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# **EXTender™ 4000**

## **Universal Quick Installation Guide**

G-4000P-RXM Rev AF

Nov 8, 2006

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## Purpose of this Document

This document provides instructions to install, configure, and troubleshoot the EXTender 4000 single client device.

## Safety Considerations



### IMPORTANT SAFETY INSTRUCTIONS

- Do not install this product near water.  
Example: In a wet basement location.
- Do not overload wall outlets, as this can result in the risk of fire or electrical shock.
- Do not attach the power supply cord to building surfaces. Do not allow anything to rest on the power cord. Do not place this product where anyone can step on the cord.
- Do not operate the system if chemical gas leakage is suspected in the area. Use a telephone located in another, safe area to report the trouble.

## Support Telephone Numbers

For Customer Support please contact MCK technical assistance at 1-888 454-5828 between 8:30am - 8:00pm (EST). If you are outside North America please dial 1-617-454-6192.

## Introduction

The EXTender 4000 provides remote voice access to a corporate system for a single remote user. Remote users can connect to a PBXgateway™ via a 10Base-T Ethernet connection using IP packet transmission.

The remote users' telephones connect to the EXTender 4000 via an RJ-11 telephone jack. The user's telephone traffic is placed in IP packets and sent out to the corporate LAN and then to the PBXgateway via a 10Base-T Ethernet connection in the PBSX gateway.

The EXTender 4000 provides a choice of three voice compression algorithms: G711, G729A, and G726 (24 and 32 Kbps ADPCM options) to reduce bandwidth requirements. The EXTender 4000 extends the full functionality of the system to a remote location, via IP over a LAN.

All voice traffic and signaling information from the digital telephone system is packetized by Remote Voice Protocol (RVP™). These packets are encapsulated into IP packets and sent out over the Ethernet. The voice packets can share the Ethernet network with other common data devices. The remote user can also connect a PC to the LAN through an RJ-45 Ethernet jack on the EXTender 4000, which acts as a hub.

The voice and signaling traffic is transmitted over the LAN between the EXTender 4000 at the remote location and the PBXgateway at the central location. At the Gateway, the packets are converted back into the system protocol and sent to the system via an RJ-21 cable.

*IP-based products utilize Voice over IP (VoIP) technology to deliver remote voice solutions. The voice quality of these solutions depends on variables such as available bandwidth, network latency, and Quality of Service (QoS) initiatives, all of which are controlled by the network and internet service providers. Because these variables are not within our control, we cannot guarantee the performance of the user's IP-based remote voice solution.*

## Specifications

### Regulatory Approvals

FCC	Parts 15 & 68, Subpart B, Class B
NRTL/C	CSA Standard C22.2 No.0-M91, 225-M90
Industry Canada	CS-03
UL Standard	950

### System Architecture

CPU	Motorola 68EN302, 20MHz
DSP	Analog Devices 2187, 52 MIPS

### Memory

DRAM	2MB
Flash Memory	2MB
Boot ROM	512KB

### Ethernet Port

Protocol	RJ-45, Ethernet (used for RVP over IP)
Interface	10Base-T
IP Addressing	DHCP and Static

### Interfaces

Telephone	RJ-11
-----------	-------

### Voice

Voice compression	G.729a, G.711, G.726 (ADPCM 32 and ADPCM 24
-------------------	---

### Protocols and Services

LAN	RVP over Internet Protocol (IP)
-----	---------------------------------

### Electrical

Line Voltage	120V AC Adapter
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### Environment

Temperature	32° – 130°F (0° – 55°C)
Relative Humidity	5 to 95%

### Dimensions

6.3 in. x 5.3 in. x 1.4 in.  
160 mm x 135 mm x 34.5 mm

### Weight

300 g

## Prerequisites for Installation

You must meet the following requirements before installing the EXTender 4000:

### Networking

- An appropriate network-terminating device must be installed and functioning at both the corporate facility and the branch office.
- The data connection between the corporate facility and the EXTender 4000 must be operational and configured properly.
- The network termination equipment must support a 10Base-T Ethernet interface.

### TCP/UDP

Ensure that the correct TCP/UDP ports are opened to allow the EXTender 4000 to connect through your company firewall. The following TCP/UDP port requirements must be met:

#### Remote Location

The EXTender 4000 uses port 12,288 for incoming UDP streams and any port between 1024 and 65535 for outgoing TCP streams.

#### Gateway Location

The Gateway unit uses TCP/UDP port 2698.

### Power and Wiring

The system is designed to operate at 120 VAC. Do not apply power to the EXTender 4000 until you are instructed to do so in the installation procedure.

- Install the EXTender 4000 power supply and cabling away from high power/high RF noise devices such as computers, fans, fluorescent ballast, and power supplies.
- Use good wiring practices. Do not run wires over fluorescent lights, computers, air conditioners, etc. as this can introduce noise.
- The distance between the telephones and the EXTender 4000 should NOT exceed 500 feet.

