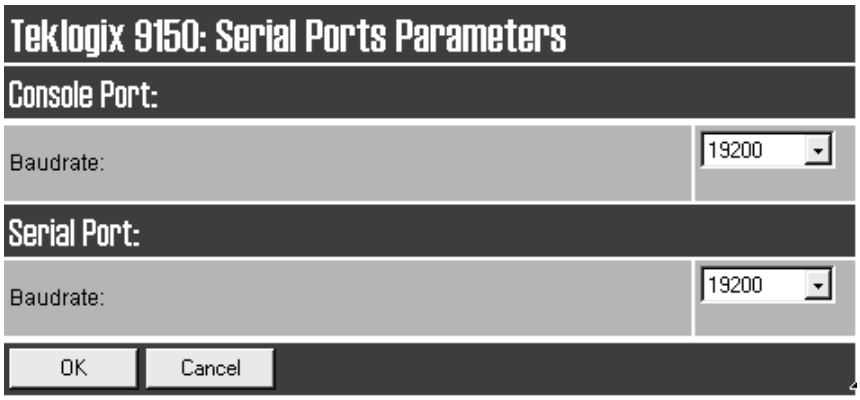
DNS Default Domain

This is the default domain name for this 9150.

DNS Name Server

This is the IP address of the designated DNS Name Server.

3.4.5 Serial Ports Parameters



3.4.5.1 Console Port

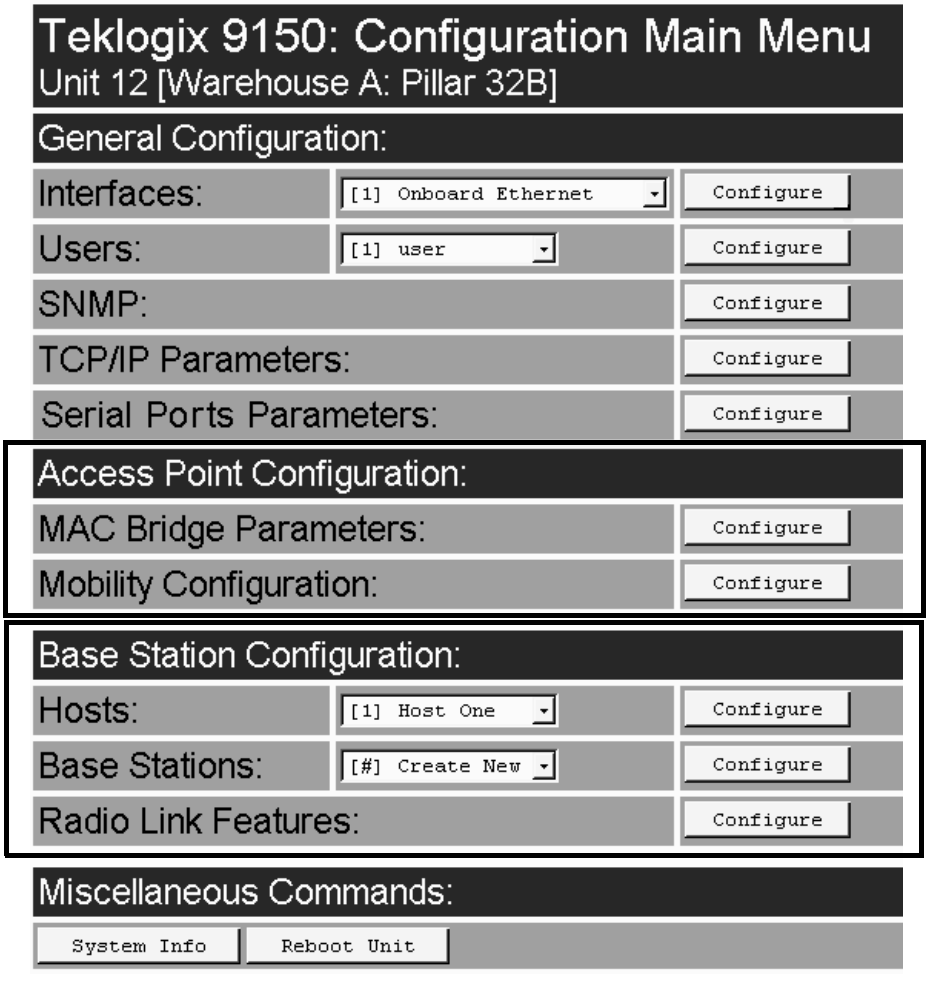
The default baud rate for the console port is **19.2k**.

3.4.5.2 Serial Port

The default baud rate for the serial port is **19.2k**.

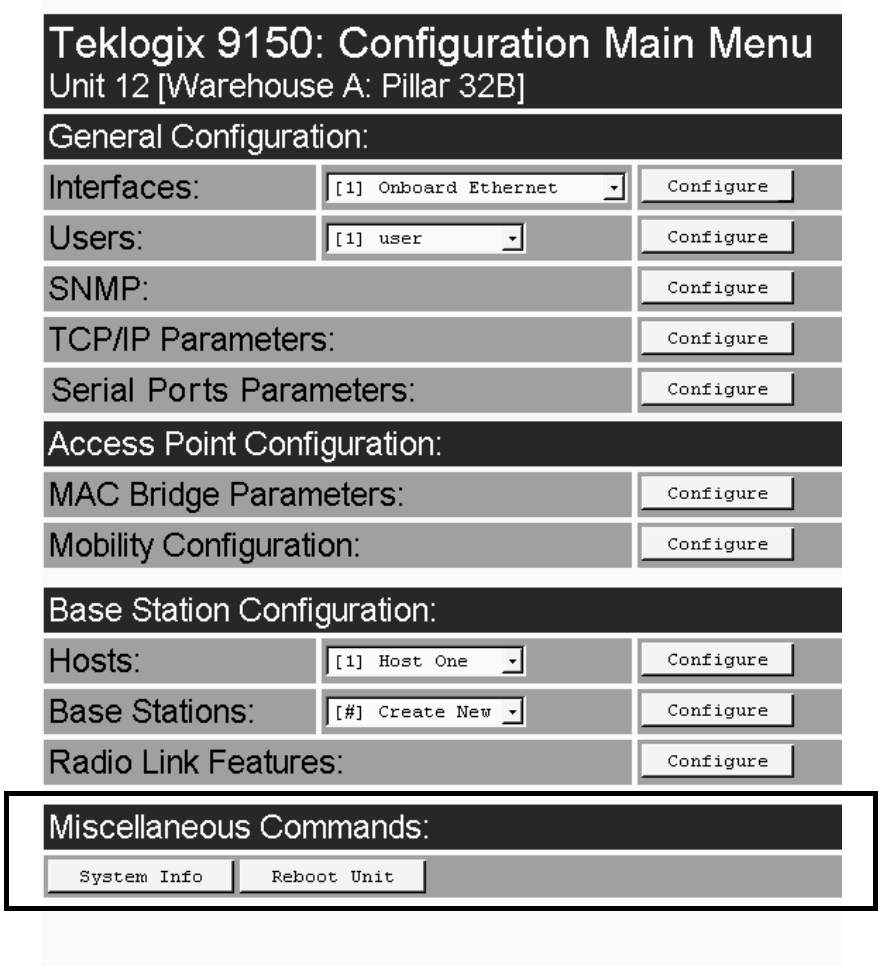
3.5 Access Point/Base Station Configurations

The 9150 is capable of operating as a transparent bridge (access point) between the wireless and wired networks, and also as a mini-controller or base station. For these operations, the parameters in these pages must be set appropriately. For detailed information on the sub-menus and to set up the 9150 as a base station, see Chapter 4: “Base Station Configuration”. To configure an access point device, see Chapter 6: “Access Point Configuration”. To configure the 9150 as a mini-controller, see Chapter 5: “Mini-Controller Configuration”.



3.6 Miscellaneous Commands

There are two miscellaneous commands: *System Info* and *Reboot Unit*.



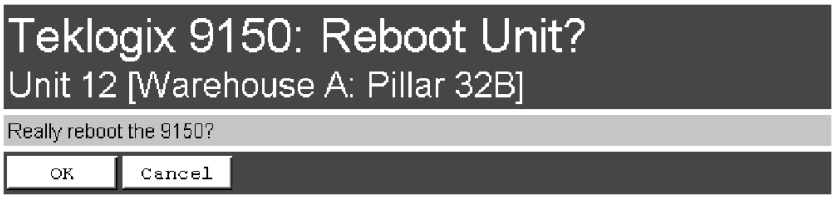
3.6.1 System Info

The System Information, hardware and software, for the 9150 Wireless Gateway unit is detected automatically and summarized in this page. The screen is shown on page 43.

Teklogix 9150: System Information	
Device Model:	Teklogix 9150
Unit Serial Number:	
Software Version:	F099T
Boot Code Version:	D059Q
System IP Address:	10.128.10.43
Ethernet Hardware Address:	00:c0:af:00:42:78
Flash Size:	2097152 bytes.
SRAM Size:	16777216 bytes.
PC Card Slot A:	Token-Ring
PC Card Slot B:	IEEE 802.11 DS [FCC-USA (0x10)]
Emulations:	disable
OK	

3.6.2 Reboot Unit

This option opens a dialog box which allows you to remotely "warm" reboot the 9150.



If the **OK** button is chosen, the 9150 will be rebooted, the LEDs will turn off momentarily, and the following message will be received:

Important: *If changing radio types in the 9150, and therefore changing the* Radio Type *parameter (see page 50), the unit must be powered OFF and ON again ("cold" rebooted). Rebooting with the* Reboot Unit *option will not implement the radio parameter change.*

BASE STATION CONFIGURATION 4

4.1 Overview

The 9150 Wireless Gateway can operate as a base station, facilitating communications between terminals and wireless base stations and a Teklogix 9400 or 9300 Network Controller, or 9140 Wireless Gateway (as a mini-controller) with a range of host platforms. Alternatively, the network controller can be a host running a Teklogix SDK (handler). The 9150 can also act as a slave base station to a 9140 on the network. As a base station, the 9150 uses the Wireless LAN (Wlan) or Adaptive Polling/Contention RF protocols.

Note: *The 9150 main parameters should first be set up as described in Chapter 3: "9150 Main Configuration". For details on the RF protocols, see page 8.*

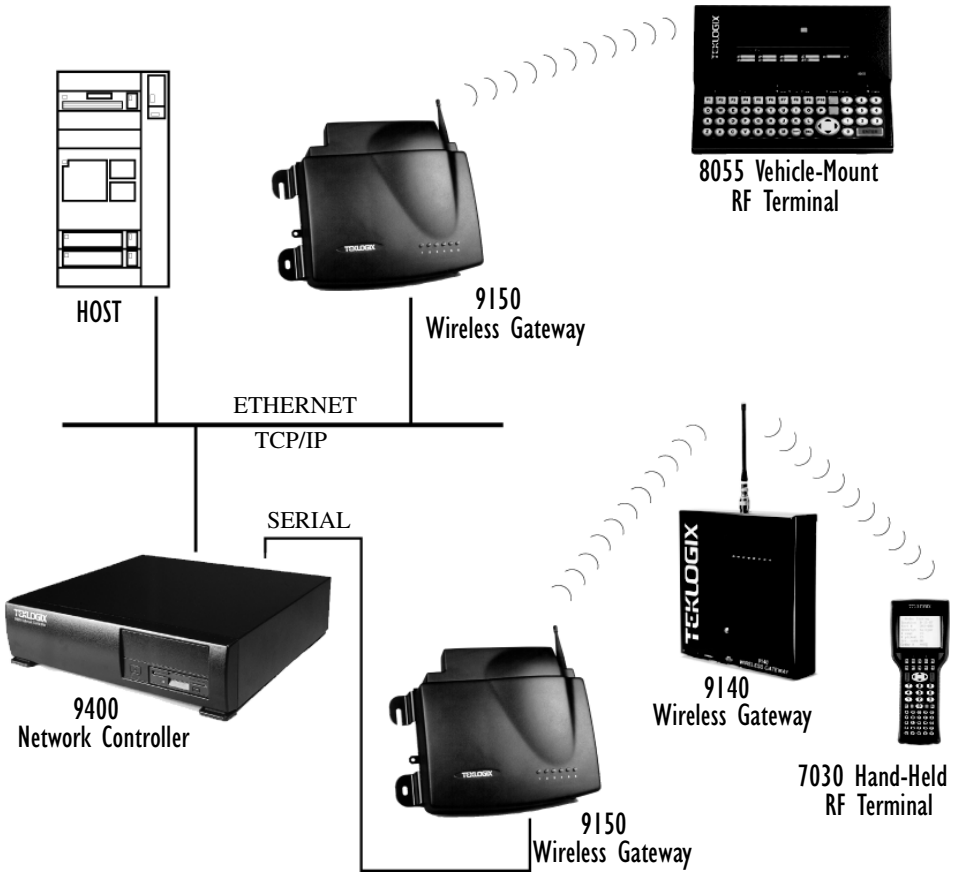


Figure 4.1 9150 Base Station Configuration

For operation as a base station, the parameters in the *Base Station Configuration* pages on the *Configuration Main Menu* screen should be set appropriately, as described in the sections that follow. In addition, the appropriate radio parameters must be applied. These are found in the *Interfaces* pages for *TekLAN* and *Narrow Band* radios. See pages 49and 53, respectively.

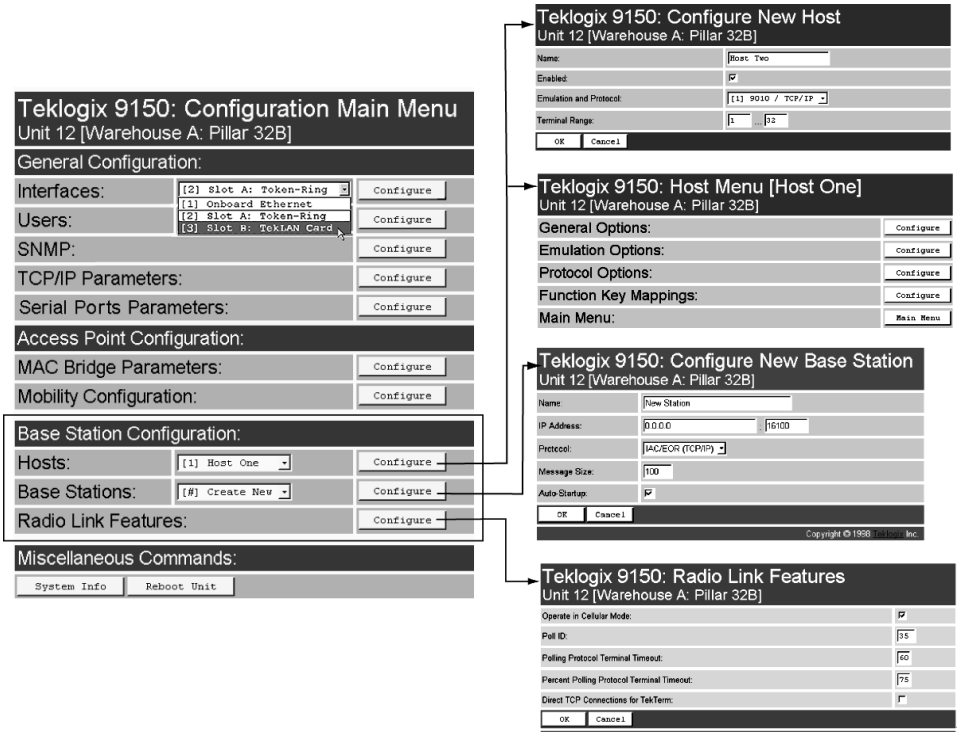


Figure 4.2 Overview Of Base Station Configuration Menus

4.2 Interfaces

4.2.1 TekLAN Parameters

The pull-down menu shown for the *Interfaces* option in the 9150 *Configuration Main Menu* page indicates which interfaces have been detected in use. Entering the "Configure" dialog box for "Slot A: TekLAN Card", opens the parameters page for TekLAN, which presents both the radio and Wlan parameters.

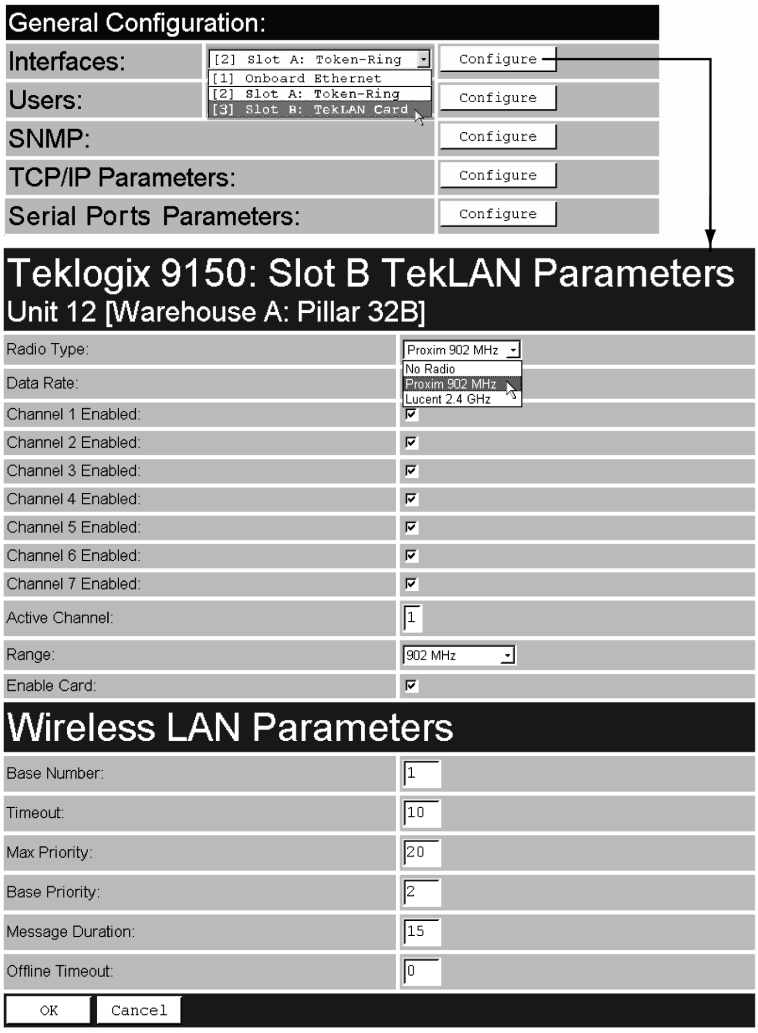
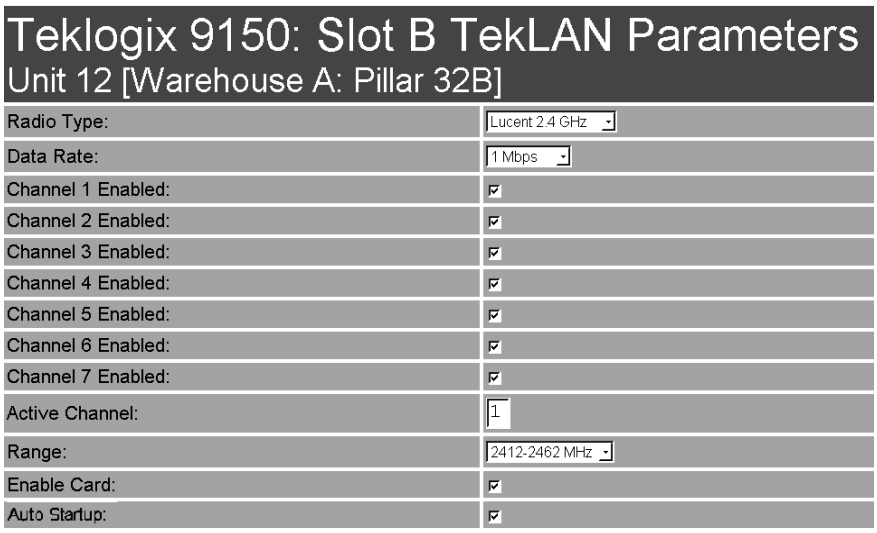


Figure 4.3 Overview Of TekLAN Menus

4.2.1.1 Radio



Radio Type

The type of PC radio card installed on the 9150 is dependent on your wireless network. This parameter should be set to the installed radio. The radios for TekLAN are the TekLAN 902 MHz DS Spread Spectrum, and the TekLAN 2.4 GHz DS Spread Spectrum.

Important: *If changing radio types in the 9150, DO NOT "hot swap" the PC cards: turn the 9150 off before changing the radio. Following this, when changing the* Radio Type *parameter, the unit must be powered OFF and ON again ("cold" rebooted). Rebooting with the* Reboot Unit *option will not implement the radio parameter change.*

Data Rate

This parameter determines the data (baud) rate for the radio channel. This is a decimal value in bits per second. The acceptable value for the *Data Rate* parameter differs depending on the type of radio installed in the 9150.

- TekLAN 902 MHz DS SS: 122 kbps.
- TekLAN 2.4 GHz DS SS: 1 Mbps.

Channel n Enabled

These parameters are used to **enable** (√) or **disable** a channel. The number of channels available is determined by the type of radio installed. See "PC Card Radios" on page 145 for the number of available channels for each radio type.

Active Channel

This parameter determines the current default radio channel.

Range

The federal agencies, Industry Canada and the Federal Communications Commission in the United States, as well as other country-specific agencies world-wide, regulate the use of radio frequencies to ensure that communication conflicts are avoided. See "PC Card Radios" on page 145 for the assigned frequencies for each radio type.

The *Range* parameter determines which channels can be enabled and is set according to the approved frequency range in the country where the system is installed. The TekLAN 902 MHz radio is only assigned the 902 MHz frequency. For the TekLAN 2.4 GHz radio, the frequency range and the associated channels and countries are assigned as follows:

Country	Range	Channels Available
For testing purposes only.	2412-2462	1 to 6
Canada, U.S., U.K.	2422-2462	2 to 6
Australia	2422-2442	2 to 4

Table 4.1 Frequency Range – TekLAN 2.4 GHz Spread Spectrum (TRX7425)

Enable Card

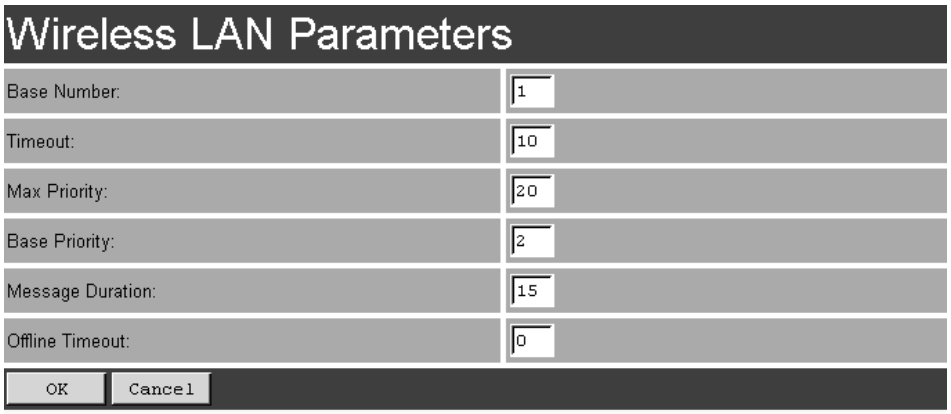
This parameter **enables** the PC card (√). The card may be **disabled** temporarily when, for testing purposes, it is required that there be no radio interference.

Auto Startup

This parameter **enables** (√) polling immediately when the 9150 is rebooted. If *Auto Startup* is **disabled**, the 9150 will wait until polling is initialized from the network controller. When the 9150 is operating as a Wlan base station under a network controller, this parameter should be **disabled**.

4.2.1.2 Wireless LAN Parameters

The Wlan protocol can only be used with spread spectrum radios.



Important: *If your system is using the Wlan protocol, make sure that* Operate in Cellular Mode *is* ***enabled*** *(see page 72) in the Radio Link Features sub-menu and that cellular mode is also set on the 9400/9300 Network Controller.*

Base Number

This parameter is used to assign a unique address to each base station. As the terminals move from one base station to another, this address is transmitted by the base stations to the terminals, identifying each 9150 on a multiple base station system. The allowable range of base station numbers is **1** to **64**.

Timeout

This value is used to adjust Wlan performance and should be set to **10**.

Max Priority

This value is used to adjust Wlan performance and should be set to **20**.

Base Priority (TekLAN 2.4 GHz)

The *Base Priority* parameter determines the number of priority transmit slots reserved for each base station. The allowable range for this parameter is **0** to **100**. For optimal performance, this parameter should be set to a value of **2**.

Message Duration (TekLAN 2.4 GHz)

This parameter controls the duration of transmit slots to optimize communications and decrease the likelihood of collisions. A *Message Duration* value of **1** translates into a slot duration of 130 micro seconds. The allowable range for this parameter is **2** to **200**. For optimal performance, this parameter should be set to **15**.

Offline Timeout

This parameter determines the time in minutes that a terminal is allowed to be inactive before the 9150 declares it offline. An offline terminal is still considered part of the system. Messages to offline terminals are queued at the 9150. The terminal remains offline until it transmits any message. Values for this parameter range from **0** to **100**. If the parameter is set to **0**, terminals are never declared offline.

4.2.2 Narrow Band Radio Parameters

The pull-down menu shown for the *Interfaces* option on the 9150 *Configuration Main Menu* page indicates which interfaces have been detected in use. For the selection “Slot A: Teklogix Narrowband”, entering the “Configure” dialog box will open the parameters pages for the TRX7370 Narrow Band PC card radio. These pages list the polling protocol and radio parameters, and show the radio card’s permanent communications settings.

