IPX Quick Start User Guide

About This Document:

The "*IPX Quick Start User Guide*" provides very basic steps to set up IPX systems. The product specification and system configuration interfaces may have been updated since the writing of this document.

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Security and Safety Warning:

Users are strongly suggested to read through this quick start user guide before using the IPX systems. The IPX chassis is not allowed to be opened by users, or it could disable itself. Repair can only be done by authorized technicians. The product should not be placed in dusty, hot, or moist areas. The product and its wires should be out of reach from children for electrical safety. The vendor of IPX systems does not carry liability for loss of the user's life or property.

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1   Introduction to IPX

1.1   Overview

The IPX is a hybrid IP PBX and supports analog phones, IP phones, PSTN lines, VoIP lines and VoIP trunks. The IPX has very rich set of IP PBX features and services. The IPX is an IP router, a NAT firewall, a VoIP gateway, and VoIP server.

The IPX products are designed for SMB (Small Medium Businesses) and enterprise customers to easily build internal VoIP network. The IPX products can help VoIP service providers to offer VoIP services to business customers as replacement of T1/E1 trunk service.

1.2   Interfaces

The IPX has the following types of physical interfaces:

♦   Ethernet uplink interface (WAN interface). It is generally used to connect with public IP networks. The IP address on the WAN interface can be statically configured or dynamically acquired using DHCP or PPPoE protocol.

♦   Ethernet LAN interface. It is used to connect to a PC or Ethernet hub/switch for multiple PCs.

♦   PSTN analog interfaces. They support FXO signaling protocols and are used to connect PSTN.

♦   Phone interfaces. They support FXS signaling protocols and are used to connect analog phones.

1.3   Supported Standards

The IPX supports international standards defined by the ITU, IEEE, and IETF, and various other national standards, allowing it to work with existing PSTN and IP networks.

♦   IEEE-802.3 10/100Base-TX

♦   ITU POTS FXS and FXO (loop-start), FSK, DTMF, Bellcore, ETSI

♦   IETF ARP, IP, ICMP, TCP, UDP and NAT

♦   IETF DHCP, DNS, PPPoE, HTTP, FTP, TFTP

♦   IETF SIP, RTP, RTCP

♦   G.711, G.723, G.729 and variations, G.168 EC, T.30, T.38

1.4   Key Features

The IPX has a rich set of features enabling a wide range of value added services.

♦   PBX features include auto attendant, manual attendant, call forwarding, call transfer, call blocking, call wait, call holding, call parking, 3-way calls, voice mail, user defined IVR, ACD, follow-me, wakeup calls and many more.

♦   Intelligent call routing allows outgoing voice calls to select best routes based on preconfigured policies, rules and calling plans.

♦   An embedded IP router supports LAN stations with DHCP and DNS services. The IP routing with NAT capability allows your PC in the private LAN to share the same Internet access.

♦   The security firewall has a set of flexible and powerful packet filtering rules. Users can define security policies to protect LAN resources from external attacks.

♦   VoIP peering allows IPX systems to form voice intranet in a mesh topology; VoIP server allows

IPX systems to form star shaped voice intranet so that client IPX can be in private network.

♦ Gateway capabilities allows incoming PSTN calls to go through the IPX based VoIP network and to land on a remote PSTN..

♦ Web based system management has a vivid graphic user interface and allows administrators to remotely manage the IPX systems.

2 Wiring

2.1 Interface Description

♦ WAN interface: 10/100Base-TX Ethernet uplink to WAN or the Internet.

♦ LAN interface: 10/100Base-TX Ethernet link to PC or Ethernet switch.

♦ PSTN interfaces: for telephone lines to local telephone company or other PBX.

♦ Phone interfaces: for analog phones

♦ Power socket: to AC power

♦ Grounding: chassis ground, recommend to ground with a rack or the earth.

Figure 2.1 IPX Ports

Reset pin hole:

User can use a needle to push through the reset pin hole to reboot system. Doing so will *reset the system to the factory default status*. Such a reset will white-out the existing configuration of the system and should only be used when the system has no other way to recover. Generally, the way to reboot the system is through the management page or power-off/power-on the system.

