User's Guide

P/N 071873-001

MobileLAN™ voice System

Intermec

A UNOVA Company

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Outside U.S.A. and Canada: Contact your local Intermec service supplier.

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Specifications and Worksheets

Before You Begin

This section introduces you to standard warranty provisions, safety precautions, warnings and cautions, document formatting conventions, and sources of additional product information. A documentation roadmap is also provided to guide you in finding the appropriate information.

Warranty Information

To receive a copy of the standard warranty provision for this product, contact your local Intermec support services organization. In the U.S.A. call 1-800-755-5505, and in Canada call 1-800-668-7043. If you live outside the U.S.A or Canada, you can find your local Intermec support services organization on the Intermec Web site at www.intermec.com.

Safety Summary

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

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

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

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

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

Cautions and Notes

The cautions, and notes in this manual use the following format.

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

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

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

About This Manual

This manual contains all of the information necessary to install, configure, and troubleshoot the MobileLAN™voice system.

This manual was written for installers and users who operate, program, and connect the MobileLAN voice system to a network or system. A basic understanding of standard Windows operations and data communications is necessary.

Terms

You should be aware of how these terms are being used in this manual:

Term	Description
telephony gateway	Any MobileLAN voice telephony gateway.
wireless telephone	Any MobileLAN voice wireless telephone.

Format Conventions for Input From a Keyboard

This table describes the formatting conventions for input from PC or host computer keyboards and reader keypads:

Convention	Description
`Special` text	Shows the command as you should enter it into the device.
Italic text	Indicates that you must replace the parameter with a value.
Bold text	Indicates the keys you must press on a PC or host computer keyboard. For example, "press **Enter**" means you press the key labeled "Enter" on the PC or host computer keyboard.

Other Intermec Manuals

You may need additional information when working with the MobileLANvoice system in a data collection system. Please visit our Web site at www.intermec.com to download many of our current manuals in PDF format. To order printed versions of the Intermec manuals, contact your local Intermec representative or distributor.

1

Learning About the MobileLAN voice System

This chapter explains the MobileLAN™voice system, its components, and the telephony gateways.

About the MobileLAN voice System

The MobileLAN voice system is the industry's most advanced Voice-Over-IP wireless LAN product. By integrating your network with a new or existing wireless LAN, your on-site mobile users are provided with high-quality mobile voice communications throughout the workplace.

Read this chapter to learn about the features and operation of the MobileLAN voice wireless telephone system.

System Architecture

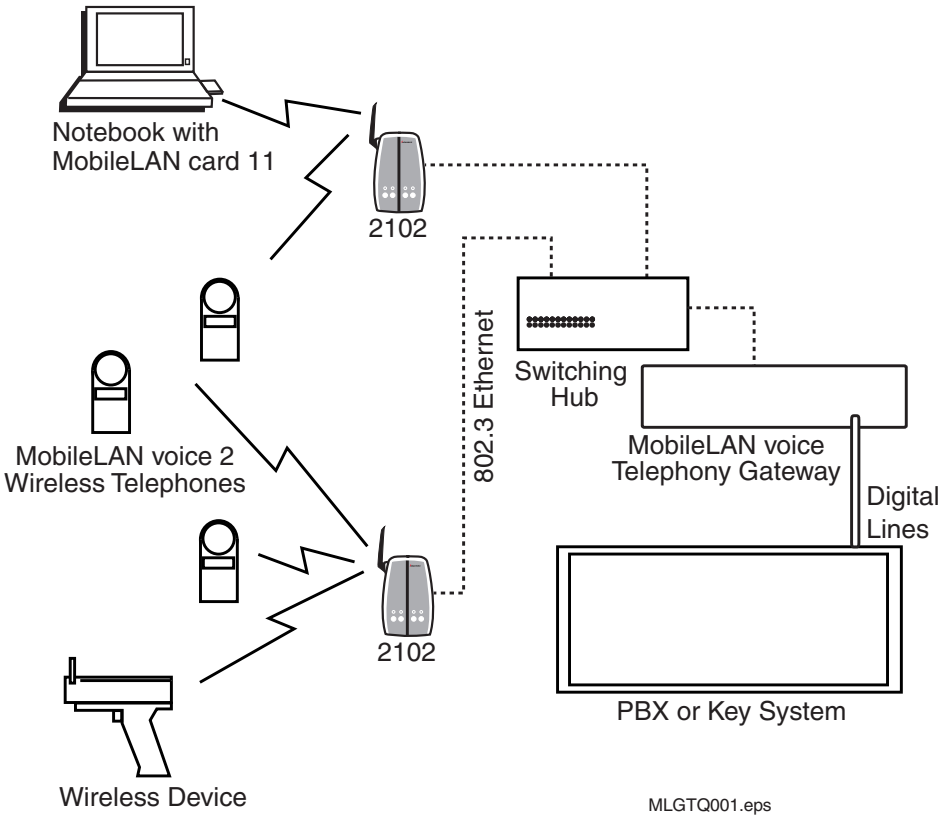
The MobileLAN voice system is Intermec's wireless LAN-based telephony product. This system operates in the 2.400-2.483 GHz unlicensed band using direct sequence (DS) spread spectrum technology, which is compatible with the IEEE 802.11b standard.

The MobileLAN voice system includes MobileLAN voice 2 wireless telephones and MobileLAN voice telephony gateways. The wireless telephones operate as clients on the wireless LAN (WLAN) alongside other mobile 802.11b devices. WLAN fixed radios, called access points, receive IP voice packets from wireless telephones and forward them to the telephony gateways over the Ethernet LAN. The telephony gateway connects to the host telephone switch using digital or analog line interfaces.

Wireless telephones are able to emulate proprietary digital telephone sets, making advanced switch features such as multiple line appearances and display features available to mobile users.

The following system diagram shows the MobileLAN voice system and its position in a typical voice/data network.

MobileLAN voice System



System Components

Your complete system network has several components: telephony gateways, wireless telephones, access points, switching hubs, and routers.

MobileLAN voice Telephony Gateways

This telephony gateway serves as the connecting point, or gateway, between the LAN and the existing telephone system. One or more telephony gateways are typically installed in the telephone equipment room.

Each MobileLAN voice telephony gateway (4-port) supports up to four wireless telephones. Up to four of these telephony gateways can be connected together to support a maximum of 16 wireless telephones.

Each MobileLAN voice telephony gateway (16-port) supports up to 16 wireless telephones. Up to four of these telephony gateways can be connected together to support a maximum of 64 wireless telephones.

Intermec offers digital telephony gateways that work with the digital ports on most common brands of telephone systems (PBX or key systems). Intermec also offers analog telephony gateways that work with analog (loop start) ports on telephone systems (CO, PBX or key systems).

MobileLAN voice 2 Wireless Telephones

Employees can carry wireless telephones to make and receive calls as they move throughout the site. The wireless telephones are to be used on the premises; they are not cellular or satellite phones. They are connected to the facility's existing telephone system and to the telephony gateway, and, just like wired telephones, they can receive calls directly, receive transferred calls, transfer calls to other extensions, and make outside and long distance calls (subject to the restrictions applied in your facility).

Access Points

Access points provide the connection between the wired Ethernet LAN and the IEEE 802.11b HR LAN. They must be positioned in all areas where wireless telephones will be used. The number and placement of access points will affect the coverage area and capacity of the wireless system. Typically, the requirements for use of MobileLAN voice 2 wireless telephones are similar to those of wireless data devices. You can have up to seven Intermec 21XX universal access points communicating with each telephony gateway. Each access point can handle up to seven phone calls.

For specific information about your facility's needs, contact your local Intermec representative.

Switching Hub

A switching hub is a component in the wired Ethernet LAN infrastructure. Hubs connect multiple network devices including MobileLAN voice telephony gateways and access points. Switching hubs are required to provide the higher performance network connections needed to handle combined voice and data traffic. All telephony gateways in a single MobileLAN voice system must be connected to the same switching hub.

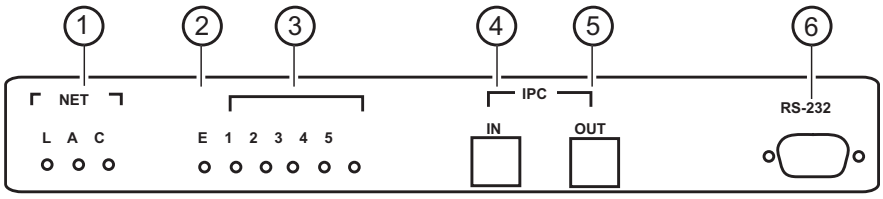
Router

A router is an optional component in the wired Ethernet LAN infrastructure that separates a wired LAN into segments so that network traffic is restricted to those segments that are directly involved in the communication. Installation of a network router is recommended in larger networks where there may be significant network traffic not related to the wireless LAN. A router will isolate the wireless LAN from the associated wired LAN so that they are not impacted by each other's traffic. The telephony gateways, the access points, and their associated switching hub must all be on the same "side" of the router.

About the MobileLAN voice Telephony Gateway (4-Port)

This section describes the MobileLAN voice telephony gateway's (4-port) front panel and back panel.

Front Panel



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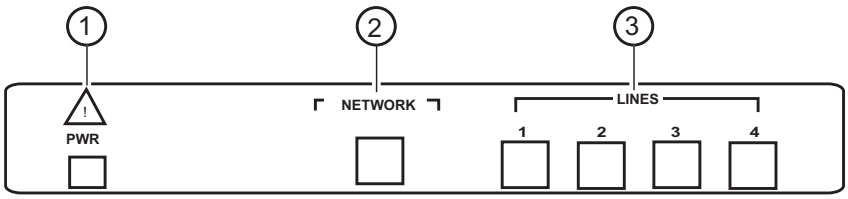
Number	Description	Explanation
1	Network Link LEDs	**L** This LED is lit when there is a network connection, i.e., LINK OK. **A** This LED is lit if there is system activity. **C** This LED is lit if there are network collisions.
2	Error LED	This LED is lit when the system detects an error.
3	Status LEDs	**1** This LED is the heartbeat and indicates that the telephony gateway is running. **2** This LED is lit if line(s) is in use. **3, 4** Currently unused. **5** This LED is lit if this telephony gateway is the master gateway.
4	IPC IN	Connects one telephony gateway to another. One IPC cable ships with each gateway.
5	IPC OUT	Connects one telephony gateway to another. One IPC cable ships with each gateway.
6	RS-232 Port	This male DB-9 connector (DTE) is used for RS-232 connection to a terminal, terminal emulator, or modem for system administration.

Back Panel



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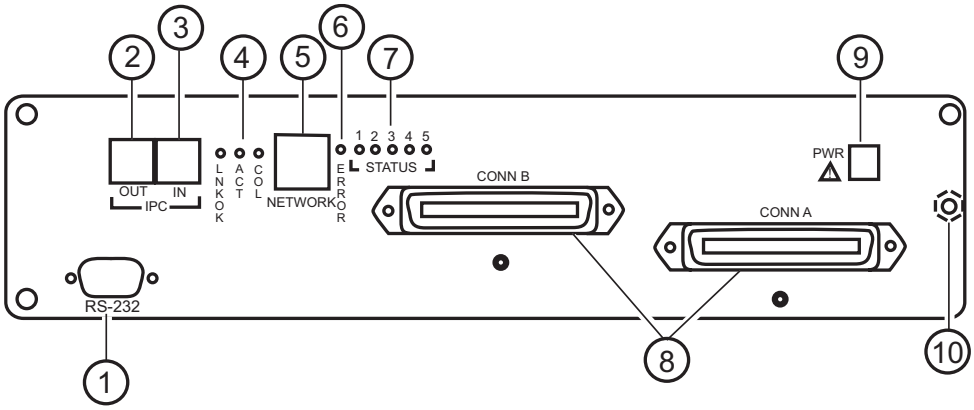
Caution
Make sure you use the appropriate Intermec power supply for your country. If you need to order an Intermec power supply, contact your local Intermec representative.

Conseil
Assurez-vous d'utiliser la source d'alimentation Intermec adéquate pour votre pays. Si vous devez commander une source d'alimentation Intermec, veuillez contacter votre représentant local Intermec.

Number	Description	Explanation
1	Power Jack	Connects the telephony gateway to the AC adapter that is supplying power to the system.
2	Network	Connects the telephony gateway to the wired (Ethernet) LAN using a 10BaseT cable with an RJ-45 connector.
3	Lines 1-4	Connect the telephony gateway to the telephone demarcation block using RJ-11 connectors.

About the MobileLAN voice Telephony Gateway (16-Port)

This section describes the MobileLAN voice telephony gateway's (16-port) front panel.



MLGTQ004.eps

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Number	Description	Explanation
1	RS-232 Port	This male DB-9 connector (DTE) is used for RS-232 connection to a terminal, terminal emulator, or modem for system administration.
2	IPC OUT	Connects one telephony gateway to another. One IPC cable ships with each gateway.
3	IPC IN	Connects one telephony gateway to another. One IPC cable ships with each gateway.
4	Link LEDs	**LNKOK** This LED is lit when there is a network connection. **ACT** This LED is lit if there is system activity. **COL** This LED is lit if there are network collisions.

MobileLAN voice Telephony Gateway (16-port) Front Panel Description (continued)

Number	Description	Explanation
5	Network	This port uses a 10BaseT cable with an RJ-45 connector and connects the telephony gateway to the wired (Ethernet) LAN.
6	Error LED	This LED is lit when the system detects an error.
7	Status LEDs	**1** This LED is the heartbeat and indicates that the telephony gateway is running. **2** This LED is lit if line(s) is in use. **3, 4** Currently unused. **5** This LED is lit if this telephony gateway is the master gateway.
8	Connector A or Connector B	These connectors use an RJ-21 connector and connect the telephony gateway to the telephone cross-connect demarcation block. Use Connector A only.
9	Power Jack	This jack connects the telephony gateway to the AC adapter that is supplying power to the system.
10	Grounding Terminal (on back panel)	This terminal is used for grounding when installing the telephony gateway.

2

Installing the MobileLAN voice System

This chapter explains how to prepare your site and install the MobileLAN™voice system, including the MobileLAN voice telephony gateways.

Installation Overview

Installation has two phases. In some cases, a separate person is responsible for each phase. It is important that you coordinate the activities among the persons involved.

1. Site Preparation
2. System Installation

This table lists the installation tasks that this chapter describes.

✓	Task Description
Site Preparation	
	Perform a site survey to ensure access point coverage.
	Determine connection of the MobileLAN voice telephony gateway to the LAN and telephone switch.
	Prepare and install LAN access.
	Procure required materials. For help, see “Equipment Requirements” later in this chapter.
	Determine physical location of MobileLAN voice telephony gateway. For help, see “Telephony Gateway Location Requirements” later in this chapter.
System Installation	
	Prepare and install telephone demarc blocks or connections.
	Assign and program telephone switch ports.
	Connect cables to telephone demarc blocks.
	Install and connect MobileLAN voice telephony gateway(s) to telephone demarcation blocks and LAN access device.

For help with the system installation, see “System Installation” later in this chapter.

Site Preparation

As shown in the MobileLAN voice system diagram on page 1-4, the MobileLAN voice telephony gateway is connected to both the switching hub and the wired telephone system. The specifications covered here allow for great flexibility in physical placement of the components within stated guidelines.

Equipment Requirements

You need to provide this equipment that is required to install all telephony gateways:

- Power outlet–must accept Intermec AC adapter.
- 10BaseT cables–connect the telephony gateway to the switching Ethernet hub.

You need to provide this equipment that is required to install specific telephony gateways:

4-Port (Analog and Digital)

Power supply–Make sure you use the appropriate power supply for your country.

North America	QPS100A
Continental Europe	QPS100B
U.K.	QPS100C
Switzerland	QPS100D

Demarcation block or modular connectors–Connects the PBX ports to the telephony gateway.

RJ-11 phone line cord–Connects the telephone lines to each telephony gateway. Up to four cords may be needed.

16-Port (Analog and Digital)

Power supply–Make sure you use the appropriate power supply for your country.

North America	TPS100A
Continental Europe	TPS100B
U.K.	TPS100C
Switzerland	TPS100D

Cross-connect block–Connects the PBX ports to the telephony gateway.

25-pair cables–Connect the telephony gateway to the cross-connect block. Must have an RJ-21 male connector at one end.