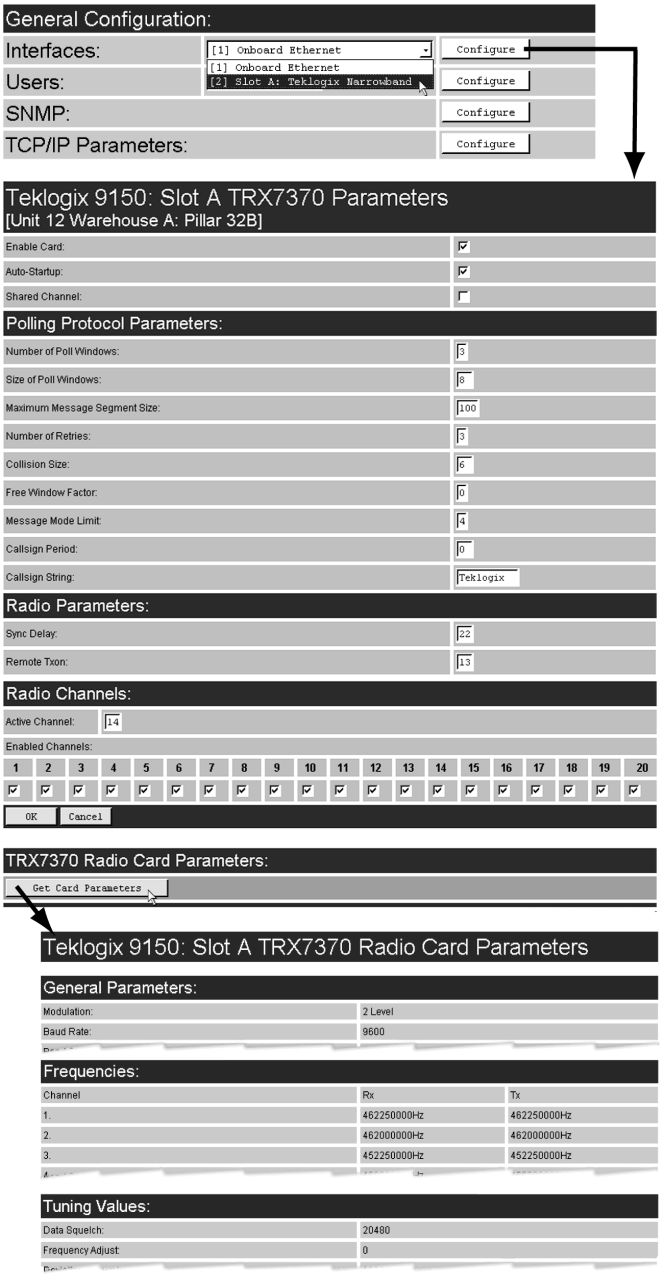
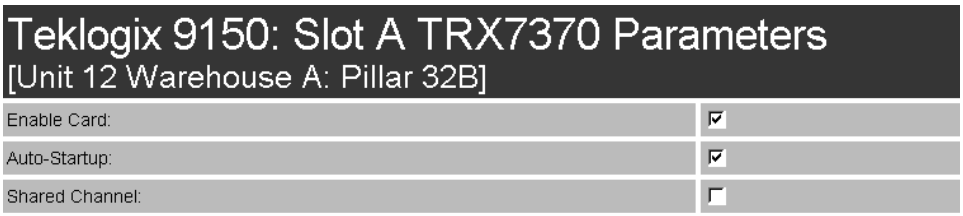


Figure 4.4 Overview Of Teklogix Narrow Band Menus



Enable Card

This parameter **enables** the PC card (√). The card may be **disabled** temporarily when, for testing purposes, it is required that there be no radio interference.

Important: *If changing radio types in the 9150, DO NOT "hot swap" the PC cards: turn the 9150 off before changing the radio.*

Auto-Startup

This parameter **enables** (√) polling immediately when the 9150 is rebooted. If *Auto Startup* is **disabled**, the 9150 will wait until polling is initialized from the network controller.

Shared Channel

Shared Channel is only used in Holland to accommodate government requirements. When **enabled** (√), it imposes timing restrictions for polling. Every 2 seconds of polling is followed by 0.5 seconds of silence—no polling occurs.

Further, if another carrier is detected on the channel, the 9150 will cease radio transmissions on that channel until the path is clear.

4.2.2.1 Polling Protocol Parameters

Polling Protocol Parameters:	
Number of Poll Windows:	3
Size of Poll Windows:	8
Maximum Message Segment Size:	100
Number of Retries:	3
Collision Size:	6
Free Window Factor:	0
Message Mode Limit:	4
Callsign Period:	0
Callsign String:	Teklogix

Number of Poll Windows

This parameter defines the number of poll windows the 9150 will use. The value assigned to this parameter is dependent on the number of terminals and the radio link protocol used.

Table 4.2 indicates how the value assigned to the *Number of Poll Windows* parameter is determined.

Number of Terminals	Minimum # of Windows
1-16	2
17-81	3
82-256	4

Table 4.2 Number Of Poll Windows – Cellular Protocol

Size of Poll Windows

The value assigned to this parameter determines the largest message that can be passed between the 9150 and the terminal in a normal poll window. The window size can be adjusted to accommodate anywhere from **4** to **32** characters.

Larger windows increase the polling period and can increase the response time. Smaller windows increase the number of message and long message polls, and can also increase the response time.

Important: *In "Cellular" mode, the minimum value for this parameter is **8**.*

Maximum Message Segment Size

This parameter determines the largest single message that can be passed *to* a terminal in message mode or *from* a terminal in long message mode. In a 9150 base station, the value entered in this parameter must be greater than or equal to the value entered in the network controller or 9150 mini-controller. The range of this parameter is between 32 and 116 characters. (Longer messages are broken into several packets.) The default value is **100**.

Number of Retries

This parameter determines how many times the 9150 attempts to resend a message if an acknowledgement is not received from the terminal. (These retries do not necessarily occur in consecutive polls because incomplete messages are returned to the bottom of the message queue.) After all retries have been exhausted, the terminal is declared "offline". The 9150 does not transmit any messages to the terminal until the terminal declares itself "online". The allowable values range from **1** to **7**.

Collision Size

This parameter reduces the probability that random noise on the radio link will be interpreted as a collision between terminals. Response time increases when the 9150 resolves collisions unnecessarily.

Collision Size places an upper limit on the number of characters that are received prior to the receipt of an error message (CRC, CD lost, etc.). If eight is the value of this parameter, eight or less characters followed by an error message appearing over the radio link are considered noise. If there are more than eight characters, it is considered a collision. Acceptable values range from **3** to **15**.

Free Window Factor

The value entered in this parameter determines if "free window mode" will be used. In free window mode, all terminals transmit in the free poll window instead of the window to which they are normally assigned.

Entering a value of **0** (zero) in this parameter **disables** free window mode. Increasing the value of this parameter increases the likelihood of a message being transmitted in the free window.

Message Mode Limit

This parameter defines an upper limit to the number of messages that must be queued for transmission before message mode polling starts. Accepted values range from **0** to **7**, where **0 disables** message mode.

Note: *The number of terminals and past events are also part of the algorithm that determines whether or not to start message mode.*

Callsign Period

A call sign is periodically transmitted as an audible Morse code signal. This parameter specifies the interval in minutes between call sign transmissions. Acceptable values range from **0** to **60**. The federal agencies, Industry Canada and the Federal Communications Commission in the United States, require that each system transmit its own identification call sign every 15 minutes.

In countries where a call sign is not required, setting this parameter to **0** prevents the transmission of any call signs, allowing for shorter poll time-outs in terminals and faster channel switching.

Callsign String

This string can be a maximum of **10** characters long. All characters are either numbers or letters. The prefix “DE” (from) is added to the beginning of the transmitted call sign.

4.2.2.2 Radio Parameters

Sync Delay

Important: *This parameter should not be changed from its factory setting without a clear understanding of the timing of the radio protocol.*

Sync Delay specifies the delay between the time of the base station transmission and the first response window, measured in milliseconds. The value assigned to this parameter must be compatible with other base stations and terminals in the system. The default setting of **22** is based on the requirements of a 2 level modulation narrow band radio, operating at 9600 baud.

Remote Txon

Remote Txon accommodates the turn on time of the radio in the base station. It specifies the number of fill characters sent to the radio before real data is output. Since this parameter is based on character times, the number is dependent on the radio link baud rate. When the baud rate is changed, this parameter automatically changes to the correct value.

The value assigned to the *Remote Txon* parameter must be consistent across all terminals and base station equipment.

Important: *This parameter should not be changed from its factory setting without an understanding of the timing of the radio protocol.*

4.2.2.3 Radio Channels

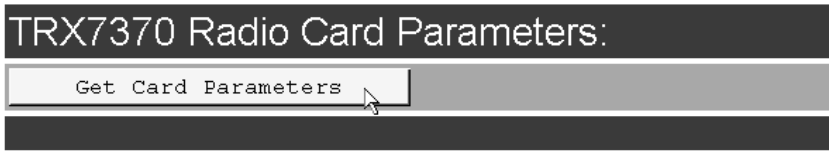
Active Channel

This parameter determines the operating radio channel of the 9150. The channel selected must be an enabled channel. Refer to *Enabled Channels*, below, for details.

Enabled Channels

This parameter is used to **enable** (√) or **disable** up to 20 channels – the maximum number of channels supported by the TRX7370 radio. Enabling a channel allows the channel to be set to an operating channel (*Active Channel*) and also makes the channel available for channel searching. If, for example, the operating channel is 1 and all other channels are enabled, terminals may roam through all 20 channels. Note that the *Enabled Channels* menu only displays channels that have been configured with frequencies. See page 62 for the list of associated frequencies.

4.2.2.4 TRX7370 Radio Card Parameters



Entering the "Get Card Parameters" dialog box will open the list of *General*, *Frequencies*, and *Tuning Values* parameters for the TRX7370 Narrow Band PC card radio. These manufacturer's settings are not configurable. The settings are shown on pages 62 and 63.

Teklogix 9150: Slot A TRX7370 Radio Card Parameters

General Parameters:

Modulation:	2 Level
Baud Rate:	9600
Band Start:	450MHz
Band Size:	16MHz
Frequency Step:	6250Hz
Power:	2W, full power
Collision Threshold:	30ms
Preamble, 2 Level:	10DEL, 1SOH chars
Preamble, 4 Level:	6DEL, 1SOH chars

OK

Frequencies:

Channel	Rx	Tx
1.	462250000Hz	462250000Hz
2.	462000000Hz	462000000Hz
3.	452250000Hz	452250000Hz
4.	466000000Hz	466000000Hz
5.	453250000Hz	453250000Hz
6.	453750000Hz	453750000Hz
7.	454250000Hz	454250000Hz
8.	454750000Hz	454750000Hz
9.	455250000Hz	455250000Hz
10.	455750000Hz	455750000Hz
11.	456250000Hz	456250000Hz
12.	456750000Hz	456750000Hz
13.	457250000Hz	457250000Hz
14.	457750000Hz	457750000Hz
15.	458250000Hz	458250000Hz
16.	458750000Hz	458750000Hz
17.	459250000Hz	459250000Hz
18.	459750000Hz	459750000Hz
19.	460250000Hz	460250000Hz
20.	460750000Hz	460750000Hz

Tuning Values:

Data Squelch:	20480
Frequency Adjust:	0
Deviation, 2 Level:	11264
Deviation, 4 Level, Subband 1:	14704
Deviation, 4 Level, Subband 2:	14704
Deviation, 4 Level, Subband 3:	14704
Deviation, 4 Level, Subband 4:	14704
Deviation, 4 Level, Subband 5:	14704
Modulation Balance, Subband 1:	1414
Modulation Balance, Subband 2:	1414
Modulation Balance, Subband 3:	1414
Modulation Balance, Subband 4:	1414
Modulation Balance, Subband 5:	1414

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General Parameters

General Parameters:	
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Preamble, 2 Level:	10DEL, 1SOH chars
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OK

Frequencies

Frequencies:		
Channel	Rx	Tx
1.	462250000Hz	462250000Hz
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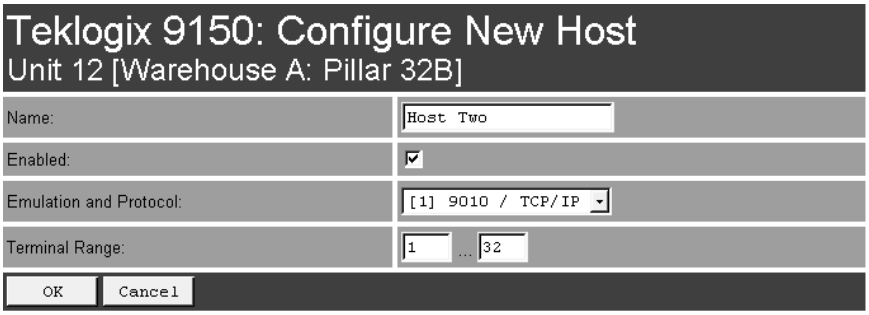
5.	453250000Hz	453250000Hz
6.	453750000Hz	453750000Hz
7.	454250000Hz	454250000Hz
8.	454750000Hz	454750000Hz
9.	455250000Hz	455250000Hz
10.	455750000Hz	455750000Hz
11.	456250000Hz	456250000Hz
12.	456750000Hz	456750000Hz
13.	457250000Hz	457250000Hz
14.	457750000Hz	457750000Hz
15.	458250000Hz	458250000Hz
16.	458750000Hz	458750000Hz
17.	459250000Hz	459250000Hz
18.	459750000Hz	459750000Hz
19.	460250000Hz	460250000Hz
20.	460750000Hz	460750000Hz

Tuning Values

Tuning Values:	
Data Squelch:	20480
Frequency Adjust:	0
Deviation, 2 Level:	11264
Deviation, 4 Level, Subband 1:	14704
Deviation, 4 Level, Subband 2:	14704
Deviation, 4 Level, Subband 3:	14704
Deviation, 4 Level, Subband 4:	14704
Deviation, 4 Level, Subband 5:	14704
Modulation Balance, Subband 1:	1414
Modulation Balance, Subband 2:	1414
Modulation Balance, Subband 3:	1414
Modulation Balance, Subband 4:	1414
Modulation Balance, Subband 5:	1414

4.3 Hosts

The drop-down menu in this option shows the host names present on the system. Up to six hosts can be supported. A “host” must be configured for each master network controller, TSDK host, or master base station that communicates with the 9150. Opening the “Configure” dialog box for a selected host lists the parameters that can be modified or deleted for that host. New hosts can be added by selecting “[#] Create New” in the drop-down menu before entering the “Configure” dialog box.



Name

This parameter indicates the assigned host name. The host name also appears on the RF terminal when switching between hosts in a multiple-host environment.

Note: *The name must not contain space characters.*

Enabled

The *Enabled* option must be turned on (√) for terminals to communicate with this host.

Emulation and Protocol

This drop-down menu provides a list of host emulations and communication protocols supported by the 9150. The supported emulations with their respective protocols are:

- 9010/ TCP/IP (See page 67 for configuration parameters).
- 9010/ Serial (See pages 68 to 70 for configuration parameters).
- 3274/Telnet (See pages 84 to 98 for Configuration Parameters).
- 5250/Telnet (See pages 99 to 112 for Configuration Parameters).
- ANSI/Telnet (See pages 113 to 121 for Configuration Parameters).

When the 9150 acts as a base station, it uses the 9010 protocol (a proprietary protocol developed by Teklogix) with either a TCP/IP or serial connection to communicate with a 9400 or 9300 Network Controller, or a host using a Teklogix Software Development Kit (TSDK). This protocol uses TESS (Teklogix Screen Subsystem) or ANSI data streams to communicate with terminals. For detailed information, please refer to the appropriate *Teklogix User Manual* for: *9400 or 9300 Network Controller, TSDK, TESS* or *ANSI*.

When the 9150 acts as a mini-controller, it uses the 3274 and 5250 emulation protocols to communicate with IBM hosts, or the ANSI emulation protocol to communicate with ANSI hosts. For detailed information on configuring the 9150 as a mini-controller, please refer to Chapter 5: “Mini-Controller Configuration”.

Protocols are the methods by which terminals communicate with host computers over various physical media such as Ethernet, Token Ring, and serial connections, as well as radio-link connections. The 9150 supports the TCP/IP protocol.

Terminal Range

The values entered in this parameter designate the first and last terminals in the range of terminals that will communicate with the host. These terminal numbers are mapped to this particular host.

4.4 Main Host Menu

When you choose an existing host from the *Hosts* listbox and then select the Configure button, the 9150 displays the *Host Menu*.

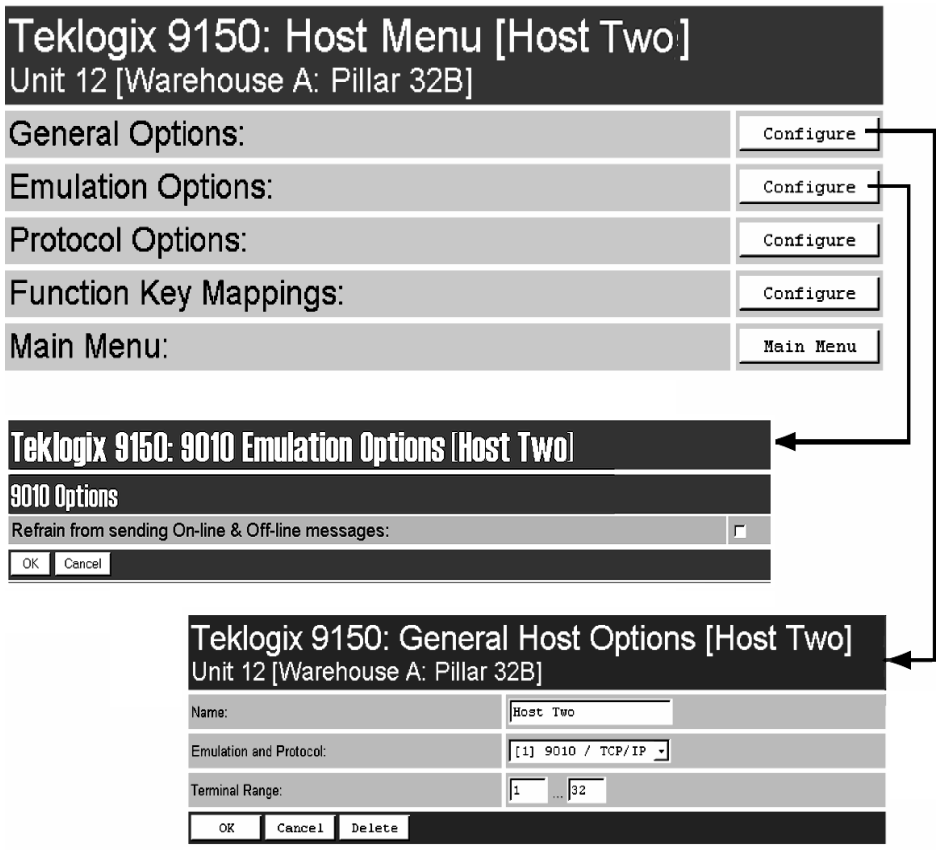


Figure 4.5 Overview Of Host Menus For 9010 / TCP/IP

The *Host Menu* has four configuration sub-menus:

"General Host Options"
When you select this sub-menu, the 9150 displays the General Options page for the host.

"Emulation Options"
When you select this sub-menu, the 9150 displays the Emulation Options page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

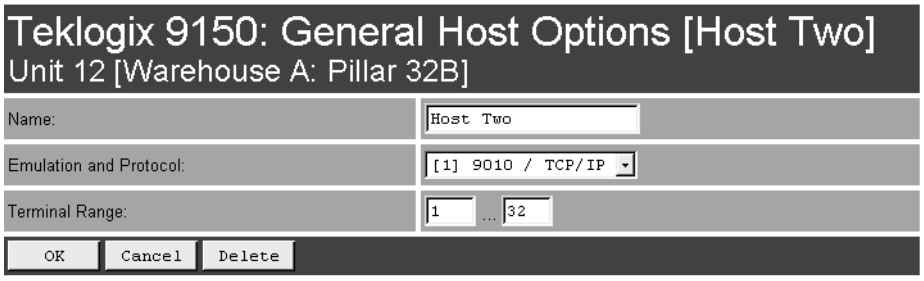
"Protocol Options" (not applicable to 9010/TCP/IP emulation)
When you select this sub-menu, the 9150 displays the Protocol Options page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

"Function Key Mappings" (3274, 5250, ANSI emulations only)
When you select this sub-menu, the 9150 displays the Function Key Mapping page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

There is also a *Main Menu* button. When you select this button, the 9150 displays the *Configuration Main Menu (see page 48)*.

4.4.1 General Host Options

In this screen, you can select general options for the host connection. The host connection may also be deleted.

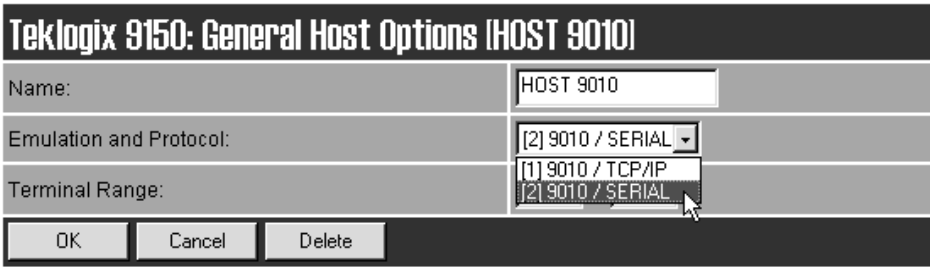


Name

This parameter allows you to enter a name for the new host.

Emulation and Protocol

This parameter allows you to select the emulation and protocol to be used for the connection to this host. As a base station, the 9150 can use either **9010/ TCP/IP** or **9010/SERIAL**, depending on the connection to the network controller or host.

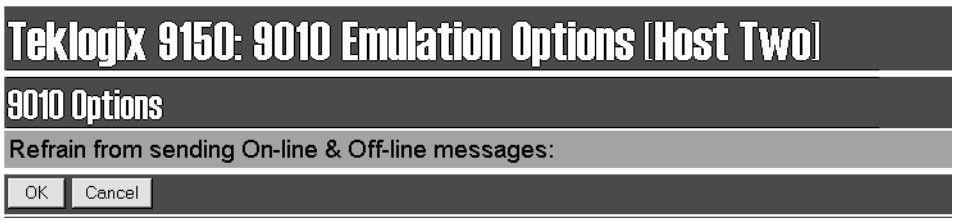


Terminal Range

This parameter allows you to specify the range of terminals which will communicate with this host. The left-hand textbox contains the lowest terminal number which is allowed to communicate with the host; the right-hand textbox contains the highest terminal number. Terminal numbers may range from **1** to **3840**.

4.4.2 9010 / TCP/IP

4.4.2.1 Emulation Options



Refrain from sending On-line & Off-line messages

If this parameter is **enabled** (√), the 9150 base station **does not** notify the host if the status of a terminal changes between offline and online. If this parameter is **disabled**, the 9150 **does** notify the host regarding any terminal status changes.

4.4.2.2 Protocol Options And Function Key Mappings

These parameters are not applicable to the 9010 / TCP/IP emulation.

4.4.3 9010 / Serial

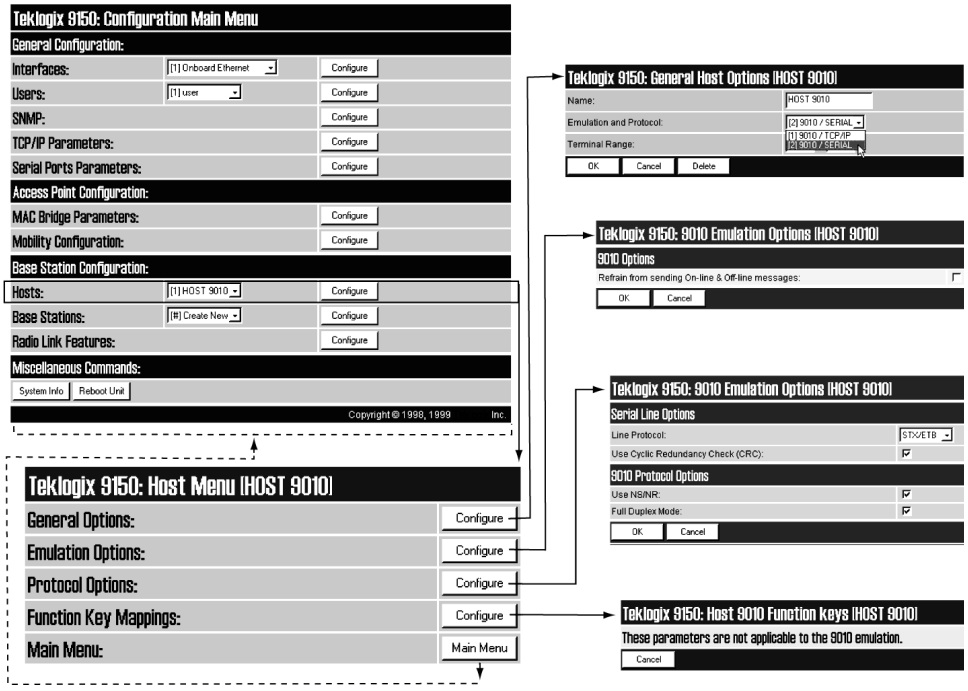
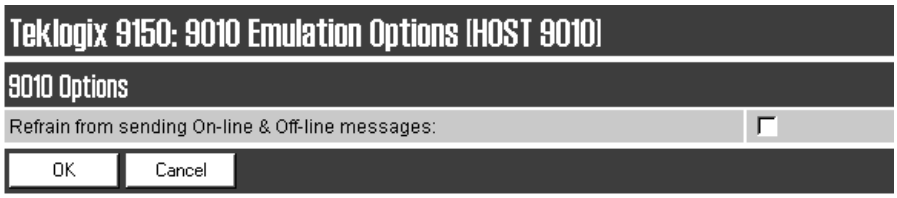


Figure 4.6 Overview Of Host Menus For 9010 / Serial

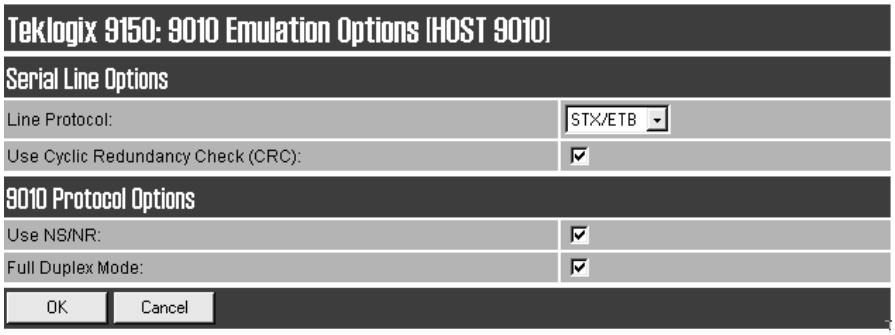
4.4.3.1 Emulation Options



Refrain from sending On-line & Off-line messages

If this parameter is **enabled** (√), the 9150 base station **does not** notify the host if the status of a terminal changes between offline and online. If this parameter is **disabled**, the 9150 **does** notify the host regarding any terminal status changes.