## Installation Components

Quantity	Description	Provided
1	EXTender 4000 Quick Installation Guide	Yes
1	EXTender 4000 unit	Yes
1	12VDC Power Supply	Yes
1	CAT 5 Ethernet cable	Yes

### Parts NOT Included with the EXTender 4000

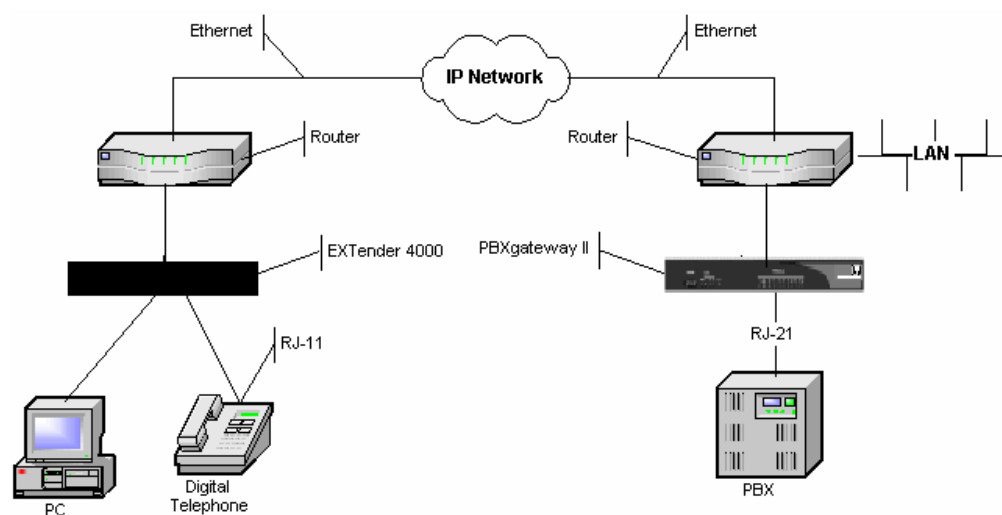
- Digital telephones and cabling
- Routers - Use routers if you want to access to the Remote/Gateway system from outside the local network.

See page **Error! Bookmark not defined.** for a list of compatible telephones.

**Note:** Use two-wire digital display telephones only.

### Typical Installation

Figure 1 shows a typical installation of the EXTender 4000.



**Figure 1: Typical Installation**

### Location

You can place the EXTender 4000 on any desktop, within 6 feet of an electrical outlet. Follow the Safety Considerations on page 4.

## Compatible Telephones

### Alcatel

Reflexes 4023  
Reflexes 4034  
Reflexes 4035

### Avaya Definity

2402  
2410  
2420  
6402+ \*  
6408+  
6416D+  
6424D+  
8403  
8405  
8410D  
8410DR  
8411  
8434DX  
9040 TransTalk  
9410D  
CallMaster III  
CallMaster IV  
CallMaster V  
CallMaster VI  
Gray Market  
9031DCP  
XM24 (add-on module for 64xx)  
*\* This digital display telephone is NOT  
recommended for administrative purposes.*

### Ericsson

Dialog 3200  
Dialog 3201  
Dialog 3202  
Dialog 3203  
Dialog 3210  
Dialog 3211  
Dialog 3212  
Dialog 3213  
AOM  
Ericsson headset

### Panasonic DBS Digital Telephones

VB-41200 DSLT Digital Single Line Telephone  
VB-44210 16 key standard phone  
VB-44220 22 key standard phone  
VB-44223 22 key small-display speakerphone  
VB-44224 22 key small-display speakerphone (voice  
recognition)  
VB-44225 22 key large-display speakerphone  
VB-44230 34 key standard phone  
VB-44233 34 key small-display speakerphone

### Panasonic DBS Supported Add-on Modules

VB-44310 EM24 - 24 Button Expansion Module  
VB-44320 DSS72 - 72 Button DSS/BLF Module

### Iwatsu ADIX Digital Telephones

The EXTender will support many of the ADIX digital telephones. It is recommended that each telephone connected to the EXTender have a display. The use of display telephones provides important status information regarding the connection to the PBXgateway.

### Avaya Magix Digital Telephones

4424LD+  
4424D+  
4412D+  
4406D+  
4400D+  
4400+

### Nitsuko i-Series Digital Telephones

92550 - Digital Single Line  
92753 - 12 Line, 22 Button, with Display  
92750 - 12 Line, 22 Button, no Display  
92783 - 24 Line, 34 Button, with Display  
92760 - 18 Line, 28 Button, no Display  
92763 - 18 Line, 28 Button, with Display  
92773 - 24 Line, 34 Button, Super Display

