

SL4020 SmartLink Analog VoIP SoHo Router

Getting Started Guide



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About this guide

This guide describes using the SmartLink 4020 router.

Audience

This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

Structure

This guide contains the following chapters and appendices:

- [Chapter 1](#) on page 20 provides information about router features and capabilities
- [Chapter 2](#) on page 22 provides hardware installation procedures
- [Chapter 3](#) on page 25 provides quick-start procedures for configuring the SmartLink router
- [Chapter 3](#) on page 26 describes the Home section settings
- [Chapter 4](#) on page 29 describes the WAN section settings
- [Chapter 5](#) on page 41 describes the LAN section settings
- [Chapter 6](#) on page 48 describes the Telephony section settings
- [Chapter 7](#) on page 64 describes the System section settings
- [Chapter 8](#) on page 79 describes how to download and display the SmartLink 4020 router user guide
- [Chapter 9](#) on page 81 describes how to log out of the router management system
- [Chapter 10](#) on page 83 contains information on contacting Patton technical support for assistance
- [Appendix A](#) on page 86 contains compliance information for the router
- [Appendix B](#) on page 88 contains specifications for the router
- [Appendix C](#) on page 91 describes dialing plans and contains sample plans

For best results, read the contents of this guide *before* you install the router.

Precautions

Notes, cautions, and warnings, which have the following meanings, are used throughout this guide to help you become aware of potential problems. **Warnings** are intended to prevent safety hazards that could result in personal injury. **Cautions** are intended to prevent situations that could result in property damage or impaired functioning.

Note A note presents additional information or interesting sidelights.



The alert symbol and IMPORTANT heading calls attention to important information.



The alert symbol and CAUTION heading indicate a potential hazard. Strictly follow the instructions to avoid property damage.



The shock hazard symbol and CAUTION heading indicate a potential electric shock hazard. Strictly follow the instructions to avoid property damage caused by electric shock.



The alert symbol and WARNING heading indicate a potential safety hazard. Strictly follow the warning instructions to avoid personal injury.



The shock hazard symbol and WARNING heading indicate a potential electric shock hazard. Strictly follow the warning instructions to avoid injury caused by electric shock.

Safety when working with electricity



The SmartLink contains no user serviceable parts. The equipment shall be returned to Patton Electronics for repairs, or repaired by qualified service personnel.



Mains Voltage: Do not open the case when the power cord is attached. For systems without a power switch, line voltages are present within the power supply when the power cords are connected. The mains outlet that is utilized to power the SmartLink shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker.



The SmartLink is not shipped with power cables. For AC powered units, ensure that the power cable used meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.



Hazardous network voltages are present in WAN ports regardless of whether power to the SmartLink is ON or OFF. To avoid electric shock, use caution when near WAN ports. When detaching cables, detach the end away from the SmartLink first.



Do not work on the system or connect or disconnect cables during periods of lightning activity.



Before opening the chassis, disconnect the telephone network cables to avoid contact with telephone line voltages. When detaching the cables, detach the end away from the SmartLink first.



Ultimate disposal of this equipment must be handled according to all applicable national laws and regulations.

General observations

- Clean the case with a soft slightly moist anti-static cloth
- Place the unit on a flat surface and ensure free air circulation
- Avoid exposing the unit to direct sunlight and other heat sources
- Protect the unit from moisture, vapors, and corrosive liquids

Typographical conventions used in this document

This section describes the typographical conventions and terms used in this guide.

General conventions

The procedures described in this manual use the following text conventions:

Table 1. General conventions

Convention	Meaning
Garamond blue type	Indicates a cross-reference hyperlink that points to a figure, graphic, table, or section heading. Clicking on the hyperlink jumps you to the reference. When you have finished reviewing the reference, click on the Go to Previous View button  in the Adobe® Acrobat® Reader toolbar to return to your starting point.
Garamond bold type	Indicates the names of command buttons that execute an action.

Table 1. General conventions

Convention	Meaning
< >	Angle brackets indicate function and keyboard keys, such as <SHIFT>, <CTRL>, <C>, and so on.

Chapter 1

General information

Chapter contents

SmartLink 4020 overview20

SmartLink 4020 overview

The SmartLink VoIP SoHo Router (see [figure 1](#)) provides transparent connectivity for analog phones and faxes to the world of Internet voice. Connecting to any analog phone, fax or PBX, the SmartLink product is an effective and flexible solution for small offices and telecommuters to access Internet-based telephone services and corporate intranet systems across established LAN and Internet connections like xDSL and cable modems.



