

ZIP 4x4

User's Manual

Manual Part Number 90-18100



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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 ZIP4x4. The manual can also be used by engineers that want to make a phone system compatible with the ZIP4x4. The manual assumes you are familiar with networking and telephony principles and practices.

If you are using the ZIP4x4 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 ZIP4x4 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 ZIP4x4 User's Guide (which is 12 pages). One guide is shipped with each phone, but you can download the guide from the ZIP4x4 web site at:

<http://www.zip4x4.com>

1.1.2 Installation and Use

Unpack the ZIP4x4 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 ZIP4x4 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 ZIP4x4 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 four” because it has four call appearances and four Ethernet circuits.



Figure 1-1 Top View of ZIP4x4

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

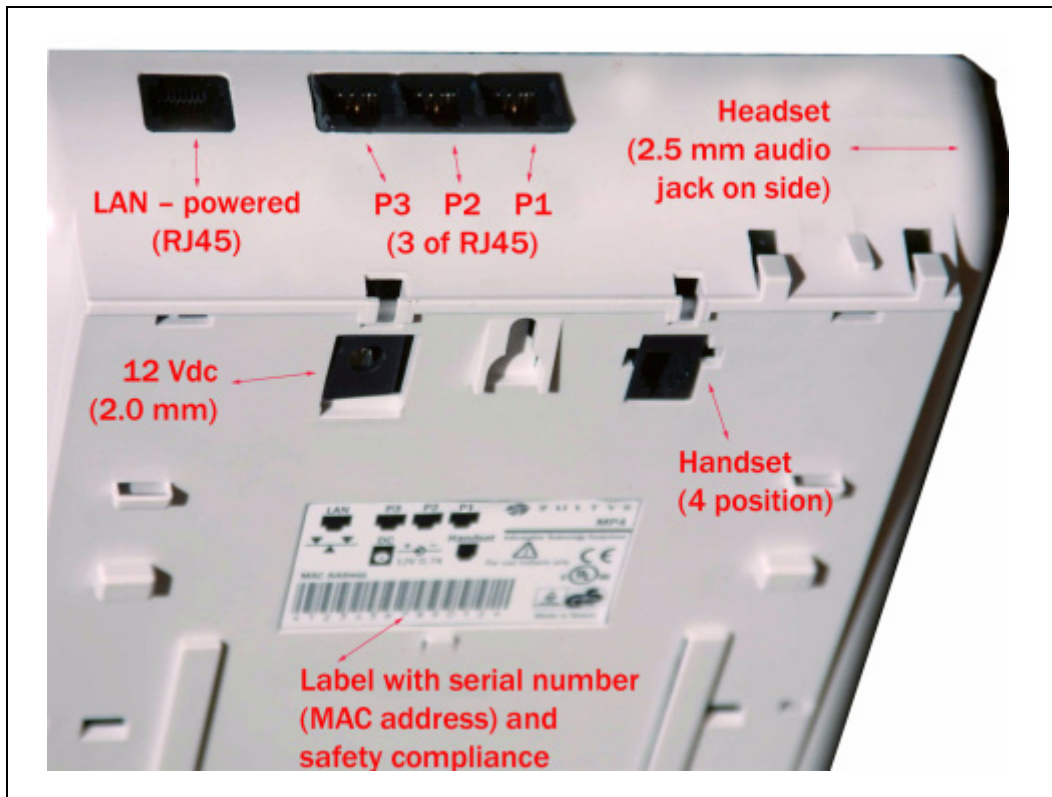


Figure 1-2 Bottom View of ZIP4x4

- 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
- 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
- critical operational parameters are protected by password

- 100 memory phone book plus 64 location memory for last numbers received or dialed
- 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 ZIP4x4 can control the QoS to ensure that voice packets always have priority. Further, when the phone is not in use, the ZIP4x4 supports wire speed switching between the LAN (network) and the accessory ports. A conceptual picture of the switch is shown in figure 1-3.

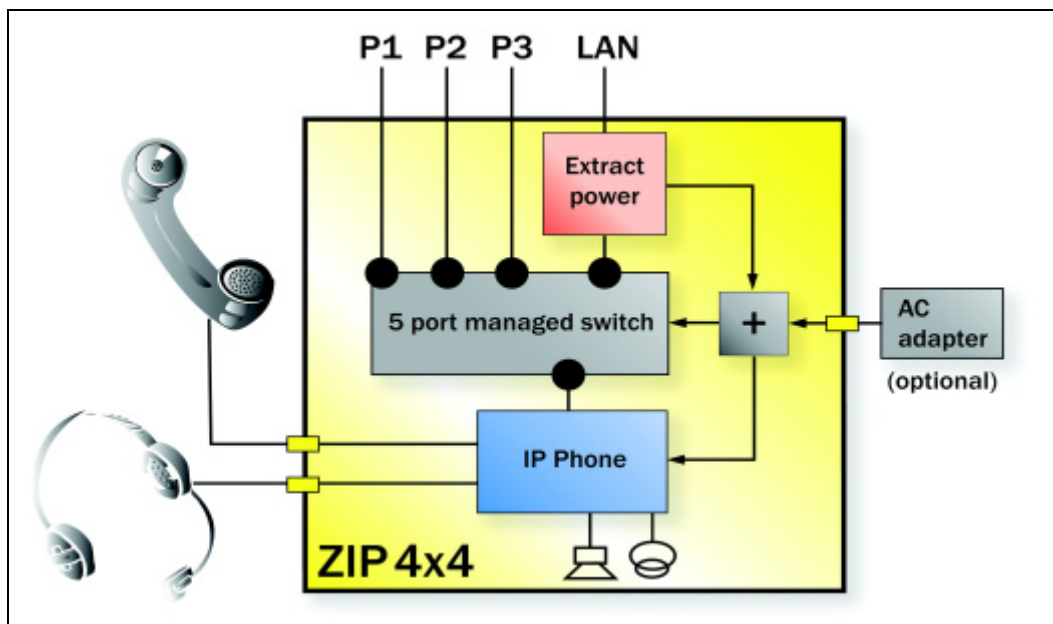


Figure 1-3 Internal Representation of the Managed Switch

You can put the phone and the accessory ports on different VLANs (802.1q – see section 9.6.4 on page 140 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 9.5.1 on page 121.



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 ZIP4x4.

Zultys Part	Description
90-05100	White ZIP4x4, with ac power supply for N. America, Taiwan, and Japan
90-05101	White ZIP4x4, with ac power supply for UK and Hong Kong
90-05102	White ZIP4x4, with ac power supply for continental Europe (Schuko plug)
90-05103	White ZIP4x4, with ac power supply for Australia and New Zealand
90-05104	White ZIP4x4, with ac power supply for Israel
90-05110	White ZIP4x4, without ac power supply
90-05120	Black ZIP4x4, with ac power supply for N. America, Taiwan, and Japan
90-05121	Black ZIP4x4, with ac power supply for UK and Hong Kong
90-05122	Black ZIP4x4, with ac power supply for continental Europe (Schuko plug)
90-05123	Black ZIP4x4, with ac power supply for Australia and New Zealand
90-05124	Black ZIP4x4, with ac power supply for Israel
90-05130	Black ZIP4x4, without ac power supply

Figure 1-5 Ordering Numbers for the ZIP4x4

1.4 Documentation Overview

1.4.1 Organization

This user's manual describes:

- how to install the ZIP4x4
- 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 183.

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 ZIP4x4 or the loss of data.

Warning This notice indicates that if a specific procedure or practice is not correctly followed, permanent damage to the ZIP4x4 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 ZIP4x4 web site at:

<http://www.zip4x4.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 ZIP4x4 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 ZIP4x4, 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 ZIP4x4.

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Zultys grants you a non-transferable and non-exclusive right to use its Licensed Materials to operate the ZIP4x4 hardware. You may install the ZIP4x4 software on an unlimited number of computers at the facility or premises where the ZIP4x4 hardware is located.

If you transfer the ZIP4x4 hardware, you agree to destroy all copies of Licensed Materials, together with any archive copy thereof, at the facility or premises where the ZIP4x4 hardware had been located.

You agree to treat updates to the ZIP4x4 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 ZIP4x4 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 ZIP4x4, 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 ZIP4x4 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 9.4.4, starting on page 119), 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 ZIP4x4, 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 ZIP4x4 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 ZIP4x4, 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 ZIP4x4 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 ZIP4x4, 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 ZIP4x4 are currently available at no charge. You should check the ZIP4x4 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 ZIP4x4 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 ZIP4x4.
- Check the index or table of contents of this manual for the topic you need.
- See the ZIP4x4 technical support information and FAQ pages on the ZIP4x4 web site:

<http://www.zip4x4.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 ZIP4x4.

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 ZIP4x4 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 ZIP4x4 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 ZIP4x4 does not behave in the manner that you expect.

The onus is on you, the system administrator, to configure the ZIP4x4 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 ZIP4x4

3.1 Initial Inspection

When the shipment of your ZIP4x4 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 ZIP4x4 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 ZIP4x4 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 ZIP4x4 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 ZIP4x4 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 Preparing the ZIP4x4 for Use

4.1.1 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.

4.1.2 Power

You can power the ZIP4x4 from an ac supply or from the network.

4.1.2.1 Power over Ethernet

If you ordered the phone without an ac adapter you must ensure that you connect the ZIP4x4 to an Ethernet switch that provides power as per IEEE 802.3af.¹ The ZIP4x4 takes its power from the port labelled *LAN*. The cable length can be 100 m, the maximum allowed for an unpowered Ethernet circuit.

4.1.2.2 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

-
1. The ZIP4x4 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 ZIP4x4 with any adapters other than those supplied by Zultys.

4.1.2.3 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 ZIP4x4 using the menu. See section 9.4.3 on page 118.

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.

4.1.2.4 When Power is Applied

When you apply power, the phone starts to operate. The ZIP4x4 does not have any power switch. After the phone is powered up, it displays a message on the screen as shown in section 4.2 on page 26.

4.1.3 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.

4.1.4 Connecting to the Network

You normally connect the ZIP4x4 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 8.2.9 on page 79 describes the method of directly connecting two ZIP4x4 phones, either outside of a LAN or isolated within a network.

4.1.4.1 Auto MDI/MDI-X and Auto Negotiation

Each of the four Ethernet circuits on the ZIP4x4 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 ZIP4x4 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.

4.1.4.2 Single Circuit

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

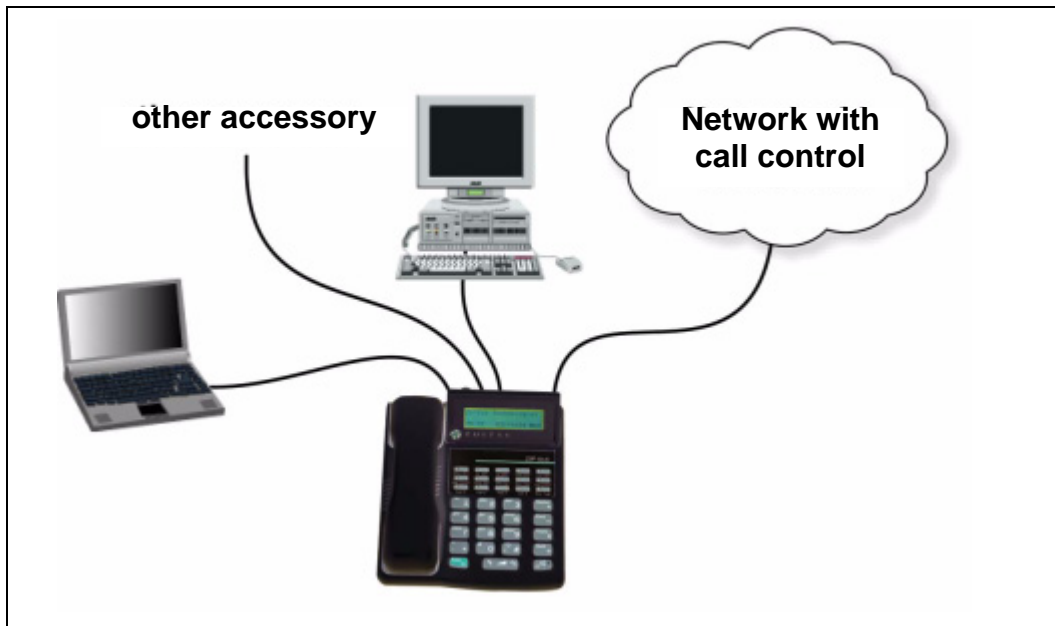


Figure 4-1 Connecting the ZIP4x4 and Your PC

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 9.4.3 on page 118.

4.1.4.3 Cascading

The ZIP4x4 has a very efficient network switch incorporated in it so you can cascade the phones as shown in figure 4-2.

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 ZIP4x4 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 9.4.3 on page 118.

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 ZIP4x4 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.

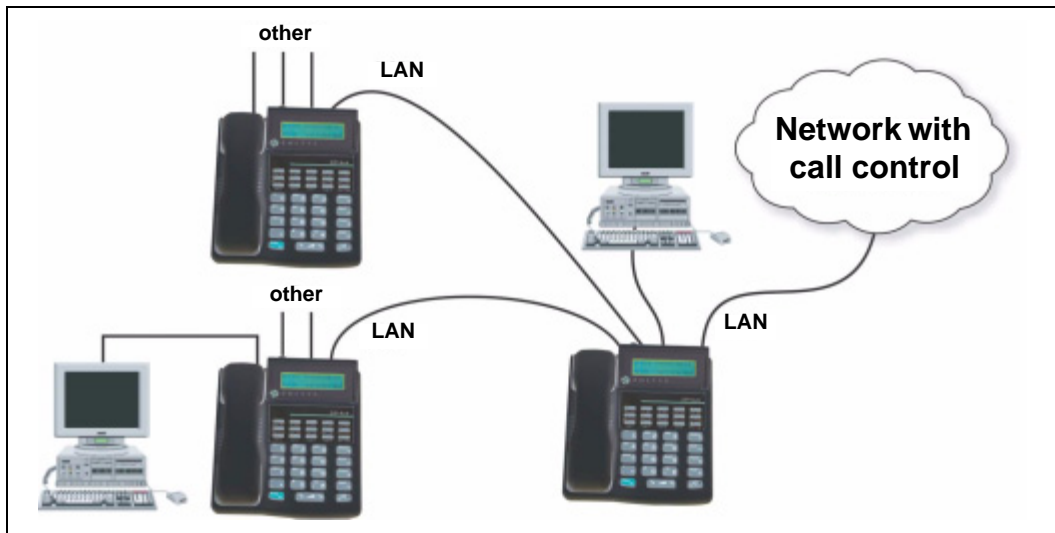


Figure 4-2 Cascading Phones

4.1.5 Connecting a Headset

You can connect a headset to the audio socket on the side of the phone or in series with the handset. The most convenient solution, and the lower cost alternative, is to use a headset on the side of the phone. Headset 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 ZIP4x4 you can choose either type of headset. Switching between the headset, handset, and speaker is described in section 8.1.1 on page 71.

4.1.5.1 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.

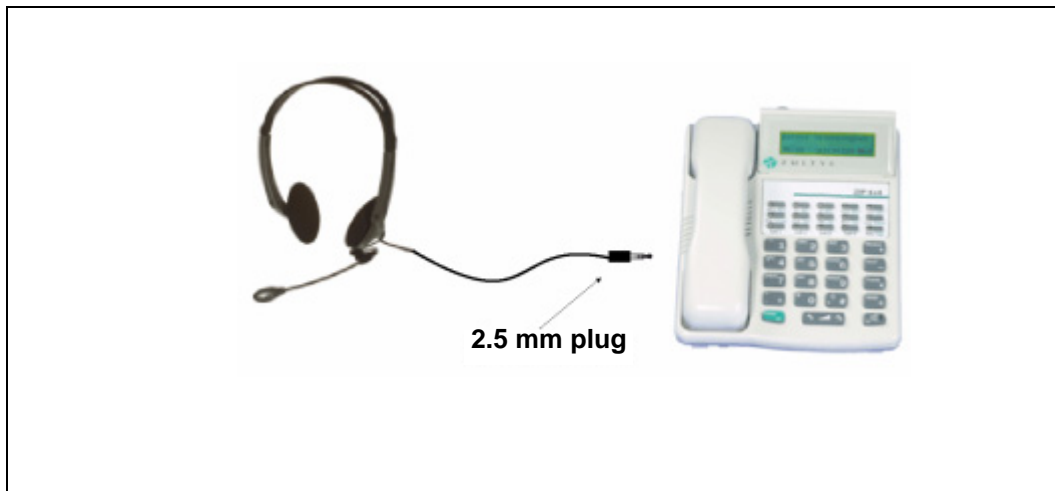


Figure 4-3 Connecting a Headset to the ZIP4x4 Using the Audio Connector

4.1.5.2 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.

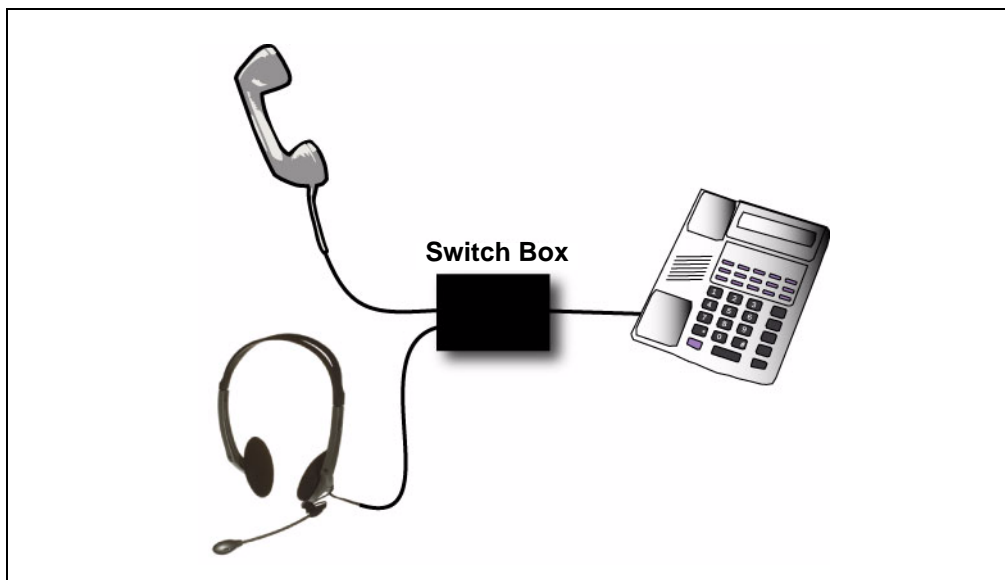


Figure 4-4 Connecting a Headset to the ZIP4x4 Using an External Switch Box

4.2 Power On

4.2.1 Description

When you power up the ZIP4x4, 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 server contains a configuration file that fully provisions your phone and contains addresses for network elements used by the phone, so that ZIP4x4 can register with the SIP server. The exact sequence for start up is described in chapter 5, starting on page 35.

4.2.2 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:



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

4.2.3 Copyright

Once the operating system is loaded, the ZIP4x4 displays the Zultys logo, followed by copyright information:



1. When the phone is shipped from the factory, DHCP is enabled. To fix the IP address in the phone, see section 9.6.2 on page 134.

```

ZIP 4x4 SIP Phone
Copyright © 2003
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 4.2.5 on page 30.

4.2.4 Running a Quick Test

4.2.4.1 Accessing

You can run quick tests of the hardware of the ZIP4x4 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 9.7 on page 147.

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. Press the Speaker key to tests the speaker and microphone.

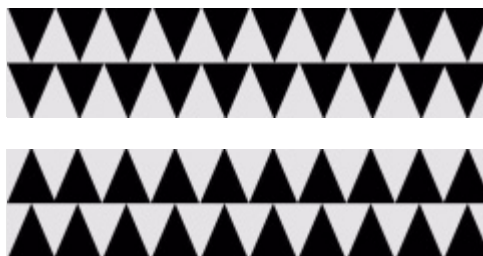
4.2.4.2 Quick Test of the LCD, LEDs, Buttons, Keys, and Ethernet Ports

This test is used in manufacturing to verify the hardware and takes about 25 s. You need two short Ethernet cables. Before or after you have started the test, connect:

- Ethernet circuit P1 to Ethernet circuit P2
- Ethernet circuit P3 to the LAN circuit

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.

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 9.4.4 on page 119.
2. The buttons that have LEDs are described in section 1.2.3 on page 5.

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 ZIP4x4 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.

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

```
Keypad 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
```

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 4.2.2 on page 26, 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.

4.2.4.3 Quick Test of the Speaker and Microphone

This verifies the amplitude of sound received in the microphone over a range of levels of sound transmitted from the speaker. The phone transmits a sequence of tones at different levels and displays:

```
Testing Audio
```

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 4.2.2 on page 26, 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.

4.2.5 Communicating with the Network

4.2.5.1 Phone Not Connected

If the phone is not connected on its LAN circuit, the phone displays:

```
ZIP4x4 SIP Phone
Phone not connected
```

4.2.5.2 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.

4.2.5.3 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.

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 5.3.5 on page 42 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:

```
ZIP4x4 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

```
ZIP4x4 SIP Phone
Unable to locate
TFTP server
```

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

4.2.5.4 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
```

4.2.5.5 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 9.6 on page 132, 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.

4.2.5.6 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 9.4.3 on page 118.

4.2.5.7 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 9.4.3 on page 118.

4.2.6 Satisfactory Connections

4.2.6.1 Date and Time

Your ZIP4x4 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
```

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 ZIP4x4 displays:

```
Enter date
Year:
◆2003
```

Use the Up and Down buttons or the Up and Down keys to select the correct year. The phone defaults to 2002 scrolls to a maximum of 2022, then to 2002 again.

-
1. The ZIP4x4 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.

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 ZIP4x4 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 48.

You can subsequently alter the date and time using the menu as described in section 9.5.4 on page 122, or you can cycle power on the phone to obtain the same screen.

4.2.6.2 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 4.2.5.6 on page 31.

1. Use 24 hour notation regardless of the format you may have chosen in which time is displayed in section 9.5.7 on page 129.

Provisioning the Phone

5.1 Introduction

This and the following two sections (section 5.2 and section 5.3) describe the method used by the ZIP4x4 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 ZIP4x4 work with a particular SIP system.

5.1.1 Summary of Boot Process

To use the ZIP4x4 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 ZIP4x4 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.

