ZIP 4x5

User's Manual

Manual Part Number 90-18400

Notice

The information contained in this document is subject to change without notice.

Zultys Technologies makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Zultys Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Zultys Technologies assumes no responsibility for the use or reliability of interconnected equipment that is not furnished by Zultys Technologies.

This document contains proprietary information which is protected by copyright. The contents of this manual and the associated software are the property of Zultys Technologies, and all rights are reserved. No part of this document may be photocopied, reproduced, stored in any computer format, translated to another language, or publicly displayed without the prior written consent of Zultys Technologies.

The information contained herein has been prepared by Zultys Technologies solely for use by Zultys's employees, agents, and customers. Dissemination or use of the information or concepts contained herein to or by other parties is prohibited without prior written consent from Zultys Technologies.

Zultys, the Zultys logo, the Zultys mark, ZIP2, ZIP4x4, ZIP4x5, MX250, MX1200, MXIE, BPS12, and "Enterprise Media Exchange" are trademarks of Zultys Technologies. All other names may be trademarks or registered trademarks of their respective owners.

Revision History

Release	Release Date
1.0.4	22 July 2004

Contents

Chapter 3   Receiving the ZIP 4x5   17

Chapter 4   Installation   21

C h a p t e r   1

Introduction

1.1   **Scope**

1.1.1   Audience

This manual is intended for networking engineers and network administrators who need to install, maintain, support, and use the ZIP4x5. The manual can also be used by engineers that want to make a phone system compatible with the ZIP4x5. The manual assumes you are familiar with networking and telephony principles and practices.

If you are using the ZIP4x5 with the MX250 or the MX1200, you should read this manual in conjunction with the *MX Administrator User's Manual*.[1] That manual describes how certain features of the phone interact with the enterprise media exchange. You can obtain that manual on line at one of these web sites:

    http://www.MX250.com

    http://www.MX1200.com

This manual on the ZIP4x5 can be used by a user who wants to understand in detail how features and functions of the phone operate. End users who do not need the depth of information contained in this manual (which is about 150 pages) should refer to the ZIP4x5 User's Guide (which is 12 pages). One guide is shipped with each phone, but you can download the guide from the ZIP4x5 web site at:

    http://www.zip4x5.com

1.1.2   Installation and Use

Unpack the ZIP4x5 and verify the contents as described in section 3.2 on page 17. Install the product as described in chapter 4, starting on page 21.

1.1.3   What this Manual Includes

This manual provides detailed information and instructions on the complete installation and operation of the ZIP4x5 IP phone.

---

1. The MX250 and MX1200 are Enterprise Media Exchanges. They are manufactured by Zultys and provide the communications needs of an enterprise by integrating voice, data, video, and fax.

1.1.4 What this Manual Does Not Include

This manual does not provide technology details, pricing, names of sales representatives, or names of distribution channels. Access the Zultys web site for this information:

http://www.Zultys.com

1.2 Features

The ZIP4x5 is a SIP based IP phone with a large number of features. The top of the phone is shown in figure 1-1 and the bottom of the phone in figure 1-2. The phone is referred to as a "four by five" because it has four call appearances and five circuits – four Ethernet circuits and one analog circuit.

Figure 1-1   Top View of ZIP 4x5

Key features of the phone are:

- four virtual lines support four simultaneous calls
- headset, handset, and speaker modes
- acoustic echo cancellation in speaker mode provides high quality speaker phone
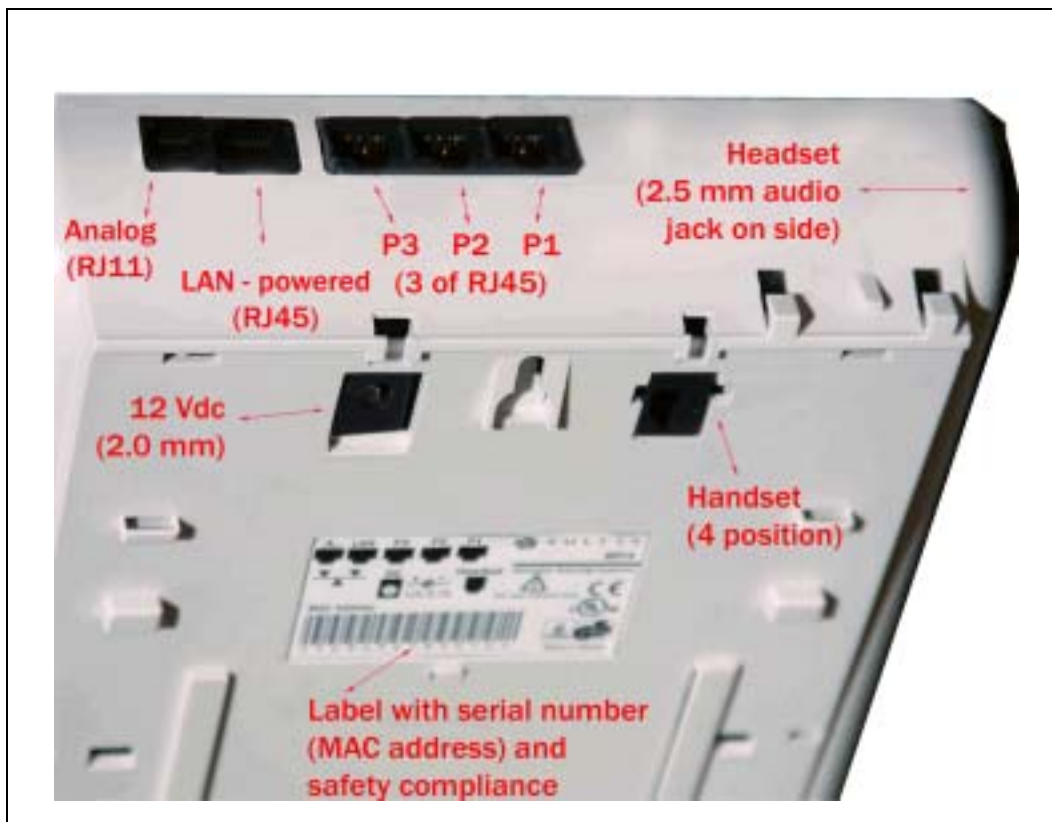
Figure 1-2   Bottom View of ZIP 4x5

- four 10/100Base-T Ethernet circuits to connect to the LAN and three additional devices such as a desktop PC, a notebook PC, and another accessory

- one analog circuit to connect to the PSTN

- supports all commonly used PBX functions when used in conjunction with an appropriate call control system

- supports IEEE 802.1q VLAN tagging and IEEE 802.1p priority marking so it can be used with any switch

- receives power over Ethernet (IEEE 802.3af) or from ac adapter

- speech encryption ensures that your calls can be kept secure

- easy to create conferences with three to five people, including those who call you

- 35 buttons (11 with LEDs) give significant ease of use

- 3 line x 20 character display is easy to read (5 mm high characters)

- uses standard SIP messages to interface to a variety of call managers from various manufacturers

- dial by number or SIP address

- built in switch can forward traffic at line speeds and supports QoS and VLAN tagging

- complete calculator function

- hot key dialling

- voice activated dialling

- firewall, NAT, VPN, and DHCP server functions

- STUN protocol support

- PPPoE support for connecting to WAN

- Bluetooth support for wireless headsets

- browser and TFTP support for configuring and updates

- critical operational parameters are protected by password

- 100 memory phone book plus 64 location memory for last numbers received or dialled

- based on highly stable Linux operating system

1.2.1   Switch Functionality

The phone uses an Ethernet switch (not a hub) to connect the three accessory ports and the phone itself to the LAN. Therefore, the ZIP4x5 can control the QoS to ensure that voice packets always have priority. Further, when the phone is not in use, the ZIP4x5 supports wire speed switching between the LAN (network) and the accessory ports. A conceptual picture of the switch is shown in figure 1-3.
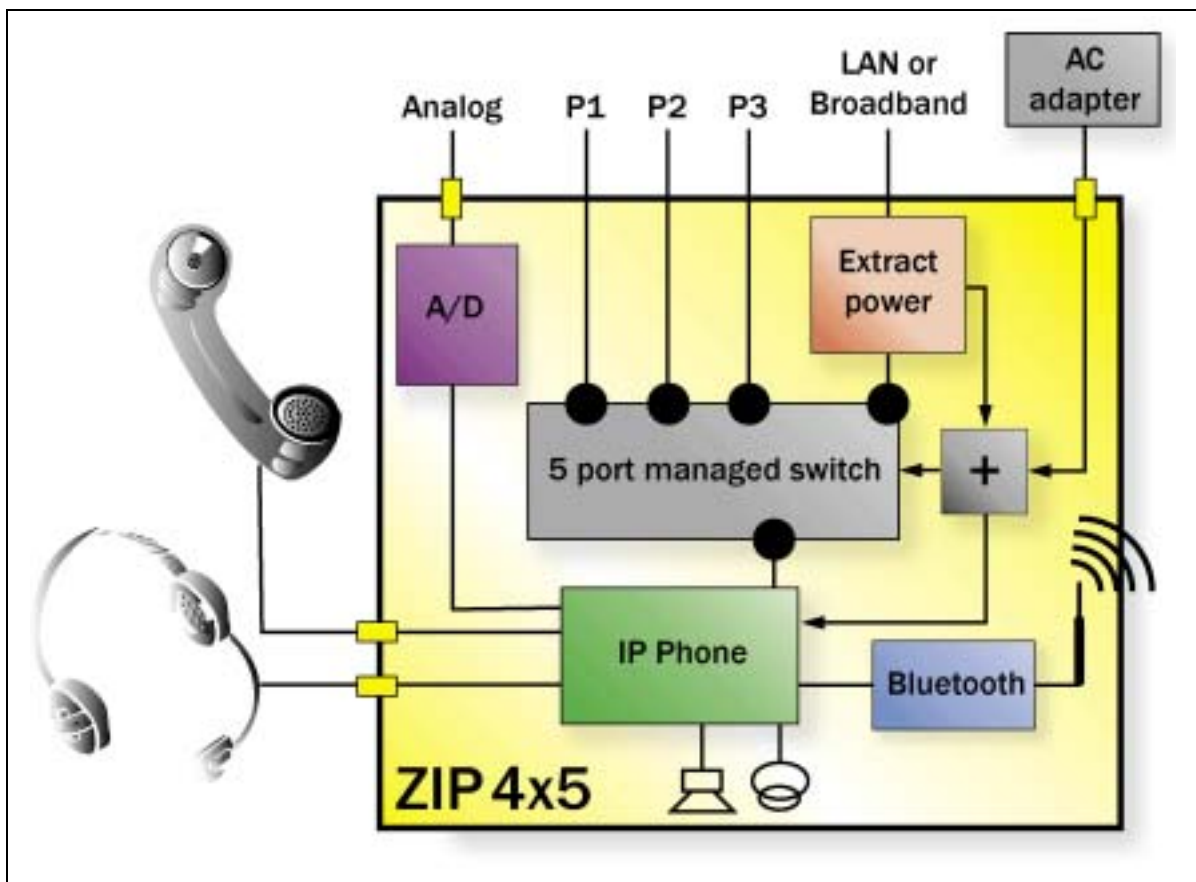
Figure 1-3   Internal Representation of the Managed Switch

You can put the phone and the accessory ports on different VLANs (802.1q – see section 10.6.4 on page 173 for details).

The inclusion of the switch inside the phone allows you to take a single Ethernet circuit from the wiring closet to the desktop. If you are connecting multiple users and not computers, you can use this internal switch to make connections to other phones. You can connect phones two layers deep with this arrangement to minimize the number of switch ports required in the wiring closet.

1.2.2   Display Description

The display is a graphical LCD, 160 dots by 32 dots. It is used mostly to display characters, 20 columns by 3 rows. You can tilt the display so that it is facing you. Pull the back of the display unit and swing it up and towards the front of the phone, as shown in figure 1-4.

You can adjust the contrast of the display as described in section 10.5.1 on page 147.

Figure 1-4   Showing how you can tilt the LCD for better viewing

1.2.3   LEDs

The phone has eight bi-color LEDs and three red LEDs. The bi-color LEDs can be off, or show red, green, or orange. These LEDs are on the four call buttons and the four buttons immediately above them. The red LEDs are on the speaker key, the mute button, and the park button.

1.2.4   Instruction Card

The phone has an instruction card on the bottom. Slide out the card using the tab to see brief instructions on how to use the phone.

1.3 Ordering Information

Figure 1-5 shows the Zultys ordering numbers for the ZIP4x5.

Zultys Part	Description
90-05400	White ZIP4x5, with ac power supply for N. America, Taiwan, and Japan
90-05401	White ZIP4x5, with ac power supply for UK and Hong Kong
90-05402	White ZIP4x5, with ac power supply for continental Europe (Schuko plug)
90-05403	White ZIP4x5, with ac power supply for Australia and New Zealand
90-05404	White ZIP4x5, with ac power supply for Israel
90-05410	White ZIP4x5, without ac power supply
90-05420	Black ZIP4x5, with ac power supply for N. America, Taiwan, and Japan
90-05421	Black ZIP4x5, with ac power supply for UK and Hong Kong
90-05422	Black ZIP4x5, with ac power supply for continental Europe (Schuko plug)
90-05423	Black ZIP4x5, with ac power supply for Australia and New Zealand
90-05424	Black ZIP4x5, with ac power supply for Israel
90-05430	Black ZIP4x5, without ac power supply

Figure 1-5   Ordering Numbers for the ZIP4x5

1.4 Documentation Overview

1.4.1 Organization

This user's manual describes:

- how to install the ZIP4x5
- how to provision the phone for use within the network
- how to make and receive calls
- how to access the features of the phone
- how to customize the phone to suit your preferences
- what to do when you are convinced there is a problem

1.4.2 Nomenclature

1.4.2.1 Acronyms

This manual often uses acronyms specific to the industry of telecommunications and data communications. Because the sections (and, to a certain extent, the subsections) can be read in any sequence, acronyms are not defined in the text. For a complete list of acronyms used in this manual, see Appendix D, starting on page 255.