Figure 1. SmartLink 4020

The SmartLink Model 4021 provides two RJ-45 Ethernet ports and one FXS (RJ-11) analog phone port. The SmartLink Model 4022 provides two RJ-45 Ethernet ports and two FXS (RJ-11) analog phone ports. Front panel LEDs quickly show at-a-glance the status of the system, LAN, WAN, and phone ports.

A full suite of IP features (DHCP, NAT/PAT, NTP and VPN) are available to LAN devices attached downstream. VLAN tagging and prioritization enables voice traffic to be handled before data traffic. Support for PPPoE and IPSEC tunneling simplifies extending corporate intranet services to remote teleworkers.

The web interface offers two levels of configuration access for the network operator and end user. The friendly web interface and product labeling (Phone, LAN, WAN etc.) to help ensure a trouble-free installation for the end user. Configuration and firmware can be downloaded from a TFTP server or HTTP server.

Chapter 2 **SmartLink installation**

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Installing the router

Do the following:

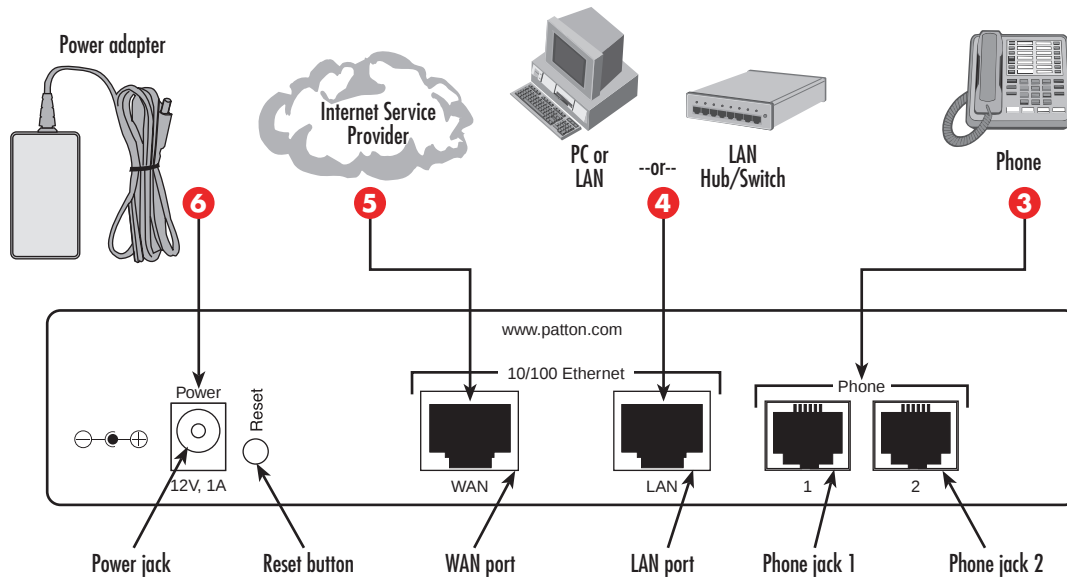


Figure 2. SmartLink 4020 installation diagram

- 1 Place the unit on a desktop or similar sturdy, flat surface that offers easy access to the cables. The unit should be installed in a dry environment with sufficient space to allow air circulation for cooling.

Note For proper ventilation, leave at least 2 inches (5 cm) of clearance at the sides, front, and rear of the unit.

- 2 Set your LAN Local Area Connection Properties for Internet Protocol (TCP/IP) to *Obtain an IP address automatically* and to *Obtain DNS server address automatically*.



Do not work on the system or connect or disconnect cables during periods of lightning activity.



The Interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

- 3 Plug in the telephone or telephones (see [figure 2](#)).
- 4 Plug in the PC or LAN, or a LAN hub/switch.

Note The SmartLink has automatic MDX (auto-crossover) detection and configuration on all Ethernet ports. Any of the ports can be connected to a host or hub/switch with a straight-through wired cable.

- 5 Connect to the Internet service provider.



The external router power supply automatically adjusts to accept an input voltage from 100 to 240 VAC (50/60 Hz).

Verify that the proper voltage is present before plugging the power cord into the receptacle. Failure to do so could result in equipment damage.

- 6 Verify that the AC power cord included with your router is compatible with local standards. If it is not, refer to “[Contacting Patton for assistance](#)” on page 83 to find out how to replace it with a compatible power cord. Plug the power adapter into the *12V DC, 1.0A* port on the SmartLink 4020. Connect the other end of the power cord to an appropriate AC power outlet.
- 7 Wait 30 seconds after powering the SmartLink 4020 on, then verify that the green *Power* LED is lit (see [figure 3](#)). At this point, you should be able to use your browser to surf the Internet.