Backboard space–This telephony gateway is wall-mounted (vertically or horizontally) to 3/4" plywood that is screwed to a wall.

Screws–Use four #8x3/4" panhead wood screws (or equivalent) to attach the telephony gateway to the plywood.

Telephony Gateway Location Requirements

Locate the telephony gateway (4-port) on a shelf or table, away from external heat sources. Locate the other telephony gateway (16-port) on a wall with sufficient backboard mounting space.

Both telephony gateways must be located in a space with

- proximity to the LAN access device (switching Ethernet hub), telephone switch, and power source.
- easy access to the front and back panels that are used for cabling.
- a maximum distance of 76.2 m (250 ft) from the host telephone switch for a digital interface and 106.4 m (349 ft) from the switching Ethernet hub.

LAN Requirements

Make sure that you have the necessary network infrastructure and that the system administrator has provided you with the necessary TCP/IP information.

Network Infrastructure

The telephony gateway connects to your local area network (LAN). To provide adequate bandwidth and limit collisions, a switching Ethernet hub is required. The traffic between the telephony gateway and access points should be isolated as much as possible to avoid additional latency. The telephony gateway and access points must be on the same logic IP subnet. Intersubnet roaming is not permitted for wireless devices.

Each telephony gateway to be installed requires a 10 Mbps switching Ethernet connection.

The MobileLAN voice system relies on access points to transmit and receive packets from wireless telephones. To configure an access point to support MobileLAN voice system, see the your access point documentation.

IP Addressing

The telephony gateway, along with each of the wireless devices associated with it, requires an IP address. The system administrator must determine what IP addresses are to be used by the telephony gateway. Wireless telephones can be set for DHCP or Static IP addressing. Record IP address assignments on the Wireless Device Planning Worksheets—one for each telephony gateway. The worksheets are started when the system is installed and the information recorded on them is used in the setup and maintenance of the system.

For more information on how to assign IP addresses to the telephony gateways and wireless telephones, see Chapter 3, “Configuring the MobileLAN voice System.”

System Installation

Note: You or your wire contractor is responsible for adhering to all local codes for wiring.

This section explains how to prepare your telephone system by performing these steps:

1. Prepare and install demarcation blocks.
2. Assign and program telephone ports.
3. Connect telephone lines to demarcation blocks.

Preparing Demarcation Blocks

Caution

If the wiring between the MobileLAN voice system and the telephone system leaves the building, consult your telephone system manual for instructions on providing adequate lightning and other overcurrent protection.

All telephony gateways, except the 16-port analog gateway, are intended only for connection to the isolated side of an on-premise PBX or key system.

The interfaces are intended to connect to digital PBX ports that provide signals of 5Vp-p (max) AC components. Some PBXs provide a 48 VDC offset.

Conseil

Si le câblage qui relie le système vocal MobileLAN au système téléphonique doit aller à l'extérieur du bâtiment, consultez le manuel fourni avec le système téléphonique pour obtenir des instructions sur la façon d'assurer une protection adéquate contre la foudre et les surintensités.

Toutes les passerelles de téléphonie, à l'exception de la passerelle analogique de 16 ports, sont destinées à être connectées seulement à la paroi isolée d'un autocommutateur privé (PBX) en place sur les lieux ou à un système d'appareils à clés.

Les interfaces sont destinées à connecter les ports d'autocommutateurs privés (PBX) numériques qui fournissent les signaux pour les composants C.A. 5V crête à crête (max.). Certains ports PBX entraînent un décalage de 48 Vcc.

4-port The telephony gateway is connected to the existing telephone system using standard RJ-11, 2- or 4-conductor phone line cord. Up to four cords (one for each wireless telephone) will be needed to connect telephone lines to each telephony gateway.

16-port The telephony gateway is connected to the existing telephone system using RJ-21 connections. A telephony gateway is designed to operate with a specific interface to the telephone system: 2-wire analog or 2-wire digital. The number of demarcation blocks required for the system depends on the type of telephony gateway to be installed.

Interface Type	Intermec Part No.	Wire Pairs	Number of Blocks
16-port analog	071504	1	1
16-port digital (2-wire)	071505	1	1

Based on the number and type of interfaces in the system, determine the number of 25-pair cables required to connect telephone line ports to the demarcation blocks.

External Modem

The MobileLAN voice system can also be accessed remotely using an external modem connected to the RS-232 administration port. The telephone connection to such a modem is independent of the MobileLAN voice system, but if your site will use an external modem, this connection should be accounted for while installing the related wiring.

For more information on modem settings, see Chapter 3, “Configuring the MobileLAN voice System.”

Installing Telephone Demarcation Blocks or Connections

4-port Install the demarcation blocks or modular connectors used to connect the telephone system to the telephony gateway.

16-port Install the demarcation blocks used to connect the telephone system to the telephony gateway 3/4" telephone facility backboard. Although this manual uses 66-blocks as examples, any standard cross-connect blocks are acceptable.

Assigning and Programming Telephone Ports

Copy the Wireless Device Planning Worksheets that are in Appendix A—one for each telephony gateway being installed. The wire contractor or installer should inform the system administrator which telephone port numbers have been designated for the wireless devices and the remote diagnostics modem line. As the wire contractor or installer punches down each telephone connection, record the information on the worksheet to identify the user and extension assigned. Use the worksheets to track which switch port ID is assigned to which port on the telephony gateway. Post these worksheets near the demarcation block.

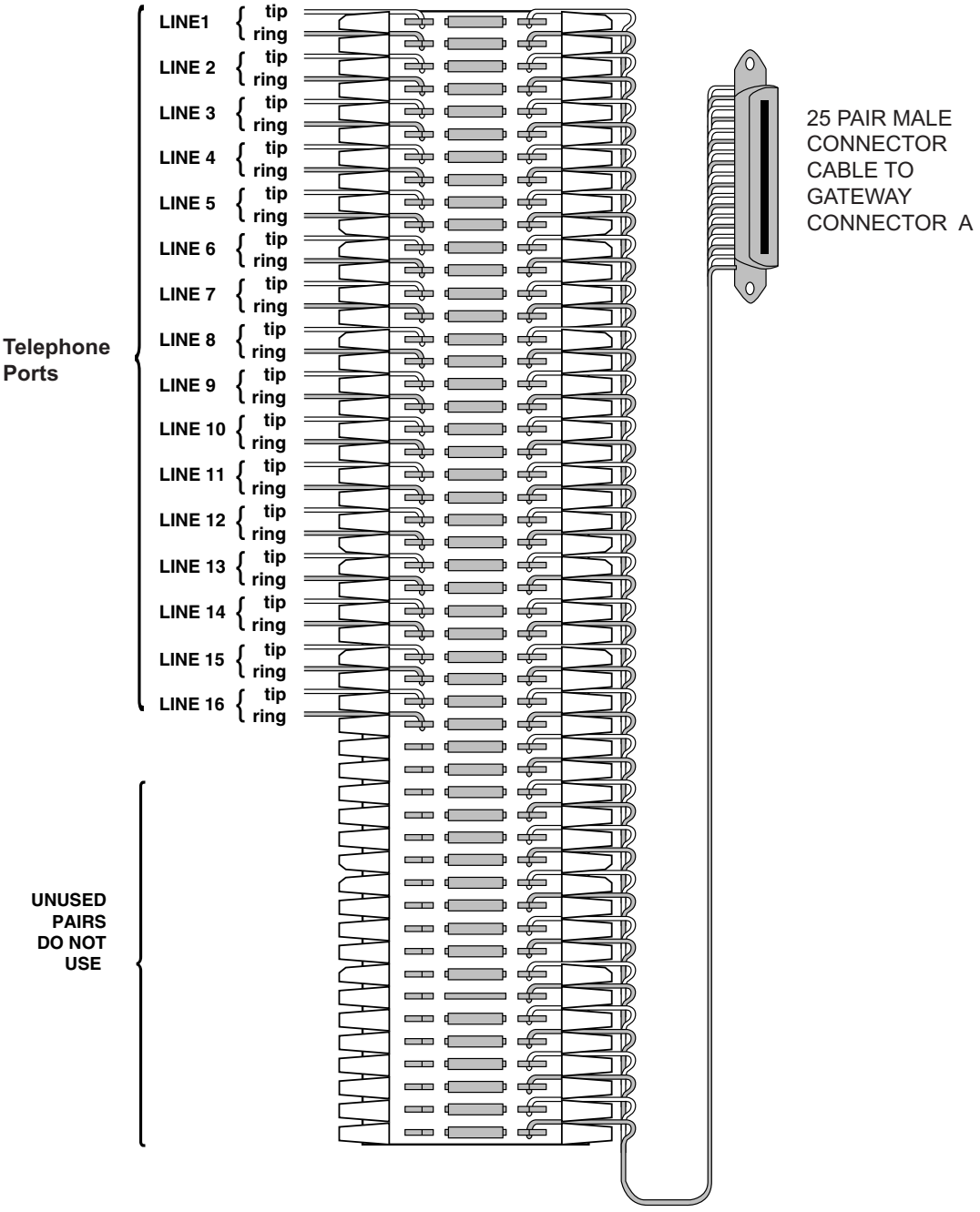
The system administrator must assign extension numbers associated with the wireless devices and plan the functions (trunk access, toll restrictions, system features, ringing options, etc.) to be programmed. This programming will be done after the wireless devices are assigned to the telephony gateway, but will be faster if planned in advance by verifying the parameters and features on the current telephone system and wired phones.

Connecting Telephone Lines to Demarc Blocks

Copy the Wireless Device Planning Worksheets that are in Appendix A—one for each telephony gateway being installed. Use the worksheets to track the telephone port assignments connected to each telephony gateway. As the wire contractor or installer punches down each telephone connection, record the information on the worksheet to identify the user and extension assigned. Post these worksheets near the demarcation block.

Telephone cables are punched down onto the cross-connect blocks as shown in the following demarc block diagrams.

2-Wire Analog or Digital Demarc Block



Telephony Gateway Installation

Before you install the MobileLAN voice telephony gateways, verify the pre-installation requirements and check the equipment at the installation site.

Verify Pre-Installation Requirements

Check the site to be sure pre-installation work has been completed correctly. This work includes:

- Location chosen for the telephony gateway is adequate and power is available.
- Site survey completed to ensure that access point coverage is adequate.
- Telephone lines for the wireless devices are installed and properly terminated.
- Dedicated line is available for remote access to diagnostic modem.
- Telephone system administrator is on-site to program the existing telephone system.
- (16-port analog only) For each telephony gateway, grounding terminal in the back panel has been electrically connected to earth ground. Consult the NEC and local codes for instructions on making the connection to the ground.

Check Equipment

These items must be at the installation site:

- MobileLAN voice telephony gateways
- AC adapters–one for each telephony gateway
- Power outlet–accepts the AC adapters
- IPC cables–one for each telephony gateway (shipped with the gateway)
- 10BaseT cables
- *MobileLAN™voice Telephony Gateway Quick Start Guide* and *MobileLAN™voice System User's Guide*

For the telephony gateway (4-port), these items must also be at the installation site:

- Demarcation block or modular connectors
- RJ-11 phone cord

For the telephony gateway (16-port), these items must also be at the installation site:

- Cross-connect block
- Screws
- Star washers–two per telephony gateway for static protection
- ESD bonding straps–one per telephony gateway for static protection
- 25-pair cables

Mounting the Telephony Gateway (16-Port)

The telephony gateway can be mounted either horizontally or vertically.

To Mount the Gateway…	Connector A is…	Mount the Gateways….	Clearance Between Gateways
Horizontally	To the right side of the telephony gateway, with labels in correct position.	On top of one another	Leave a little more than 0.64 cm (0.25 in) between adjacent telephony gateways, allowing easy removal of the gateways via the keyhole openings on the back panel. Do not leave more than 1.28 cm (0.5 in) spacing or the ESD bonding strap will not fit correctly. To set the desired telephony gateway spacing, leave (2.3 cm (0.9 in) + desired gap) between adjacent mounting holes.
Vertically	At the top of the telephony gateway.	Side by side	Adjacent telephony gateways should be physically touching.

To mount the telephony gateway

1. Using a 1/8-inch drill bit, drill four pilot holes, on 1.84 x12.1 inch centers (approximately equivalent to 1-13/16 inch x 12-1/8 inch).
2. If installing only one telephony gateway, insert the #8x3/4" screws in the pilot holes and tighten, leaving a 0.33 to 0.64 cm (1/8 to 1/4 in) gap from the wall.

   If installing more than one telephony gateway, install the ESD bonding strap(s) between adjacent gateways:

   a. Remove the screws from the bottom (vertical mount) or left (horizontal mount) of adjacent telephony gateways.

b. Place the ESD strap over the pilot holes that span two telephony gateways and hold it against the plywood backboard.

c. Place the star washer on top of the ESD strap.

d. Insert the #8x3/4" screw and tighten to leave 0.33 to 0.64 cm (1/8 to 1/4 in) gap from the wall.

e. Repeat for all ESD straps.

3. Position the telephony gateway with Connector A to the right (horizontal) or bottom (vertical). Slide the telephony gateway over the screws until the gateway drops into place in the keyhole opening.
4. Tighten the screws.
5. (Analog only) For each telephony gateway, the grounding terminal in the back panel must be electrically connected to earth ground. Consult the NEC and local codes for instructions on making the connection to the ground.

Connecting the Telephony Gateway

This section explains how to connect the telephony gateway by performing these steps:

1. Connect the telephony gateway to demarcation blocks.
2. If necessary, connect multiple telephony gateways together.
3. Connect the telephony gateway to the LAN.
4. Connect the telephony gateway to power.

Connecting the Telephony Gateway to Demarcation Blocks

4-port Connect the RJ-11 connector from the demarcation block to the designated line port (1-4) on each telephony gateway. The following table shows the pinout for the modular RJ-11 connector.

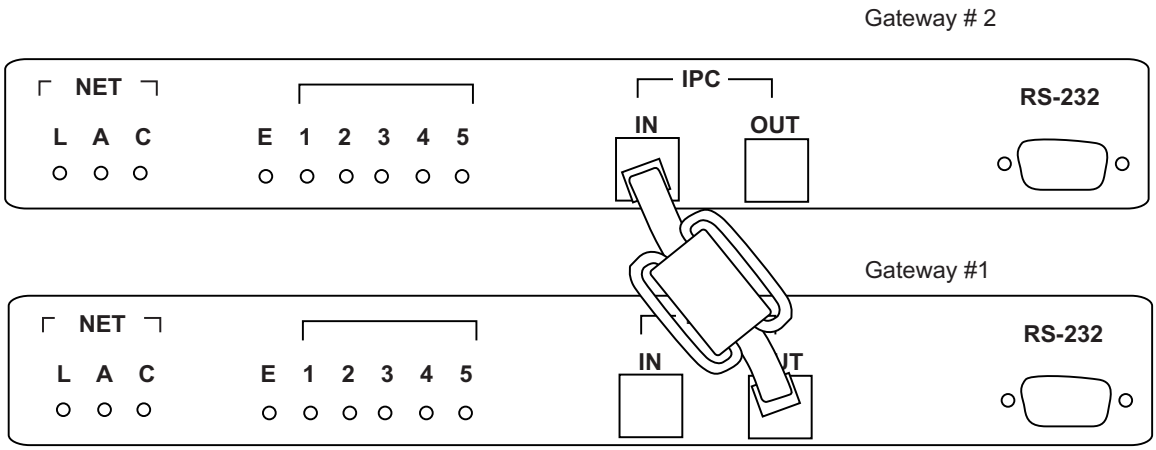
Pin	Function - 4-Wire	Function - 2-Wire
1	Transmit to Switch	Not Used
2	Receive from Switch	Transmit/Receive
3	Receive from Switch	Transmit/Receive
4	Transmit to Switch	Not Used

16-port Connect the male RJ-21 connector from the appropriate demarcation block to the designated RJ-21 connector (A or B) on each telephony gateway. Secure the cables using the keeper.