4.4.3.2 Protocol Options: Serial Line



Line Protocol

This listbox specifies the serial line protocol used on this host connection.

The three available choices are **STX/ETB**, **LF/CR**, and **DEL/LF**. Each of these three choices specifies the start and end characters that delimit the start and end of data on the serial link to the host. These characters are:

Character Code	Meaning	Hex Value
STX	Start of Text	01
ETB	End of Text Block	17
LF	Line Feed	0A
CR	Carriage Return	0D
DEL	Delete	7F

Table 4.3 Serial Line Protocol Character Codes

Note: *For communication to Teklogix handlers or SDKs, always use STX/ETB. LF/CR and DEL/LF are used in third-party handlers.*

The default setting is **STX/ETB**.

Use Cyclic Redundancy Check (CRC)

If this parameter is **enabled** (√), the 9150 base station uses a CRC checksum on the data sent over the serial line to the host.

4.4.3.3 Protocol Options: 9010 Protocol

Use NS/NR

If this parameter is **enabled** (√), the 9150 base station uses NS/NR protocol for this serial host connection.

Note: *Only use NS/NR with the STX/ETB protocol. Teklogix recommends that this be enabled when possible.*

Full Duplex Mode

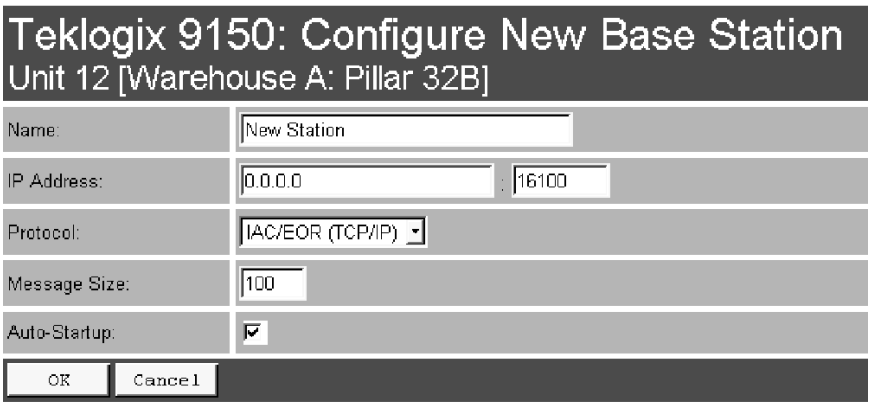
If this parameter is **enabled** (√), the 9150 base station uses full-duplex communication on this serial host connection.

4.4.3.4 Function Key Mappings

These parameters are not applicable to the 9010/Serial emulation.

4.5 Base Stations

These options and parameters allow you to configure the 9150 as a master base station connected to up to 32 slave 9150 and 9140 base stations over an Ethernet or Token Ring network. The master 9150 is connected to a 9400 or 9300 Network Controller, or up to six hosts running TSDK (Teklogix Software Development Kit). From the *Base Stations* option under *Base Station Configuration* (see Figure 4.2 on page 48), entering "Configure" will open the "Configure New Base Station" page, which will enable you to add a new slave base station to the system or change the parameters on an existing slave base station.



Name

The name entered in this parameter is used as an alternate way of identifying the IP address of a slave base station.

IP Address

This parameter provides the corresponding IP address for the slave base station. The *IP Address* **must be a unique value** so that each slave base station can be identified on the network. The acceptable value ranges from **0.0.0.0** to **239.255.255.255**. The default value for the IP port is **16100**.

Protocol

IAC/EOR (TCP/IP) is the default protocol for the Ethernet or Token Ring connection.

Message Size

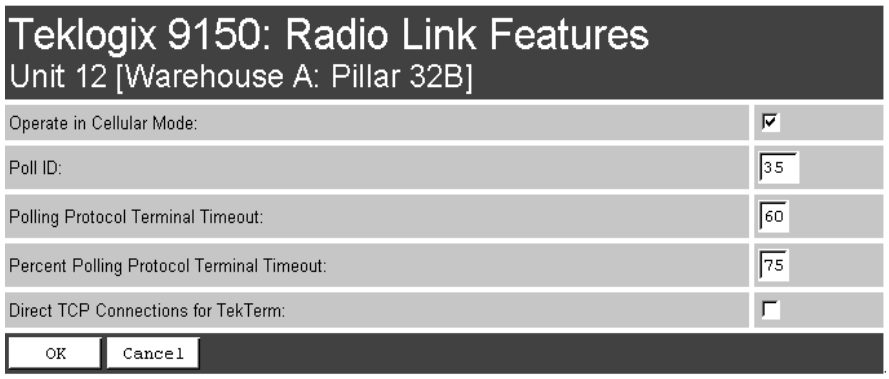
Message Size determines the largest single message that can be passed to a terminal. The range of this parameter is between **32** and **380** characters. (Longer messages are broken into several packets.) For polling protocol base stations, the upper limit is **116**.

Auto-Startup

When this parameter is **enabled** (√), the slave base stations will start polling when the **master 9150** boots up. When *Auto-Startup* is **disabled**, the base stations will not start polling until they receive a *start polling* command from the **host**.

4.6 Radio Link Features

From the *Radio Link Features* option under *Base Station Configuration* (see Figure 4.2 on page 48), entering "Configure" will open the "Radio Link Features" page for the polling and cellular parameters.



Operate in Cellular Mode

To operate as a Wlan base station, this parameter should be **enabled** (√). For further information see "Wlan Protocol" on page 8.

Note: *The 9400 or 9300 Network Controller must also be set to cellular mode.*

Poll ID

In Wlan protocol, this is a unique identifying number set only in a 9150 master base station, 9150 mini-controller or a network controller, which is used in the poll header when polling terminals. *Poll ID* is set by Teklogix personnel.

In Adaptive Polling/Contention protocol for narrow band radios, *Poll ID* is used to assign a unique address to each base station. As the terminals move from one base station to another, this address is transmitted by the base stations to the terminals, identifying each 9150 in a multiple base station system.

Polling Protocol Terminal Timeout

This parameter determines the time in minutes that a terminal can be inactive before the 9150 declares it offline. Before this happens, the terminal will be declared offline by the *Percent Polling Protocol Terminal Timeout* parameter (see below). After the terminal is removed from the system, it will need to re-initialize in order to communicate with the 9150. This parameter reduces the overhead on the radio link caused when terminals which are not communicating are supported. The allowable values range from **1** to **240**.

Note: *This parameter is not relevant for Wlan.*

Percent Polling Protocol Terminal Timeout

This parameter determines the time that a terminal is allowed to be inactive before the 9150 declares it offline. This time is expressed as a percentage of the *Polling Protocol Terminal Timeout* parameter, above. For example, if the *Polling Protocol Terminal Timeout* is 60, and this parameter is set to 75%, then the timeout would be 60 min x 75% = 45 minutes. An offline terminal is still considered part of the system. Messages to offline terminals are queued at the 9150. The terminal remains offline until it transmits an online message. Values for this parameter range from **50** to **90**.

Direct TCP Connections for TekTerm

Enabling this parameter allows the *TekTerm* program resident in Teklogix terminals to connect directly to the 9150, when it is acting as a base station to a host via TCP/IP.

MINI-CONTROLLER CONFIGURATION 5

5.1 Overview

The network controller in a Teklogix system performs a number of important tasks. One of these tasks is *emulation*: the translation of data between the protocol of the host computer and the protocol used by Teklogix terminals.

The data which is sent from a host computer to a terminal to provide its display, and returned to the host as a result of operations at the terminal, is called a data stream. Host computers can provide data streams of various types to their terminals.

Teklogix terminals can directly accept only two types of data stream: *TESS* and *ANSI*. TESS (Teklogix Screen Subsystem) is the proprietary data stream used by Teklogix terminals. ANSI data streams are a standard type of data stream used by wired ANSI terminals. Other types of data stream provided by the host must be converted into TESS or ANSI before Teklogix terminals can work with them. This translation is done by emulation software in a network controller.

The 9150 is equipped with emulation capabilities, allowing it to act as a mini-controller. When a 9150 is configured as a mini-controller, Teklogix terminals can emulate an ANSI, 5250 or 3274 terminal via a 9150 rather than through a 9400/9300 Network Controller.

Important: *9150s acting as mini-controllers are designed for small, low-transaction sites. A 9400/9300 Network Controller is required for systems that support more than 50 terminals.*

Acting as a mini-controller, the 9150 can support up to 32 additional networked base stations and up to 50 terminals. A 9150 mini-controller can also manage wireless LAN configurations.

A 9150 configured as a mini-controller can support the following emulations:

- 5250 emulation using TCP/IP over an Ethernet or Token Ring LAN.
- 3274 emulation using TCP/IP over an Ethernet or Token Ring LAN.
- ANSI emulation using TCP/IP over an Ethernet or Token Ring LAN.

Note: *The 9150 main parameters should first be set up as described in Chapter 3: "9150 Main Configuration".*

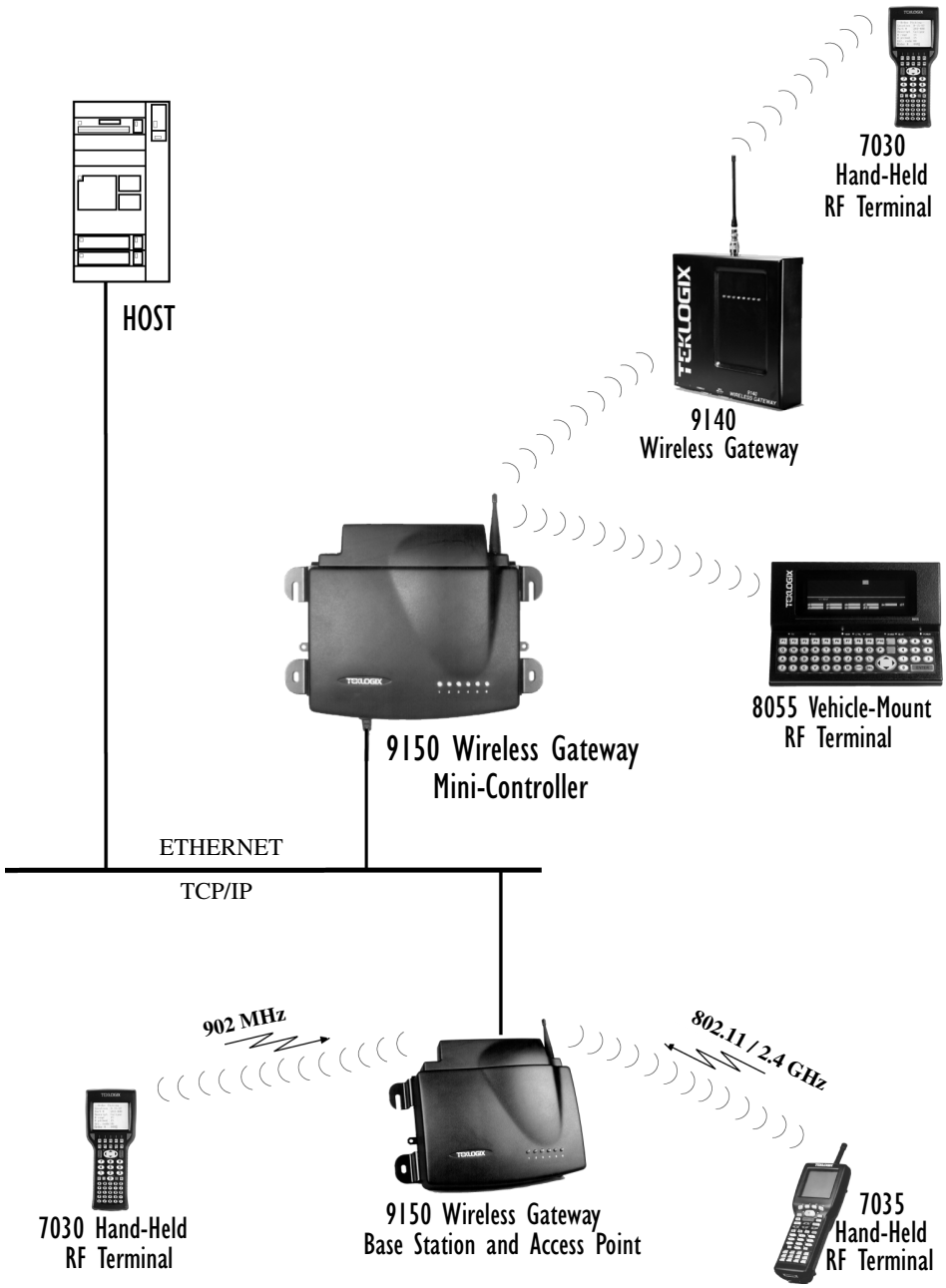
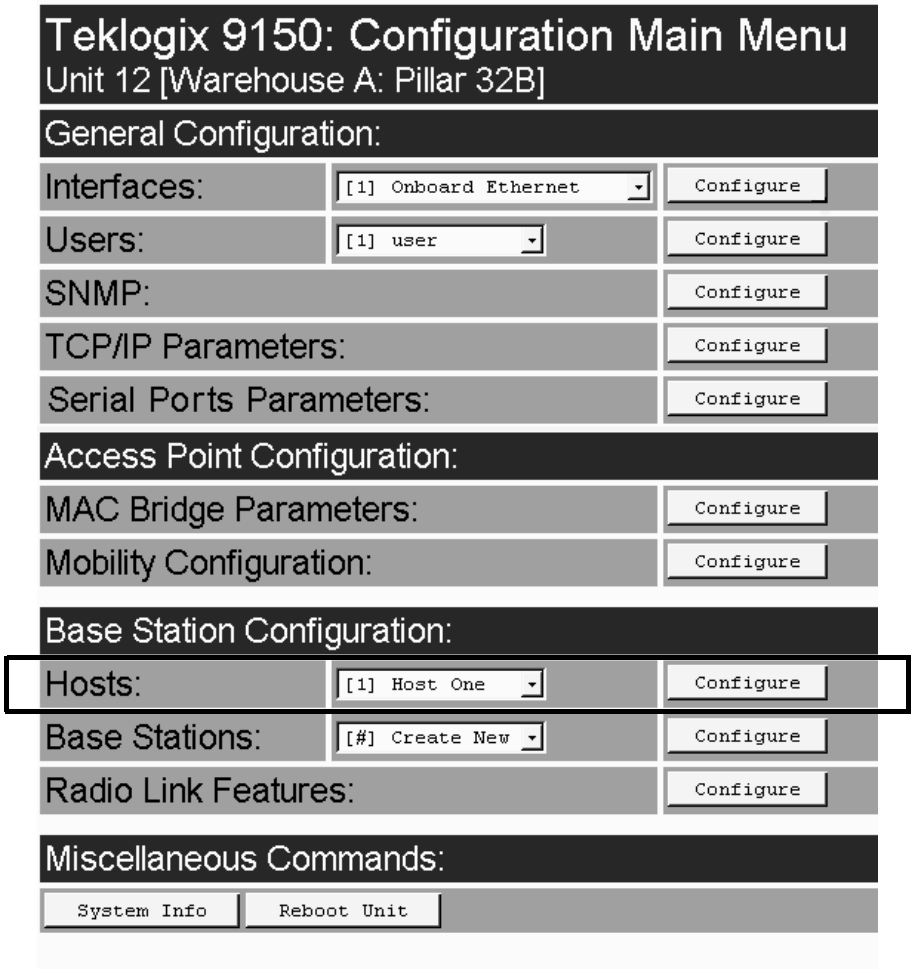


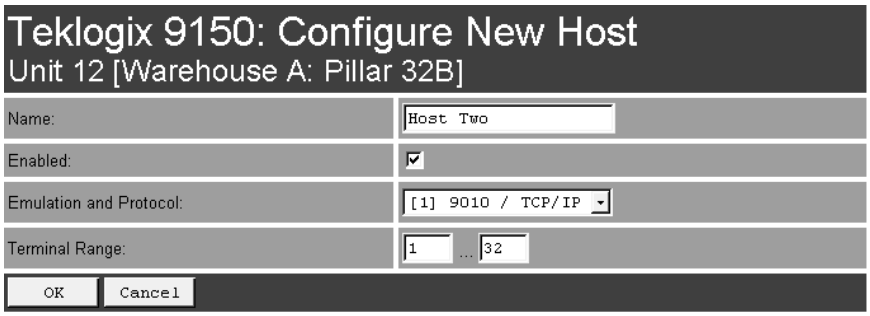
Figure 5.1 9150 Mini-Controller Configuration

For operation as a mini-controller, the parameters in the *Hosts* pages under *Base Station Configuration* should be set appropriately. The *Hosts* options are found on the *Configuration Main Menu* page. For information on configuring radio protocol parameters, please refer to "Radio Link Features" on page 72.



5.2 Hosts

The drop-down menu in this option shows the host names present on the system. Up to six hosts can be supported. A "host" must be configured for each host that communicates with the 9150 mini-controller. Opening the *Configure* dialog box for a selected host lists the parameters that can be modified or deleted for that host. New hosts can be added by selecting "[#] Create New" in the drop-down menu before entering the *Configure* dialog box.



Name

This parameter indicates the assigned host name. The host name also appears on the RF terminal when switching between hosts in a multiple-host environment.

Enabled

The *Enabled* option must be turned on (√) for terminals to communicate with this host.

Emulation and Protocol

This drop-down menu provides a list of host emulations and communication protocols supported by the 9150. Working with Teklogix terminals and base stations, the 9150 can emulate IBM 3278-2, 5251-11, and 5555-B01 terminals, as well as ANSI terminals.

Protocols are the methods by which terminals communicate with host computers over various physical media such as Ethernet, Token Ring, and serial connections, as well as radio-link connections. The 9150 supports the TCP/IP protocol.

The supported emulations with their respective protocols are:

- 9010/ TCP/IP or Serial (See page 84 for Configuration Parameters).
- 3274/Telnet (See pages 84 to 98 for Configuration Parameters).
- 5250/Telnet (See pages 99 to 112 for Configuration Parameters).
- ANSI/Telnet (See pages 113 to 121 for Configuration Parameters).

When the 9150 acts as a base station, it uses the 9010 emulation (a proprietary asynchronous protocol developed by Teklogix) to communicate with a 9300 Network Controller or a host using a Teklogix Software Development Kit (TSDK). For detailed information on configuring the 9150 as a base station, please refer to Chapter 4: “Base Station Configuration”.

When the 9150 acts as a mini-controller, it uses the 3274 and 5250 emulation protocols to communicate with IBM hosts, or the ANSI emulation protocol to communicate with ANSI terminals.

Terminal Range

The values entered in this parameter designate the first and last terminals in the range of terminals that will communicate with the host. These terminal numbers are mapped to this particular host. Terminal numbers may range from **1** to **50**.

5.3 Main Host Menu

When you choose an existing host name from the *Hosts* listbox and then select the *Configure* button, the 9150 displays the *Host Menu*. The *Host Menu* presents the options for four sub-menus: *General Host Options*, *Emulation Options*, *Protocol Options*, and *Function Key Mappings*. There is also a *Main Menu* button. When you select this button, the 9150 displays the *Configuration Main Menu* page (see page 79 for an enlarged illustration).

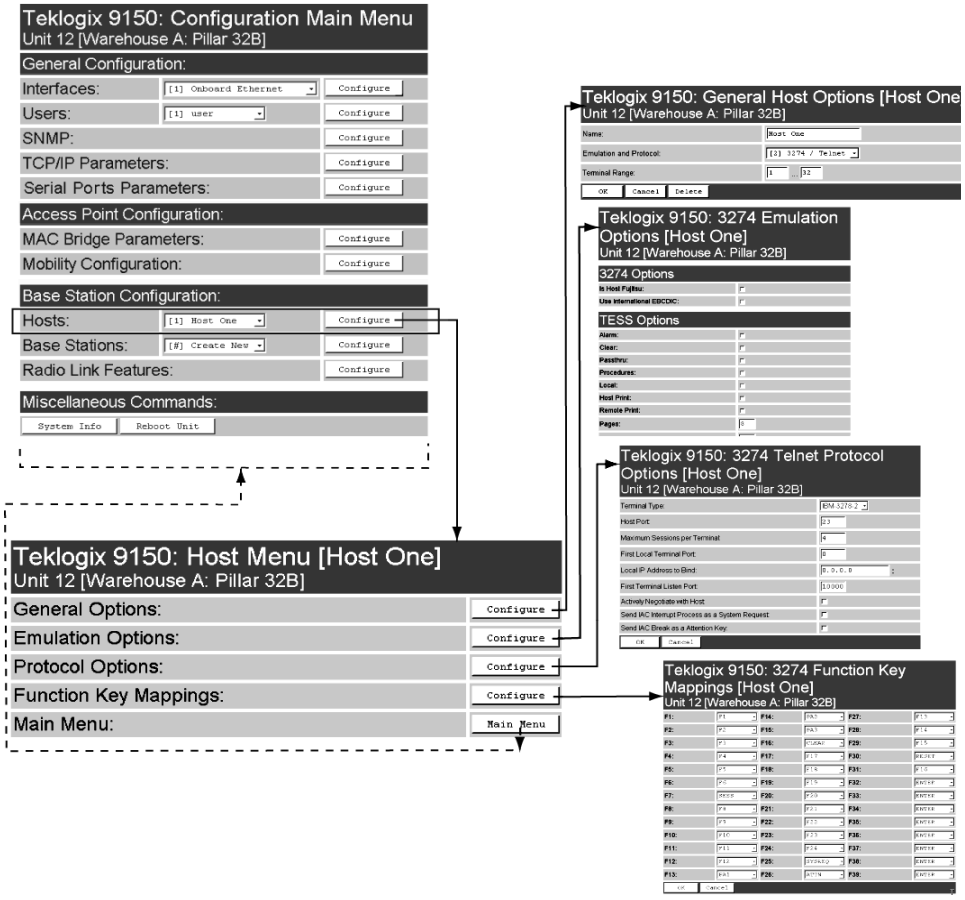


Figure 5.2 Overview Of Host Menus

As illustrated in Figure 5.2 on page 82, the four configuration sub-menus display the following options:

"General Options"
When you select this sub-menu, the 9150 displays the *General Options* page for the host.

"Emulation Options"
When you select this sub-menu, the 9150 displays the *Emulation Options* page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

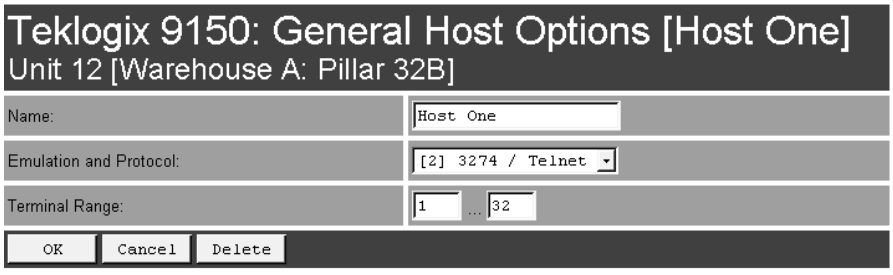
"Protocol Options"
When you select this sub-menu, the 9150 displays the *Protocol Options* page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

"Function Key Mappings"
When you select this sub-menu, the 9150 displays the *Function Key Mappings* page for the host. This page may vary depending on the type of emulation and protocol selected for the host.

Note: *The* Function Key Mappings *parameters are not applicable to either of the 9010 emulations; the* Protocol Options *parameters do not apply to the 9010/TCP/IP emulation.*

5.3.1 General Options

In this page, you can select general options for this host connection. The host connection may also be deleted.



Name

This parameter allows you to enter a name for the new host.

Emulation and Protocol

This parameter allows you to select the emulation and protocol to be used for the connection to this host. Available combinations of emulation and protocol are: **3274/Telnet**, **5250/Telnet**, **ANSI/Telnet**.

Terminal Range

This parameter allows you to specify the range of terminals which will communicate with this host. The left-hand textbox contains the lowest terminal number which is allowed to communicate with the host; the right-hand textbox contains the highest terminal number. Terminal numbers may range from **1** to **50**.

5.3.2 9010 Emulations

When the 9150 acts as a base station, it uses the 9010 protocol (a proprietary asynchronous protocol developed by Teklogix) to communicate with a 9400 or 9300 Network Controller, or a host using a Teklogix Software Development Kit (TSDK). For detailed information on configuring the 9150 as a base station, please refer to Chapter 4: “Base Station Configuration”.

5.3.3 3274/Telnet

5.3.3.1 Emulation Options

The 9150 mini-controller displays this version of the *Emulation Options* page after you have selected the *3274/Telnet* emulation/protocol combination for this host connection.

With IBM 3274, or IBM 5250 emulation, the 9150 mini-controller converts the application data stream from the host to TESS (Teklogix Screen Subsystem) commands. Some of the parameters in this page govern the conversion of the host screens to TESS.

Teklogix 9150: 3274 Emulation Options [Host One]
Unit 12 [Warehouse A: Pillar 32B]

3274 Options

Is Host Fujitsu:	☐
Use International EBCDIC:	☐

TESS Options

Alarm:	☐
Clear:	☐
Passthru:	☐
Procedures:	☐
Local:	☐
Host Print:	☐
Remote Print:	☐
Pages:	8
Transmit Line:	0
AIAG:	0
Visible Match Character:	0
Hidden Match Character:	0
Serial I/O:	0
Print Line:	0
Print Form Length:	0
Barcode:	0
Entry Line:	0
Field Overhead:	5
Command Region:	0 , 0 - 0 , 0

OK Cancel

Is Host Fujitsu

If this parameter is **enabled**, the 9150 mini-controller sends its data in Fujitsu format. Enabling this parameter causes the standard IBM formatting codes (for start of field, setting buffers, etc.) to be replaced by the codes used by Fujitsu host computers.