2.2 Wires

Telephone wires with RJ11 heads are for connections from IPX PSTN ports to local telephone network and for connection from IPX Phone ports to analog phones.

Straight Ethernet wires with RJ45 heads are for connection between IPX WAN port and upstream router such as DSL router and for connection between IPX LAN port and a PC. If the IPX LAN port is connecting to an Ethernet switch, a cross over Ethernet wire should be used.

3 Basic Network Setups

3.1 Network Design

Two common network designs are: add-on design and QoS design, as in the following diagram.

If you do not want to change the existing IP network and just add new VoIP systems and IP phones use a design similar to "Add-on Design". In this design, the VoIP application will compete with the existing PCs and existing data applications.
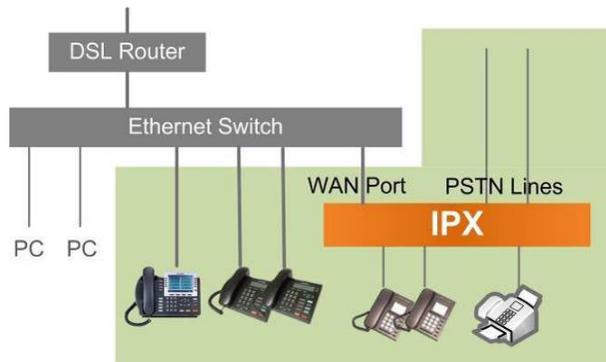
Figure 3.1 Add-on Design

If you wish to guarantee VoIP quality, you are better to change the existing network a little bit, as in the diagram of "QoS Design". In this design the bandwidth is managed by the IPX, which gives the VoIP traffic with higher priority.
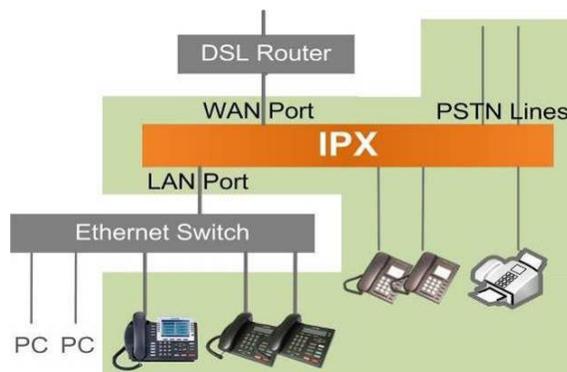

Figure 3.2 QoS Design

3.2 Setup Procedures

- ♦ Connect an Ethernet wire from the IPX WAN port to a DSL router.
- ♦ Connect PC or Ethernet switch/hub to the IPX LAN port.
- ♦ Connect normal analog phone sets to IPX Phone ports.
- ♦ Connect telephone lines from the wall to the IPX PSTN ports.
- ♦ (optionally) Ground the IPX
- ♦ Connect the adaptor and power cord
- ♦ Power on

4 Quick Start Configuration

The IPX management system is a web service embedded in the IPX system.

4.1 Default LAN Configuration

The default configuration for the LAN interfaces is good enough in most cases. A PC in the LAN segment can use DHCP to automatically acquire an IP address in the default subnet of 192.168.6.0/255.255.255.0, e.g. 192.168.6.254. The default router and DNS server is the IPX.

The default IP address of the IPX LAN port is 192.168.6.1

4.2 Logon to the IPX Management System

Several minutes after being powered on, the IPX should have steady green LED. To logon to the IPX system, a PC must directly or indirectly connect to the IPX system. The PC uses DHCP to acquire an IP address[1] from the IPX. The web browser on the PC should point to URL http://192.168.6.1:8080/

The initial administrator user name/password is: **admin/admin**. It is recommended to change the administrator account password for security reasons.

Figure 4.1 IPX Login

(Later on, if you can also access the IPX through the WAN interface, you can logon to the system by using http://the-IPX-wan-address:8080/)

4.3 Configure WAN Interface

Depending on the network environment and the way you access the Internet, IPX WAN interface can be configured in one of three ways.

If you place the IPX behind ADSL router (ADSL modem plus IP router), the IPX WAN interface can be configured to use DHCP to get an IP address from the ADSL router. This is the factory default configuration in the IPX.

