



Configuring Voice over IP with KlasRouter

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The information in this article applies to:

- o KlasRouter v2.0

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1.0 Introduction

This document describes how to use the Voice over IP (VoIP) features incorporated into KlasRouter. KlasRouter has 4 x RJ-11 FXS voice ports that allow users to make a call with a standard analog phone. VoIP converts the analog voice signal from the phone and converts it into an IP packet, which can then be routed over an IP network. Once the packet is routed to the proper location, it is converted back into an analog voice signal. KlasRouter uses the Session Initiation Protocol (SIP) to establish and terminate VoIP calls. KlasRouter also maintains a Phone Book for users to store commonly called phone numbers. The following sections outline the steps needed to configure the VoIP ports and the Phone Book with KlasRouter.

2.0 Configuration of KlasRouter

2.1 Cable Connections

Prior to beginning, ensure the following cable connections have been properly secured:

1. Power cord is plugged in and KlasRouter is on.
2. Control Port Cable is connected to the PC's serial port.
3. Control Port Cable is connected to the 'Control' port on the front of the KlasRouter.
4. Analog phone is connected to VoIP Port 1 on the back of KlasRouter.

2.2 Establishing a HyperTerminal Session

To configure the KlasRouter, you must establish a HyperTerminal Session between a PC and the KlasRouter. Follow the instructions in KlasRouter Application Note Q10601 to successfully establish a HyperTerminal Session and open the KlasRouter Main Configuration Menu.

2.3 Configuring the Ethernet LAN

Since the VoIP packets rely on the IP network to be forwarded to the proper location, the VoIP ports are tied into the Ethernet LAN for addressing purposes. There is a SIP Proxy Server within KlasRouter that is also used in conjunction with the Ethernet LAN IP address in order to establish the SIP address for call set-up and tear down. Therefore, it is important to configure the Ethernet LAN IP address prior to configuring the VoIP ports or KlasRouter Phone Book. Your network may be different, but for the purpose of this application note, we will assume that the Ethernet LAN IP address is 192.168.1.1 with a 24-bit subnet mask. Follow the directions in Klas Application Note Q10605 in order to configure the Ethernet LAN.

2.4 Configuring the VoIP Ports

KlasRouter contains four VoIP RJ-11 ports that can be used with a standard analog telephone. Since KlasRouter uses the Session Initiation Protocol (SIP) for call setup and

tear-down, you can use KlasRouter to call any other telephone connected to a SIP server, including additional phones connected to KlasRouter. Follow the steps below to configure the VoIP Ports.

1. Return to the KlasRouter Main Configuration Menu.
2. Enter '6' on the KlasRouter Main Configuration Menu as shown below to start the VoIP configuration process.
3. Press '1' on the VoIP Configuration Menu to Start VoIP.
4. Press 'Enter' to return to the VoIP Configuration Menu.
5. Enter '4' on the VoIP Configuration Menu, as shown below in Figure 1, to view the existing configuration and re-configure the VoIP ports, if necessary, on the KlasRouter.

```

Voice over IP Configuration Menu
-----
1) Start VoIP
2) Stop VoIP
3) VoIP Status
4) VoIP Ports
5) Phone Book
6) Codec configuration
7) Advanced configuration
Press 'x' to Return

Enter Option>4

```

Figure 1. KlasRouter VoIP Configuration Menu

6. You will see the current VoIP port settings. Scroll down to the end of the settings and enter the number of the VoIP port you would like to configure. Enter '1' to configure VoIP Port 1.
7. As shown below in Figure 2, you will be prompted to enter a new name for the port. It is not necessary to rename the port, but it might be wise to enter a name that appropriately describes the use for the phone, such as Mobile Phone 1. If you do not want to re-name the port, you can just press 'Enter' to accept the current name.
8. You will then be prompted to enter the SIP Address for that port. Follow the format given in the user prompt by entering a user-name, followed by the @ symbol and then the Ethernet LAN IP address.
9. You will then be prompted to enter a SIP Registration Server. It is not necessary to enter a SIP Registration Server with the KlasRouter, but networks that possess a robust VoIP infrastructure may require you to register your SIP Address with their server. If you need to connect to an external server, enter the IP address of that server at this point. Otherwise, press 'Enter' to skip this step.
10. You will be asked if this is a modem port. This option allows you to pass data or Secure Voice through the voice port. Enter 'n' to deactivate this setting.
11. You will then be prompted to enter a SIP Password. Enter a password if desired or press 'Enter' to decline the Password option. Klas does not recommend using a password.