Use International EBCDIC

If this parameter is **enabled**, the 9150 mini-controller uses the International EBCDIC character set, swapping the positions of the **!** and **]** characters.

Alarm

When this parameter is **enabled**, terminals beep when the word "ALARM" appears on the application screen in the location specified by the *Command Region* parameter (see page 95). The word "ALARM" should be a *display-only* field.

Note: *The* Command Region *parameter must be enabled for this parameter to work.*

Clear

If this parameter is **enabled**, the 9150 mini-controller creates an *empty* entry field for an entry field that is filled with spaces.

Some host applications rely on the video attributes of displayed characters to highlight fields, particularly entry fields. For example, the application screen may define all entry fields with reverse video and fill the field with spaces. This is effective on terminals that support reverse video, but on terminals that do not, it can make the field invisible since it is made up entirely of spaces.

By default, all empty entry fields displayed at the Teklogix terminal are highlighted by the "entry character" chosen in the terminal's configuration (not all Teklogix terminals support video attributes).

Note: *This operation is only performed on screens received* ***from the host.*** *Data sent* ***to the host*** *remains unaffected.*

Passthru

If this parameter is **enabled**, the 9150 allows the host to send data directly to the RF terminal's serial port. This is most commonly used for printing.

Preparing Host Screens for Pass-Through

On the screen to be sent through the terminal serial port, the word ***PASSTHRU*** (in capital letters) must appear on the first line, starting on the second column. The actual data to be sent to the terminal may start anywhere below the first line.

With 5250 or 3274 emulations, attributes occupy a position in the screen buffer. An attribute placed between column 2 and the end of the word "PASSTHRU" will 'push' all following characters one position to the right. Therefore, any required attributes should occupy column 1 of the first line (just preceding the word "PASSTHRU").

Example:

```
column: 1 2 3 4 5 6 7 8 9
line 1: @ P A S S T H R U @
line 2: @ P A R T :   1 2 3 4 5
```

where **@** *is an attribute.*

When the 9150 is finished sending the data to the terminal's printer, it will send an *ENTER* key to the host. The host must wait for the *ENTER* key before sending any more screens (including other PASSTHRU screens) to this terminal.

Note: *Refer to the Terminals User Manual for information about setting parameters on the terminal for pass-through.*

Procedures

If this parameter is **enabled**, the host may send TESS procedures through the 9150 to the terminals. A TESS procedure is a group of TESS commands that can be executed by the TESS *execute procedure* command.

Local

If this parameter is **enabled**, the 9150 allows the host to provide pages to be loaded as local TESS procedures in the terminals.

The local procedures are selected from a menu at the terminal. The terminals can perform these procedures when they are offline. Later when the terminals are online, they send the results of these functions to the host.

Note: *The* Procedures *parameter must also be* ***enabled*** *for* Local *to work.*

Host Print

When this parameter is **enabled**, the host can send extra data to the terminal's screens, and instruct the terminal to print it. This is in contrast to the *Local Print* feature, where the terminal makes the initial print request.

The text that is passed to the printer is formatted into the 24 x 80 application screen. If the host can initiate the print operation, the text is printed. The 9150 identifies the additional text as a print page by the presence of the word "PRINT" (in capital letters) beginning in the 2nd column of line 13 on the 24 x 80 screen. The word "PRINT" should be defined as *display-only* text.

The print page is positioned below the terminal's display page (see the following figure). The size of the print page is always the same as the terminal's display page (assuming that in the terminal's configuration, the page length is less than 12 lines).

When *Host Print* is **enabled**, the 9150 passes the print page to the terminal after receiving the application screen from the host.

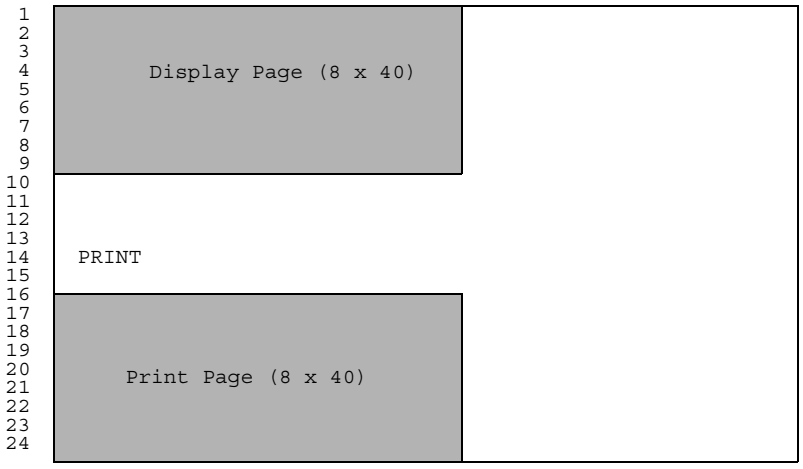


Figure 5.3 Application Screen With Print Page

Notes:

1. *Unlike the* Passthru *option, when using* Host Print *no escape commands can be sent to the printer.*
2. *Support for printing must be enabled at the terminal in its* Printer *command under the TESS Features menu; refer to the 7030/8055/8060 Terminals User Manual for more information.*

Remote Print

When this parameter is **enabled**, the 9150 sends the print page to a terminal whenever the terminal requests it (by sending the "F17" function key from the terminal, or the "PRINT" key on older terminals). The 9150 sends the function response back to the host.

This is in contrast to *Host Print*, where the host makes the initial print request.

Note: *Support for printing must be enabled at the terminal. Refer to the Terminals User Manual or the Parameter Guide for more information.*

Pages

This parameter determines the number of host screens (or pages) stored at the terminal, to a maximum of **16**.

The 9150 reduces data transmitted to the terminals by using the terminal's capability to store a page of data for each screen it displays. The 9150 maintains an image of each page stored at the terminal. After receiving an application screen, the 9150 tries to match the screen with a stored page. If a similar page is already in the terminal's memory, the 9150 instructs the terminal to redisplay its copy of the page; only the necessary changes are sent from the controller. If no match is found, the complete page is sent to the terminal over the radio link.

Note: *There is a corresponding parameter on the terminal itself, and the* ***actual*** *number of saved pages will be the* ***smaller*** *of the two values.*

Transmit Line

When this feature is **enabled**, all modified data at the terminal is automatically transmitted when the operator enters data into a *transmit-upon-entry* field.

The value in this textbox specifies the line on the screen which is designated the *transmit line*. The last entry field above or on the transmit line on the screen will be identified as the *transmit-upon-entry* field. If any entry fields exist on lines below the transmit line, no entry field will be designated as the *transmit-upon-entry* field.

A value of **0** (zero) disables this feature. A value of **24** designates the *last* entry field on each application screen as *transmit-upon-entry.*

AIAG

This parameter provides auto-locate and fill for input coming from bar code readers. When bar code data is entered at a terminal, the terminal searches for "AIAG" fields on the current page that can accept the bar code data. The data preloaded into the "AIAG" field by the application program determines whether or not the bar code data is accepted.

At the 9150 mini-controller, a decimal value of an ASCII character from **0** to **127** is set to match the "AIAG Field Identifier" set at the host. A value of **0** disables this feature.

The format of the preloaded data is as follows:

```
<mode> <AIAG prefix(data)>
```

The mode character used with the command allows for different operating modes to suit various application operations. The automatic locate and fill operation applies only to data received from a bar code reader. Descriptions of the modes and AIAG prefix are listed in Table 5.1 on page 91. **These modes are set at the host.**

Mode	Function
0	Display prefix, send prefix to host.
1	Do not display prefix, send prefix to host.
2	Display prefix, do not send prefix to host.
3	Do not display prefix, do not send prefix to host.
+4	Add 4 to above values to cause transmit to host when all AIAG fields with 4 set are filled. Function 0 is "pressed" if there are any fields with this bit set, and all fields with this bit set have been filled by operator input.
+8	Add 8 to above values to allow overwrite of previously entered data.
+16	Add 16 to above values to indicate cursor position priority for search and fill.
AIAG Prefix (data)	The text to be matched in the AIAG field.

Table 5.1 Mode Functions And AIAG Prefix Description

Example:

The information in the sample screen below is defined at and sent ***from*** the host. It includes the "AIAG Identifier" – the tag identifying this as an AIAG field – followed by the mode, in this case Mode 0, and finally, the "AIAG Prefix" – I.

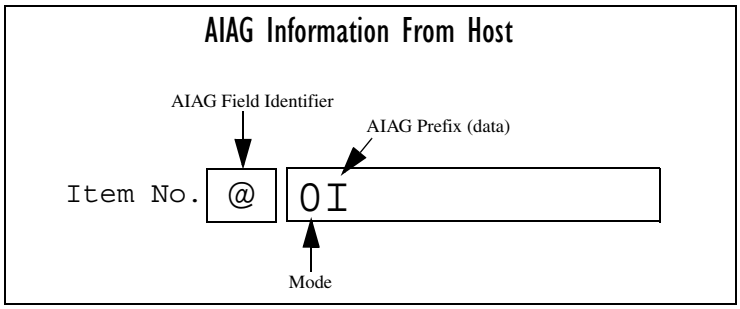


Figure 5.4 AIAG Field Sent From The Host

When the information arrives at the terminal screen, the appropriate AIAG field for the scanned information is located using the "AIAG Identifier". Because Mode 0 was set at the host, the "AIAG Prefix" – I – is displayed on the terminal screen, and when this screen is completed, the prefix will be sent back to the host.

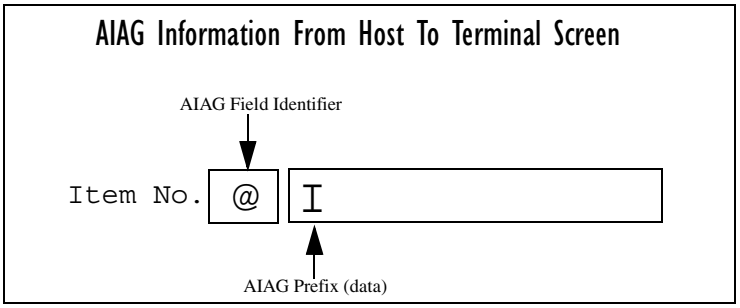


Figure 5.5 AIAG Field Sent To The Terminal

Visible Match Character

By inserting a special ASCII character directly before an entry field, the application program distinguishes a "match field" from an entry field. For example, suppose an angle bracket "**>**" is defined for visible match fields. Inserting "**>**" immediately preceding the entry field identifies it as a match field, as illustrated below.

Part #> _____

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** disables this feature. The ASCII decimal value entered at the 9150 must coincide with the value set by the application program.

To use the *Visible Match* feature, the host computer preloads data into a match entry field; the data is visible on the terminal screen. The preloaded data sent to a terminal can consist of exact characters, special match characters or a combination of the two. Refer to Table 5.2 on page 93 for match characters recognized by Teklogix terminals.

If an entry does not match the preloaded data, the entry is displayed, the terminal beeps, and the cursor moves to the first position in the match field. The operator can either make another entry in the match field, or move the cursor to a new field.

When an entry (even one that doesn't match the preloaded data) is made in a match field, the entry is sent to the host as part of the terminal's modified data during the next transmission.

Character	Description
#	Match a number.
&	Match a letter (either case).
^	Match an uppercase letter.
_	Match a lowercase letter.
|	Match an alphanumeric character.
"	Match a letter, number or space.
?	Match a punctuation character.
'	Match any character.
:	Match all character positions in the field with the preceding character.
;	Match any remaining characters, but not necessarily the remainder of the field, with the preceding character.

Table 5.2 Match Characters

Example:

Suppose you want to preload an entry field with a part number. If the part number is known, you can preload the field with that part number. If more flexibility is needed, and the part number always begins with two alphabetic characters followed by a hyphen and four digits, the match string for the field would be: `&&-####` .

Hidden Match Character

Unlike data in a "visible match" field, the preloaded data in a "hidden match" field is *not* displayed at the terminal.

Note: *Refer to "Visible Match Character" on page 92 for detailed information about field matching.*

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** disables this feature. The ASCII decimal value entered at the 9150 must coincide with the value set by the application program.

Serial I/O

Serial I/O fields are special entry and fixed fields that accept input from and output to a serial port. The application program distinguishes this field as *Serial I/O* by preceding the field with a special character.

If this character precedes a fixed field, the data will be sent to the terminal's serial port. If it precedes an entry field, the field accepts data from the terminal's serial port.

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** (zero) disables this feature.

Print Line

This parameter allows you to enter the starting line number of the print page in the application screen. A value of **1** causes the display page to be printed; a value of **0** (zero) disables this feature.

Print Form Length

This parameter sets the printer's form length in lines. The range is **0** to **24**.

Barcode

Barcode-input-only fields are special entry fields that only accept input from a bar code reader. The application program distinguishes an entry field as *barcode-input-only* by preceding the field with a special character.

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** (zero) disables this feature.

Entry Line

This parameter contains the number of the first line displayed if there is no entry field in the upper-left portion of the screen, and if an entry field is at or below this line.

The *Entry Line* parameter allows an automatic offset within the host screen, so that the area displayed by the terminal includes an entry field that would normally be out of bounds. Normally, Teklogix terminals only display the upper-left corner of the application screen because of their smaller display size.

Field Overhead

This parameter contains the maximum number of characters allowed between two *fixed* fields which still allows the 9150 to join them into one field.

Sometimes the 9150 will join two adjacent fixed fields and then send them as one field. This reduces the overhead on the radio link.

For example, if two fields were 4 characters apart and this parameter was '5', then these fields would be joined into one.

Command Region

This parameter defines a region of the host screen which the 9150 will examine for the presence of reserved commands.

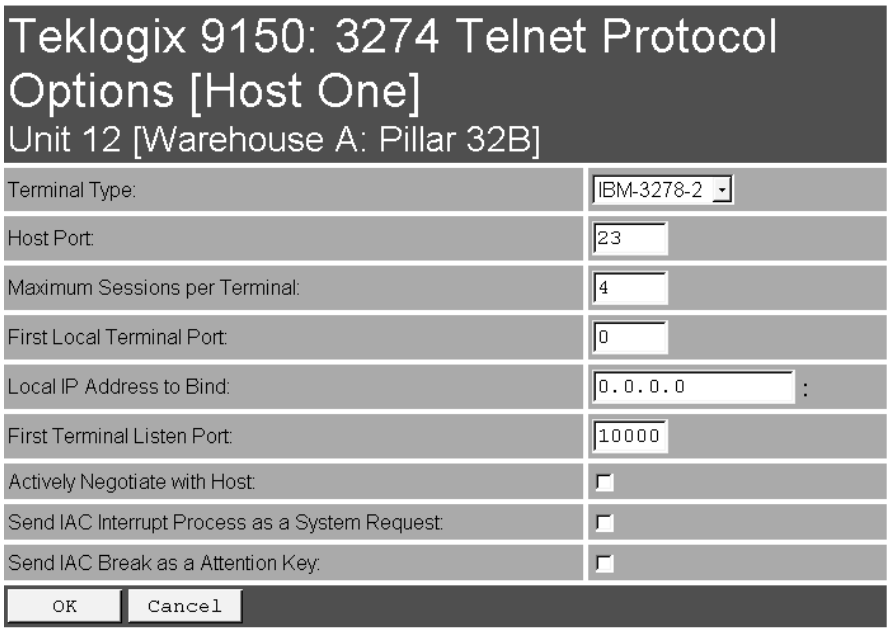
The four numbers in the *Command Region* textboxes represent the row and column addresses of the upper left corner and the lower right corner of the command region. The first textbox of each pair contains the row number; the second contains the column number. The range of row values is **0** to **24**; column values are **0** to **80**.

To define the last two lines of the host screen as the command region, for example, enter the values *23, 1* and *24, 80*.

Currently, the only command supported is *ALARM* (refer to page 86 for details on this command). When the word "ALARM" is placed anywhere within the command region, the 9150 will send a TESS *beep* command to the terminal.

5.3.3.2 Protocol Options

This page differs depending on the type of emulation and protocol selected in the *General Host Options* page. The 9150 displays this version of the *Protocol Options* page when you select the emulation/protocol combination of *3274/Telnet* for this host.



Terminal Type

This parameter allows you to choose the type of terminal to be emulated by the 9150 for this host. At present there is only one choice of terminal for *3274/Telnet*: the **IBM 3278-2**.

Host Port

This parameter allows you to enter a host port value for the selected *3274/Telnet* host connection. The default value is **23**.

Maximum Sessions per Terminal

This parameter contains the maximum number of telnet sessions which are allowed to originate from each terminal. The range is **0** to **127**, with a default value of **4**.

First Local Terminal Port

This parameter contains the port number from which the first terminal will connect on outbound telnet sessions. The default value is **0**.

Local IP Address to Bind

This parameter contains the IP address of the network adaptor in the 9150 from which the first terminal will connect on outbound telnet sessions.

First Terminal Listen Port

This parameter specifies the first port number at which the 9150 will listen for telnet connection requests to the terminals. The default value is **10000**.

Actively Negotiate with Host

If this parameter is enabled, the 9150 negotiates with the host during setup of the telnet connection.

Send IAC Interrupt Process as a System Request

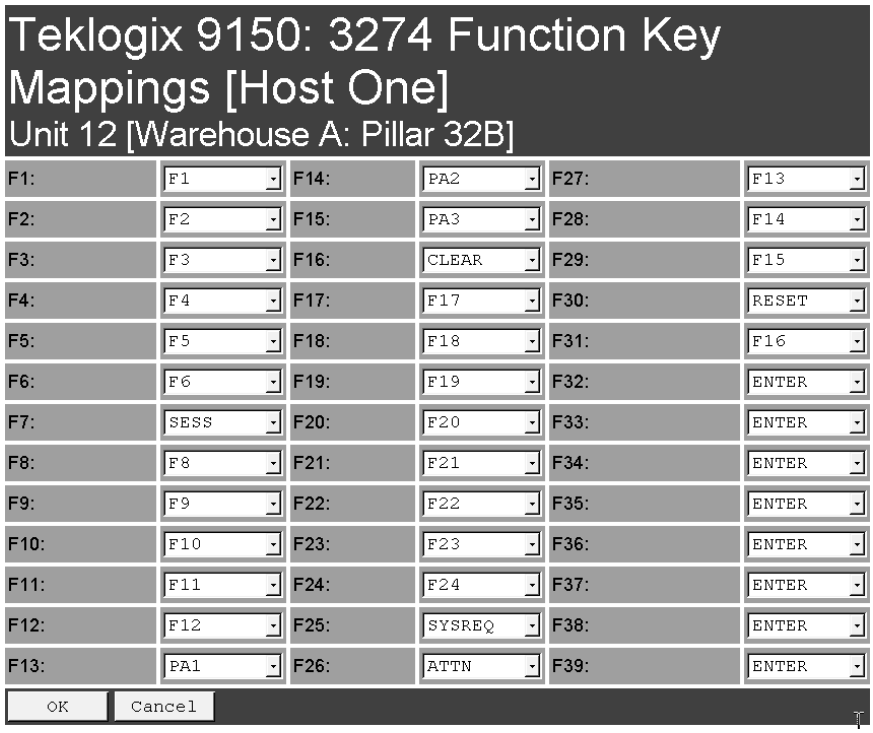
If this parameter is enabled, the 9150 sends the IAC Interrupt Process request to the host as a 3274 System Request.

Send IAC Break as an Attention Key

If this parameter is enabled, the 9150 sends the IAC Break request to the host as a 3274 Attention key.

5.3.3.3 Function Key Mappings

This page differs depending on the type of emulation selected in the *General Host Options* page. The 9150 displays this version of the *Function Key Mapping* page when you select *3274* emulation for this host.

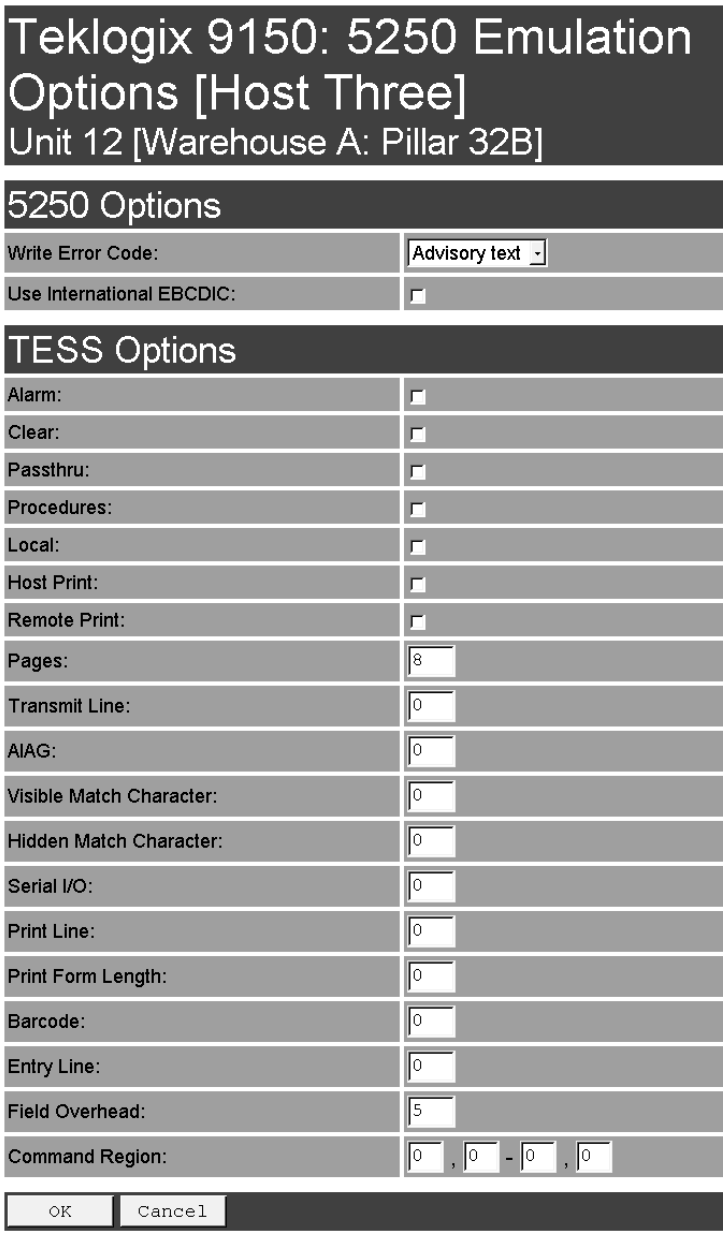


Function key n

The *Function Key* parameter allows you to select a code that will be sent to the host when you press a function key on the terminal. Each function key may be chosen from the same range of possible codes; however, each function key has a different default code. The default values are shown on this page.

5.3.4 5250/Telnet

5.3.4.1 Emulation Options



The 9150 displays this version of the *Emulation Options* page after you have selected the *5250/Telnet* emulation/protocol combination for this host connection.

With IBM 5250, or IBM 3274 emulation, the 9150 mini-controller converts the application data stream from the host to TESS (Teklogix Screen Subsystem) commands. Some of the parameters in this page govern the conversion of the host screens to TESS.

Write Error Code

If *advisory text* is selected here, the 9150 sends error codes to the terminal screen as advisory text, which is written at the bottom of the screen. If *screen text* is chosen, the 9150 sends the error codes as regular screen text.

Use International EBCDIC

If this parameter is **enabled**, the 9150 will swap the positions of the **!** and **]** characters in the EBCDIC character table.

Alarm

If this parameter is **enabled**, terminals will beep when the word “ALARM” (in capital letters) appears on the application screen, in the location specified by the *Command Region* parameter (see page 109). The word “ALARM” should be a *display-only* field.

Note: *The* Command Region *parameter must be* ***enabled*** *for this parameter to work.*

Clear

If this parameter is **enabled**, the 9150 mini-controller creates an *empty* entry field for an entry field that is filled with spaces.

Some host applications rely on the video attributes of displayed characters to highlight fields, particularly entry fields. For example, the application screen may define all entry fields with reverse video and fill the field with spaces. This is effective on terminals that support reverse video, but on terminals that do not, it can make the field invisible since it is made up entirely of spaces.

By default, all empty entry fields displayed at the Teklogix terminal are highlighted by the "entry character" chosen in the terminal's configuration (not all Teklogix terminals support video attributes). The *Clear* feature creates an empty entry field in place of an entry field filled with spaces.

Note: *This operation is only performed on screens received **from the host.** Data sent **to the host** remains unaffected.*

Passthru

If this parameter is **enabled**, the 9150 allows the host to send data directly to the RF terminal's serial port. This is most commonly used for printing.

Preparing Host Screens for Pass-Through

On the screen to be sent through the terminal serial port, the word "PASSTHRU" (in capital letters) must appear on the first line, starting on the second column. The actual data to be sent to the terminal may start anywhere below the first line.

With 5250 or 3274 emulations, attributes occupy a position in the screen buffer. An attribute placed between column 2 and the end of the word "PASSTHRU" will push all following characters one position to the right. Therefore, any required attributes should occupy column 1 of the first line (just preceding the word "PASSTHRU").

Example:

```
column: 1 2 3 4 5 6 7 8 9
line 1: @ P A S S T H R U @
line 2: @ P A R T :   1 2 3 4 5
```

*where **@** is an attribute.*

When the 9150 is finished sending the data to the terminal's printer, it will send an "ENTER" key to the host. The host must wait for the "ENTER" key before sending any more screens (including other "PASSTHRU" screens) to this terminal.

Note: *Refer to the 7030/8055/8060 Terminals User Manual for information about setting parameters on the terminal for pass-through.*

Procedures

If this parameter is **enabled**, the host may send TESS procedures through the 9150 to the terminals. A TESS procedure is a group of TESS commands that can be executed by the TESS *execute procedure* command.

Local

If this parameter is **enabled**, the 9150 allows the host to provide pages to be loaded as local TESS procedures in the terminals.

The local procedures are selected from a menu at the terminal. The terminals can perform these procedures when they are offline. Later when the terminals are online, they send the results of these functions to the host.