If you want the IPX to have a fixed IP address instead of the dynamically assigned by the ADSL router, you can configure a proper static IP address on the IPX WAN interface. For example, if the ADSL router's LAN IP address is 192.168.1.1, then you can use 192.168.1.100.

If you use a simple ADSL modem (no router capability), you can configure PPPoE on the IPX WAN interface. You need user account info from your ADSL service provider.

4.4 Setup PSTN Lines

In order to make phone calls to external PSTN phones or to receive phone calls from outside, user needs to configure PSTN numbers associated with the lines plugged into corresponding analog PSTN interfaces.

The PSTN lines can be configured either to "DID" to an extension or to the auto attendant.

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[1] If the PC's IP address and the IPX LAN IP address are not in the same IP subnet, the PC cannot connect to the IPX. You should go to Windows *local area connection*, right click for the *properties*, and select *TCP/IP* and *properties* again. Make sure the PC obtains IP address and DNS server address automatically from the IPX. The way to find IPX LAN IP address is to open cmd window and type command ipconfig, which will show the default gateway address.

4.5   Set up Extensions

One way to know an extension's number is to dial *25# on the extension. The IPX will announce the current extension number.

You can review, change, or add extension of the IPX in following these steps:

1. In *Basic Voice > Local IPX Code*, you can change the extension length and modify the IPX code. The IPX code is the ID of the IPX system; it becomes a prefix of local extension numbers[2].

2. In *Basic Voice > Extensions > Analog Extensions*, you can rearrange the analog extension numbers. You can edit individual analog extension, at least including user name, as part of call id, and email address for voice email etc.

3. In *Basic Voice > Extensions > IP Extensions*, you can add some IP extensions. Note that the extension numbers must start with IPX code. The maximum number of IP extension can be added into the IPX depends on the IPX model. In each IP extension, the following must be configured: (1) User name, as part of call id, (2) Email address for voice email etc., (3) VoIP device password for authentication of IP phone registration.

Notes:

Virtual extension is in fact an alias of any phone number addressable from the IPX. Dialing the virtual extension is equivalent to dialing the defined target digits. A virtual number must have the IPX code as its prefix.

5   Localization

In *Basic Voice > Region and Language*, you should select proper PSTN standard and language. If you do not see your country name in the list, select other.

In the same configuration page, you might want to change auto attendant greeting. A simple way for this is to record greeting from local extension by dialing to *28#.

In System > System Setting > Clock, you must select your local time zone, enable NTP protocol, and manually set the daylight saving date of the year if needed. Accurate time is important since many PBX services and call billing are based on accurate time.

6   ##Net

Every IPX has one ## Net number which can be found in *System > Product Info* page. Every IPX can intercommunicate with other IPX by dialing its ##Net number, as long as both are on the internet. No cost, no restrictions on time, anywhere. Please remember to press # at the end of dialing to speed up the call.

7   Connect to a VoIP Service Provider

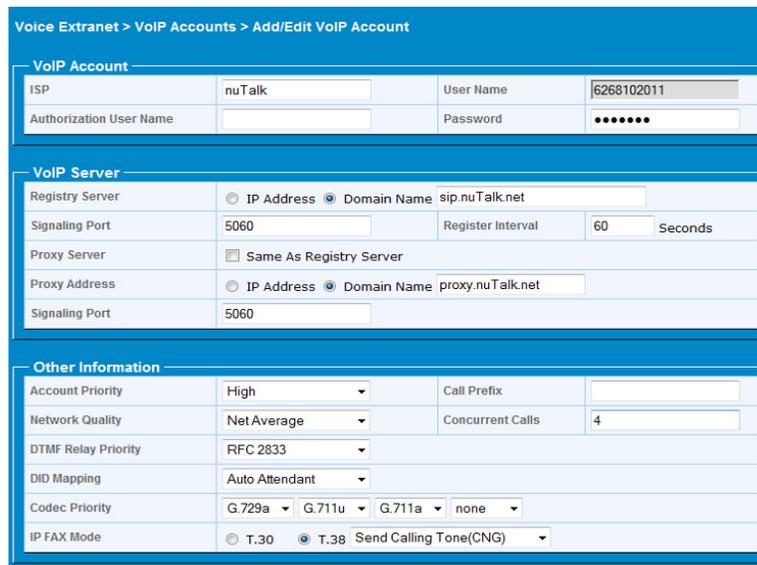Users often need to call outside through telephone lines. Alternatively, user can make external calls