*Note: A minimum of one display  
telephone is required on each EXTender.*

IX-8KTD and IX-8KTS  
IX-12KTD-2 and IX-12KTS-2  
IX-24KTD and IX-24KTS  
IX-MKT

## IX-VTA

### Nitsuko i-Series Digital Telephones

92550 - Digital Single Line  
92753 - 12 Line, 22 Button, with Display  
92750 - 12 Line, 22 Button, no Display  
92783 - 24 Line, 34 Button, with Display  
92760 - 18 Line, 28 Button, no Display  
92763 - 18 Line, 28 Button, with Display  
92773 - 24 Line, 34 Button, Super Display

### Nortel

#### Meridian

M2006 \*  
M2008 \*  
M2216  
M2317  
M2616  
M2616CT  
M3903  
M3904  
M3905

#### Norstar

M7100 \*  
M7208  
M7310  
M7324  
M7410  
ATA2  
T7208  
T7316  
T7316E

\* This digital display telephone is NOT recommended for administrative purposes

### Toshiba

DKT 2004  
DKT 2010-SD  
DKT 2020-SD

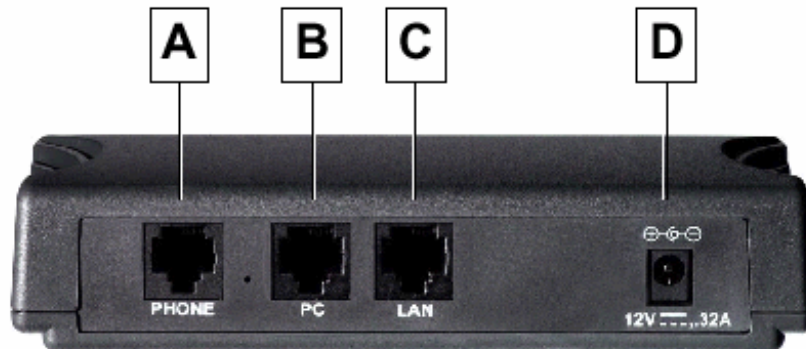
### Avaya IP Office (PBX Type to Select)\*

4406D+ (Magix)  
4412D+ (Magix)  
4424D+ (Magix)  
2402 (Definity)  
2410 (Definity)  
2420 (Definity)  
6408+ (Definity)  
6416D+ (Definity)  
6424D+ (Definity)  
5402 (Definity)  
5420 (Definity)

**\*NOTE:** To select the proper PBX Type go to the Utilities menu in the UI and run the Setup Wizard again.

## Connections

The EXTender 4000 requires connections A through D as shown in Figure 2.



**Figure 2: Back of Extender 4000**

Letter	Label	Cable Type	Connects to....
A	PHONE	Cat 3 with RJ-11 connectors	one digital telephone
B	PC	Cat 3/5/6 with a RJ-45 connectors	NIC card on the PC *
C	LAN	Cat 3/5/6 with a RJ-45 connectors	a Hub/Repeater or Switch on Local Area Network (LAN)**
D	+12 VDC	Power Supply	a 12 VDC power supply (comes with the unit)

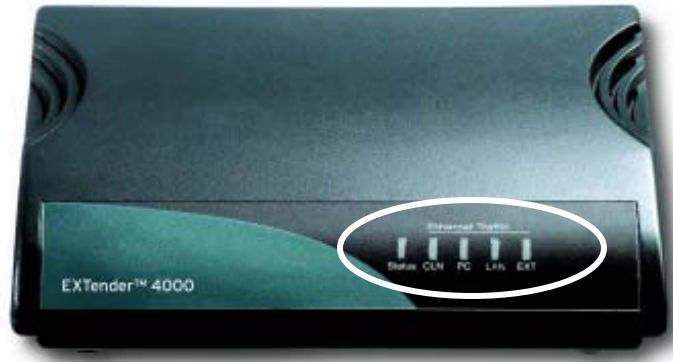
### Notes:

\* The PC port is a hub style Ethernet port and should connect only to an Ethernet station.

\*\* The LAN port is a station-side Ethernet port and should connect only to an Ethernet hub. It operates only on 10 megabit Ethernet networks. It does not support 100 megabits.

## Power-Up

1. Once the EXTender 4000 is properly connected and powered it performs a series of self-diagnostic tests that are displayed as a series of LED flashes. The "Status" LED blinks for several seconds as the module initializes.
2. Once the power-up sequence has finished, the state of the LEDs should be:



**Figure 3: Front Panel**

Label	Description
Status	Blinking while module is initializing.
	Off when not powered.
	After unit is powered:
	On Solid Green when enabled but not extended.
	Slow Green Flash when extended and on-hook.
	Fast Green Flash when extended and off hook.
	Green Flicker when there is no connection to a telephone.
CLN	Blinking when an Ethernet collision condition exists.
PC	Normally off, blinks when traffic is sent.
LAN	Normally off, blinks when traffic is sent.
EXT	Normally off, blinks when the 4000 Extender sends Ethernet traffic.

## Configuration using the Telephone Interface

**Introduction** You can use the telephone-set interface for setting configuration parameters for the EXTender 4000 from a two-wire digital telephone.