Note Follow the directions of your voice service provider to set up voice services.

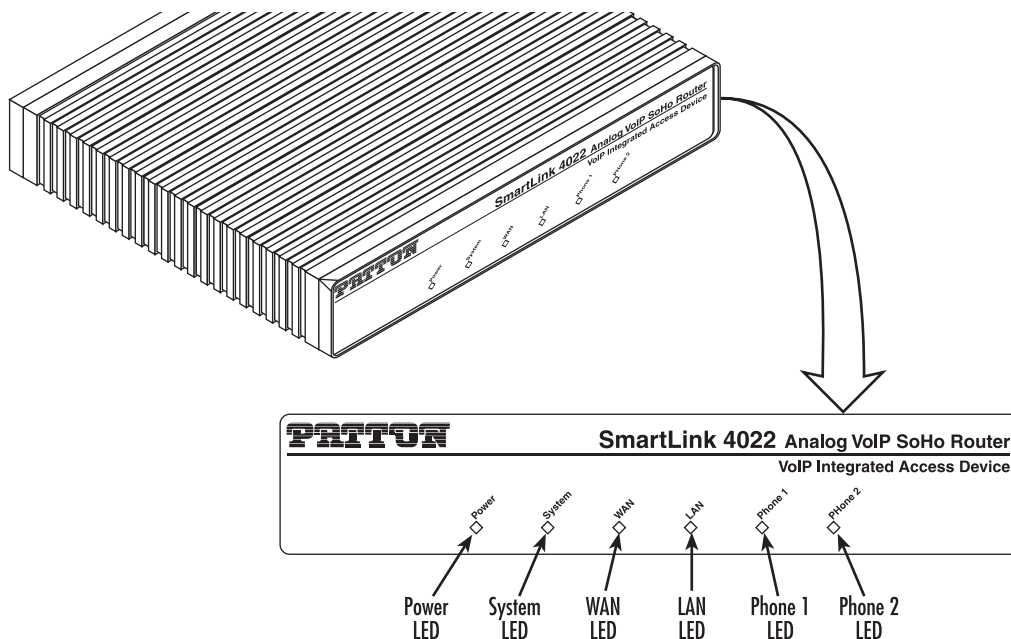


Figure 3. Router front panel LEDs

Connecting the SmartLink to the network

You can check the connection with the ping command from the SmartLink to another host on the network.

```
172.16.1.99(if-ip)[eth0]#ping <IP Address of the host>
```

Respectively from the host: *ping 172.16.1.99*

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System information

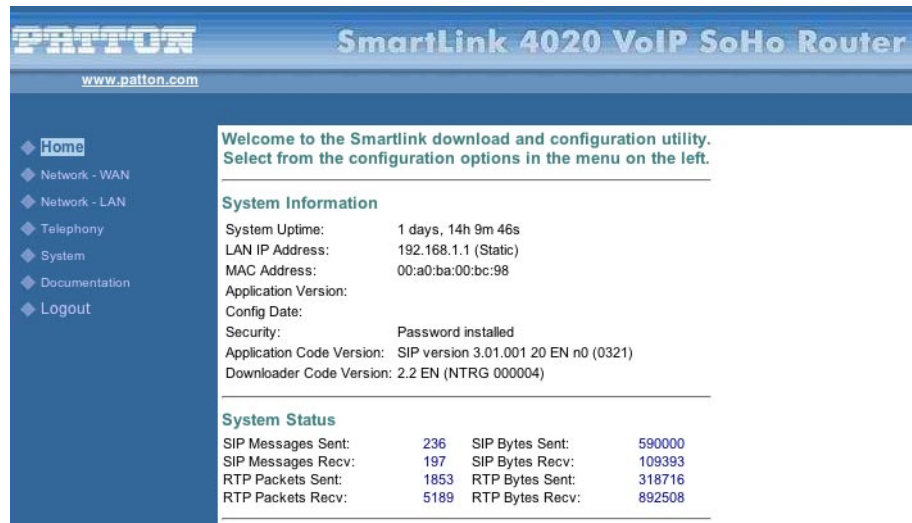


Figure 4. SmartLink VoIP download and configuration Home page

System Uptime

Shows how long the SmartLink has been operating since the last time it was reset.

LAN IP Address

The IP address of your LAN.

MAC address

The media access control (MAC) address of the LAN Ethernet interface in the SmartLink.

Application Version

The SmartLink firmware version number.

Config Date

The date of the configuration file that was downloaded from an auto-upgrade server.

Security

Indicates that the SmartLink utility has been secured with a password. To configure a password, see section “[Set Security Password](#)” on page 67.