5.1.1.1 DHCP Support

When you connect the ZIP4x4 phone to a DHCP server, the DHCP server must be configured with the following options for your network to fully support the ZIP4x4:

- 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:

```
ZIP4x4_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=EEEEEE
vlan_id_c=-1
circuits_c=EEEEEE
vlan_id_d=-1
circuits_d=EEEEEE
vlan_id_e=-1
circuits_e=EEEEEE
vlan_id_f=-1
circuits_f=EEEEEE
vlan_id_g=-1
circuits_g=EEEEEE
vlan_id_h=-1
circuits_h=EEEEEE
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=./ZIP4x4

[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 ZIP4x4
;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 4x4 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 ZIP4x4. Configuration parameters are described in Appendix C, starting on page 163.

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 9.5.3.
 2. If the specific configuration file contains such a line, the phone ignores it.

ZIP 4x4 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 Updating Software on the ZIP4x4

5.3.1 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.

5.3.2 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.

The software name is:

```
ZIP4x4_<version>.bin
```

For example:

```
ZIP4x4_0_1_4.bin
```

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

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

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.

5.3.3 Binary File

The binary file for the software contains the software version. When the ZIP4x4 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.

5.3.4 Ladder Diagram

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

5.3.4.1 Step 1

Action. ZIP4x4 sends DHCP DISCOVER (broadcast)

Description. The ZIP4x4 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).

5.3.4.2 Step 2

Action. DHCP Server responds with a DHCP OFFER

Description. The DHCP Server indicates an available IP Address to the ZIP4x4.

5.3.4.3 Step 3

Action. ZIP4x4 sends DHCP REQUEST (broadcast)

Description. The ZIP4x4 accepts the DHCP server's offer and asks the server to provide its configuration.

5.3.4.4 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 ZIP4x4 are described in section 5.1.1.1.

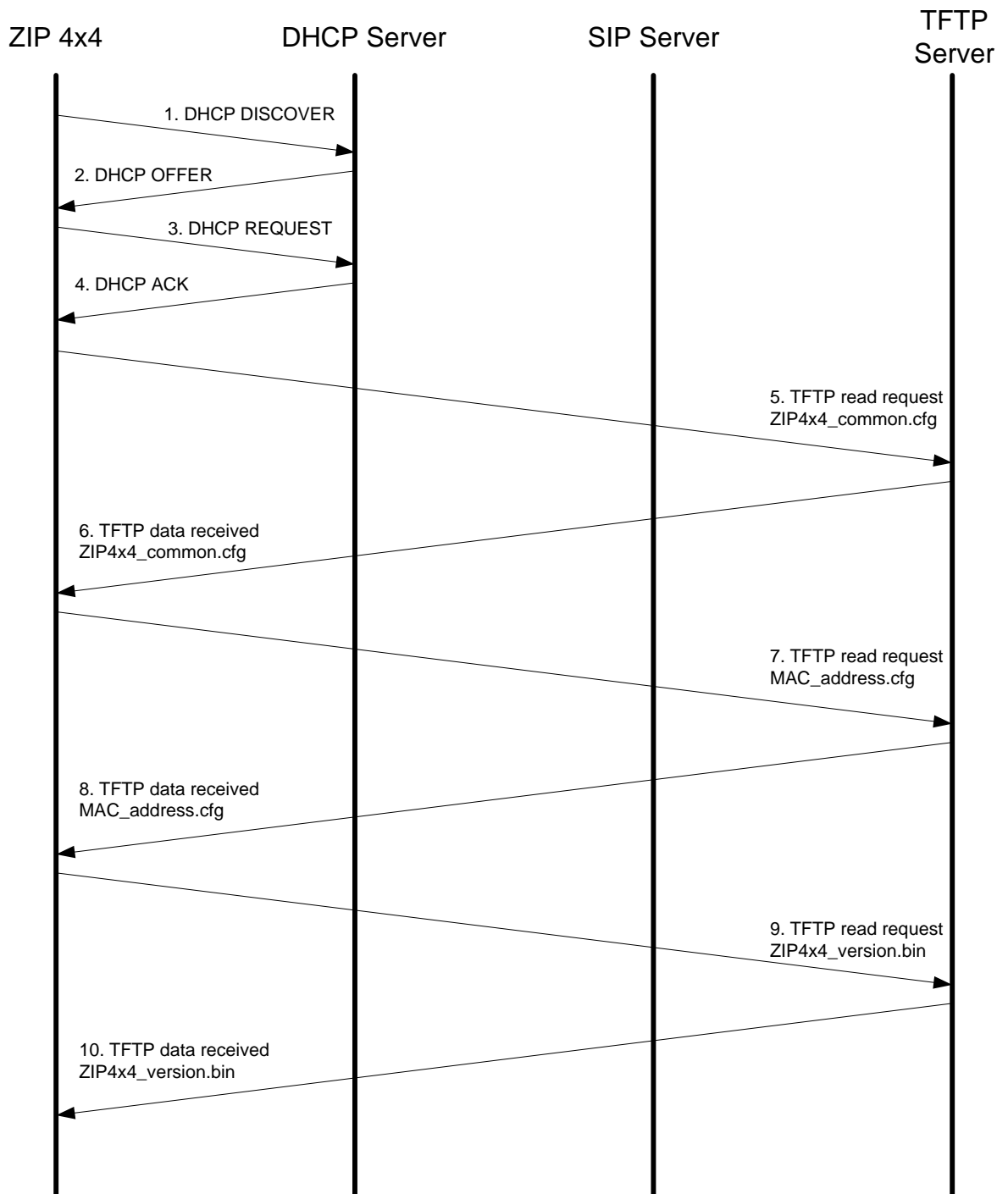


Figure 5-2 Messages for ZIP4x4 to Obtain Configuration

5.3.4.5 Step 5

Action. ZIP4x4 initiates TFTP read request for ZIP4x4_common.cfg

Description. ZIP4x4 requests its common configuration file using the TFTP Server address provided by DHCP option #66.

5.3.4.6 Step 6

Action. ZIP4x4 receives TFTP data (ZIP4x4_common.cfg) from the TFTP Server

Description. The ZIP4x4 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.

5.3.4.7 Step 7

Action. ZIP4x4 initiates TFTP read request for MAC_address.cfg

Description. The ZIP4x4 requests its specific configuration file. The specific configuration file is uniquely named with the specific MAC address of the phone (for example, 0008A10FF312.cfg).

5.3.4.8 Step 8

Action. ZIP4x4 receives TFTP data (MAC_address.cfg) from the TFTP Server

Description. The ZIP4x4 reads its specific configuration file and determines whether its software version matches that specified. If not, it retrieves the new software.

5.3.4.9 Step 9

Action. ZIP4x4 initiates TFTP read request for ZIP4x4_version bin.

Description. The ZIP4x4 requests the specific software version using the TFTP Server address provided by DHCP option #66 (for example, ZIP4x4_0_1_34.bin).

5.3.4.10 Step 10

Action. The ZIP4x4 receives TFTP data (ZIP4x4_version.bin) from the TFTP Server

Description. After downloading the software version the ZIP4x4 reboots and repeats all of the steps (except for retrieving software). At this point, the ZIP4x4 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.

5.3.5 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.

Interacting with the Phone

6.1 Call Appearances

The ZIP4x4 has four call appearances. Each call appearance allows you to have a separate or joined call.

This type of phone is different from phones that have been in common use for the past 100 years. On those 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 ZIP4x4 has a single circuit to connect to the switch. All calls take place over this same circuit, or line. Dedicated software and hardware inside the phone and the switch permit you to have four simultaneous conversations. These are referred to as four calls, not four lines.

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.

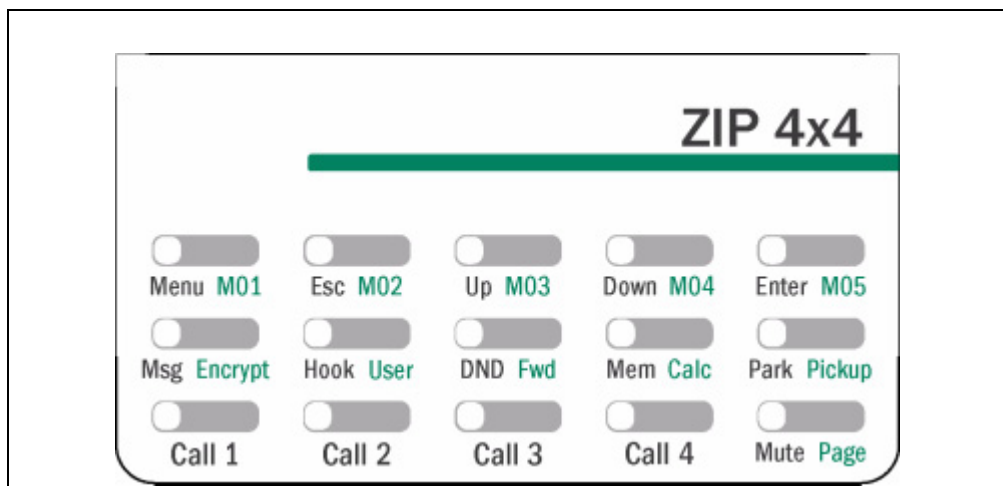


Figure 6-1 View of Buttons on ZIP4x4

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

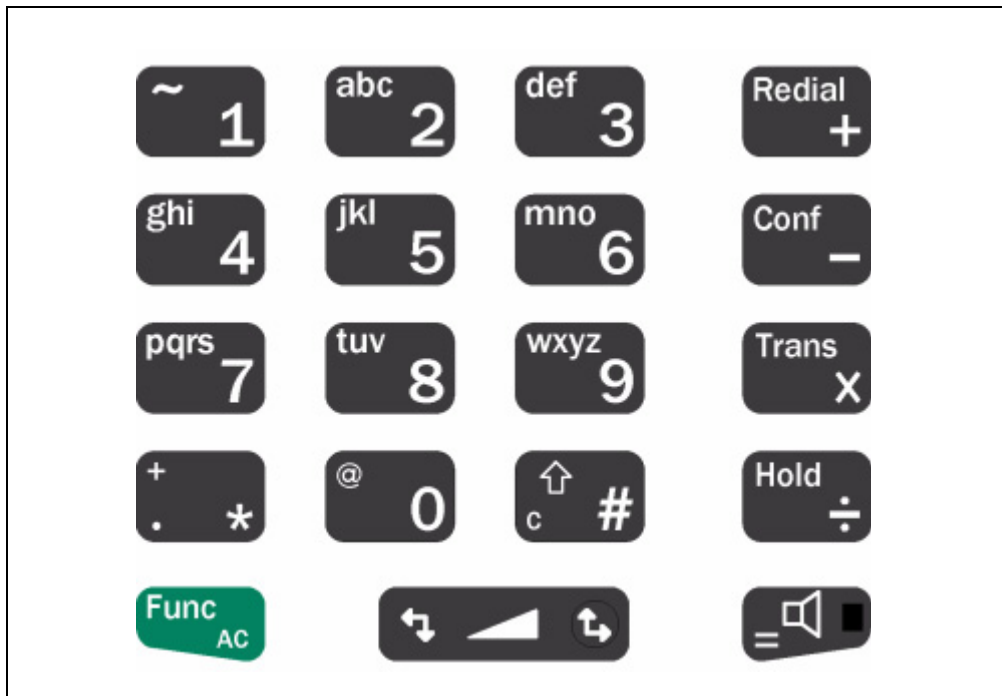


Figure 6-2 View of Keys on ZIP4x4

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.

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 ZIP4x4 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 ZIP4x4 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 25, 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 25, 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:



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.

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

1. Section 9.6.6 on page 145 describes how you select the tone that is played when the phone rings.

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 49. 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.

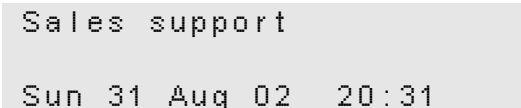
As you make or receive calls, or affect the operation of the phone, the LCD shows the status of the calls or interaction with the system.

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

For example:



```
Sales support
Sun 31 Aug 02 20:31
```

1. The Func key is described in section 6.2.1.2 on page 46.

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 8.7.3 on page 96 for more details.

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 ZIP4x4 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 9.1 on page 107 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 9.5.2 on page 121 and section 9.5.7 on page 129 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 ZIP4x4 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 ZIP4x4 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 ZIP4x4 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 ZIP4x4 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 ZIP4x4 receives a call, the ZIP4x4 immediately changes the display to be as shown in section 6.3.2 on page 49. 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 ZIP4x4 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

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 independent 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 36 for details of the configuration file. See section 9.6.5 on page 143 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 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.

ZIP4x4 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 ZIP4x4 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 ZIP4x4 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 8.2 on page 72 and section 8.6 on page 94 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 8.8 on page 99.

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 ZIP4x4 lights the LED on the Encrypt button continuously green.

1. See section 9.6.6 on page 145 for details.

If the device that you are calling cannot support encryption, the call will not complete. Your ZIP4x4 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 ZIP4x4 is configured so that encryption is **always on** and it receives a call from a device that has encryption **always on**, or if your ZIP4x4 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 ZIP4x4 is configured so that encryption is **always on** and it receives a call from a device that has encryption **always off**, or if your ZIP4x4 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 8.4.4.3 on page 88). You can identify that the call was rejected as described in section 8.7.5 on page 98.

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 ZIP4x4 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 ZIP4x4 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 ZIP4x4 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 8.5.3 on page 92. 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 63. 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

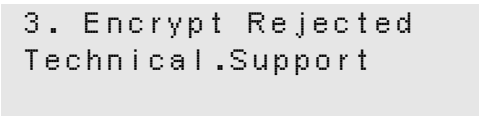
All calls that comprise a conference call must be encrypted or not encrypted. You cannot mix calls on a conference call that are encrypted or not encrypted because this makes the entire conference subject to eavesdropping and is therefore not secure.

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 8.8.5 on page 101.

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 ZIP4x4 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 ZIP4x4 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 ZIP4x4 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 69.

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 ZIP4x4, 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 69.

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 ZIP4x4 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.

To log out of a phone, do the following:

1. Select User | Log out of group.
2. The display changes to:

```
Group log out
➔all
Lancelot Capability
```

The display shows the names of all the users who have temporarily logged into the phone as an operator or agent. 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 all users out of all groups, 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 ACD agents logged into the ZIP4x4, the display shows instead:

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

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

This function is used to log out of an operator or ACD group. When you use this function, the phone removes you from all groups that you have logged into. If you had logged into multiple groups, and you want to log out of one group but remain in one or more other groups, you must log back into the groups after executing this command.

7.4 Do Not Disturb (DND)

Press this button if you want to receive no calls. The phone lights the LED on the button continuously red. The display does not change. When you set DND, it has no effect on calls that you have in progress or calls that are on hold.

If you have configured any forwarding rules on the phone, setting DND overrides those rules. When this function is active and the ZIP4x4 receives a call it immediately rejects it. The phone does not make any sound, does not light any of the call appearance buttons, and does not change the display. If you press this button when you have one or more incoming calls, you will reject all incoming calls.

If your phone is idle,¹ the phone displays the number of calls that you have missed, for example:

```
Sales support
17 missed calls
Sun 31 Aug 02 20:31
```

1. See section 6.3.1 on page 48 for a definition of the idle state.

To remove the DND function, press the button again.

To call a person who had called you see section 8.7.5 on page 98.

7.5 Forward

7.5.1 Description

When the phone forwards a call, it redirects an incoming call to another destination (name or number). The destination can be another extension within the enterprise or an external number. You can turn on and off forwarding to instruct the phone to forward calls:

- unconditionally (all calls)
- if you do not answer the phone (on no answer)
- if you have an active call (when busy)

7.5.2 Unconditional

If you have configured the phone to forward calls unconditionally the phone does not announce that it is receiving an incoming call. It does not change the display or any LED. The phone immediately forwards the call to the destination that you have specified.

When the phone receives an incoming call, it does not accumulate this as a missed call.

7.5.3 On No Answer

If you have configured the phone to forward calls on no answer, the phone announces an incoming call in the usual manner. If you do not answer the call within ten seconds, the phone transfers the call to the destination that you have specified.

The phone counts the number of calls that it forwards on no answer as missed calls.

7.5.4 When Busy

If you have configured the phone to forward calls when busy, the phone announces an incoming call in the usual manner if you do not have an active call.

If you have an active call, the phone forwards the call to the destination that you have specified. In this case, an active call is one where you are in the middle of a conversation or when you have put a conversation on hold. That is, the phone has a call button whose LED is lit continuously green or orange, or flashing green or orange.

If the phone receives more than one incoming call, the phone will indicate there are incoming calls on multiple call appearances. As soon as you answer one of the calls, the phone is now busy and it immediately forwards the other calls to the destination that you have specified.

The phone counts the number of calls that it forwards when busy as missed calls.

7.5.5 Configuring

Press the Forward button.¹ The display changes to:

```
Forward
➔off
  all calls
  on no answer
  when busy
```

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.

When you make a selection other than *off*, the display changes to one of the following to prompt you to enter a name or number to which the calls should be redirected:

```
Forward
all calls
➔1704
```

```
Forward
on no answer
➔1066
```

```
Forward
when busy
➔1415
```

You can enter the name or number from the keypad as you would if you were making a call, or from a memory location.²

After you enter a name or number and press the Enter button, the phone lights the LED on the Fwd button continuously green. If you select *off*, the LED is turned off.

7.6 Park

The functionality of call park and call pickup are dependent on the phone system. You can park individual calls and conference calls. The following description is based on connecting your ZIP4x4 to a phone system that fully supports the park and pickup function.

1. You can access this feature through the menu, under settings. Pressing the Forward button is a short cut.
 2. See section 8.7.3 on page 96 and section 8.7.4 on page 97 for a description of how to specify a memory location.

7.6.1 Individual Call

To park a call, ensure you are in active communication with the person. That is, the LED on the call appearance button is lit continuously green. Press the Park button. The ZIP4x4 transfers the call to the park server and appears to the other person as if the call has been placed on hold.¹ The person with whom you were talking hears music on hold supplied by the phone system.²

The system issues you a two digit number and the screen changes to:

```
Park on 37
Lancelot Capability
Brown
```

You must note the two digit number that the system issues to you (in the example above it is 37). The display remains unchanged until another action takes place.

The phone transfers control of the call to the phone system, turns off the LED on the call appearance button, turns the LED on the Park button continuously red, and sounds an audible double beep in the earpiece or speaker. You can place the phone on hook.

The phone continues to display the screen shown above, and continues to light the LED on the Park button, until you go on hook, press a call appearance button, or use another function or feature of the phone. If the phone receives an incoming call, it will retain the display for a minimum of two seconds.

The phone does not provide dial tone until you go on hook and off hook again or you press a call appearance button.

To retrieve the call use the Pickup function as described in section 7.7 on page 66.

7.6.2 Failure to Park an Individual Call

If the park is unsuccessful, the phone displays:

```
* Failure to park *
Lancelot Capability
Brown
```

The phone retains this display until you press a key, lift the handset, or replace the handset, after which it displays the screen that the phone was showing prior to you attempting to park the call. You remain connected to the other person.

You can try to park the call again, but if your attempts to park a call fail repeatedly, you should consult your system administrator.

1. See section 9.6.5 on page 143 for details how to configure the address of the park server.
2. See section 8.5.2 on page 89 for a description of the hold function.

7.6.3 Conference Call

When you park a conference call, the ZIP4x4 parks each of the calls that comprise the conference call sequentially. The phone system returns a two digit park number for each of the calls in your conference call. For example, if you had three parties in a conference call, the phone displays:

```
Park on 57 58 59  
Conference call
```

The phone system normally issues sequential numbers for the park numbers, but this cannot be guaranteed.

When you park the conference call, the parties to the call hear music on hold and cannot communicate with one another until you pickup the call as described in section 7.7 on page 66.¹

7.6.4 Failure to Park a Conference Call

If the park is unsuccessful, the phone displays XX instead of a park number:

```
Park on 57 XX 58  
Conference call  
* Failure to park *
```

The phone retains this display until you press a key, lift the handset, or replace the handset, after which it displays the screen that the phone was showing prior to you attempting to park the call. You remain connected to the party or parties that were not parked.

You can try to park the call again, but if your attempts to park a call fail repeatedly, you should consult your system administrator.

7.7 Pickup

The functionality of call park and call pickup are dependent on the phone system. You can pickup an individual call or a conference call that has been parked with the Park function as described in section 7.6 on page 64.

You can pickup a call that you parked yourself or that another person parked. You cannot pickup a call that was parked if the other party terminated the call while the call was parked.

1. This is different from placing the conference on hold as described in section 8.8.2 on page 100.

7.7.1 Individual Call

You can resume a conversation that has been previously put on hold with the Park function using any ZIP4x4 phone. Press the Pickup button. The phone lights the LED continuously red on the Park button and displays:

```
Pickup from
#
```

Enter the two digit number for the parked call and press the Enter button or the # key. If you specify an invalid number (or if the party who was parked terminated the call in the mean time), the phone displays:

```
Pickup from
#37
(36 is invalid)
```

If the phone is off hook, the phone will play the fast busy tone when you have entered an invalid number. You can enter a valid number or press the Esc button to exit the function.

Once the phone is connected to the parked call, the phone turns off the LED on the Pickup button and changes the display to the usual display of a call being connected, as described in section 8.3.5 on page 82.

If you forget the two digit number, call the operator for assistance. The operator may be able to assist you to find the number.

If you pickup a parked call that you had not intended to pickup, park the call again. Call the operator and tell the operator what has happened.

7.7.2 Conference Call

To pickup a conference call, you must pickup each of the calls that was parked. Therefore, you use the pickup function more than once to resume the conference.

1. Press the Pickup button.

The phone lights the LED continuously red on the Park button and displays:

```
Pickup from
#
```

2. Enter the two digit number for one of the parked calls and press the Enter button or the # key.

You are now communicating with one of the people on the conference call.

3. Press the Conf key.

The phone lights the first call appearance orange and selects a second call appearance.

4. Repeat from item 1 until you have picked up all members of the conference call.

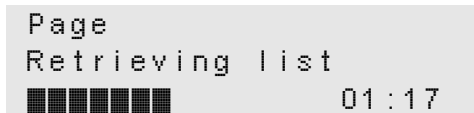
If you try to pickup from an invalid number, the phone display indicates the error shown in the previous section.

7.8 Page

A page is an announcement sent to multiple people without those people needing to answer the phone. The phone plays the announcement through its speaker and you do not need to take the phone off hook to hear the announcement. If you have an active conversation (the LED on a call appearance button is lit continuously green or orange), the phone may or may not play the announcement depending on the settings chosen by the system administrator. The functionality of paging is dependent on the phone system.

To make a paging announcement, do the following:

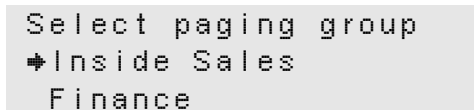
1. If you have any active calls, put them on hold or terminate them.
2. If you have calls in progress on all four call appearances, you cannot page. Terminate at least one of the calls to make a call appearance available.
3. Either:
 - a. Go off hook and press the Page button; or
 - b. Press the Page button.
4. The ZIP4x4 accesses the phone system and changes the display to:



```
Page
Retrieving list
■■■■■■■■ 01:17
```

The phone shows a new bar every second and maintains the total time on the right of the third row of the display. Every 10 s the phone clears the bars and then starts to show them one by one again.¹

5. If the phone encounters an error, it displays one of the screens shown in section 7.9 on page 69.
6. The phone lights the LED on the Page button continuously red.
7. The phone changes the display to:



```
Select paging group
▶ Inside Sales
Finance
```

The phone displays a list of paging groups that you are allowed to page. This list is defined by the system administrator.

8. Use the Up and Down buttons or the Up and Down keys to select the group you want to page and press the Enter button.

1. The length of time taken to access the server depends on the number of paging groups and the activity on your network. This could be anywhere from a second to a minute.

The phone selects the lowest numbered call appearance and puts the phone into speaker mode.

9. The phone lights the LED on the Page button to flash red for 250 ms and off for 250 ms.
10. The phone changes the display to:

```
Paging
Inside Sales
00:15
```

The phone indicates which group you are paging and shows a timer that increments to indicate the duration of the page.

11. Speak your paging announcement. The call control system relays it to all members of the paging group.
12. When you have finished the page, go on hook, press the call appearance button that was being used, or press the Page button.

7.9 Error Conditions

If the phone encounters an error while logging in a user, logging in an ACD agent, parking a call, or paging, it will display one of the following error messages.

1. In this section, the first line of the display of the screen images shows:

```
User log in
```

However, if the phone receives an error while you are logging into an ACD group, the screens will instead show:

```
Group log in
```

If you are parking a call, the screens will instead show:

```
Call park
```

If you are attempting to make a page, the screens will instead show:

```
Page
```

2. If communications with the phone system fail, the phone displays:

```
User log in
Error:
Network failure
```

3. If the phone system does not respond, the phone displays:

```
User log in  
Error: Server not  
responding
```

4. If the phone system has asked for authentication (user address and password), and you entered these incorrectly, the phone displays:

```
User log in  
Error: Invalid  
address or password
```

5. If the phone system does not support the function, the phone displays:

```
User log in  
Error:Not  
supported by server
```

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

Using the Phone

8.1 Going Off Hook and On Hook

You can use the handset, headset, or speaker for any call and easily switch between them – even during the same call. Subsequent sections detail the processes for making and terminating a call. This section briefly describes how to select between the three audio paths.

8.1.1 Using the Handset, Headset, and Speaker

To use the handset, pick it up. When you have finished using it, replace it in the cradle.

To use the headset, press the Hook button. When you have finished using it, press the Hook button again. When the headset is active, the phone lights the LED on the Hook button continuously red. When the headset is inactive, the phone turns off the LED.

To use the speaker, press and release the Speaker key. When you have finished using it, press the key again. When the speaker is active, the phone lights the LED on the Speaker key continuously red. When the speaker is inactive, the phone turns off the LED.

8.1.2 Off Hook

The term *off hook* means that you do one of the following:

- pick up the handset
- press the Hook button so that it is active (LED is lit continuously red)
- press the Speaker key so that the speaker is active (LED is lit continuously red)

The phone is said to be off hook when you have done any one of these things.

8.1.3 On Hook

The term *on hook* means that you do all of the following:

- replace the handset in the cradle
- press the Hook button so that it is inactive (LED is off)
- press the Speaker key so that the speaker is inactive (LED is off)

The phone is said to be on hook when all of these conditions are met.

8.1.4 Switching Between the Handset, Headset, and Speaker

If you are using the handset and want to:

- use the headset, press the Hook button and replace the handset in the cradle
- use the speaker, press the speaker key and replace the handset in the cradle

If you are using the headset and want to:

- use the handset, pick up the handset
- use the speaker, press the speaker key

If you are using the speaker and want to:

- use the handset, pick up the handset
- use the headset, press the Hook button

8.1.5 Disconnecting the Handset or Headset

8.1.5.1 Handset

The phone cannot detect whether a handset is connected or not. Therefore if you connect or disconnect a handset during a call, the phone does not change its state.

8.1.5.2 Headset

Before a Call. If you connect a headset to the headset jack before making a call, you can use it to make or receive subsequent calls.

During a Call. If you are using a headset and unplug it during a call, the phone continues to send the sound to the headset jack. You cannot hear the other person and he or she cannot hear you. To resume the conversation, plug the headset back into the plug, lift the handset, or press the Speaker button.

If you connect a headset to the headset jack during a call, and the Hook button was inactive, then when you subsequently press the Hook button you can use the headset. If the Hook button was active when you inserted the headset you cannot use it during the current call.

8.2 Making a Call

To make a call, you normally want the phone to be in the idle state (see section 6.3.1 on page 48). You can obtain dial tone before you dial, or you can make a call without hearing a dial tone.¹

Section 8.2.1 on page 73 and section 8.2.2 on page 74 describe how to dial a number. You can also make a call by dialling a SIP address as described in section 8.2.6 on page 76.

You can make a call by dialling from memory (the phone book) as described in section 8.7.5 on page 98, or by dialling from the list of recent calls as described in section 8.7.5 on page 98.

1. It is not necessary to receive a dial tone. If the phone is connected to the switch, you can make a call. This is similar to the way you use a PC. If it is connected to the network, you can access the network – you do not require any audible feedback prior to accessing the network.

You can directly call from one ZIP4x4 to another without the aid of a call control system, as described in section 8.2.9 on page 79

Important This type of phone is different from phones that have been in common use for the past 100 years. On those older phones, as you press a button to dial a digit, the phone transmits the digit to the telephone exchange. On the ZIP4x4, the phone sends all the digits as a complete message and you therefore need to inform the phone when you have entered all the digits. The phone then assembles the complete message and sends it to the SIP server.

8.2.1 Dialling a Number After You Get Dial Tone

1. Do one of the following:
 - a. Take the phone off hook.¹
 - If all four call appearances are in use, nothing happens.
 - If there is a free call appearance, the phone selects the lowest numbered call appearance that is free. The phone flashes the LED on that call appearance button green for 250 ms and off for 750 ms.² This indicates the call appearance has been reserved but is not yet in use.
 - The phone provides dial tone to the handset, headset, or speaker as appropriate.³
 - b. Press one of the call appearance buttons that has its LED turned off.
 - The phone reserves the call appearance and indicates this by flashing the LED on that call appearance button green for 250 ms and off for 750 ms.
 - The phone selects speaker mode and provides dial tone to the speaker.
2. The phone shows:

```
1 . Call
█
```

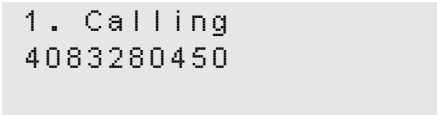
The number on the first row is the call appearance that has been reserved for this call.

3. Enter the digits.⁴
 - As you enter the digits, the phone displays the digits, for example:

```
1 . Call
40883280
```

1. See section 8.1.2 on page 71 for a definition of off hook.
2. A summary of the meanings of the LEDs for the call appearance buttons is given in appendix B on page 159.
3. The tone that you hear is generated by the phone. You select that to match the tone commonly in use in your country. Section 9.5.7 on page 129 describes how you select the country where you live.
4. At this point, you can dial from a memory location in the phone book. When you do so, you don't need to enter any digits or do any of the items listed in step 4. See section 8.7.3 on page 96 for details.

- The phone plays the DTMF digits to the handset, headset, or speaker as appropriate while you type them.
 - The phone flashes the LED on the call appearance button fast, which is a prompt for you to press it.
4. When you have finished entering all the digits, do one of the following:
 - a. Press the # key.¹
 - b. Press the call appearance button that is flashing green.²
 - c. Wait three seconds, after which time the phone assumes that you have entered all the digits.
 5. The phone will play the DTMF digit for the # key.
 6. The phone will send the dialled digits. It plays no sound while it does this.
 7. The phone will change the display to (for example):



```
1. Calling
4083280450
```

The first line of the display shows the call appearance that is being used for the call.

8. The phone indicates the call appearance that is being used by changing the flashing for the LED on the call appearance button. The LED will be lit for 750 ms and flash off for 250 ms.
9. While the call is proceeding, the phone plays ringback tone. This may be generated by the phone according to the country selection that you have made.
10. When the call is established (the called party has answered) the phone lights the LED on the call appearance button green continuously.

8.2.2 Dialling a Number without Dial Tone

You can make a call without having to hear a dial tone or the digits being dialled. You can do this while the phone is in the calculator mode. This mode is called “hot key dialling”.

1. Enter the digits. The phone shows the digits on the screen. As you enter the digits the phone does not play the DTMF sounds for the digits.
2. Do one of the following:
 - a. Pick up the handset. The phone selects the lowest number call appearance that is available and sends the digits.
 - b. Press the Hook button. The phone selects the lowest number call appearance that is available, sends the digits, and routes the sound to the headset.
 - c. Press the Speaker key. The phone selects the lowest number call appearance that is available, sends the digits, and puts the phone into speaker mode.

1. If you want to send a # digit as part of the dialled name or number, see section 8.2.3 on page 75.

2. If you press any other call appearance button, the phone will clear the display and assume you want to make a new call.

- d. Press one of the call appearance buttons. The phone sends the digits and puts the phone into speaker mode.
- e. Press the # key. The phone selects the lowest numbered call appearance that is available, sends the digits, and puts the phone into speaker mode. The phone does not play the DTMF digit for the # key.

You can also dial directly from the phone book without a dial tone as described in section 8.7.3 on page 96.

8.2.3 Sending a # as Part of the Number

When you are entering a number and you press the # key the phone interprets that as the end of the number and sends the number to the switch without the #. If you need to send a # as part of the string, press the Func key. The phone changes the top row of the display to show:

```
1 . Call      Func : abc
```

The keys now allow you to enter letters as well as numbers. This is more fully described in section 8.2.6 on page 76. Press the * key twice to display characters that you can select. Use the right arrow on the volume key to highlight the # character, then press the * key again. Finally, press the Func key so that the keys enter only numbers again.

8.2.4 Dialling When in Calculator Mode

You can keep the phone normally in calculator mode as described in section 8.9.9 on page 105 and still be able to make and receive calls. When you want to make a call, you can do so with or without a dial tone.

If you want to dial a SIP address, you must exit calculator mode first.

1. Do one of the following:
 - a. Lift the handset or press the Hook button.
 - b. Press one of the call appearance buttons that is not lit.
2. The phone exits calculator mode, reserves a call appearance, and provides dial tone.
3. Dial the number or address as described in section 8.2.1 on page 73.

When you terminate the call, the phone returns to calculator mode if there is no activity on any of the call appearances (all LEDs on these buttons are off). When the phone resumes the calculator mode, the phone displays the state of any calculation that you had started.

8.2.5 Making a Call While Accessing the Menu

If you are accessing the menu and want to make a call, you can do so only by getting dial tone first. That is, you must go off hook or select a free call appearance as described in section 8.2.1 on page 73. When the call terminates the phone resumes access to the menu exactly as it was prior to the call. The phone automatically exits the menu function 60 s after the end of the call if you do not press any keys or buttons.

If you are accessing the phone book, and have used the search function to locate a name, number, or address, then when you go off hook or select a call appearance, the phone calls that contact and exits the menu function.

8.2.6 Dialling Using a SIP Address

8.2.6.1 Purpose

When you dial using a SIP address, you don't need to know a person's phone number. This is a good method of making a call if the person's address has been created logically. You can use any of the schemes described in section 8.2.1 on page 73 or section 8.2.2 on page 74. If the phone is in calculator mode see section 8.2.4 on page 75 for how to make the call.

A SIP address is normally written as:

SIP:name@domain

For example:

SIP:john.doe@zultys.com

With the ZIP4x4, you must not write "SIP:" because the phone will automatically insert that for you. Also, when you call an address that is within the same domain as your phone, you do not need to enter the domain name.

8.2.6.2 Entering an Address

To dial using a SIP address, you must take the phone out of calculator mode. See section 8.9.8 on page 105 for details. It is easier to enter an address in this manner without first selecting a call appearance or obtaining dial tone. When you have selected a call appearance, the phone times out between you entering characters and sends the characters. This time-out might be too short when creating an alphanumeric address.

To enter an alphanumeric address instead of a numeric address, press the Func key once. The display shows **Func:abc** on the top row. The function key in this mode locks the use of the keys so that you do not need to repeatedly press the Func key.

The digit keys 2 to 9 allow you to type the letters of the alphabet that are displayed on those keys. When you press a key, it selects the first character. If you quickly press the key again, it selects the second letter and so on. When you repeatedly press the key, the phone selects the next character in sequence, then the number of the key, then it scrolls back to the first letter.

To scroll through the list of characters, press the key within 800 ms of the last press. If you take longer than this, the cursor position moves to the right and when you next press the key you will select the first letter in the list. If you want to select a character from the same key to be the next character you enter, you can wait or you can press the right arrow on the volume key.

To select upper case characters instead of lower case characters, press the # key. The display shows **Func:ABC** on the top row. To return to selecting lower case characters, press the # key again. The arrow on that key reminds you the key is used to shift between upper and lower case characters.

The maximum length of a SIP address is defined to be 256 characters. However, the ZIP4x4 will allow you only to enter 64 characters. Once you reach that limit, the phone will not accept more characters.

8.2.6.3 Character Mapping on Numeric Keys

This is a list of the characters selected by repeatedly pressing the various keys:

1. ~, -, _!, 1
2. a, b, c, 2; or A, B, C, 2
3. d, e, f, 3; or D, E, F, 3
4. g, h, i, 4; or G, H, I, 4
5. j, k, l, 5; or J, K, L, 5
6. m, n, o, 6; or M, N, O, 6
7. p, q, r, s, 7; or P, Q, R, S, 7
8. t, u, v, 8; or T, U, V, 8
9. w, x, y, z, 9; or W, X, Y, Z, 9
0. @, space, 0
- *. * then selection

8.2.6.4 Using the * Key

When you press the * key, the ZIP4x4 selects the * which can be sent as a part of a dialled number, either by SIP or as a DTMF digit. If you press the * key twice within 800 ms, you can select from many different symbols. The phone changes the display to:

```
Select character:
. , : ; - _ # * ( ) ' " @ & % / \ < > ~
+ ÷ = ± µ ° ? ! § $ € ¥
```

The cursor is at the dot character. Use the left and right arrows on the volume key or the Up and Down buttons to move the cursor. Press the Esc button to exit this mode. When the cursor is highlighting the character you want to select press any other key. The phone places the character you selected in place of the * that it originally displayed.¹

You can enter a dot (period or full stop) quickly by pressing the * key three times.

8.2.6.5 Exiting Alphanumeric mode

You can put the phone out of the alphanumeric mode by pressing Func at any time. This will allow you to easily enter digits that may be part of the address. You can return the phone to alphanumeric mode by pressing the Func key again.

1. You cannot use some of these characters as part of an address. The SIP address is formulated based on the same rules as an email address.

8.2.6.6 Display

The process for making a call to a SIP address, and what the LCD shows during the process, are similar to that described in section 8.2.1 on page 73 and section 8.2.2 on page 74 for dialling a number. When you are entering the address, the display shows:

```
Call :      Func : abc  
john.doe@z█
```

8.2.6.7 Editing the Address

Use the volume key as described in section 8.2.7 on page 78.

8.2.6.8 Sending the Address

To send the address (and initiate the call), lift the handset, press the hook button, press the speaker key, or press a call button. If you did one of these prior to entering the address, press the # key twice or wait three seconds.

8.2.6.9 LEDs

The LEDs operate as they do when you enter a numeric phone number.

8.2.7 Editing a Number

You can edit a number or SIP address that you have entered by using the volume keys.

When you press the right arrow, the cursor moves forward through the digits. If the cursor was at the last digit, the phone places the cursor at the first digit.

When you press the left arrow, the phone deletes the character *to the left* of the cursor.¹ If you press the left arrow when the cursor is at the first character, the phone moves the cursor to the position after the last character (and it therefore does not delete any character).

For example, suppose you want to dial the number 12345, but instead you enter:

```
1 2 4 5
```

You can either press the left arrow twice, to get:

```
1 2
```

Then enter 345. Or, press the right arrow three times so that the cursor is at the 4. Then enter 3. The digit three is inserted before the digit 4.

1. This is equivalent to the backspace action on a computer's keyboard.

8.2.8 Dialling an Invalid Destination

When you initiate the call, the phone performs a simple check on the number or address that you entered. If this is invalid, the phone displays:

```
1. Invalid address
408€32
```

The phone retains this display for three seconds before returning to whatever was displayed prior to your initiating the call (usually the idle display). If you had selected a call appearance, it will become idle after five seconds.

8.2.9 Making a Call Without a SIP Proxy

The ZIP4x4 is intended for use with a telephone system but it is possible to use it without one. You might do this if you have two phones either directly connected or isolated on a network. To make the call, you must know the IP address of the phone you want to call or the other device must have an FQDN that your ZIP4x4 can resolve with a DNS server.

To make a call directly to the other device, ensure that:

- your phone has a unique IP address
- your phone has not registered with a SIP registrar
- you know the IP address and device ID of the phone you want to contact

The following instructions contain many steps, some of which may not be applicable, depending on the configuration of the phone prior to your using it:

1. Log into the phone using the password as described in section 9.6.1 on page 133.
2. Disable DHCP, set a static IP address, subnet mask and default gateway, as described in section 9.6.2 on page 134.¹
3. Remove the address of the TFTP server and the address of the SIP outbound proxy, as described in section 9.6.2 on page 134.
4. Assign a unique device ID to the phone and remove the domain name as described in section 9.6.5 on page 143.
5. Repeat these steps for the other phone.
6. Connect the phones so that they can be accessed over the LAN.
7. Create a call from one phone to the other using the method outlined in section 8.2.6 on page 76, but address the other phone by its device ID and IP address:

```
1. Call      Func:abc
<device ID>@<IP
address>
```

1. It is not a requirement that the phones have a static IP address. However, if you use DHCP, the phone may receive a new IP address after its lease expires. You will have to find out this new IP address before you can make a call to that phone.

For example, if the two phones have device IDs of East and West, you might make a call from East to West by typing:

```
1. Call      Func:abc  
West@10.1.13.17
```

If the other phone has an FQDN, you might enter:

```
1. Call      Func:abc  
West@Zultys.West.com
```

8. If you want to repeatedly make calls in this manner, enter the address into a memory location, as described in section 9.2.2 on page 109. Dial the number from memory as described in section 8.7.3 on page 96.

8.3 Call Proceeding and Call Answered

8.3.1 Calling

When you have started to make a call, the display changes to:

```
1. Calling  
4083280450  
0:17
```

The display shows the call appearance that is in use for this call and the number or address being called. The display indicates the time (minutes and seconds) since you started the call and reflects the time that you have been waiting for the call to connect.

The phone displays the called number on the second line. In the unlikely event that the number is greater than 20 digits, the ZIP4x4 displays the rest of the number on the third line.

If the number that you have dialed is in your phone book, the ZIP4x4 displays the name of the called party instead of the phone number. It will display the name on the second and third lines. Where possible, the ZIP4x4 will split the name at a space character. For example:

```
1. Calling  
Zultys Technologies  
0:17
```

or:

```
1. Calling  
Lancelot Capability  
Brown 0:17
```

The phone will continue to use this name instead of the number for future displays during this call.

If you have dialled the person using a SIP address, the phone will display this instead of a number. It will try to break the name at a period (full stop), “at” symbol, or other punctuation.

The LED on the call appearance button flashes green for 750 ms and off for 250 ms.

You will hear nothing during this phase of the call.

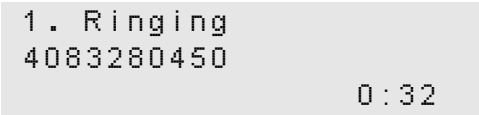
8.3.2 Ringback

8.3.2.1 ZIP4x4 to SIP Phone Calls or ZIP4x4 to ISDN Calls

When you make a call to another SIP phone, the ringback that you hear will be generated by your phone. The tones will be those that you have selected for the country.¹

If you are making a call to the PSTN, the SIP to PSTN gateway normally opens the communication path so that you hear the sound coming from the network. Therefore, if you are calling a different country you will hear the ringback tone from that country. This tone may be different from that used in your country.

The LED on the call appearance button continues to flash green for 750 ms and off for 250 ms. The display changes to:



```
1. Ringing
4083280450
0:32
```

The timer continues to show the time since you initiated the call.

8.3.2.2 ZIP4x4 to CAS Calls

If you are connected to the PSTN using T1 CAS circuits, your SIP to PSTN gateway may not know the status of the connection. It may open the speech path even though there is no ringback. The LED on the call appearance button will then be lit solidly green.

The phone behaves as if the call has been established as described in section 8.5 on page 89. Because the speech path is open, you may hear busy tone although the phone indicates that you are connected.

1. See section 9.5.7 on page 129 for details on how you select the country.

8.3.3 Far End Busy

If the person you are calling is busy, the phone either plays the busy tone for your country or the busy tone that is generated by the phone network at the far end. This depends whether your server has indication that the called party is busy or not. If your server is aware the called party is busy, your phone flashes the LED on the call appearance button green for 750 ms and red for 250 ms. The display changes to:

```
1. Far end busy
4083280450
0:28
```

The phone stops the timer as soon as it receives notification that the called party is busy. The phone maintains this state until you go on hook.

8.3.4 Network Busy

If the network is busy, the phone either plays the fast busy tone (congestion tone) for your country or the fast busy tone that is generated by the phone network at the far end. This depends whether your server can detect whether or not the network is busy. If it is aware the network is busy, your phone flashes the LED on the call appearance button green and red for 250 ms each color.

The ZIP4x4 displays this message if the number you are calling does not exist or is not available.

The display changes to:

```
1. Network busy
4083280450
0:23
```

The phone stops the timer as soon as it receives notification that the network is busy.

The phone maintains this state until you go on hook.

8.3.5 Call Answered

8.3.5.1 Expanded Display

When the called party answers, the phone makes the LED for the call appearance to be lit continuously green and changes the display to:

```
1. Connected
4083280450
00:00:45
```

or

```
1. Connected
Lancelot Capability
Brown          00:00:45
```

The display shows the duration of the call in hours, minutes, and seconds. The phone starts this timer from zero when it is made aware that the phone is connected. Depending on the system and the protocol used to complete the call, the phone may believe the call is connected but the called person has not yet answered the call.

If you want to display the date and time, use the Up or Down buttons to show the call appearance summary.¹

You can toggle the phone to the compressed display mode by pressing the Enter button.²

8.3.5.2 Call Appearance Summary

This summary display is part of the expanded display. Press Up or Down to scroll through the expanded displays. At the end of the list, the display changes to:

```
1. Cnct    2. Idle
3. Idle    4. Idle
Sun 31 Aug 02 20:32
```

The display shows the state of each call appearance as follows:

- **Idle.** Call appearance not in use.
- **Call.** Calling.
- **FrRn.** The far end (called party) is ringing.
- **Cnct.** Connected.
- **Busy.** Far end busy.
- **NwBz.** Network busy
- **Ring.** There is an incoming call.
- **Hold.** You have placed the call (individual or conference call) on hold.
- **Conf.** The person is part of a conference call.
- **Trns.** You are in the middle of transferring the call.
- **Rejc.** Call to another phone was rejected.

You can toggle the phone to the compressed display mode by pressing the Enter button.

1. Do not press the Func key or Menu button before pressing the Up and Down buttons.
2. Do not press the Func key or Menu button before pressing the Enter button.

8.3.5.3 Compressed Display

When the phone displays the data in the compressed mode, the LED remains unchanged at solid green while the display changes to:

```
1 . 4083280450 00:45  
Sun 31 Aug 02 20:32
```

or:

```
1 . Lancelot C 00:45  
Sun 31 Aug 02 20:32
```

On the top row, the phone displays:

- the call appearance for this call (1 to 4)
- the number you called (or the SIP address of the person you called) or the name of the person if the name exists in the phone book
- a timer that indicates the duration of the call

The phone truncates the number (or name) that you have called to 12 characters so that it can display the duration of the call. The phone leaves a minimum of two spaces between the end of the phone number and the timer.

The timer shows the call time in minutes and seconds until the call length has reached an hour. It then displays the time in hours and minutes.

The phone displays the current time and date just as it does in the idle state.¹

You can toggle the phone to the expanded display mode by pressing the Enter button.²

8.3.6 Network Failure

If the phone sends a message to the SIP server that the SIP server does not answer, the phone displays:

```
Unable to  
communicate with  
SIP device
```

The phone makes the handset, headset, and speaker quiet and displays the message until you attempt to make another call or perform another task on the phone.

You should contact the administrator of the system if you see this message.

1. See section 6.3.1 on page 48 for the description of the idle state.
2. Do not press the Func key or Menu button before pressing the Enter button.

8.4 Receiving a Call

8.4.1 Alerting

When you receive a call, the phone flashes the LED of the call appearance button. The LED flashes on for 250 ms and off for 250 ms.

The phone plays a ringing tone on the speaker if you have no active calls and you have adjusted the volume to be greater than zero. If you set the volume to zero, the ZIP4x4 plays no ring sound.

The phone plays one ring tone for calls that originate from outside the enterprise and another for those that originate inside the enterprise. You select the sound that is played using the menu as described in section 9.5.5 on page 123. You adjust the volume as described in section 6.2.1.3 on page 47.

8.4.2 Before You Answer

8.4.2.1 Expanded Display

When the phone is in the expanded display mode it shows on the display:

```
1. To <called name>
   <caller's name, 1>
   <caller's name, 2>
```

The phone shows the call appearance and the name of the called person, truncated to 14 characters. This name is taken from the SIP message and not from the name you have programmed into the phone. The phone shows this information because the phone could be shared by multiple people or another person might have redirected his or her calls to your phone.

The phone displays the name of the caller, again taken from the SIP message. The ZIP4x4 will try to break the name at a space character to neatly fit onto the two lines, or at a period (full stop), "at" symbol, or other punctuation if the name is a SIP address.

The phone shows in each case, the display name from the SIP message if it is present, otherwise it displays the user portion of the SIP URI.

For example, the phone might show:

```
1. To Garden Cottage
   Lancelot Capability
   Brown
```

If the SIP header had a number, the ZIP4x4 tries to match the number with numbers you have entered into the phone book.¹ If the phone finds a match, it displays the name associated with that number in the phone book instead of the number itself. If the SIP header did not have a name or number for the caller, it will show the SIP address of the caller.

You can toggle the phone to the compressed display mode by pressing the Enter button.

1. The phone book is covered in detail in section 9.2 on page 107.

8.4.2.2 Compressed Display

When the phone is in the compressed display mode it shows on the display:

```
1. Lancelot Capabili  
Sun 31 Aug 02 20:3
```

The phone truncates the caller's name or address to 17 characters. You can toggle the phone to the expanded display mode by pressing the Enter button.

8.4.3 Receiving Multiple Calls and Call Waiting

If you receive multiple calls, the phone flashes the LEDs on the call appearance buttons for each incoming call.

If you have an active call (a call appearance button is lit continuously green or continuously orange), the phone plays a short beep in the currently selected audio path. You can select the tone that is played as described in section 9.5.5 on page 123.

If you have one or more calls on hold, and you have placed the phone on hook, the phone plays the ringing tone you selected on the speaker.

8.4.3.1 Expanded Display

The display shows the first call that was received. To view the details of other calls, press the Up and Down buttons.¹ The display changes, for example:

```
1. To Garden Cottage  
Lancelot Capability  
Brown
```

Press Down:

```
2. To Garden Cottage  
Lord Blenheim
```

Press Down:

```
3. To Garden Cottage  
Oxford Stone Masons
```

Press Down:

```
1. Ring    2. Ring  
3. Ring    4. Idle  
Sun 31 Aug 02 20:32
```

1. Do not press the Func key or Menu button before pressing the Up or Down buttons.

This example is for the case when there are three incoming calls. The meaning of the abbreviations on the fourth display is described in section 8.3.5.2 on page 83.

You can toggle the phone to the compressed display mode by pressing the Enter button.

8.4.3.2 Compressed Display

The display shows information for multiple calls. You can scroll the display by pressing the Up and Down buttons:

```
1. Lancelot Capabili
2. Lord Blenheim
3. Oxford stone Maso
```

Press Down:

```
2. Lord Blenheim
3. Oxford Stone Maso
Sun 31 Aug 02 20:32
```

Press Down:

```
3. Oxford stone Maso
Sun 31 Aug 02 20:32
1. Lancelot Capabili
```

The phone truncates the caller's name or address to 17 characters. When you press the Up and Down buttons, the rows of text denoting the call appearances scroll along with the date and time.

You can toggle the phone to the expanded display mode by pressing the Enter button. When you do so, the phone displays the details of the caller that was on the top row of the compressed display.

8.4.4 Rejecting the Call or Not Answering

8.4.4.1 Rejecting Calls

You can reject a call by pressing the DND button. Once you have pressed the DND button, the function remains active. See section 7.4 on page 62 for more details.

If the phone is receiving multiple calls when you press DND, the phone rejects *all* of the incoming calls. If you want to talk to one of the people who is calling you, answer that call before you press DND.

8.4.4.2 Not Answering Calls

If you do not answer the call, the phone behavior depends upon the system to which it is connected. Your system may route a call voice mail or it may disconnect the caller.

8.4.4.3 Missed Calls

When the phone next returns to the idle state it shows the number of call you have missed or that your ZIP4x4 rejected, for example:

```
Sales support
3 missed calls
Mon 01 Sep 02 08:17
```

If you have configured the phone to unconditionally forward all calls, none of the calls that the phone receives is counted as being missed.

To view a list of the calls that you have missed and to dial the caller, follow the procedure described in section 8.7.5 on page 98.

The phone may reject a call because of encryption policies as described in section 7.2.2.2 on page 55.

8.4.5 Answering the Call

8.4.5.1 No Existing Conversation

If the phone is idle when you receive a new call, do one of the following to answer the call:

1. Press the call button that represents the call you want to answer. The phone selects the speaker mode and answers the call.
2. Take the phone off hook.¹ The phone answers the call that is displayed on the LCD if the display is in expanded mode, or the call that is on the first row of the LCD if the display is in compressed mode.

The phone lights the LED for the call appearance continuously green. The display is identical to that shown when you make a call as described in section 8.3.5 on page 82.

Important If you press the call appearance button of a new call while you have an existing conversation, you will drop the first call unless you press Hold beforehand.

8.4.5.2 Existing Conversation

If you are talking with one or more people when you receive a new call, do one of the following to answer the call:

1. Press the call button that represents the call you want to answer. The phone terminates the existing call and answers the new call.
2. Press the Hold key then press the call button that represents the call you want to answer. The phone puts the existing call on hold and answers the new call.

1. See section 8.1.2 on page 71 for a definition of off hook.

8.4.6 Receiving a Call While Accessing the Menu

If you are accessing the menu and the phone receives a call, it substitutes the menu that was displayed with the notification of the incoming call as shown in section 6.3.2 on page 49. When the call terminates the phone resumes access to the menu exactly as it was prior to the call. The phone automatically exits the menu function 60 s after the end of the call if you do not press any keys or buttons.

8.5 During a Call

During a call, you can transfer or hold the current conversation. You can create or answer a new call and you can create a conference call.¹ You can use the calculator as described in section 8.9 on page 103. You can switch between using the headset, handset, or speaker as described in section 8.1.1 on page 71.

If you press one of the keys 0 to 9, *, or # while the call is active (LED on the call appearance button is lit continuously green), the phone sends a message for that key and plays a DTMF tone in the earpiece or speaker simultaneously.²

8.5.1 Mute

If you want to hear the person with whom you are speaking, but do not want him or her to hear you, press the Mute button. The phone disconnects the microphone input and flashes the LED on the Mute button red for 500 ms and off for 500 ms. The ZIP4x4 does not change the display. To resume a 2-way conversation, press the Mute button again.

When you have pressed the Mute button so that the LED is flashing, you have muted the entire phone, not just the current conversation. If you place the muted call on hold, and select another call, the mute function remains active and the person on the other call will not be able to hear you. If you terminate the call with the Mute function still active, the Mute function remains active until you disable it.³

When you mute the phone and press the digit keys, the phone plays the DTMF digit into the audio path you have selected and sends the digit to the switch. You might use this feature to communicate with an IVR system.

8.5.2 Hold

8.5.2.1 Description

The Hold function allows you to maintain the state of a call but suspend the conversation. The person cannot hear you and you cannot hear the other person.⁴

-
1. If the SIP Server becomes unreachable during an active call, pressing a button that requires a response from the SIP server (such as Hold, Park, or Transfer) will terminate the call.
 2. The message is sent in the RTP payload according to RFC 2833.
 3. If you cycle the power on the phone, the phone disables the Mute function.
 4. When you put a conference call on hold, the other people do not hear any music, as described in section 8.8.2 on page 100.

When you place a call on hold, you must retrieve the call from your same phone to resume the conversation. If you want to retrieve the conversation from a different phone, use the Park function as described in section 7.6 on page 64.

8.5.2.2 Placing a Call on Hold

If you want to put the conversation on hold, press the Hold key. The LED on the call appearance button flashes green for 500 ms and off for 500 ms.

The phone is silent. Although you still have the phone off hook, the phone does not provide you with a dial tone and does not automatically reserve a call appearance.¹

You can place the phone on hook. The call that is on hold remains on hold. When you take the phone off hook, the phone does not provide you with a dial tone and does not automatically reserve a call appearance.

8.5.2.3 Expanded Display

If the phone is in the expanded display mode when you put a call on hold and the phone is not receiving an incoming call, the phone changes the display to:

```
1. Hold
4083280450
                                00:00:29
```

or

```
1. Hold
Lancelot Capability
Brown                                00:00:29
```

The display shows the time period that the conversation *has been on hold* in hours, minutes, and seconds.

If you want to display the date and time, use the Up or Down buttons.² The display changes to:

```
1. Hold    2. Idle
3. Idle    4. Idle
Sun 31 Aug 02 20:32
```

The display shows the state of each call appearance as described in section 8.3.5.2 on page 83.

You can toggle the phone to the compressed display mode by pressing the Enter button.

1. If the other phone terminates the call while on hold, the ZIP4x4 will remain silent. The Hold button will quit flashing to indicate that the session is terminated.
2. Do not press the Func key or Menu button before pressing the Up and Down buttons.

8.5.2.4 Compressed Display

If the phone is in the compressed display mode when you put a call on hold and the phone is not receiving an incoming call, the display changes to:

```
1 . 4083280450 00:29
Sun 31 Aug 02 20:32
```

or:

```
1 . Lancelot C 00:29
Sun 31 Aug 02 20:32
```

On the top row, the phone displays:

- the call appearance for this call (1 to 4)
- the number you called (or the SIP address of the person you called) or the name of the person if the name exists in the phone book and you made the call
- a timer that flashes and indicates the time period that the conversation *has been on hold* in minutes and seconds

The phone displays the current time and date just as it does in the idle state.

You can toggle the phone to the expanded display mode by pressing the Enter button.

8.5.2.5 Making a New Call After Placing a Call on Hold

The phone does not select a new call appearance nor does it provide you with dial tone when you have a call on hold. To make a new call, do one of the following:

1. Go off hook if you do not currently have the phone off hook.
2. Select a call appearance then dial the name or number.
3. Dial the name or number then select a call appearance.

Important If you press a call appearance button without first pressing Hold, you will terminate the current call.

8.5.2.6 Answering a Call After Placing a Call on Hold

If you receive an incoming call while you are talking with a person on another call appearance, you can put the first call on hold. You then need to press the call appearance button to answer the incoming call.

If you placed a call on hold, then went on hook, you need only to go off hook to answer the incoming call.

Important If you press a call appearance button without first pressing Hold, you will terminate the current call.

8.5.2.7 To Resume the Conversation

To resume talking with the person on hold, do one of the following:

1. If you have only one call on hold (only one call appearance button is flashing green and off):
 - a. optionally take the phone off hook
 - b. press the Hold key or press the call appearance button
2. If you have more than one conversation on hold:
 - a. use the Up and Down buttons to identify which caller is on which call appearance¹
 - b. optionally take the phone off hook
 - c. do one of the following:
 - press the call appearance button indicating the person with whom you want to speak
 - press the Hold key to resume the conversation with the conversation that you most recently placed on hold

If the phone was on hook when you selected the call that you wanted to resume, the phone activates the speaker mode.

The phone makes the LED on the call appearance button solid green again and changes the display to that described in section 8.3.5 on page 82. The phone displays the call duration again, which the phone incrementally changed during the time that you had the call on hold.

8.5.3 Transferring a Call

You can transfer a call you made to, or a call you answered from, another person inside or outside of the enterprise. You can choose to speak to the person to whom you are transferring the call (referred to as an “attended transfer”), or to not speak with the person (referred to as an “unattended transfer” or “blind transfer”). You cannot transfer a conference call.²

To transfer a call, do the following:

1. Ensure that you have at least one free call appearance. You cannot transfer a call if you currently have four calls.
2. Ensure that the call you want to transfer is the active call (that is, you are currently in communication with the person).
3. Press the Transfer key.
4. The phone places the active call on hold, and indicates this by flashing the LED on the call appearance button green.
5. The phone reserves a call appearance and provides you with a dial tone.

1. See section 8.4.3 on page 86 for details.

2. You can, however, park a conference as described in section 7.6.3 on page 66.

6. Make the call as described in section 8.2.1 on page 73.
7. The phone updates the display to indicate which call is being transferred. For example, suppose you were talking on call 1 when you received a call on appearance 2. You answered it and used call appearance 3 to transfer the call. The display might look like:

```
1. Hold
Lancelot Capability
Brown                0:46
```

Press Down:

```
2. Transfer
Lord Blenheim
                                0:12
```

Press Down:

```
3. Calling
Oxford Stone Masons
                                0:08
```

Press Down:

```
1. Hold    2. Trns
3. Call    4. Idle
Mon 07 Oct 02 13:39
```

The abbreviations are explained in section 8.3.5.2 on page 83. You can toggle the phone to the compressed display mode by pressing the Enter button.

8. If you do not want to talk to the person to whom you are transferring the call, place the phone on hook or press the Transfer key again. The phone turns off the LEDs on the call appearance buttons as the transfer is completed.
9. If you want to talk to the person to whom you are transferring the call:
 - a. Wait until the person answers. Depending on the current settings for the user, the call may be redirected to the person's voice mail.
 - b. The phone changes the summary display to:

```
1. Hold    2. Trns
3. Cnct    4. Idle
Mon 07 Oct 02 13:40
```

- c. If you want to proceed to transfer the call, place the phone on hook or press the Transfer key again.
- d. If you do not want to transfer the call, press the call appearance button for the person who is on hold pending the transfer. The phone releases the call you just made.

8.5.4 Transferred by the Other Party

When a call appearance on the ZIP4x4 is transferred to a different party, the call information for the initial party (the party that transferred your call), instead of the party that received your call, remains on the LCD.

8.5.5 Using the Calculator

You can use the calculator while you have one or more conversations active. If the phone had been in calculator mode prior to making a call, the phone toggles out of this mode for the duration of the call and toggles back to calculator mode at the end of the call.

See section 8.9.9 on page 105 for information on making calls while in calculator mode and section 8.2.4 on page 75 for details how to dial in this mode.

8.6 Ending a Call

8.6.1 You Terminate the Call

Do one of the following:

1. Go on hook.¹ The phone ends the call, makes the handset, headset, and speaker quiet, and turns off the LED for the call appearance.
2. Press the call button that is lit continuously green.² The phone ends the call, makes the handset, headset, and speaker quiet, and turns off the LED for the call appearance.
3. Press a call button other than the one that is lit continuously green. The phone ends the call.

If the LED on that call appearance button was off (indicating the call appearance was inactive), the phone will provide you with dial tone and you can make another call.

If the LED on that call appearance button was indicating there was an incoming call, you will answer the call.

If the LED on that call appearance button was indicating there was a call on hold or a conference call on hold you can resume the conversation with the other person or people.

8.6.2 Other Party Terminates the Call

When the person that you are talking with goes on hook, your ZIP4x4 phone is immediately aware of this. The phone turns the call appearance LED solid red to indicate that the far end has disconnected. The phone changes the display to show that the call is disconnected, for example:

```
1. Disconnected
Lancelot Capability
Brown           1:23
```

1. See section 8.1.3 on page 71 for a definition of on hook.

2. The phone lights the LED continuously green to indicate which call is currently active.

The timer stops incrementing and shows you the duration of the call that has just ended. The phone plays busy tone until you put the phone on hook.

8.7 Quick Ways to Dial a Number

8.7.1 Introduction

You can dial any of 32 names or numbers that you have recently dialed. See section 8.7.2 on page 95.

You can dial a name or number that you have stored in the phone book by specifying the location in the memory. See section 8.7.3 on page 96.

You can dial a name or number that you have stored in the phone book by selecting the name of the person. See section 8.7.4 on page 97.

You can dial any of 32 names or numbers of people who have recently called you. See section 8.7.5 on page 98.

8.7.2 Redial

8.7.2.1 Last Name or Number Dialed

To dial the name or number that you most recently dialed, press the Redial key twice.

You can substitute entering a number by redialling it instead of entering it from the keypad for any of the call methods outlined in section 8.2.1 on page 73. The phone plays the DTMF digit for #.

If you have not reserved a call appearance, the phone enables speaker mode and silently dials the number.

8.7.2.2 List of Recent Names or Numbers Dialed

If you press the Redial key once, the phone allows you to select from the most recent 32 calls that you have made. The screen displays the name or number that you dialed, and the date and time that you made the call. It shows the most recent call as call 01, and the oldest call as call 32. For example:

```
Redial 01
Zultys Technologies
Thu 03 Oct 02 17:14
```

Press the Up and Down buttons to move through the list of names or numbers. Press the Enter button or the Redial key to select the number.

You can substitute entering a number by selecting it from the list of recently dialed names or numbers for any of the call methods outlined in section 8.2.1 on page 73. The phone plays the DTMF digit for #.

If you have not reserved a call appearance, the phone enables speaker mode and silently dials the number.

To exit the feature without selecting a name or number from the list, press the Esc button.

8.7.3 Dialling by Memory Location in the Phone Book

8.7.3.1 Description

You can save 99 phone numbers in the phone and associate a name with each number. The phone has one additional number that is reserved for calling the voice mail, as described in section 7.1 on page 53.

To enter and edit numbers, use the menu as described in section 9.2 on page 107.

8.7.3.2 Memory Locations 1 to 5

To dial a number or address in the phone book at memory locations 1, 2, 3, 4, or 5, press the button M01, M02, M03, M04, or M05.

The phone plays the DTMF digit for # and silently dials the number. If you have not reserved a call appearance, the phone enables speaker mode.

8.7.3.3 Any Memory Location

To dial a number or address in the phone book at any memory location, press the Mem button. The ZIP4x4 lights the LED on the button red. Enter the two digit number (00 to 99) of the memory location. You do not need to press the Enter button or #.¹

The phone turns off the LED, plays the DTMF digit for #, and silently dials the number. If you have not reserved a call appearance, the phone enables speaker mode.

If you do not enter two digits within 60 seconds, or if you press the Esc button, the phone turns off the LED, and restores the display to the idle condition.

8.7.3.4 Other Uses for the Memory

You can substitute entering a number from the memory instead of from the keypad for any of the call methods outlined in section 8.2.1 on page 73. The phone plays the DTMF digit for #.

You can also specify a destination from the memory as a number for forwarding calls. This is described in section 7.5.5 on page 64.

1. The voice mail is location 00 and may or may not be active. See section 7.1 on page 53 for details.

8.7.3.5 Invalid Location

If you try to dial from a memory location that is empty, the phone displays:

```
Error!
Phone book location
34 is empty.
```

The phone holds this display for two seconds, or until you press a key, lift the handset, or replace the handset.

8.7.4 Dialling by Name

If you have no active calls, you can quickly dial by the name of a person or entity by pressing the Down button.¹ The phone shows you the entries in your phone book listed alphabetically. If an entry in the phone book does not have a name, the display shows the address.

To use this feature, do the following:

1. Press the Down button.

The display changes to show the first, second, and last entries in the phone book. The arrow is on the middle row and points to the first entry:

```
last_entry
➔first_entry
second entry
```

For example:

```
Zultys Technologies
➔Apple Computer
Blenheim Palace
```

2. Do one of the following:
 - a. Use the Up and Down buttons to select the name. The arrow remains in the middle row.
 - b. Use the numeric keys 2 to 9 to select the first letter of the name. When you press the key, the display shows the first name in the phone book that begins with the first letter on the key. If there is no such entry, the display does not change. If you press the key within one second, the display shows the first name in the phone book that begins with the second letter on the key, and so on.
3. If you are dialling following receipt of dial tone, press the Enter button or the # key.

The phone plays the DTMF digit for the # key and the call proceeds as described in section 8.2.1 on page 73.
4. If you are dialling without receipt of dial tone, do one of the following:
 - a. Go off hook.

1. Do not press the Menu button or the Func key first.

- b. Press the Enter button.
- c. Press a call appearance button.

The phone silently dials the number or address and the call proceeds as described in section 8.2.2 on page 74.

To exit the feature without selecting a name or number from the list, press the Esc button.

8.7.5 Dialling a Recent Call

If you miss a call or if your phone rejects an incoming call it indicates this when the phone is in the idle state.¹ If you have no active calls, you can quickly dial someone who has recently called you by pressing the Up button.² The phone shows the most recent call as call 01, and the oldest call as call 32.

To use this feature, do the following:

1. Press the Up button.

The display changes to show the most recent incoming call, for example:

```
Incoming 01 (missed)
Lancelot Capability
Sat 21 Sep 02 03:26
```

The phone displays

- if you missed the call (by showing **missed** on the top row)
 - whether your phone rejected the call (by showing **reject** on the top row)³
 - whether you answered the call (by having no parenthetical comment on the top row)
 - the name, number, or address of the caller
 - the date and time that you received the call
2. Press the Up and Down buttons to move through the list of names or numbers.
 3. If you were dialling following receipt of dial tone, press the Enter button or the # key.
The phone plays the DTMF digit for the # key and the call proceeds as described in section 8.2.1 on page 73.
 4. If you were dialling without receipt of dial tone, do one of the following:
 - a. Go off hook.
 - b. Press the Enter button.
 - c. Press a call appearance button.

The phone silently dials the number or address and the call proceeds as described in section 8.2.2 on page 74.

1. See section 8.4.4.3 on page 88 for details.
2. Do not press the Menu button or the Func key first.
3. A phone can reject a call because of encryption policies. See section 7.2.2.2 on page 55 for details.

To exit the feature without selecting a name or number from the list, press the Esc button.

8.8 Conference Calls

The ZIP4x4 allows you to hold a conversation with two, three, or four other people simultaneously. When you have a conversation with more than one person this is called a conference. This is a feature that is supported on the ZIP4x4 so the function will operate on any phone system that can support multiple call appearances to the phone. You can have only a single conference call active at a time.

You can join people into the conference call that you have called or who have called you. You can drop individuals from and add individuals to the conference at any time.

8.8.1 Initiating a Conference Call

This section describes the simplest means to initiate a conference call. Section 8.8.5 on page 101 describes other means to add people to a conference call.

1. Make or answer the first call as you would normally do so.
2. Press the Conf key.

The phone selects another call appearance and provides you with dial tone.

The phone changes the LED on the first call appearance to be lit continuously orange.

3. Dial the third person for the conference.

The phone joins all calls into a single conference.

4. The phone changes the colors of the LEDs on the call appearance buttons to be all continuous orange.
5. If the phone is in the expanded display mode, the phone changes the display to:

```
1. Conf with 2, 3
4083280450
00:00:29
```

or

```
2. Conf with 1, 3
Lancelot Capability
Brown 00:00:45
```

The phone displays:

- the call appearance number
 - an indication that the person is in a conference and which other call appearances are in the same conference
 - the name or number of the person on the call appearance
 - how long the call has been on this call appearance (not the duration of the conference call)
6. Press the Up or Down buttons to scroll through the list of people on the conference call.

7. You can toggle the phone to the compressed display mode by pressing the Enter button.
8. If the phone is in the compressed display mode the display changes to:

```
1. 4083280450 00:29
2. Lancelot C 00:45
Wed 26 Jun 02 11:34
```

The phone displays the name or number of the person on the conference call together with how long the call has been on the call appearance.

The phone displays the current time and date just as it does in the idle state.

9. Press the Up or Down buttons to scroll through the list of people on the conference call.
10. You can toggle the phone to the expanded display mode by pressing the Enter button.

8.8.2 Placing a Conference Call on Hold

To place the conference on hold, press the Hold key. The LEDs on each of the call appearance buttons flash orange for half a second and off for half a second. The other people on the conference call can carry on with the conversation without you. The people on the conference call cannot hear you and you cannot hear the other people.

The phone does not select a new call appearance and does not provide you with a dial tone.

If you want to place the conference call on hold and resume the call from a different phone, use the park feature as described in section 7.6 on page 64.

8.8.3 Resuming a Conference Call

When the conference call is on hold, and you want to resume conversation with the conference, do one of the following:

1. Press any of the call appearance buttons that has its LED flashing orange.
 - a. If the phone has no other calls active other than the existing calls that are part of the conference, the conference resumes as it was prior to your placing it on hold.
 - b. If the phone has other calls proceeding or active, the phone terminates those calls.
 - c. If the phone has other calls on hold, the phone keeps those calls on hold.
2. Press the Conf key.
 - a. If the phone has no other calls active other than the existing calls that are part of the conference, the conference resumes as it was prior to your placing it on hold.
 - b. If the phone has other calls proceeding, active, or on hold, the phone joins all calls into the conference.

8.8.4 Muting a Conference Call

When you press the Mute button, the other people on the conference call can continue with their conversation uninterrupted. You can hear the conversation but the other people on the conference cannot hear you.

The phone flashes the LED on the Mute button red for 500 ms and off for 500 ms. The phone does not change the display.

To allow the other people on the conference call to hear you, press the Mute button again.

8.8.5 Adding Another Person to the Conference

8.8.5.1 Outgoing

To make an outgoing call do one of the following:

1. If you want the other people on the conference call to hear you make the call:
 - a. Press the Conf key.
 - b. The phone selects the lowest numbered call appearance that is inactive.¹
 - c. The phone plays dial tone that can be heard by the other participants in the conference call.
 - d. The phone flashes the LED on the call appearance button green to indicate it has reserved the call appearance.
 - e. Dial a name or number using the keypad, by specifying a memory location, or by selecting a recent number either called or received. The other participants in the conference can hear the DTMF digits as you dial them.
 - f. As the call proceeds, the phone changes the LED on the call appearance button as described in section 8.2 on page 72. The other participants in the conference call can hear the call progress tones.
 - g. Once the called party answers, he or she is immediately in the conference call and all participants can hear the conversation. The phone changes the LED of the call appearance button to continuous orange.
2. If you do not want the other people on the conference call to hear you make the call, or you want to speak privately to the person prior to him or her joining the conference call:
 - a. Press the Hold key.
 - b. The phone puts the conference on hold and flashes the LEDs on the call appearance buttons for each of the calls in the conference orange.
 - c. Make a new call by one of the methods described in section 8.2 on page 72.
 - d. When the called party answers, the phone turns the call appearance LED to continuous green. You can have a conversation with the person without any of the members of the conference call.
 - e. If you do not want the person that you have called to join the conference call:
 - Press the call appearance button that is lit continuously green. That terminates the call.
 - Press any of the call appearance buttons that is flashing orange to resume the conference call without the person you just called.

1. If the phone does not have an inactive call appearance, pressing the Conference key has no effect.

- f. If you want the person you just called to join the conference call, press the Conf key. The phone lights the LED on the call appearance button to be continuously orange.

8.8.5.2 Incoming

To answer an incoming call do one of the following:

1. If you want the other people on the conference call to hear you answer the call:
 - a. Press the Conf key.
 - b. The phone immediately joins the calling party to the conference call.
 - c. The phone changes the LED of the call appearance button to continuous orange.
2. If you do not want the other people on the conference call to hear you answer the call, or you want to speak privately to the person prior to him or her joining the conference call:
 - a. Press the Hold key.
 - b. The phone puts the conference on hold.
 - c. Press the call appearance button that indicates there is an incoming call.
 - d. The phone changes that call appearance button to be solid green and you can talk with the calling party.
 - e. If you do not want the person that has called to join the conference call:
 - Press the call appearance button that is lit continuously green. That terminates the call.
 - Press the Hold key. The phone puts the call on hold and flashes the LED on the call appearance button green.
 - Press any of the call appearance buttons that is flashing orange to resume the conference call without the person you just called.
 - f. If you want the person you just called to join the conference call, press the Conf key. The phone lights the LED on the call appearance button to be continuously orange.

8.8.6 Terminating a Conference Call

8.8.6.1 Ending the Entire Conference

To end a conference call, ensure the conference call is active, then go on hook. The phone terminates the calls on each of the call appearances and turns the LEDs on those buttons off.

8.8.6.2 Individuals Dropping from the Conference

As individuals leave the conference call, the call appearance that person was occupying on your phone will become free. The phone turns off the LED on the call appearance button.

8.8.6.3 Dropping Individuals

To end an individual call that is part of a conference, ensure the conference call is active, then press the call appearance button of the call that you want to terminate. The phone terminates the call on that call appearance and turns the LED on that button off.

You can use the Up and Down buttons to identify which person is on which call appearance as described in section 8.4.3 on page 86.

8.8.6.4 Ceasing to be Part of the Conference

If you no longer want to take part in the conference but want the other participants to continue to talk to one another, place the conference on hold as described in section 8.8.2 on page 100.

Your phone continues to mix the audio signals for the conference call and it continues to use the call appearances on your phone. As the participants in the call leave the conference, the call appearances used by the individuals will once again become free and the phone will turn off the LEDs on those call appearance buttons.

8.9 Calculator

8.9.1 Functions

The calculator can perform simple additions, subtractions, multiplications, and divisions with a precision (number of significant digits) of 12 digits. You can easily put the phone into calculator mode and restore it to phone mode. Alternatively, you can keep the ZIP4x4 normally in calculator mode; the ZIP4x4 will switch between calculator mode and call mode intelligently depending upon what you are doing.

8.9.2 Keys

To put the ZIP4x4 into calculator mode, press Calc.¹ The phone displays the word **Calculator** on the top row and keeps it there until you press a numeric key or exit calculator mode. The phone turns on the LED on the calculator button continuous green.

Use the keys labelled 0 to 9 for numerals, the * key for the decimal point, and the Redial (+), Conf (—), Trans (X), and Hold (÷) keys to indicate the arithmetic function. Press the Speaker (=) key to obtain the result of the calculation.

8.9.3 Display

As you type, the display shows the calculation and the result:

```
2.048
x 192
= 393.216
```

1. See section 6.2.1.2 on page 46 on how to access this.

The software puts each number on a separate line, preceded by the arithmetic operator. If you enter multiple arithmetic functions, the software scrolls the numbers off the top of the display. You can scroll the display by using the Up and Down buttons.

As you perform multiple calculations, the ZIP4x4 remembers what you typed so that you can scroll back. The phone remembers and can display 32 lines.

8.9.4 Order of Operations

If you use multiple operators, the calculator performs multiplications and divisions first then additions and subtractions. Therefore:

$$2 + 3 \times 4 = 14$$

and:

$$2 \times 3 + 4 \times 5 = 26$$

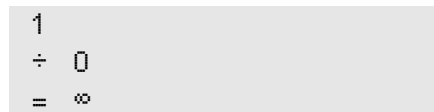
A calculator that displays a single number might evaluate the calculations as 20 and 50 respectively. If you want the calculator to make a calculation with each operator, use the = key to force the calculation, as in the following example:

$$1 + 2 \div 3 = 1.666667$$

$$1 + 2 = 3 \div 3 = 1$$

8.9.5 Divide by Zero

If you divide a number by zero, the phone displays the symbol for infinity. For example:



1
÷ 0
= ∞

8.9.6 Editing

You can edit your entries by using the volume keys in a similar manner to that described in section 8.2.7 on page 78. When you edit your entry, you can change the arithmetic operator. Use the Up and Down buttons to move between the lines.

After you have made the changes, it is not necessary for you to return the cursor to the last position. You can press the = button to see the result. The software displays the last line and the result of the equation.

8.9.7 Clearing

You can clear the current entry by pressing the # key. The small 'C' on that key indicates *Clear*. If you most recently entered a number, the phone clears the entire number. If you most recently entered an arithmetic operator, the phone clears the operator. As you continue to press the Clear key, the phone deletes numbers or arithmetic operators that you have entered.

You can clear all numbers and arithmetic operators that you have entered by pressing the Func key. The small letters 'AC' on that key indicate *All Clear*.

8.9.8 Exiting

You exit the calculator mode by pressing the Calc button. To select Calc, you press the Func key followed by the Mem | Calc button. When you press the Func key, the phone clears all data in the calculator. When you next enter calculator mode, the display is clear.

8.9.9 Making and Answering a Call While in Calculator Mode

You can make a call while in calculator mode. As soon as you start to do so, the phone automatically toggles from calculator mode to phone mode. It turns off the LED on the calculator button. Making a call when in calculator mode is described in detail in section 8.2.4 on page 75.

If the phone receives an incoming call, it immediately toggles from calculator mode to phone mode. The phone turns off the LED on the calculator button and displays information about the call. Receiving a call is described in section 8.4 on page 85.

When the phone is not in calculator mode, the five function keys (Redial, Conference, Transfer, Hold, and Speaker) do not function as arithmetic keys. You can, for example, easily put a conversation on hold (without dividing their phone number!).

When you terminate the call, the ZIP4x4 returns to the calculator mode provided all of the LEDs on the call appearance buttons are off; that is, there is no call activity.

You can put the ZIP4x4 into calculator mode during a conversation or while you have conversations on hold by pressing Calc again. The ZIP4x4 turns on the LED on the calculator button and displays the calculator screen as it was prior to a call.

Important In this mode you cannot access the functions for Redial, Conference, Transfer, Hold, and Speaker. If you need to access these functions, exit the calculator mode first.

The Menu

9.1 Introduction

When you press the Menu button, the phone displays:

```
Menu
➔Phone book
  Instant Messages
  Information
  User Settings
  Protected Settings
  Self Test
```

This example shows seven 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. The selections are:

Phone Book. Store and recall numbers that you want to dial. See section 9.2 on page 107.

Instant Messages. Exchange instant messages with other ZIP4x4 users. See section 9.3 on page 113.

Information. View data about the phone, the way it is connected, and the calls you have made. See section 9.4 on page 116.

User Settings. Customize the phone to suit your needs. See section 9.5 on page 120.

Protected Settings. Adjust the communications settings so that the phone works within your network. See section 9.6 on page 132.

Self Test. Test the functionality of your phone and its connections to your network. See section 9.7 on page 147.

Details on navigating through the menu are described in section 6.3.3 on page 49. See Appendix A, starting on page 155, for a complete summary of the menu structure.

9.2 Menu | Phone Book

You can store 100 contacts in the phone book at memory locations referred to as 00 to 99. Location 00 is reserved for accessing the voice mail as described in section 9.6.5 on page 143. The administrator configures address 00. You need a password to change that number.

When you select Menu | Phone Book the display shows:

```
Phone Book
➔Search
  Add new contact
  Edit
  Delete
```

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. The selections are:

Search. Find a name or number in the phone book. See section 9.2.1 on page 108.

Add new contact. Put a new entry in the phone book. See section 9.2.2 on page 109.

Edit. Change the information for a contact. See section 9.2.3 on page 111.

Delete. Remove a contact from memory. See section 9.2.4 on page 112.

9.2.1 Search

To search for a contact, do the following:

1. Select Menu | Phone Book | Search.
2. The display shows:

```
Search      Func: abc
➔
```

The phone automatically places the keypad in character mode and shows Func:abc on the top row.

3. Specify the name of the person whose address you are trying to find using the character mode as described in section 8.2.6 on page 76.

Enter no characters or the first few letters of the name of the contact.

4. Press the Enter button.

The phone displays the first contact in your address book that matches the characters you have typed or the contact that is next alphabetically to the characters you have typed.¹ The phone ignores upper and lower case characters to perform the match.

For example, if you typed L and pressed the Enter button, the ZIP4x4 might display:

```
Ken Livingston
➔Lancelot Capability
Lord Nelson
```

1. If you typed no characters, the ZIP4x4 displays all of the contacts in your phone book and points to the one that is closest to the start of the alphabet.

The phone looks at the contact's name to find a match. If you have not entered a name for the contact, the phone displays the address (SIP URI or number). The SIP URIs are sorted within the alphabetical list. Numbers are at the end of the list.

5. If the contact is not the one you wanted:
 - a. Use the Up and Down buttons or the Up and Down keys to scroll through the list of names.
 - b. Press the keys again to select the first letter for a different contact.
6. To dial a contact, press the Enter button, press a call appearance button, or go off hook. The phone exits the menu function.
7. To exit the search function, press the Esc button.¹

9.2.2 Add New Contact

To add a new contact to the phone book, do the following:

1. Select Menu | Phone Book | Add new contact.
2. The display shows:

```
Name          Func:abc
#
```

The phone automatically places the keypad in character mode and shows Func:abc on the top row.

3. Type the name of the contact using the character mode as described in section 8.2.6 on page 76. The maximum length of the name can be 19 characters. After you have typed the 19th character the cursor remains on the last character. If you try to add more characters, the phone plays the DTMF digit for the # key and replaces the last character in the string with the last typed character.
4. Press the Enter button.

You can press the Enter button without entering a name for the contact.
5. The display shows:

```
Address
#
```

Enter a name or number for the contact.²

1. Even though Func:abc is active, if you press the Esc button, the phone does not interpret this as if you are trying to dial memory location number two (M02).

2. The phone prompts you for an *address* to indicate that either a name or a SIP URI is acceptable.

6. If you want to enter a number, you can enter a simple string of digits such as:

```
Address
➔1485
```

You should not append a # character to the end of the phone string.

You can enter punctuation characters, for example:

```
Address
➔9-(408)328-0450
```

The phone stores the characters that you enter, but when you dial, the phone sends only the digits to the phone system.

Remember to precede the number with the access code for an outside line if the administrator of the system has configured the dial plan to require it.

7. If you want to save a SIP address instead of the number, press the Func key to access letters and enter the address of the contact using the character mode as described in section 8.2.6 on page 76.

```
Address      Func:abc
➔lancelot.capability
```

If the address is greater than 19 characters, the display scrolls to show just 19 characters:

```
Address      Func:abc
➔ot.capability.brown
```

The maximum length of the SIP URI can be 64 characters. After you have typed the 64th character the cursor remains on the last character. If you try to add more characters, the phone plays the DTMF digit for the # key and replaces the last character in the SIP URI with the last typed character.

You do not need to precede the address with the word SIP and a colon character. The ZIP4x4 automatically includes these for you in the outgoing message. If you want to type the characters, you can do so:

```
Address      Func:abc
➔SIP:lancelot.ca■
```

8. When you have finished entering the address (SIP URI or number), press the Enter button. You can enter a name and save it into memory without entering an address or a number, but you cannot dial that contact.

9. The display shows:

```
Location
➔07
  11
```

The phone shows a list of unused memory locations, and points to the lowest location that is free.

10. Use the Up and Down buttons or the Up and Down keys to select a memory location and press the Enter button.
11. The display changes to:

```
Saved                07
Lancelot Capability
+44-(123)9872 8645
```

The phone shows:

- a. the memory location on the top row
 - b. the name on the second row, or if there is no name, a blank line
 - c. the first 20 digits of the phone number or SIP URI on the bottom row, if there is a number or SIP URI¹
12. To dial the contact, press a call appearance button or go off hook.
The phone exits the menu function.
13. To display the phone book menu, press the Esc button. To exit the menu function without calling the contact, press the Menu button.

9.2.3 Edit

To edit the information you have saved about a contact, do the following:

1. Select Menu | Phone Book | Edit.
2. The display shows:

```
Edit                Func:abc
➔lanc
```

The phone automatically places the keypad in character mode and shows Func:abc on the top row.

3. Find the name of the contact as you would if you were searching for a contact as described in section 9.2.1 on page 108.

1. The phone system must understand the '+' symbol as is shown in this example. Not all phone systems may do so.

4. Edit the name, and address of the contact as you would do if you were entering a new contact as described in section 9.2.2 on page 109.

The phone places the cursor at the end of the name, address, or number. Edit it as described in section 8.2.7 on page 78.

If you did not earlier enter a name or an address, the phone still allows you to edit these so that you can complete them if required. When you press the Enter button, the phone gives you the opportunity to complete blank fields.

You can edit a contact to assign a different memory location. The location you assign must be currently unused.

5. When you have completed editing the information, the phone indicates it has saved the information and you can dial the contact or exit the function.

9.2.4 Delete

To delete the information you have saved about a contact, do the following:

1. Select Menu | Phone Book | Delete.
2. The display shows:

```
Delete      Func:abc
➔lanc
```

The phone automatically places the keypad in character mode and shows Func:abc on the top row.

3. Find the name of the contact as you would if you were searching for a contact as described in section 9.2.1 on page 108.
4. Press the Enter button when you have located the contact you want to delete.
5. The phone displays:

```
Lancelot Capability
Brown
Delete?  ➔No   Yes
```

6. Use the Up and Down buttons or the Up and Down keys to select Yes.
If you do not want to delete this entry, select No, or press the Esc button.
7. Press the Enter button to delete the information.

The phone removes the entry from its memory and displays the main menu for the phone book.

9.3 Menu | Instant Messages

You can exchange instant messages with other SIP devices connected to the same SIP server that connects to your ZIP4x4. The ZIP4x4 can send messages of 1000 characters in length and receive messages of up to 3600 characters.

When you select Menu | Instant Message, the LCD displays options for accessing ZIP4x4 Instant Message functions:

```
Instant Messages
➔Compose
  Inbox <4 msgs>
  Outbox <3 msgs>
  Erase all
  Configure
```

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.

9.3.1 Compose

When you select Menu | Instant Message | Compose, the LCD displays the lines for specifying the recipient and content of your instant message:

```
New message Func:abc
To :➔
Text:
```

To create and send an instant message:

1. Specify the recipient of your message on the **To** line, using one of the following methods
 - enter the recipient's extension
 - enter the recipient's address from the keypad, using the method described in section 8.2.6 on page 76 for entering an alphanumeric address.
 - access the address book by pressing the Mem button, then select the recipient from the list.
2. Press the Down button to move the cursor to the Text line.
3. Enter the message content, using the method described in section 8.2.6 on page 76 for entering an alphanumeric message.¹
4. Press the Enter button. The ZIP4x4 confirms your intent before sending the message.

1. Some unicode characters (such as μ , $^\circ$, § , ¥) may be interpreted differently by other IM programs, such as Windows Messenger.

9.3.2 Inbox

Instant messages received by the ZIP4x4 are placed in the inbox. The LED on the Msg button flashes orange for 500 ms and off for 500 ms when the inbox contains unopened instant messages. The Inbox line of the Instant Message display lists the number of messages that remain in the Inbox; the Instant Message display shown in section 9.3 on page 113 shows an inbox that contains four messages. Messages remain in the inbox until you delete them.

To access the instant message inbox:

1. Select Menu | Instant Message | Inbox from the main menu. You can also access the inbox by pressing the Msg button if the LED on that button is flashing orange. The LCD displays the list of instant messages in your inbox, as shown below.

```

➔✉ 2520@sample.com
✉ 2496@sample.com
✉ 2514@sample.com

```

The open envelope symbol on the first line indicates that the instant message sent from the extension listed on the line was previously opened. The closed envelope symbol on the bottom two lines indicates that those messages are new and have not been opened.

2. To open a message, use the up and down buttons to position the arrow next to the desired message, then press the enter key.

```

Thu Sep 25 16:50:26
Are you finished with
the report yet?
➔Delete Reply

```

The top line of the message display is the header that lists the day and time that the inbox received the message. The bottom line is a response menu for the message. The instant message is displayed between the header line and the response line.

The example display requires four rows; in practice, the display can show only three rows at once. Press the Up and Down buttons to scroll through the message.

3. To close the message, perform one of the following actions:
 - Select *Delete* in the Response line and press the enter key. The resulting display asks you to confirm the deletion of the message. Select Yes to delete the message and return to the inbox. Select No to return to the message.

```

Delete Message
➔Yes
No

```

- Select *Reply* in the Response line and press the enter key. The resulting display is the compose menu, with the address of the sender of the original message entered on the To line. Type a message in the text line and press the enter key. The next display confirms your intent to send the message. Select Yes to send the message and return to the inbox; select No to discard your message and return to the inbox. In each case, the inbox message is not altered.

- Press the Esc key to exit the message and return to the inbox.

9.3.3 Outbox

Instant messages that are sent from the ZIP4x4 are placed in the outbox. Messages remain in the outbox until you delete them. The outbox line of the Instant Message display lists the number of messages that remain in the outbox; the Instant Message display shown in section 9.3 shows an outbox that contains three messages.

To access the instant message outbox:

1. Select Menu | Instant Message | Outbox from the main menu. The LCD displays the list of instant messages in your outbox, as shown below.

```
➔2498@10.1.38.251
 2502@10.1.38.251
 2508@10.1.38.251
```

2. To open a message, use the up and down buttons to position the arrow next to the desired message, then press the enter key.

```
Fri Sep 26 09:14:04
I finished the report
this morning.
➔Delete Resend
```

The top line of the message display is the header that lists the day and time that the message was sent. The bottom line is a response menu for the message. The instant message is displayed between the header line and the response line.

The example display requires four rows; in practice, the display can show only three rows at once. Press the Up and Down buttons to scroll through the message.

3. To close the message, perform one of the following actions:
 - Select *Delete* in the Response line and press the enter key. The resulting display asks you to confirm the deletion of the message. Select Yes to delete the message and return to the inbox. Select No to return to the message.

```
Delete Message
➔Yes
No
```

- Select *Resend* in the Response line and press the enter key. The resulting display is the compose menu, with the address of the sender of the original message entered on the To line and the original message entered on the text line. Press the enter key to send the message. The next display confirms your intent to send the message. Select Yes to send the message and return to the inbox; select No to discard your message and return to the inbox. In each case, the inbox message is not altered.
- Press the Esc key to exit the message and return to the inbox.

9.3.4 Erase all

Select this option to remove all messages from the ZIP4x4 inbox and outbox.

9.3.5 Configure

Selecting the **Configure** option displays a menu that programs the ZIP4x4 to receive instant messages.

```
IM | Configure
➔Receive and display
  Reject
```

To configure the ZIP4x5 to receive instant messages, select **Receive and Display**.

To disable the ZIP4x5 from receiving instant messages, select **Reject**.

9.4 Menu | Information

This allows you to view data about the phone. You cannot change any part of the configuration in this menu item. When you select Menu | Information the display shows:

```
Information
➔Times
  Records
  Communications
  Manufacture
```

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. The selections are:

Times. View the time difference from GMT and how long the phone has been connected. See section 9.4.1 on page 116.

Records. View the record of the calls to and from the phone and the protocol messages to and from the phone. See section 9.4.2 on page 117.

Communications. View data about how the phone is connected. See section 9.4.3 on page 118.

Manufacture. View data about the hardware and software versions of the phone. See section 9.4.4 on page 119.

9.4.1 Times

When you select Menu | Information | Times, the ZIP4x4 shows the following displays. You can only view this information. Use the Up and Down buttons or the Up and Down keys to scroll through the various screens. The display on your phone may be different from the screens shown below.

Time Difference from GMT. This is the value that has been entered manually or that has been obtained from the configuration file:

```
Information | Times
➔Difference from GMT
-8:00 hours
```

Phone Power On. This is when the phone was turned on. The date and time is shown in the format that you have selected in section 9.5.7 on page 129:

```
Information | Times
➔Phone power on
Mon 29 Mar 04 08:44
```

Phone Connected. This is when the phone was connected to the network. The date and time is shown in the format that you have selected in section 9.5.7 on page 129:

```
Information | Times
➔Phone connected
Mon 29 Mar 04 08:45
```

Phone Registered. This is when the phone last registered with the SIP server. The phone needs to register periodically, typically each hour. The date and time is shown in the format that you have selected in section 9.5.7 on page 129:

```
Information | Times
➔Phone registered
Mon 29 Mar 04 10:37
```

Total Talk Time. This is the total time that the phone has been in the active call state since power on. It is the summation of time spent on calls that you originated and calls that you received. The time is reset each time the power is cycled on the phone. The time is shown in days, hours, minutes, and seconds:

```
Information | Times
➔Total talk time
16 d 35 h 12 m 14 s
```

9.4.2 Records

When you select Menu | Information | Records, the ZIP4x4 shows the following displays. You can only view this information. Use the Up and Down buttons or the Up and Down keys to scroll through the various screens. The display on your phone may be different from the screens shown below.

Call Log. This shows a listing of the calls you have made or received. This feature is not supported in version 1.2.

SIP Log. This shows a listing of the protocol messages sent from or received by your phone. This feature is not supported in version 1.2.

9.4.3 Communications

When you select Menu | Information | Communications, the ZIP4x4 shows the following displays. You can only view this information. Use the Up and Down buttons or the Up and Down keys to scroll through the various screens. The display on your phone may be different from the screens shown below.

Status of Ethernet Circuits. This data is updated in real time, so that as the phone receives communication the display may change.

```
Information | Comms
➔P 1  P 2  P 3  LAN
   100F  ----  10H 100F
```

- a. P1, P2, and P3 signify the three switched ports on the back of the phone.
- b. LAN signifies the port that you connect to the switch.
- c. — signifies there is no connection.
- d. 10 signifies there is connection at 10 Mb/s.
- e. 100 signifies there is connection at 100 Mb/s.
- f. H signifies half duplex.
- g. F signifies full duplex.

When you display this first screen, the LEDs on the four call buttons display the status of the Ethernet circuits.¹

- a. The LED is solid green to indicate that there is a connection.
- b. The LED flashes orange every quarter second to indicate there is activity.

You interpret the LEDs as follows:

- a. LED on Call 1 indicates the status of the circuit P1.
- b. LED on Call 2 indicates the status of the circuit P2.
- c. LED on Call 3 indicates the status of the circuit P3.
- d. LED on Call 4 indicates the status of the circuit LAN.

Power. The phone shows if it has power from the ac adapter and power from the LAN,² updated in real time. You should use the ac adapter if you have one, regardless whether the phone can be powered from the LAN.

```
Information | Comms
➔Power
  AC = on;  LAN = off
```

1. Do not confuse the use of the LEDs in this mode with the four call appearances. The call appearances all take place over the circuit labelled LAN.
 2. The power over the LAN is also referred to as power over Ethernet, PoE.

TFTP Address. This is what has been configured manually or obtained by DHCP. If the DHCP server did not specify the TFTP address, the phone indicates this:

```
Information | Comms
➔TFTP Address
  192.168.1.100
```

```
Information | Comms
➔TFTP Address
  not found
```

Configuration File. Once the phone obtains the address of the TFTP server, it tries to retrieve its configuration file from the TFTP server. It reports whether the file was read correctly or not:

```
Information | Comms
➔Configuration file
  OK
```

```
Information | Comms
➔Configuration file
  not found
```

9.4.4 Manufacture

When you select Menu | Information | Manufacture, the ZIP4x4 shows the following displays. You can only view this information. Use the Up and Down buttons or the Up and Down keys to scroll through the various screens. The display on your phone may be different from the screens shown below.

MAC Address. This is hard coded into the phone during manufacture and cannot be modified.¹

```
Information | Manfr
➔MAC address
  00-50-C2-18-0A-9F
```

Versions. You can update the software version. Later versions may include more features or better support for existing features. The boot code permanently resides on the phone and you cannot modify it. You may need to provide the hardware version and date of manufacture if you need support on the phone. The versions on your phone may be different from those shown in the following examples.

```
Information | Manfr
➔Software version
  1.2.12
```

1. The MAC address uniquely identifies your phone. The MAC address is printed on a label on the base of the phone as a bar code with text.

```
Information | Manfr
➔Boot code version
  1.0.3
```

```
Information | Manfr
➔Hardware version
  E09
```

```
Information | Manfr
➔Date of Manufacture
  31 Dec 2003
```

See section 5.3.5 on page 42 for how to update the software.

9.5 Menu | User Settings

This menu selection allows you to tailor the phone to suit your personal preferences. When you select Menu | User Settings the display shows:

```
User Settings
➔LCD Contrast
  Greeting message
  Clear user settings
  Date and time
  Audio
  Event Timer
  Regional options
  Factory Defaults
```

This example shows nine 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. The selections are:

LCD Contrast. Improve readability of the display. See section 9.5.1 on page 121.

Greeting Message. Change the display in the idle state. See section 9.5.2 on page 121.

Clear user settings. Reset the settings to those created by the system administrator. See section 9.5.3 on page 122.

Date and Time. Set the current date and time and the offset from GMT. See section 9.5.4 on page 122.

Audio. Select the ring tones. See section 9.5.5 on page 123.

Event Timer. Determine the length of time that the phone should display messages. See section 9.5.6 on page 128.

Regional Options. Select the country, language, and how you want the date and time presented. See section 9.5.7 on page 129.

Factory Defaults. Restores all phone parameters to their original factory settings. See section 9.5.8 on page 132.

Important If you have been assigned the phone, and want to ensure that the changes you make to the settings remain after you power up the phone, select **Never** under the menu *Clear user settings*, described in section 9.5.3 on page 122.

9.5.1 LCD Contrast

You alter the contrast to improve readability. The readability is affected by the ambient light, the room temperature, and the angle at which you view the display. To change the contrast, select Menu | Settings | Contrast. The display changes to:



Use the Up and Down buttons to change the contrast. The display gets darker as the number increases. There are 20 steps, numbered 1 to 20. The bar on the bottom of the display is a graphical representation of the setting.

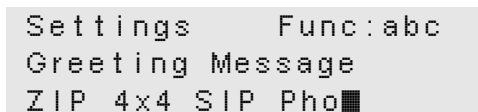
9.5.2 Greeting Message

This allows you to display a message on the top row of the phone when the phone is idle (see section 6.3.1 on page 48). When shipped from the factory, the greeting message is set to



To change the greeting message:

1. Select Menu | Settings | Greeting Message.
2. The display changes to:



3. The phone displays the current greeting message so you can edit it. Use the method described in section 8.2.6 on page 76 to edit and change an alphanumeric message.
The phone has already enabled alphanumeric mode for this purpose.
4. Press the Enter button when done, or the Esc button to cancel.

9.5.3 Clear User Settings

This determines what settings the phone will use each time it powers up. When you select this, the phone displays:

```
Clear user settings
➔never
  on next power on
  on each power on
```

This example shows four 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.

Ordinarily, you will keep the selection to **never**. Each time the phone powers on, it retains the user settings that you have entered.

If you select **on next power on**, the phone takes its user settings from the configuration file saved on the TFTP site. This is the configuration selected by the system administrator.¹ Once the phone has taken the settings from the configuration file, it sets this entry to **never**, and will not take the settings from the configuration file again.

This is very useful if a telephone is being transferred to a different person or if the person is changing locations. The administrator can maintain the default setting (within the administration UI) and change this parameter on the phone to **on next power on**. The next time the phone boots up it will take the default configuration. This will eliminate any undesirable settings and the user of the phone can now configure his or her own preferences.

If you select **on each power on**, the phone takes its user settings from the configuration file saved on the TFTP site every time that the phone powers up. This is useful if the phone is in a common area and users may change the settings from those desired by the system administrator.

9.5.4 Date and Time

This allows you to adjust the current date and time on the ZIP4x4 and select the offset from GMT. By default, the phone should use NTP and obtain its time automatically. If you find that the date or time is incorrect, contact the administrator of your network.

The phone relies on having an accurate time for its operation. Therefore, if you need to adjust the phone, you need to reboot the phone. To make the changes:

1. Select Menu | Settings | Date and Time.
2. The display changes to:

```
Phone must restart.
Continue?
➔No      Yes
```

3. Use the Up and Down buttons or the Up and Down keys to select Yes and press the Enter button.

1. See section 5.1 on page 35 for a description of the mechanism by which this takes place.

The phone restarts and shows the display described in section 4.2.3 on page 26. The phone operates from that point forward. The phone will overwrite configuration parameters with data received from the DHCP server and TFTP server but will not destroy user settings such as phone lists.

4. Press the Esc button, or select No and press the Enter button, if you do not want to change the date and time.

9.5.5 Audio

This allows you to configure the ring tones and what sound if any is played when you press a button or key. You select the country where you live separately (see section 9.5.7 on page 129). That selection determines the sounds you hear for other call progress tones.

To configure the audio properties, do the following:

1. Select Menu | User Settings | Audio.
2. The display changes to:

```
Set | Audio
➤external ring tone
  internal ring tone
  internal call answr
  call disconnect
  second call tone
  hold reminder tone
  key click
```

This example shows eight 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.

If the administrator has selected (see section 9.6.6 on page 145) that only a single tone should be played for internal or external calls, the phone instead displays in lieu of rows two and three:

```
➤ring tone
```

3. Press the Enter button, the display shows:

```
External ring tone
➤ring pause
  ring ring
  short ring
  bell bell
  custom
```

This example shows six 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.

When you move to a different selection, the phone plays the particular sound. The volume keys control the volume and do not select between the items in the list.

See section 9.5.5.1 on page 126 for how to access the custom audio features.

4. If you make a selection other than custom, the phone changes the display to that shown in step 2.
5. Select "internal ring tone" and press the Enter button, the display shows:

```
Internal ring tone
ring pause
➔ring ring
short ring
bell bell
custom
```

This example shows six 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.

When you move to a different selection, the phone plays the particular sound. The volume keys control the volume and do not select between the items in the list.

See section 9.5.5.1 on page 126 for how to access the custom audio features.

6. If you make a selection other than custom, the phone changes the display to that shown in step 2.
7. Select "internal call answer" and press the Enter button. The display shows:

```
Internal Call Answer
➔ring phone
auto answer speaker
auto answer hook
```

This example shows four 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.

Select **Ring Phone** to program the phone to plays the internal ring tone until you take the phone off hook or a system call handling routine sends the call to an operator or your voice mail.

Select **Auto Answer Speaker** to program the phone to ring once, then automatically go off hook and route the caller's voice through your external speaker. You can then speak to the calling party.

Select **Auto Answer Hook** to program the phone to ring once, then automatically go off hook and route the caller's voice through your headset. You can then speak to the calling party.

8. Select "call disconnect" and press the Enter button; the displays shows:

```
Call disconnect
➔busy tone
busy tone timeout
silent
```

This example shows four 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.

Select **busy tone** to program the phone to play a busy tone after the other party disconnects from a phone call

Select **busy tone timeout** to program the phone to play a busy tone for five seconds after the other party disconnects from a phone call

Select **silent** to program the phone to remain quiet after the other party disconnects from a phone call.

9. Select "second call tone" and press the Enter button, the display shows:

```
Second call tone
➔short high beep
   long high beep
   short low beep
   long low beep
   custom
   silent
```

This is the tone that is played to you when you are talking on the phone and the phone receives an incoming call (call waiting). The phone does not play the standard ring tone but instead announces the call with the tone you select here.

This example shows seven 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. Also, with each choice, the phone plays the particular sound. The volume keys control the volume and do not select between the items in the list.

See section 9.5.5.1 on page 126 for how to access the custom audio features.

10. If you make a selection other than custom, the phone changes the display to that shown in step 2.
11. Press "hold reminder and press the Enter button. The display shows:

```
Hold reminder
➔off
   beep
   bleep
```

This example shows four 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. Also, with each choice, the phone plays the particular sound.

This tone is played once every 30 seconds when you have a call that is on hold.

12. Select "key click" and press the Enter button, the display shows:

```
Key click
➔off
  click
  beep
  bleep
```

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. Also, with each choice, the phone plays the particular sound.

This tone is played when you press a button or when you press a non numeric key. It is also played when you press a numeric key and are not necessarily dialling a number.

13. When you have made your selection, press the Enter button. The phone changes the display to that shown in step 2.

9.5.5.1 Custom Audio

This section describes how you can select a custom tone used to indicate an incoming call from and internal number or an external number or indicate a second call (while you are on a call).

In this section, the first line of the display of the screen images shows:

```
External ring tone
```

However, if you are selecting a custom tone for the internal calls, the screens will instead show:

```
Internal ring tone
```

If you are selecting a custom tone to indicate a second call, the screens will instead show:

```
Second call tone
```

For details on how to access these functions see step 3 (for external ring tone), step 5 (for internal ring tone), or step 9 (for second call tone) of section 9.5.5 on page 123.

1. When you select custom, the display shows:

```
External ring tone
Retrieving list
■■■■■■■■ 01:17
```

The phone shows a new bar every second and maintains the total time on the right of the third row of the display. Every 10 s the phone clears the bars and then starts to show them one by one again.¹

1. The length of time taken to access the server depends on the number of sound files stored on the server and the activity on your network. This could be anywhere from a few seconds to a few minutes.

2. After the phone has found all the custom tones available, it lists them and displays:

```
External ring tone
➔sound1
  sound2
```

3. Use Up and Down or the volume keys to scroll between the choices. Press the Enter button to select a sound or the Esc button to return to the previous menu.
4. When you select a file, the phone retrieves it from the server and the display shows:

```
External ring tone
Downloading file
■■■■■ 00:34
```

The phone shows a new bar every second and maintains the total time on the right of the third row of the display. Every 10 s the phone clears the bars and then starts to show them one by one again.¹

5. When the phone has downloaded the file, the phone plays the file and displays:

```
External ring tone
bell bell
➔custom
```

6. Press the Enter button to keep this selection. The phone changes the display to that shown in step 2 on page 123. Press the Esc button if you want to select a different file. The phone displays that shown in step 2 on page 127 so you can select a different file.²
7. If the phone encounters errors while accessing the HTTP server or retrieving the file, it will display one of the following messages.
- a. The ZIP4x4 displays this message if the connection to the HTTP server fails:

```
External ring tone
Error: Connection
failure
```

- b. The ZIP4x4 displays this message if the HTTP server does not exist or does not respond:

```
External ring tone
Retrieving list
Error: time-out
```

1. The length of time taken to download the file depends on the size of the file and the activity on your network. This could be anywhere from a few seconds to a few minutes.

2. The phone assumes that the list of files has not changed and therefore shows you the same list of files that it earlier retrieved. If you wait for more than 30 seconds, the phone will once again retrieve the list of files and will display that shown in step 1 instead.

- c. The ZIP4x4 displays this message if the HTTP server denies access:¹

```
External ring tone
Retrieving list
Error: unauthorized
```

- d. The ZIP4x4 displays this message if the HTTP server forbids access:²

```
External ring tone
Retrieving list
Error: forbidden
```

- e. The ZIP4x4 displays this message if there is an error with the HTTP server:³

```
External ring tone
Retrieving list
Error: bad server
```

- f. The ZIP4x4 displays this message if the specified directory on the HTTP server is empty:

```
External ring tone
Retrieving list
Error: no files
```

- g. The ZIP4x4 displays this message if the downloaded WAV file is of the wrong format:⁴

```
External ring tone
Downloaded file
Error: wrong format
```

9.5.6 Event Timer

The phone displays messages about the status of a call or a problem. Some of these messages are displayed only temporarily. With this setting, you determine for how long the phone should show the message.

1. Select Menu | User Settings | Event Timer.

The display changes to:

```
Event Timer
seconds (2..10)
➔3
```

1. This is HTTP error 401 (unauthorized).
2. This is HTTP error 403 (forbidden).
3. This is one of the HTTP errors 500 (internal server error), 501 (not implemented), 502 (bad gateway), or 503 (service unavailable).
4. The WAV files that are saved on the HTTP server must be encoded as described in section 9.6.6 on page 145.

2. Use the keypad to enter a number between 2 and 10. This represents the time in seconds for which the event will be displayed. The default value is three seconds.
3. Press the Enter button.

9.5.7 Regional Options

To configure the regional options, do the following:

1. Select Menu | User Settings | Regional Options.

The display changes to:

```
Set | Regional Optn
➔country
  language
  number format
  date and time
  time format
  date format
```

This example shows seven 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.

2. Press the Enter button. The phone displays the country settings menu:

```
Settings | Country
  UK
  ➔USA
```

To select a country, scroll through the list of countries with the Up and Down buttons. Available country settings include Afghanistan, Argentina, Australia, Austria, Bahrain, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Japan, Jordan, Korea, Kuwait, Lebanon, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Oman, Philippines, Qatar, Romania, Russia, Saudi Arabia, Singapore, Spain, Sweden, Switzerland, Syria, Thailand, UAE, UK, USA, and Yemen.

This selection determines the tones that the phone generates for call progress tones (dial tone, ringback tone, busy tone, and network busy tone (congestion)). It does not determine the tone used for alert (ringing), which informs you of an incoming call.¹

The selection is also used to narrow your choices of time zones.

3. Select the country, press the Enter button, press the Down button and press the Enter button again.

The display changes to:

```
Settings | Language
  ➔English
```

1. See section 9.5.5 on page 123 for details on how to select different ring tones.

With this version of the software, only English is supported.

4. Press the Enter button, press the Down button and press the Enter button again.

The display changes to:

```
Settings | Numbers
➔. decimal , 1000
. decimal 1000
, decimal . 1000
, decimal sp 1000
, decimal 1000
```

The selections allow you to choose how you want numbers displayed by selecting the characters used for the decimal point and the delimiter for thousands. For example, the selections would show a number as:

- a. 12,345.6789
- b. 12345.6789
- c. 12.345,6789
- d. 12 345,6789
- e. 12345,6789

The phone uses this format only when you use the calculator.

5. Choose the format that you want, press the Enter button, press the Down button and press the Enter button again.

The display changes to:

```
Settings | Date Time
➔date time
time date
```

This determines whether the phone shows the date before or after the time, for example:

```
09:30 Sun 06 Oct 02
Sun 06 Oct 02 09:30
```

6. Select the format you want and press the Enter button.¹ Press the down button and press the enter button to select time format.

1. If you want to change the date and time, see section 9.5.4 on page 122.

The display changes to:

```
Settings | Time Frmt
➔24 hour
 24 hour + seconds
 12 hour
 12 hour + seconds
```

In 24 hour format the phone always uses two digits for the hour. For example

```
09:30
```

In 12 hour format the phone uses one or two digits for the hour and appends an 'a' or 'p' at the end after the minutes. For example

```
9:30a
```

When you display the seconds it appears, for example, as:

```
09:30:27
 9:30:27a
```

7. Select the format you want and press the Enter button. Press the down button, then press the enter button to select date format.
8. The display changes so that you can select the format for the date. The choices depend whether you have selected to display seconds or not.

If you have chosen to not display seconds, the choices are:

```
Settings | Date Frmt
➔Sun 06 Oct 02
 10/6/2002
 10-6-2002
 10/6/02 Sun
 10-6-02 Sun
 Sun Oct 06 02
 02 Oct 06 Sun
 02/10/06 Sun
 02-10-06 Sun
 2002/10/06
 2002-10-06
```

This example shows 12 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.

If you have chosen to display the seconds in 12 hour format, the choices are:

```
Settings | Date Frmt
➔10-6 Sun
 10/6 Sun
 10/6/02
 10-6-02
 10/06 Sun
 10-06 Sun
 02/10/06
 02-10-06
```

If you have chosen to display the seconds in 24 hour format, the choices are:

```
Settings | Date Frmt
➔10-6 Sun
 10/6 Sun
 10/6/02
 10-6-02
 10/06 Sun
 10-06 Sun
 02/10/06
 02-10-06
 Sun 06 Oct
 Sun Oct 06
 Oct 06 Sun
```

9. Select the one you want and press the Enter button.
10. Press the menu button to exit the menu function.

9.5.8 Factory Defaults

Select the Factory Defaults option from the User Settings panel to reset the phone parameters to their original, factory installed values.

9.6 Menu | Protected Settings

This allows you to alter the communication parameters of the phone. You may need to configure these parameters if your system does not support automatic provisioning.

Each of the parameters in this menu is protected by a password that you need to enter to make changes to the settings. If you do not know the password, you can view but not alter the parameters. The menu name *Protected Settings* indicates that you need a password to modify the settings.

When you select Menu | Protected Settings the display shows:

```
Protected Settings
➔Password
  IP Communications
  SIP Communications
  VLAN
  Names and numbers
  Audio
```

This example shows seven 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. The selections are:

Password. Enter and change the password, and logout of password mode. See section 9.6.1 on page 133.

IP Communications. Configure IP addresses and related parameters. See section 9.6.2 on page 134.

VLAN. Configure the VLANs for the various Ethernet ports. See section 9.6.4 on page 140.

Names and Numbers. Enter the names and phone numbers associated with the phone. See section 9.6.5 on page 143.

Audio. Configure the sounds that the phone can play. See section 9.6.6 on page 145.

9.6.1 Password

When the phone is shipped from the factory, it has the default password:

```
985897
```

This corresponds to the word “zultys.” When you select Menu | Protected Settings | Password the display shows:

```
PSettings | Password
➔Enter password
*****
```

You enter the password followed by the Enter button. The ZIP4x4 displays the star characters shown above as you enter the password. You need to enter the correct password to be able to change any of the protected settings described in the remainder of this section 9.6.

If you enter the password incorrectly, the screen remains, prompting you to enter the password again.

If you enter the password correctly, the display changes to:

```
PSettings | Password
➔Log out
  Change
```

You should log out once you have made changes to the phone configuration to prevent other people from modifying the parameters. The phone will log you out automatically if you have not made any changes to the configuration for ten minutes or if you turn the power off.

To change the password, select Change. The display shows:

```
PSettings | Password
➔Enter new password
*****
```

When you press the Enter button, the display changes to:

```
PSettings | Password
➔Repeat new password
*****
```

If you enter the password the same each time, the ZIP4x4 displays the upper level. Otherwise, the ZIP4x4 prompts you to enter the new password again. The password can be only numeric (you can use the digits 0 to 9, the # character and the * character) and can be from 4 to 15 characters. If you try to add a sixteenth character, the phone plays the DTMF digit for the # key and replaces the last character in the string with the last typed character.

The Administrator can change the password from the configuration file that is saved on the TFTP server. If the Administrator chose to do so, the ZIP4x4 restores the password to that saved in its configuration file the next time it powers up.¹

9.6.2 IP Communications

When you select Menu | Protected Settings | IP Communications, the display shows the parameters needed by the phone to communicate with the network. Each of these parameters is locked and you cannot change any of them unless you have previously entered the password. If you have entered the password, you can modify any of the parameters.

The first screen shows:

```
PSettings | IP
➔DHCP
  Phone address
  Subnet mask
  Default gateway
  DNS server
  Secondary DNS
  NTP server
  TFTP server
  TFTP address
  DSCP
```

1. Automatic provisioning is described in section 5.1 on page 35.

This example shows ten rows, though in practice the display can show only three rows at once. Use the Up and Down buttons or the Up and Down keys to scroll through the various settings. Press the Enter button to select a parameter.

Type the new value using the keypad. Most parameters require an IP address. To enter the period (full stop), use the * key. You can enter some parameters by entering an FQDN. To enter this, follow the procedure described in section 8.2.6 on page 76.

Press the Enter button (to save changes) or the Esc button (to discard changes) to exit the screen. The selections are as follows:

DHCP. This allows you to enable or disable DHCP.

```
PSettings | IP
➔Enable DHCP
  Disable DHCP
```

When you enable DHCP, the DHCP server should provide the following information:

- IP address for the phone
- domain name
- subnet mask
- address of the default gateway (you can specify this as an IP address or an FQDN)
- IP address of the DNS server
- IP address of the secondary DNS server
- address of the NTP server (you can specify this as an IP address or an FQDN)
- address of the TFTP server (you can specify this as an IP address or an FQDN)

If you enable DHCP you should not ordinarily modify these parameters on the ZIP4x4. If the server does not provide all of these parameters, or if you want to make a change to one of the parameters, you can set it from the appropriate screen.¹

When you disable DHCP, you must enter these parameters manually.²

Phone Address. This is the IP address that the phone has obtained dynamically through DHCP or is a static address that you manually configure.

```
PSettings | IP
Address of phone
➔192.168.0.6
```

1. In the version of software available as of the time of writing, you need to reboot the phone for any changes to the IP parameters to take effect. If the phone reads data from the DHCP server during the boot up process, it will overwrite whatever parameter you have modified if the server provides that parameter. The phone will not overwrite parameters that are absent in the data that it receives from the DHCP server.
2. For each of the parameters that you enter from the keypad, you can enter only an IP address and cannot enter an FQDN.

Subnet Mask. This identifies the subnet mask for the phone.

```
PSettings | IP
Subnet mask
➔255.255.254.0
```

Default Gateway. This is the IP address for the gateway on the same subnet on which the phone resides.

```
PSettings | IP
Default gateway
➔10.1.30.1
```

DNS Server. This is the IP address for the server that provides address resolution (DN to IP address) for the phone.

```
PSettings | IP
DNS server
➔10.1.10.1
```

Secondary DNS Server. This is the IP address for the alternative server that provides address resolution (DN to IP address) for the phone.

```
PSettings | IP
Secondary DNS server
➔10.1.10.10
```

NTP Server. This is the IP address for the server that provides date and time information for the phone. If you leave this field blank, or if your DHCP server does not provide an address for the SNTP server, the ZIP4x4 uses the address of the SIP Outbound Proxy to access the SNTP server.

```
PSettings | IP
NTP server
➔10.1.10.194
```

TFTP Server. This parameter indicates the source of the IP address for the TFTP that provides the configuration files to the ZIP4x4.

```
PSettings | IP
From DHCP
➔Fixed Address
```

TFTP Address. This is the IP address for the file server that provides configuration information for the phone.

```
PSettings | IP
TFTP server
➔10.1.10.20
```

The TFTP server should contain a configuration file that provides the following information:¹

- address of the SIP outbound proxy server (you can specify this as an FQDN or an IP address)
- address of the SIP registrar server (you can specify this as an FQDN or an IP address)
- address of the voice mail server (you can specify this as an FQDN or an IP address)
- RTP start port
- SIP receive port
- SIP transmit port
- SIP transport protocol

If you use the ZIP4x4 with the a system that does not creates the configuration file with all these parameters, you must configure these parameters manually.

DSCP. The next setting is the DSCP (layer 3 QoS) setting.² The phone displays:

```
Phone port DSCP
➔0
(0~63. VoIP 46)
```

Type a number for the DSCP setting and press the Enter button. The phone will not accept a number that is greater than 63. All voice packets (RTP) leaving the phone's microprocessor will have this value in the ToS byte of the IP header (see figure 1-3 on page 4).

The default value is 0, which corresponds to best effort. If you use differentiated services in your network, you should set the value to 46 (101110 binary) which corresponds to the expedited forwarding per hop behavior (PHB).

9.6.3 SIP Communications

When you select Menu | Protected Settings | SIP Communications, the display shows the parameters needed by the phone to communicate with the SIP proxy and registrar servers.³

Each of these parameters is locked and you cannot change any of them unless you have previously entered the password. If you have entered the password, you can modify any of the parameters.

The first screen shows:

```
PSettings | SIP
➔Outbound proxy
Backup proxy
Registrar server
RTP start port
Receive port
```

1. For more information about how the phone uses the TFTP server, see section 5.1 on page 37.

2. RFC 2597 and RFC 2598 define the various code points and per-hop behavior (PHBs). RFC 2474 and RFC 2475 define differentiated services.

3. SIP phones sessions are conducted by exchanging a a series of SIP messages with the SIP server. The ZIP4x4 will not respond to any SIP message that has a damaged contact field.

```

Proxy port
Registrar port
Backup proxy port
Page server
Transport protocol
Invite retrans
Non invite retrans
Backup proxy reg
Proxy Password
    
```

This example shows fifteen rows, though in practice the display can show only three rows at once. Use the Up and Down buttons or the Up and Down keys to scroll through the various settings. Press the Enter button to select a parameter.

Type the new value using the keypad. Most parameters require an IP address. To enter the period (full stop), use the * key. You can enter some parameters by entering an FQDN. To enter this, follow the procedure described in section 8.2.6 on page 76.

Press the Enter button (to save changes) or the Esc button (to discard changes) to exit the screen. The selections are as follows:

Outbound Proxy Server. This is the IP address of the server that handles call control for the ZIP4x4.

```

PSettings | SIP
Outbound proxy
➔10.1.30.194
    
```

Backup Proxy Server. This is the IP address of the backup proxy server. The ZIP4x4 will attempt to switch to the backup proxy if the primary proxy server fails to operate.

```

PSettings | SIP
Backup proxy
➔10.1.31.196
    
```

Registrar Server. This is the IP address of the registrar server. When this value is set, the ZIP 4x4 attempts to register with this server instead of the proxy.

```

PSettings | SIP
Registrar server
➔10.1.30.194
    
```

RTP Start port. The ZIP4x4 uses consecutively numbered RTP and RTCP port numbers (actually UDP port numbers) for communication. RTP carries media and RTCP carries control information.

The default RTP start port is 1760. The first call appearance uses port 1760 to receive media and port 1761 to receive RTCP control information. The second call appearance uses ports 1762 and 1763. The highest port in use is 1767. The RTP start port must always be an even number and should not be set to the same value as the Receive Port or the Proxy Port.

```
PSettings | SIP
RTP start port
➔1760
```

Receive Port. This is the TCP or UDP port number the phone uses to receive SIP messages. The default value is 5060 and that is used if you leave this field blank.

```
PSettings | SIP
Receive port
➔5060
```

Proxy Port. This is the TCP or UDP port number the phone uses to send SIP messages. The default value is 5060 and that is used if you leave this field blank.

```
PSettings | SIP
Proxy port
➔5060
```

Registrar Port. This parameter specifies the SIP Registrar server port. The default value is 5060 and that is used if you leave this field blank.

```
PSettings | SIP
Registrar port
➔5060
```

Backup Proxy Port. This parameter specifies the TCP or UDP port number of the backup proxy. The default value of 5060 is used if you leave this field blank.

```
PSettings | SIP
Backup proxy port
➔5060
```

Page Server. This parameter specifies the IP address of the page server.

```
PSettings | SIP
Page server
➔10.1.31.193
```

Transport Protocol. This determines if the phone uses UDP or TCP to transport the SIP messages. The default is UDP. In the current version of software TCP is not supported.

```
PSettings | SIP
Transport protocol
➔UDP
```

Invite Retransmission. This parameter specifies the number of unsuccessful INVITE transmissions before the phone switches to the backup proxy. Valid settings range from 1 to 6.

```
PSettings | SIP
Invite retrans
➔6
```

Non Invite Retransmission. This parameter specifies the number of unsuccessful retransmissions (other than INVITE) before the phone switches to the backup proxy. Valid settings range from 1 to 10.

```
PSettings | SIP
Non invite retrans
➔10
```

Backup Proxy Reg. This parameter determines if the phone registers with the backup proxy at start up. Default value is "No".

```
Register with
backup proxy?
➔No      Yes
```

Proxy Password. The proxy password authenticates the ZIP4x4 to proxy servers that require authentication. Default value is blank.

```
PSettings | SIP
Proxy password
➔
```

9.6.4 VLAN

You configure VLANs on the switch that is built into the phone to match your network, optimize performance, and obtain the best speech quality. You must enter the password prior to modifying the VLAN configuration.

You can have one to eight VLANs on the ZIP4x4. These are referred to as A, B, C, D, E, F, G, and H. For each VLAN, you can specify the VLAN ID from 0 to 4094.¹

Each Ethernet circuit can be on different VLANs. The phone itself is considered to connect to a separate Ethernet circuit on the switch, as shown in figure 1-3 on page 4.

1. You should not normally use VLAN ID of 0. You may not obtain the results you expect if you do so.

To configure the VLANs, do the following:

1. If you have not already done so, enter the password as described in section 9.6.1 on page 133 so that you have rights to make the changes.
2. Select VLAN from the menu (Menu | Protected Settings | VLAN).

The display shows:

```
VLAN support
➔Off      On
```

Select On to enable VLAN support within the ZIP4x4.

3. Press the enter button. The display shows:

```
VLAN definition
A: 1
(0 to 4094)
```

Type a number from 0 to 4094. Use the left and right keys to edit the number as described in section 8.2.7 on page 78. The default value is 1.

4. Press the Down button or the Enter button. The phone changes the display to:

```
VLAN definition
B: * not used *
(0 to 4094; * = no)
```

Type a number from 0 to 4094 or press *. When you press * the phone clears the number and indicates that this VLAN definition is not used. This is the default value.

5. Press the Enter button. If you have defined a second VLAN (that is, you entered a VLAN ID for the definition of B), the phone prompts you to define a third VLAN (C), and so on.
6. As soon as you define no more VLANs (or you define eight VLANs which is the maximum number), the phone displays:

```
VLAN A
P1    U
P2    U
```

7. The phone shows a table.
 - a. You can change the data in the cells of the table.
 - b. The column headings of the table show the VLANs that you have defined. In the example above only the first VLAN (A) was defined.
 - c. The row headings of the table shows four circuits: P1, P2, P3, and LAN. The phone circuit for VLAN A is always untagged and is not displayed.
8. In the second and third rows, the phone displays whether the phone and Ethernet circuit P1 are included in the VLAN or not. The phone shows:

- a. U if the circuit is included in the VLAN but untagged
 - b. T if the circuit is included in the VLAN and tagged
 - c. E if the circuit is excluded from the VLAN
9. The phone places the cursor in the first cell of the table (representing the setting for the first VLAN for the phone).
 10. To change the setting, press:
 - a. 1 for U
 - b. 2 for T
 - c. 3 for E
 11. The phone moves the cursor to the next position. If you have defined a single VLAN (as shown in the example above) the phone places the cursor under the configuration for the port P1.
 12. Continue to select the configuration for the other ports. Use the Up and Down buttons or the left and right keys to scroll between the selectable entries.
 13. The phone scrolls the display to be:

```
VLAN A
P2 U
P3 U
```

14. Press the Enter button when you have finished entering all the data in the table.
15. An example of a more complex table might be:

```
VLAN A B C
P1 U T E
P2 E T E
P3 T E U
LAN T T T
```

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 rows.

The phone defaults to having all ports members of VLAN A. P1, P2, P3, and LAN are untagged members of the VLAN and the VLAN ID is 1.

When you create another VLAN, the phone defaults to excluding all ports from the other VLAN. You must then select those ports that will be tagged or untagged members of the newly created VLAN.

The phone port (Phn) is always excluded from all VLANs except the first (VLAN A), which is untagged. The phone port is not displayed by the menu.

No port can be an untagged member (U) of more than one VLAN. If you set a port to be an untagged member of one VLAN and then set it to be an untagged member of a different VLAN, the phone changes the initial setting to be excluded from the VLAN.

16. Configure the CoS setting (IEEE 802.1p). The phone displays:

```
Phone port L2 CoS
➔5
(0 to 7. Default 5)
```

Type a number for the setting – the phone will accept an input from the keys 0 to 7. This setting is used only by the phone port on the switch. Press the Enter button.

The phone does not display this if you have not configured the Phn port to be a tagged member of VLAN A.

9.6.5 Names and Numbers

When you select Menu | Protected Settings | Names and Numbers, the display shows:

```
PSettings | Names
➔Device ID
  Domain
  Voice Mail
  Park Extension
  Page Extension
```

This example shows six rows, though in practice the display can show only three rows at once. Use the Up and Down buttons or the Up and Down keys to scroll through the various settings. Press the Enter button to select a parameter.

The selections are as follows. Any of the parameters can be alphanumeric. To enter an alphanumeric parameter, follow the procedure described in section 8.2.6 on page 76.

Device ID. Specify the name which this phone uses to register with the SIP registrar and to subsequently make calls. This parameter is the user portion of the address:

user @ domain

When the phone is shipped from the factory, this parameter is blank. The phone then uses the MAC address. If you want to use a different name, type it in the field. To restore the device ID to be the value of the MAC address, delete the text in the field.

```
PSettings
Device ID
➔
```

Domain Name. Specify the domain name for the enterprise. This has no default value and you must therefore complete this parameter. The phone can obtain this information from the DHCP server. This is always specified as an FQDN, so the phone automatically enables character entry mode.

```
PSettings Func:abc
Domain name
➔Zultys.com
```

Voice Mail. Specify the name or number for the server that stores voice mail. The name or number of the voice mail is saved at memory location 00. You can dial it by pressing the Msg button or pressing Memory 00.¹ When the ZIP4x4 needs to access the voice mail, it sends the call to:

<voice mail number>@<SIP outbound proxy server>

For example:

5500@10.1.30.194

You can enter a name for the address of the voice mail. Therefore, any of the following is valid:

voice.mail@10.1.30.194

voice.mail@SIP.Zultys.com

5500@SIP.Zultys.com

This parameter has the default value of

voice.mail

If this value is acceptable, you do not need to modify it. The phone can obtain this information from the configuration file pulled from the TFTP server.