1.4.2.2   Jargon

This manual often uses technical terms specific to the industry of telecommunications and data communications. Very specialized terms are sparsely used, and their meanings are clearly explained where they are used.

1.4.3   Special Paragraph Styles

The following are the notices that are used to attract special attention to certain items. They set text off from the main body of the manual. These notices also appear in other languages where required by certain regulatory bodies:

Important   This notice contains special information that should not be ignored.

Caution   This notice calls attention to a condition or procedure which, if not observed, could result in damage to the ZIP4x5 or the loss of data.

Warning   This notice indicates that if a specific procedure or practice is not correctly followed, permanent damage to the ZIP4x5 and personal injury may result.

Danger   This notice warns you of imminent hazard to yourself and others if proper procedures are not followed.

1.5   Forms of Documentation

This manual is updated with each major release of the software. The manual describes the features in that release of the software.

Between major releases of software, Zultys may issue one or more minor releases of software. These minor releases may have more capabilities than the current formal release. The features in that software (and the user interfaces to support those features) may or may not be described in this manual.

This manual is available only in PDF format. You can download the PDF file from the ZIP4x5 web site at:

http://www.zip4x5.com

You can obtain old versions of the manual that may describe the software that you have or the latest manual that describes all the latest features of the product. You can identify the version of the manual from the title page, opposite the table of contents (page 2 of the PDF file).

When you use the PDF file, you can click on any reference in the text. This powerful feature allows you to follow the references in the text very easily. Using Acrobat, you can then return to the page you were previously reading. This is a huge benefit to you if you want to study a small area of the product.

1.6 Colophon

This document was produced on personal computers using Adobe's FrameMaker for Windows. The printed book is printed by an offset process.

The headings are set in Swiss 721, Bitstream's version of the Helvetica™ typeface; the copy is set in Zapf Calligraphic, Bitstream's version of the Palatino™ typeface; notices are set in Swiss 721 or News Gothic, Bitstream's version of the Kingsley-ATF Type Corporation typeface. The drawings were produced using Adobe Photoshop, Adobe Illustrator, and Microsoft Visio.

1.7 Documentation Feedback

Zultys appreciates any constructive feedback on all our documentation. If you have comments or error reports on any Zultys documentation, please submit your feedback to:

Technical Publications Department
Zultys Technologies
771 Vaqueros Avenue
Sunnyvale, California 94085 USA
techpubs@Zultys.com

Warranty, Service, and Support

2.1 Introduction

Zultys wants you to get the most out of the product you have purchased. To that end, we offer you:

- hardware warranty (for failure of the hardware)
- software subscription (to update the phone)
- technical support (in case of difficulty)
- training (to learn the phone)

Zultys makes each of these available to you under different terms and conditions. This chapter describes what is offered and the conditions of the coverage.

2.2 Warranty

2.2.1 General

Zultys Technologies (Zultys) provides a warranty to the purchaser of its products as outlined below. In the USA, the purchaser is the end user. For international sales, the purchaser is Zultys' distributor, who has sold you, the end user, the product.

2.2.2 Products Sold in the USA to USA Customers

This section represents Zultys' standard warranty at the time that this manual was produced. These terms apply to sales made in the USA to USA customers.

2.2.2.1 Products Covered and Period

1. Zultys hardware products are warranted against defects in material and workmanship. If Zultys receives notice of such defects during the warranty period, Zultys shall at its option either repair or replace hardware products that prove to be defective. Some newly manufactured products purchased may contain selected re-manufactured parts equivalent to new in performance.

2. Zultys software and firmware products which are designated by Zultys for use with a hardware product, when properly installed on that hardware product, are warranted not to fail to execute their programming instructions due to defects in materials and workmanship. If Zultys receives notice of such defects during the warranty period, Zultys shall repair or replace software media and firmware which do not execute their programming instructions due to such defects. Zultys does not warrant that the software, firmware, or hardware will meet your requirements or that their operation shall be uninterrupted or error free.

3. If Zultys is unable, within a reasonable time, to repair or replace any product to a condition as warranted, Buyer shall be entitled to a refund of the purchase price upon return of the product to Zultys.

2.2.2.2   Supplemental Statements

Supplemental statements setting forth the duration and implementation of warranty and installation applicable to purchased products are incorporated herein.

2.2.2.3   Duration and Commencement of Warranty Period

Unless otherwise agreed to in writing, the warranty period is one year. The warranty period begins on the date you received the product.

2.2.2.4   Confirmation of Delivery Date

If you request warranty, Zultys may require proof of your date of purchase of the system. You will need to provide Zultys with a copy of your invoice showing the date that you bought the product and the name and address of the distributor that sold you the product. Zultys will not ask you for this information if you bought the product directly from Zultys.

2.2.2.5   Obtaining Warranty Service

For warranty service or repair, this product must be returned to a service facility designated by Zultys. Zultys may repair on-site at the option of the Buyer. The Buyer is then responsible for travel charges and applicable additional expenses for such services.

Buyer shall prepay shipping charges to Zultys and Zultys shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Zultys from another country.

2.2.2.6   Limitation of Warranty

1. The foregoing warranty shall apply only when:

   - The product has not been abused, misused, or improperly or inadequately maintained by the Buyer; and

   - The defect has not been caused by normal wear and tear; and

   - The defect is not the result of voltage surges or brownouts, lightning, water damage or flooding, fire, explosion, earthquakes, tornadoes, acts of aggression or war, or by any similar phenomenon; and

- All interconnected software or hardware has been either supplied by Zultys or approved for use by Zultys in writing prior to its use; and

- There has been no unauthorized modification of the product; and

- The product has not been operated outside of the environmental or other specifications; and

- There was proper site preparation, installation, and maintenance; and

- The defect is reported by the original purchaser of the product.

2. Zultys assumes no responsibility for the use or reliability of interconnected equipment that is not furnished by Zultys.

3. THE WARRANTY SET FORTH ABOVE IS EXCLUSIVE AND NO OTHER WARRANTY, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED. ZULTYS SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

2.2.3 Extended Warranty for Products Sold in the USA to USA Customers

You can extend your warranty for additional periods, each of two years. The price for this extension is different depending on whether you purchase the extended warranty at the time you place your order for the system, during a period of coverage, or at a time when you no longer have coverage. Contact your Zultys sales representative for current pricing.

2.2.4 Products Sold Outside of the USA

If you have purchased your product from a distributor of Zultys' products outside the USA, that distributor provides you with warranty on the product. The terms of the warranty under which your product was purchased may differ from the terms in section 2.2.2 on page 9. Zultys requires that its distributors provide warranty terms to you that are similar to the terms outlined in this section, and that comply with the local laws and expectations of the country in which you reside.

Contact your Zultys sales representative for the details of the warranty that covers your product.

2.2.5 Repairs to the Hardware

2.2.5.1 Verification

If you believe that hardware on your the ZIP4x5 is faulty, contact your Zultys sales or service representative. In the USA, you may need to contact Zultys' technical support to confirm that the equipment is faulty. Follow the procedures in section 2.6.3 on page 15 before calling.

If Zultys' sales or service representative determines that there may be a problem with your hardware, you will be issued an RMA number.

2.2.5.2 Warranty Repairs

If your hardware is covered under a warranty, see section 2.2 on page 9 for details of the terms of the repair.

2.2.5.3 Out of Warranty Repairs

If the phone is no longer covered by warranty, and if you do not have a maintenance contract, you will have to pay for the repairs. Contact your Zultys sales or service representative to obtain the current repair prices and payment terms. Outside the USA, contact the distributor responsible for your territory.

2.2.5.4 Returning to Zultys

See section 3.4.6 on page 19 for details on returning equipment to Zultys.

2.3 Software License Agreement

When you obtain software updates from Zultys for your ZIP4x5, you agree to be bound by the terms of this license agreement. This agreement is between you and Zultys.

Zultys licenses and copyrights software and documentation, whether supplied on printed media or electronic media. Such software and documentation is the intellectual property of Zultys, and is hereinafter referred to as Licensed Materials. Title to Licensed Materials shall remain with Zultys. Software in this context refers to code that executes on your PC, and software, firmware, FPGA code, and DSP code that execute within the ZIP4x5.

You shall not copy Licensed Materials, except for archive purposes, to replace a defective copy, or for verification of program errors.

For Licensed Materials that are supplied to you, the word purchase or similar or derivative words used in this manual or on any purchase order is understood to mean License, and purchaser, customer, or similar or derivative words is understood to mean Licensee.

You agree not to reverse engineer, reverse assemble, reverse compile, sublicense, rent, lease, disclose, or assign Licensed Materials and to not use, copy, modify, merge, or transfer copies of Licensed Materials, except as provide herein.

Zultys grants you a non-transferable and non-exclusive right to use its Licensed Materials to operate the ZIP4x5 hardware. You may install the ZIP4x5 software on an unlimited number of computers at the facility or premises where the ZIP4x5 hardware is located.

If you transfer the ZIP4x5 hardware, you agree to destroy all copies of Licensed Materials, together with any archive copy thereof, at the facility or premises where the ZIP4x5 hardware had been located.

You agree to treat updates to the ZIP4x5 product the same as other Licensed Materials under this agreement.

2.4 Training

Zultys offers training at its facility in California. Contact your Zultys sales representative for current pricing. If you have purchased your the ZIP4x5 from a distributor located either within or outside the USA, contact your distributor about equivalent services that they may offer locally.

Training is not included in the purchase price of your system, and you must pay for these services (and any applicable travel expenses) separately.

The training at Zultys's facility is a two day course. The purpose of the course is to teach you how to use the ZIP4x5, so that you can leave the classroom and apply your knowledge to your specific deployment of the product. The course teaches you about installation, provisioning, system administration, and maintenance.

2.5　Software Updates

2.5.1　General

The majority of features in the ZIP4x5 are provided by software. Newer versions of the software may contain more features.

You can identify the version of the software from the menu (described in chapter 10.4.4, starting on page 145), under Information.

Zultys posts versions of its software on its web site at:

　　http://www.zultys.com

The information on the web site tells you what new features are included in the latest software release.

2.5.2　Released and Pre-Released Software

Released software has been fully tested by Zultys and by selected customers of Zultys. When you take delivery of an the ZIP4x5, you receive the latest released software. Zultys issues a new release of software about once a year.

Pre-released software has been partially tested. Zultys distributes this software to support new features or functions requested by customers. Pre-releases may also contain fixes to some known bugs. Zultys may distribute dozens of versions of pre-released software between formal releases. However, Zultys restricts the circulation of these pre-released versions. When you use pre-released software, you are acknowledging that Zultys has not fully tested the software version.

If you have chosen to install pre-release software on your phone, you should do so only if you think that the use of the increased features outweigh the risks associated with using software that has not been fully tested. Zultys documents the new or enhanced features in the updated version of this manual, and does not usually make printed documentation immediately available.

2.5.3　Software Subscriptions

You may need to purchase a software subscription separately from your purchase of the product. When you buy a subscription, it covers your ZIP4x5 for a period of one year. The software subscription entitles you to software updates that may include new or enhanced features, problem fixes, or both. Zultys alone will determine in what way a new release is different from an older release. Zultys alone will determine the number of such updates that it will distribute during any twelve-month period, including none. However, Zultys usually offers one formal release within a twelve-month period.

When you have a current software subscription for your the ZIP4x5, you are entitled to download software from the web site. All software that is posted on Zultys' web site requires a password before you can install it on your system. Zultys supplies you with the password when you purchase a subscription. The password expires at the end of the subscription period unless you renew the subscription.

Zultys may determine that some functions of the ZIP4x5 will be sold separately as software licenses. If you have purchased software licenses, the software subscription includes updates to those software options.

The price for the software subscription is different depending on whether you purchase the subscription at the time you place an order for the system, during a period of coverage, or at a time when you no longer have coverage. Contact your Zultys sales representative for current pricing.

The software subscription (or an extension of software subscription) applies to an individual phone. If you have more than one ZIP4x5, and you wish to operate all phones on the latest software, you should have a current subscription for each system. You may not update the software on those phones for which the software subscription has expired.

As of the time of writing this manual, Zultys has determined that all software updates for the ZIP4x5 are currently available at no charge. You should check the ZIP4x5 web site periodically if you are interested in software updates. Zultys reserves the right to charge for software updates at a future date.

2.6   Support

2.6.1   Resources

This section suggests ways to save yourself time by checking for answers yourself and ruling out common problems.

If you have a question about the way the ZIP4x5 works, the best way to get an accurate, immediate answer is to try one or all of these approaches first.

- Review the User's Guide for the ZIP4x5.

- Check the index or table of contents of this manual for the topic you need.

- See the ZIP4x5 technical support information and FAQ pages on the ZIP4x5 web site:

  http://www.zip4x5.com

If you take these steps and still cannot find the answer, contact your sales representative, distributor, or Zultys.

2.6.2   Contacting your Reseller

If you brought your product from a reseller and not directly from Zultys, you should contact them first about questions related to the product. The reseller that sold the product to you has charged you money for this support and you should therefore expect that they will assist you.

Often, a reseller will provide you a maintenance contract as part of your purchase, so that the reseller will support you for a period of time after you receive the product. Verify with your purchasing department to see if you have a support contract for your ZIP4x5.

If the reseller is unable or unwilling to assist you, or if you bought the product directly from Zultys, you should contact Zultys' technical support directly.

2.6.3   Using Zultys' Technical Support

Zultys provides you with 30 days free technical support with the purchase of a phone. The period of technical support starts on the first day that you make a call to technical support and ends on the 30th calendar day from the first time that you called.