Connecting Multiple Telephony Gateways

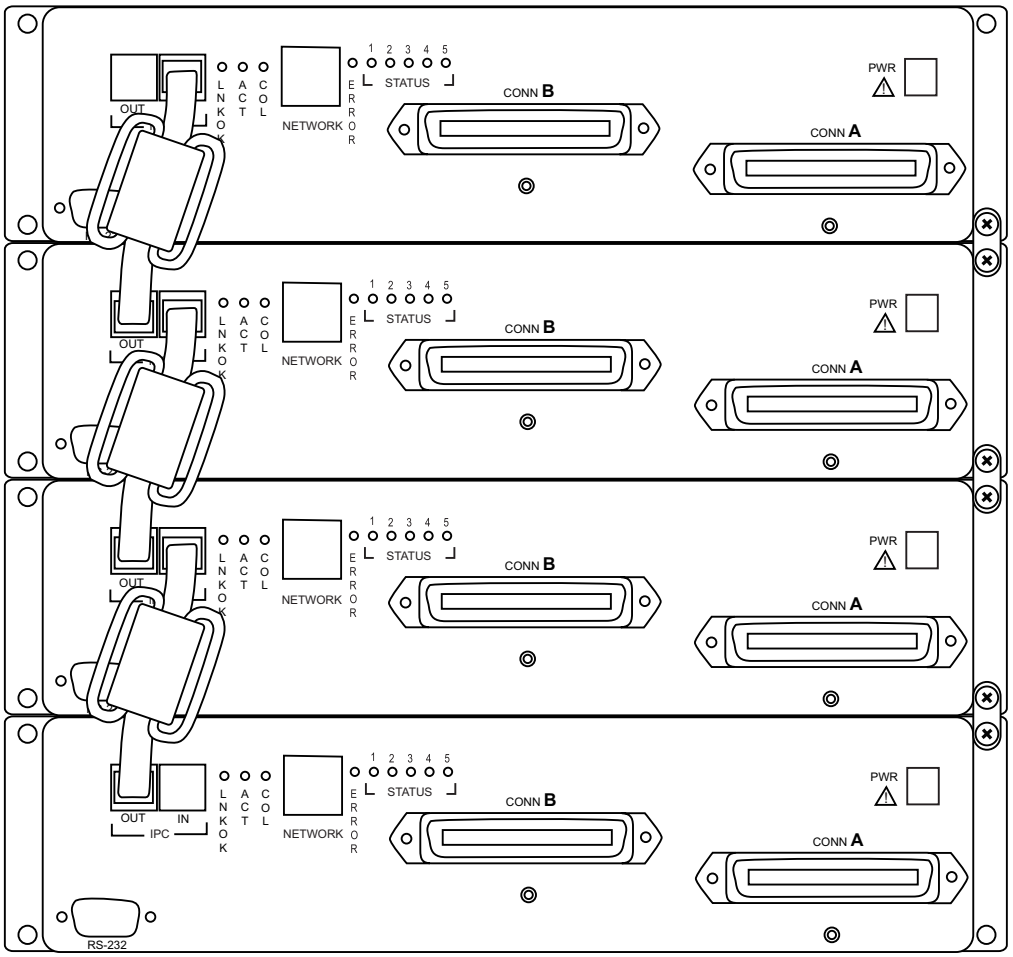
You can connect up to four telephony gateways together to increase system capacity. To connect multiple telephony gateways, connect the IPC cable from the IPC OUT port of the first unit to the IPC IN port of the adjacent unit. Repeat until all telephony gateways are connected.

Connecting Telephony Gateways (4-Port)



Note: No IPC cable is connected to the IN port of the first unit or to the OUT port of the last unit. You must use the IPC cable that shipped with your telephony gateway.

Connecting Telephony Gateways (16-Port)



Note: No IPC cable is connected to the IN port of the first unit or to the OUT port of the last unit. You must use the IPC cable that shipped with your telephony gateway.

Connecting the Telephony Gateway to the LAN

Using an RJ-45 cable, connect the NET (NETWORK) port on each telephony gateway to the connecting port on the same switching Ethernet hub. Each telephony gateway requires a separate Ethernet connection on the same switching hub.

Connecting Power

Caution
Make sure you use the appropriate Intermec power supply for your country. If you need to order an Intermec power supply, contact your local Intermec representative.

Conseil
Assurez-vous d'utiliser la source d'alimentation Intermec adéquate pour votre pays. Si vous devez commander une source d'alimentation Intermec, veuillez contacter votre représentant local Intermec.

Note: For proper operation, all telephony gateways must be turned on and off at the same time. If your MobileLAN voice system contains more than one telephony gateway, use an outlet strip with a built-in power switch.

To connect power

1. Connect the power plug from the AC adapter to the PWR jack on the back panel of the telephony gateway.
2. Plug the AC adapter into a proper AC power source or into an outlet strip.

The telephony gateways will cycle through diagnostic testing and the LEDs will blink for about one minute. When the system is ready for use:

- The E LED should be off on each telephony gateway.
- LED 1 (Status 1) should be blinking on each telephony gateway.
- LED 5 (Status 5) should be lit on one and only one telephony gateway. If LED 5 is lit on more than one telephony gateway, the gateways are not correctly connected to one another. Check the IPC and network connections.

After the telephony gateways are installed, you must configure the gateway and wireless telephones. For help, see Chapter 3, "Configuring the MobileLAN voice System."

3

Configuring the MobileLAN voice System

This chapter explains how to configure MobileLAN™voice telephony gateways and the MobileLAN voice 2 wireless telephones.

System Configuration Overview

This section covers the steps that must be taken to set up the MobileLAN voice system for operation. The usual course of setup procedures will follow these general steps in the following order:

1. Install and connect the telephony gateway(s). For help, see Chapter 2, “Installing the MobileLAN voice System.”
2. Configure the telephony gateway. For help, see “Configuring the Telephony Gateway (First Time).”
3. Assign wireless telephones to telephone lines. For help, see “Associating the Wireless Telephone Lines.”
4. Configure Feature programming. For help, see “Programming Wireless Telephone Features.”
5. Edit the wireless telephone menu. For help, see “Programming the Wireless Telephone Menu.”
6. Configure, test, and set user preferences for each wireless telephone. For help, see “Configuring the Wireless Telephone.”
7. Use the wireless telephones to perform access point coverage tests. For help, see “Using Site Survey Mode.”

Using the Administration Console

The MobileLAN voice telephony gateways and MobileLAN voice 2 wireless telephones are configured and maintained through the Administration Console. The Administration Console is a series of screens that contain menus and options. You can view the Administration Console on a terminal that is connected to a telephony gateway through the serial port, through a Telnet session on the LAN, or through an external modem.

Using the Administration Console, you can:

- Review system status to check usage and diagnose system problems.
- Configure the telephony gateway's network parameters and its interface to the host telephone system.
- Configure the telephony gateway's wireless telephones, including adding and deleting the wireless telephones.
- Program the wireless telephone's menu and features associated with the FCN key.
- Update the system software.

Note: Access points are not configured from the Administration Console. For help configuring your access point, see your access point documentation.

Navigating Through the Screens

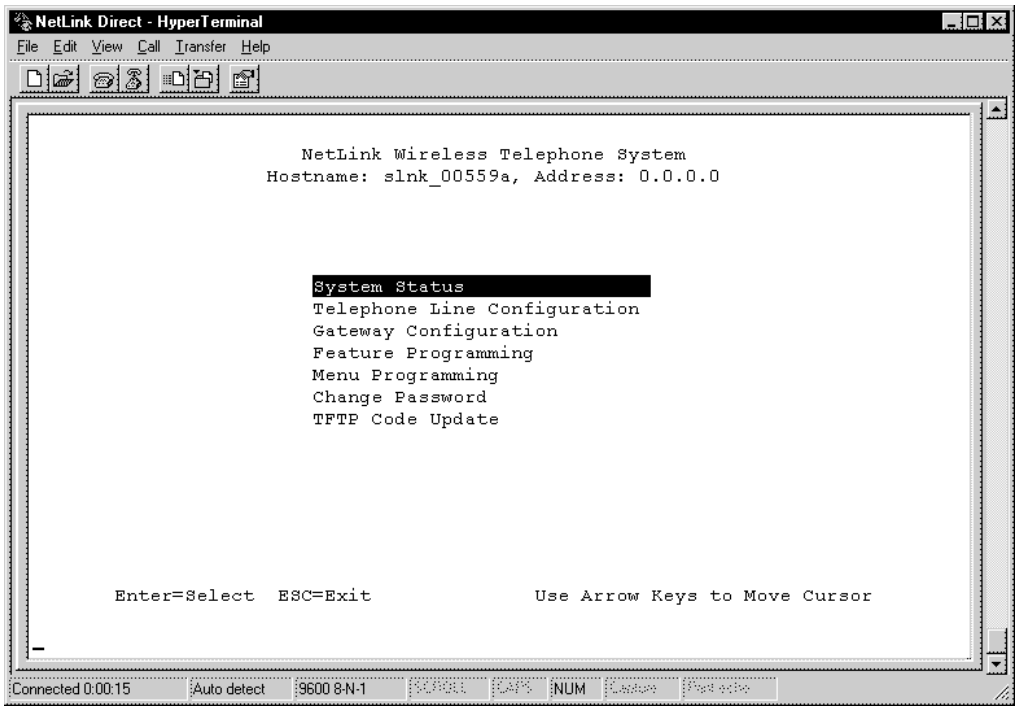
Use these keys to move around the Administration Console screens.

To Perform This Function	Press
Select function from menu	Arrow keys to highlight selection and then press **Enter**.
Display menu associated with the highlighted field	**Enter**. The Enter key will either display the options associated with an item or let you type an entry into the field.
Exit screen	**Esc**. The Esc key will take you to the previous screen.
Move one line up	Corresponding arrow key.
Move one line down	
Move one field to the left	
Move one field to the right	

The top line of each administration screen displays the hostname and IP address of the telephony gateway to which you are connected.

About the Main Menu

The main menu provides a list of options that help you configure and maintain the telephony gateway and the wireless telephones it supports.



Menu Option	Function
System Status	Provides status of the telephony gateway and its communications links. Use to view the system operation and troubleshoot problems.
Telephone Line Configuration	Use to add, delete, and maintain wireless telephones.
Gateway Configuration	Use to enter and maintain configuration information for the telephony gateway.
Feature Programming	Associates telephone system features with the FCN keys on the wireless telephone.
Menu Programming	Enables customization of the wireless telephone menus so that they conform to the feature programming.
Change Password	Use to change the administration password.
TFTP Code Update (4-port only)	Use to update the telephony gateway with new software.

Configuring the Telephony Gateway (First Time)

For the initial configuration of each MobileLAN voice telephony gateway, you should have the Wireless Device Planning Worksheet(s) that was filled out during installation. There should be one worksheet for each telephony gateway. You need to know these parameters before proceeding with the setup:

- Hostname (usually the default name is replaced with a locally-designated identifier)
- IP address (established by the system administrator)
- PBX (Private Branch Exchange) type
- Number of phones per access point

The initial setup of each telephony gateway requires establishing its IP address on the LAN. You need to perform this task using a serial connection. Intermec recommends that you also configure other basic setup parameters at this time. Perform these steps on each telephony gateway.

1. Connect to the telephony gateway via the serial port.
2. Select the telephony gateway.
3. Configure the telephony gateway.
4. Reset the telephony gateway.

Connecting to the Telephony Gateway Via the Serial Port

1. Connect the telephony gateway to the serial port of a PC or terminal using a DB-9 female, null-modem cable (Part No. MCI100).
2. On your PC, run a terminal emulation program (such as HyperTerminal) or use a VT100 terminal with this configuration:

Baud rate	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

3. Press **Enter** to display the login screen.
4. Type the default login: `admin` and the default password: `admin`. These fields are case sensitive.

The Gateway Connection Selection screen appears and lists the telephony gateway and its factory default name.

Selecting the Telephony Gateway

After the initial configuration, the Gateway Connection Selection screen will list all the telephony gateways in your MobileLAN voice system. This time, however, it only lists the telephony gateway that is connected via the serial cable.

To select the telephony gateway

- Press **Enter** to select the highlighted telephony gateway. The main menu appears.

Configuring the Telephony Gateway

The basic setup recommended here is essential to the telephony gateway functioning. After the MobileLAN voice system is running, you may want to configure additional parameters to adjust the system for your usage situation. For help, see "Configuring the Telephony Gateway" later in this chapter.

To configure the telephony gateway

1. From the main menu, select Gateway Configuration. The Gateway Configuration screen appears.
2. Use the worksheet for the telephony gateway to enter these parameters:

Option	Description
IP address	Enter the IP address for the telephony gateway, including numbers and periods. This address is assigned by your system administrator.
Hostname	(Optional) Enter the hostname for the telephony gateway, if you want to change the default name. You cannot enter spaces. This name is used for identification purposes only.
Subnet mask	Enter the subnet mask for the telephony gateway, including numbers and periods. This subnet mask is assigned by your system administrator. This field is null in the MobileLAN voice system.
Telephone switch type	Press **Enter** to change this field. From the submenu of PBX types, select the telephone switch type you are using.
Phones per access point	Enter the maximum number of active wireless telephones calls per access point. Intermec's 21XX universal access points can handle up to seven calls.

Configuring the Telephony Gateway (continued)

Option	Description
Companding type	Press Enter to change this field. From the submenu of signal compression type, select the companding type you are using. Mu-law is the standard format in most host telephone systems in North America. A-law is typically used in Mexico and Europe. **Note:** If the companding type of the telephony gateway does not match that of the PBX, the wireless telephones will have distorted dial tone and unintelligible voice quality.

Resetting the Telephony Gateway

When you are done configuring the basic setup parameters for the telephony gateway, you need to reset it.

To reset the telephony gateway

1. Press **Esc** to exit the Gateway Configuration screen. You are asked if you want to reset the telephony gateway.
2. Press **Y** to reset the telephony gateway.

Resetting All Telephony Gateways

When you are done configuring all the telephony gateways, do not unplug the serial cable. You now need to reset all the telephony gateways.

To reset all telephony gateways

1. Log in again and navigate to the Gateway Configuration screen.
2. Use the arrow keys to select Reset All Systems and press **Enter**. You are asked if you want to reset all the telephony gateways.
3. Press **Y** to reset all the telephony gateways.

The telephony gateways are now ready to operate. The next step is to configure the Wireless Telephones. For help, see "Configuring the Wireless Telephone" later in this chapter.

Configuring the Telephony Gateway

Each MobileLAN voice telephony gateway is administered separately. That is, you need to enter configuration information separately for each telephony gateway.

Connecting to a Telephony Gateway

In addition to the serial connection described earlier in this chapter, you can connect to the telephony gateway via a Telnet session on the LAN or via an external modem. Once the IP addresses are configured, every telephony gateway is accessible through a connection to any telephony gateway.

Connecting Via Telnet

You use the Telnet method of connection for routine maintenance of the MobileLAN voice system for both local and remote administration, depending on your network.

Note: You can only connect to a telephony gateway using Telnet after the telephony gateway's IP address is configured.

To connect via Telnet

1. Run a Telnet session to the IP address of any telephony gateway.
2. Log into the session. The Gateway Connection Selection screen appears.
3. Select the Telephony Gateway you wish to administer and press **Enter**. The main menu appears.

Note that the top line of each screen displays the hostname and IP address of the telephony gateway that you are currently maintaining.

Connecting Via External Modem

You use the external modem method of connection for routine maintenance of the MobileLAN voice system when system administration is remotely done, and the network itself is not remotely accessible.

Generally speaking, you should be able to use the modem's default settings, except you must disable Hardware Flow Control.

Note: You need a standard analog phone line for the modem. (A digital line from a digital PBX will not work.) Consult with your telephone system vendor or the telephone company for more information about dialing into a modem.

These settings are for the US Robotics Sportster modem. Other modem models may be used, but those models' settings will need to be adapted to conform to those listed in this table.

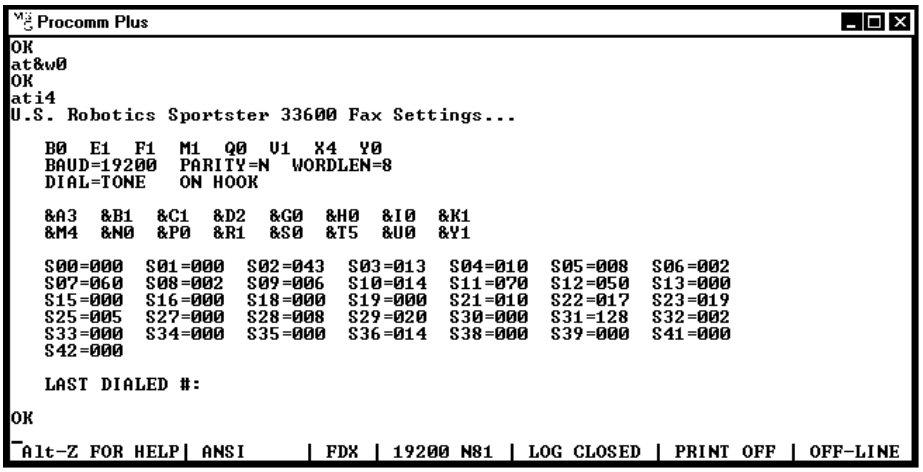
To configure and connect the modem

1. Connect the modem to a PC using a standard modem cable. Plug the 9-pin connector into the RS-232 port on the PC, and plug the 25-pin connector into the modem's port.
2. Use a standard communications package such as ProComm Plus or HyperTerminal, to bring up the modem and type these commands.