Note: *The* Procedures *parameter must also be* ***enabled*** *for* Local *to work.*

Host Print

When this parameter is **enabled**, the host can send extra data to the terminal's screens, and instruct the terminal to print it. This is in contrast to the Local Print feature, where the terminal makes the initial print request.

The text that is passed to the printer is formatted into the 24 x 80 application screen. If the host can initiate the print operation, the text is printed. The 9150 identifies the additional text as a print page by the presence of the word "PRINT" (in capital letters) beginning in the 2nd column of line 13 on the 24 x 80 screen. The word "PRINT" should be defined as *display-only text.*

The print page is positioned below the terminal's display page (see Figure 5.6 on page 103). The size of the print page is always the same as the terminal's display page (assuming that in the terminal's configuration, the page length is less than 12 lines).

When *Host Print* is **enabled**, the 9150 passes the print page to the terminal after receiving the application screen from the host.

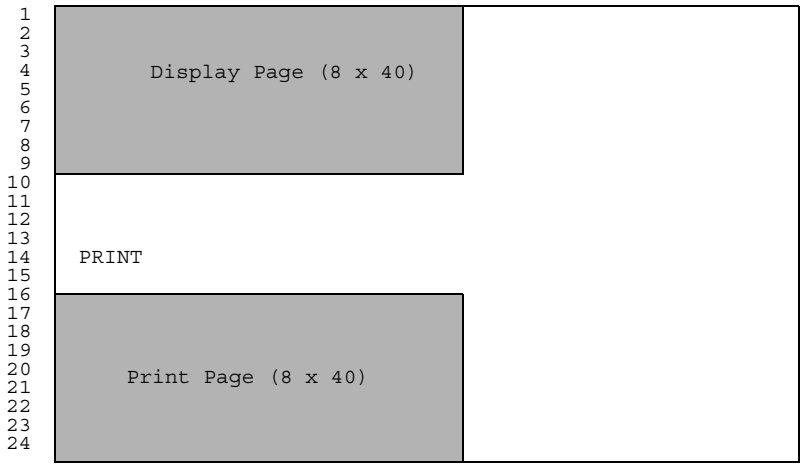


Figure 5.6 Application Screen With Print Page

Notes:

1. *Unlike the* Passthru *option, when using* Host Print *no escape commands can be sent to the printer.*
2. *Support for printing must be enabled at the terminal in its* Printer *command under the TESS Features menu; refer to the 7030/8055/8060 Terminals User Manual for more information.*

Remote Print

When this parameter is **enabled**, the 9150 sends the print page to a terminal whenever the terminal requests it (by sending the "F17" function key from the terminal, or the "PRINT" key on older terminals). The 9150 sends the function response back to the host.

This is in contrast to *Host Print*, where the host makes the initial print request.

Note: *Support for printing must be enabled at the terminal level. Refer to the 7030/8055/8060 Terminals User Manual for more information.*

Pages

This parameter determines the number of host screens (or pages) stored at the terminal, to a maximum of **16**.

The 9150 reduces data transmitted to the terminals by using the terminal's capability to store a page of data for each screen it displays. The 9150 maintains an image of each page stored at the terminal. After receiving an application screen, the 9150 tries to match the screen with a stored page.

If a similar page is already in the terminal's memory, the 9150 instructs the terminal to re-display its copy of the page; only the necessary changes are sent from the controller. If no match is found, the complete page is sent to the terminal over the radio link.

Note: *There is a corresponding parameter on the terminal itself, and the* ***actual*** *number of saved pages will be the* ***smaller*** *of the two values.*

Transmit Line

When this feature is **enabled**, all modified data at the terminal will be automatically transmitted when the operator enters data into a *transmit-upon-entry* field.

The value in this textbox specifies the line on the screen which is designated the *transmit line*. The last entry field above or on the transmit line on the screen will be identified as the *transmit-upon-entry* field. If any entry fields exist on lines below the transmit line, no entry field will be designated as the *transmit-upon-entry* field.

A value of **0** (zero) disables this feature. A value of **24** will cause the *last* entry field on each application screen to be defined as *transmit-upon-entry.*

AIAG

This parameter provides auto-locate and fill for input coming from bar code readers. When bar code data is entered at a terminal, the terminal searches for "AIAG" fields on the current page that can accept the bar code data. The data preloaded into the "AIAG" field by the application program determines whether or not the bar code data is accepted.

At the 9150 mini-controller, a decimal value of an ASCII character from **0** to **127** is set to match the "AIAG Field Identifier" set at the host. A value of **0** disables this feature.

The format of the preloaded data is as follows:

<mode> <AIAG prefix(data)>

The mode character used with the command allows for different operating modes to suit various application operations. The automatic locate and fill operation applies only to data received from a bar code reader. Descriptions of the modes and AIAG prefix are listed in the table below. **These modes are set at the host.**

Mode	Function
0	Display prefix, send prefix to host.
1	Do not display prefix, send prefix to host.
2	Display prefix, do not send prefix to host.
3	Do not display prefix, do not send prefix to host.
+4	Add 4 to above values to cause transmit to host when all AIAG fields with 4 set are filled. Function 0 is "pressed" if there are any fields with this bit set, and all fields with this bit set have been filled by operator input.
+8	Add 8 to above values to allow overwrite of previously entered data.
+16	Add 16 to above values to indicate cursor position priority for search and fill.
AIAG Prefix (data)	The text to be matched in the AIAG field.

Table 5.3 Mode Functions And AIAG Prefix Description

Example:

The information in the sample screen below is defined at and sent ***from*** the host. It includes the "AIAG Identifier" – the tag identifying this as an AIAG field – followed by the mode, in this case Mode 0, and finally, the "AIAG Prefix" – I.

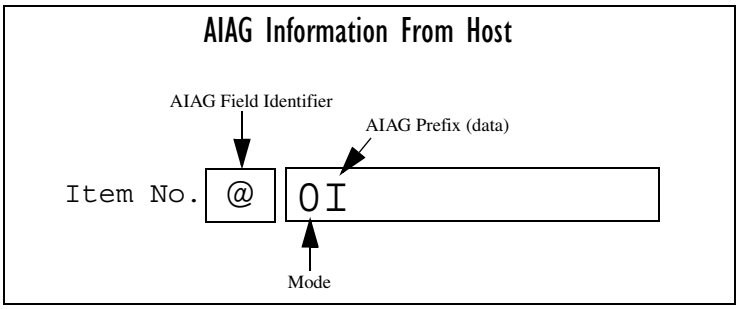


Figure 5.7 AIAG Field Sent From The Host

When the information arrives at the terminal screen, the appropriate AIAG field for the scanned information is located using the "AIAG Identifier". Because Mode 0 was set at the host, the "AIAG Prefix" – I – is displayed on the terminal screen, and when this screen is completed, the prefix will be sent back to the host.

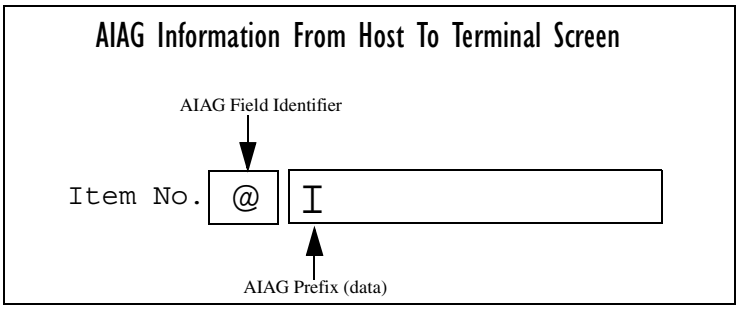


Figure 5.8 AIAG Field Sent To The Terminal

Visible Match Character

By inserting a special ASCII character directly before an entry field, the application program distinguishes a "match field" from an entry field. For example, suppose an angle bracket "**>**" is defined for visible match fields. Inserting "**>**" immediately preceding the entry field identifies it as a match field, as illustrated below.

```
Part #> _____________
```

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** disables this feature. The ASCII decimal value entered at the 9150 must coincide with the value set by the application program.

To use the *Visible Match* feature, the host computer preloads data into a match entry field; the data is visible on the terminal screen. The preloaded data sent to a terminal can consist of exact characters, special match characters or a combination of the two. Refer to the table below for match characters recognized by Teklogix terminals.

If an entry does not match the preloaded data, the entry is displayed, the terminal beeps, and the cursor moves to the first position in the match field. The operator can either make another entry in the match field, or move the cursor to a new field. When an entry (even one that doesn't match the preloaded data) is made in a match field, the entry is sent to the host as part of the terminal's modified data during the next transmission.

Character	Description
#	Match a number.
&	Match a letter (either case).
^	Match an uppercase letter.
_	Match a lowercase letter.
|	Match an alphanumeric character.
"	Match a letter, number or space.
?	Match a punctuation character.
'	Match any character.
:	Match all character positions in the field with the preceding character.
;	Match any remaining characters, but not necessarily the remainder of the field, with the preceding character.

Table 5.4 Match Characters

Example:

Suppose you want to preload an entry field with a part number. If the part number is known, you can preload the field with that part number. If more flexibility is needed, and the part number always begins with two alphabetic characters followed by a hyphen and four digits, the match string for the field would be: `&&-####` .

Hidden Match Character

Unlike data in a "visible match" field, the preloaded data in a "hidden match" field is *not* displayed at the terminal.

Note: *Refer to "Visible Match Character" on page 106 for detailed information about field matching.*

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** disables this feature. The ASCII decimal value entered at the 9150 must coincide with the value set by the application program.

Serial I/O

Serial I/O fields are special entry and fixed fields that accept input from and output to a serial port. The application program distinguishes this field as *Serial I/O* by preceding the field with a special character.

If this character precedes a fixed field, the data will be sent to the terminal's serial port. If it precedes an entry field, the field accepts data from the terminal's serial port.

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** (zero) disables this feature.

Print Line

This parameter allows you to enter the starting line number of the print page in the application screen. A value of **1** causes the display page to be printed; a value of **0** (zero) disables this feature.

Print Form Length

This parameter sets the printer's form length in lines. The range is **0** to **24**.

Barcode

Barcode-input-only fields are special entry fields that only accept input from a bar code reader. The application program distinguishes an entry field as *barcode-input-only* by preceding the field with a special character.

The range for this parameter – **0** to **127** – represents the decimal values of ASCII characters. A value of **0** (zero) disables this feature.

Entry Line

This parameter contains the number of the first line displayed if there is no entry field in the upper-left portion of the screen, and if an entry field is at or below this line.

The *Entry Line* parameter allows an automatic offset within the host screen, so that the area displayed by the terminal includes an entry field that would normally be out of bounds. Normally, Teklogix terminals only display the upper-left corner of the application screen because of their smaller display size.

Field Overhead

This parameter contains the maximum number of characters allowed between two *fixed* fields which still allows the 9150 to join them into one field.

Sometimes the 9150 will join two adjacent fixed fields and then send them as one field. This reduces the overhead on the radio link.

For example, if two fields were 4 characters apart and this parameter was ‘5’, then these fields would be joined into one.

Command Region

This parameter defines a region of the host screen which the 9150 will examine for the presence of reserved commands.

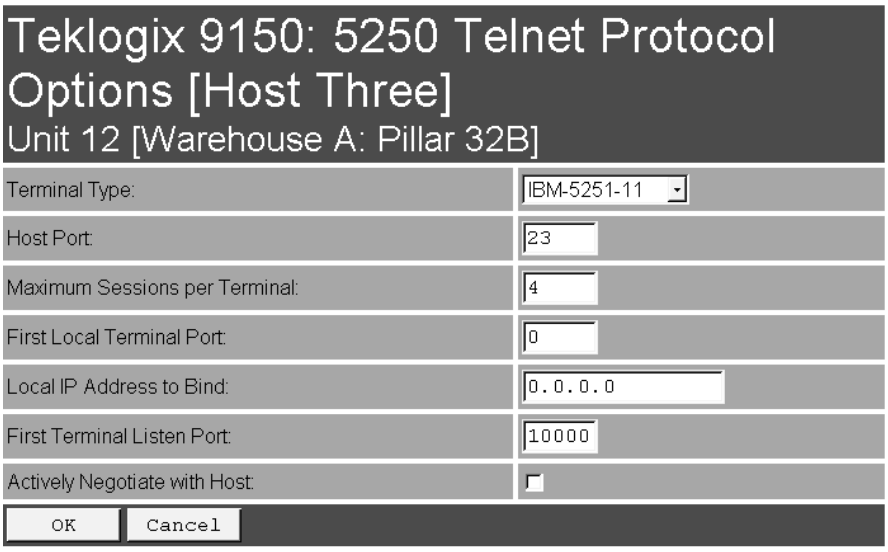
The four numbers in the *Command Region* textboxes represent the row and column addresses of the upper left corner and the lower right corner of the command region. The first textbox of each pair contains the row number; the second contains the column number. The range of row values is **0** to **24**; column values are **0** to **80**.

To define the last two lines of the host screen as the command region, for example, enter the values *23, 1* and *24, 80*.

Currently, the only command supported is *ALARM* (refer to page 100 for details on this command). When the word "ALARM" is placed anywhere within the command region, the 9150 will send a TESS *beep* command to the terminal.

5.3.4.2 Protocol Options

This page differs depending on the type of emulation and protocol selected in the *General Host Options* page. The 9150 displays this version of the *Protocol Options* page when you select the emulation/protocol combination of *5250/Telnet* for this host.



Terminal Type

This parameter allows you to choose the type of terminal to be emulated by the 9150 for this host. At present there are two choices of terminal for *5250/Telnet*: the **IBM 5251-11** and **IBM 5555-B01**.

Host Port

This parameter allows you to enter a host port value for the selected *5250/Telnet* host connection. The default value is **23**.

Maximum Sessions per Terminal

This parameter contains the maximum number of telnet sessions which are allowed to originate from each terminal. The range is **0** to **127**, with a default value of **4**.

First Local Terminal Port

This parameter contains the port number from which the first terminal will connect on outbound telnet sessions. The default value is **0**.

Local IP Address to Bind

This parameter contains the IP address of the network adaptor from which the first terminal will connect on outbound telnet sessions.

First Terminal Listen Port

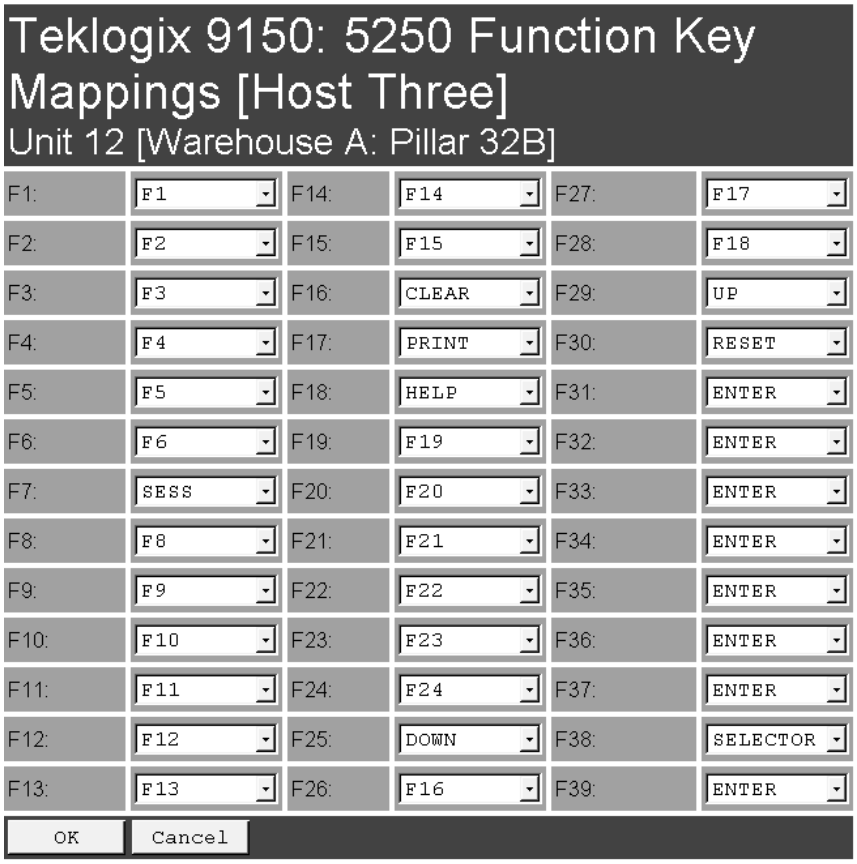
This parameter specifies the first port number at which the 9150 will listen for telnet connection requests to the terminals. The default value is **0**.

Actively Negotiate with Host

If this parameter is enabled, the 9150 negotiates with the host during setup of the telnet connection.

5.3.4.3 Function Key Mappings

This page differs depending on the type of emulation selected in the *General Host Options* page. The 9150 displays this version of the *Function Key Mapping* page when you select *5250* emulation for this host.



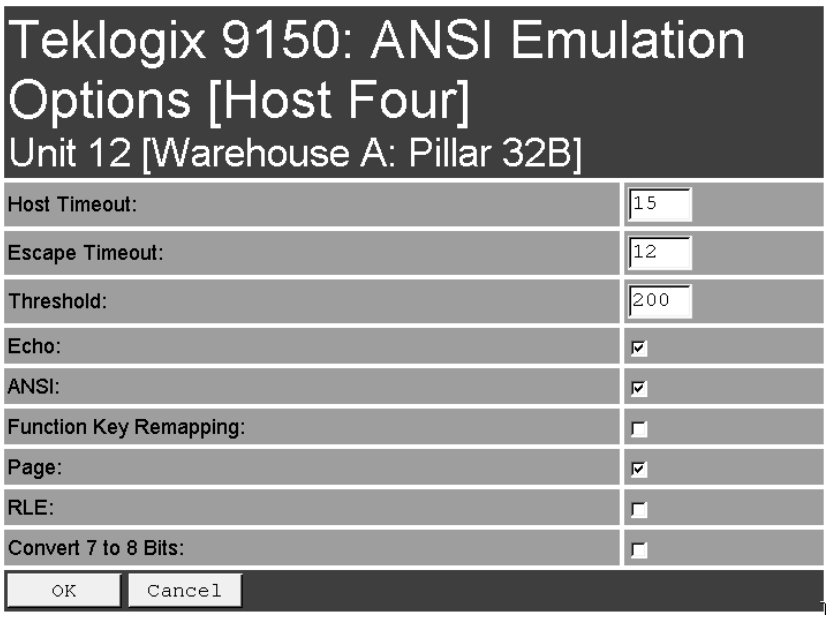
Function key n

The *Function Key* parameter allows you to select a code that will be sent to the host when you press a function key on the terminal. Each function key may be chosen from the same range of possible codes; however, each function key has a different default code. The default values are shown on this page.

5.3.5 ANSI/Telnet

5.3.5.1 Emulation Options

The 9150 displays this version of the *Emulation Options* page after you have selected the *ANSI/Telnet* emulation/protocol combination for this host connection.



Host Timeout

The *Host Timeout* is the interval (in *ticks*, or 60ths of a second) between bursts of data received from the host. The range is **0** to **255**, with a default value of **15**.

If the 9150 does not receive any characters from the host after this timeout has elapsed, it assumes that the host has finished sending data and is waiting for user input (in other words, it assumes that a screen of data has been completed).

Important: *The* Page *parameter (page 115) must be* ***enabled*** *in order to change the value in the* Host Timeout *parameter.*

Escape Timeout

The *Escape Timeout* is the length of time (in *ticks*, or 60ths of a second) that the 9150 will hold an "ESC" received from the host, and consider the next received byte to be part of an escape sequence. The range is **0** to **255**, with a default value of **12**.

When this timeout has elapsed, the host will have to send another "ESC" character to start an escape sequence.

Note: *This is especially important when an ESC is at the end of a data packet.*

Threshold

The *Threshold* is the minimum number of bytes of update data for the terminal screen which must be received from the host before the 9150 will store the screen as a new "saved page". The range is **0** to **999**, with a default value of **200**.

Important: *The* Page *parameter (page 115) must be* ***enabled*** *in order to change the value in the* Threshold *parameter.*

Echo

If this parameter is **enabled**, the 9150 uses *"Smart" Echo*. This mode reduces the amount of data sent to the terminal by decreasing the number of radio transmissions.

Ordinarily, when a character mode application is being used, each keystroke is sent to the host in one transmission, and the character is echoed by the host in another transmission. When *"Smart" Echo* is **enabled**, the 9150 will not send the host echo to the terminals if it matches the data sent from the terminal. Thus, the number of radio transmissions is reduced.

This mode also reduces or eliminates the delay between typing a character on the keyboard and displaying the character echoed by the host. The maximum number of characters waiting for echo is **25**. Any additional characters will be sent to the host but not displayed.

Notes:

1. *This parameter also determines whether an ANSI parameter query is sent to the terminal.*
2. "Smart" Echo *also needs to be enabled at the terminal (refer to the 7030/8055/8060 Terminals User Manual).*

ANSI

If this parameter is **enabled**, the 9150 uses ANSI *escape code filtering*. When escape-code filtering is **enabled**, ANSI escape codes not supported by the terminals will be filtered out of the data stream to reduce radio traffic. The terminals currently support most, if not all, standard ANSI escape sequences, so this parameter should be **disabled** in most cases.

Function Key Remapping

If this parameter is **enabled**, the 9150 remaps the function keys for this host connection as defined in the Function Key Remapping page (page 121).

Page

If this parameter is **enabled**, the 9150 uses page saving**,** reducing data transmitted to the terminals.

The 9150 maintains an image of each page stored at the terminal. After receiving an application screen, the 9150 tries to match the screen with a stored page. If the page is already in the terminal, the 9150 instructs the terminal to redisplay its stored copy of the page; no data need be sent across the radio link for that page. If the 9150 finds no match for the page, the complete page is sent to the terminal.

Note: *When page saving is enabled, the number of saved pages is that which is set on the terminal. Refer to the 7030/8055/8060 Terminals User Manual for details.*

RLE

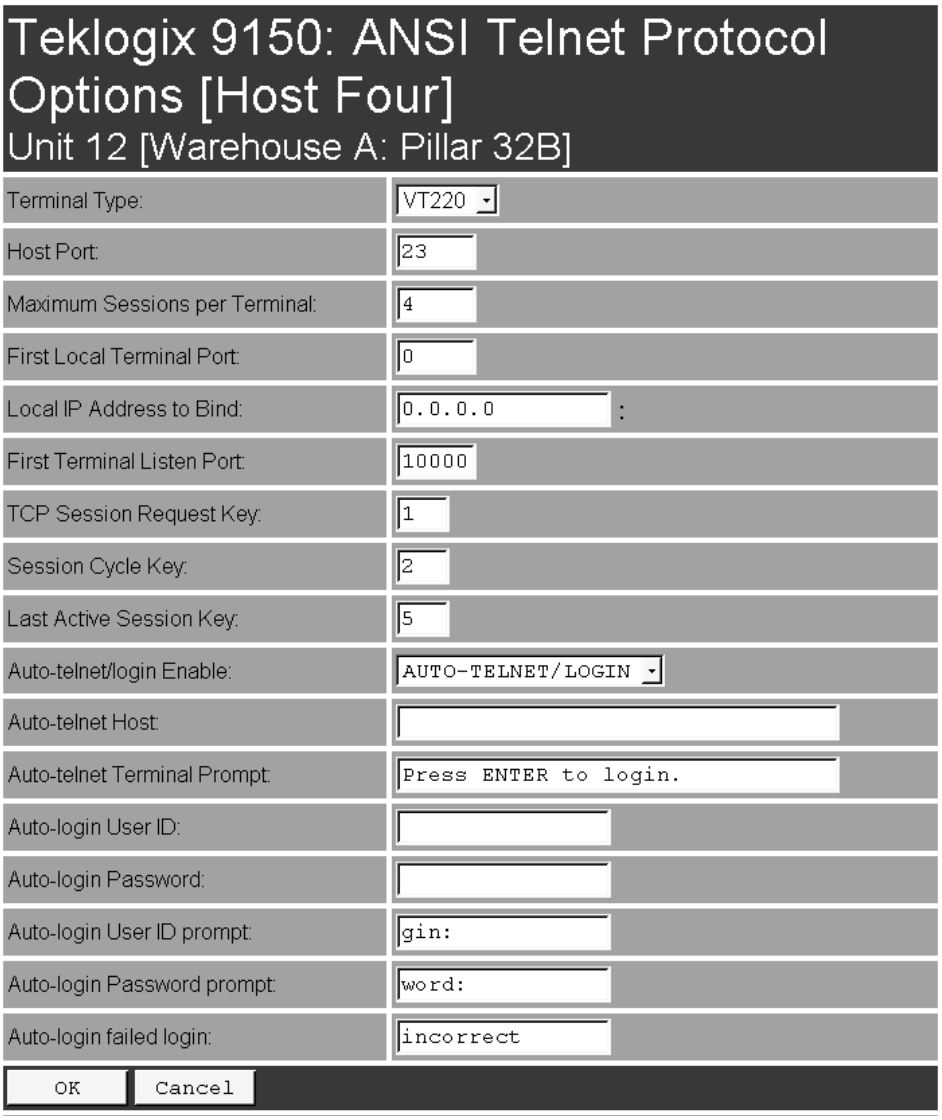
If this parameter is **enabled**, the 9150 uses run-length encoding (RLE) on the data it sends across the radio link. *RLE* compresses repeated characters going from the host to the terminal. If repeated characters are found in the data stream, the first one is sent, followed by a short escape sequence (3 or 4 characters) which tells the terminal how many times to repeat this character. In this way RLE compresses the data and decreases the total amount of radio-link traffic.

Convert 7 to 8 Bits

If this parameter is **enabled**, the 9150 converts 7-bit control sequences to their 8-bit equivalents in ANSI data streams going to the terminals. This replaces two-character escape sequences with a single equivalent character, compressing the data.

5.3.5.2 Protocol Options

This page differs depending on the type of emulation and protocol selected in the *General Host Options* page. The 9150 displays this version of the *Protocol Options* page when you select the emulation/protocol combination of *ANSI/Telnet* for this host.



Terminal Type

This parameter specifies the type of terminal to be emulated by the 9150, either a **VT100** or **VT200**.

Host Port

This parameter specifies the value for the host port for the selected ANSI host connection. The default value is **23**.