Application Code Version

Shows the application code version being used.

Download Code Version

Shows the download code version being used.

System Status

SIP Messages Sent

Total number of VoIP SIP messages sent (including retransmissions)

SIP Messages Received

Total number of VoIP SIP messages received (including retransmissions)

SIP Bytes Sent

Total number of bytes of VoIP SIP messages sent (including retransmissions)

SIP Bytes Received

Total number of bytes of VoIP SIP messages received (including retransmissions)

RTP Packets Sent

Total number of VoIP RTP packets sent (including redundant packets)

RTP Packets Received

Total number of VoIP RTP packets received (including redundant packets)

RTP Bytes Sent

Total number of VoIP RTP bytes sent

RTP Bytes Received

Total number of VoIP RTP bytes received

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Status

Interface Status

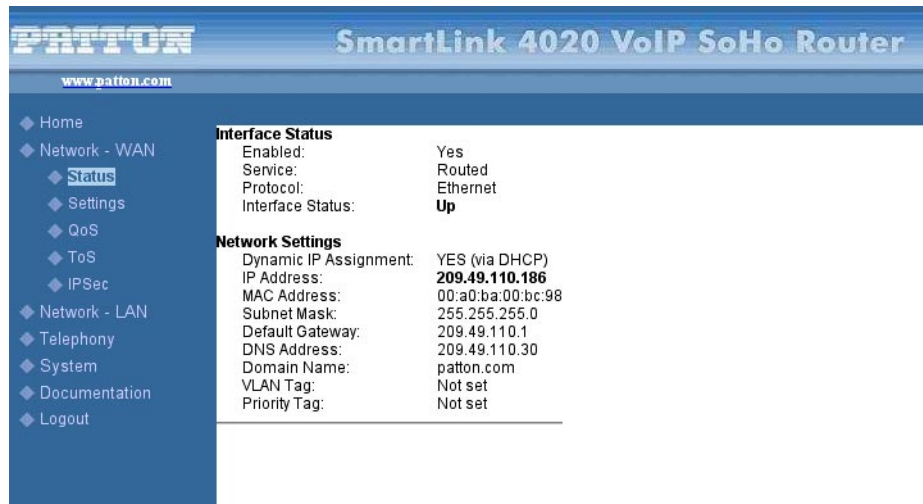


Figure 5. Internet Status window

Enabled

Yes indicates the WAN interface is enabled and ready to be used.

Service

Either *Routed* or *Bridged*, displays the level of your WAN interface's connection.

Protocol

Indicates that the Ethernet protocol is being used to transfer data.

Interface Status

Either *Up* or *Down*.

Network Settings

These are the details of your WAN network settings.

Dynamic IP Assignment

Displays *Yes (via DHCP)* if you are using a dynamic IP address or *No* if a dynamic IP address is not being used.

IP address

The IP address of the SmartLink on the WAN.

MAC address

The MAC address of the WAN Ethernet interface in the SmartLink.

Subnet Mask

The subnet mask is 32-bit number that filters a destination IP address to determine to which subnet it belongs. For example, a subnet mask of *255.255.0.0* for a network ID of *192.5.0.0* tells the switch to accept traffic destined for IP addresses that begin with *192.5*—all other packets are ignored.

Default Gateway

The IP address of the gateway. The gateway IP address can be retrieved automatically in DHCP mode or be set up manually with a fixed IP address.

Domain name

The network domain of the SmartLink.

DNS address

Refers to the address of your domain name server, if applicable.

VLAN

VLAN tag value encoded in the WAN Ethernet header in all outgoing packets

Priority Tag

Priority tag value encoded in the WAN Ethernet header in outgoing packets.

Settings

The *Settings* window contains the following sections:

- Internet Configuration (see [figure 6](#) on page 33)
- WAN PPPoE Configuration (see [figure 7](#) on page 34)
- MAC Spoofing Configuration (see [figure 8](#) on page 35)
- MTU (see [figure 9](#) on page 35)
- Internet VLAN Configuration (see [figure 8](#) on page 35)

Note After configuring the sections, click the **Save Internet Settings** button (see [figure 5](#) on page 31) to save the new configuration.

Internet Configuration

The screenshot shows the 'Internet Configuration' section of the router's web interface. The sidebar on the left contains links: Home, Network - WAN (selected), Status, Settings (highlighted), QoS, ToS, IPSec, Network - LAN, Telephony, System, Documentation, and Logout. The main content area is titled 'Internet Configuration' and includes a 'Device Operating Mode' dropdown set to 'Router'. Below this, there are two radio button options: 'Obtain Internet configuration dynamically' (selected) and 'Specify fixed Internet configuration'. Under the 'Specify fixed Internet configuration' option, there are input fields for IP Address (172.16.0.1), IP Netmask (255.255.0.0), IP Gateway, IP DNS Server, Host Name, and Domain Name.