   Press **Enter** after typing each command.

Command	Description
AT&F1	Loads factory default settings
AT&H0	Sets Transmit Data Flow control to disabled
AT&R1	Sets modem to ignore Request to Send (RTS)
AT&W0	Saves the configuration

3. Turn off the modem and then turn it back on.
4. Type `ATI4` and press **Enter**. The settings should match those shown in this screen, which was taken from ProComm Plus.



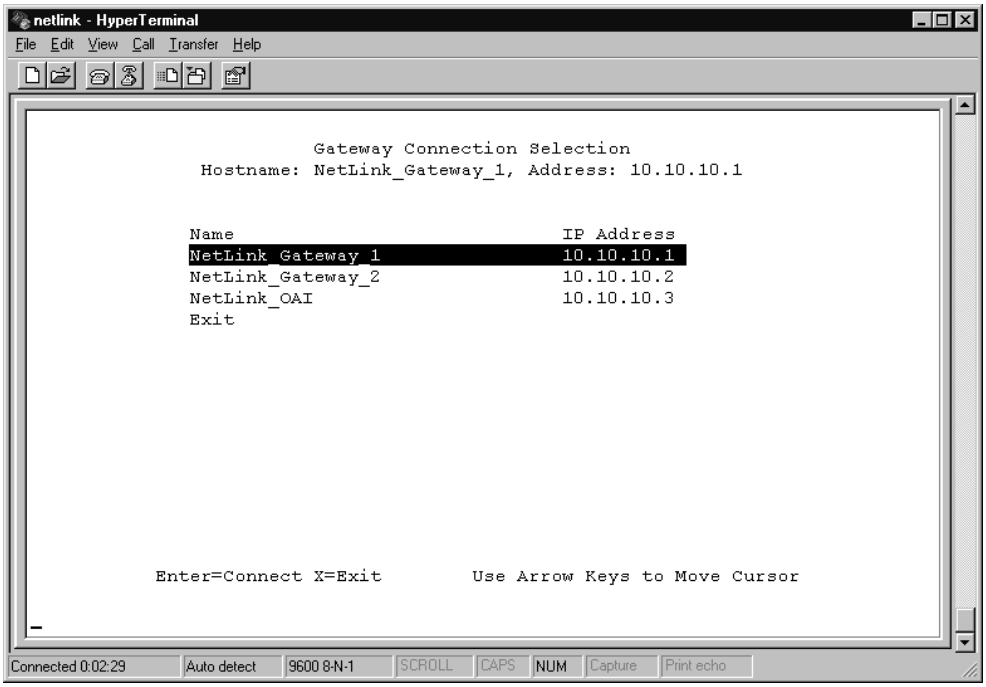
5. Unplug the modem from the PC's serial port and plug it into the telephony gateway.

Gateway Connection Selection Screen

After logging into the telephony gateway, the first Administrative Console screen that appears is the Gateway Connection Selection screen. This screen lets you select the telephony gateway that you want to maintain.

To navigate in the Gateway Selection screen

1. Once you are logged into the system, the Gateway Connection Selection screen appears.



2. Use the arrow keys to select the telephony gateway that you want to configure and press **Enter**. The main menu appears.

Note that the top line of each administration screen displays the hostname and IP address of the telephony gateway being administered.

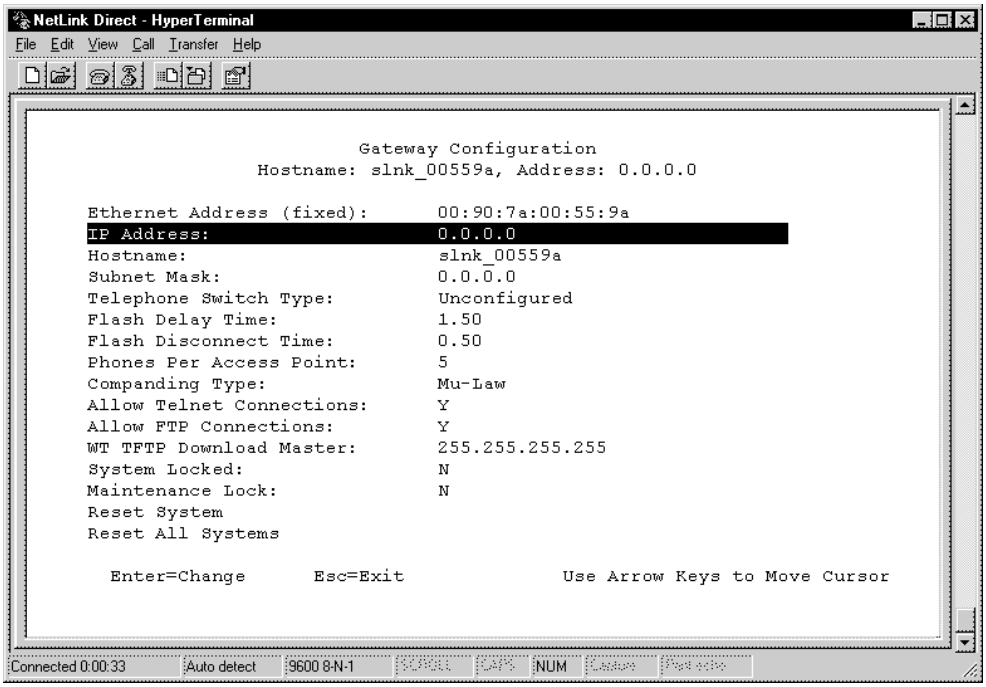
For help understanding the main menu, see “About the Main Menu” earlier in this chapter.

Gateway Configuration Screen

The Gateway Configuration screen lets you configure and maintain the telephony gateway. Do not change any settings until you understand the parameters and are familiar with the consequences any changes will produce.

To go to the Gateway Configuration screen

- From the main menu, select Gateway Configuration and press **Enter**. The Gateway Configuration screen appears.



To exit the Gateway Configuration screen

- Press **Esc**. If Maintenance Lock is set to Y, the system will prompt you to reset this telephony gateway.

Note: If you reset one telephony gateway, you should then choose Reset All Systems. Resetting all the telephony gateways keeps them synchronized, which is important for proper system functioning.

Gateway Configuration Screen

Option	Description
Ethernet Address	This address is the MAC address for the telephony gateway. It is set at the factory and is not user configurable.
IP Address*	Enter the IP address for the telephony gateway, including numbers and periods. This address is assigned by your system administrator.
Hostname*	(Optional) Enter the hostname for the telephony gateway, if you want to change the default name. You cannot enter spaces. This name is used for identification purposes only.
Subnet Mask*	Enter the subnet mask for the telephony gateway, including numbers and periods. This subnet mask is assigned by your system administrator. This field is null in the MobileLAN voice system.
Telephone Switch Type*	Press **Enter** to change this field. From the submenu of PBX types, select the telephone switch type you are using.
Flash Delay Time	(Analog only) Enter the length of time the system should wait after the "on-hook" flash signal ends before allowing other keys to be transmitted to the host telephone system. The range is from 0.01 to 2 seconds. This value depends on the requirements of the host telephone system.
Flash Disconnect Time	(Analog only) Enter the length of time the system should be "on-hook" when the user presses **Start** during a call or uses a macro that includes a Flash code. The range is from 0.01 to 2 seconds. This value depends on the requirements of the host telephone system.
Phones Per Access Point*	Enter the maximum number of active wireless telephone calls per access point.
Companding Type*	Press **Enter** to change this field. From the submenu of signal compression type, select the companding type you are using. **Mu-law** The standard format in most host telephone systems in North America. **A-law** The format typically used in Mexico and Europe. **Note:** If the companding type of the telephony gateway does not match that of the PBX, the wireless telephones will have distorted dial tone and unintelligible voice quality.
Allow Telnet Connections	Enter Y (yes) to allow connection to the telephony gateway via Telnet; enter N (no) if you do not want to allow Telnet connections.
Allow FTP Connections	Enter Y (yes) to allow the telephony gateway to communicate via FTP; enter N (no) if you do not want to allow the telephony gateway to communicate via FTP. You use FTP for software updates as well as to back up and restore software configuration.

Gateway Configuration Screen (continued)

Option	Description
WT TFTP Download Master	This option indicates the source of software updates for the wireless telephones that are associated with this telephony gateway. When you receive a software update, you must place it in this location. When the wireless telephone is turned on, it checks this source for confirmation that it is running the correct software version. If there is any discrepancy, the wireless telephone downloads the software that resides in this source location. **255.255.255.255** (Telephony gateway (16-port) default) This address indicates that the wireless telephones will get software from this telephony gateway. **0.0.0.0** (Telephony Gateway (4-port) default) This address disables the ability for wireless telephones to download new software from this telephony gateway. **IP Address** The IP address of a network TFTP server that will be used to transfer software updates to the wireless telephones.
System Locked	Use this option when you want to take the system down for maintenance. The default is N (no). Change this option to Y (yes) to prevent any new calls from starting. Return this option to N to restore normal operation.
Maintenance Lock	This option prevents any new calls from starting. You cannot change this option. The telephony gateway automatically sets this option to Y (yes) when certain maintenance activities require a reset. These activities are indicated in this table with an asterisk (*). When you reset the telephony gateway, the Maintenance Lock is cleared.
Reset System	This option resets this telephony gateway.
Reset All Systems	This option resets all telephony gateways.

*When these settings are changed, the telephony gateway automatically goes into Maintenance Lock and prevents any new calls from starting. You will be prompted to reset the system upon exit. Resetting terminates any active calls and clears the Maintenance Lock.

Note: The Allow Telnet Connections and the Allow FTP Connections options are security points. If you disable both of these options, the only way you can access the telephony gateway is via serial connection.

Associating the Wireless Telephone Lines

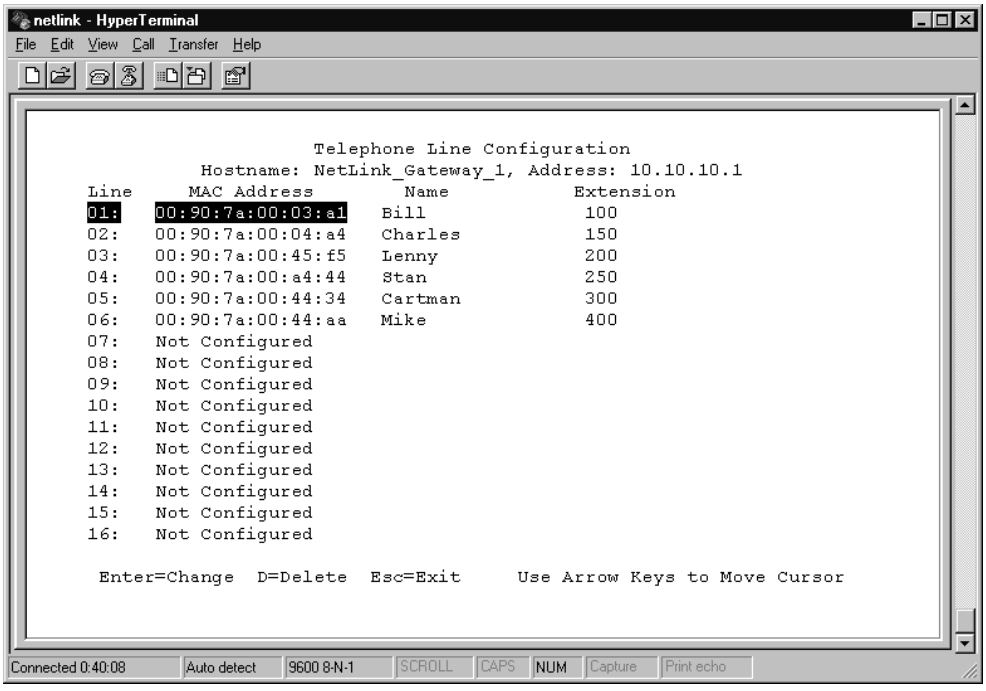
After the installation is complete and the MobileLAN voice telephony gateways are configured, you need to associate each wireless telephone with a telephone port on the telephony gateway.

After you complete these steps, you can configure each wireless telephone. For help, see "Configuring the Wireless Telephone" later in this chapter.

To configure the wireless telephone lines, you should have the wireless telephones that need to be configured and the Wireless Device Planning Worksheet(s). There should be one worksheet per telephony gateway that lists the port assignment, extension, and user name for each wireless telephone.

Adding or Changing a Wireless Telephone

1. From the Gateway Connection Selection screen, select the telephony gateway that serves the ports that you want to configure. The main menu appears.
2. Select Telephone Line Configuration. A screen similar to the following screen appears.



3. Use the arrow keys to select a line and press **Enter**. For each wireless telephone, enter this information:

Option	Description
MAC Address	Enter the address including digits and colons. This 12-character address is printed on the sticker underneath the battery on the wireless telephone. It can also be displayed on the wireless telephone by turning off the telephone and then pressing and holding **Pwr**. The address appears on the first line of the display.
Name	Enter the user name assigned to the wireless telephone. This field is for record keeping only. That is, the user name is not sent to the PBX or to the wireless telephone.
Extension	Enter the extension assigned to the wireless telephone. This field is for record keeping only. That is, the extension is not sent to the PBX or to the wireless telephone.

4. Write the MAC address on the Wireless Planning Device Worksheet for this telephony gateway.
5. Repeat Steps 3, 4, and 5 for each wireless telephone to be added or changed.

Note: A wireless telephone may be associated with one and only one telephone line. The same MAC address may not be assigned to two or more telephone lines.

Deleting a Wireless Telephone

1. From the Gateway Connection Selection screen, select the telephony gateway that serves the port for the line being used by the wireless telephone. The main menu appears.
2. Select Telephone Line Configuration.
3. Use the arrow keys to select the line that you want to delete.
4. Press **D** to delete the wireless telephone information.
5. Press **Y** to accept changes.
6. Update the Wireless Planning Device Worksheet for this telephony gateway to remove the wireless telephone that you deleted.

Programming Wireless Telephone Features

Two basic types of wired telephone systems exist—analog and digital. Both types offer special features such as hold, transfer, conference, camp on, and speed dial. In both types of systems, these features are activated in a telephone by pressing a series of keys or a single programmed button on the wired telephone.

For both analog and digital systems, you must use the Feature Programming screen on the MobileLAN voice telephony gateway to program mute to **FCN 1** and the optional OAI (Open Application Interface).

Analog You use the Feature Programming screen to program special features. You access these special features by pressing the Fcn key on the wireless telephone followed by another key. This shortcut is called a "function key macro." You can define function key macros for the digits 1 through 9, *, 0, and #.