```
PSettings Func:abc
Voice mail
➔voice.mail
```

```
PSettings
Voice mail
➔5500
```

Park Extension. Specify the name or number for the server that handles call park and call pickup.² When the phone parks a call, it transfers the call to the park server which returns the two digit park ID. When the user picks up a parked call, the phone makes a call to the park server with the additional two digits appended.

When you press the Park or Pickup button, the phone sends the call to:

<park extension>@<SIP outbound proxy server>

For example:

5501@10.1.30.194

```
PSettings
Park Extension
➔5501
```

-
1. See section 8.7.3 on page 96 for how to dial from a memory location. See section 7.1 on page 53 for how to access the voice mail using the Message button.
 2. Call park and call pickup are described in section 7.6 on page 64 and section 7.7 on page 66.

Page Extension. This parameter specifies the number for the server that handles paging transmissions. the domain name for the enterprise. This has no default value and you must therefore complete this parameter. The phone can obtain this information from the DHCP server. This is always specified as an FQDN, so the phone automatically enables character entry mode.

```
PSettings
Page Extension
➔ *4
```

9.6.6 Audio

This selection allows you to control the way speech and ringing tones are handled on the ZIP4x4. The phone is supplied with four standard tones to announce ringing that most businesses will find acceptable. The phone can play any WAV file as a ringing tone. Using these settings you determine what choices the users of the phone will have to change the ringing tones for the phone.

To configure the audio properties, do the following:

1. If you have not already done so, enter the password as described in section 9.6.1 on page 133 so that you have rights to make the changes.
2. Select Menu | Protected Settings | Audio.
3. The display changes to:

```
PSettings | Audio
➔ codec
  encryption
  distinctive ring
  accept URL
  sound URL
```

This example shows six 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.

4. Press the Enter button to select one of the parameters described below.

Codec. This is the way the speech is encoded. Normally, you should select μ law for North America and Japan, and A law everywhere else.

```
Audio | Codec
➔ G.711  $\mu$  law
  G.711 A law
```

Encryption. This allows you to select whether encryption must be used in the enterprise or not. This selection modifies the way encryption is engaged as described in section 7.2 on page 53.

If you want to allow the user the option to select encryption as he or she sees fit, choose **normally on** or **normally off**. In the one case the phone usually attempts to establish a secure connection and in the other case the phone usually attempts to establish an insecure connection. Final control is left to the user.

If you want all calls in your enterprise to be encrypted and do not want a user to disable encryption, choose **always on**.

If you never want to allow users to encrypt a conversation, choose **never on**.

```
Audio | Encryption
➔normally on
  normally off
  always on
  never on
```

Important If you select **always on** and the phone system does not support encryption, users can make calls from one phone to another but cannot make calls to the PSTN, receive calls from the PSTN, hear music on hold, or receive voice mail.

Danger If you select **always on** and the phone system does not support encryption, users cannot dial emergency services from the phone.

Distinctive Ring. This allows the user of the phone to select a single ring tone for all received calls, or separate ring tones for internal and external calls.

```
Distinctive ring
➔allow
  do not allow
```

Accept URL. The SIP message that is used to set up a call (the INVITE message) may contain a pointer to a WAV file. The phone can access this WAV file and play it to announce the incoming call. However, this will increase traffic on your network, delay the announcement of the call, and may contain an undesirable sound or message.

```
Accept URL
➔no
  yes
```

If you enable this feature, then when the phone receives a URL to play sound, it repeats the WAV file if it is short and keeps playing it regardless of size if it is long, until the call is answered or terminated.

Sound URL. With this setting you can allow users to play WAV files that are not built into the phone to announce an incoming call. You specify in this menu setting the location of the WAV files and you can have control over the WAV files that are stored in that location. You can therefore ensure that only appropriate files are played to announce the incoming call.

```
Sound URL  Func:abc
http://intranet/MIS/
phone_sounds
```

When a user selects a WAV file from that location, the phone stores it in its memory. Therefore, there is no increase in network traffic with each incoming call and no delay in announcing the call to the user.

For a ring tone, the phone stores only the first 128 KB of any WAV file (approximately 16.4 s of sound). When it plays the WAV file, it repeats it until the call is answered or terminated. For a second call tone, the phone stores only the first 8 KB of any WAV file (approximately 1 s of sound). The phone plays this only once when a call is received.

To specify a location, type it in using the method described in section 8.2.6 on page 76. The phone automatically puts the keypad in character mode for this purpose and displays Func:abc on the top row. The phone displays only 40 characters of the path. If you type more than 40 characters the phone scrolls the entire path name. When the phone first displays the path, it shows only the first 40 characters.

The ZIP4x4 will allow users access only to the first 256 files in the directory. Therefore, you should not store more than this. Each of the files in the directory must be encoded as 8 bit μ -law (PCM).

If you do not want to allow users access to this feature, clear the string completely.

9.7 Menu | Self Test

9.7.1 Purpose

This menu selection allows you to test the phone and the network to which it is connected. The phone will not allow you to make or receive calls when you are conducting any of the self tests. When you select Menu | Self Test the display shows:

```
Self Test
➤Ping
  Loop Ethernet ports
  Buttons and keys
  LEDs
  LCD
  Audio
  Audio Return
```

This example shows eight 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. The selections are shown in the following sections.

9.7.2 Ping

This causes the phone to send an ICMP echo request message to an IP device, and the phone expects an ICMP echo reply to be returned. The display shows:

```
Ping
➤
```

Enter an FQDN or an IP address. Enter an IP address using the keypad and use the * key to enter a period (full stop), for example:

```
Ping
*10.1.31.12
```

Enter an FQDN using the method described in section 8.2.6 on page 76, for example:

```
Ping          Func:abc
*sip.zultys.com
```

Press the Enter button when you have typed the device address or FQDN. The phone first resolves an FQDN. While it is resolving the address, the phone displays:

```
Ping
Resolving ...
sip.zultys.com
```

If the DNS supplies an address quickly, you may not see this screen. If the DNS cannot resolve the name, the phone displays:

```
Ping
Unknown host
sip.zltys.com
```

Press the Menu, Esc, or Enter buttons to exit this state.

If you typed an IP address, or an FDQN that was resolved, the ZIP4x4 sends up to 99 messages to the host, each one second apart. Each message has 24 bytes of optional data (so the total message length is 32 bytes) and the phone increments the sequence numbers starting with 0 after power on and continuing to increment the numbers until 64K. The phone displays:

```
Ping: 10.1.40.25
01: reply < 10 ms
Min000;Avg000;Max000

Ping: 203.47.73.194
01: reply = 691 ms
Min000;Avg000;Max000
```

On the top row the phone displays the IP address of the host (which may be resolved from what you typed). On the second row, the phone displays the number of the message (1 to 99), whether it received a reply or not and the round trip delay. The phone calculates the round trip delay by storing the time at which it sent the message in the data portion of the ICMP message. The phone resolves this time to 10 ms.

On the bottom row, the phone displays the minimum, average, and maximum times of the round trip delay, each in ms. This is resolved to 1 ms.

The maximum time that the phone waits for a response is 990 ms. If it receives a response after that time, it ignores it. After this time-out, the phone displays:

```
Ping: 10.1.40.25
17: time-out
Min000;Avg456;Max673
```

The phone does not count this time to calculate the minimum, average, or maximum times.

The phone continues to send messages. When it receives a response to a message it updates the second and third rows of the display. The ZIP4x4 continues in this way until it has sent 99 messages or until you press the Esc button to stop the process. When you stop the process, the phone waits the time-out period for any reply that it might be expecting. The phone displays:

```
Ping: 10.1.40.25
Sent 56. Received 49
Min047;Avg481;Max673
```

The phone shows the number of echo request messages that it sent and the number of echo reply messages that it received (before it timed out).

Press Menu, Esc, or Enter to exit this test. If you press Menu, the phone exits the menu system. If you press Enter or Esc, the phone displays the Self Test menu shown in section 9.7.1 on page 147.

9.7.3 Loop Ethernet Ports

This allows you to test the four Ethernet circuits on the phone. To conduct this test, you must power the ZIP4x4 from an ac adapter.¹ When you select this, the display shows:

```
Test | Ethernet
Connect P1 to P2, P3
to LAN. Press Enter
```

Using two CAT5 cables, connect:²

- Ethernet port P1 to Ethernet port P2
- Ethernet port P3 to Ethernet port LAN

Press the Enter button when you have done so. The phone displays:

```
Test | Ethernet
P1-P2      P3-LAN
000 000    000 000
```

1. See section 4.1.2.2 on page 21 for details of how to connect an ac adapter.

2. The cables you use can be straight or cross wired. See section 4.1.4.1 on page 22 for details.

The phone sends data packets from P1 to P2, from P2 to P1, from P3 to LAN, and LAN to P3. It sends up to 999 packets out of each circuit, or until you press the Esc button to stop the process. It receives the packets and checks for errors. If it receives a packet with no errors it shows this on the bottom row. If it fails to receive a packet within 25 ms or if the packet has errors, it does not count this in the totals on the bottom row.

The bottom row shows how many packets each circuit has received. If there are no errors, the counts will all be the same. If you let the test run for the maximum number of 999 packets, each value should be 999.

Press Menu, Esc, or Enter to exit this test. If you press Menu, the phone exits the menu system. If you press Enter or Esc, the phone displays the Self Test menu shown in section 9.7.1 on page 147.

Caution Remove all cables from the back of the ZIP4x4 before proceeding. You must not connect the phone to your network with a loop on the Ethernet ports of the phone.

9.7.4 Buttons and Keys

This allows you to test the buttons, keys, handset switch, and headset switch on the phone. When you select this, the display shows:

```
Test | Buttons, Keys
Press each in turn.
Wait to exit.
```

The phone waits 10 s for you to press a button or key. If you do not press a button or key in 10 s, the phone exits this menu selection. Once you press a button or key, the display changes to:

```
■                               ===
Wait to exit.
```

The top row represents the state of the buttons, handset switch, and headset switch. The second row represents the state of the keys. As you press a button or key, or change the status of a switch, the phone puts the cursor character on the display. Each position on the display is dedicated to one button, key, or switch.

There are 17 spaces on the top row – one for each of the 15 buttons and one each for the hook switch and headset switch. The mapping of the buttons to the positions on the display is left to right, top to bottom. These are represented by the first 15 positions on the top row.

The 19th position on the top row represents the headset switch. Either insert and remove or remove and insert the headset for the phone to detect a transition.

The 20th position (right most) on the top row represents the handset switch. Either lift and replace or replace and lift the handset for the phone to detect a transition.

There are 20 places on the bottom row – one for each key. The mapping of the buttons to the positions on the display is left to right, top to bottom.

When you have pressed all of the buttons and keys, and lifted and replaced the headset and handset switches, the display will look like:



If you press a button twice, the cursor changes so that you can easily see which button you are currently pressing even when most are already pressed.

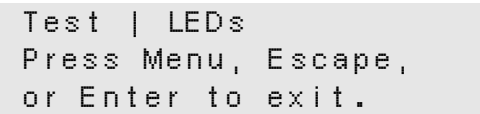
If the phone does not detect that you pressed a button or key, the phone does not display the cursor character. For example, the display might look like:



In this example, the phone did not recognize that you pressed the Up button and the Func key. Wait 10 s to exit this test. The phone displays the Self Test menu shown in section 9.7.1 on page 147.

9.7.5 LEDs

This allows you to verify that each of the LEDs is functioning. When you select this, the display shows:



The phone turns off all LEDs, then lights each of the LEDs in turn, in the following order:

- red on Msg
- green on Msg
- red on Hook
- green on Hook
- red on DND
- green on DND
- red on Mem
- green on Mem
- red on Park
- red on Call 1
- green on Call 1
- red on Call 2

- green on Call 2
- red on Call 3
- green on Call 3
- red on Call 4
- green on Call 4
- red on Mute
- red on Speaker

The phone holds each LED lit for one second, so the test takes 20 s. The test repeats until you press Menu, Esc, or Enter. If you press Enter or Esc, the phone displays the Self Test menu shown in section 9.7.1 on page 147, and flashes the Mute and Speaker LEDs again.

If you press Menu, the phone exits the menu system and turns off all of the LEDs.

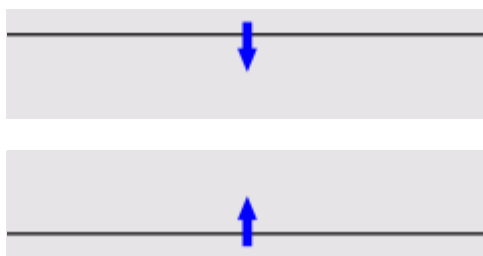
9.7.6 LCD

The phone displays several graphical patterns followed by the Zultys logo. The first display is:



The phone shows a vertical line that moves from left to right. It then moves the line back from right to left.

The next display is:



The phone shows a horizontal line that moves from top to bottom. It then moves the line back from bottom to top.

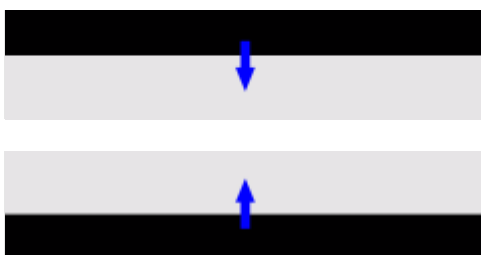
The next display is:





The phone shows a vertical filled area that moves from left to right. It then clears the display and moves the filled area from right to left.

The next display is:



The phone shows a horizontal filled area that moves from top to bottom. It then clears the display and moves the filled area from bottom to top.

Each transition takes one to two seconds, so the test time for the transitional screens is about 15 s.

Finally the phone fills the display with the Zultys logo:



The phone transitions the contrast from its current value, to the maximum value, then to the minimum value, and back to the original value. This test takes ten seconds.

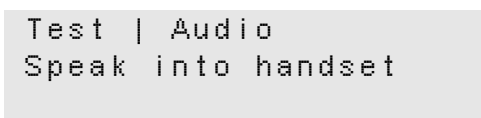
The ZIP4x4 then repeats the test of the LCD by showing the vertical line.

Press Menu, Esc, or Enter to exit this test. If you press Menu, the phone exits the menu system. If you press Enter or Esc, the phone displays the Self Test menu shown in section 9.7.1 on page 147. The phone restores the contrast setting in effect prior to your running the test.

9.7.7 Audio

This allows you to test the audio paths (microphones and speakers) on the phone. The phone prompts you to speak into a microphone, then replays what you spoke. This test is a subjective test, but if you use external test equipment to generate and receive the sounds, you can perform a quantitative test.

The phone first displays:



After two seconds, the phone plays a double beep into the handset. The phone then detects when you start to speak. If you do not speak for 10 s, the phone proceeds to test the headset.

After you start to speak, the phone records the next 10 s of your speech. It shows a progress on the third row of the display. In the following example, the phone has recorded 7.5 s of speech:

```
Test | Audio
Speak into handset
████████████████████
```

When the phone has recorded for 10 s, it plays a double beep into the handset. The phone is silent for one second and then plays a tone that sweeps from 300 Hz to 3 kHz in three seconds.

The phone is silent for 500 ms then it replays the audio that it recorded to the headset.

The phone then displays

```
Test | Audio
Speak into headset
```

The cycle repeats but with the headset instead of the handset. If you do not have a headset connected, the phone will time-out after 10 s and test the speaker.

Lastly, the phone displays

```
Test | Audio
Speak into base unit
```

Speak into the microphone used for speaker mode for this test.

Press Menu, Esc, or Enter at any time to exit this test. If you press Menu, the phone exits the menu system. If you press Enter or Esc, or if the test has completely finished, the phone displays the Self Test menu shown in section 9.7.1 on page 147.

9.7.8 Audio Return

This test is not supported in version 1.1.

Appendix A

Menu Structure

Phone Book (section 9.2)		
Search		
Add new contact		
Edit		
Delete		
Instant Messages (section 9.3)		
Compose		
Inbox		
Outbox		
Erase all		
Configure		
• Receive and Display ⇒		
• Reject		
Information (section 9.4)		
Times		
• Difference from GMT ⇒		
• Phone registered ⇒		
• Phone power on ⇒		
• Total talk time		
• Phone connected ⇒		
Records		
• Call log ⇒		
• SIP log		
Communications		
• Ethernet circuits ⇒		
• Configuration file		
• Power ⇒		
• TFTP address ⇒		
Manufacture		
• MAC address ⇒		
• Hardware version ⇒		
• Software version ⇒		
• Date of manufacture		
• Boot code version ⇒		

User Settings (section 9.5)

LCD Contrast

Greeting message

Clear user settings

- Never ⇒
- on next power on ⇒
- on each power on

Date and time

Audio

- external ring tone ⇒
- call disconnect ⇒
- key click
- internal ring tone ⇒
- second call tone ⇒
- internal call answer ⇒
- hold reminder tone ⇒

Event Timer

Regional Options

- country ⇒
- date and time ⇒
- language ⇒
- time format ⇒
- number format ⇒
- date format

Factory Defaults

Protected Settings (section 9.6)

Password

- Enter ⇒
- Log out ⇒
- Change

IP Communications

- DHCP ⇒
- Default gateway ⇒
- NTP server ⇒
- DSCP ⇒
- Phone address ⇒
- DNS server ⇒
- TFTP server ⇒
- Subnet mask ⇒
- Secondary DNS ⇒
- TFTP address ⇒

SIP Communications

- Outbound proxy ⇒
- RTP start port ⇒
- Registrar port ⇒
- Transport protocol ⇒
- Backup proxy reg ⇒
- Backup proxy ⇒
- Receive port ⇒
- Backup proxy port ⇒
- Invite retrans ⇒
- Proxy password
- Registrar Server ⇒
- Proxy port ⇒
- Page server ⇒
- Non invite retrans ⇒

VLAN

Names and Numbers

- Device ID ⇒
- Park extension ⇒
- Domain ⇒
- Page Extension
- Voice mail ⇒

Audio

• Codec ⇒	• Encryption ⇒	• Distinctive ring⇒
• Accept URL ⇒	• Sound URL	
Self Test (section 9.7)		
Ping		
Loop Ethernet ports		
Buttons and keys		
LEDs		
LCD		
Audio		
Audio Return		

LED Summary

B.1 Call Appearance Buttons

The LEDs on the call appearance buttons can be off or can show red, green, or orange. Figure B-1 shows what the LEDs show for various phases of a call. The figure shows where you can find more details about that state.

Function	LED Color				Details
Idle	—	—	—	—	Section 6.3.1 on page 48
Call appearance reserved	G	—	—	—	Section 8.2.1 on page 73
Call appearance for dialling	G	—	G	—	Section 8.2.1 on page 73
Call proceeding	G	G	G	—	Section 8.3.1 on page 80
Far end busy	G	G	G	R	Section 8.3.3 on page 82
Network busy	G	R	G	R	Section 8.3.4 on page 82
Encryption rejected	G	R	G	R	section 7.2.2.1 on page 54
Call connected	G	G	G	G	Section 8.3.5 on page 82
Call on hold	G	G	—	—	Section 8.5.2 on page 89
Far end disconnected	R	R	R	R	Section 8.6.2 on page 94
Incoming call	R	—	R	—	Section 8.4 on page 85
Conference	O	O	O	O	Section 8.8.1 on page 99
Conference on hold	O	O	—	—	Section 8.8.2 on page 100

Figure B-1 Summary of LEDs on Call Appearance Buttons

In the figure, there are four columns for the LED color. Each column represents the color that the LED will show for a quarter of a second. The pattern repeats after a second. In the figure:

- ‘—’ indicates the LED is off for a quarter second
- ‘R’ indicates the LED is red for a quarter second
- ‘G’ indicates the LED is green for a quarter second
- ‘O’ indicates the LED is orange for a quarter second

For example, when the call is connected, the LED is continuously lit green (green for each quarter second). When the call is on hold, the LED is green for half a second then off for half a second.

The time reference for all LEDs is the same, so that the first quarter second for each LED starts simultaneously. This provides a more uniform display. For example, if the phone receives a call on call appearance 1 it will flash its LED. If another call comes in 250 ms later, the LED on the second call appearance button will flash synchronously with the first LED.

When the phone is starting, or if there is a problem with the data connection, the phone “walks” a pattern on the four call appearances. The patterns are shown in figure B-2.

Function	Pattern	Details
Power on; loading Linux operating system	Walking red left to right	Section 4.2.2 on page 26
Power on; you have pressed a key for one second	Walking red right to left	Section 4.2.4 on page 27
Unable to establish proper connection to network	Walking orange left to right	Section 4.2.5.6 on page 31

Figure B-2 Special Patterns for LEDs on Call Appearance Buttons

B.1.1 Message and Encrypt Button

The LED flashes red for 500 ms and is off for 500 ms when you have voice mail. See section 7.1 on page 53 for details.

The LED is permanently on when the phone is encrypting the speech. See section 7.2.2 on page 54 for details.

The LED flashes green for 250 ms and red for 250 ms when encryption is rejected.

B.1.2 Hook and User Button

The LED is lit continuously red when the phone sends the audio to the headset. See section 8.1.1 on page 71 for details.

The LED is lit continuously green when another user has logged into your phone or when you or another person has logged into an ACD group, and the headset is not in use. See section 7.3 on page 58 for details.

B.1.3 DND and Forward Button

The LED is lit continuously red when the phone will reject all calls. See section 7.4 on page 62 for details.

The LED is lit continuously green when the phone will forward some or all calls. See section 7.5 on page 63 for details.

B.1.4 Memory and Calculator Button

The LED is lit continuously red after you press the Memory button. Enter a two digit number. The phone turns off the LED. See section 8.7.3 on page 96 for details.

The LED is lit continuously green when the phone is in calculator mode. See section 8.9.2 on page 103 for details.

B.1.5 Park and Pickup Button

The LED is lit continuously red after you press the Park or Pickup button. Enter a two digit number. The phone turns off the LED. See section 7.6 on page 64 and section 7.7 on page 66 for details.

B.1.6 Mute and Page Button

The LED on the Mute button flashes red for 500 ms and is off for 500 ms when you are engaged in a call and your speech is suppressed. See section 8.5.1 on page 89 for details.

The LED is lit continuously after you press the Page button and before you select a paging address. The LED flashes red for 250 ms and is off for 250 ms when you are making a paging announcement. See section 7.8 on page 68 for details.

The LED flashes synchronously with the LED on the Speaker key when the menu is active. See section 6.3.3 on page 49 for details.

B.1.7 Speaker Key

The LED on the Speaker key is lit continuously red when the phone is in speaker mode. See section 8.1.1 on page 71 for details.

The LED flashes on for 250 ms and off for 750 ms when the menu is active. See section 6.3.3 on page 49 for details.

Configuration Files

C.1 Introduction

The ZIP4x4 phone obtains its configuration from three possible sources:

- what is saved in the phone's memory
- what is saved in a common configuration file
- what is saved in a specific configuration file

If the Clear User Settings menu command (as described in section 9.5.3) is set to **on each power on**, the phone reads the configuration files each time it resets, either by command or by power on, and saves the contents to memory. This overwrites all user settings with the parameter values defined by the configuration files.

This appendix describes the function, composition, and implementation of ZIP4x4 configuration files.

C.2 Configuration File Types

The ZIP4x4 phone obtains its configuration from two separate files: the common configuration file and the specific configuration file.

C.2.1 Common Configuration File

The common configuration file sets parameters on all phones within an enterprise that are to have the same values. Parameters that are normally set within a common configuration file define the network configuration, SIP server interface characteristics, and other settings that are common among all phones in an enterprise.

The common configuration file is called:

```
ZIP4x4_common.cfg
```

This file must be stored in the root directory of the TFTP server.

C.2.2 Specific Configuration File

The specific configuration file sets parameters for an individual phone within an enterprise. Parameters normally set within a specific configuration file customize ZIP4x4 features for the person using the phone, such as the greeting message, audio characteristics, and LCD options.

The common configuration file identifies the location of the specific configuration files. A phone extracts configuration information from the common file first, then from its specific configuration file. Parameter settings in the specific file take precedence over settings of the same parameters in the common file.

The name of the specific configuration file is:

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

For example,

```
0050C2180FD8.cfg
```

is the specific configuration file for a ZIP4x4 phone that has the MAC address 00:50:C2:18:0F:D8.

C.3 Configuration File Format

Common and specific configuration files are similar in format and composition. Most configuration parameters can be set in either file. Configuration files are stored in ASCII format.

C.3.1 File Sections

Each file is separated into sections, with each section containing settings for a functional parameter group. The order of the functional sections within each configuration file has no effect upon the configuration of the phone. The first line in each section contains the name of the functional group, denoted by square brackets. Figure C-1 displays the name of each function heading and the proper format of the headings.

```
[HW_CONFIG]

[VLAN_CONFIG]

[NET_CONFIG]

[SIP_CONFIG]

[AUDIO_INFO]

[GENERAL_INFO]
```

Figure C-1 Configuration File Section Headings

C.3.2 Parameter Entries

All available parameter settings are classified by function, as described in section C.4. Each parameter within a configuration file must be contained within its defined functional section. The order of parameters within each function section does not effect the configuration of the phone. If a parameter is defined in the common file and the specific file, the specific file setting takes precedence. Figure C-2 displays an example of parameter settings in a configuration file.

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

[NET_CONFIG]
use_dhcp=yes
tftp_cfg_dir=./ZIP4x4
```

Figure C-2 Configuration File Example

The name of the parameter and the parameter value must be on the same line. The name of the parameter is not case sensitive; it can be entered in either upper or lower case. However, parameter values are case sensitive. Refer to the parameter tables in section C.4 for more details. Comment lines are denoted with a leading semi-colon (;) and have no effect on the configuration of the phone.