Zultys generally ceases to support old versions of the software six months after a new release is available. If the software subscription for your phone has expired, or you have not upgraded your phone to the latest software release after six months of the release date, Zultys' technical support may not be able to assist you.

2.6.3.1   Technical Support by E-Mail

Often, Zultys's technical support will need to know exactly how your phone is configured. You should send this information to Zultys' technical support using e-mail to:

support@Zultys.com

If possible, Zultys' technical support will resolve your problem efficiently by e-mail. If the problem cannot be resolved by e-mail, Zultys' technical support will call you or wait for you to call them.

2.6.3.2   Calling Technical Support

Be prepared when you call. When you call to speak to Zultys's technical support, you will get an immediate resolution to your problem if you are ready with certain types of information:

1. Send details of your configuration in advance of calling. Allow Zultys' technical support at least four hours to review your e-mail. In your e-mail, state what it is that you think is wrong.

2. When you call, ensure you have your ZIP4x5 close by.

3. Ensure that your surrounding area is quiet, and that you can hear the technical support person.

4. Zultys' technical support can assist you best if you are ready to describe the sequence that led to the problem.

5. Know exactly what you did before the problem occurred, and the exact wording of any message appearing on the LCD.

6. Have a pen or pencil and paper ready to take notes.

2.6.3.3   Support vs. Training

The ZIP4x5 is an advanced phone that requires detailed technical knowledge of data communications and telecommunications to configure. It is easy for you to modify parameters so that the ZIP4x5 does not behave in the manner that you expect.

The onus is on you, the system administrator, to configure the ZIP4x5 the way you want it. Zultys' technical support is not a substitute for training or commissioning. If you need training on the product, join one of Zultys' training courses (see section 2.4 on page 12 for details). Use Zultys' technical support to solve problems that you have tried diligently to solve by yourself.

You may contact Zultys' technical support at the following number. You must pay for any phone charges:

+1-408-328-0450

Receiving the ZIP 4x5

3.1   Initial Inspection

When the shipment of your ZIP4x5 arrives, inspect the shipping boxes for external damages and record any discrepancies. Save the boxes and packing material in case you need to ship the phone to another facility. Always retain the packing materials if you suspect that the shipment is damaged — the carrier may need to inspect them.

Warning   Do not attempt to use the ZIP4x5 or its accessories if it or they appear damaged.

3.2   Package Contents

3.2.1   Verify Contents

Upon delivery of your products, inspect the packing list, and confirm that all items listed on that note were received. Compare the packing slip with your purchase order.

Ensure that there are no discrepancies and then install the ZIP4x5 as described in chapter 4, starting on page 21.

Important If you suspect that there are discrepancies or that the equipment is not fully functional, contact Zultys or your Zultys sales representative **immediately**. Retain all packing materials and the shipping note for Zultys or its representative to inspect. ZULTYS CANNOT BE HELD RESPONSIBLE IF YOU CLAIM THAT AN ITEM IS MISSING, AND YOU HAVE NOT INFORMED ZULTYS WITHIN THREE DAYS OF RECEIPT, OR IF YOU HAVE NOT RETAINED ALL PACKING MATERIALS FOR INSPECTION.

3.2.2   Serial Numbers

Verify the serial numbers of each item and compare them with the serial numbers on the packing lists. The serial number of the ZIP4x5 is a twelve character digit alphanumeric code printed on a white barcode label.

3.2.3 Items Included with Each Phone

Carefully open the box that contains the ZIP4x5 and verify you have the following items:

- phone body
- instruction card under the phone body
- handset and handset cord
- headset
- ac adapter for your country (optional)
- Ethernet cord
- User's Guide

3.3 In Case of Damage or Malfunction

Notify your Zultys sales or service representative under any of the following conditions:

- the shipping container or any of the contents appear damaged
- an item is missing
- there is a discrepancy between the packing slip and the equipment received
- the equipment does not function correctly

Your local Zultys sales representative will arrange for repair or replacement, at Zultys's discretion. In certain cases, Zultys may require a claim settlement.

3.4 Returning Items for Repair or Replacement

3.4.1 Warranty Coverage

Before returning merchandise to Zultys for repair or replacement, you must ensure that the items are under warranty. Read chapter 2, starting on page 9, for details on the warranty of Zultys's products. If you are unsure about the warranty of your merchandise, call your local Zultys sales representative for clarification. You must obtain an RMA before returning any merchandise from Zultys; this includes equipment covered under warranty.

For merchandise not under warranty, Zultys offers extended warranty. Call your local Zultys sales representative for pricing on extended warranty for your merchandise.

3.4.2 Obtaining RMA Number

If you believe that something is wrong with the equipment, call Zultys's inside sales department to obtain a return merchandise authorization (RMA) number. If the problem is technical in nature, Zultys may first try to diagnose the problem over the telephone. If the problem cannot be resolved over the telephone, Zultys will issue an RMA number and give you specific instructions for the return of the merchandise to Zultys's facilities.

If you have purchased Zultys's products through a distributor outside the US, contact the distributor for specific instructions. Zultys issues RMA numbers for customers who buy its products directly from Zultys. Distributors will offer their own service and support for Zultys's products.

3.4.3 Describing the Problem

If you are returning equipment to Zultys for service, attach a tag or sheet of paper to the equipment giving the following details:

- your company or institution's name, address, and phone number
- the main person to contact, an alternative contact, and their phone numbers if different from the main phone number
- the return shipping address and any special shipping instructions
- the model number and serial number of the equipment being returned
- a description of the failure (If failure is intermittent, describe its frequency and special condition that initiate the failure.)
- any additional comments

3.4.4 Accessories

Do not return any of the accessories with the equipment unless you suspect that one of them is faulty. If you return an accessory, place a tag on it that clearly identifies it as yours, and briefly explain the problem.

3.4.5 Packing

Wherever possible, use the original packing materials to ship the equipment. If these are not available, containers and cushioning material similar to those originally used are available from Zultys.

If it is inconvenient to obtain supplies from Zultys, use a strong, double-walled shipping carton. Place about 70 mm (3 in) of cushioning material around all sides of the equipment.

Zultys is not responsible for any damage that occurs during shipment back to the factory.

3.4.6 Shipping

Obtain from your nearest Zultys sales or service representative the correct address to which you should return the equipment. Clearly mark the container with Zultys's address and your own address. Ship the package prepaid and insured to Zultys.

The method of shipment which Zultys will return repaired merchandise back to your facility will be the same method by which you shipped the merchandise to Zultys. For example, if you shipped merchandise to Zultys by ground shipment, Zultys will return the merchandise to you by ground shipment. If the merchandise must be repaired and returned to you as soon as possible, you must arrange for the merchandise to be shipped to Zultys by overnight shipment.

3.4.7   Correspondence

In any correspondence subsequent to the return of equipment, always refer to the equipment by model number and serial number.

Installation

4.1 Regulatory Certification

The ZIP4x5 is a class B digital device. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- reorient or locate the receiving antenna
- increase the separation between the equipment and receiver
- connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- consult the dealer or an experienced radio/TV technician for help

Important Modifications made to the product, unless expressly approved by Zultys Technologies, could void the user's authority to operate the equipment.

Important The term "IC:" before the radio certification number only signifies that Industry Canada technical specifications were met.

Important This Class B digital apparatus complies with Canadian ICES-003

Important Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

4.2 Preparing the ZIP4x5 for Use

4.2.1 Handset

Connect the handset to the bottom of the phone as identified in figure 1-2. Trap the cord in the clips at the back of the phone to relieve strain on the connector and to allow the cord to exit neatly to the left of the phone.

4.2.2 Power

You can power the ZIP4x5 from an ac supply or from the network.

4.2.2.1 Power over Ethernet

If you ordered the phone without an ac adapter you must ensure that you connect the ZIP4x5 to an Ethernet switch that provides power as per IEEE 802.3af.[1] The ZIP4x5 takes its power from the port labelled *LAN*. The cable length can be 100 m, the maximum allowed for an unpowered Ethernet circuit.

4.2.2.2 Power from an AC Adapter

If you have ordered the phone with an ac adapter, you should use it regardless whether power is provided over the Ethernet connection. Connect the ac adapter to the bottom of the phone as identified in figure 1-2. The plug is at a right angle to the cord so that if you accidentally pull the phone, the cord does not fall out.[2]

4.2.2.3 Dual Power Sources

If the phone receives power from both the Ethernet port and an ac adapter, it consumes power only from the ac adapter. You can see what power is applied to the ZIP4x5 using the menu. See section 10.4.3 on page 144.

If the ac power fails, the phone can take power from a LAN power source and continue to operate. The length of time that the phone will operate with the power from the LAN is dependent on the capacity of the battery connected to the power source and the number of phones drawing power. Using the phone to make a call does not materially change the power used by the phone.

4.2.2.4 When Power is Applied

When you apply power, the phone starts to operate. The ZIP4x5 does not have any power switch. After the phone is powered up, it displays a message on the screen as shown in section 4.3 on page 26.

---

1. The ZIP4x5 is fully compliant with IEE 802.3af and is a device that consumes "half power" as defined by the specification.
2. You should use one of the ac adapters provided by Zultys. If you are unable to obtain this, use an adapter that has a dc output of 12 V, 600 mA. The plug should be 2.0 mm or 2.1 mm with the center positive.
   Zultys does not warrant operation of the ZIP4x5 with any adapters other than those supplied by Zultys.

4.2.3 Wall or Desk Mounting

You can mount the phone on a wall or on a desk. Install the rear platform that has the two back feet if you are putting the phone on a desk. Remove this platform (as shown in figure 1-2) if you want to mount the phone on the wall, and mount it in the lower position.

4.2.4 Connecting to the Network

You normally connect the ZIP4x5 to a LAN or directly to a call control system. The call control system manages many function for the phone including the ability to originate and terminate a call, and provides a storage for voice mail. This section briefly describes the process of connecting the phone to a network.

Section 9.2.9 on page 105 describes the method of directly connecting two ZIP4x5 phones, either outside of a LAN or isolated within a network.

4.2.4.1 Auto MDI/MDI-X and Auto Negotiation

Each of the four Ethernet circuits on the ZIP4x5 has automatic sensing to determine on which pins of the RJ45 connector it should transmit data and on which pins of the RJ45 connector it should receive data. This is referred to as auto MDI/MDI-X.

With this function in the phone, you can use a straight or cross wired cable to connect the phone to any other device. If you connect the phone to a device that itself has auto MDI/MDI-X, the devices resolve the appropriate pins to use through random selection.

Also, each of the four Ethernet circuits on the ZIP4x5 has automatic sensing to determine whether the circuit should operate at 10 Mb/s or 100 Mb/s. The phone will always attempt to establish connection at the higher rate and will fall back to the lower rate only if the device to which you have connected the phone cannot operate at the higher rate.

4.2.4.2 Single Circuit

Connect the LAN circuit on the back of the phone to the LAN, as shown in figure 4-1.

You may have a router or switch to which you connect the phone. Whatever connectivity exists between the phone and the SIP server, ensure that you use the LAN port to perform the uplink.[1]

Connect your PC or notebook to any of the other three circuits (P1, P2, or P3). You can identify if the phone has connectivity and activity on any of the circuits as described in section 10.4.3 on page 144.

4.2.4.3 Cascading

The ZIP4x5 has a very efficient network switch incorporated in it so you can cascade the phones as shown in figure 4-2.

---

1. If you do not use VLANs on the phone, and if you do not expect the phone to receive power from the network, you can actually use any port to connect to the phone system. In this case, the switch inside the ZIP4x5 is an unmanaged switch and it does not matter to which port you connect. However, the phone must have connectivity on the port marked LAN and always using this to connect to the network ensures that you have a consistent network that is easier to maintain.
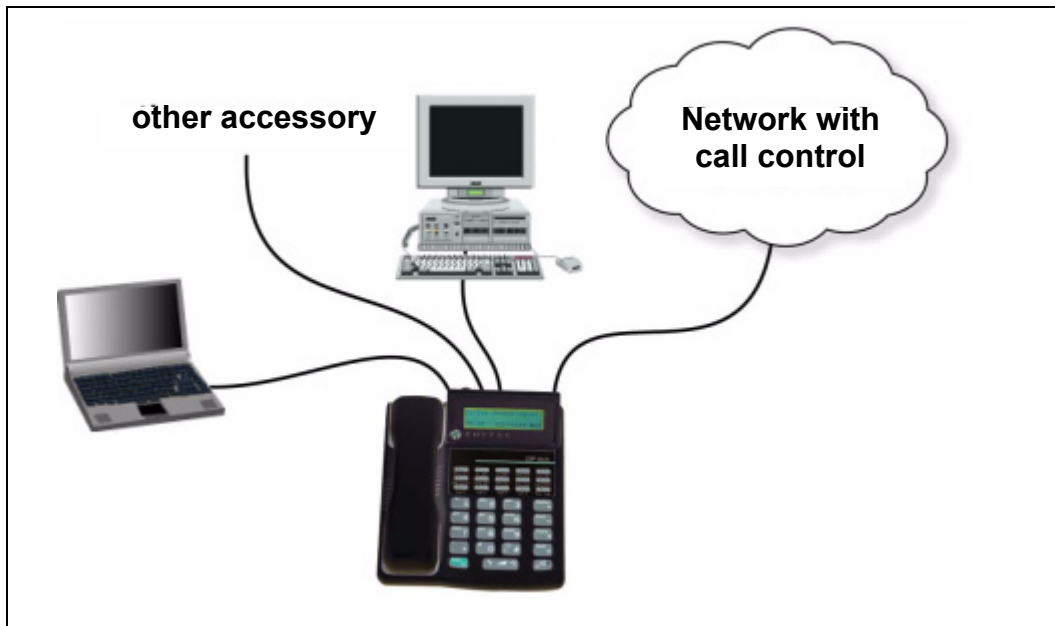
Figure 4-1   Connecting the ZIP4x5 and Your PC
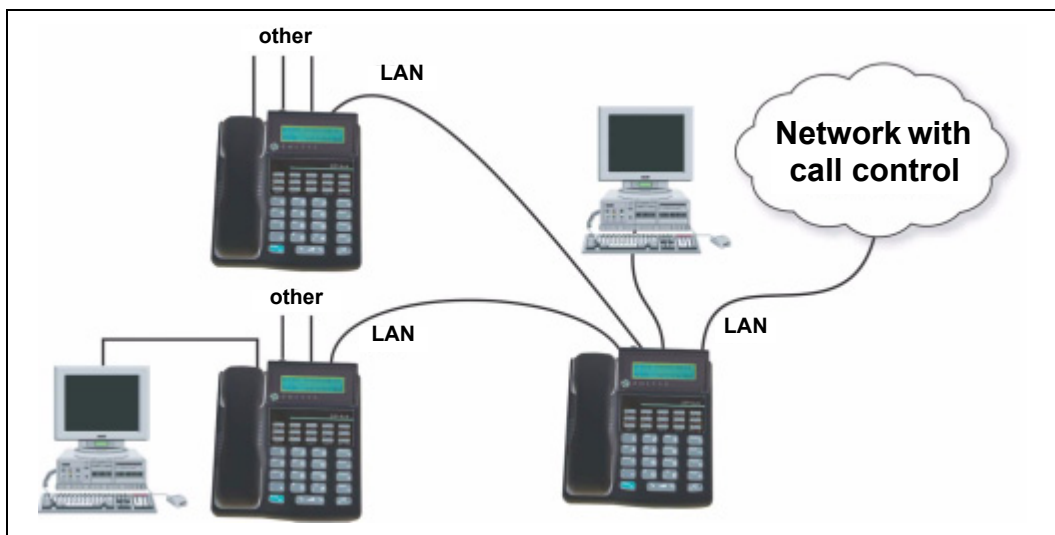
Figure 4-2   Cascading Phones

Connect the LAN port on the phone to the LAN and connect other phones to the other ports. Connect your PC to the fourth port. You can use any of the ports P1, P2, and P3 for the other phones or your PC.