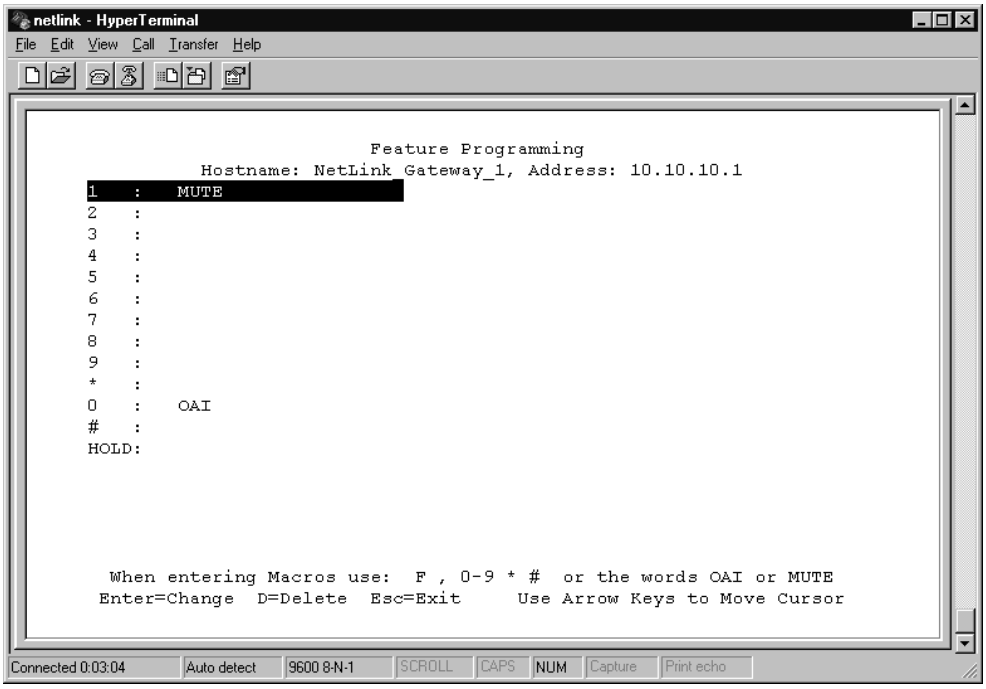
Digital You do feature programming in the PBX. These features are also programmed into the wireless telephones. You only use the Feature Programming screen to program mute and OAI.

You should use the same Feature Programming settings for every telephony gateway sharing the same PBX so that all wireless telephones have access to the same special features.

To go to the Feature Programming screen

1. From the Gateway Connection Selection screen, select the telephony gateway that you want to configure. The main menu appears.
2. Select Feature Programming. A screen similar to the following screen appears.

Feature Programming Screen



The numbers and symbols on the left side of the screen indicate which key the user presses after pressing the FCN key to activate the feature.

3. Use the arrow keys to select 1, press **Enter**, and type `MUTE` as shown in the previous screen.
4. (OAI only) Use the arrow keys to navigate to the key to which you want the OAI function assigned, press **Enter**, and type OAI as shown for 0 in the above screen.

These steps apply to analog systems only

5. The table below displays the default menu options that are programmed into the wireless telephones for an analog system. You may want to set these same functions here or change them. If you change them, be sure to enter the corresponding changes in the Menu Programming screen in the next section.

Function Key	Feature	Key Sequence
FCN+1	Mute	MUTE
FCN+2	Xfer	
FCN+3	Conn	
FCN+4	Conf	
FCN+5	Fwd	
FCN+6	Redial	
FCN+7	Pick	
FCN+8	Camp	
FCN+9	Exit Menus	(Leave Blank)
FCN+0		
FCN+*		
FCN+#		

   Consult your wired telephone system documents for the key sequence that matches the feature in the above table. Blank cells are provided for your data.

   Note that the zero (0), star (*), and pound (#) keys are not assigned by default, but may be programmed here and in the default menus on the wireless telephones.

6. Use the arrow keys to navigate to the function key, press **Enter**, and then type the key sequence that corresponds to the feature you want to activate for that function.

   Press **Enter** after each entry.

   Press **F** to assign the FLASH function.

   Example: If the Transfer feature key sequence is Flash Star 7 and you wish to keep the default at FCN+2, navigate to key 2, press **Enter**, type `F*7`, and press **Enter**.

7. Repeat Step 6 for each feature you wish to program to a function key macro.

Remember to note the features and macros so that they can be edited in the Wireless Telephone menu, if necessary, and programmed into any other telephony gateways on the same PBX.

When you have finished programming the macros, press **Esc** to return to the main menu.

Programming the Wireless Telephone Menu

The MobileLAN voice 2 wireless telephone can display a menu of functions that are activated when you press the Fcn key. The menu should match the feature programming established in the Feature Programming screen for analog systems or in the PBX for digital systems. For help, see "Programming Wireless Telephone Features" in the previous section.

The wireless telephone displays four menus as you repeatedly press the FCN key. Each menu has four programmable options that are programmed in the Menu Programming screen, which displays all four menus at once. The default factory settings are for features most commonly accessed by users of the type of PBX installed with the wireless telephone system.

All the settings can be customized to conform to the feature programming established at your site. You should program each telephony gateway with identical menus.

Analog The features defined for the custom menus should match the features programmed in the Feature Programming screen. For example, if you have defined **FCN 2** on Feature Programming as Xfer, then you should also define **FCN 2** on Menu Programming as Xfer.

Digital The features defined for the custom menus should match the programming assigned through the PBX. For example, if you have assigned Xfer to the key that corresponds to **FCN 2** on the digital telephone that is being emulated by the wireless telephone, then you should also define **FCN 2** on Menu Programming as Xfer. Note that some key assignments cannot be customized on certain types of telephone systems.

To go to the Menu Programming screen

1. From the Gateway Connection Selection screen, select the telephony gateway that you want to configure. The main menu appears.
2. Select Menu Programming. The Menu programming screen displays the defaults for your wireless telephone system. A screen similar to the following screen appears.

Menu Programming Screen

Each of the four menus displays two lines. The numbers followed by the equal sign indicate which key to press on the Wireless Telephone to activate the feature, such as 2=Xfer. These lines will display on the wireless telephone exactly as programmed here. You should program all telephony gateways identically.

If any of the factory defaults have been changed by using the Feature Programming, you should change the menu items here so that they correspond to what has been programmed elsewhere.

The Delay function is used when the PBX uses softkeys. With the Delay function, when the FCN key is pressed, the wireless telephone displays the features that are associated with the softkeys so that one of these features can be selected first. If the Delay function is programmed, pressing **FCN** twice will bring up the programmed menus immediately.

To change the menu settings

1. Use the arrow keys to navigate to the menu display screen number (1-4) that you want to edit and press **Enter**.
2. Type the information that you want to display on each line of the menu.
3. Press **Enter** to save the entries.
4. Repeat Steps 1, 2, and 3 for each menu as needed.

To restore factory defaults

- Use the arrow keys to navigate to Restore Factory Defaults and press **Enter**.

Configuring the Wireless Telephone

Before you can configure a MobileLAN voice 2 wireless telephone, you must associate it with one and only one line on a telephony gateway. For help, see "Associating the Wireless Telephone Lines" earlier in this chapter.

These instructions assume that the wireless telephone has been properly associated with a line on a telephony gateway. While wireless telephones are being associated, the wireless telephone system will continue normal operation.

Use the Wireless Device Planning Worksheets to make sure that you are correctly assigning telephone parameters.

Configuring the Network Parameters

You need to use the Admin menu to assign the IP address and ESSID for the wireless telephone so that it can communicate with the LAN and with the access points. You may also need to set WEP encryption.

However, the Admin menu also lets you restore the factory defaults of the wireless telephone and use the wireless telephone to check signal strength.

To configure the network parameters

1. With the wireless telephone turned off, press and hold the PWR key and then press the END key.
2. Release the PWR key, then release the END key. The first option on the Admin menu appears.

3. Press the left or right arrow keys (# and *****) on the wireless telephone to scroll through the menu options.

   Press **0** (zero) to change the selected option.

   Press **FCN** to return to the previous menu level.

   Press **END** to exit the menus.

The Admin menu parameters are explained in the next sections. An asterisk (*) next to an option indicates that it is selected.

IP Address

Select the option that you want the wireless telephone to use to obtain its IP address configuration:

Use DHCP (Default) The wireless telephone uses Dynamic Host Configuration Protocol (DHCP) to assign an IP address each time it is turned on.

Static IP This option lets you manually set an IP address for the wireless telephone. If you choose this option, you will be prompted to enter the IP address for this wireless telephone. Enter the digits only, including leading zeroes. You do not need to enter periods.

ESSID

Select the option that will enable the wireless telephone to communicate with access points with the correct ESSID (Extended Service Set ID, aka SSID, aka Network Name) each time it is turned on.

Learn Once This option lets the wireless telephone scan all ESSs for its telephony gateway. Once it finds its telephony gateway, it retains the ESSID from whichever access point it associates with at that point. When overlapping wireless systems exist, the Learn Once feature lets the wireless telephone turn on in any ESSID area and use only the ESSID established at first learn. This ESSID is retained by the wireless telephone until the ESSID option is reselected.

Learn Always This option lets the wireless telephone automatically learn the ESSID each time it is turned on. This option may be useful if the wireless telephone will be used at more than one site.

Note: Overlapping wireless systems can complicate the use of the Learn Once and Learn Always options. A wireless telephone in an overlapping area could receive conflicting signals. If this is the situation at your site, use Static Entry or Learn Once in an area without overlapping ESSIDs.

You must enable broadcast ESSID in the access points for ESSID learning to function.

Static Entry If your access points do not broadcast the ESSID or if there are overlapping wireless systems in use at the site, you may want to enter the correct ESSID manually:

To enter the ESSID

1. On the keypad, enter the first character of the ESSID. To enter the character, you may need to press the appropriate key repeatedly to scroll through the letters associated with that key.

   For example, if you press **2** repeatedly, you will see 2, A, B, and C, a, b, and c.

   This table shows you how to enter non-numeric characters or other characters not represented on the keypad.

To Enter	Press
. - _ ! # $ % & ‘ ( ) , : ; / \ = @ ~	1
Space	0
Q	7
Z	9

2. When the correct character appears, press the right arrow to move on to the next character.
3. Repeat Steps 1 and 2 for each character of the ESSID.
4. Press **END** to save the entry and return to the menu.

   Press **FCN** to abort and return to the menu without saving any changes.

Restore Defaults

The Restore Defaults option sets all user and administrative parameters to their factory defaults. During configuration, press the right arrow to skip this mode.

Site Survey Mode

You can use the Site Survey mode to check the signal strength from access points. When you select Site Survey Mode, the wireless telephone remains in this mode until it is turned off. During configuration, press the right arrow to skip this mode. For help, see “Using Site Survey Mode” later in this chapter.

Encryption

WEP (Wired Equivalent Privacy) is a wireless encryption protocol that scrambles wireless signals allowing for greater security in the wireless network. By default, WEP options are off.

If your access points use WEP encryption, you must configure each wireless telephone to correspond exactly with the encryption protocol set up in the access point.

Authentication Select either Open System or Shared Key.

WEP Select either WEP Off or WEP On.

Key Information Press the right arrow key to scroll through the options:

Default Key Enter the key number specified for use by the wireless telephones. This key will be 1 through 4.

Key Length Select either 40-bit or 128-bit depending on the key length specified for use at this location.

Key 1-4 Scroll to the key option that corresponds to the Default Key that was entered. Press **0** and enter the encryption key as a sequence of hexadecimal characters. (Use the 2 and 3 keys to access hexadecimal digits A-F; use the left arrow key to backspace.)

For 40-bit keys you will need to enter 10 digits; for 128-bit keys you will need to enter 26 digits. The display will scroll as needed.

Note: Encryption codes appear as you enter them. However for security reasons, codes will not display when you return to the Admin menu, Encryption options.

WEP may be set at “optional” at the access point if there are wireless devices in use that do not have WEP capability. All wireless devices must be upgraded to WEP capability for a fully secured WEP environment.

Testing a Wireless Telephone

You can verify proper registration and operation of each wireless telephone by performing these tests on each wireless telephone in your MobileLAN voice system.

To test a wireless telephone

1. Press **PWR** to turn on the wireless telephone. You will see a series of messages displayed on the screen as the wireless telephone acquires the system. The wireless telephone should display the user extension or dashes if no extension is programmed. The NO SVC icon should disappear.
2. Press **START**. The extension number should clear and you should hear a dial tone.

   On some digital systems, depending on how the telephone system is programmed, you may have to select a line to get a dial tone. Place a call and listen to the audio quality. Press **END** to end the call.

3. Place a call to the wireless telephone and verify that it rings, answers, and clearly transmits/receives audio.
4. Use the **FCN** key to verify all programmed features on the wireless telephone.
5. Press **END**. Any line indicators should turn off and the extension number display should return.

If any of these steps fails to operate as described, see Chapter 4, "Maintaining and Troubleshooting the MobileLAN voice System" for corrective action.

Setting User Preferences

These user-defined preferences are also covered in the *MobileLAN™voice 2 Wireless Telephone Quick Start Guide* (Part No. 071875). The system administrator can refer to this list for more information about customizing wireless telephone settings.

To configure these options, the wireless telephone must acquire the system (the NO SVC icon must be off) and be at the extension display. Press and hold the FCN key briefly to access these options:

Volume Level This option lets you set the base audio volume level of this wireless telephone. Select a level from 1 (softest) to 8 (loudest). Level 5 is the default.

Telephone Ring This option lets you change the standard ring used for normal operation. From the Telephone Ring menu, select either Normal Ring (an audible alert) or Vibrator Ring. The Auxiliary Ring modes are reserved for future use. Vibrator ring works only if your wireless telephone has the optional vibrating ringer. The ring type currently in use appears with an asterisk (*).

High Noise Mode This option lets you select the noise level in your environment. This option adjusts the wireless telephone to account for background noise. Intermec does not recommend that you use the non-Normal Noise modes unless you are in a loud environment, or you may find it difficult to hear on your wireless telephone.

Current IP Address This option displays the IP address currently assigned to this wireless telephone. You cannot change the IP address here.

Extension This option lets you enter the extension for this wireless telephone. Note this number is for labeling purposes only; entering it does not assign the extension.

Language This option lets you select a language for the display if a different language is supported on your system.

Using Site Survey Mode

You can use the MobileLAN voice 2 wireless telephones to conduct a preliminary Site Survey Mode test. Site surveys test signal strength in the covered area. Note any areas where coverage is conflicting or inadequate. Note any system difficulties. For help, see "Solving Coverage Issues" later in this section and Chapter 4, "Maintaining and Troubleshooting the MobileLAN voice System."

Put a wireless telephone in Site Survey mode. For help, see "Configuring the Wireless Telephone" earlier in this chapter. Walk the entire coverage area while viewing the display. The Hold key toggles between the two coverage modes described below. The wireless telephone will remain in Site Survey mode until it is turned off. When testing is complete, press **PWR** to turn off the wireless telephone.

Note: When you use the MobileLAN voice 2 wireless telephone to conduct a site survey, you are surveying for a transmit rate of 2 Mbps. Your data clients generally support a transmit rate of 11 Mbps. Depending on the needs of your network, you may still need to perform another site survey to support your data clients. Slower transmission rates usually provide better range and faster transmission rates usually provide increased throughput.

Detect dBm Coverage

As you walk the perimeter, the two-line display will show the top four access points that the wireless telephone can contact in a code as illustrated below.

```
XXX1  YY  XXX2 YY
XXX3  YY  XXX4 YY
        F1
```

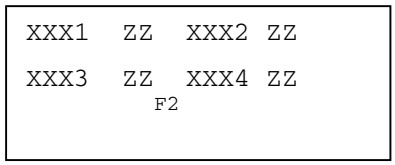
- XXX1 through XXX4 are the last four digits of each access point's MAC address. The primary access point (the access point that had the strongest signal to this wireless telephone) appears first, followed by the three access points with the next strongest signals.
- YY is the power level in dBm at which this wireless telephone heard the associated access point. Although shown as a positive number, YY represents negative dBm and lower numbers represent stronger signals.

  For example, a displayed value of 40 indicates -40 dBm, and is therefore a stronger signal then a display of 50 (which indicates -50 dBm).

  At least one access point's reading should be lower than 70 dBm in all areas. Note any areas that have inadequate dBm readings.

Detect Overlap or Conflicts

Press the HOLD key to toggle to the Site Survey function that shows the channel number of the access points. Use this information to detect overlaps or conflicts in access point signaling.



- XXX1 through XXX4 are the last four digits of each access point's MAC address.
- ZZ is the channel number that the access point is using.

It is preferable that no overlaps exist anywhere in your facility. If that is not possible (especially likely in DS (Direct Sequence) systems), then any location that shares two access points with the same channel pattern should also show at least two access points with stronger signals that do not conflict.

Solving Coverage Issues

You can best resolve coverage issues by adding and/or relocating access points.

You can resolve conflict and overlap issues by reassigning channel patterns to the access points or by relocating the access points.

4

Maintaining and Troubleshooting the MobileLAN voice System

This chapter explains how to maintain the MobileLAN™voice system. It also explains how to diagnose and correct problems with the MobileLAN voice system.