Figure 6. Internet Configuration section of the Settings window

Device Operating Mode

Choose *Router* or *Bridged* depending on your operation.

Obtain WAN configuration dynamically

Select this option if appropriate. If you choose *Obtain WAN configuration dynamically*, the information is detected automatically through DHCP.

Specify fixed WAN configuration

Select this option if you will not be using DHCP. If you choose *Specify fixed WAN configuration*, you will have to enter the following information:

- IP address.
- IP of the netmask.
- IP of the gateway.
- IP of the DNS Server, if applicable.
- Host name (the name will identify the computer on the Internet, such as *www.patton.com*).
- Domain name (the name that will identify one or more IP addresses). For example, the *patton.com* domain is used by Patton Electronics Company. That domain can include multiple hostnames (such as **www.patton.com**, **ftp.patton.com**, and so on) that point to individual computers on the Patton network. In short, for the hostname URL *http://www.patton.com*, the domain name is *patton.com*.

WAN PPPoE Configuration

WAN PPPoE Configuration

Enable PPPoE: No

Authentication

Username:

Password:

Settings

Idle Timeout: minutes

Echo Timeout: seconds

Echo Count:

Service Name:

AC Name:

Figure 7. WAN PPPoE Configuration section of the Settings window

Enable PPPoE

Select *Yes* to enable PPPoE or *No* to disable PPPoE.

Authentication

Enter the username and password provided by your ISP.

Settings

Idle Timeout. Idle timeout before PPP connection is closed due to inactivity

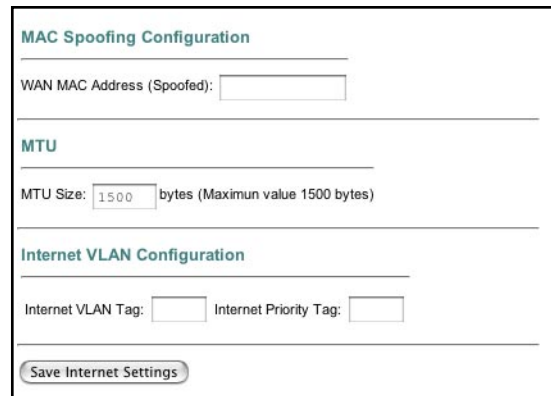
Echo Timeout. The duration between PPP echo requests sending to server.

Echo Count. The number of unanswered PPP echo requests before PPP connection is closed.

Service Name. PPPoE Service name

AC Name. PPPoE AC name

MAC Spoofing Configuration



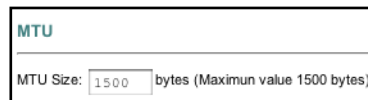
The screenshot shows the 'MAC Spoofing Configuration' section of a settings window. It contains three main input areas: 'WAN MAC Address (Spoofed):' with an empty text box, 'MTU' with 'MTU Size: 1500 bytes (Maximum value 1500 bytes)', and 'Internet VLAN Configuration' with 'Internet VLAN Tag:' and 'Internet Priority Tag:' each followed by an empty text box. A 'Save Internet Settings' button is at the bottom.

Figure 8. MAC Spoofing Configuration section of the Settings window

WAN MAC Address (Spoofed)

Only available when the unit is under the router mode. The spoofed MAC address to be used by the device's WAN interfaces, the Ethernet address of the outgoing packets from the WAN interface would be replaced with this address. If blank, the WAN interfaces will use the value of MAC

MTU Size



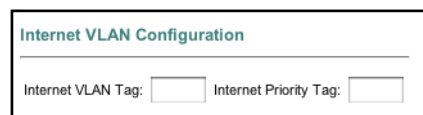
The screenshot shows the 'MTU' section of the settings window. It includes the label 'MTU' and a text input field for 'MTU Size' with the value '1500' and the text 'bytes (Maximum value 1500 bytes)'.

Figure 9. MTU section of the Settings window

MTU (Maximum Transfer Unit) Size

The size limit (bytes) of the packet for all outgoing packets.

Internet VLAN Configuration



The screenshot shows the 'Internet VLAN Configuration' section of the settings window. It contains two text input fields: 'Internet VLAN Tag:' and 'Internet Priority Tag:'.

Figure 10. Internet VLAN Configuration section of the Settings window

Internet VLAN Tag

VLAN tag for all outgoing packets on WAN interface. The value should be between 0 and 4094.