Maximum Sessions per Terminal

This parameter contains the maximum number of telnet sessions which are allowed to originate from each terminal. The range is **0** to **127**, with a default value of **4**.

First Local Terminal Port

This parameter specifies the port number from which the 9150 attempts a telnet connection for the first terminal. The default value is **0**.

Additional telnet sessions are assigned higher port numbers.

Local IP Address to Bind

This parameter specifies the IP address of the 9150 interface that connects to this host. It is used along with the local port numbers to create a unique socket for each terminal session.

First Terminal Listen Port

This parameter specifies the lowest port number at which the 9150 listens for telnet connections initiated by the host. The default value is **10000**.

TCP Session Request Key

This parameter contains the decimal ASCII character code of the character which will prompt the terminal to request a new ANSI terminal session. The range is **0** to **255**, with a default value of **1**.

Session Cycle Key

This parameter contains the decimal ASCII character code of the character which will prompt the terminal to display the next ANSI terminal session. The range is **0** to **255**, with a default value of **2**.

Last Active Session Key

This parameter contains the decimal ASCII character code of the character which will prompt the terminal to display the last ANSI terminal session. The range is **0** to **255**, with a default value of **5**.

Auto-telnet/login Enable

This parameter enables you to disable or enable automatic connection of telnet sessions from terminals to this host. The choices provided are: **Disable**; **Enable Auto-telnet**; **Enable Auto-telnet/login**. The default value is **Disable**.

When *Auto-telnet* is **disabled**, telnet sessions from the terminals to the host must be initiated manually from the terminals.

When *Auto-telnet* is **enabled**, the 9150 initiates one telnet session from each terminal whose terminal number is mapped to this host. Additional telnet sessions may be initiated from each terminal to the host, but they must be initiated manually.

Note: *Auto-telnet sessions are only initiated for terminals which are "online" (turned on and operating properly on the Teklogix RF network).*

When *Auto-telnet* and *Auto-login* are **enabled**, the 9150 initiates one telnet session from each terminal whose terminal number is mapped to this host. It then logs each session in to the host using the User ID and Password provided in this page.

Note: *The User ID and Password is identical for all Auto-telnet sessions automatically logged in to this host.*

Auto-telnet Host

This parameter contains the host name or IP address for the host to which the 9150 connects Auto-telnet sessions.

Note: *A host name placed in this textbox must be "resolvable" by the 9150: the 9150 must be able to obtain an IP address for it. For example, the host name may correspond to an entry in the 9150's host table, or the 9150 may be able to query a domain-name server.*

Any host name which can be used at the terminal's TCP> prompt may be used here.

Auto-telnet Terminal Prompt

This parameter contains the text presented to the user to request a login. The characters can be any ASCII string, with a **maximum of 32** characters. The default is no text, just press <ENTER> to login.

Auto-login User ID

This parameter contains the user ID presented by the 9150 to the host for the Auto-login sessions. The characters can be any ASCII string acceptable to the host, with a **maximum of 15** characters.

Auto-login Password

This parameter contains the password presented by the 9150 to the host for the Auto-login sessions. The characters can be any ASCII string acceptable to the host, with a **maximum of 15** characters.

Auto-login User ID prompt

The 9150 compares the text in this textbox to the text presented to it by the host. When they match, the 9150 assumes that the host has just sent its request for a user name, and it sends the user ID specified in the *Auto-Login User ID* parameter to the host. The characters can be any ASCII string, with a **maximum of 15** characters. The default text is **gin:** .

Note: *The match string should be as short as possible, yet long enough to uniquely identify the user-ID prompt. Do not include multi-part words separated by space characters, since some hosts send out characters other than space characters to present a space on the screen.*

Auto-login Password prompt

The 9150 compares the text in this textbox to the text presented to it by the host. When they match, the 9150 assumes that the host has just sent its request for a password, and it sends the password specified in the *Auto-Login Password* parameter to the host. The characters can be any ASCII string, with a maximum of 15 characters. The default text is **word:** .

Note: *The match string should be as short as possible, yet long enough to uniquely identify the password prompt. Do not include multi-part words separated by space characters, since some hosts send out characters other than space characters to present a space on the screen.*

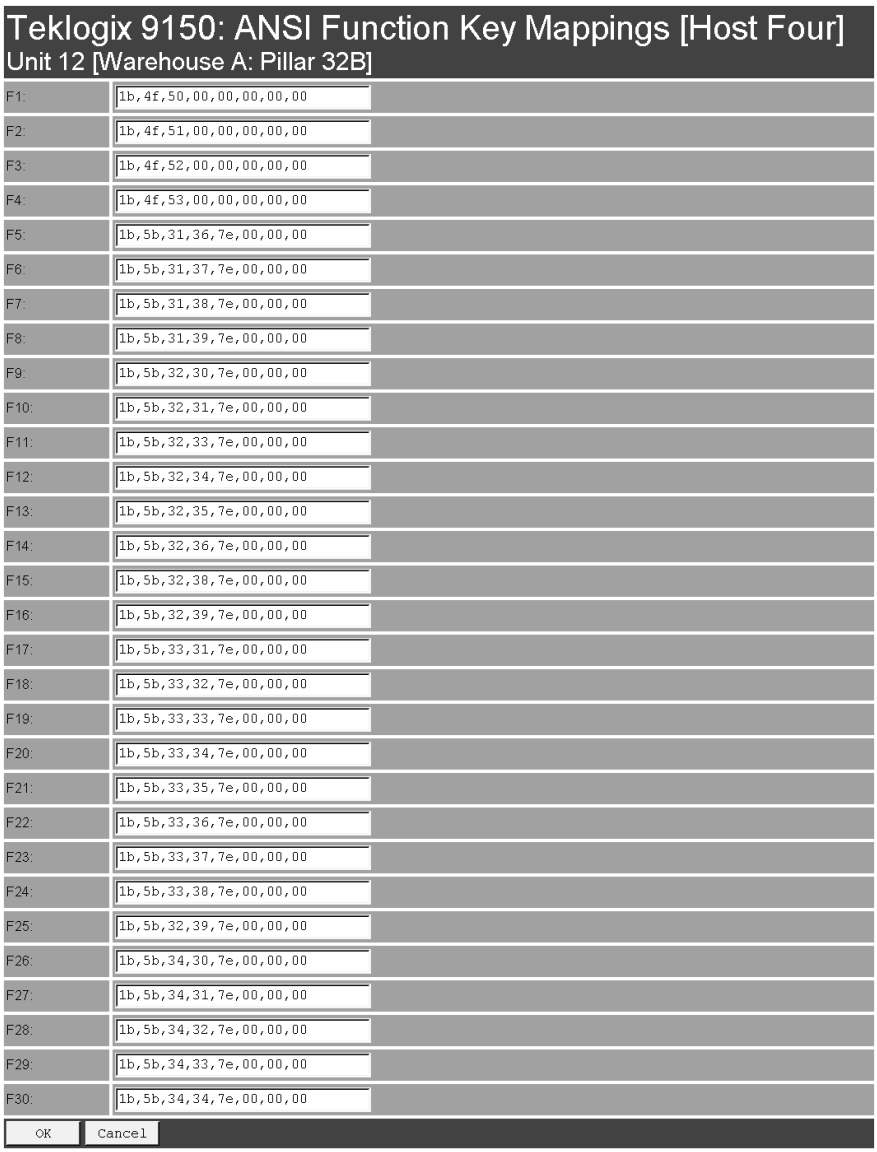
Auto-login failed login

The 9150 compares the text in this textbox to the text presented to it by the host. When they match, the 9150 assumes that the host has just sent a string informing the terminal of a failed login attempt. The 9150 then presents the *Auto-telnet Terminal Prompt* on the terminal's screen to request the user to login manually. The characters can be any ASCII string, with a maximum of 15 characters. The default text is **incorrect** .

Note: *The match string should be as short as possible, yet long enough to uniquely identify the failed-login prompt. Do not include multi-part words separated by space characters, since some hosts send out characters other than space characters to present a space on the screen.*

5.3.5.3 Function Key Mappings

This page differs depending on the type of emulation selected in the *General Host Options* page. The 9150 displays this version of the *Function Key Mapping* page after you have selected the *ANSI/Telnet* emulation/protocol combination for this host connection.



Function key n

The *Function Key* parameter allows you to select a code that will be sent to the host when you press a function key on the terminal. Each function key may be chosen from the same range of possible codes; however, each function key has a different default code. The default values are shown on the screen on page 121.

ACCESS POINT CONFIGURATION 6

6.1 Overview

The 9150 can operate as an access point device between IEEE 802.11 wireless and wired networks. Using IEEE 802.11 protocol, the 9150 provides a transparent bridge between Teklogix or client terminals and a network controller or host. For an overview of IEEE 802.11, please refer to "IEEE 802.11 Protocol" on page 10. For operation as an access point, the parameters in the following pages must be set appropriately.

Note: *The 9150 main parameters should first be set up as described in Chapter 3: "9150 Main Configuration".*

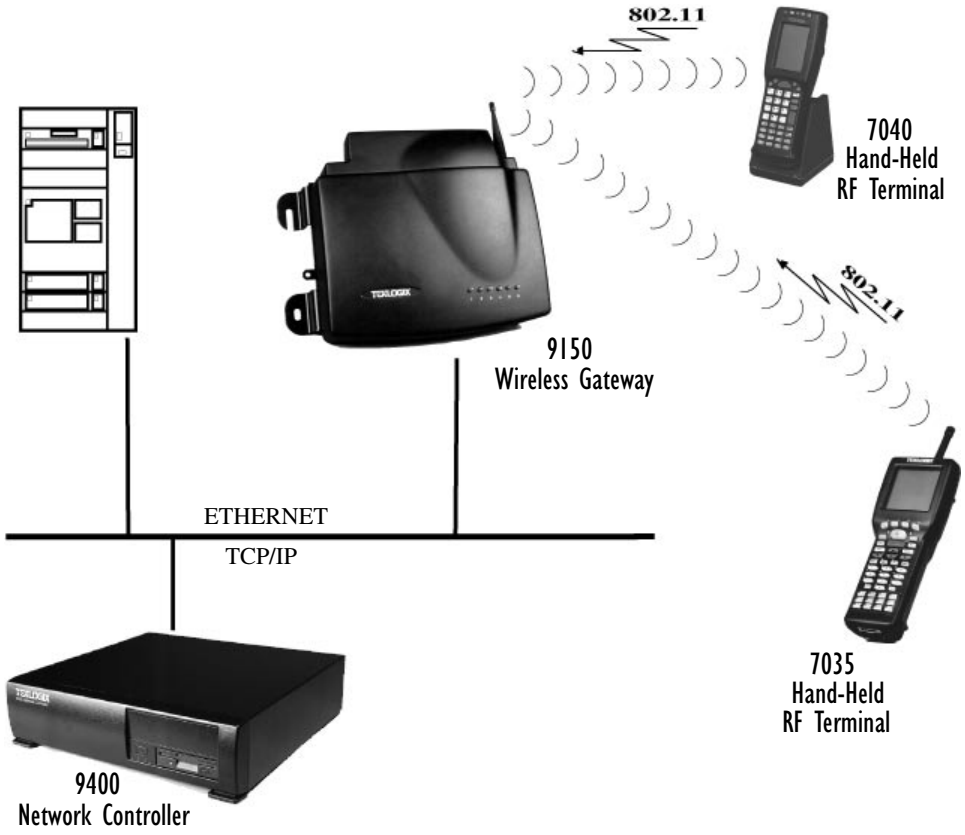
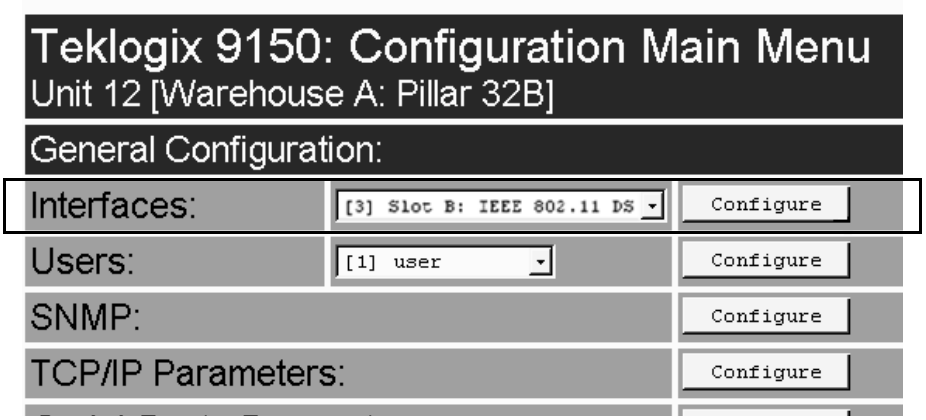


Figure 6.1 9150 Access Point Configuration

6.2 Interfaces

The pull-down menu shown for the *Interfaces* option indicates which interfaces have been detected in use by the 9150, including one of two 802.11 PCMCIA radios:

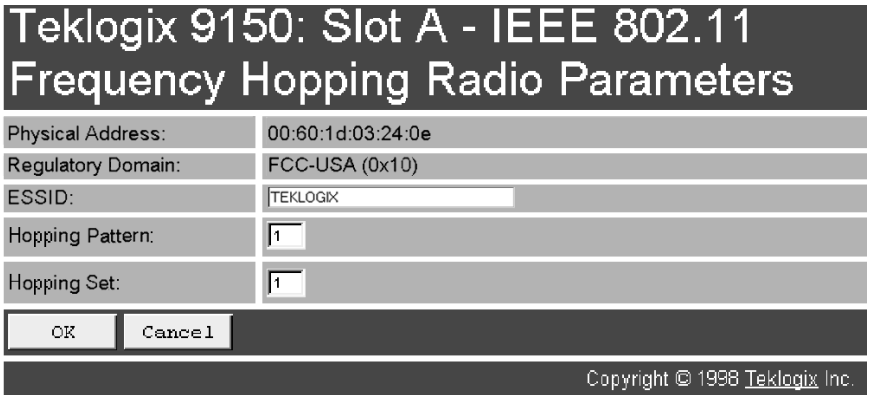
- IEEE 802.11 FH: Proxim RangeLAN802 IEEE 802.11 FHSS 2.4 GHz.
- IEEE 802.11 DS: Lucent WaveLAN IEEE 802.11 DSSS 2.4 GHz.



Selecting a radio type from the drop-down list and entering "Configure" will open the radio parameters page for that radio.

6.2.1 IEEE 802.11 (Frequency Hopping Radio Parameters)

When the Proxim RangeLAN802 IEEE 802.11 FHSS 2.4 GHz PCMCIA card is installed in the 9150, the following radio parameters page is opened:



Physical Address

This parameter shows the hardware address (MAC address) of the radio card. A globally unique MAC address is assigned to each card by the card manufacturer. *The value cannot be changed.*

Regulatory Domain

The regulatory domain value identifies the regulatory body's country code for the RF regulations with which the radio complies. For the USA, the regulatory body is the FCC, for Canada it's Industry Canada, and for Europe it's ETSI. The hex value in brackets beside the name is the code (as specified in the IEEE 802.11 standard) for that domain. The country codes that are decoded into a name are listed below. For other country codes the name portion will be replaced with "Unknown".

Regulatory Body	Domain Code	Country
FCC-USA	0x10	USA (for DS radios this is also the code used for Canada)
Industry Canada	0x20	Canada (currently only for FH radios, this may change in the future)
ETSI-Europe	0x30	Most of Europe
Spain	0x31	Spain
France	0x32	France
MKK-Japan	0x40	Japan

ESSID

This is the *Extended Service Set Identifier* parameter. The ESSID is an alphanumeric character string of **up to 32** characters and is case-sensitive. If your network includes devices that use the DOS ODI Driver, select alphabetical characters in uppercase only to allow the DOS ODI devices to connect to the network as well. *The ESSID should be the same for all devices in a system.*

Hopping Pattern

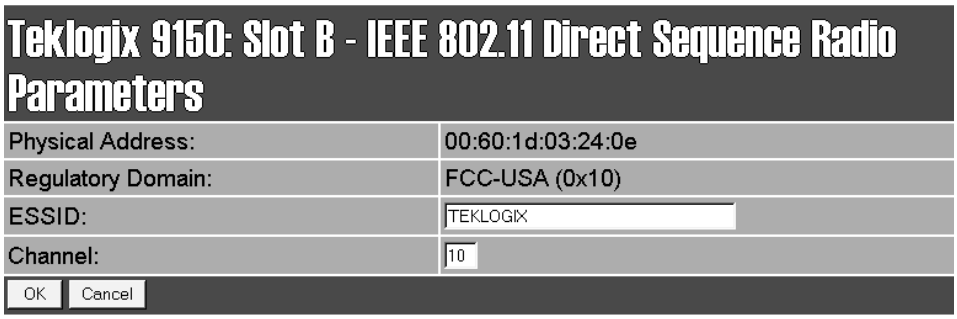
The combined settings for the *Hopping Pattern* and *Hopping Set* parameters determine the operating channel for a radio using frequency hopping. Please refer to your network administrator for details.

Hopping Set

The combined settings for the *Hopping Set* and *Hopping Pattern* parameters determine the operating channel for a radio using frequency hopping. Please refer to your system administrator for details.

6.2.2 IEEE 802.11 (Direct Sequence Radio Parameters)

When the Lucent WaveLAN IEEE 802.11 DSSS 2.4 GHz PCMCIA card is installed in the 9150, the following radio parameters page is opened:



Physical Address

This parameter shows the hardware address (MAC address) of the radio card. A globally unique MAC address is assigned to each card by the card manufacturer. *The value cannot be changed.*

Regulatory Domain

The regulatory domain value identifies the regulatory body's country code for the RF regulations with which the radio complies. For the USA, the regulatory body is the FCC, for Canada it's Industry Canada, and for Europe it's ETSI. The hex value in brackets beside the name is the code (as specified in the IEEE 802.11 standard) for that domain. The country codes that are decoded into a name are listed on page 127. For other country codes the name portion will be replaced with "Unknown".

ESSID

This is the *Extended Service Set Identifier* parameter. The ESSID is an alphanumeric character string of **up to 32** characters and is case-sensitive. If your network includes devices that use the DOS ODI Driver, select alphabetical characters in uppercase only to allow the DOS ODI devices to connect to the network as well. *The ESSID should be the same for all devices in a system.*

Channel

This parameter sets the operating channel for this radio, as determined by the system administrator. For a listing of the allowable channels for each country, please see "PC Card Radios" on page 145.

6.3 MAC Bridge Parameters

The MAC Bridge parameters consist of protocol filters which direct the 9150 to forward or discard frames that contain a known protocol type. This enables the 9150 to be selective of what type of frames will be bridged over the radio, in order to limit the amount of data on busy networks. Filtering frames is based on the protocol information in the frame. This is discussed in detail in "Protocol Filters" on page 133.

The *MAC Bridge Parameters* page is entered from the Access Point Configuration menu on the first page.

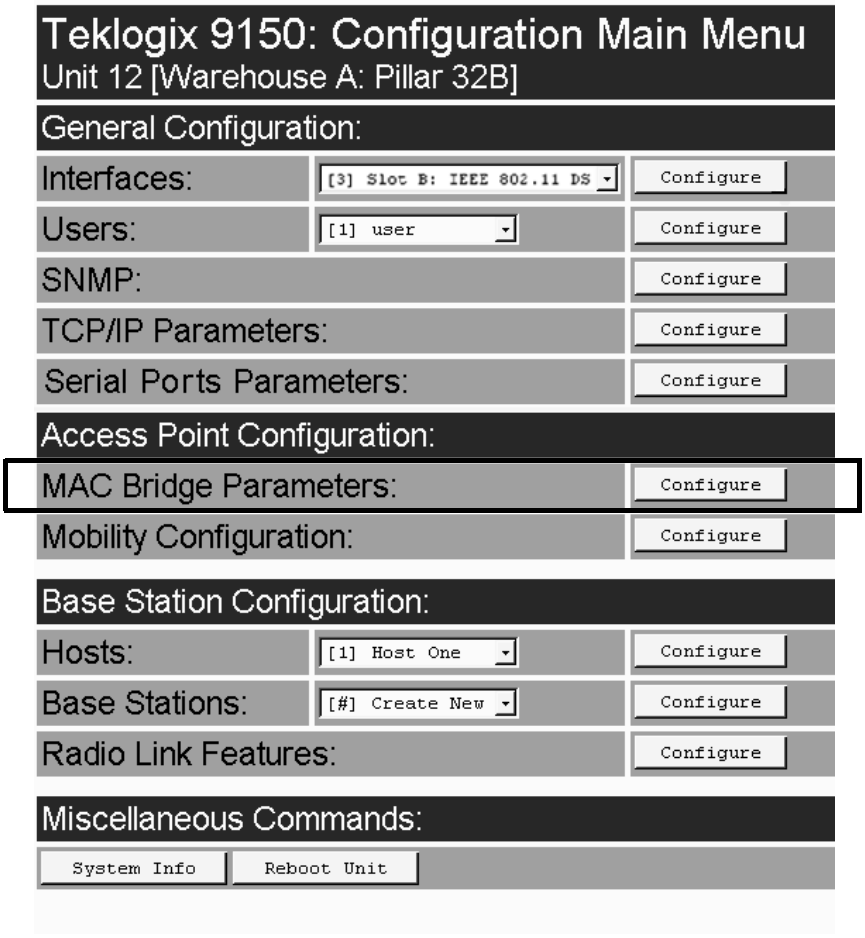


Figure 6.2 below charts the pages for the MAC bridge filters. Entering "OK" or "Cancel" in the individual Filter pages will return you to the *Bridge Parameters* page.

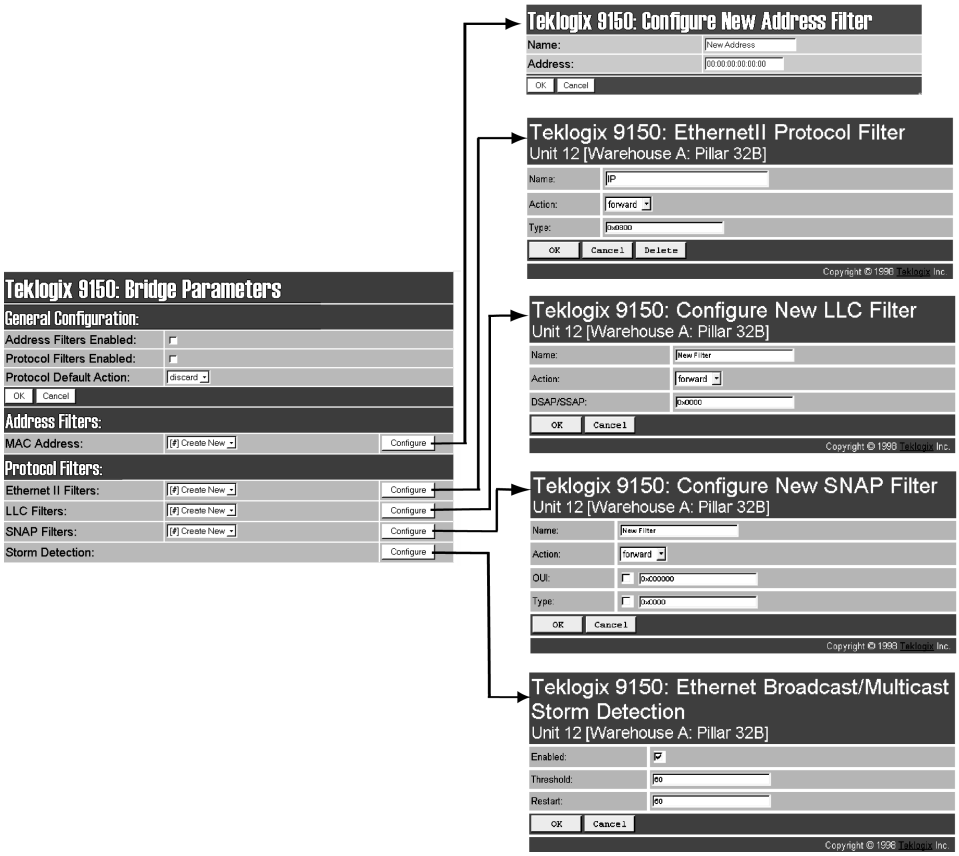
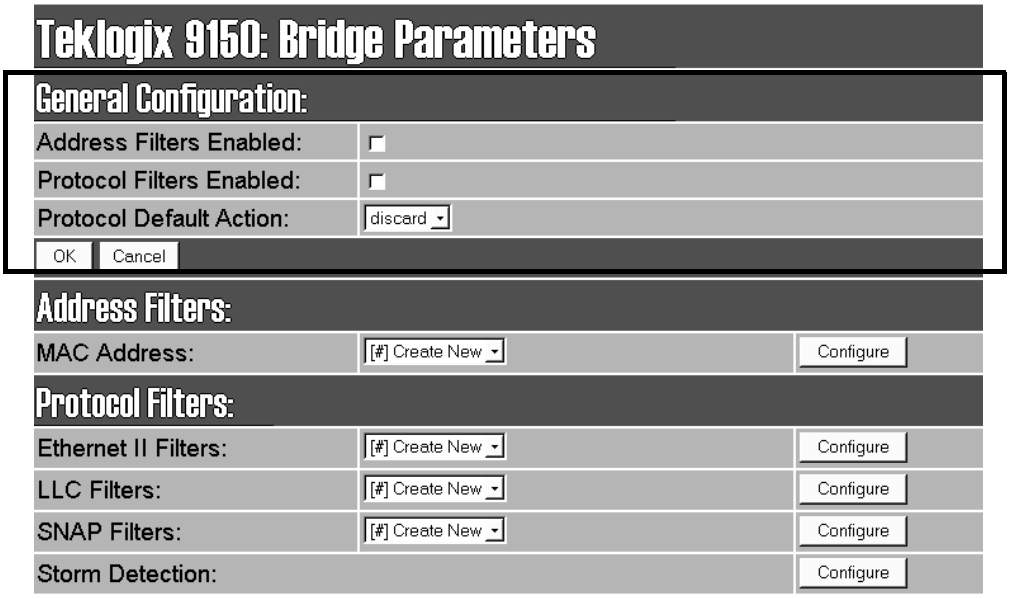


Figure 6.2 Overview Of MAC Bridge Configuration Menus

6.3.1 General Configuration



Address Filters Enabled

The checkbox in this parameter enables or disables the *Address Filters* function. If filtering is **enabled** (√), the 9150 can filter out frames based on destination MAC addresses. The list of MAC addresses for filtering is set by the *Address Filters* option on page 132. Frames are filtered and either forwarded or discarded, depending on the rest of the settings in this configuration. If filtering is **disabled**, no filtering will be done based on MAC addresses.