Maintaining the MobileLAN voice System

This section explains how to upgrade the software on your MobileLAN voice telephony gateways and on your MobileLAN voice 2 wireless telephones. It also explains how to back up and restore the configuration files on your telephony gateways.

Upgrading the MobileLAN voice Software

The MobileLAN voice telephony gateways and the MobileLAN voice 2 wireless telephones use proprietary software programs. The software versions that are running on the system components can be displayed via the System Status menu. For help obtaining information about software upgrades, contact your local Intermec representative.

After software upgrades are obtained from Intermec, they must be transferred to the appropriate location in the LAN to update the code used by the MobileLAN voice system components.

You can upgrade the software on your MobileLAN voice devices using one of these three methods: automatic, FTP (File Transfer Protocol), or TFTP (Trivial File Transfer Protocol). This table shows which method is used by which component of the system:

MobileLAN voice Device	Upgrade Method
Telephony Gateway (16-port)	FTP to telephony gateway.
Telephony Gateway (4-port)	TFTP from TFTP server to telephony gateway via TFTP menu option.
Wireless Telephones*	Automatic from telephony gateway (usual for telephony gateway (16-port)). Automatic from TFTP server (required for telephony gateway (4-port)).

* as set in the Gateway Configuration screen, WT TFTP Download Master, IP address.

Note: Navigate to the Gateway Configuration screen and place the system in System Lock before proceeding with the FTP or TFTP procedure to prevent new calls from starting. All calls in progress are terminated when the system is reset.

Upgrading the Telephony Gateways Using FTP

When using FTP, you use a host system to connect to a remote system. In this example, the host is the server and the remote is the telephony gateway. The "put" command means to copy the files from the host to the remote system. The "get" command means to copy the files from the remote system to the host.

Note: FTP commands vary with the program being used. Use these steps as a general guide, but note that your FTP program may use different terms.

To transfer the software using FTP:

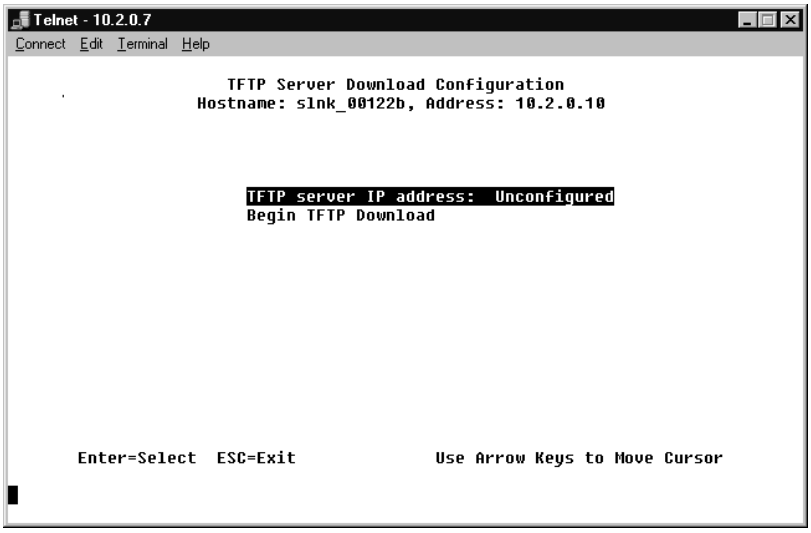
1. Connect to the TFTP server or the telephony gateway by typing `FTP` *`hostname`* or `FTP` *`IPaddress`*.
2. Log in using the administrator login (admin) and password (default is admin). A login confirmation message appears, followed by the FTP> prompt.
3. At the FTP prompt, type `binary`. A confirmation message appears.
4. At the FTP prompt, use the put command to transfer the required files to the client server or the telephony gateway.
5. After files are transferred, use the Quit command to quit FTP.
6. Navigate to the main menu for the telephony gateway and select System Status. The System Status menu appears.
7. Select Software Versions and verify that software versions for the telephony gateway are correct.
8. Reset the system via the Gateway Configuration screen.

Upgrading the Telephony Gateways Using TFTP

Obtain and load TFTP on the specified server. Consult your server vendor's documentation for information about TFTP. Load the updated software in a location that is accessible by the TFTP program.

To transfer the update via TFTP

1. Navigate to the main menu for the telephony gateway or OAI telephony gateway and select TFTP Code Update. The following screen appears.



2. In the TFTP Server IP Address field, type the IP address of the TFTP server.
3. Select Begin TFTP Download. The system prompts you with the following message:

   "Are you sure (Reset and Download New Code?)"
4. Press **Y** (yes) to begin the download. The screen goes blank and the download will begin.

   You should see the status lights on the telephony gateway cycle to indicate that the download is in progress. When the download is complete the telephony gateway resets.
5. Navigate to the main menu for the telephony gateway and select System Status. The System Status menu appears.
6. Select Software Versions and verify that software versions for the telephony gateway are correct.
7. Reset the system via the Gateway Configuration screen.

Upgrading the Wireless Telephones

You can perform over-the-air transfer of software updates from the telephony gateway or designated TFTP server to the wireless telephones. The downloader function in the wireless telephone checks its software version every time the wireless telephone is turned on. If there is any discrepancy–as there would be when the WT TFTP Download Master is updated–the wireless telephone immediately begins to download the update.

Normal Download Messages

When the wireless telephone is turned on, it displays a series of messages indicating that it is searching for new software, checking the versions, and downloading. The normal message progression is:

Message	Description
Checking Code	Wireless telephone is contacting the Download Master to determine if it has a newer version of software that should be downloaded.
Erasing Memory	Wireless telephone has determined that a download should occur and is erasing the current software from memory. This message also displays a progress bar. When the progress bar fills the display line the erase operation is complete.
Updating Code	Wireless telephone is downloading new software into memory. The number icons at the bottom of the display indicate which file number is currently being downloaded. This message also displays a progress bar. When the progress bar fills the display line the update operation is complete on that file.

While the wireless telephone is updating, the NO SVC message displays.

When the update is complete, the wireless telephone displays the extension number and is ready for use.

Download Failure or Recovery Messages

These display messages indicate a failure or recovery situation during the download process.

Message	Description
Server Busy	Wireless telephone is attempting to download from a Download Master that is busy downloading other phones and refusing additional downloads. The wireless telephone will automatically retry the download every few seconds.
TFTP ERROR(x):yy	A failure has occurred during the TFTP download of one of the files. (x) is the file number that was being downloaded; yy is an error code describing the particular failure. Possible error codes are: 01 = TFTP server did not find the requested file. 02 = Access violation (reported from TFTP server). 07 = TFTP server reported “No such user” error. Check the TFTP server configuration. 81 = File put into memory did not CRC. The wireless telephone will attempt to download the file again. FF = Timeout error. TFTP server did not respond within a specified period of time.
Erase Failed	Download process failed to erase the memory in the wireless telephone. This operation will try again.
Waiting	Wireless telephone has attempted some operation several times and has failed, and is now waiting for a period of time before attempting that operation again.

Backing Up and Restoring the Telephony Gateway Configuration

When you are done configuring the telephony gateway, you should back up its configuration files (config.bin). If necessary, you can then use FTP to restore the files.

Note: FTP commands vary with the program being used. Use these steps as a general guide, but note that your FTP program may use different terms.

To copy the configuration from/to the telephony gateway

1. Connect to the telephony gateway.

   To back up the configuration, type `FTP` *`hostname`*.
   To restore the configuration, type `FTP` *`IPaddress`*.

2. Log in using the administrator login and password. A login confirm message appears, followed by the FTP> prompt.
3. At the FTP prompt, type `binary`. A confirm message appears.
4. Use the get command to back up the files or use the put command to restore files.

   To back up the configuration, at the FTP prompt use the get command to transfer the required files from the telephony gateway to the server. For example, type `get config.bin`.

   To restore the configuration, at the FTP prompt use the put command to transfer the required files from the server to the telephony gateway. For example, type `put config.bin`.

5. After files are transferred, use the Quit command to quit FTP.
6. Navigate to the main menu for the telephony gateway and select System Status. The System Status menu appears.
7. Select Software Versions and verify that software versions for the telephony gateway are correct.

Note: The get and put commands copy files. Be careful not to overwrite your config.bin files. To avoid overwriting your files, you can

- change directories before you connect and copy each telephony gateway's config.bin file to its own directory.
- use the local file name form of the get or put command to rename the file when it is copied. For example, type `get config.bin gateway1.bin` to copy config.bin as gateway1.bin to the host.

Remember to copy the correct files when restoring configuration files. For example, type `put gateway1.bin config.bin` to copy gateway1.bin as config.bin to the telephony gateway.

About Troubleshooting

Troubleshooting your MobileLAN voice system requires full information about the components not only of the system, but also of the larger system, which includes both the host telephone system and the LAN. The MobileLAN voice telephony gateways provide a "window" into the functioning of the various wireless components via the System Status menu.

Normally, troubleshooting sequences proceed from the simple to the complex. To perform these procedures, you should have a thorough understanding of the configuration of the system.

You should also have additional information about your system that can be provided by a map, blueprint, or diagram of the facility that clearly shows hardware components including access point positions and wireless telephone assignments. Also, you should have the Wireless Telephone Assignment Worksheets.

The MobileLAN voice system provides diagnostic information in three ways.

- Administration Console - Use the console to provide information about telephone line status, system alarms, and network status displays on the System Status screen. For help accessing the console, see "Using the Administration Console" in Chapter 3.
- Wireless Telephone Status Messages - These status messages provide information about the wireless telephone's communication with the access point, telephony gateway, and host telephone system.
- Telephony gateway status indicators.

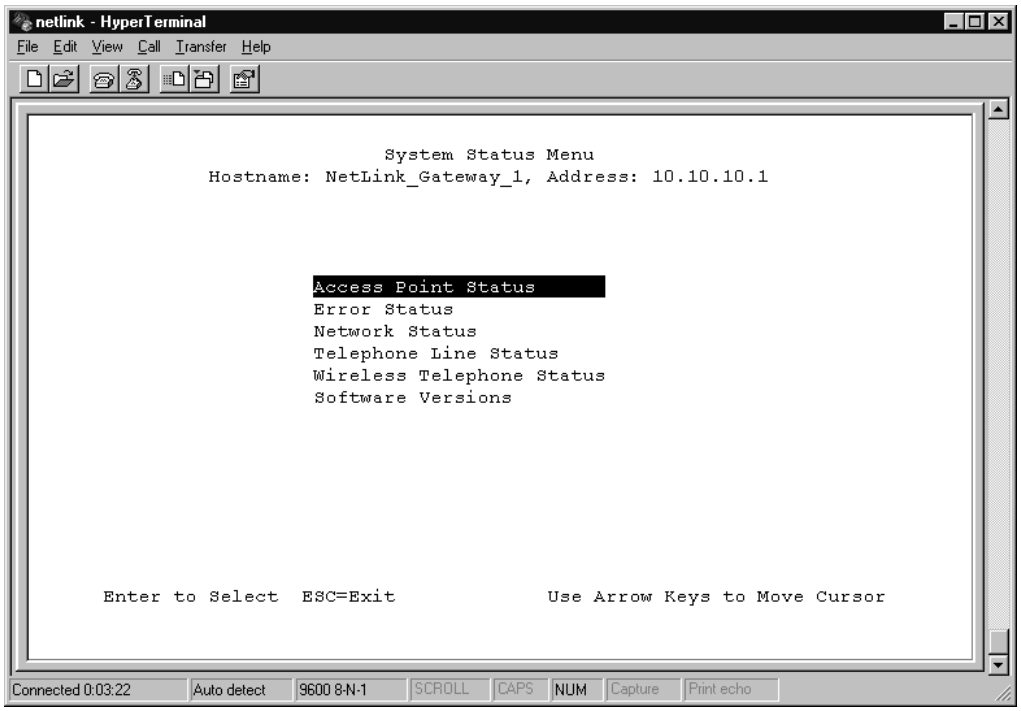
About the System Status Menu

You can use the System Status Menu to get information about telephone line status, system alarms, and network status.

To go to the System Status Menu

- From the main menu, select System Status Menu and press **Enter**.

System Status Menu Screen



Option	Description
Access Point Status	This screen shows information about the access points that have been used by the wireless telephones.
Error Status	This screen displays alarm and error message information.
Network Status	This screen displays information about the Ethernet network to which the telephony gateway is connected.
Telephone Line Status	This screen displays information about the PBX lines to which the telephony gateway is attached and the wireless telephones associated with these lines.
Wireless Telephone Status	This screen contains network communications statistics for each wireless telephone.
Software Versions	This screen lists the software version for each component in the MobileLAN voice system.

These System Status Menu screens provide a window into the real-time operation of the components of the MobileLAN voice system. Use this data to determine system function and to troubleshoot areas that may be experiencing trouble.

The System Status Menu screens are explained in more detail in the next sections.

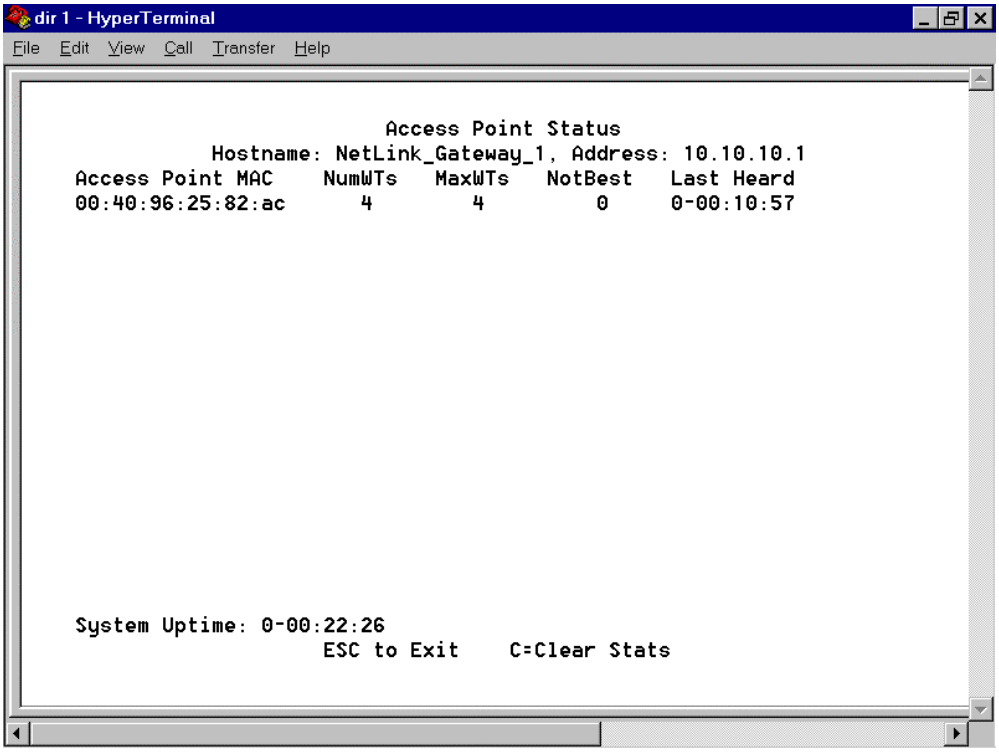
Understanding the Access Point Status Screen

During a call, wireless telephones send information about their access points to the telephony gateway. The telephony gateway maintains information on the last 16 access points on which it has received reports and displays this information on the Access Point Status screen. You can use the data on this screen to troubleshoot access point problems.

If the list is full and a different access point is used by a wireless telephone, the access point that has not been heard from for the longest time is replaced.

To go to the Access Point Status screen

- From the System Status Menu, select Access Point Status and press **Enter**. A screen similar to the one below appears.



Access Point Status Screen Options

Option	Description
Access Point MAC	The MAC address of a access point.
NumWTs	The number of wireless telephones that are currently communicating with this access point.
MaxWTs	The maximum number of wireless telephones that have simultaneously used this access point since last reset.
NotBest	The number of times a wireless telephone has indicated that it is not using the best access point.
Last Heard	The time a report from a wireless telephone was received that included information about this access point. If there is a significant difference between Last Heard and System Uptime, it may indicate that the access point has not been used recently, which might indicate that there has been a break in communications.
System Uptime	The time elapsed since the telephony gateway was last reset or was power cycled. This indicator allows you to check access point activity against telephony gateway functionality. If the telephony gateway should be hearing from an access point due to an active wireless telephone that should be using it but isn't, there will be a significant variation in the access point's Last Heard time and the System Uptime.
Clear Status	This option sets NumWTs, MaxWTs, and NotBest to zero. It does not remove any access points from the screen. This option lets you start over and view access point activity from that point in time.