C.4 Configuration Parameters

This section provides tables that list all of the configuration parameters in each functional group. Parameters in each table are listed in alphabetic order. Many parameters correspond to an equivalent menu command; the tables refer to the section describing the menu command for each of these parameters.

C.4.1 Network Configuration

Network configuration parameters define settings required by the phone to communicate with the network. Figure C-3 lists the network configuration parameters.

C.4.1.1 Server Parameter Settings

Although the default values for the following parameters may be set properly for your network configuration, it is highly recommended that the configuration files explicitly define the settings for these variables.

use_dhcp: When DHCP is enabled, the DHCP server should dynamically provide an IP address and subnet mask for the phone, IP addresses for the DNS servers, default gateway, NTP server, and TFTP server.

If dhcp is not enabled, or if the DHCP is unable to return addresses for any of these servers, you must specify valid IP addresses for each server or the phone will not properly configure on startup.

Parameter	Description	Description of equivalent menu command
default_gateway	Parameter is IP address of default gateway that is used for manual configuration when use_dhcp is set to 'no' or DHCP does not provide the default gateway (DHCP option 3). Valid setting is 32 bit IP address in dotted decimal notation. Default value is NULL string.	section 9.6.2 on page 134
domain	Parameter is name of the domain in which the phone resides; used for manual configuration when use_dhcp is set to 'no' or DHCP does not return the domain (DHCP option 15). Valid settings are FQDN or IP address in dotted decimal notation. No default value.	none
dscp_setting	Configures DiffServ (layer 3 QoS) setting. All voice packets (RTP) leaving the phone will have the ToS byte in the IP header set to this value. Valid settings range from 0 to 63. Default value is 0.	section 9.6.4 on page 140
ip_addr	Parameter is static address assigned to the ZIP4x4. Used for manual configuration when use_dhcp is set to 'no' or DHCP does not return an address (DHCP option 50). Valid setting is 32 bit IP address in dotted decimal notation. Default value is NULL string.	section 9.6.2 on page 134
ntp_server_addr	Parameter is IP address of NTP server. Used for manual configuration when use_dhcp is set to 'no' or DHCP does not return NTP server (DHCP option 42). Parameter value is 32 bit IP address in dotted decimal notation. Default value is NULL string.	section 9.6.2 on page 134
primary_dns	Parameter is IP address of primary DNS Server. Used for manual configuration when use_dhcp is set to 'no' or DHCP does not return DNS Server (DHCP option 6). Valid setting is 32 bit IP address in dotted decimal notation. Default value is NULL string.	section 9.6.2 on page 134
secondary_dns	Parameter is IP address of secondary DNS Server that is used for manual configuration when use_dhcp is set to 'no' or DHCP does not return valid address. Valid setting is 32 bit IP address in dotted decimal notation. Default value is NULL string.	section 9.6.2 on page 134
subnet_mask	Parameter is Subnet mask that is used for manual configuration for phone when if use_dhcp is set to 'no' or DHCP does not return mask (DHCP option 1). Valid setting is 32 bit mask in dotted decimal notation. Default value is NULL string.	section 9.6.2 on page 134

Figure C-3 Network Configuration Parameters

Parameter	Description	Description of equivalent menu command
tftp_addr_fixed	Specifies source of TFTP IP address. Valid settings are 'yes' and 'no': 'yes' - TFTP server address is fixed to value of tftp_server_addr 'no' - TFTP server address is not fixed. If tftp_addr_fixed='yes', DHCP cannot be used to configure TFTP server address. Default value is 'no'.	
tftp_cfg_dir	TFTP directory location of the specific configuration file. Parameter value is directory name that is referenced from TFTP root directory. This parameter must be set in the common configuration file. Default value is ./ZIP4x4.	section 5.2 on page 36
tftp_server_addr	IP address of TFTP server. Parameter used only if use_dhcp is set to 'no' or DHCP does not return a TFTP server (DHCP option 66). Parameter value is 32 bit IP address in dotted decimal notation. Default value is NULL string.	section 9.6.2 on page 134
use_dhcp	When enabled, phone uses DHCP to configure network settings: IP address, subnet mask, domain name, default gateway, DNS servers, NTP server address, and TFTP server address. Valid settings are 'yes' and 'no': 'yes' - enables DHCP 'no' - disables DHCP Default value is 'yes'.	section 9.6.2 on page 134

Figure C-3 Network Configuration Parameters (Continued)

tftp_cfg_dir: This parameter points to the TFTP server directory that stores the specific configuration file for your phone. This parameter must be set in the common configuration file in order for the phone to read and process its specific configuration file. The default value of ./ZIP4x4 is valid only if your TFTP server contains a directory by that name and if the specific configuration file resides in that directory.

C.4.1.2 Sample Configuration File

Figure C-4 displays the network settings section from a sample configuration file.

```
[NET_CONFIG]
use_dhcp=yes
ip_addr=
subnet_mask=
default_gateway=
primary_dns=
secondary_dns=
domain=zultys.com
ntp_server_addr=
tftp_server_addr=
tftp_cfg_dir=./ZIP4x4
dscp_setting=0
```

Figure C-4 Sample Configuration File – Network Settings

C.4.2 SIP Configuration

SIP parameters allow the ZIP4x4 phone to operate properly in a SIP environment. Figure C-5 lists the SIP configuration parameters.

Parameter	Description	Description of equivalent menu command
auth_password	The proxy password authenticates the ZIP 4x4 to proxy servers that require authentication. Default value is zultys.	section 9.6.3 on page 137
backup_proxy_addr	Backup SIP server proxy address value. If primary proxy server fails to operate, ZIP4x4 attempts to switch to backup proxy. Default is null string.	
backup_proxy_port	Backup SIP server proxy port value. Valid settings range from 1025 to 65535. Default value is 5060.	
backup_reg_expires	Specifies time period, in seconds, after which a REGISTRATION expires for the Backup proxy. This value is inserted into the Expires header field. Valid settings are any positive number. Recommended value is 3600. Default value is 3600.	
call_park_extension	Specifies the name or extension of the call park server. Default value is *7.	section 9.6.5 on page 143
device_id	Specifies the user portion of the SIP URI Default value is MAC address of the phone (upper case).	section 9.6.5 on page 143
display_name	Specifies the string that is sent in the display name part of the SIP From: header. Default is NULL string.	section 9.6.2 on page 134
encryption	Specifies the encryption mode. Valid settings range from 0 to 3, as follows: 0 - encryption is on by default when call is placed, but can be turned off 1 - encryption is off by default when call is placed, but can be turned on 2 - encryption is always on and cannot be turned off 3 - encryption is always off and cannot be turned on Default value is 1.	section 9.6.6 on page 145
inb_im_enabled	Enables instant messaging on the phone. Valid settings are yes and no, as follows: yes - enables the phone to send and receive instant messages. no - rejects all incoming instant messages; phone cannot send IM. Default value is yes.	section 9.3.5 on page 116

Figure C-5 SIP Configuration Parameters

Parameter	Description	Description of equivalent menu command
page_extension	Specifies name or number of the paging server. Default value is *4.	
page_server_addr	Parameter is IP address of the server that sends RTP streams to the phone. Phone ignores RTP streams from other addresses. Failure to specify an address disables paging on the phone. Default value is NULL string.	
phone_sip_port	Specifies the UDP port number that the phone uses to send and receive SIP messages. Valid settings range from 1025 to 65535. Default value is 5060.	section 9.6.2 on page 134 (SIP Receive Port)
proxy_addr	Specifies the IP address of the SIP proxy server that will be used by the phone. Parameter value is 32 bit IP address in dotted decimal notation. Default value is NULL string.	section 9.6.2 on page 134 (SIP Outbound Proxy Server)
proxy_port	Port of the SIP proxy that is used by the phone. Valid settings range from 1025 to 65535. Default value is 5060.	section 9.6.2 on page 134 (SIP Transmit Port)
register_w_backup_proxy	When enabled, phone registers with backup proxy at startup. Valid settings are 'yes' and 'no': 'yes' - enables option 'no' - disables option Default value is 'no'.	
register_w_proxy	Enables the phone to register with the registrar server if specified; otherwise phone registers with proxy server. register_w_proxy must be set to yes.	none
registrar_addr	SIP registrar server address. When this value is set, phone attempts to register with this server instead of proxy. Default value is proxy address value.	
registrar_port	SIP Registrar server port. Valid settings range from 1025 to 65535. Default value is 5060.	
registration_expires	Specifies time period, in seconds, after which a REGISTRATION expires. This value is inserted into the Expires header field. Valid settings are any positive number. Recommended value is 3600. Default value is 3600.	none

Figure C-5 SIP Configuration Parameters (Continued)

Parameter	Description	Description of equivalent menu command
rtp_start_port	Specifies the starting port number for RTP/RTCP transmissions. Valid settings range from 1026 to 64528. The starting port must always be an even number. Should not be set to same value as phone_sip_port or proxy_port. Default value is 33000.	section 9.6.2 on page 134
session_expires	Specifies the timeout period that the phone transmits or receives a RE-INVITE that refreshes a session that is still in progress. Valid settings are any positive number. Recommended value is 3600. Default value is 3600.	
sip_invite_retrans	Specifies number of unsuccessful INVITE retransmissions before phone switches to backup proxy. Valid settings range from 1 to 6. Default value is 6.	
sip_non_invite_retrans	Specifies number of unsuccessful retransmissions (other than INVITE) before phone switches to backup proxy. Valid settings range from 1 to 10. Default value is 10.	
subscription_expires	Specifies time period, in seconds, after which a SUBSCRIBE expires. This value is inserted into the Expires header field. Valid settings are any positive number. Recommended value is 3600. Default value is 3600.	
use_proxy	Enables the sending of SIP requests through the proxy server, which is necessary for normal phone operation. Valid settings are 'yes' and 'no': 'yes' - enables option 'no' - disables option Default value is 'yes'.	
voice_mail_uri	Specifies the name or extension of the voice mail server Default value is voice.mail (default uri is *86).	section 9.6.5 on page 143

Figure C-5 SIP Configuration Parameters (Continued)

C.4.2.1 Mandatory Fields

The **proxy_addr** parameter must be set in order for the ZIP4x4 phone to send SIP address through the proxy server. The proxy server receives SIP requests from the phone and forwards them to the next intermediate device in the network. This parameter sets the address of the proxy server for the phone and provides no meaningful default if it is omitted from the configuration files.

C.4.2.2 Sample Configuration File

Figure C-6 displays the SIP settings section from a sample configuration file.

```
[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 ZIP4x4
;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
```

Figure C-6 Sample Configuration File – SIP Settings

C.4.3 Hardware Configuration

Hardware configuration parameters adjust LCD and volume characteristics. Figure C-7 lists the hardware configuration parameters.

Parameter	Description	Description of equivalent menu command
handset_volume	Adjusts the handset volume. Values range from 0 (silent) to 20 (loud). Default value is 10.	none
headset_volume	Adjusts the headset volume. Values range from 0 (silent) to 20 (loud). Default value is 10.	none
lcd_contrast	Adjusts the LCD contrast. Values range from 1 (light) to 20 (dark). Default value is 7.	section 9.5.1 on page 121
ring_volume	Adjusts the ringer volume. Values range from 0 (silent) to 20 (loud). Default value is 10.	none
speaker_volume	Adjusts the speaker volume. Values range from 0 (silent) to 20 (loud). Default value is 10.	none

Figure C-7 Hardware Configuration Parameters

All hardware configuration parameters are optional. Figure C-8 displays the Hardware settings section from a sample configuration file.

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

Figure C-8 Sample Configuration File – Hardware Configuration Settings

C.4.4 VLAN Configuration

VLAN parameters can configure the switch that is built into the ZIP4x4 to match the settings in your network. Figure C-9 lists the VLAN configuration parameters.

C.4.4.1 Programming Restrictions

You can configure the ZIP4x4 with up to eight VLANs, referred to as A, B, C, D, E, F, G, and H. Each Ethernet circuit can be on a different VLAN. The following restrictions must be considered when configuring the VLANs

- Each VLAN must have a different ID number.
- The Phone circuit must always be excluded from all VLANs except VLAN A.
- Each circuit can be an untagged member (U) of no more than one VLAN.
- If you configure one or more ports as a tagged member of a VLAN, you must configure the CoS setting (cos_setting). This setting is only used by the phone circuit.

Parameter	Description	Description of equivalent menu command
circuits_a	Defines the VLAN inclusion status of the five ZIP4x4 circuits for VLAN A: Phone, P1, P2, P3, and LAN, respectively. Valid settings for each circuit include T (tagged), U (untagged), and E (excluded). Values are case sensitive. Default value is UUUUU.	section 9.6.4 on page 140
circuits_b circuits_c circuits_d circuits_e circuits_f circuits_g circuits_h	Defines inclusion status of the five ZIP4x4 circuits for VLAN B through VLAN H: Phone, P1, P2, P3, and LAN respectively. Valid settings for each digit include T (tagged), U (untagged), and E (excluded); values are case sensitive. Default value is EEEEE for each VLAN setting.	section 9.6.4 on page 140
cos_setting	Configures the Class of Service (CoS) at layer 2 for the phone port. Valid if Phone port is defined as a tagged member of VLAN A. Values range from 0 to 7. Default value is 5.	section 9.6.4 on page 140
mode	Enables VLAN support within the ZIP4x4. Valid settings are 0 and 1, as follows: 0 - VLAN support is off 1 - VLAN support is on Default value is 0.	section 9.6.4 on page 140

Figure C-9 VLAN Configuration Parameters

Parameter	Description	Description of equivalent menu command
vlan_id_a	Specifies the VLAN ID for VLAN A. Values range from 1 to 4094. Default value is 1.	section 9.6.4 on page 140
vlan_id_b vlan_id_c vlan_id_d vlan_id_e vlan_id_f vlan_id_g vlan_id_h	Each variable specifies the VLAN ID for the respective VLAN. Valid settings are -1 and the range from 1 to 4094. -1 The specified VLAN is not used. 1 to 4094 VLAN ID for the specified VLAN. Default value is -1 for each VLAN setting.	section 9.6.4 on page 140

Figure C-9 VLAN Configuration Parameters (Continued)

C.4.4.2 Sample Configuration File

Figure C-10 displays the VLAN settings section from a sample configuration file.

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

Figure C-10 Sample Configuration File – VLAN Configuration Settings

C.4.5 Audio Information

Audio information parameters configure ring tone styles. Figure C-11 lists the Audio Information configuration parameters.

Parameter	Description	Description of equivalent menu command
codec	Specifies speech encoding method. Valid settings are 0, 1, 2, and 3: 0 specifies G.711 μ -law 1 specifies G.711 A-law 2 specifies G.729A 3 specifies G.729AB Default value is 0.	section 9.6.6 on page 145
cust_ring2	Specifies the file that provides the call waiting tone when ring_tone2 is set to 4 (custom). File directory is specified by sound_url. Valid setting is string that represents the file name. Default value is NULL string.	section 9.5.5.1 on page 126
distinctive_ring	Specifies the use of different ring tones for internal and external calls. Valid parameter settings are 'yes' and 'no' as follows: yes - internal and external calls use different ring tones as specified by int_ring_tone and ext_ring_tone, respectively. no - all calls use internal ring tone setting as specified by int_ring_tone. Default value is yes.	section 9.6.6 on page 145
ext_cust_ring	Specifies the file that provides external ring tone when ext_ring_tone is set to 4 (custom). File directory is specified by sound_url. Valid setting is string that represents the name of the file. Default value is NULL string.	section 9.5.5.1 on page 126
ext_ring_tone	Specifies the ring tone for calls received from phones outside of the enterprise. Valid settings range from 0 to 4 as follows: 0 - ring pause 1 - ring ring 2 - short ring 3 - bell bell 4 - sound defined by custom file (see ext_cust_ring) Default value is 0.	section 9.5.5 on page 123
hold_tone	This tone is played once every 30 seconds when you have a call that is on hold. Valid settings range from 0 to 3 as follows: 0 - off 1 - beep 2 - bleep Default value is 0.	section 9.5.5 on page 123
int_cust_ring	Specifies the file that provides internal ring tone when int_ring_tone is set to 4 (custom). File directory is specified by sound_url. Valid setting is string that represents the name of the file. Default value is NULL string.	section 9.5.5.1 on page 126

Figure C-11 Audio Information Configuration Parameters

Parameter	Description	Description of equivalent menu command
int_ring_tone	Specifies the ring tone for calls received from phones inside the enterprise. Valid settings range from 0 to 4 as follows: 0 - ring pause 1 - ring ring 2 - short ring 3 - bell bell 4 - sound defined by custom file (see int_cust_ring) Default value is 0.	section 9.5.5 on page 123
key_click	Specifies the tone that the phone emits when you press a button or a non numeric key. Valid settings range from 0 to 3 as follows: 0 - off 1 - click 2 - beep 3 - bleep Default value is 0.	section 9.5.5 on page 123
ring_tone2	Specifies the call waiting tone that is played when you are talking on the phone and the phone receives another call. Valid settings range from 0 to 5 as follows: 0 - short high beep 1 - long high beep 2 - short low beep 3 - long low beep 4 - sound defined by custom file (see cust_ring2) 5 - silent Default value is 0.	section 9.5.5 on page 123
sound_url	Specifies the http directory location for files that define custom ring tones. Valid setting is http://<name of directory> Default value is http://www.zultys.com/phone_sounds/	section 9.6.6 on page 145

Figure C-11 Audio Information Configuration Parameters (Continued)

All audio information parameters are optional. Figure C-12 displays the Audio Information settings section from a sample configuration file.

```
[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
sound_url=
```

Figure C-12 Sample Configuration File – Audio Information Settings

C.4.6 General Information

General information parameters configure miscellaneous phone settings. All general information parameters are optional.

Figure C-13 lists the General Information configuration parameters.

Parameter	Description	Description of equivalent menu command
clear_settings	<p>Determines the frequency that settings are cleared when the phone is powered on. Valid settings are 0, 1, and 2:</p> <p>0 - phone never clears the user settings. Each time the phone powers on, it retains the user settings previously entered.</p> <p>1 - phone clears the user settings on the next power on. Configuration file provides user settings the next time the phone is powered on, then sets this parameter to 0.</p> <p>2- phone clears the user settings each time it powers on. Configuration file provides user settings after each clearing.</p> <p>Default value is 2.</p>	section 9.5.3 on page 122
country	<p>Specifies the call progress tones used by the phone, as defined by country variation. Valid settings include Afghanistan, Argentina, Australia, Austria, Bahrain, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Japan, Jordan, Korea, Kuwait, Lebanon, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Oman, Philippines, Qatar, Romania, Russia, Saudi Arabia, Singapore, Spain, Sweden, Switzerland, Syria, Thailand, UAE, UK, USA, and Yemen.</p> <p>Default value is USA.</p>	section 5.3.2 on page 39
date_fmt	<p>Specifies the format for the LCD date display. Valid entry is a text string that uses the date format tags listed below; section C.4.6.2 and section C.4.6.3 lists the valid format tag combinations.</p> <p>Format tags include:</p> <ul style="list-style-type: none"> %a - abbreviated weekday name %b - abbreviated month name %c - data and time format defined for country parameter setting %d - day of month as decimal number (01-31) %m - month as decimal number (01-12) %y - year without century, as decimal number (00-99) %Y - year with century, as decimal number <p>Example: %a %d %b %Y yields the following: Mon 05 May 2003</p> <p>Default is %a %d %b %y (sample default: Sun 04 May 03).</p>	

Figure C-13 General Information Parameters

Parameter	Description	Description of equivalent menu command
date_time_order	Specifies the display order of the date and time on the LCD. Valid settings are 0 and 1: 0 - time is displayed first 1 - date is displayed first Default value is 1.	section 9.5.7 on page 129
delmtr	Specifies the calculator settings for the decimal point and thousands delimiter. Valid settings is a two character string: the first character specifies the decimal point (period or comma) and the second character specifies the thousand delimiter (period, comma, space, or no separation). Section C.4.6.3 lists the valid format tag combinations. Default value is . _ (period, underscore); Example: 2241.57	section 9.5.7 on page 129
display_events	Specifies time in seconds that some error messages and information screens are displayed on the LCD. Valid settings range from 2 to 10. Default value is 2.	
greeting_message	Specifies the message displayed on the top row of the LCD. Message contains up to twenty alphanumeric characters. Default message is ZIP 4x4 SIP Phone.	section 9.5.2 on page 121
password	Specifies password required to change the protected settings. Valid passwords contain four to fifteen numeric (0-9) digits. Default password is 985897.	section 9.6.2 on page 134
software_version	Specifies the software version that the phone must use. If the phone is running a different version, it will attempt to load the correct version from the TFTP server.	section 5.3.2 on page 39
time_fmt	Specifies the format for the LCD time display. Valid entry is a text string that uses the time format tags listed below; section C.4.6.1 lists the valid format tag combinations. Format tags include: %H - hour in 24-hour format (00-23) %I - hour in 12-hour format (01-12) %M - minute as decimal number (00-59) %S - second as decimal number (00-59) %f - am/pm indicator for 12-hour clock Enter other characters (such as :) Example: %I:%M%f yields the following: 5:45p Default: %H:%M (sample default: 15:45).	
timezone	Specifies the timezone location of the phone. Parameter value is the offset from GMT in minutes; valid settings range from -720 to +720. Default value is -480.	

Figure C-13 General Information Parameters (Continued)

C.4.6.1 Programming Restrictions: Time Format

Figure C-14 lists the four time format (time_fmt) tag combinations supported by the ZIP4x4. The phone will not properly update the time and date if an unsupported combination is used:

Desired Time Format	Format String
24 hour format: display hours and minutes	%H:%M
24 hour format: display hours, minutes, and seconds	%H:%M:%S
12 hour format: display hours and minutes	%l:%M%f
12 hour format: display hours, minutes, and seconds	%l:%M:%S%f

Figure C-14 Time Format Strings Supported by the ZIP4x4

C.4.6.2 Programming Restrictions: Date Format

The choice of valid date format (date_fmt) tag combinations depend upon the selected time format string, as described in section C.4.6.1. Figure C-15 lists the valid date formats when you select a time format that does not display seconds. Figure C-16 displays the valid date formats when you select a time format that displays seconds.

Desired Date Format	Format String
Sun 06 Oct 03	%a %d %b %y
10/6/2003	%m/%-d/%Y
10-6-2003	%m-%-d-%Y
10/6/03 Sun	%m/%-d/%Y %a
10-6-03 Sun	%m-%-d-%Y %a
Sun Oct 06 03	%a %b %d %y
03 Oct 06 Sun	%y %d %b %a
03/10/06 Sun	%y/%m/%d %a
03-10-06 Sun	%y-%m-%d %a
2003/10/06	%Y/%m/%d
2003-10-06	%Y-%m-%d

Figure C-15 Date Format Strings Supported when Time Format Does Not Display Seconds

Desired Date Format	Format String
10/6 Sun	%m/%-d %a
10-6 Sun	%m-%-d %a
10/6/03	%m/%-d/%y
10-6-03	%m-%-d-%y
10/06 Sun	%m/%d %a
10-06 Sun	%m-%d %a
02/10/06	%y/%m/%d
02-10-06	%y-%m-%d

Figure C-16 Date Format Strings Supported when Time Format Displays Seconds

Desired Date Format	Format String
Sun 06 Oct (supported only for 24 hour time format)	%a %d %b
Sun Oct 06 (supported only for 24 hour time format)	%a %b %d
Oct 06 Sun (supported only for 24 hour time format)	%b %d %a

Figure C-16 Date Format Strings Supported when Time Format Displays Seconds

C.4.6.3 Programming Restrictions: Delimiter Format

The delimiters format configure the appearance of numbers as used in the calculator. Each delimiter string comprises two characters. The first character specifies the decimal point – either a period (.) or a comma (,). The second character specifies the thousands delimiter; selection options include a comma (,), period (.), a space (), or no separation between the characters, which is denoted by an underscore (_).

Figure C-17 lists the six delimiter format (delmtr) tag combinations supported by the ZIP4x4. The calculator may not function properly if an unsupported combination is used:

Desired Number Format	Delimiter String
1,234.99	“.,” (period, comma)
1.234,99	“,.” (comma, period)
1 234.99	“.” (period, space)
1 234,99	“, ” (comma, space)
1234.99	“._” (period, underscore)
1234,99	“, _” (comma, underscore)

Figure C-17 Time Format Strings Supported by the ZIP4x4

C.4.6.4 Sample Configuration File

Figure C-18 displays the Audio Information settings section from a sample configuration file.

```
[GENERAL_INFO]
software_version=1.0.0
;The message displayed on the LCD in idle mode
greeting_message=ZIP 4x4 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 C-18 Sample Configuration File – General Information Settings

Acronyms

ACD	automatic call distributor
CAS	channel associated signalling
CoS	class of service
DHCP	dynamic host configuration protocol
DND	do not disturb
DNS	domain name service
DTMF	dual tone multi-frequency
FQDN	fully qualified domain name
GMT	Greenwich Mean Time
ICMP	Internet control message protocol
IEEE	Institute of Electrical and Electronic Engineers
IP	Internet protocol
LAN	local area network
MAC	media access control
MDI	media dependent interface
NTP	network time protocol
PBX	private branch exchange
PCM	pulse code modulation
PHB	per hop behavior
PIN	personal information number
PSTN	public switched telephone network
QoS	quality of service
RTCP	real time transport protocol control protocol
RTP	real time transport protocol
SIP	session initiation protocol
SNTP	simple network time protocol
TCP	transmission control protocol
TFTP	thin file transfer protocol
UDP	user datagram protocol
URI	uniform resource identifier
URL	universal reference locator

VLAN virtual local area network

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