Internet Priority Tag

Priority tag for all outgoing packets on WAN interface. The value should be between 0 and 7.

Saving your work

When you are finished configuring the VLAN settings, click the **Save Internet Settings** button (see [figure 8](#) on page 35) to save all changes.

QoS (Quality of Service)

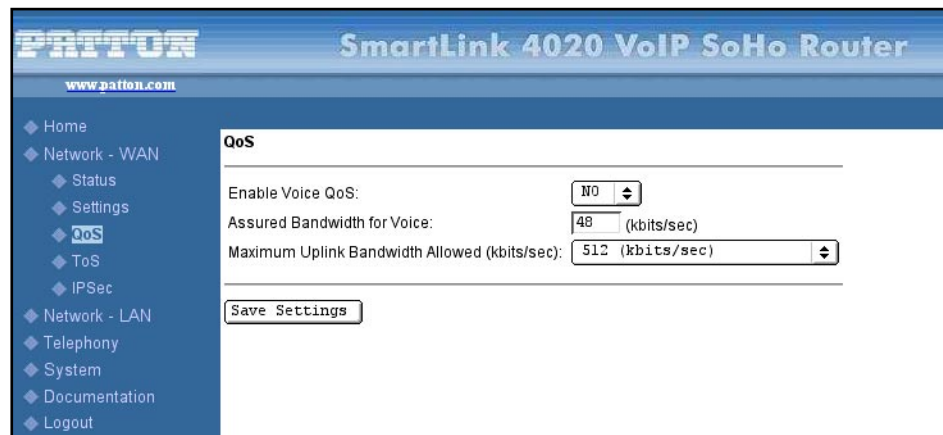
The screenshot shows the web interface of a Patton SmartLink 4020 VoIP SoHo Router. The top header includes the Patton logo and the router model name. Below the header is a navigation menu on the left with options like Home, Network - WAN, Status, Settings, QoS, ToS, IPSec, Network - LAN, Telephony, System, Documentation, and Logout. The main content area is titled 'QoS' and contains three configuration fields: 'Enable Voice QoS' with a dropdown menu set to 'NO', 'Assured Bandwidth for Voice' with a text input field containing '48' and '(kbits/sec)' next to it, and 'Maximum Uplink Bandwidth Allowed (kbits/sec)' with a dropdown menu set to '512'. A 'Save Settings' button is located at the bottom of the configuration area.

Figure 11. QoS window

Enable Voice QoS

Enable or disable the voice quality of service function.

Assured Bandwidth for Voice

Bandwidth allocated for voice.

Maximum Uplink Bandwidth Allowed

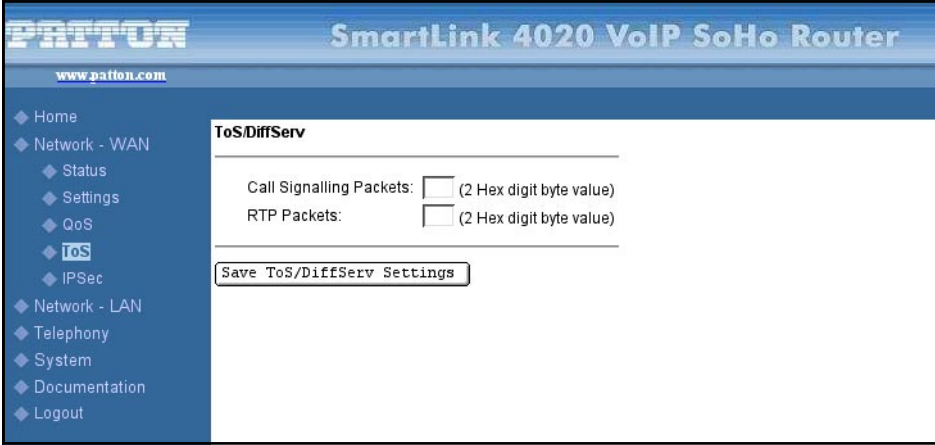
Specify a maximum uplink bandwidth.

Saving your work

When you are finished configuring settings, click the **Save Settings** button to save the changes.

ToS/DiffServ

This sub-page is used to configure the Type-of-Service/Diffserv byte values which are to be used in the IP header of all transmitted SIP signaling packets and RTP packets. The ToS/DiffServ byte values are entered as two-digit hexadecimal values. If no special ToS/DiffServ value is to be used for a particular traffic type, enter **00** or leave the setting empty.