*Note: Before you begin, ensure the EXTender 4000 is connected and powered up, as described on the previous pages.*

**Required Settings** You must set the following parameters before placing calls with the EXTender 4000.

*Note: The following numbers or addresses are network related; you must enter them correctly. They are not random numbers, therefore the network administrator must assign them before you attempt to configure or place calls through the Remote module.*

Use the terms listed here when requesting this required information.

**Set the User ID** – The UserID identifies the specific port assigned to the telephone or user connected to the Remote module. This User ID must match the User ID assigned to the port on the PBX. See the *PBXgateway System Administrator's Guide* for instructions on setting parameters in the PBXgateway Management Interface (MI).

**Set the Gateway IP Address** – The Gateway IP Address identifies the Switch Module (PBX) at the corporate facility that is responsible for handling the voice traffic for the EXTender 4000

**Set the Address Mode** - This mode determines whether the IP address is static or is to be obtained from a Dynamic Host Configuration Protocol (DHCP) server.

**Set the IP Address** - This is the IP address of the EXTender 4000 unit. All devices must have a unique IP address, if not using DHCP address mode.

**Set the IP Subnet Mask** – The subnet mask indicates the network class (A, B, or C). If you use subnetting, you must set this mask appropriately (usually, 255.255.255.0).

**Set the Default Router** – This is the address of a device on the LAN that forwards IP traffic to and from other network segments.

***Note:** Once you enter an IP address and reboot the EXTender 4000, you can manage the device completely via Telnet or Remote Log in.*

## Accessing the Phone Set Interface

**How to access the telephone-set interface** If a connection is already established and the telephone is operational, press the **Hold** key four times and press '2' to disconnect. Press the **Hold** key an additional four times to start the telephone-set interface. (See the flowchart on page 14.). The message "*Press '1' to Connect*" appears in the display.

**Menu Log** Navigate through the telephone-set interface using the dialpad on the telephone. The menu legend shows each applicable dial key and the its corresponding screen or command within the interface. (See Figure 4, below.)

### ***IMPORTANT NOTE:***

If a function key is not pressed for 30 seconds, the module automatically returns to the first display, "Press '1' to Connect".

- 1:** (Prv) Press to move backward through the menus. (Moves left or up in chart.)
- 2:** (Ok) Press to select the displayed option AND means Ok. (Moves right in chart.)
- 3:** (Nxt) Press to move forward through the menus. In the Address Mode sub-menu, use this key to scroll down the list of available address modes. (Moves down in chart.)

**No:** Press to quit the current menu and return to the previous menu without making a change. (Some screens use this feature for enabling or disabling an option.)

## Accessing the Phone Set Interface, continued

### Menu Log, continued

**Program:** (*Ericsson Only*) to accept user input (example, an IP address).

**Clear (C):** (*Ericsson Only*) Press to cancel user input. **Note:** For Ericsson phones the Clear (C) key is used in place of the Hold key.

**FEAT:** (*Iwatsu ADIX Only*) to accept user input (example, an IP address).

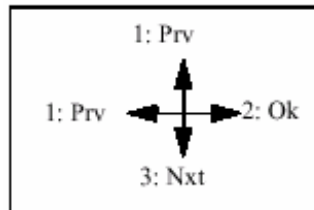
**REDIAL:** - to accept user input (example, an IP address).

**Release (RLS):** (*Merdian / Norstar Only*) to accept user input (example, an IP address).

**#:** - to delete a value (one character).

**\***: - to represent a period (.) when entering certain values, for example, an IP address.

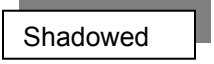
The figure below shows how to navigate through the telephone-set interface using the dial keys. Refer to this figure to use the following flowcharts.