Note: Unless noted otherwise, times are displayed using the format: D - HH : MM : SS, where D is day, HH is hours, MM is minutes, and SS is seconds.

Understanding the Error Status Screen

The Error Status screen displays any active alarms that indicate some system malfunction. Some of these alarms are easily remedied and others require a call to Intermec Technical Support.

To go to the Error Status screen

- From the System Status Menu, select Error Status and press **Enter**. A screen similar to the one below appears. This example displays two Line Sync alarms and their messages.

These tables display the list of alarm types, display messages, and description of the error.

Alarm	Message	Error Description	Action
Config	GW software version difference	Conflicting software versions on two telephony gateways	Upgrade the downrev.
Config	No IP address	No IP address set in configuration	Set IP Address for telephony gateway.
Config	No Ethernet address	Bad software or bad flash memory	Call Intermec Technical Support.
Config	No Flash1 data	Bad software or bad flash memory	Call Intermec Technical Support.
DAA	PBX table unavailable	Bad software load on telephony gateway	Call Intermec Technical Support.
DAA	PBX type unavailable	Bad software load on telephony gateway	Call Intermec Technical Support.
DAA	DAA type Mismatch	Installed PBX interface cannot be used to attach to the specified PBX.	Change the specified PBX or replace the telephony gateway with a model that supports the desired PBX.
DAA	Spoonfeed unavailable	Bad software load on telephony gateway	Call Intermec Technical Support.
DAA	Bootload unavailable	Bad software load on telephony gateway	Call Intermec Technical Support.
DAA	DSP code unavailable	Bad software load on telephony gateway	Call Intermec Technical Support.
DAA	DSP 1 keepalive	Hardware problem on telephony gateway	Reset the telephony gateway. If problem persists, call Intermec Technical Support.
DAA	DSP 2 keepalive	Hardware problem on telephony gateway	Reset the telephony gateway. If problem persists, call Intermec Technical Support.
DAA	DSP 1 download	Hardware problem on telephony gateway	Reset the telephony gateway. If problem persists, call Intermec Technical Support.

Error Status Screen Alarm Types (continued)

Alarm	Message	Error Description	Action
DAA	DSP 2 download	Hardware problem on telephony gateway	Reset the telephony gateway. If problem persists, call Intermec Technical Support.
DAA	AUX DAA Unknown	Hardware problem on telephony gateway. Auxiliary DAA was detected but type is unknown.	Call Intermec Technical Support.
DAA	FPGA Download	Bad software load on telephony gateway	Call Intermec Technical Support.
DAA	FPGA Code Unavailable	Bad software load on telephony gateway	Call Intermec Technical Support.
Line Sync	Line [XX] out of sync (where XX is 1-16)	The line from the host telephone system is not communicating with the telephony gateway.	Check cabling from telephone system to telephony gateway. Check PBX type to be sure it is correctly configured.
CT	Bootload unavailable	Bad software load on telephony gateway	Call Intermec Technical Support.
CT	DSP code unavailable	Bad software load on telephony gateway	Call Intermec Technical Support.
CT	DSP 1 keepalive	Hardware problem on telephony gateway	Reset the telephony gateway. If problem persists, call Intermec Technical Support.
CT	DSP 2 keepalive	Hardware problem on telephony gateway	Reset the telephony gateway. If problem persists, call Intermec Technical Support.
CT	DSP 1 download	Hardware problem on telephony gateway	Reset the telephony gateway. If problem persists, call Intermec Technical Support.
CT	DSP 2 download	Hardware problem on telephony gateway.	Reset the telephony gateway. If problem persists, call Intermec Technical Support.

Error Status Screen Alarm Types (continued)

Alarm	Message	Error Description
Module	Init data failed	Internal software error, usually seen in conjunction with other errors.
Module	Verify telephony gateway failed	Internal software error, usually seen in conjunction with other errors.
Module	Config hardware data failed	Internal software error, usually seen in conjunction with other errors.
Module	Start hardware failed	Internal software error, usually seen in conjunction with other errors.
Module	Init data failed	Internal software error, usually seen in conjunction with other errors.

Note: Module alarms should only occur with CT/DAA alarms. Correct the CT/DAA alarms first and if the Module alarm persists, contact Intermec Technical Support.

Alarm	Message	Error Description	Action
Radio	Invalid Free Level	Internal software error	Call Intermec Technical Support.
Radio	No IP Address	Internal software error	Call Intermec Technical Support.
Radio	No IP Packet	Internal software error	Call Intermec Technical Support.
Radio	IP Packet Error	An IP packet with insufficient IP header length	Possible network problem, contact network vendor.
Radio	SRP Packet Error	Incompatible software between wireless telephone and telephony gateway	Call Intermec Technical Support. Provide software version information.

Error Status Screen Alarm Types (continued)

Alarm	Message	Error Description	Action
Radio	SRP Invalid AID	Incompatible software between wireless telephone and telephony gateway. Possible network error.	Call Intermec Technical Support. Provide software version information. If versions are compatible, contact network administrator.
Radio	SRP Invalid Hook State	Incompatible software between wireless telephone and telephony gateway	Call Intermec Technical Support and provide software version information.
Radio	Key Buffer Full	Key presses are too fast to process.	Slower key presses
Radio	SRP Opcode Error	Incompatible software between wireless telephone and telephony gateway	Call Intermec Technical Support and provide software version information.
Radio	Unknown Timeout State	Internal software error	Call Intermec Technical Support.
Radio	Unknown line event	Internal software error	Call Intermec Technical Support.
Radio	Unknown SRP event	Internal software error	Call Intermec Technical Support.
Radio	SRP event alloc failed	Too many network events queued for wireless telephone. Possible network problem or interference.	Contact system administrator.
Radio	Audio TX queue not empty	Unable to process all transmissions within 10 ms. Indicates high traffic on network	Contact Intermec Technical Support to help you diagnose traffic problem.

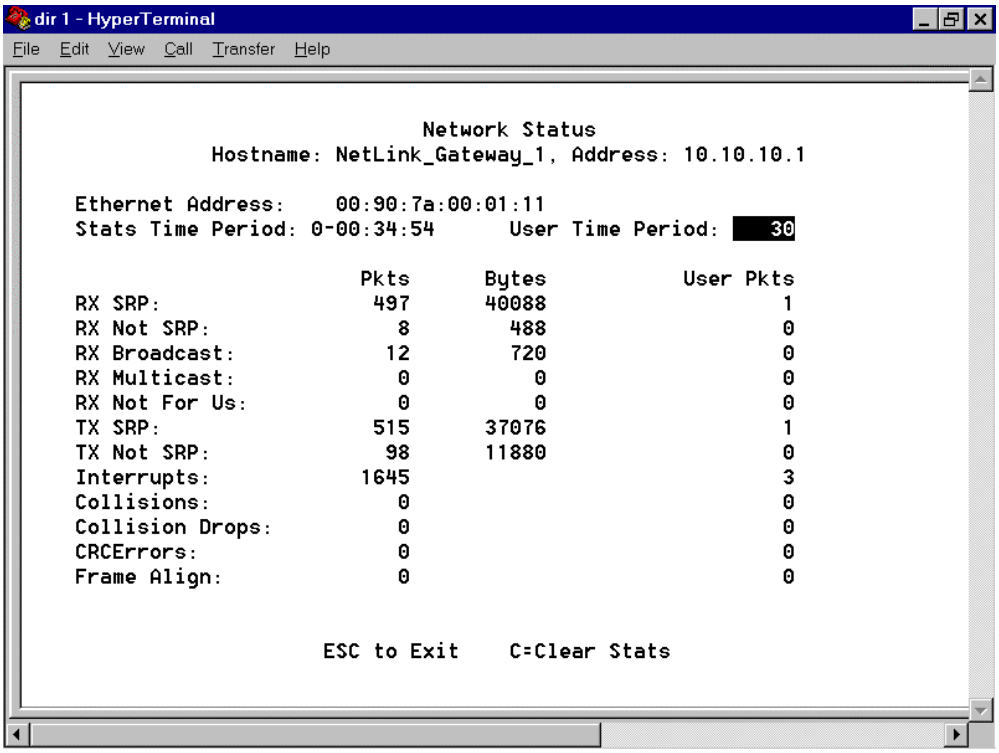
Note: Radio alarms usually indicate internal software errors. Usually there will be no external indication of a problem.

Understanding the Network Status Screen

The telephony gateway is connected to the Ethernet network, which is also called the Local Area Network (LAN). The Network Status screen displays information about the Ethernet network. This information can help troubleshoot network problems.

To go to the Network Status screen

- From the System Status Menu, select Network Status and press **Enter**. A screen similar to the one below appears.



Option	Description
Ethernet Address	The MAC address of the telephony gateway.
Stats Time Period	The length of time the statistics have been accumulating in the Pkts and Bytes columns. This time is either the system uptime or the time since a user pressed C=Clear Stats while viewing this display.
User Time Period	The length of time (in seconds) statistics will accumulate in the User Pkts column before resetting to zero. When troubleshooting a problem, use this setting to isolate statistics for a given time period (for example, one hour). This field is the only one in this screen that you can change.

The rest of the Network Status screen are Ethernet statistics. The Pkts and User Pkts columns list the count of Ethernet packets received or transmitted. The Bytes column is the count of bytes received or transmitted during the amount of time indicated by the Stats Time Period.

Option	Description
RX SRP	The number of SRP packets and bytes received. (RX=received)
RX Not SRP	The number of packets and bytes received addressed to the telephony gateway that are not SRP packets.
RX Broadcast	The number of broadcast packets and bytes received.
RX Multicast	The number of packets and bytes received with the MobileLAN voice multicast address. (A “multicast” message is sent to more than one destination on the network.)
RX Not For Us	The number of multicast packets and bytes received that were not for the telephony gateway.
TX SRP	The number of SRP packets and bytes transmitted. (TX=transmitted)
TX Not SRP	The total number of packets and bytes transmitted that are not SRP packets.
Interrupts	The number of times the Ethernet controller has signaled the microprocessor that it has received or sent a packet.
Collsions	The number of times the Ethernet controller has attempted to send a packet, but another device on the network transmitted at the same time, corrupting the transmission.
Collision Drops	The number of packets the Ethernet controller has discarded because there were over 16 collisions. After 16 collisions the Ethernet controller hardware discards the current packet and attempts to send the next packet in its buffer.
CRC Errors	The number of packets discarded by the Ethernet controller because of a CRC (Cyclic Redundancy Check) error.
Frame Align	The number of packets the Ethernet controller discarded because of an error in their frame alignment.

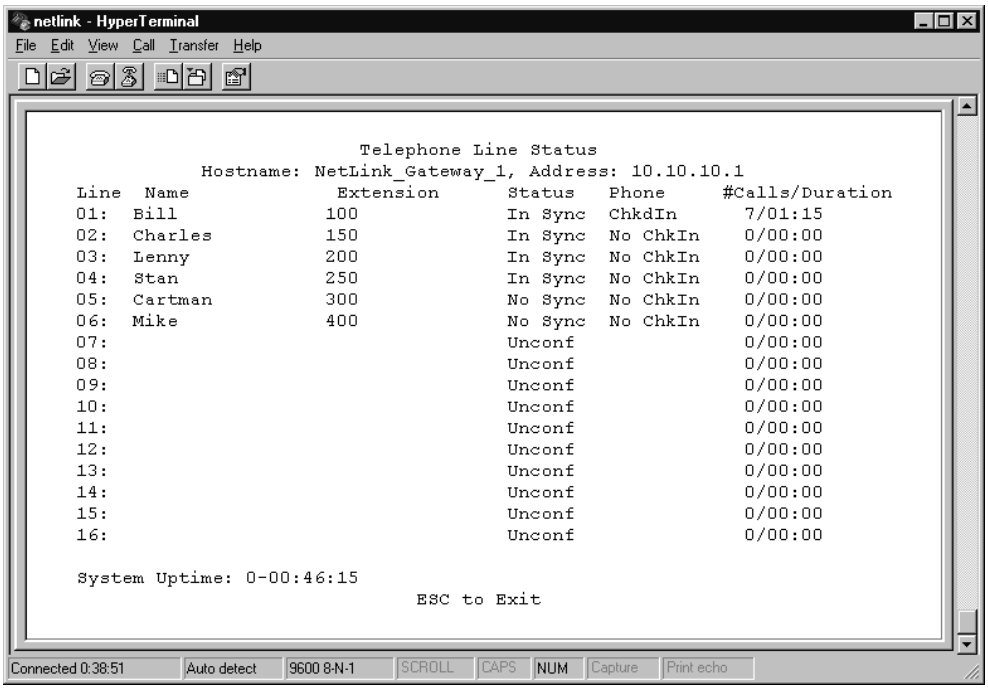
Understanding the Telephone Line Status Screen

Each telephony gateway associates wireless telephones with lines from the host telephone system (PBX) as configured in the system setup. The Telephone Line Status screen provides operational information about each wireless telephone connection. This information corresponds with the configuration information set up from the Telephone Line Configuration option on the main menu.

When the telephony gateway needs to be maintained, current call activity can be checked on this screen to determine the level of service interruption a shutdown will involve.

To go to the Telephone Line Status screen

- From the System Status Menu, select Telephone Line Status and press **Enter**. A screen similar to the one below appears.



Telephone Line Status Screen Options

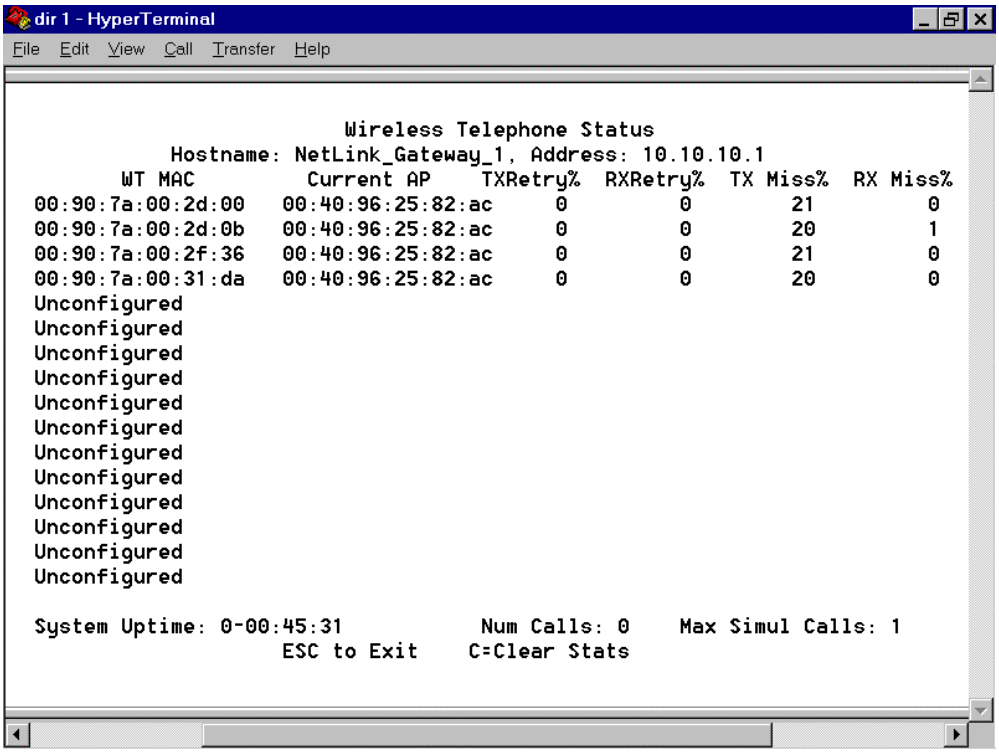
Option	Description
Line	The telephone line number (1-16).
Name	The person or name associated with this line for identification purposes.
Extension	The extension number associated with this line for identification purposes.
Status	The status of the lines from the host telephone system (PBX) to the telephony gateway.
	In Sync This indicates there is communication between the telephony gateway and the PBX.
	No Sync This indicates there is no communication between the telephony gateway and the PBX. Check to see if PBX ports are correctly configured. Check connections between the PBX and the telephony gateway.
	Unconf This indicates the line is not configured.
Phone	The status or activity of the wireless telephone.
	ChkdIn This indicates the wireless telephone has checked in and is in communication with a access point.
	No ChkIn This indicates the wireless telephone has not checked in with a access point. It may be out of range or turned off.
	In Call This indicates the wireless telephone is in use.
# Calls/Duration	The total number of calls made on this line since the system was brought up, and the total duration of the calls.
System Uptime	The time elapsed since the telephony gateway was last reset or was power cycled.