At the second phone in the chain, connect the LAN port to the first phone in the chain. The first phone can obtain power from the LAN through the first phone. The ZIP4x5 does not propagate the power to any of the ports P1, P2, or P3. Therefore, a phone connected to one of these ports must obtain its power from an ac adapter.

Although you can continue to cascade phones in this manner, it is not recommended that you do so. The network may be difficult to manage and may have poor performance.

Once you have made the connections, you can identify if a phone has connectivity and activity on any of its circuits as described in section 10.4.3 on page 144.

4.2.5   Connecting a Headset

You can connect a headset to the audio socket on the side of the phone or in series with the handset. You can also use a Bluetooth wireless headset with the ZIP4x5. The most convenient solution is the wireless headset while the lower cost alternative is a headset on the side of the phone. Audio socket output parameters include:

- **Rated Output:** 12.5 mW

- **Impedance (Z_L):** 32 ohms

- **Microphone Type:** condenser

- **Connector Type:** 2.5 mm mono phone jack

> Tip – Microphone
>
> Ring – Speaker
>
> Sleeve – Ground

Zultys supplies a headset with the phone, but you can buy good quality replacement headsets for about $20.

Traditionally, headsets have been designed to plug in series with the handset. These also provide good quality but typically cost $120.

With the ZIP4x5 you can choose either type of headset. Switching between the headset, handset, and speaker is described in section 9.1.1 on page 97.

4.2.5.1   Using a Wireless Headset

The ZIP4x5 supports all Bluetooth wireless headsets. Section 10.5.7 on page 155 describes the procedure for programming the phone to recognize your Bluetooth headset and to pair your headset with the ZIP4x5.

4.2.5.2   Using the Audio Connector

The connector on the side of the phone is a 2.5 mm socket. Connect the headset that came with the phone or an alternative standard headset into this socket.

Do not buy a headset that has two connectors. These are normally used to connect to the sound ports of a PC. Those connectors are 3.5 mm.

4.2.5.3   Using an External Switch Box

You can connect a headset in series with the handset connector as shown in figure 4-4. The switch box usually has an amplifier that is powered either from an ac outlet or from batteries. This box allows you to select between using the handset and using the headset.
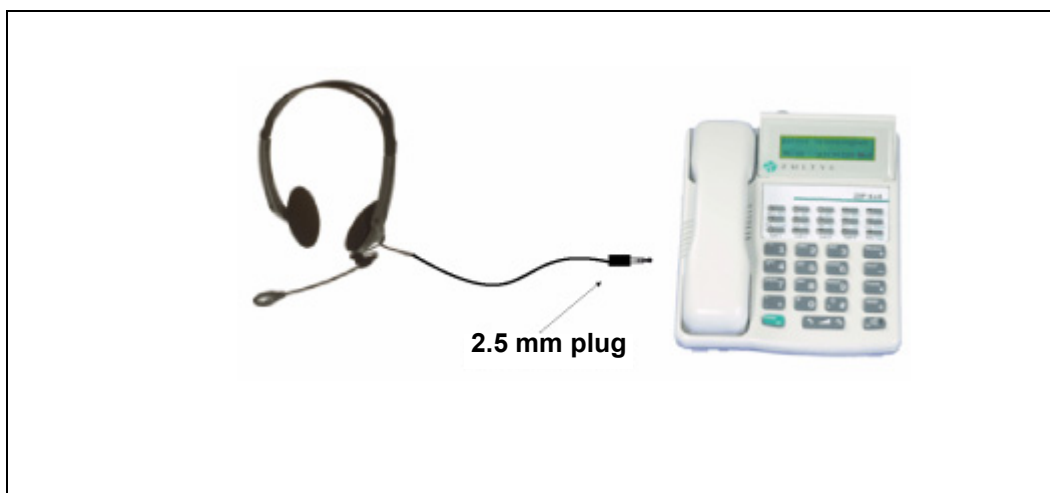
Figure 4-3   Connecting a Headset to the ZIP4x5 Using the Audio Connector
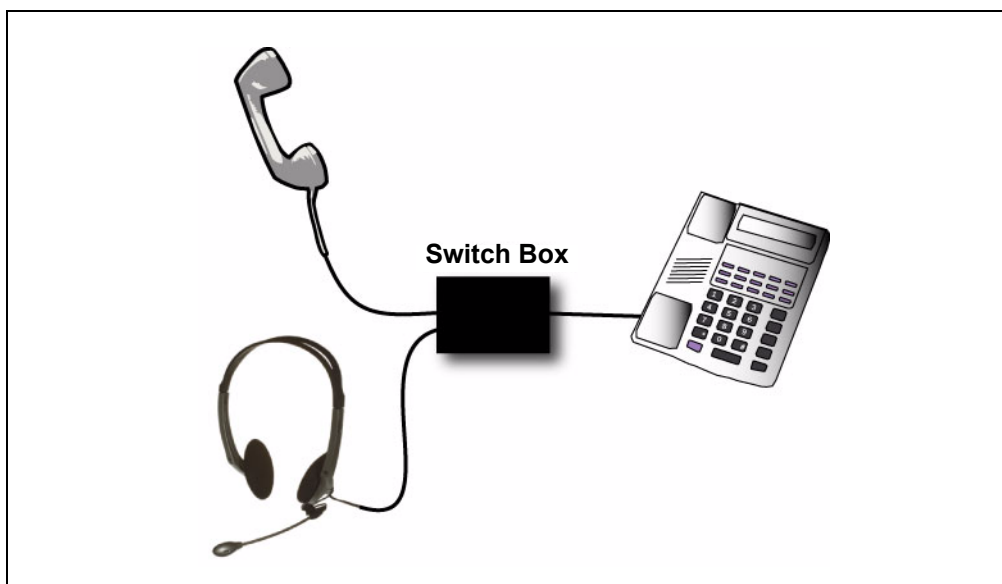
Figure 4-4   Connecting a Headset to the ZIP4x5 Using an External Switch Box

4.3   Power On

4.3.1   Description

When you power up the ZIP4x5, it performs a quick power on self test, and typically starts operation in less than 20 seconds. The exact time depends on your network. The phone tries to find a DHCP server if DHCP is enabled.[1] The DHCP server points to a TFTP server. The TFTP

---

1. When the phone is shipped from the factory, DHCP is enabled. To fix the IP address in the phone, see section 10.6.2 on page 166.

server contains a configuration file that fully provisions your phone and contains addresses for network elements used by the phone, so that ZIP4x5 can register with the SIP server. The exact sequence for start up is described in chapter 5, starting on page 37.

4.3.2   Initial Indications

While the phone is starting, it flashes the call appearance LEDs red. It flashes each LED on for 250 ms and off for 750 ms. The phone flashes the LED on Call 1, then the LED on Call 2, and so on, to give the appearance of the color walking from left to right; This is summarized in figure 4-5.

	Call Appearance Button LEDs			
	Call 1	**Call 2**	**Call 3**	**Call 4**
First quarter second	On	–	–	–
Second quarter second	–	On	–	–
Third quarter second	–	–	On	–
Fourth quarter second	–	–	–	On

Figure 4-5   LEDs on Call Appearance Buttons During Power On

The LCD shows:

```
Loading.
```

The phone holds the indication on the display for about 13 seconds while it initializes the Linux operating system.

4.3.3   Copyright

Once the operating system is loaded, the ZIP4x5 displays the Zultys logo, followed by copyright information:

```
ZULTYS
```

```
ZIP 4x5 SIP Phone
Copyright © 2004
Zultys Technologies
```

The phone holds each display for about one second while the phone continues to initialize.[1] If you do not run the quick test, the phone continues with the boot up procedure as described in section 4.3.5 on page 31.

---

1. The phone does not display the software version number during power on. If you want to know this, use the menu to access the manufacturing information, as described in section 10.4.4 on page 145.

4.3.4   Running a Quick Test

4.3.4.1   Accessing

You can run quick tests of the hardware of the ZIP4x5 immediately after power on. You can access a more comprehensive set of self tests at any time when the phone is operating normally by using the menu as described in section 10.7 on page 180.

You access a quick self test by pressing and holding the Func key or the Speaker key while the phone boots up. You must press and hold only one of the keys for one second. You can press the key while the phone displays "Loading" or the Zultys logo.

Press the Func key to test the LCD, LEDs, Buttons, Keys, and Ethernet Ports, as described in section 4.3.4.2. Press the Speaker key to tests the speaker and microphone, as described in section 4.3.4.3.

4.3.4.2   Quick Test of the LCD, LEDs, Buttons, Keys, and Ethernet Ports

This test verifies the hardware and takes about 25 s. You need two short Ethernet cables.[1]

1.   Connect Ethernet circuit P1 to Ethernet circuit P2.

2.   Connect Ethernet circuit P3 to the LAN circuit.

3.   Power up the phone.

4.   Immediately after powering up the phone, press and hold the Func key until the graphics pattern shown below appears. Release the Func key.

Once the software starts the self test, it immediately activates the LEDs. The software toggles those LEDs that have a single color to be off or red. The software shows the other LEDs as off, green, red, and orange in a repetitive pattern. Observe the LEDs and verify that they all function.[2]

The software changes the LCD between two fixed graphical patterns as shown below:

Observe the LCD and verify that all segments are turned on and off.

Press each of the buttons and keys in sequence, moving from top left to bottom right. That is, press the Menu button followed by the Esc button and end with the Volume up key followed by the Speaker key. As you press each button or key, the ZIP4x5 beeps. If you press a button or key out of sequence, or if the software fails to recognize a button or key, it does not beep.

---

1. If you have access to an MX250 Media Exchange, you should configure the phone to perform the FXO Analog Test at this time. Connect the Analog Port on the ZIP4x5 to FXS port 1 or 2 on the MX250. The FXS port on the MX250 must be properly configured to perform this test.
2. The buttons that have LEDs are described in section 1.2.3 on page 5.

When you have finished pressing all of the buttons and keys, the phone displays:

```
Keypad test passed.
```

The phone then performs an FXO (analog) Test[1] and displays the result:

```
FXO Test Passed
```

The phone then tests the Ethernet circuits. It sends data from P1 to P2, then P2 to P3, and displays:
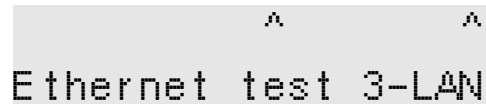
```
     ^       ^
Ethernet test 1-2
```
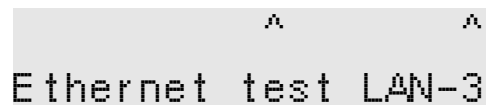
```
     ^       ^
Ethernet test 2-1
```

The phone then sends data from P3 to the LAN port, then from the LAN port to P3, and displays:

```
           ^           ^
Ethernet test 3-LAN
```

```
           ^           ^
Ethernet test LAN-3
```

If the test is successful, the phone displays:

```
Ethernet test OK
```

1. The ZIP4x5 displays this result only if you have connected the phone to perform the FXO analog test. If the phone is not connected to an MX250, this panel will display "FXO Test Failed"..

If the test is unsuccessful, the phone stops the test at the failed test, beeps three times, and displays:

```
FAIL
Ethernet test 1-2
```

The phone then proceeds to load the software as described in section 4.3.2 on page 27, and displays:

```
Loading.
```

Caution   Remove the Ethernet cables that are looping the Ethernet circuits and connect the phone to the network. The phone will not operate if you have a loop on any of the Ethernet circuits.