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12. You will then be prompted to enter the Echo Cancellation setting. Echo Cancellation improves the speech quality of the call by removing the acoustic echo naturally caused by a full-duplex session. The default setting is to have echo cancellation 'active'. Klas recommends accepting the default setting by entering '1'.
13. You will then be prompted to enter your codec preference. The different options vary according to the quality of speech and the bit rate of the voice packets. Generally, you want to use a codec preference that is a good balance between acceptable quality of speech and a low bit rate. The default setting is 'g723' which offers solid voice quality at a bit rate of 6.3 kbps. Klas recommends pressing 'Enter' to accept the default setting.
14. You will then be prompted to enter the RTP Port. Klas recommends pressing 'Enter' to accept the default, which is '49160'. You may choose to enter a different RTP Port if your particular network requires a specific port for firewall or application purposes.

```

VoIP Port 1
-----
Name: KRT Port 1

Enter new name ('q' to quit)>
Using current name.

SIP Username: 1001
Enter new SIP Username ('q' to quit)>
Using current SIP Username.

Register with SIP Registration Server: yes
Register with SIP Registration Server?(y=yes|n=no|'q' to quit)>n

Modem Port: no
Is this a STU port?(y=yes|n=no|'q' to quit)>n

Echo Cancellation: active
Activate Echo Cancellation(y=yes|n=no|'q' to quit)>y

Preferred Codec: g723
Enter new preferred codec
(g711a|g711u|g723|g726_16|g726_24|g726_32|g726_40|g729|'q' to quit)> g723

RTP Port: 49160
Enter new RTP port (1 - 65535 | 'q' to quit)>
Using currently configured RTP port.

Attention! This change requires a restart of the VoIP process!

Settings for port 1 have been changed.

Press Enter to return to VoIP Configuration Menu

```

Figure 2. Configuring a VoIP Port

15. Press 'Enter' to return to the VoIP Port Configuration Menu.
16. Press 'x' to return to the VoIP Configuration Menu.

17. Enter '2' to start VoIP and activate the changes made to the port.

You have now configured a VoIP port. Repeat steps 4-17 for each VoIP port you would like to re-configure. Once finished, press 'x' to return to the VoIP Configuration Menu.

2.5 Configuring the KlasRouter Phone Book

Configuring the KlasRouter VoIP Phone Book allows you to associate a phone number with a SIP Address of another phone on a separate network. KlasRouter takes the number dialed by the user and checks the VoIP Phone Book to see what SIP Address is associated with that phone number. Once a match has been determined, KlasRouter sends the voice packets to the matching SIP Address. The phone number can be any sequence of numbers and as long as it identifies a valid SIP Address, the call will be processed by KlasRouter. By default, the VoIP Phone Book is pre-configured for dialing the KlasRouter default VoIP port settings. Follow the steps below to edit the VoIP Phone Book to include phones attached to another KlasRouter.

1. Press '5' on the VoIP Configuration Menu to enter the Phone Book.
2. Press '1' to Add an entry to the Phone Book, as shown below.

```

Phone Book
-----
1001          KRT Port 1      SIP      1001@192.168.1.1
1002          KRT Port 2      SIP      1002@192.168.1.1
1003          KRT Port 3      SIP      1003@192.168.1.1
1004          KRT Port 4      SIP      1004@192.168.1.1

1) Add phone book entry
2) Edit phone book entry
3) Delete phone book entry
Press 'x' to Return

Enter Option>1

```

Figure 3. Phone Book Configuration Menu

3. Enter the phone number for the phone you would like to dial. In the example from Figure 4 below, we used a sample phone number of '1234'.
4. Enter a description of the phone associated with the new phone number. KlasRouter puts no restrictions on the name, but it should accurately describe the opposite phone. In Figure 4, the description is 'Sample Phone'.
5. Enter the SIP Address of the phone you will be dialing. Follow the format given in the user prompt by entering a name, followed by the @ symbol and then the Ethernet switch IP address where the phone resides. In Figure 4, the SIP Address is '1234@192.168.2.1.' This means there must be a SIP endpoint at IP address 192.168.2.1 in order to process the SIP call. (**Note: If you are using a different addressing scheme than in our example from Section 1, the IP address will be different. The IP address portion of the SIP Address must match the IP Address of the network you are dialing.**)

```
Add Entry to Phone Book
-----
Enter Phone No ('q' to quit)>1234
Enter Name ('q' to quit)>Sample Phone
Enter Address(USER@IPADDRESS[:PORT]) ('q' to quit)>1234@192.168.2.1
Attention! This change requires a restart of the VoIP process!
Sample Phone added to phone book
Press Enter to return to Phone Book
```

Figure 4. Adding an Entry to the Phone Book

6. Press 'Enter' to return to the Phone Book Menu

MORE INFORMATION

For more information about KlasRouter and other Klas products, visit the following Klas website:

<www.klasonline.com>

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