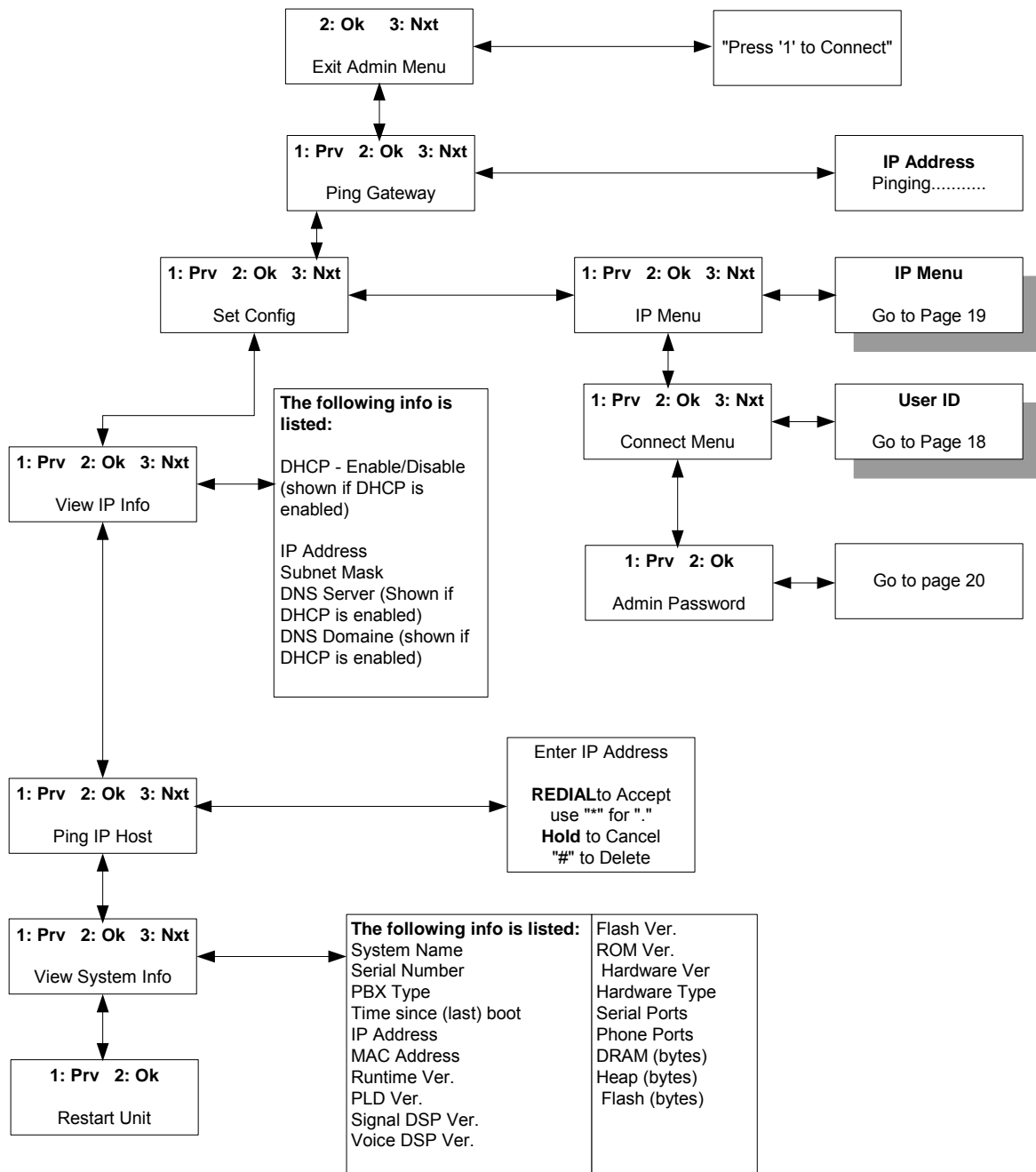
**Figure 4: Menu Log**

## Menu Structure

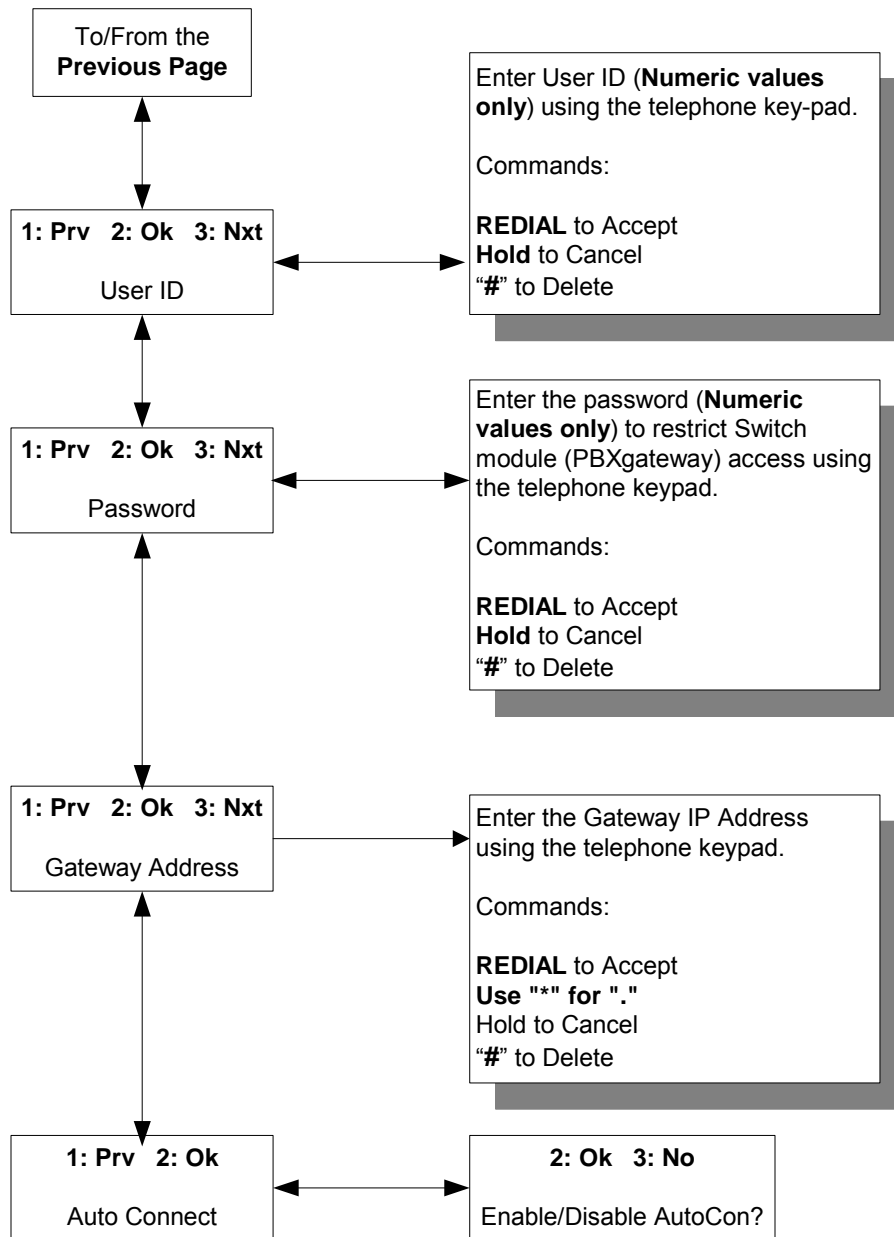
The following pages detail the menu structure for the telephone-set interface in a flowchart manner. Use the legend on the following page to help you navigate through the menus and access the required parameters.