4.3.4.3   Quick Test of the Speaker and Microphone

This test verifies the amplitude of sound received in the microphone over a range of levels of sound transmitted from the speaker. To perform the test:

1.   Power cycle the phone by disconnecting power, then reconnecting power.

2.   Immediately after reconnecting power, press and hold the Speaker key until the following display appears:

```
Testing Audio
```

The phone transmits a sequence of tones at different level. The test takes six seconds. At the end, the phone displays one of the following:

```
Audio test PASSED
```

```
Audio test FAILED
```

The phone then proceeds to load the software as described in section 4.3.2 on page 27, and displays:
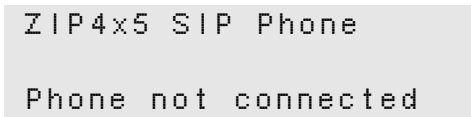
```
Loading.
```

Important If you had disconnected the phone from the network, connect the phone to the network and remove all unnecessary cables from the phone.

4.3.5 Communicating with the Network

4.3.5.1 Phone Not Connected
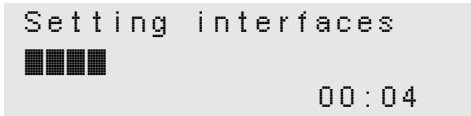
If the phone is not connected on its LAN circuit, the phone displays:

```
ZIP4x5 SIP Phone

Phone not connected
```

4.3.5.2 Interface Setup

If you have programmed the ZIP4x5 to function as a remote server, as described in chapter 8, starting on page 73, the phone displays the following panel while setting up the firewall.

```
Setting interfaces
████
              00:04
```

This step usually requires less than five seconds.

4.3.5.3 Connecting to a DHCP Server

If the phone is configured for dynamic IP addressing, it attempts to locate a DHCP server. The phone displays:

```
Looking for DHCP
████████
              00:08
```

Depending on your network, this can take from two to 30 seconds. The phone displays a progress bar, adding one character every second. It displays the time it has been trying in the lower right corner of the display, in hours, minutes, and seconds. Every 20 s, the phone clears the progress bar then starts adding one character each second again.

The phone continues to try to find the DHCP server indefinitely.

4.3.5.4   Connecting to the PPPoE Server

If the phone is configured to connect with a PPPoE server, as described in section 8.3.2 on page 79, it displays the following panel while attempting to locate the server.

```
Starting PPPoE
████████
                00:08
```

Depending on your network, this can take from two to 30 seconds. The phone displays a progress bar, adding one character every second. It displays the time it has been trying in the lower right corner of the display, in hours, minutes, and seconds. Every 20 s, the phone clears the progress bar then starts adding one character each second again.

4.3.5.5   Connecting to the STUN Server

If the phone is configured to connect with a STUN server, it displays the following panel while attempting to locate the server. Section C.4.1.1 on page 199 describes the STUN Server configuration.

```
Starting PPPoE
████████
                00:08
```
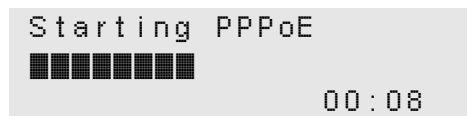
This may require up to ten seconds. If the phone is configured to find the Stun Server, it will attempt to do so indefinitely until it connects to one.

If the NAT type[1] is not supported by the STUN protocol, the ZIP4x5 displays the following error:

```
Unsupported NAT Type
Unable to run STUN
```
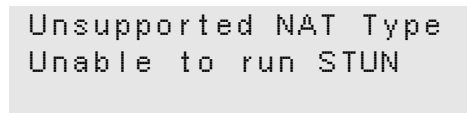
4.3.5.6   Connecting to the TFTP Server

Once the phone has its IP address, it tries to locate the TFTP server if it is programmed with the address of the TFTP server or if it obtained the address from the DHCP server. The phone displays:

```
Looking for TFTP
███
                00:03
```
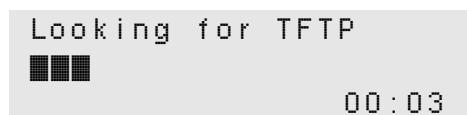
Depending on your network, this can take from one to ten seconds. The phone displays a progress bar, adding one character every second. It displays the time it has been trying in the lower right corner of the display, in seconds.

---

1. The ZIP4x5 STUN implementation supports open internet (no NAT), Full Cone NAT, Restricted Cone NAT, and Port Restricted Cone NAT. Refer to RFC 3489 for details on STUN and the supported NAT types.

If the phone can find the TFTP server, the configuration file or files it retrieves may indicate that the phone needs to update its software. See section 5.4.5 on page 45 for details of the screen that the phone shows in this case.

If the phone can find the TFTP server but cannot find the configuration file (or it can find it, but there is an error with it), the phone displays:

```
ZIP4x5 SIP Phone
Unable to read
configuration file
```

The phone displays this for three seconds and then proceeds to register.

The phone continues to try to find the TFTP server for ten seconds. If it cannot locate the TFTP server within this time, and the phone has the address of a SIP registrar, it displays

```
ZIP4x5 SIP Phone
Unable to locate
TFTP server
```

The phone displays this for three seconds and then proceeds to register.

4.3.5.7 Connecting to the SIP Registrar

If the phone has an address for the SIP registrar, it displays:

```
SIP registration


            00:06
```

The phone continues to attempt to register indefinitely. If the SIP registrar rejects the attempt to register, the phone displays:

```
SIP registration

Rejected    02:17
```

4.3.5.8 Failure When Using a Fixed IP Address

If you have configured the phone to use a fixed IP address, and to not use DHCP, the phone should boot up and connect to the TFTP server (if provisioned) and then connect to the SIP registrar. If there is a problem with this process, the phone displays:

```
Failed to initialize
network. Correct
settings and reboot.
```

Use the menu to configure the protected settings as described in section 10.6 on page 164, then restart the phone.

The phone will also display this message if you have configured it for DHCP but the DHCP server is incorrectly configured. This is an unusual situation, because administrators take great care to ensure that the DHCP servers are correctly configured.

4.3.5.9 Prohibition on Making a Call

When there is one or more of the problems listed above, the phone flashes the LEDs orange on the Call buttons. It flashes the first button for 250 ms, then the second for 250 ms, and so on, to give the appearance of a "walking" pattern. The LEDs on the call buttons remain in this state, the call buttons are inoperative, the phone does not provide dial tone, and you cannot make any calls until you have resolved the problem.

You can use other functions of the phone. Therefore you can change the configuration and the settings, view or modify the phone book, and use the calculator. Once you press keys to activate the other functions, the display removes the notification of the error condition. You need to use the menu to access the status as described in section 10.4.3 on page 144.

4.3.5.10 Attempt to Establish Connection

The phone continually tries to re-establish connection with the network, once every four seconds.[1] If it does establish connection, it stops the walking pattern on the call appearance buttons and you can use the phone to make calls. You do not need to cycle the power on the phone to make the phone usable.
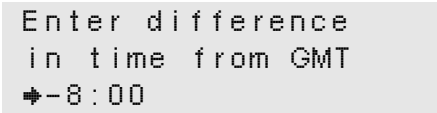
The phone retains the display until you press a key or until you make a call or the phone receives a call. You need to use the menu to access the status as described in section 10.4.3 on page 144.

4.3.6 Satisfactory Connections

4.3.6.1 Date and Time

Your ZIP4x5 may prompt you for the date and time. The prompts that you see are based on the system to which the phone is connected. Many systems may automatically configure the time, date, and geographic location of your phone. Other systems may connect your phone directly to an NTP server.

If the phone connects to an NTP server, it needs to know the difference between the local time and GMT.[2] Instead of asking for a location, the phone therefore displays:

```
Enter difference
in time from GMT
➨-8:00
```

---

1. The ZIP4x5 sends the second request 500 ms after the first request. It sends the third request 1.0 s after that, the fourth request 2.0 s after that, and thereafter every four seconds.
2. After the phone has booted it uses SNTP to obtain the date and time for the first time. Thereafter, it uses NTP every ten to 15 minutes to obtain the date and time.

Use the Up and Down buttons or the Up and Down keys to select the correct time difference. The phone changes the time in units of 30 minutes. The maximum time differences are +12 hours and –12 hours. When you have made your entry, press the Enter button. The phone shows the idle display.

If the phone cannot find an NTP server, you must enter the date and time manually. The ZIP4x5 displays:

```
Enter date
Year:
➧2004
```

Use the Up and Down buttons or the Up and Down keys to select the correct year. The phone defaults to 2003 scrolls to a maximum of 2023, then to 2003 again.

Press the Enter button. The phone displays:

```
Enter date
Month:
➧January
```

Use the Up and Down buttons or the Up and Down keys to scroll between the months.

Press the Enter button. The phone displays:

```
Enter date
Day:
➧1
```

Use the Up and Down buttons or the Up and Down keys to scroll between the days. The phone scrolls back to 1 once it has reached 28, 29, 30, or 31, depending on the year and month you have entered.

Press the Enter button. The phone displays:

```
Enter time
➧15:08:39
```

Enter the time with the keypad using 24 hour notation.[1] Use the * key to enter the colon character that separates hours from minutes and minutes from seconds. You do not have to enter the seconds. If you do not enter the seconds, the ZIP4x5 sets the seconds to zero.

Press the Enter button when you have entered the time. The phone shows the idle display, as described in section 6.3.1 on page 50.

You can subsequently alter the date and time using the menu as described in section 10.5.4 on page 148, or you can cycle power on the phone to obtain the same screen.

---

1. Use 24 hour notation regardless of the format you may have chosen in which time is displayed in section 10.5.10 on page 160.

4.3.6.2 Subsequent Loss of Connection

If the phone has established LAN connectivity and registered with the phone system, and then it loses connectivity, or a subsequent registration request is denied, you cannot make calls. The phone remains in this state as described in section 4.3.5.9 on page 34.

Provisioning the Phone

5.1   Introduction

This and the following sections (section 5.2 through section 5.4) describe the methods used by the ZIP4x5 to automatically obtain its configuration. These sections describe the underlying method for the exchanges that take place. You do not need to read these sections unless you want to understand the provisioning process, or make the ZIP4x5 work with a particular SIP system.

5.1.1   Summary of Boot Process

To use the ZIP4x5 in its usual manner, you must connect the phone to a LAN that has a DHCP server and a TFTP server. The start up process is as follows:

1.   The DHCP server provides an IP address to the phone and also the address of the TFTP server.

2.   The phone accesses the TFTP server to locate a configuration file that is common for all ZIP4x5 phones connected to your network.

3.   The phone reads the common configuration file. The configuration file points to a directory where the phone can find its specific configuration file.

4.   The phone reads its specific configuration file.

5.   The phone uses the data retrieved from the configuration files to configure itself so that it can operate properly in the network.

5.1.2   DHCP Support

When you connect the ZIP4x5 phone to a DHCP server, the DHCP server must be configured with the following options for your network to fully support the ZIP4x5:

- subnet mask (option 1)
- default gateway (option 3)
- domain name server (option 6)
- IP Address (option 50)
- TFTP server name (option 66)

In addition, it is recommended that your DHCP server also provide:

- NTP Time Offset (option 2)

- domain name (option 15)

- NTP servers (option 42)

You should consult your system administrator for specific details on configuration of the DHCP server.

5.2   Configuration Files

There can be three sources of configuration for the phone:

- what is saved in a common configuration file

- what is saved in a specific configuration file

- what is saved in the phone's memory

The common configuration file is called:

```
ZIP4x5_common.cfg
```

This file is stored in the root directory of the TFTP server.

The specific configuration file is called:

```
<MAC address>.cfg
```

For example,

```
0050C2180FD8.cfg
```

The format for the files is identical, and is shown in figure 5-1. This is an ASCII text file, with the name of the parameter and the value of the parameter listed on the same line. Each parameter must be within the section (denoted by square brackets "[]"). The contents of the file are not case sensitive; you can enter parameter names in upper or lower case. Comment lines are denoted with a leading semi-colon (;) and have no effect on the operation of the phone.

```
[HW_CONFIG]
lcd_contrast=8
ring_volume=5
speaker_volume=5
headset_volume=5
handset_volume=5
```

Figure 5-1   Format for Configuration File

```
[VLAN_CONFIG]
mode=1
vlan_id_a=1
circuits_a=UUUUU
vlan_id_b=-1
circuits_b=EEEEE
vlan_id_c=-1
circuits_c=EEEEE
vlan_id_d=-1
circuits_d=EEEEE
vlan_id_e=-1
circuits_e=EEEEE
vlan_id_f=-1
circuits_f=EEEEE
vlan_id_g=-1
circuits_g=EEEEE
vlan_id_h=-1
circuits_h=EEEEE
cos_setting=5
dscp_setting=0


[NET_CONFIG]
use_dhcp=yes
ip_addr=
subnet_mask=
default_gateway=
primary_dns=
secondary_dns=
;host_name is DNS lookup for this phone
host_name=
domain=zultys.com
ntp_server_addr=
tftp_server_addr=
tftp_cfg_dir=./ZIP4x5


[SIP_CONFIG]
phone_sip_port=5060
rtp_start_port=33000
;The Device ID is the user portion of the SIP URI
device_id=West
;The Display Name is sent in SIP messages
display_name=Zultys ZIP4x5
;This must always be set to "yes"
use_proxy=yes
register_w_proxy=yes
proxy_addr=10.1.32.224
proxy_port=5060
voice_mail_uri=258
call_park_extension=259
registration_expires=3600
session_expires=3600
```

Figure 5-1   Format for Configuration File (Continued)

```
    [AUDIO_INFO]
    ext_ring_tone=0
    ext_cust_ring=
    int_ring_tone=0
    int_cust_ring=
    ring_tone2=0
    cust_ring2=
    key_click=0
    codec=0
    distinctive_ring=yes
    accept_url=no
    sound_url=


    [GENERAL_INFO]
    software_version=1.0.0
    ;The message displayed on the LCD in idle mode
    greeting_message=ZIP 4x5 SIP Phone
    password=985897
    time_fmt=%H:%M
    date_fmt=%a %d %b %y
    date_time_order=0
    ;This is the offset from GMT, in minutes
    timezone=-480
    country=USA
    language=ENGLISH
    delmtr=._
    clear_settings=2
```

Figure 5-1   Format for Configuration File (Continued)

Many parameters in the configuration files correspond to the parameters that you can configure through the menu of the ZIP4x5. Configuration parameters are described in Appendix C, starting on page 197.