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[2]   Multiple IPX codes can be configured so that local numbers can have different prefixes. However, digit 0 and 9 should not be used since they reserved for operator line and external access lines.

over the Internet through VoIP service providers. To use the Internet for voice calls, you need to have a VoIP subscriber account from a service provider. The following info should be obtained from a service provider:

♦ Account name (some providers call "user name", "authorization id").

♦ Account password

♦ Register Server Address (some providers call "VoIP server", "SIP register")

♦ Proxy Server Address (some provider call "SIP Proxy" or "outbound Proxy", in the most cases, it is the same as the register server).

In *Quick Setup* or *Voice Extranet >VoIP Accounts* page, you can add a new VoIP line.

Figure 7.1 Add a VoIP Line

The signaling port is set to 5060 by default. Please make sure that the registration time interval is set to the value required by service provider. Some VoIP service providers only support G.711u, in which case you need to make this a high priority.

8   Building Enterprise VoIP Intranet

8.1   Voice Intranet Topology

Two or more IPX systems can be used to build a simple enterprise voice network, called IPX voice intranet. These IPX systems can be in different locations, in different cities, or even in different countries. The communications between the IPXs are secured and no one would be able to block such inter office communications. The integrity and privacy of internal phone calls are protected. A typical voice intranet is shown in the following diagram.
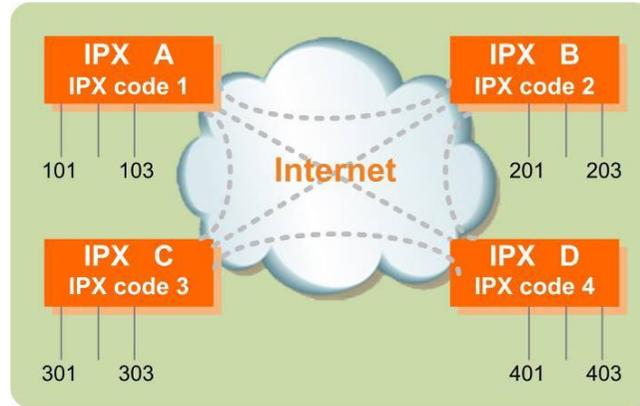
Figure 8.1 Voice Intranet

In the diagram, the phone calls between 101 and 401 are the same as calling to next desk 102.

8.2   Voice Intranet Planning

Extension number is composed of two parts:

♦   A IPX code, used to identify an IPX system and used as a prefix of extension numbers;

♦   Local extension suffix.

The extension number can be 3-7 in length. To build an enterprise voice intranet, administrator needs to do some number planning including IPX code (the "area code" in enterprise voice intranet) assignment and local extension suffix assignment.

8.3   Adding Peer IPX Systems

You need to add neighbor IPX system into the peer list of this IPX. The key information needed in configuration of a peer is the IPX code and domain name of the neighbor IPX. It is better to use the built-in domain name of neighbor IPX (check *System > Product Info* of the neighbor IPX). Using decimal IP addresses can cause stability issue since in many cases the IP addresses acquired from an ISP are dynamic.

Figure 8.2 Add a Peer

The IPX systems that have peer relationship must be reachable to each other. If an IPX is in a private network, for example, behind a DSL router, following steps should be followed:

(1)   Place the IPX in the DMZ of the DSL router or other external NAT/Firewall;

(2)   If DMZ setting is not possible, configure the port forwarding for TCP 8080, UDP 8060, 20000–20009.

(3) In *Voice Intranet > Intranet Option*, select manual setup VoIP signaling IP address to be the domain name of the IPX.

8.4 Enterprise Voice Intranet Summary

♦ Each IPX can have multiple IPX codes, but with the same length; for different IPX systems, their IPX code length can different; Any IPX code in entire voice intranet cannot a prefix of another IPX code.