Understanding the Wireless Telephone Status Screen

Each telephony gateway tracks its wireless telephones' activity and provides this information through the Wireless Telephone Status screen. These statistics can help you determine the source of audio quality problems.

To go to the Wireless Telephone Status screen

- From the System Status Menu, select Wireless Telephone Status and press **Enter**. A screen similar to the one below appears.



Wireless Telephone Status Options

Option	Description
WT MAC	The MAC address of the wireless telephone.
Current AP	The MAC address of the access point the wireless telephone is using or last used. If the wireless telephone is not checked in, the telephony gateway will display ‘none’.
TX Retry	The rate at which packets the wireless telephone sent to the access point had to be retried. See below for an extended explanation of TX and RX Retry.
RX Retry	The rate at which packets the wireless telephone sent to the access point had to be retried.
TX Miss	The rate at which audio packets were successfully transmitted by the wireless telephone. There is usually a burst of missed packets at the start of a call; the number should quickly drop to less than 100.
RX Miss	The rate at which audio packets were never received by the wireless telephone.
System Uptime	The time elapsed since the telephony gateway was last reset or was power cycled.
Num Calls	The number of currently active calls on the telephony gateway.
Max Simul Calls	The maximum number of simultaneous active calls on the telephony gateway.
Clear Status	This option sets the statistics to zero so you can view wireless telephone activity from that point in time.

Note: The wireless telephone computes the “rate” for the TX and RX statistics by calculating the number to increase quickly when retries begin. As retries lessen to zero and the transmissions become more reliable, the number peaks and decreases slowly.

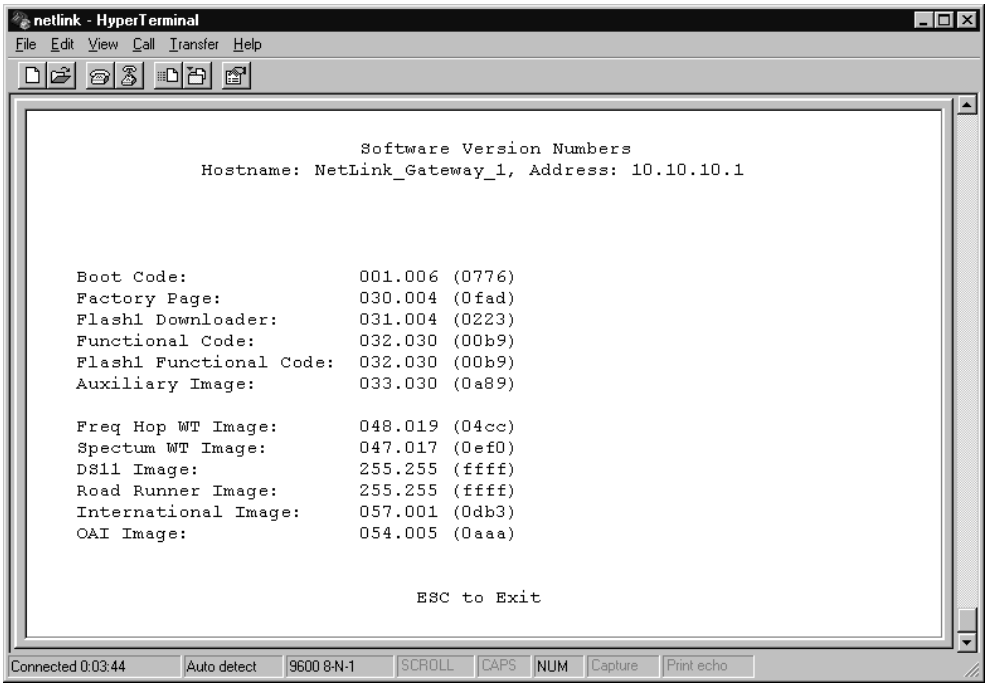
Viewing speed of increase/decrease as well as total count reached will give you an accurate picture of the Retry and Missed characteristics.

Understanding the Software Version Numbers Screen

Each telephony gateway and wireless telephone runs software that is controlled and maintained through versioning. The Software Version Numbers screen provides information about the version currently running on the components. This information helps you determine if you are running the most recent version and will assist Intermec Technical Support in troubleshooting software problems.

To go to the Software Version Numbers screen

- From the System Status Menu, select Software Version and press **Enter**. A screen similar to the one below appears. Note that the telephony gateway (4-port) has significantly fewer components than the telephony gateway (16-port).



Wireless Telephone Problems

MobileLAN voice 2 wireless telephones can exhibit transmission problems in several ways. They can cease functioning properly, display error messages, or display incorrect data. When using and troubleshooting wireless telephones, consider the following problem sources to determine the best method of approaching any specific situation.

Access Point Problems

Most, but not all, wireless telephone audio problems have to do with access point range, positioning and capacity. Using the wireless telephone to help you perform a site survey as described in "Using Site Survey Mode" in Chapter 3 can isolate the access point causing these types of problems. If you suspect the wireless telephone has the problem, conduct a parallel site survey with a wireless telephone that is known to be properly functioning.

In Range/Out of Range

Service will be disrupted if you move outside the area covered by the access points. Service is restored if you move back within range. If a call drops because you move out of range, the wireless telephone will recover the call if you move back into range within a few seconds.

Capacity

In areas of heavy use, the call capacity of a particular access point may be filled. If this happens, you will hear three chirps from the wireless telephone. You can wait until another user terminates a call, or you can move within range of another access point and try the call again. If you are on a call and move into an area where capacity is full, the system attempts to find another access point. Due to range limitations, this may be the same as moving out of range.

Transmission Obstructions

Prior to system installation, the best location for access points for optimum transmission coverage was determined. However, small pockets of obstruction may still be present, or obstructions may be introduced into the facility after system installation. This loss of service can be restored by moving out of the obstructed area, or by adding access points.

Configuration Problems

Certain problems are associated with improper configuration of either the telephony gateway or the wireless telephone.

For instance, no extension displayed or wrong extension displayed on the wireless telephone has no effect on its operation, but serves to easily identify it. Other configuration problems, like having incorrect menu items or inability to connect or access telephone system features, affect the wireless telephone's functioning.

Configuration problems are generally corrected by changing the configuration at the telephony gateway or on the wireless telephone. For help, see Chapter 3, "Configuring the MobileLAN voice System." There may also be incorrect programming of the PBX or access point. For help, see the documentation for your product.

Infrastructure Problems

Calls ringing on the wrong wireless telephone or multiple wireless telephones not working are likely to be caused by faulty installation. The wires that connect the demarcation block to the telephony gateway could be installed incorrectly.

Contact your wireless LAN and/or PBX vendor for more information about troubleshooting infrastructure problems.

Dial Tone Problems

A dial tone problem exists if the wireless telephone has no dial tone, or if you are unable to hear the other party's voice, hear echo, or hear dead air.

To troubleshoot dial tone problems

1. Turn on the wireless telephone in an active service area. If the wireless telephone does not get a dial tone in an active area, continue with the steps below.

   If the no dial tone problem is limited to a certain area, see the "Access Point Problems" earlier in this chapter.

2. Verify that the No Svc message turns off a few seconds after the wireless telephone is turned on.
3. Swap the battery with a battery from a functional wireless telephone, turn the wireless telephone back on, and check for dial tone. If this corrects the problem, charge the battery pack that was removed.
4. Turn the wireless telephone off then on again, and then test again for dial tone. If OK, place a call and determine voice quality.
5. While maintaining an active call, walk through several access point coverage areas. If fluctuation occurs, see "Access Point Problems" earlier in this chapter.

6. Check for alarms on the gateway (System Status). If there are alarms, see "Understanding the Error Status Screen" earlier in this chapter.
7. Make sure the wireless telephone's gateway port is connected to a working phone line. Check the line at the demarcation block. You may need to contact your vendor to perform this check.
8. Check the cabling between the telephony gateway and the demarcation block, and between the demarcation block and the telephone system ports.
9. Move the wireless telephone to a different port location and test again.

Wireless Telephone Status Messages

Wireless telephone status messages provide information about the MobileLAN system communication with the access point and host telephone system. The following table summarizes the status messages, in alphabetical order.

Message	Description	Action
Three chirps	Wireless telephone is not able to communicate with the best access point, probably because that access point has no bandwidth available.	None. This is only a warning, the call will be handed off to the best access point once it becomes available.
BATT, Low Battery, and beep	Low battery	In call: BATT displays when you are on the wireless telephone and the battery charge is low. You have two minutes to complete call. You can change the battery while the call is still in progress. Do not press **End**. Quickly remove the discharged battery and replace it with a charged battery, turn on the wireless telephone, and press **Start** to resume the call in progress. Not in call: Low Battery and Beep indicate low battery charge when you are not on the wireless telephone. The wireless telephone will not work until battery is replaced.
Checking Code	Wireless telephone is contacting the Download Master to determine if it has a newer version of software that should be downloaded.	None. This message should only last for approximately one second. If the message remains on the screen, turn off the wireless telephone and contact Intermec Technical Support.
DHCP Error (1-4)	DHCP Error 1	The wireless telephone cannot locate a DHCP server. It will try every four seconds until a server is located.
	DHCP Error 2	The wireless telephone has not received a response from the DHCP server for a request of an IP address. It will retry until a server is found.

Wireless Telephone Status Messages (continued)

Message	Description	Action
DHCP error (1-4) (*continued*)	DHCP Error 3	The DHCP server refuses to lease the wireless telephone an IP address. It will keep trying.
	DHCP Error 4	The DHCP server offered the wireless telephone a lease that is too short. The minimum acceptable lease is 24 hours. The wireless telephone will stop trying. Reconfigure the server and power cycle the wireless telephone.
Erase Failed	Download process failed to erase the memory in the wireless telephone.	Operation will retry but may eventually report the error "int. error: 0F" Power cycle the wireless telephone.
Erasing Memory	Wireless telephone has determined that a download should occur and is erasing the current software from memory.	None. When the progress bar fills the display line the erase operation is complete.
Internal Err. # #	The wireless telephone has detected a fault from which it cannot recover.	Record the error code so it can be reported. Turn the wireless telephone off then on again. If the error persists, try registering a different wireless telephone to this telephone port. If the error still persists, contact Intermec Technical Support.
Multiple GW regs	The wireless telephone has discovered more than one telephony gateway that is configured with the wireless telephone's MAC address.	Check each telephony gateway for the wireless telephone's MAC address on the Telephone Line Configuration screen. Delete any duplicate entries leaving only one entry on the correct telephone gateway and port for this wireless telephone.
Network Busy	All access points are full or busy	Try the call again later.
No Gateway Found	Phone not registered on telephony gateway	Verify that telephony gateway is properly configured.
	Telephony gateway is not working	Verify that telephony gateway is turned on. If so, follow standard telephony gateway troubleshooting procedures.
	No LAN connection at the access point or telephony gateway	Verify telephony gateway connection to LAN and all access points.
No IP Address	Invalid IP	Check the IP address of the wireless telephone and reconfigure if required.
No Net Access	Cannot authenticate/associate with access point	Verify the access point configuration.

Wireless Telephone Status Messages (continued)

Message	Description	Action
No Net Found	This indicates any of the following:	
	No radio link	Verify that the access point is turned on.
	No ESSID – Autolearn not supported (or) Incorrect ESSID	Verify the ESSID of the WLAN and enter or Autolearn it again if required.
	Access point does not support 1 Mbps	Call Intermec Technical Support.
	Out of range	Try getting closer to the access point. Check to see if other wireless telephones are working within the same range of the access point. If so, check the ESSID of this wireless telephone.
	Incorrect WEP settings	Verify that all the WEP settings in the wireless telephone match those in the access points.
No Reg Domain	Regulatory Domain not set	Call Intermec Technical Support.
No PBX	No communication with host telephone system.	Displays before the system has synchronized ports with the host telephone system. Should disappear when the ports are correctly wired and programmed.
No SVC	Wireless telephone is not communicating with the access point or the telephony gateway.	This message may display with another diagnostic message. Follow diagnostic actions for the second message (such as No Net Found).
		If other devices are working from the access point, this wireless telephone may not be properly registered on the system. From the Administration software, check to see that the MAC address is properly assigned.
Server Busy	Wireless telephone is attempting to download from a Download Master that is busy downloading other phones and refusing additional downloads.	None. The wireless telephone will automatically retry the download every few seconds.
System Locked (with Busy Tone)	System is locked	Try the call again. The system has been locked for maintenance.
System Busy (with Busy Tone)	System is busy or out of resources	All call paths are in use. Try the call again in a few minutes.

Wireless Telephone Status Messages (continued)

Message	Description	Action
TFTP ERROR(x):yy	A failure has occurred during a TFTP software download. (x) = The file number which was being downloaded; yy is an error code describing the particular failure. Possible error codes are: 01 = TFTP server did not find the requested file. 02 = Access violation (reported from TFTP server). 07 = TFTP server reported "No such user" error. 81 = File put into memory did not CRC. FF = Timeout error. TFTP server did not respond within a specified period of time.	Error code 01, 02 or 07 - check the TFTP server configuration. Error code 81 - the wireless telephone will attempt to download the file again. For other messages, turn off the wireless telephone, then turn it on again to retry the download. If the error repeats, note it and contact Intermec Technical Support.
Updating Code	Wireless telephone is downloading new software into memory. The number icons at the bottom of the display indicate which file number is currently being downloaded.	None. When the progress bar fills the display line the update operation is complete on that file.
Waiting	Wireless telephone has attempted some operation several times and failed	None. The wireless telephone is waiting for a specified period of time before attempting that operation again.

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Specifications and Worksheets

Specifications

Physical Specifications

	4-Port	16-Port
Width:	13.7 cm (5.4 in)	33 cm (13.0 in)
Length:	22.3 cm (8.8 in)	17.8 cm (7.0 in)
Height:	3.8 cm (1.5 in)	7.6 cm (3.0 in)
Weight:	0.68 kg (1.5 lbs)	2.2 kg (4.75 lbs)

Electrical Rating

Electrical Rating: 120-240 VAC; 50-60 Hz

Temperature and Environmental Specifications

Operating Temperature: 0°C to 40°C (32°F to 104°F)

Storage Temperature: -20°C to 70°C (-4°F to 158°F)

Relative Humidity: 0 to 80% non-condensing

Other Specifications

	4-Port	16-Port
System Capacity:	16 wireless telephones 16 simultaneous calls	64 wireless telephones 32 simultaneous calls
Telephone Switch: Connections	RJ-11, 6 position connector	RJ-21, 25 pair connector

LAN Connections: RJ-45, 10Base-T Ethernet

Administration: Serial port, Telnet, external modem

Network Configuration: Static IP addressing

Client Protocol Support: H.323 and SpectraLink proprietary

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Wireless Device Planning Worksheet

Copy and complete this worksheet to track parameters for each MobileLAN voice telephony gateway (4-port).

MobileLAN voice Telephony Gateway Hostname: _____

MAC Address: _____ **IP Address:** _____

Host Switch Type: _____ **Subnet Mask:** _____

Phones Per Access Point: _____ **Telnet Port ID:** _____

Gateway Port	Dialing Extension	MAC Address	Switch Port ID	IP Address	User Name
1					
2					
3					
4					

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Wireless Device Planning Worksheet

Copy and complete this worksheet to track parameters for each MobileLAN voice telephony gateway (16-port).

MobileLAN voice Telephony Gateway Hostname: _____

MAC Address: _____ **IP Address:** _____

Host Switch Type: _____ **Subnet Mask:** _____

Phones Per Access Point: _____ **Telnet Port ID:** _____

Gateway Port	Dialing Extension	MAC Address	Switch Port ID	IP Address	User Name
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

MobileLANvoice Telephony Gateway (16-Port) (continued)

Page 2

Gateway Port	Dialing Extension	MAC Address	Switch Port ID	IP Address	User Name
11					
12					
13					
14					
15					
16					