Every time the phone restarts (either by command or by power on), the phone reads the configuration files. It extracts the data in the files and saves it to memory, overwriting all parameters that are saved in memory except that if the user settings are not configured to be cleared, it retains the settings in the phone.[1]

The common configuration file specifies a directory, using the parameter:[2]

```
            tftp_cfg_dir= <directory_name>
```

The phone accesses the specified directory (which can be blank, or '.') and reads the specific configuration file from the specified directory. It extracts the data in the file and saves it to memory, overwriting whatever parameters were already saved in memory. The parameters specified in the specific configuration file take precedence over the same parameters specified in the common configuration file.

For example, suppose the common configuration specifies the greeting message to be:

---
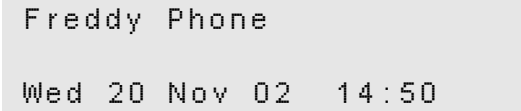
1. You select whether you want the user settings cleared using the menu, as described in section 10.5.3.
2. If the specific configuration file contains such a line, the phone ignores it.

```
ZIP 4x5 SIP Phone
```

and the specific configuration specifies the greeting message to be:

```
Freddy Phone
```

Then, in the idle state, the phone will display:

```
Freddy Phone

Wed 20 Nov 02   14:50
```

The phone continues to start, using the parameters that are now saved in its memory.

5.3   Web Interface Configuration Utility

The ZIP4x5 provides a web interface configuration utility, offering an alternative method of provisioning your phone. Through this utility, you can modify all operating parameters that are available through configuration files.

To access the web interface, enter the IP address of your ZIP4x5 in the address entry box of your web browser and press the enter button. The home panel will appear in your browser.

Appendix D, starting on page 225, describes each panel of the web interface configuration utility.

5.4   Updating Software on the ZIP4x5

5.4.1   Introduction

You must connect the phone to a LAN that has a TFTP server and a DHCP server.[1] The DHCP server provides an IP address to the phone and also the address of the TFTP server. The phone accesses the TFTP server to locate and retrieve its configuration files. It reads the configuration files to identify what software version it should be using. If the files specify a different version from that on the phone, the phone retrieves the specified software version from the TFTP server.

5.4.2   Specific Description

To update the software, one or both of the configuration files described in section 5.2 must specify the software version that the phone must use. This is specified on the line shown in figure 5-2 as:

```
software_version=0.1.4
```

The phone compares the version specified to that installed on the phone. If the versions are the same, the phone continues with the startup process. If the versions are different, the phone retrieves the software from the TFTP site. The phone looks first in the root directory of the TFTP site then in the subdirectory of the TFTP site where the specific configuration file may be stored, if one is specified.

---

1. You cannot update the software if you fix the IP address of the phone.

The software name is:

```
ZIP4x5_<version>.bin
```
For example:

```
ZIP4x5_0_1_4.bin
```

The file name uses the underscore character to separate the three parts of the software version number.

If the common configuration file indicates a different version of the software than the specific configuration file, the phone retrieves the software version specified by the specific configuration file.

The phone programs itself with the new software and restarts.

5.4.3   Binary File

The binary file for the software contains the software version. When the ZIP4x5 reads the file, it verifies the version that is contained in the file with the file name and will not load it if the versions do not match.

The first characters in the binary file are encoded as a null terminated ASCII string. The end of the file contains a 16 bit CRC sum check.

The size of the binary file is between 2 MB and 4 MB.

5.4.4   Ladder Diagram

Figure 5-2 shows the messages used in this process. The following sections describe the process.

5.4.4.1   Step 1

Action. ZIP4x5 sends DHCP DISCOVER (broadcast)

Description. The ZIP4x5 boots (after power is initially applied or after receiving a SIP NOTIFY message) and sends out a DHCP DISCOVER message requesting an IP Address and other options (same as those provided in DHCP ACK).

5.4.4.2   Step 2

Action. DHCP Server responds with a DHCP OFFER

Description. The DHCP Server indicates an available IP Address to the ZIP4x5.

5.4.4.3   Step 3

Action. ZIP4x5 sends DHCP REQUEST (broadcast)

Description. The ZIP4x5 accepts the DHCP server's offer and asks the server to provide its configuration.
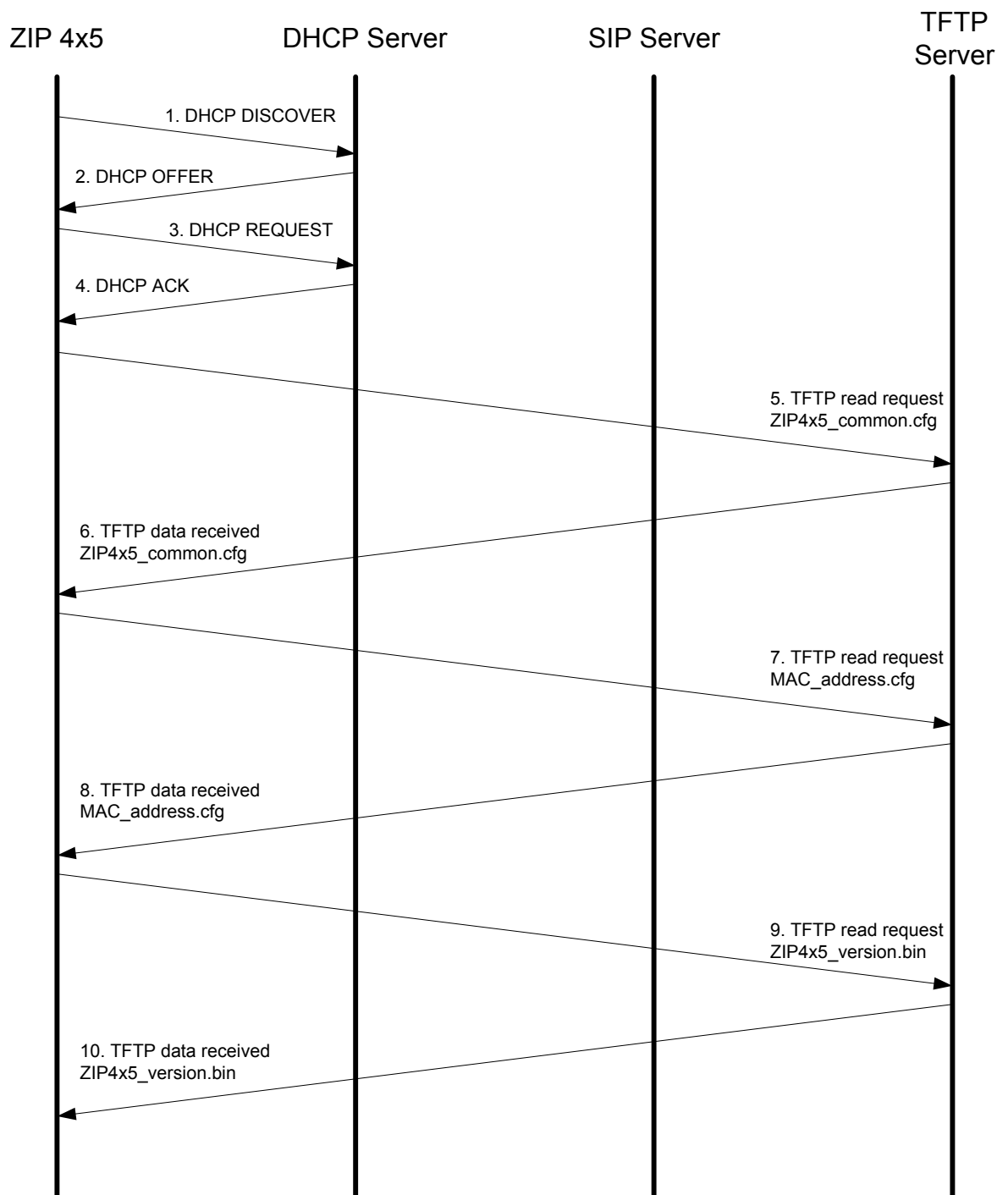
Figure 5-2   Messages for ZIP4x5 to Obtain Configuration

5.4.4.4   Step 4

Action. DHCP Server sends DHCP ACK

Description. DHCP Server responds with committed IP Address and other configuration options. The specific options needed by the ZIP4x5 are described in section 5.1.2.

5.4.4.5   Step 5

Action. ZIP4x5 initiates TFTP read request for ZIP4x5_common.cfg

Description. ZIP4x5 requests its common configuration file using the TFTP Server address provided by DHCP option #66.

5.4.4.6   Step 6

Action. ZIP4x5 receives TFTP data (ZIP4x5_common.cfg) from the TFTP Server

Description. The ZIP4x5 receives the common configuration file and reads it. It is possible that the specific configuration file for a phone is located in a directory that is not the TFTP root directory. If this is the case, the subdirectory is indicated in this common configuration file.

5.4.4.7   Step 7

Action. ZIP4x5 initiates TFTP read request for MAC_address.cfg

Description. The ZIP4x5 requests its specific configuration file. The specific configuration file is uniquely named with the specific MAC address of the phone (for example, 0008A10FF312.cfg).

5.4.4.8   Step 8

Action. ZIP4x5 receives TFTP data (MAC_address.cfg) from the TFTP Server

Description. The ZIP4x5 reads its specific configuration file and determines whether its software version matches that specified. If not, it retrieves the new software.

5.4.4.9   Step 9

Action. ZIP4x5 initiates TFTP read request for ZIP4x5_version bin.

Description. The ZIP4x5 requests the specific software version using the TFTP Server address provided by DHCP option #66 (for example, ZIP4x5_0_1_34.bin).

5.4.4.10   Step 10

Action. The ZIP4x5 receives TFTP data (ZIP4x5_version.bin) from the TFTP Server

Description. After downloading the software version the ZIP4x5 reboots and repeats all of the steps (except for retrieving software). At this point, the ZIP4x5 performs a checksum verification and compares the new software version file name with the version information stored internally to the .bin file. If the checksum fails or if the file name does not match that of the version information stored internally to the .bin file, the phone indicates an error and loads the previous software version.

5.4.5   Summary

For a user, the process of updating the software is fully automatic. The administrator of the network can initiate this process at any time. When the phone is idle, it will start the process of updating the software. Usually, the administrator would cause this to happen when no one is likely to want to use the phone.

To start the update process, the software in the phone restarts and displays:

```
Updating software
. . . . . . . . . . .
```

The phone displays this message using different characters than normal, and only two lines of text. It shows the progress of the update on the second line using periods (full stops). There are 20 characters on the line and each period indicates the phone has completed about 5% of the programming task. The phone shows a new period every one to three seconds.

Important   Do not disturb the phone during the update process. You cannot use the phone to make or receive calls while the software is being updated. This process takes about 30 seconds.

When the phone has provisioned the software, it restarts itself, just as it does when you power it on. After about 15 seconds the phone displays the idle display and is ready to use.

If the software update process fails, the phone may display:

```
Updating software
Failed......
```

The phone displays this message if it found the software file but the file had been corrupted. Contact the system administrator to resolve this. You will not be able to use the phone until you resolve the problem.

Chapter 6

Interacting with the Phone

6.1 Call Appearances

This ZIP4x5 is different from phones that have been in common use for the past 100 years. On older phones a physical pair (or two pairs) of wires carry a single voice call. A phone that can accommodate two voice calls connects to two such circuits, with each circuit being referred to as a line. A switch on the phone selects between the lines (and therefore with whom you are talking). A phone that has four lines has four such sets of circuits and can allow four simultaneous calls.

The ZIP4x5 connects an ethernet circuit and an analog circuit to the switch. All digital calls take place over one ethernet circuit, or line. Dedicated software and hardware inside the phone and the switch permit you to have four simultaneous conversations. The analog circuit carries a single voice call.

The ZIP4x5 has four call appearances. Each call appearance allows you to have a separate or joined call. Each call appearance can carry a single voice calls. Call appearances one, two, and three carry calls from the ethernet circuit. Call appearance four can carry calls over the ethernet circuit or the analog circuit. If the analog circuit is connected directly to the PSTN, it will have a different phone number than the digital call appearances. The digital and analog circuits can be programmed to the same phone number and extension if the ZIP4x5 is connected to a media exchange system that supports digital and analog calls.

6.2 Using the Keypad and the Buttons

The term *buttons* refers to the switches that are identified by the writing on a label below them, shown in figure 6-1.

The term *keypad* refers to the switches that have writing on them, shown in figure 6-2.