♦ All extension numbers within entire enterprise voice intranet should have the same length;

♦ To avoid configuration mistakes, VoIP signaling port numbers that the IPX systems listen to are better to be all the same for every IPX system in the voice intranet.

♦ If calls from unknown IPX are not welcome, you should disable "accept calls from anonymous IPX".

9 IPX System Management

9.1 Configuration File

The current configuration can be saved to a file on the PC where the browser is in use. The saved configuration file can be restored back to the IPX later. The configuration file is neither readable nor editable by any program other than the IPX firmware.

9.2 System Upgrade

When new features, enhancements, or bug fixes become available, you can download a new version of software and upgrade the IPX system. Some new feature might require a purchase of new license to be activated. It is recommended to save configurations before performing any upgrade.

9.3 Save, Reboot, Logout

At the top right corner of page frame, Save, Reboot, Logout are the most common actions in system configuration.

♦ "Save" is for saving the current configuration into the permanent memory of the IPX; otherwise the configuration will not survive over any reboot.

♦ "Reboot" is a simulation of power off and power on. When the system is rebooted, the previously saved configuration file in permanent memory will be used.

♦ "Logout" is for terminating a configuration session. It is recommended to log out of the configuration system whenever a job is done.

10 Get Help

The configuration and management of the IPX are deigned in a hierarchical fashion. With three levels of menus, it is easy to navigate. On each page, there is a "*Help*" at the top right corner of page frames. You can always get help by clicking on "*Help*". The help text explains what a current page is about and how to configure the parameters for the features designated to the configuration page.

Besides this *IPX Quick Start User Guide*, Another document *IPX Reference Manual* have more detailed technical information.

Appendix A IPX Service Operation Guide

A.1   Basic Voice Calls

1) To find your extension number, you can dial *25#. This is the simplest way to test if the phone and the IPX are working.
2) To call from one local extension to another extension within the same voice intranet, you directly dial the extension number.
3) To call from a local extension to an external number, you dial 9+the destination number+#.
4) To call from a local extension to a remote IPX within voice intranet, you dial remote IPX code+#. After hearing greeting messages, you dial an extension, or dial *9+external number+#.
5) To call any other IPX, you directly dial remote IPX's ##Net by dialing **NET number+#, e.g. **5678#.
6) To call from a PSTN phone into an enterprise, you dial a PSTN/VoIP line number of the IPX. After hearing greeting messages, dial an extension number.
7) To transfer an incoming call, press the flash button on the phone (or a quick click on the on-hook spring), then dial the destination number+#;
8) To initiate a 3-way conference call during a normal conversation, press the flash button on the phone (or a quick click on the on-hook spring), then dial *03* + the third party's phone number+#.
9) To pick up a neighbor's phone that is ringing, you can dial *63* and the target number. You can also just dial *# or *61# directly if the neighbor is in your group.
10) To change the greeting, you can dial *28# and follow the IVR to record and save your voice greeting.

   Please note that these are based on the default configuration. If configuration is modified, the ways to operate might be different.

A.2   IPX Service Commands

Services		CMD/Activation	Cancel/Deactivation
Start a 3-way call		*03* xxxx#	
Check extension umber		*25#	
Record voice to voice collection		*26#	
Listen to a voice in the voice collection		*27*xxxx#	
Record and change greeting		*28#	
Call Forwarding	Always	*47*xxxxxxxx#	*48#
	No Answer	*41*xxxxxxxx#	*42#
	Busy	*43*xxxxxxxx#	*44#
Speed dial		*51*xx*yyyyyyy#	*52*xx#
Absent service		*53#	*54#
Do Not Disturb		*55#	*56#
Pick up ringing phone in group		*61# or *63*xxxx#	

Put caller on hold (to make another call)	*65# or *65*xxxx#	
Park a call/retrieve a call from park lot	*66*xxx#	*67*xxx#
Leave a message to mailbox	*76# or *76*xxxx#	
Access voice mailbox (number)	*77# or *77*xxxx#	
Record and change voicemail prompt	*771#	*770#
Force to use a VoIP account	*8xxxxxxx#	
Dial out from an IPX	*9xxxxxxx#	

[end]