**Note:** The parameters that you must enter are  for easy identification in this flowchart.

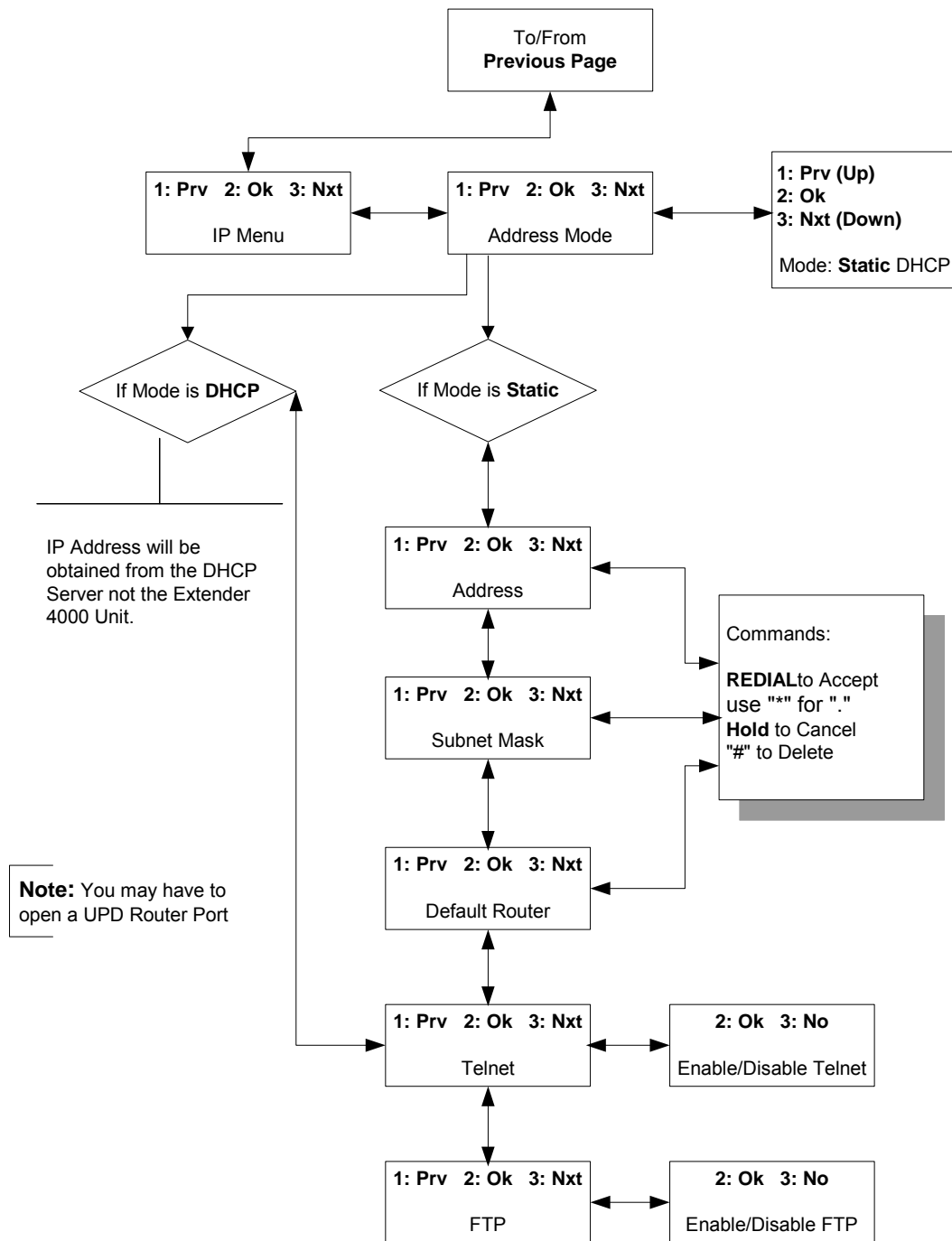
## Main Legend



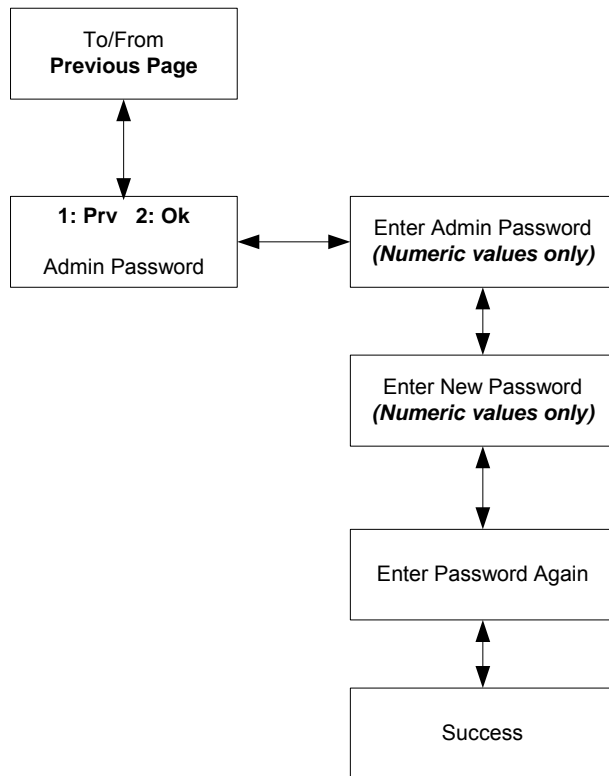
## User ID Menu



## IP Menu



## Admin Password Menu



## Saving Configuration Changes

After you change a parameter value using the telephone-set interface, follow these steps to save your changes:

Press the **Prv** key (1) to navigate backward through the menus until you see the prompt "Save Changes?".

Press the **OK** key (2). The display on the telephone indicates that the configuration is being saved. When the configuration is saved, you see the prompt "OK to Restart?"

Press the **OK** (2) key to restart the remote module.

## Configuration using the Management Interface (MI)

Once the IP address is configured for the Extender 4000, you can use Telnet over the existing LAN connection to access the MI. This connection enables you to access the MI. The MI enables you to fully manage the i-Series Extender 4000 from your PC.

*Note: If a LAN is not readily available at the time of configuration, you can Telnet into the 4000 Extender if the PC is directly connected into the Extender PC port.*

Alternatively, you can use the remote login feature of the Gateway. For detailed instructions on starting the MI, refer to the Configuration chapter of the System Administrator's Guide.