The screenshot shows the web interface of a Patton SmartLink 4020 VoIP SoHo Router. The top header includes the Patton logo and the router model name. A left-hand navigation menu lists various configuration options, with 'ToS' currently selected. The main content area is titled 'ToS/DiffServ' and contains two input fields: 'Call Signalling Packets' and 'RTP Packets'. Each field is followed by a note '(2 Hex digit byte value)'. Below these fields is a button labeled 'Save ToS/DiffServ Settings'.

Figure 12. ToS/DiffServ window

Saving your work

When you are finished configuring ToS/DiffServ settings, click the **Save ToS/DiffServ Settings** button to save the changes.

IPSec Configuration

This page allows configuration of the device's IPSec (IP security) settings.

SmartLink 4020 VoIP SoHo Router

www.patton.com

◆ Home
◆ Network - WAN
 ◆ Status
 ◆ Settings
 ◆ QoS
 ◆ ToS
 ◆ **IPSec**
◆ Network - LAN
◆ Telephony
◆ System
◆ Documentation
◆ Logout

IPSec Configuration

Select Tunnel to view/modify: Tunnel 1

Enable tunnel 1: No

Remote IP Address range: -

Remote security gateway:

Security mode: Tunnel

Outbound AH SPI (DEC):

Outbound AH Authentication Algorithm: HMAC-SHA1

Outbound AH Authentication Key (HEX):

Outbound ESP SPI (DEC):

Outbound ESP Encryption Algorithm: NULL

Outbound ESP Authentication Algorithm: NULL

Outbound ESP Encryption Key (HEX):

Outbound ESP Authentication Key (HEX):

Inbound AH SPI (DEC):

Inbound AH Authentication Algorithm: HMAC-SHA1

Inbound AH Authentication Key (HEX):

Inbound ESP SPI (DEC):

Inbound ESP Encryption Algorithm: NULL

Inbound ESP Authentication Algorithm: NULL

Inbound ESP Encryption Key (HEX):

Inbound ESP Authentication Key (HEX):

Save Tunnel Settings

Figure 13. IPSec Configuration window

Select Tunnel to view/modify

Select the desired tunnel from the pop-up menu. The following sections and examples assume *Tunnel 1* was selected.

Enable tunnel 1

Enable/disable tunnel 1 IP sec

Remote IP Address range

Start and end of remote IP address range.

Remote security gateway

Remote security gateway IP address

Security Mode

IPSec mode (tunneling/transport)

Outbound AH SPI (DEC)

Outbound AH security parameter index number.

Outbound AH Authentication Algorithm

HMAC-MD5 or HMAC-SHA1

Outbound AH Authentication Key (HEX)

Hex number up to 40 nibbles

Outbound ESP SPI (DEC)

Outbound ESP security parameter index number

Outbound ESP Encryption Algorithm

3DES-CBC or DES-CBC

Outbound ESP Authentication Algorithm

HMAC-MD5 or HMAC-SHA1

Outbound ESP Encryption Key (HEX)

Hex number up to 48 nibbles

Outbound ESP Authentication Key (HEX)

Hex number up to 40 nibbles

Inbound AH SPI (DEC)

Inbound AH security parameter index number

Inbound AH Authentication Algorithm

HMAC-MD5 or HMAC-SHA1

Inbound AH Authentication Key (HEX)

Hex number up to 40 nibbles

Inbound ESP SPI (DEC)

Inbound ESP security parameter index number

Inbound ESP Encryption Algorithm

3DES-CBC or DES-CBC

Inbound ESP Authentication Algorithm

HMAC-MD5 or HMAC-SHA1

Inbound ESP Encryption Key (HEX)

Hex number up to 48 nibbles

Inbound ESP Authentication Key (HEX)

Hex number up to 40 nibbles

Saving your work

When you are finished configuring tunnel settings, click the **Save Tunnel Settings** button to save the changes.

Chapter 5 **Network—LAN**

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Settings

The screenshot shows the Patton SmartLink 4020 VoIP SoHo Router web interface. The left sidebar contains a navigation menu with the following items: Home, Network - WAN, Network - LAN, Settings (highlighted), DHCP, Routing, Port Forwarding, IP Filtering, Service Access, Telephony, System, Documentation, and Logout. The main content area is titled 'Settings' and contains a 'Network Settings' section. This section has two input fields: 'IP Address' with the value '192.168.1.1' and 'Subnet Mask' with the value '255.255.255.0'. Below these fields is a 'Save Internet Settings' button.

Figure 14. Network Settings window

Network Settings

Enter the IP address and subnet mask of your LAN network.

Saving your work

When you are finished, click the **Save Settings** button to save the changes.

DHCP

These configuration parameters are for the internal DHCP server that will provide IP network information to LAN attached devices.