Protocol Filters Enabled

The checkbox in this parameter enables or disables the *Protocol Filters* function. If filtering is **enabled** (√), frames are filtered and either forwarded or discarded, depending on the rest of the settings in this configuration. If filtering is **disabled**, no filtering will be done based on protocol frames.

Protocol Default Action

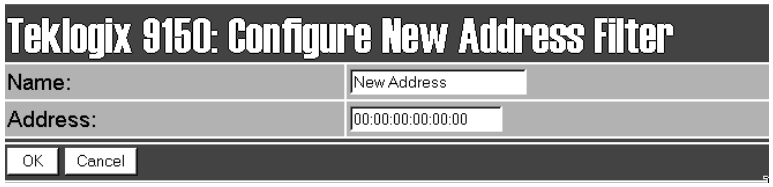
This parameter determines which *Protocol Default Action* (*discard* or *forward*) will be performed when the *Protocol Filters* are **enabled**. Each Protocol Filter (see page 133) also has a *forward/discard* action associated with it. If a frame does not match any of the filters set in the *Protocol Filters* configuration, then it will take the *Protocol Default Action* selected in this parameter.

For example, the *Protocol Default Action* may be to *discard* all frames. If a type field is **matched** in the configuration database, and the Filters action is *forward*, the frame will be passed on. If the field **is not matched**, then the frame will be discarded. Therefore if you want only IP frames forwarded, after selecting the appropriate IP Type in the Ethernet II Filters (see page 136) the *discard* setting here will drop all frames containing other protocol types.

Important: *If* Protocol Filters Enabled *is **checked**, and the* Protocol Default Action *is **discard**, an HTTP browser will not be able to access the 9150's configuration pages unless an ARP filter is defined to forward ARP packets. To do this, configure* Ethernet II Filters *to **forward** protocol type **0x0806** (ARP) packets (see page 136). Alternatively, you can create a static entry in the ARP table on the computer that is running the browser.*

6.3.2 Address Filters: MAC Address

The 9150 can use a list of destination MAC addresses to filter out frames. The MAC addresses are those of any terminals associating with the 9150. If *Address Filters* on page 131 is **enabled**, then any frame destined for any address in the list will be forwarded. If an address is not on the list when *Address Filters* is **enabled**, the frame will be discarded. Addresses are added to the filter list by entering the "Configure" dialogue box from the *Bridge Parameters* menu.



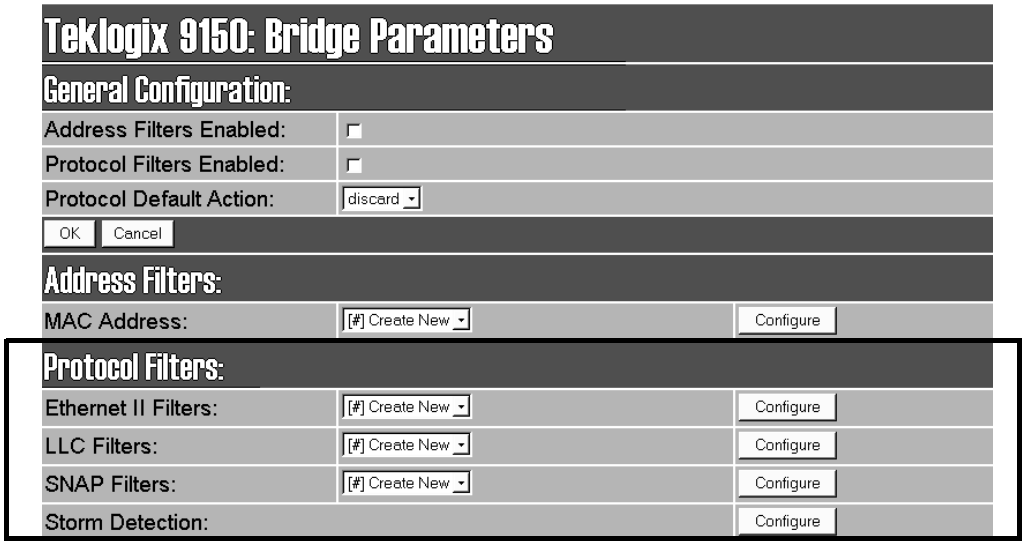
Name

This is any name you wish to use to describe this terminal.

Address

This parameter provides the corresponding MAC address for the terminal.

6.3.3 Protocol Filters



When the 9150 receives frames, it can forward or discard the messages by filtering the protocol Type fields encapsulated in the frame. The filtering is done on three types of Ethernet headers: Ethernet II, LLC and SNAP.

Figure 6.3 on page 134 illustrates the Ethernet header formats. The parameters to configure these filters are described in the sections which follow.

Notes:

1. *Although both LLC and SNAP headers are filtered on Ethernet and Token Ring networks, Ethernet headers are not filtered on Token Ring.*
2. *Throughout these menus, the values for all the protocol types are, by convention, entered in hexadecimal, preceded by "**0x**".*

The fields for a basic IEEE 802.3 Ethernet frame consist of a six-byte destination MAC address, followed by a six-byte source MAC address, and a two-byte protocol Type. The final fields in a frame are the Data field and the FCS field (Frame Check Sequence, or CRC). If the Type field contains a value that is greater than or equal to

"0x0600", it is assumed to be the protocol identifier for an Ethernet II header. This field is used to determine which protocol is being used in the frame, and this is what can be filtered (see "Ethernet II Filters" on page 136).

If the protocol Type is less than "0x05DC", then the value is interpreted as a Length field instead. It is assumed that an IEEE 802.2 Logical Link Control (LLC) header is to follow the Length. This header consists of the **D**estination **S**ervice/**S**ource **S**ervice **A**ccess **P**oint (DSAP/SSAP) and Control fields (see "LLC Filters" on page 137).

If the DSAP and SSAP are both "0xAA", and the Control field has a value of "0x03", the LLC header will be followed by an extension which is a SNAP header. The SNAP header includes the Organizational Unit Identifier (OUI) and the protocol type (see "SNAP Filters" on page 138).

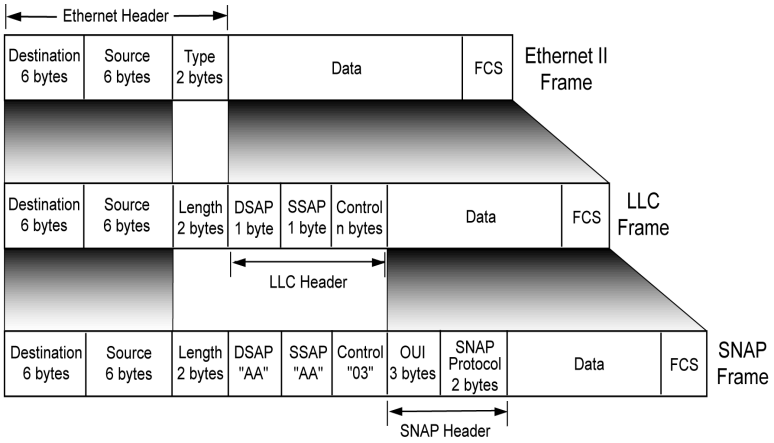


Figure 6.3 Ethernet Frame Types

The listboxes in the *Protocol Filters* option show the protocol filters already set in the configuration database. Selecting a protocol name and then opening the "Configure" dialog box gives a list of parameter settings that can be modified or deleted for that protocol.

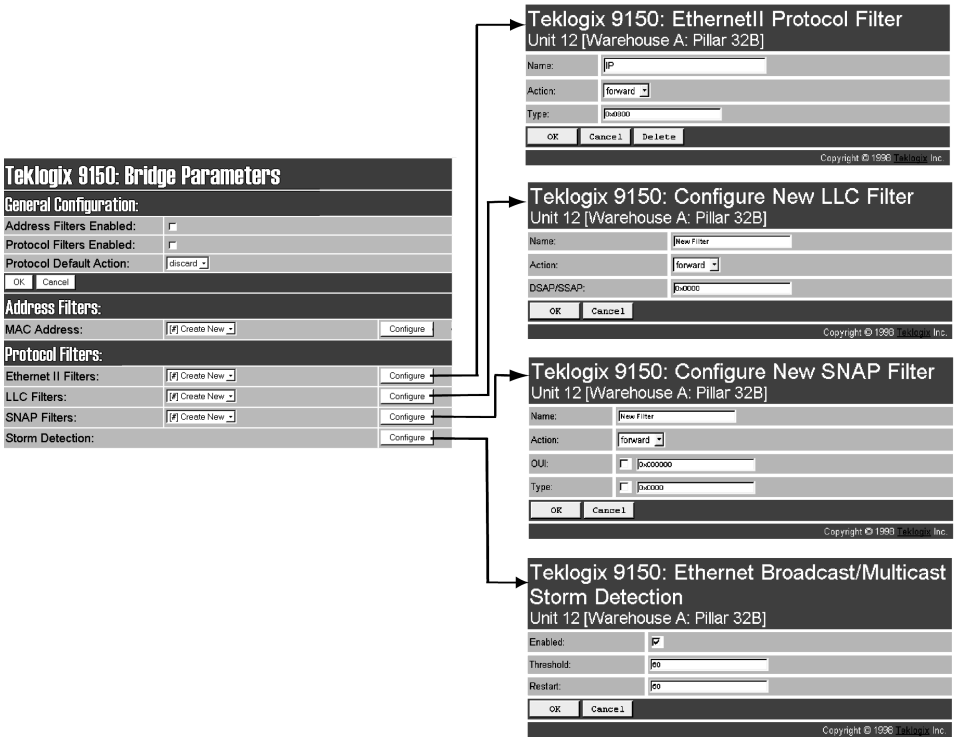
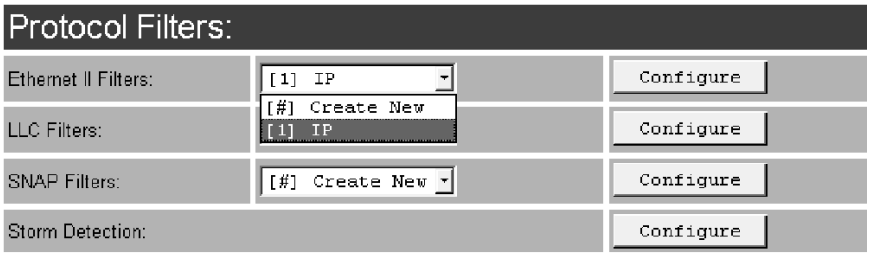


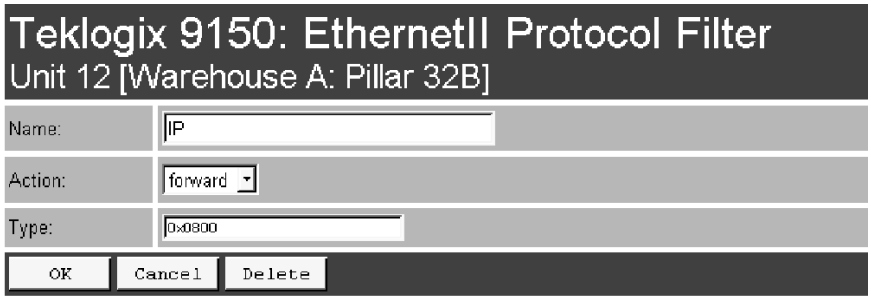
Figure 6.4 Protocol Filters Main Menu And Sub-menus

New filters can be added by selecting "[#] Create New" in the listbox before entering the "Configure" dialog box.



If a hexadecimal number is entered that is outside the minimum or maximum allowable value for these parameters, you will receive an alert that the Type value is invalid for the specified protocol.

6.3.3.1 Ethernet II Filters



Note: *This parameter is only valid for Ethernet networks. Ethernet II headers are not filtered on Token Ring networks.*

Name

This is any name you wish to use to describe this Ethernet II filter.

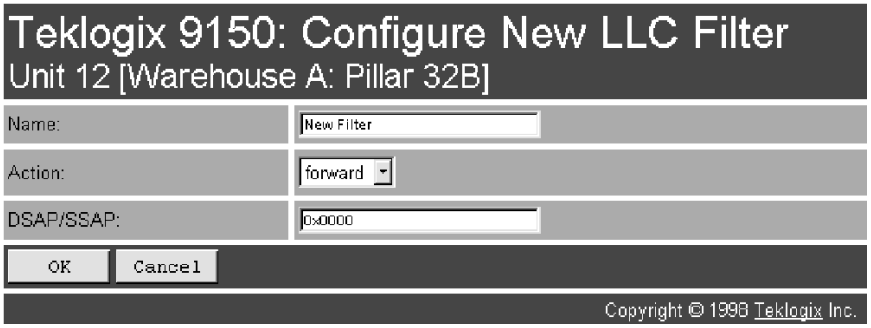
Action

This parameter can be set to either *forward* or *discard* frames with protocol types that match this filter.

Type

The value entered in this parameter must be a four-digit hexadecimal number ranging from **0x0600** to **0xFFFF**, which represents the Ethernet II protocol type you wish to filter. For example, if you only use TCP/IP, create two protocol filters, one to forward IP (Type 0x0800) and the other to forward ARP (Type 0x0806). For a listing of Ethernet II types, see "Ethernet II Types (RFC 1700)" on page B-1.

6.3.3.2 LLC Filters



Name

This is any name you wish to use to describe this LLC filter.

Action

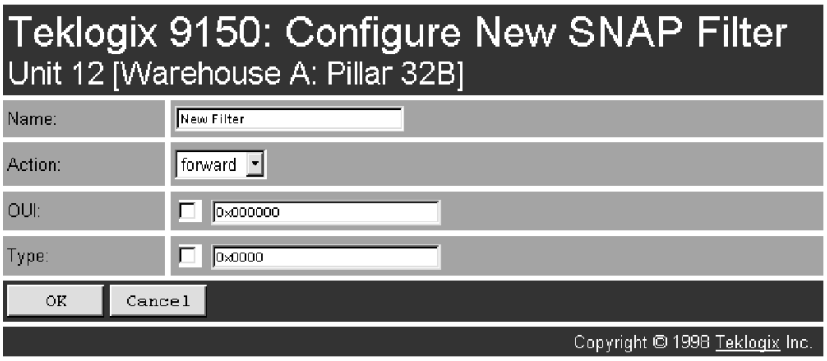
This parameter can be set to either *forward* or *discard* frames with protocol types that match this filter.

DSAP/SSAP

The value entered in the ***D**estination **S**ervice/**S**ource **S**ervice **A**ccess **P**oint* (DSAP/SSAP) parameter must be a four-digit hexadecimal number ranging from **0** to **0xFFFF**, where the first pair of digits is the DSAP and the last pair is the SSAP.

For a listing of DSAP/SSAP types, see "DSAP/SSAP Types" on page B-14.

6.3.3.3 SNAP Filters



Name

This is any name you wish to use to describe this SNAP (**S**ub**N**et **A**ccess **P**rotocol) filter.

Action

This parameter can be set to either *forward* or *discard* frames with protocol types that match this filter.

OUI

The value entered in this parameter must be a six-digit hexadecimal number ranging from **0** to **0xFFFFFF**, which is the **O**rganization **U**nique **I**dentifier. When this parameter is **enabled** (√), the OUI will be filtered.

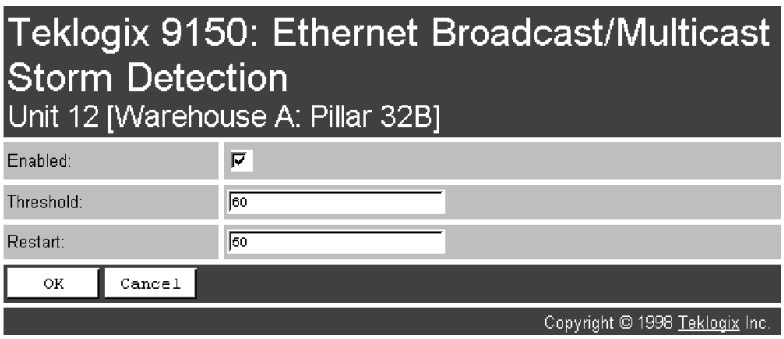
Type

The value entered in this parameter must be a four-digit hexadecimal number ranging from **0** to **0xFFFF**, which represents the SNAP type you wish to filter. When this parameter is **enabled** (√), this Type will be filtered.

For a short listing of OUI values, see “OUI Values” on page B-15.

6.3.3.4 Storm Detection

This filter parameter can prevent broadcast/multicast storms from spreading throughout the network. Network storms can burden radio traffic with unnecessary data transmissions.



Enabled

This parameter enables (√) or disables the Storm Detection filters.

Threshold

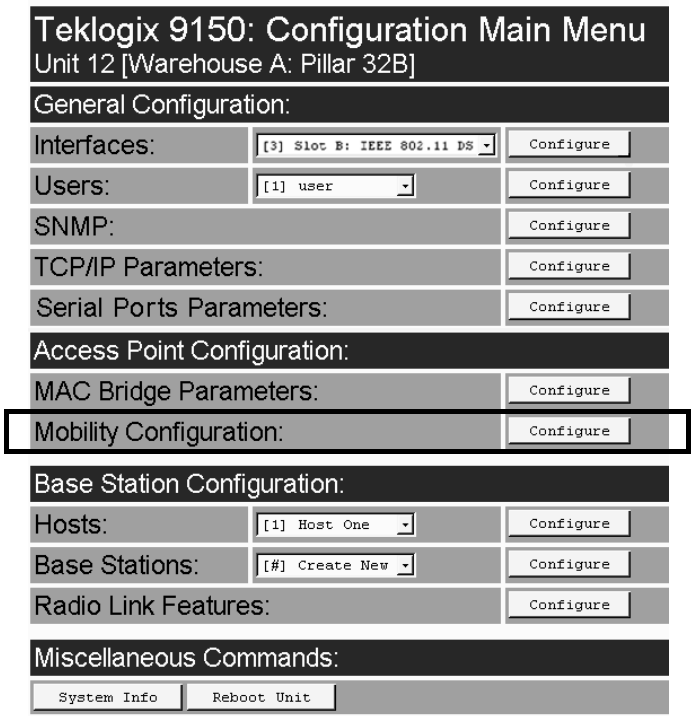
The maximum number of broadcast/multicast frames that should be received in one second is defined in this parameter. When that threshold is exceeded, a broadcast storm is declared. Every broadcast/multicast frame received will be discarded until it is determined that the storm is over (see *Restart*, below). Setting the value for *Threshold* is determined by the characteristics of your network.

Restart

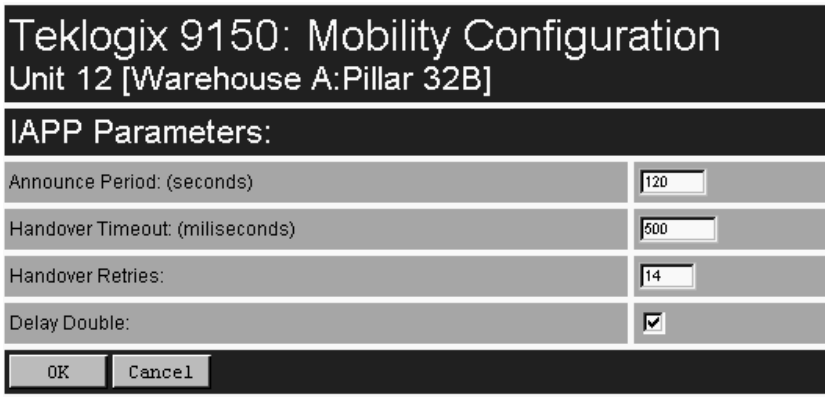
The broadcast storm is determined to be over when the number of broadcast frames received for a one second period is less than or equal to the value entered in this parameter. Setting the value for *Restart* is determined by the characteristics of your network.

6.4 Mobility Configuration

The *Mobility Configuration* page is entered from the *Access Point Configuration* menu on the first page.



Going to the *Mobility Configuration* page opens the *IAPP Parameters* options.



The Inter-Access Point Protocol (IAPP) is an extension to the IEEE 802.11 protocol. In a multiple-9150 system, IAPP facilitates roaming of mobile stations among the 9150s, and enables communication and awareness between the 9150s. Every terminal is associated with one 9150, but it can reassociate with another 9150 to maintain uninterrupted communications. The association is "handed over" from one 9150 to the next. The newly-associated 9150 will receive the terminal's data frames and pass them onto the LAN. Returning frames are no longer accepted by the original 9150, which has disassociated from that terminal. Returning frames are now accepted by the newly-associated 9150 and passed over the RF to the terminal. To implement these procedures and coordinate the 9150s, IAPP specifies two message types: *Announce* and *Handover.*

In IAPP *Announce* procedures, when the 9150 is initialized, it sends an IP multicast message to inform the other 9150s in the network that it has become active. It also informs the other 9150s of its continued operation ('alive' status) by periodically multicasting the Announce beacon.

The *Handover* protocol is intended to inform the old 9150 that a terminal has been associated with a new 9150, and to update the filter tables of intermediate MAC-bridges to correctly forward frames destined for the terminal. The newly-associated 9150 sends a Handover request to the old 9150, which disassociates itself and acknowledges the request.

Important: *These parameters are set with optimum default values. Do not adjust these values without discussing the effects with your Teklogix representative.*

6.4.1 IAPP Parameters

Announce Period

The *Announce Period* parameter indicates the number of seconds between Announce broadcasts. For further information, see "Mobility Configuration" on page 140.

Handover Timeout

If there is no response to the Handover request by the 9150 within the time specified in the *Handover Timeout* parameter, the request is retransmitted. If no response is received after a number of retries (set in the *Handover Retries* parameter, below), the 9150 will complete the reassociation procedure itself. For further information, see "Mobility Configuration" on page 140.

Handover Retries

This parameter sets the number of times the 9150 will transmit a Handover request to the disassociated 9150, before it completes the association transfer itself. See also *Handover Timeout*, above.

Delay Double

The *Delay Double* parameter doubles the amount of Handover Timeout between Handover Retries. For example, if the first retry is after 500 milliseconds, the next Handover request is sent after 1 second, followed by a retry after 2 seconds, etc.

SPECIFICATIONS 7

Note: *Performance specifications are nominal and subject to change without notice.*

7.1 Specifications For The 9150 Wireless Gateway

7.1.1 PC Card Radios

Important: *For sites in Canada, Lucent WaveLAN 802.11 and Proxim Range-LAN 802.11 radios require a radio licence, unless they are installed totally within a building. (The user shall obtain this licence from Industry Canada.)*

TRX7370 Narrow Band DSP

Transmit Power	2.0 Watts (North America) 0.5 to 2.0 Watts (International)
Frequency Range	403 to 512 MHz
Data Rate	9600 bps
No. of Channels	20

TekLAN 902 MHz DS Spread Spectrum (TRX7410)

Transmit Power	0.25 Watts (United States) 1.0 Watts (Canada and Australia)
Frequency	902 MHz
Data Rate	122 kbps
No. of Channels	7

TekLAN 2.4 GHz DS Spread Spectrum (TRX7425)

Transmit Power	0.1 Watt
Frequency Range	2.412 to 2.462 GHz
Data Rate	1 Mbps
No. of Channels	7

Proxim RangeLAN802 IEEE 802.11 FHSS 2.4 GHz (TRX7440)

Transmit Power	100 mW, 400 mW (XR)	
Frequency	2.4 GHz	
Data Rate	2 Mbps	
No. of Channels	79 (FCC, ETSI)	35 (FR)
	23 (JP)	27 (SP)

Lucent WaveLAN IEEE 802.11 DSSS 2.4 GHz (TRX7430)*

Transmit Power	32 mW	
Frequency Range	2.4 to 2.4835 GHz	
Data Rate	2 Mbps	
No. of Channels	11 (FCC)	13 (ETSI)
	4 (FR)	1 (JP)
	2 (SP)	

Lucent WaveLAN IEEE 802.11 2.4 GHz (TRX7431)*

Transmitter Power	32 mW	
Frequency Range	2.4 to 2.4835 GHz	
Data Rate	11 Mbps	
No. of Channels	11 (FCC)	13 (ETSI)
	4 (FR)	1 (JP)
	2 (SP)	

* For regulatory information concerning the Lucent WaveLAN PC Card, please see page 149.

7.1.2 Power Requirements

Input voltage	100 - 240 V
Frequency	50/60 Hz
Current	1.0 A

7.1.3 Physical Description

Enclosure		Bayer Makroblend EL-700 (PC/PET blend), jet black in colour, texture to MT-11030 or equivalent
Dimensions	Nominal	36.3 x 26.2 x 7.4 cm (14.3 x 10.3 x 2.9 in.)
	Maximum	36.8 x 26.7 x 7.6 cm (14.5 x 10.5 x 3.0 in.)
Weight	Nominal	2.9 kg (6.5 pounds)
	Maximum	3.2 kg (7.0 pounds)

7.1.4 Processor And Memory

Power PC 860DC, 40 MHz Processor
16 MB DRAM
2 MB Flash ROM

7.1.5 Environmental Requirements

Operating Temperature	0°C to 50°C (32°F to 122°F)
Operating Rel. Humidity	10% to 90% (Non-condensing)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Dust and Rain	IEC 529 IP42

7.1.6 Network Interfaces

On-Board Ethernet	10Base5 10Base2 10Base-T
Token Ring	Madge Token Ring Smart 16/4 Ringnode Adapter Type II PC card, 4 or 16 Mbps

7.1.7 SLIM Cards

Options	RS-232/20 mA Current Loop Optically isolated RS-232 Plus

7.1.8 Approvals

FCC Part 15, subpart B, Class B
Electrical Safety: CSA/NRTL, TÜV, CB Scheme
CE Mark
ETS 300 113
ETS 300 086
ETS 300 220
ETS 300 328

Lucent WaveLAN PC Card Regulatory Information

The IEEE 802.11 WaveLAN PC Card must be installed and used in strict accordance with the manufacturer's instructions. This device complies with the following radio frequency and safety standards.