### IP Call-Suspend Setup

Use the MI to configure the Call Suspend feature. The Call Suspend feature allows the telecom manager to reduce network costs by suspending the transmission of IP packets when all telephones are inactive for a configurable period of time. When the line is disconnected the telephone displays indicate that they are in the Call Suspend mode. When a user goes off-hook or an incoming call occurs, IP packets are again transmitted, and all telephones are taken out of Call Suspend mode.

The Call Suspend feature assumes that if the IP connection is down, it is possible to receive busy signals from the network preventing communication. This causes an interruption of telephone service to the branch office. This assumption leads to setting the Call Suspend timer to a value that ensures that IP packets are transmitted during normal business hours.

The expected usage pattern for the IP connection is that at the beginning of the business day, the telephones are brought out of Call Suspend mode transmitting IP packets when the first user either goes off-hook or an incoming call arrives. Packets are transmitted for the remainder of the business day because all telephones are not idle longer than the Call Suspend time-out value. At the end of the day, all telephones become inactive for the Call Suspend timeout value and no more IP packets are sent. If anyone works late or comes in early, normal usage causes the IP packets to be transmitted.

#### Procedure

1. Access the Call\_Suspend Menu using the following path:

**Path:** Remote->Configuration->Connect->Call\_Suspend

The following menu appears:

## IP Call-Suspend Setup, continued

2. Press the → key to access the parameters.

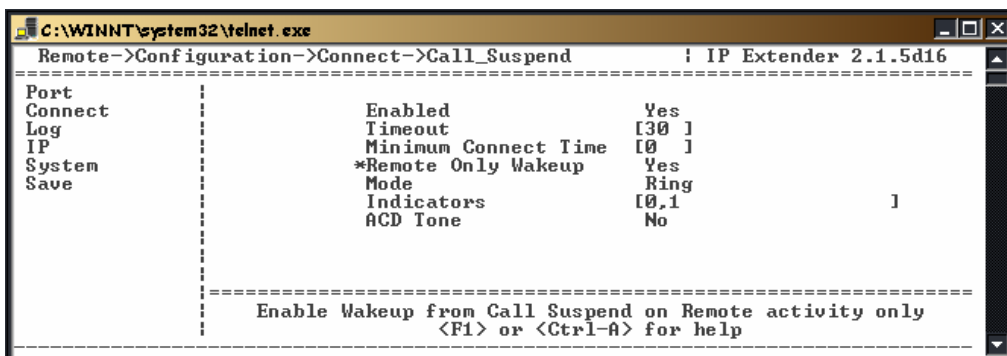


Figure 5: IP Call Suspend Settings

3. Press the → key to the Enabled parameter. Press the → key to select Yes
4. Press the ↓ and → key to the **Timeout** parameter. This parameter causes the units to go into Call Suspend mode when no activity occurs for the set Timeout value.  
**Note:** Set the value between 15 and 240 minutes.
5. Press the ↓ and → key to the Remote Only Wakeup parameter. Setting this parameter to Yes enables wakeup from Call Suspend on activity (for example, when a telephone set goes off-hook or a key is pressed) at the Branch site only. If this parameter is set to No (disabled), incoming calls can also cause wakeup from Call Suspend.
6. Press the ↓ and → key to the **Mode** parameter. Press the → key to select *Lamp* or *Ring*.
7. Press the ↓ and → key to the **Indicators** parameter. Enter a list of monitored indicators separated by commas.
8. Press the ↓ and → key to the **ACD Tone** parameter. Press the → key to select Yes or No.  
  
**Note:** Mode, Indicator, and ACD Tone are not supported by Norstar, Alcatel, or NEC.
9. Press the ← key to accept changes and go back to the Configuration Menu.
10. Press the ← key to the **Save** parameter. Press **Enter** to save changes to the active config (.rem) file.

## Placing a Call

Once the EXTender 4000 is installed and powered-up, the remote telephones can go on-line. Follow the procedure below to place a call.

### Procedure

At the remote location, the telephones should display the following message if Autoconnect is disabled:

**Press '1' to connect**

Press **1** on the keypad to connect the telephone to the corporate PBX/KSU  
Place a test call and check for clear reception.

**Note:** *If the connection is "noisy" or nonexistent, refer to the PBXgateway System Administrator's Guide for troubleshooting steps.*

## Optional Configuration

The EXTender 4000 MI has optional configuration parameters that provide the following capabilities:

**Auto-Connect** – This is a Remote module option, which automatically connects remote users (telephones) when the EXTender 4000 is rebooted or brought on-line. (Eliminates the need to press "1" on the remote telephone.) Enable this feature for non-display telephones since you cannot see the "Press '1' to Connect" message.

**Admin Password** – If configured, this option restricts access to the EXTender 4000 MI, by requiring a password for entry. You must enter the *Admin Password* before you can change any configuration parameters.

**Note:** *The EXTender 4000 units and the PBXgateway units have their own separate Admin passwords.*

**Password** – This option provides a secure link between the PBXgateway and the EXTender 4000. If this option is configured, a password is assigned to both the EXTender 4000 and the PBXgateway. This password is necessary to connect to the PBXgateway. The password on the EXTender 4000 must match the password assigned to the port on the PBXgateway.

**Note:** *Refer to the PBXgateway System Administrator's Guide for more information on configuring these options.*

## Remote Telephone Messages

The following messages appear on the remote telephone display connected to the Remote unit when a connection attempt fails. The telephone display indicates 'Connect Error,' followed by a message. The table below contains the possible Connect Error messages

Message	Description	Action
Assigned port Busy (see note)	The switch port is being used by another user.	Wait until port is available or reset port on the PBXgateway and try to re-connect.
Assigned port Down (see note)	The switch port is not available, due to problems (green flicker) with the port.	Check port connection at the PBXgateway.
Carrier Lost (see note)	Displayed if the network connection to the system is lost.	Check network links. Attempt to reconnect after network is up and running.
Connect rejected	The system rejects the connection request.	Make sure the Connect Password is correct. Check network links. Attempt to reconnect.
Connect Timeout	The Extender cannot connect to the PBXgateway.	Check WAN connection on the unit
Network disabled	The network device is not connected, being used, or is not active.	Check network link and device.
Network down	The network device has a problem.	Check network link and device.
No bandwidth	The unit bandwidth is oversubscribed. No network bandwidth is available for telephone signaling	Change voice compression.
Normal take down	Displayed when the network device is either being rebooted or reset.	Wait until the WAN link LED is solid green, and then attempt to re-connect.
No Voice path (see note)	The unit bandwidth is oversubscribed. No network bandwidth is available for voice.	Change voice compression.
Peer disconnect	Displayed when the Switch unit has disconnected from the network device.	Check the voice compression or network at the PBXgateway.

**Note:** This message is not preceded by "Connect Error".