6.2.1 Description of Keypad

6.2.1.1 Numerals and Dedicated Keys

The keypad has keys labelled 0 to 9, *, and #. These are used to dial a number and perform other functions. The keypad has keys that are dedicated to specific purposes identified by the text on the key.
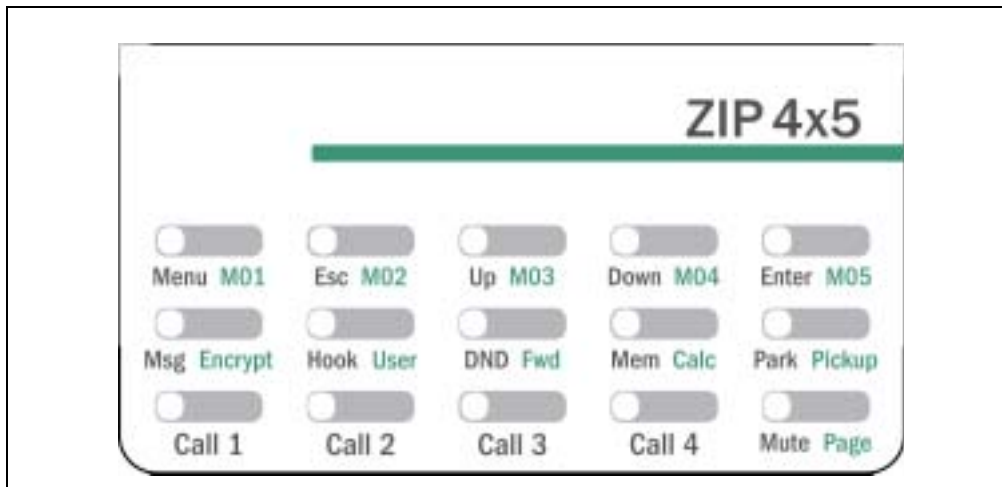
Figure 6-1   View of Buttons on ZIP 4x5
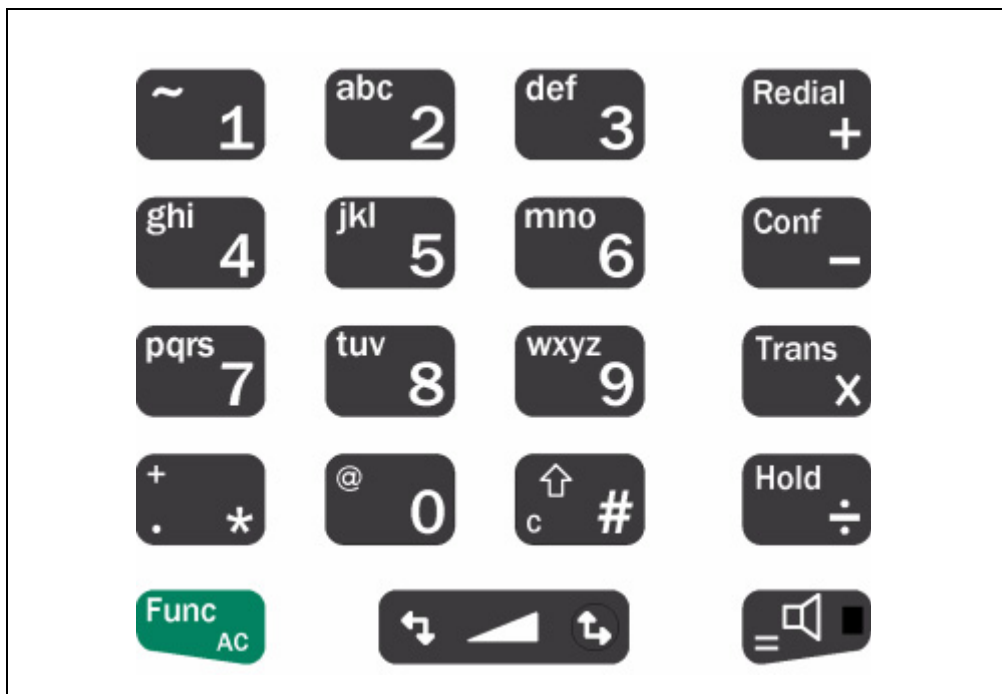
Figure 6-2   View of Keys on ZIP 4x5

6.2.1.2   Function Key

The keypad has a key marked Func that serves as a function, or shift, key to select alternative uses for the keys and buttons. To select the alternative use, press and release the Func button once, then press the appropriate button or key to select the alternative function.

Important   Do not press the Func key and another button or key simultaneously. The ZIP 4x5 can read only a single button or key being pressed at a time.

The Func key is green and the label on the card that shows the alternative function of the button is also green. If you cannot distinguish between these colors, the alternative use is written to the right of the standard use.

For example, to select the calculator mode, press Func then the button marked Mem and Calc. To exit calculator mode, repeat this sequence. In subsequent sections of this document, the text does not describe this sequence. That is, the text states, for example:

"To enter calculator mode, press Calc"

This saves writing:

"To enter calculator mode, press Func then Mem | Calc"

6.2.1.3   Volume Keys

The volume keys are identified by the double arrows on the wide button. You press the up arrow to increase the volume and the down arrow to decrease the volume. The keys are used for other functions depending on the mode.

When you change the volume, the phone remembers the value you set and uses it in the future. When you power down the phone and restore power, the phone retains the same setting. There are five individual volume settings:

1. When the phone is idle, the volume keys control the volume of the ringer. When you press the keys, the phone plays the ringer tone that you have currently selected. You can adjust the volume to suit your needs. After you stop pressing the key, the ZIP4x5 continues to play the ringer tone for two seconds.[1]

2. When you are using the handset, the volume keys control the volume at which you hear the speech from the other party through the earpiece.

3. When you are using the headset as shown in figure 4-3 on page 26, the volume keys control the volume at which you hear the speech from the other party through the earpiece.

4. When you are using the headset as shown in section 4-4 on page 26, the volume keys control the volume at which you hear the speech from the other party through the earpiece.

5. When you are using the speaker, the volume keys control the volume at which you hear the speech from the other party through the speaker.

When you adjust the volume of the headset, ensure that you have the handset on the cradle. The phone adjusts the level for the correct external headset (through a switch box or through an audio connector) depending if you have plugged a headset into the audio connector or not.

Each volume control has twenty one settings, numbered 0 to 20. When you adjust the level, the display shows:

```
Volume:
Speaker 7
███████████████
```
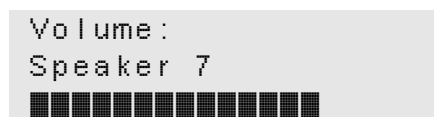
The bar at the bottom of the display represents the volume graphically, from 0 to 20. When the volume is at 0, the sound is completely turned off.

---

1. Section 10.6.6 on page 178 describes how you select the tone that is played when the phone rings.

The volume control does not alter the level of the sound at which that the phone sends its signal to the network.

6.2.2   Description of Buttons

The buttons are used to access features or functions of the phone or phone system easily. You use the buttons labelled Call 1, Call 2, Call 3, and Call 4 to make, receive, and terminate calls. The other eleven buttons have two purposes, depending if you pressed the Func key before you pressed the button.[1]

To access the secondary function of a button, press and release Func then press the button. If you do not press a button within 2½ seconds, the shift function is inoperative, so that when you press a button you will select the standard use for the button not the secondary function.

If you select the Func key in error, you can cancel it by pressing Func again.

When you press the Func key, it does not lock the selection of secondary use of the buttons.[2] Therefore, if you want to select another secondary function, you must press the Func button again. For example, suppose you want to enter calculator mode and then want to pick up a previously parked call. You would press:

Func, Mem | Calc, Func, Park | Pickup

You use the top row of buttons to navigate the menu as described in section 6.3.3 on page 51. When you press Func before you press one of the buttons on the top row, the phone dials a number that you have stored in memory locations 01 to 05.[3]

The use of each of the buttons is described in later sections.

6.3   Basics of Display Organization

The LCD is used to display information and configuration.

The top row of buttons provide access to the menu so you can configure the phone. From the menu you can also view information about the phone. Some buttons directly affect the operation of the phone or the way the phone interacts with the phone system.

As you make or receive calls, or affect the operation of the phone, the LCD shows the status of the calls or interaction with the system.

6.3.1   Idle

When the phone is idle:

- each of the call appearance LEDs is off

- the phone displays a greeting message on the first row of the display

- the phone displays the date and time on the third row of the display

---

1. The Func key is described in section 6.2.1.2 on page 48.
2. This behavior is different from when you are dialling and use the Func key to select alternative use for the keys.
3. See section 9.7.3 on page 122 for more details.

For example:

```
Sales support

Sun 22 Jan 04   19:15
```

You can program the greeting message and the format in which the date and time are shown.[1]

6.3.2 Incoming Call

When your ZIP4x5 receives a call, the phone displays:

```
x: To <your_name>
<caller's name
or number>
```

The phone shows:

- the call appearance number (1 to 4 instead of 'x')
- the name of the intended recipient of the call (on the first line)
- the name or phone number of the caller if available

6.3.3 Menu

6.3.3.1 Introduction

This section describes how to access and exit the menu. Section 10.1 on page 133 describes the menu structure.

6.3.3.2 Accessing and Exiting

You access the configuration by pressing the Menu button. You can access the menu only when the phone is on hook and is idle (no calls in progress or connected). As soon as you press the Menu button, the LED on the speaker key and the Mute button flash synchronously. They flash red for 250 ms and are off for 750 ms to inform you that you are accessing the menu.

To exit the menu, press the Menu button again or any call appearance button. If you do not press any keys or buttons for 60 seconds, the phone automatically exits the Menu mode.

6.3.3.3 Navigating

When you have accessed the menu, you then use the Enter, Esc, Up, and Down buttons to navigate through the menu.

When you are accessing the menu, you can use the volume keys instead of the up and down buttons. The key for increase is equivalent to Up and the key for decrease is equivalent to Down.

---

1. See section 10.5.2 on page 147 and section 10.5.10 on page 160 for details.

6.3.3.4   Display on LCD

When you access the menu, the top row on the LCD shows the menu item. The second and third rows show menu choices. The currently selected item has an arrow in the first row of the display. An example is shown:

```
Settings | Country
➡Australia
 Canada
```

When you press the Down button, the arrow moves down, so the above screen would look like:

```
Settings | Country
 Australia
➡Canada
```

When you press the Down button again, the ZIP4x5 displays the next menu item, keeping the arrow on the bottom row:

```
Settings | Country
 Canada
➡France
```

As you continue to press the Down button, the ZIP4x5 shows each of the menu selections in turn, wrapping round to the first menu selection once it has displayed the last.

If you press the Up button when the above display is shown, the arrow moves up to select the previous item:

```
Settings | Country
➡Canada
 France
```

As you continue to press the Up button, the ZIP4x5 shows each of the menu selections in turn, wrapping round to the last menu selection once it has displayed the first.

To select the item pointed to by the arrow, press the Enter button. This action may also show an item further into the menu structure, or it may move you up one item in the menu structure. The top row on the LCD informs you where you are in the menu structure.

To move back through the menu structure press the Esc button. If you point to an item in the menu that you want to select and press Esc instead of Enter, the phone does not change the value of the parameter.

For example, if you pressed the Enter button when the display was as above, you would select the country to be Canada, and the display would change to:

```
Set | Regional Optn
➡country
 language
```
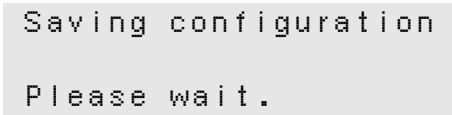
When you next enter a menu, the ZIP4x5 puts the arrow in the second row and points to the currently selected item. For example, in the example above, if you pressed the Enter button, the phone has the arrow on the second row and points to the country Canada, instead of Australia.

6.3.3.5 Using the Menu and Receiving a Call

When you are accessing the menu, and the ZIP4x5 receives a call, the ZIP4x5 immediately changes the display to be as shown in section 6.3.2 on page 51. As soon as you end the call, the phone returns the display to be as it was prior to the call. You can then continue to use the menu functions.

6.3.3.6 Saving the Data

If you make a change to the data in the menu, then when you exit the menu system (or the phone waits for 60 s and exits the menu itself), the phone saves the data to non volatile memory. The phone displays the message:

```
Saving configuration

Please wait.
```

The process of saving the configuration takes about two seconds. Do not turn off the power while the phone is displaying this message.

When the phone has saved the data, the phone replaces the display shown above with either the idle message or a different message depending on the activity on the phone. You can make and receive a call while this message is being displayed. The phone continues the process of saving the data, and changes the display appropriately.

If you make a change to the configuration (from the menu) and turn off the power without exiting the menu system, the ZIP4x5 will not have saved your changes and the changes that you made will be lost.

6.4 Data Backup

When you remove power from the phone (or there is a power failure), the phone saves data in non-volatile memory. This storage does not depend on a battery and the data will therefore be saved for many years.

The data that is saved is:

- everything that you enter with the menu
- call forwarding and DND selection
- the list of recent calls made and received
- the list of 100 contacts in the phone book

<div align="right">

C h a p t e r   7

</div>

Special Functions

7.1   Message

7.1.1   Voice Messages

When you have voice mail messages, the LED on the **Msg** button flashes red for 500 ms and off for 500 ms. The LED can become lit while you are in the middle of a conversation, if someone has left you a voice mail while you are using the phone.

To retrieve your voice mail, press the button. If you did not have the phone off hook, the phone uses speaker mode and dials the number.[1]

The operation of the voice mail system is independant of the operation of the phone. Follow the prompts for the voice mail system to listen to and delete your messages.

7.1.2   Instant Messages

When you have unopened instant messages, the LED on the **Msg** button flashes orange for 500 ms and off for 500 ms. Press the Msg button while the LED is flashing to retrieve your Instant Messages

Pressing the Msg button when the LED is not flashing orange accesses the voice mail system. To retrieve your instant message when the Msg is not flashing orange, select Menu | Instant Messages.

7.2   Encryption

7.2.1   Description

The speech traffic to and from an IP phone is sent over the LAN. It is possible for a person who is equipped with the appropriate equipment to monitor the LAN traffic and thus hear your conversation. If you want to keep your conversation private so that it cannot be monitored, you should enable encryption on the phone.

---

1. The phone dials the address (name or number) stored at memory location 00, for the voice mail server. This address can be filled from the configuration file or by using the menu. See section 5.2 on page 38 for details of the configuration file. See section 10.6.5 on page 176 for details how to enter the phone number of the voice mail system through the menu.

The administrator can select whether encryption is **normally on**, **normally off**, **always on**, or **never on**:[1]

- If the phone is configured so that encryption is **always on**, pressing the Encrypt button has no effect. Your phone can make calls only to devices that also support encryption. Your phone cannot make a call to, or receive a call from, a device that cannot encrypt the speech. You cannot turn off encryption during a call.

- If the phone is configured so that you have control over the encryption (**normally on** or **normally off**), your phone can communicate with devices that support or do not support encryption. You can use the Encrypt button to engage or stop encryption. If you make a call to a device that does not support encryption, and you have requested that the call be encrypted or your phone by default is trying to engage encryption, the call will complete with encryption disabled. You can engage and stop encryption during a call.