Canada - Industry Canada (IC)

This device complies with RSS 210 of Industry Canada.

Europe - EU Declaration of Conformity

This device complies with the specifications listed below, following the provisions of the EMC Directive 89/336/EEC:

- ETS 300-826 General EMC requirements for Radio equipment.
- ETS 300-328 Technical requirements for Radio equipment.

USA - Federal Communications Commission (FCC)

This device complies with Part 15 of FCC Rules. Operation of the devices in a WaveLAN System is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference that may cause undesired operation.

Important: *Exposure to Radio Frequency Radiation.*

The radiated output power of the IEEE 802.11 WaveLAN PC Card is far below the FCC radio frequency exposure limits. Nevertheless, the WaveLAN PC Card shall be used in such a manner that the potential for human contact during normal operation is minimized. When using this device in combination with WaveLAN Outdoor Antenna products, a certain separation distance between antenna and nearby persons has to be kept to ensure RF exposure compliance. Refer to the Regulatory Statements as identified in the documentation that comes with those products for additional information.

Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Lucent Technologies is not responsible for any radio or television interference caused by unauthorized modification of the devices included with this IEEE 802.11 WaveLAN Kit, or the substitution or attachment of connecting cables and equipment other than specified by Lucent Technologies.

The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

For country-specific approvals, please consult the flyer “Radio Certification Information” that is included with the 9150 Wireless Gateway.

APPENDIX A

PORT PINOUTS AND CABLE DIAGRAMS

A.1 Console Port

Pin No.	Name	Function	Direction
3	TD	Transmit Data	Out
2	RD	Receive Data	In
5	SG	Signal Ground	–
4*	DTR	Data Terminal Ready	Out
7*	RTS	Request to Send	Out

* always pulled high

A.2 RS-232 Plus Port (SLIM Card)

Pin No.	Name	Function	Direction
1	FG	Frame Ground	–
2	TD	Transmit Data	Out
3	RD	Receive Data	In
7	SG	Signal Ground	–

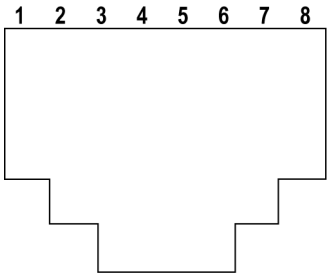
A.3 RS-232/Current Loop Port (SLIM Card)

Pin No.	Name	Function	Direction
1	FG	Frame Ground	–
2	TD	Transmit Data	Out
3	RD	Receive Data	In
4	RTS	Request to Send	Out
5	CTS	Clear to Send	In
6	DSR	Data Set Ready	In
7	SG	Signal Ground	–
8	DCD	Data Carrier Detect	In
12	–	20 mA Current Loop	In
13	–	20 mA Current Loop	In
14	–	20 mA Out	Out
19	–	Loop Enable	Out
20	DTR	Data Terminal Ready	Out

A.4 DA15 Connector Pinout (10Base5 Ethernet)

Pin No.	Function	Direction
1	Signal Ground	–
2	Collision +	In
3	Transmit +	Out
4	Signal Ground	–
5	Receive +	In
6	Signal Ground	–
7	No Connection	–
8	Signal Ground	–
9	Collision -	In
10	Transmit -	Out
11	Signal Ground	–
12	Receive -	In
13	+12 Volt Supply	Out
14	Signal Ground	–
15	No Connection	–

A.5 RJ-45 Connector Pinouts (10Base-T Ethernet)



Contact	Signal
1	TD+
2	TD−
3	RD+
4	Not used
5	Not used
6	RD−
7	Not used
8	Not used

Note: *Usually, a straight-through connection is needed to connect Twisted-Pair (10Base-T) to the hub.*

A.6 Token Ring Dsub9 Connector

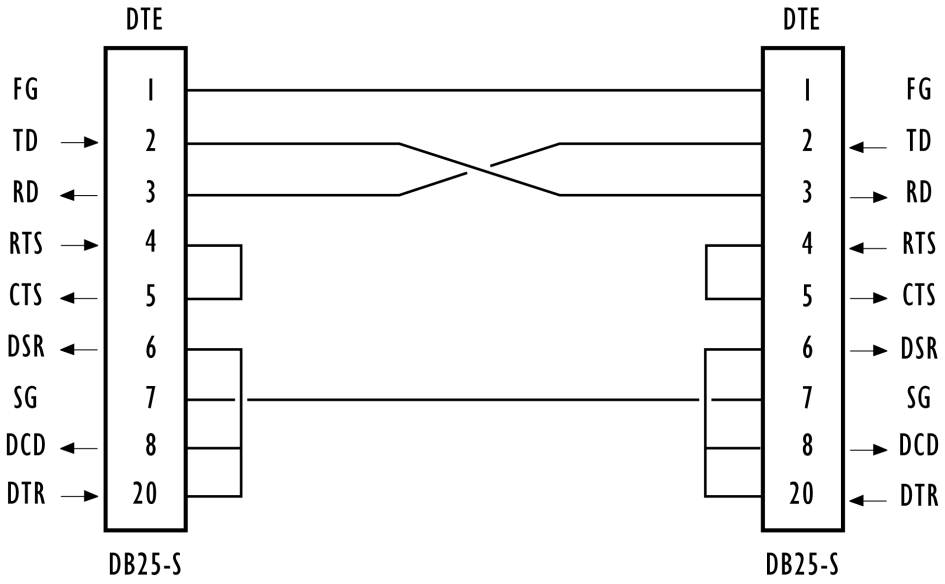
Pin No.	Function	Direction
1	Ring Input (A)	In
2	Frame Ground	–
3	+5 Volt Supply	Out
4	Frame Ground	–
5	Ring Output (B)	Out
6	Ring Input (B)	In
7	Frame Ground	–
8	Frame Ground	–
9	Ring Output (A)	Out

* This connection supports Shielded Twisted Pair (IBM STP) cable Type 1 or 6.

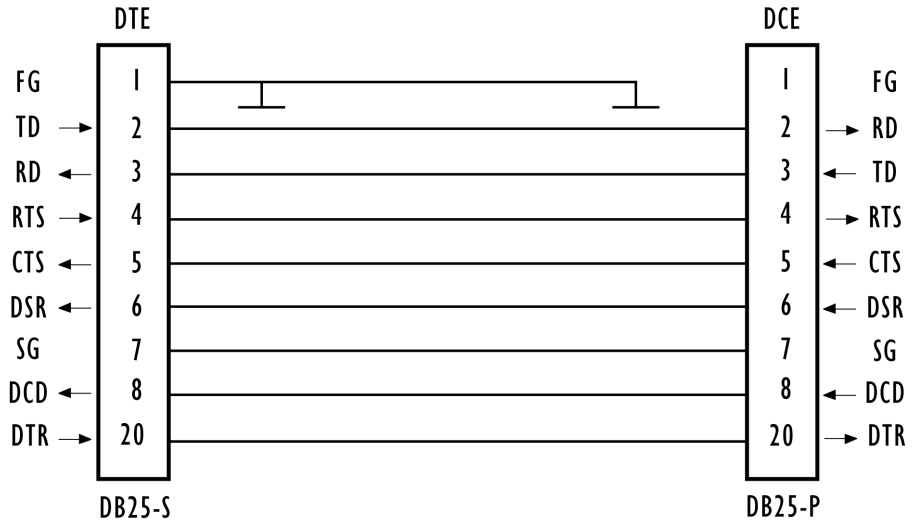
A.7 Serial Cable Descriptions

Cable No.	Function	Connection	Standard Length
16590	9400/9300 to 9150	Direct RS-232	15 feet
16598	9400/9300 to 9150	Modem RS-232	8 feet
16599	9400/9300 to 9150	Current Loop	15 feet
19387	9150 to Console	Direct	6 feet

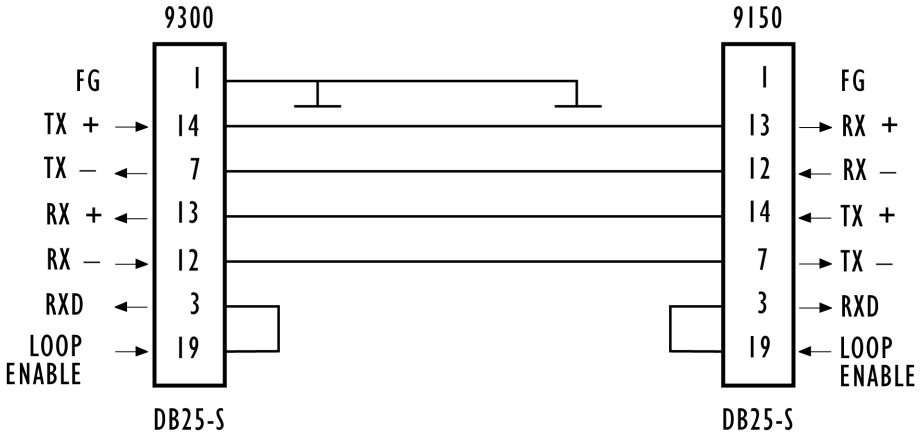
DTE to DTE Cable No. 16590



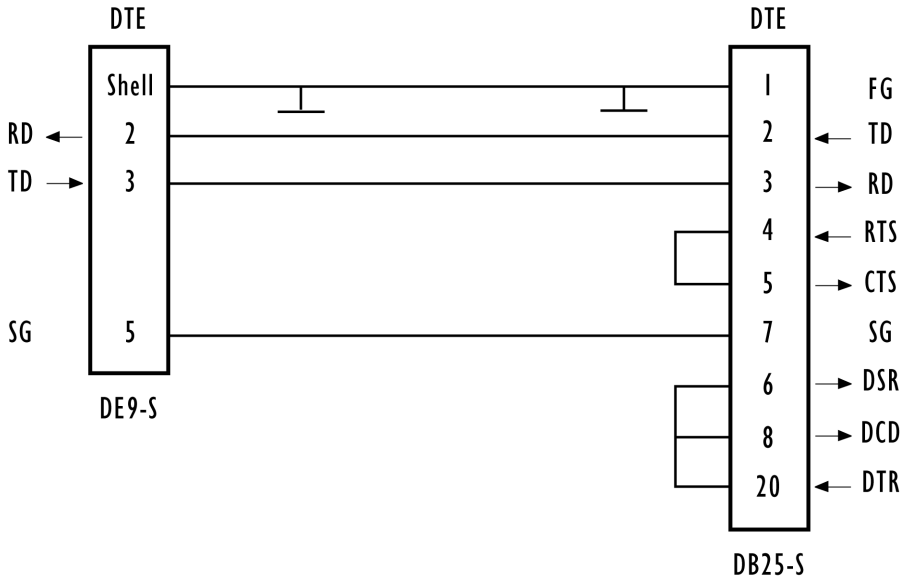
DTE to DCE Cable No. 16598



Current Loop Cable No. 16599



Console Port Cable No. 19387



APPENDIX B

MAC BRIDGE PROTOCOL FILTERS AND OUIS

B.1 Ethernet II Types (RFC 1700)

B.1.1 Listing by Description

DESCRIPTION	TYPE (HEX VALUES)
3Com Corporation	0x6010-0x6014
3Com(Bridge) loop detect	0x9003
3Com(Bridge) TCP-IP Sys	0x9002
3Com(Bridge) XNS Sys Mgmt	0x9001
Advanced Encryption System	0x823E-0x8240
Aeonic Systems	0x8036
Allen-Bradley	0x80E0-0x80E3
Alpha Micro	0x814A
Apollo Computer	0x80F7
Apollo Computers	0x8019
Appletalk	0x809B
AppleTalk AARP (Kinetics)	0x80F3
Applitek Corporation	0x80C7
Apricot Computers	0x81CC-0x81D5
ARAI Bunkichi	0x81A4
ARP	0x0806
Artisoft	0x81D6-0x81DD
Ascom Banking Systems	0x8221-0x8222

Ethernet II Types (RFC 1700)

DESCRIPTION	TYPE (HEX VALUES)
AT&T	0x8008
AT&T	0x8046
AT&T	0x8047
AT&T	0x8069
Athena Programming	0x827F-0x8282
ATOMIC	0x86DF
Autophon	0x806A
Banyan Systems	0x0BAD
Banyan Systems	0x80C4
Banyan Systems	0x80C5
BBN Simnet	0x5208
BBN VITAL-LanBridge cache	0xFF00
Berkeley Trailer encap/IP	0x1001-0x100F
Berkeley Trailer nego	0x1000
BIIN	0x814D
BIIN	0x814E
Bridge Communications	0x8132-0x8136
Cabletron	0x7034
Chaosnet	0x0804
Charles River Data System	0x8164-0x8166
Charles River Data System	0x8263-0x826A
ComDesign	0x806C
Computer Network Tech	0x869E-0x86A1
Computer Protocol Pty Ltd.	0x815C-0x815E
Computgraphic Corp.	0x806D
Comsat Labs	0x81F0-0x81F2

DESCRIPTION	TYPE (HEX VALUES)
Counterpoint Computers	0x8062
Counterpoint Computers	0x8081-0x8083
Cronus Direct	0x8004
Cronus VLN	0x8003
Dansk Data Elektronik	0x807B
Datability	0x809C-0x809E
Datability	0x80E4-0x80F0
DCA Data Exchange Cluster	0x80C0-0x80C3
DEC Customer Protocol	0x6006
DEC DECNET Phase IV Route	0x6003
DEC Diagnostic Protocol	0x6005
DEC Ethernet Encryption	0x803D
DEC LAN Traffic Monitor	0x803F
DEC LANBridge	0x8038
DEC LAT	0x6004
DEC LAVC, SCA	0x6007
DEC MOP Dump/Load	0x6001
DEC MOP Remote Console	0x6002
DEC Unassigned	0x6008-0x6009
DEC Unassigned	0x8039-0x803C
DEC Unassigned	0x803E
DEC Unassigned	0x8040-0x8042
DEC Unassigned (Exp.)	0x6000
Delta Controls	0x86DE
DLOG	0x0660
DLOG	0x0661

Ethernet II Types (RFC 1700)

DESCRIPTION	TYPE (HEX VALUES)
ECMA Internet	0x0803
Evans & Sutherland	0x805D
Excelan	0x8010
ExperData	0x8049
Gateway Communications	0x86A3-0x86AC
General Dynamics	0x8068
Harris Corporation	0x80CD-0x80CE
Hayes Microcomputers	0x8130
HP Probe	0x8005
IBM SNA Service on Ether	0x80D5
Idea Courier	0x8694-0x869D
Inst Ind Info Tech	0x829A-0x829B
Integrated Solutions TRFS	0x80DE-0x80DF
Intergraph Corporation	0x80C8-0x80CC
Internet IP (IPv4)	0x0800
Invisible Software	0x8A96-0x8A97
ISC Bunker Ramo	0xFF00-0xFF0F
Kinetics	0x80F4-0x80F5
KTI	0x8139-0x813D
Landis & Gyr Powers	0x86E0-0x86EF
Landmark Graphics Corp.	0x806E-0x8077
Little Machines	0x8060
Logicraft	0x8148
Loopback	0x9000
LRT	0x7020-0x7029
Matra	0x807A

DESCRIPTION	TYPE (HEX VALUES)
Merit Internodal	0x807C
Motorola	0x8700-0x8710
Motorola Computer	0x818D
NBS Internet	0x0802
Nestar	0x8006
Network Computing Devices	0x8149
Nixdorf Computers	0x80A3
Novell, Inc.	0x8137-0x8138
Pacer Software	0x80C6
PCS Basic Block Protocol	0x4242
Planning Research Corp.	0x8044
Polygon	0x81E6-0x81EF
Proteon	0x7030
Protocol Engines	0x817D-0x818C
PUP Addr Trans	0x0A01
Qualcomm	0x8151-0x8153
Qualcomm	0x819A-0x81A3
Quantum Software	0x8203-0x8205
RAD Network Devices	0x81A5-0x81AE
Rational Corp	0x8150
Retix	0x80F2
Reverse ARP	0x8035
Rosemount Corporation	0x80D3-0x80D4
SAIC	0x81F3-0x81F5
SECTRA	0x86DB
SGI bounce server	0x8016

Ethernet II Types (RFC 1700)

DESCRIPTION	TYPE (HEX VALUES)
SGI diagnostics	0x8013
SGI network games	0x8014
SGI reserved	0x8015
Siemens Gammasonics Inc.	0x80A4-0x80B3
SNMP	0x814C
Spider Systems Ltd.	0x809F
Stanford V Kernel exp.	0x805B
Stanford V Kernel prod.	0x805C
Symbolics Private	0x081C
Symbolics Private	0x8107-0x8109
Taurus Controls	0x829C-0x82AB
Taylor Instrument	0x80CF-0x80D2
Technically Elite Concept	0x814F
Tigan, Inc.	0x802F
Tymshare	0x802E
Ungermann-Bass dia/loop	0x7002
Ungermann-Bass download	0x7000
Ungermann-Bass net debugr	0x0900
Univ. of Mass. @ Amherst	0x8065
Univ. of Mass. @ Amherst	0x8066
Valid Systems	0x1600
Varian Associates	0x80DD
Veeco Integrated Auto.	0x8067
VG Analytical	0x81F6-0x81F8
VG Laboratory Systems	0x8131
Vitalink Communications	0x807D-0x807F

DESCRIPTION	TYPE (HEX VALUES)
Vitalink TransLAN III	0x8080
Walker Richer & Quinn	0x82AC-0x8693
Wellfleet Communications	0x80FF-0x8103
X.25 Level 3	0x0805
X.75 Internet	0x0801
Xerox IEEE802.3 PUP	0x0A00
XEROX NS IDP	0x0600
XNS Compatibility	0x0807
Xyplex	0x0888-0x088A
Xyplex	0x81B7-0x81B9

B.1.2 Listing By Type (Hexadecimal)

TYPE (HEX VALUES)	DESCRIPTION
0x0600	XEROX NS IDP
0x0660	DLOG
0x0661	DLOG
0x0800	Internet IP (IPv4)
0x0801	X.75 Internet
0x0802	NBS Internet
0x0803	ECMA Internet
0x0804	Chaosnet
0x0805	X.25 Level 3
0x0806	ARP
0x0807	XNS Compatibility
0x081C	Symbolics Private
0x0888-0x088A	Xyplex
0x0900	Ungermann-Bass net debugr
0x0A00	Xerox IEEE802.3 PUP
0x0A01	PUP Addr Trans
0x0BAD	Banyan Systems
0x1000	Berkeley Trailer nego
0x1001-0x100F	Berkeley Trailer encap/IP
0x1600	Valid Systems
0x4242	PCS Basic Block Protocol
0x5208	BBN Simnet
0x6000	DEC Unassigned (Exp.)
0x6001	DEC MOP Dump/Load
0x6002	DEC MOP Remote Console

TYPE (HEX VALUES)	DESCRIPTION
0x6003	DEC DECNET Phase IV Route
0x6004	DEC LAT
0x6005	DEC Diagnostic Protocol
0x6006	DEC Customer Protocol
0x6007	DEC LAVC, SCA
0x6008-	DEC Unassigned
0x6009	DEC Unassigned
0x6010-0x6014	3Com Corporation
0x7000	Ungermann-Bass download
0x7002	Ungermann-Bass dia/loop
0x7020-0x7029	LRT
0x7030	Proteon
0x7034	Cabletron
0x8003	Cronus VLN
0x8004	Cronus Direct
0x8005	HP Probe
0x8006	Nestar
0x8008	AT&T
0x8010	Excelan
0x8013	SGI diagnostics
0x8014	SGI network games
0x8015	SGI reserved
0x8016	SGI bounce server
0x8019	Apollo Computers
0x802E	Tymshare
0x802F	Tigan, Inc.

Ethernet II Types (RFC 1700)

TYPE (HEX VALUES)	DESCRIPTION
0x8035	Reverse ARP
0x8036	Aeonic Systems
0x8038	DEC LANBridge
0x8039-0x803C	DEC Unassigned
0x803D	DEC Ethernet Encryption
0x803E	DEC Unassigned
0x803F	DEC LAN Traffic Monitor
0x8040-0x8042	DEC Unassigned
0x8044	Planning Research Corp.
0x8046	AT&T
0x8047	AT&T
0x8049	ExperData
0x805B	Stanford V Kernel exp.
0x805C	Stanford V Kernel prod.
0x805D	Evans & Sutherland
0x8060	Little Machines
0x8062	Counterpoint Computers
0x8065	Univ. of Mass. @ Amherst
0x8066	Univ. of Mass. @ Amherst
0x8067	Veeco Integrated Auto.
0x8068	General Dynamics
0x8069	AT&T
0x806A	Autophon
0x806C	ComDesign
0x806D	Computgraphic Corp.
0x806E-0x8077	Landmark Graphics Corp.

TYPE (HEX VALUES)	DESCRIPTION
0x807A	Matra
0x807B	Dansk Data Elektronik
0x807C	Merit Internodal
0x807D-0x807F	Vitalink Communications
0x8080	Vitalink TransLAN III
0x8081-0x8083	Counterpoint Computers
0x809B	Appletalk
0x809C-0x809E	Datability
0x809F	Spider Systems Ltd.
0x80A3	Nixdorf Computers
0x80A4-0x80B3	Siemens Gammasonics Inc.
0x80C0-0x80C3	DCA Data Exchange Cluster
0x80C4	Banyan Systems
0x80C5	Banyan Systems
0x80C6	Pacer Software
0x80C7	Applitek Corporation
0x80C8-0x80CC	Intergraph Corporation
0x80CD-0x80CE	Harris Corporation
0x80CF-0x80D2	Taylor Instrument
0x80D3-0x80D4	Rosemount Corporation
0x80D5	IBM SNA Service on Ether
0x80DD	Varian Associates
0x80DE-0x80DF	Integrated Solutions TRFS
0x80E0-0x80E3	Allen-Bradley
0x80E4-0x80F0	Datability
0x80F2	Retix

Ethernet II Types (RFC 1700)

TYPE (HEX VALUES)	DESCRIPTION
0x80F3	AppleTalk AARP (Kinetics)
0x80F4-0x80F5	Kinetics
0x80F7	Apollo Computer
0x80FF-0x8103	Wellfleet Communications
0x8107-0x8109	Symbolics Private
0x8130	Hayes Microcomputers
0x8131	VG Laboratory Systems
0x8132-0x8136	Bridge Communications
0x8137-0x8138	Novell, Inc.
0x8139-0x813D	KTI
0x8148	Logicraft
0x8149	Network Computing Devices
0x814A	Alpha Micro
0x814C	SNMP
0x814D	BIIN
0x814E	BIIN
0x814F	Technically Elite Concept
0x8150	Rational Corp
0x8151-0x8153	Qualcomm
0x815C-0x815E	Computer Protocol Pty Ltd
0x8164-0x8166	Charles River Data System
0x817D-0x818C	Protocol Engines
0x818D	Motorola Computer
0x819A-0x81A3	Qualcomm
0x81A4	ARAI Bunkichi
0x81A5-0x81AE	RAD Network Devices

TYPE (HEX VALUES)	DESCRIPTION
0x81B7-0x81B9	Xyplex
0x81CC-0x81D5	Apricot Computers
0x81D6-0x81DD	Artisoft
0x81E6-0x81EF	Polygon
0x81F0-0x81F2	Comsat Labs
0x81F3-0x81F5	SAIC
0x81F6-0x81F8	VG Analytical
0x8203-0x8205	Quantum Software
0x8221-0x8222	Ascom Banking Systems
0x823E-0x8240	Advanced Encryption System
0x827F-0x8282	Athena Programming
0x8263-0x826A	Charles River Data System
0x829A-0x829B	Inst Ind Info Tech
0x829C-0x82AB	Taurus Controls
0x82AC-0x8693	Walker Richer & Quinn
0x8694-0x869D	Idea Courier
0x869E-0x86A1	Computer Network Tech
0x86A3-0x86AC	Gateway Communications
0x86DB	SECTRA
0x86DE	Delta Controls
0x86DF	ATOMIC
0x86E0-0x86EF	Landis & Gyr Powers
0x8700-0x8710	Motorola
0x8A96-0x8A97	Invisible Software
0x9000	Loopback
0x9001	3Com(Bridge) XNS Sys Mgmt

TYPE (HEX VALUES)	DESCRIPTION
0x9002	3Com(Bridge) TCP-IP Sys
0x9003	3Com(Bridge) loop detect
0xFF00	BBN VITAL-LanBridge cache
0xFF00-0xFF0F	ISC Bunker Ramo

B.2 DSAP/SSAP Types

DSAP/SSAP (HEX VALUES)	DESCRIPTION
0x0404	SNA Path Control
0x0505	SNA
0x0606	reserved (DOD IP)
0x0808	SNA
0x0C0C	SNA
0x0E0E	PROWAY-LAN network management and initialization (ISA-S72)
0x4242	MAC Bridge Spanning Tree Protocol (IEEE 802.1D-1993)
0x4E4E	MAP messaging service (EIA RS-511)
0x5E5E	ISI IP
0x8E8E	PROWAY-LAN active station list maintenance (ISA-S72)
0xAAAA	Subnetwork Access Protocol (SNAP)
0xE0E0	Novell Netware
0xF0F0	NetBIOS
0xFEFE	ISO network layer protocol (ISO CLNS DIS 8473)

B.3 OUI Values

A few important OUI values:

OUI (HEX VALUES)	DESCRIPTION
0x000000	RFC 1042 encapsulation
0x0000F8	Bridge-Tunnel encapsulation
0x0020A6	Proxim Inc.
0x00601D	Lucent Technologies
0x00C0AF	Teklogix Inc.

INDEX

BOLDFACE indicates a menu or sub-menu name; **Boldface** indicates a parameter name.

BOLDFACE indicates a menu or sub-menu name; **Boldface** indicates a parameter name.

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D

BOLDFACE indicates a menu or sub-menu name; **Boldface** indicates a parameter name.

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BOLDFACE indicates a menu or sub-menu name; **Boldface** indicates a parameter name.

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