  The phone tries to establish all calls to be encrypted if configured for **normally on**. You can turn off encryption before or during the call.

  The phone tries to establish all calls to be without encryption if configured for **normally off**. You can turn on encryption before or during the call.

- If the phone is configured so that encryption is **never on** (cannot be engaged), pressing the Encrypt button has no effect. Your phone can make calls only to devices that are do not require encryption. Your phone cannot make a call to, or receive a call from, a device that always encrypts the speech. During a call, your phone will reject a request by the far end to engage encryption.

Regardless of the setting chosen by the administrator, the LED on the Encrypt button is off when the phone is idle. It becomes active only during a call as described in the sections below.

ZIP4x5 encryption is based on open standards. To encrypt the conversation, each person must be using a device that supports these open standards, such as another ZIP4x5 or compatible phone.

The encryption is completely loss-less. That is, the quality of the voice is the same whether the voice is encrypted or not. The encryption introduces negligible delay to the speech. When you switch between the call being encrypted or not encrypted, the ZIP4x5 performs this almost instantaneously, but can take as long as 200 ms if there is a lot of traffic on the network.

Ensure that you understand the various ways to originate and terminate a call as described in section 9.2 on page 99 and section 9.6 on page 120 before reading the remainder of this section. If you want to create a conference call with encryption, ensure you know how to use the conference functions as described in section 9.8 on page 126.

7.2.2   Individual Calls

7.2.2.1   Making a Call When Encryption is Always On

Whenever you select a call appearance (directly or indirectly) to make a call, the LED on the Encrypt button flashes green synchronously with the green LED on the call appearance button.

If the device that you are calling supports encryption, the call completes as normal and the ZIP4x5 lights the LED on the Encrypt button continuously green.

---

1. See section 10.6.6 on page 178 for details.

If the device that you are calling cannot support encryption, the call will not complete. Your ZIP4x5 plays the fast busy tone (congestion tone) and flashes the LED on the call appearance button and the Encrypt button green and red for 250 ms each color. The display changes to:

```
1. Encrypt Rejected
4083280450
```

The phone shows the call appearance number and the name, number, or address of the person you were trying to call.

The phone maintains this state until you go on hook.

7.2.2.2   Receiving a Call When Encryption is Always On or Never On

If your ZIP4x5 is configured so that encryption is **always on** and it receives a call from a device that has encryption **always on**, or if your ZIP4x5 is configured so that encryption is **always off** and it receives a call from a device that has encryption **always off**, your phone will answer the call. The phone turns on the LED on the Encrypt button if encryption is engaged.

If your ZIP4x5 is configured so that encryption is **always on** and it receives a call from a device that has encryption **always off**, or if your ZIP4x5 is configured so that encryption is **always off** and it receives a call from a device that has encryption **always on**, your phone will reject the call. The phone does not make any sound or light any LEDs. Your phone accumulates this as a missed call (see section 9.4.4.3 on page 114). You can identify that the call was rejected as described in section 9.7.5 on page 124.

7.2.2.3   Making a Call With Encryption Normally On or Normally Off

When you enable encryption on the phone, it functions on each line independently. Therefore you can have an encrypted call with a person on one call appearance and a call that is not encrypted with another person on a different call appearance.

To encrypt a call prior to dialling:

- If the phone is configured so that encryption is **normally off**, press a free call appearance button then press the encrypt button.

- If the phone is configured so that encryption is **normally on**, as soon as you start to make a call the phone enables encryption.

The phone flashes the LED on the call appearance button green and also flashes the LED on the Encrypt button synchronously. Dial the number using any of the methods that you can use for a call that is not encrypted.

To encrypt a call that is already established, press the Encrypt button during the conversation.

If the other person's phone can accept encrypted voice the ZIP4x5 lights the LED on the Encrypt button solid green but makes no change to the display.

If the far end phone rejects the request to enable encryption, your ZIP4x5 beeps three times through the audio channel you are using, and displays:

```
Warning:
Encryption turned
off by far end.
```

The phone holds this display for two seconds, until you press a key, or go on hook.

7.2.2.4   Answering a Call With Encryption Normally On or Normally Off

Your phone automatically configures itself to engage or not engage encryption depending on the request from the calling device. Your phone makes no sound and makes no change to the LCD. It lights the LED on the Encrypt button continuously green if encryption is engaged.

7.2.2.5   When the Other Party Turns on Encryption During a Call

If your phone has been configured to allow encryption, the phone immediately accepts the encryption request and lights the LED on the Encrypt button continuously. The speech is now secure. Your phone makes no sound and makes no change to the LCD.

7.2.2.6   When You Select to Turn Off Encryption

To turn off encryption on a call prior to dialling:

- If the phone is configured so that encryption is **normally off**, the phone does not attempt to encrypt the call when you initiate it.

- If the phone is configured so that encryption is **normally on**, press a free call appearance button then press the encrypt button.

If you turn off the encryption during a call, your phone turns off the LED on the Encrypt button. The speech is no longer encrypted and therefore not secure.

If you try to turn off encryption and the other person is using a device that can accept only encrypted speech, the other device will reject the request and your phone flashes the LED on the encrypt button for two seconds (250 ms on and 250 ms off). The speech will remain encrypted and thereafter the LED on the Encrypt button remains lit continuously.

7.2.2.7   When the Other Party Selects to Turn Off Encryption

If the person with whom you are talking turns off the encryption, your phone beeps three times through the audio channel that you are using, turns off the LED on the Encrypt button, and displays:

```
Warning:
Encryption turned
off by far end.
```

The phone holds this display for two seconds, until you press a key, or go on hook.

7.2.3 Holding, Parking, Transferring, and Forwarding Calls

When you put a call on hold or park it, the other person's device now communicates with the call manager system, whereas it previously communicated with your phone. Similarly, when you transfer a call or forward a call, the other person's device now communicates with someone else's phone.

In each of these cases the encryption policies of the devices have to be compatible or the call may be dropped.

For example, consider the case when you are speaking with a person who puts the call on hold:

- If your phone is configured for **normally on** or **normally off**, it will adapt to the new speech path coming from the phone system by either engaging or turning off encryption.

- If your phone is configured for **always on** or **never on**, the phone system must support encryption in the former case or must be able to establish communication without encryption in the latter case. If the phone system cannot communicate with your phone, your phone rejects the call and your conversation is not placed on hold. Depending on the phone system your call may then be dropped or the phone system may reconnect you to the other person.

If you put a call on hold successfully, the phone turns off the LED on the Encrypt button. If the phone system rejects the call and does not return the call to your phone, the call will be dropped and the ZIP4x5 will turn off the LED on the respective call appearance button.

7.2.3.1 Transferring Calls

To transfer a call, you place the active call on hold, then dial the person that will receive the active call, as described in section 9.5.3 on page 118. If encryption on each phone is set for **normally on** or **normally off**, the encryption state of the transferred call depends on your call to the person that will receive the transferred call.

After placing the active call on hold:

- if you call the person that will receive the active call with encryption on, then the transferred call will be encrypted

- if you call the person that will receive the active call with encryption off, then the transferred call will not be encrypted.

7.2.3.2 Forwarding Calls

Call forwarding routes incoming calls to another destination, as described in section 7.5 on page 65. If encryption on each phone is set for **normally on** or **normally off**, the encryption state of the forwarded call depends on the encryption setting of the phone initiating the call.
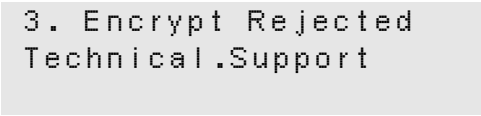
7.2.4 Conference Calls

7.2.4.1 General

All calls that comprise a conference call must be encrypted or not encrypted. You cannot mix calls on a conference call that are encrypted or not encrypted because this makes the entire conference subject to eavesdropping and is therefore not secure.

After you have set up the call with the first person, all subsequent calls added to the conference must be encrypted or not encrypted depending on whether the first call has encryption engaged or not. You can join other parties to the conference in the same way that you can you can join parties for a conference that is not encrypted and as described in section 9.8.5 on page 128.

7.2.4.2 Adding Other Parties to an Encrypted Conference Call

If you have established an encrypted call, you cannot add other calls to the conference that are not encrypted:

- If you place the conference on hold and make a call to another person, pressing the conference button will have no effect and you cannot join the person to the call if that new call is not encrypted.

- If you press the Conf key to select a new call appearance and then you call another party that will not support the request for encryption, your ZIP4x5 drops the call if it was not rejected by the other party and shows:

```
3. Encrypt Rejected
Technical.Support
```

The phone shows the call appearance number and the name, number, or address of the person you were trying to call. The phone holds this display for two seconds then reverts to the previous display.

- If you have one or more incoming calls and you press the Conf key to join those calls to the conference, your ZIP4x5 joins only those parties to the call that are encrypted. The phone continues to alert you that you for the call or calls that could not join the conference. You need to place the conference on hold to answer the other call or calls.

7.2.4.3 Turning Off Encryption on a Conference Call

The other parties to a conference call cannot turn off encryption on the conference call. Your ZIP4x5 will reject such a request. You can turn off encryption if all the devices that are participating in the conference have the encryption policy set to allow this.

If you try to turn off encryption and one or more devices can accept only encrypted speech, the other device will reject the request and your phone flashes the LED on the encrypt button for two seconds (250 ms on and 250 ms off). The speech will remain encrypted and thereafter the LED on the Encrypt button remains lit continuously.

7.3 User

7.3.1 Description

The functionality of User is dependent on the phone system. This function allows you to easily associate yourself with a phone that has not been assigned to you. It is useful if you visit another person's office or go to a common location and want to receive your phone calls. This is a quick way to create a feature sometimes referred to as "follow me."

The user feature also allows you to log in or out of an ACD group or an operator group.

When you associate yourself with the phone, systems that support this feature will ring whenever there is an incoming call for your SIP address or extension.

When you press this button, the display changes to:

```
User
➤Log in
  Log out
  Log into ACD
  Log out of ACD
```

This example shows five rows, though in practice the display can show only three rows at once. As you press Up and Down, the display scrolls through the list of choices. Press the Enter button to select a choice or the Esc button to cancel.

7.3.2 Log In

To log into the phone do the following:

1. Select User | Log in.

2. The display changes to:

```
User log in
Extension ➤
Password
```

3. Type the phone number of your extension. You must enter a numeric value and cannot enter your user name. The Func key is disabled.

4. Press the Enter button or the Down button.

    The display changes to:

```
User log in
Extension  5001
Password  ➤
```

5. Type your system password (PIN) and press the Enter button.

    The display echoes the * character as you type your password.

6. If you correctly typed the extension and password, the phone lights the LED on the User button green continuously to indicate that one or more additional users are logged into the phone. When you use the headset, the same LED is lit continuously red.

    The phone displays whatever was being displayed prior to your pressing the User button.

7. If the phone encounters an error, it displays one of the screens shown in section 7.9 on page 71.

Once you have logged yourself into the phone, the system can send calls to this phone as well as any other devices that you may have registered with it.

7.3.3   Log Out

When you move away from a phone that you have logged into, you should log out so that your calls are no longer sent to that phone. If you forget the log out, the phone's owner can log you out because you do not need a password to log out.

To log out of a phone, do the following:

1.   Select User | Log out.

2.   The display changes to:

```
User  log  out
➡all
   Lancelot  Capability
```

The display shows the names of all the users who have temporarily logged into the phone. If more than one user has logged into the phone, the phone displays "all" as the first selection.

3.   Use the Up and Down buttons to select the individual you want to log out, or select "all" to log out all users, and press the Enter button.

4.   The phone ceases to light the LED on the User button green continuously if there are no other additional users logged into the phone and no user is logged into an ACD group or operator group. When you use the headset, the same LED is lit continuously red.

5.   If there were no users logged into the ZIP4x5, the display shows instead:

```
User  log  out
No  user  is  logged  in
```

When you press any key, the phone displays the idle screen.

7.3.4   Log Into ACD or Operator Group

This function is used to log in as an agent or an operator. When you select this menu item, you can join the group without necessarily logging into the phone as an individual.

To log into the phone as an agent or operator do the following:

1.   Select User | Log into group.

2.   The display changes to:

```
Group  log  in
Group  number  ➡
Extension
```

At this point, the phone cannot accept any new calls until you exit the group log in.

3.   Type the phone number of the ACD group or operator group you want to join.

4.   Press the Enter button or Down.

The display changes to:

```
Group log in
Group number    1805
Extension     ➡
```

5. Type the phone number of your extension. You must enter a numeric value and cannot enter your user name. The Func key is disabled.

6. Press the Enter button or the Down button.

The display changes to:

```
Group log in
Extension   1854
Password   ➡
```

7. Type your system password (PIN) and press the Enter button.

The display echoes the * character as you type your password.

8. If you correctly typed the extension and password, the phone lights the LED on the User button green continuously to indicate that one or more additional users are logged into the phone. When you use the headset, the same LED is lit continuously red.

The phone displays whatever was being displayed prior to your pressing the User button.

9. If the phone encounters an error, it displays one of the screens shown in section 7.9 on page 71.

Once you have logged yourself into the phone, your system will send calls to this phone as well as any other devices that you may have registered with it.

7.3.5   Agents Operating Without a PC

Agents can function as part of an ACD group by using the ZIP4x5 phone. The phone automatically supports the following presence states:

*   logged out

*   available

*   active

When an agent wishes to take a break, he or she should log out of the ACD group and log back in when available again. The phone does not support wrap up, so a new call can be presented to the agent immediately after the end of a previous call.

7.3.6   Log Out of ACD or Operator Group

When you move away from a phone that you have logged into as an operator or agent, you should log out so that your calls are no longer sent to that phone. If you forget to log out, the phone's owner can log you out because you do not need a password to log out.