The screenshot shows the DHCP Server Configuration window in the Patton SmartLink 4020 VoIP SoHo Router web interface. The left sidebar is the same as in Figure 14, with 'DHCP' highlighted. The main content area is titled 'DHCP Server Configuration' and contains three sections: 'Server Settings', 'Client Network Information', and 'Static Address Assignments'. The 'Server Settings' section has a radio button for 'Enabled' (selected) and a 'Disabled' option. Below it is a 'Client IP Address Range' field with the value '192.168.1.100 - 131'. The 'Client Network Information' section has a 'Domain Name' field and a 'DNS Server 1' field with the value '80.0.0.1' and a '2:' field. The 'Static Address Assignments' section has a table with columns 'Identify Using', 'Host Identifier', and 'Internal Address'. The 'Identify Using' column has a dropdown menu with 'Hostname' selected. The 'Host Identifier' column has an empty text box. The 'Internal Address' column has the value '192.168.1.' followed by an empty text box. At the bottom of the window are three buttons: 'Save DHCP Settings', 'View DHCP Table', and 'Save Internet Settings'.

Figure 15. DHCP Server Configuration window

Server Settings

Select *Yes* to enable or *No* disable DHCP.

Client IP Address Range

Minimum and Maximum limit on the DHCP IP address pool

Client Network Information

Domain Name

LAN domain name provided to DHCP clients during the DHCP OFFER process.

DNS Server

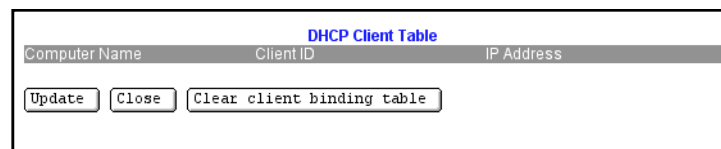
This statically assigned DNS server IP address will be provided to clients during the DHCP OFFER process.

Static Address Assignment

Up to eight static DHCP address assignments can be configured. To add a static IP assignment, enter the LAN device's host name (must be unique in the private network) and/or MAC address. Specify the Internal address to be assigned and press the **Add** button.

Viewing the DHCP Client Table

Click the **View DHCP Table** button to display the *DHCP Client Table* (see [figure 16](#)).



Computer Name	Client ID	IP Address
---------------	-----------	------------

Update Close Clear client binding table

Figure 16. DHCP Client Table window

Saving your work

When you are finished configuring DHCP server settings, click the **Save DHCP Settings** button (see [figure 15](#) on page 42) to save the changes.

Routing

These configuration parameters are for the internal router.

Figure 17. Router Configuration window

Dynamic Routing

Whether or not dynamic routing on the interfaces is enabled/disabled.

Static Routing

Under *Static Routing*, you can specify the routing paths of your internal network.

Viewing the Routing Table

Click the **View Routing Table** button to display the *Routing Table* (see [figure 18](#)).

Routing Table						
Subnet Mask	Gateway IP	Dest IP Address	Metric	Interface	Flags	
0.0.0.0	209.49.110.1	209.49.110.1	3	IF1	SD	
0.0.0.0	209.49.110.1	0.0.0.0	2	IF1	RD	

Update Close

Figure 18. Routing Table window

Saving your work

When you are finished configuring Router settings, click the **Save Router Settings** button (see [figure 17](#) on page 44) to save the changes.

Port Forwarding

The screenshot shows the web interface of a Patton SmartLink 4020 VoIP SoHo Router. The left sidebar contains a navigation menu with links: Home, Network - WAN, Network - LAN, Settings, DHCP, Routing, Port Forwarding (highlighted), IP Filtering, Service Access, Telephony, System, Documentation, and Logout. The main content area is titled 'Port Forwarding Configuration'. It includes a 'Reserved Ports' section listing ports 68, 5060-5070, 1900, 2828, 2929, 7001-7003, 8000-8015, and 5555. Below this is the 'Port Forwarding to LAN' section with input fields for Port Range, Protocol (set to 'Both'), and Destination Address (192.168.1.), along with a 'Save Internet Settings' button. The 'DeMilitarized Zone' section has a text description and an input field for the DMZ host IP (192.168.1.). At the bottom is a 'Save NAPT Settings' button.

Figure 19. Port Forwarding Configuration window

Reserved Ports

Specifies reserved ports that cannot be forwarded to the LAN.

Port Forwarding to LAN

In this section, you enter the specifications, which you will be forwarding to the LAN, including port range, protocol (*Both*, *TCP* or *UDP*), and destination IP address.

De-Militarized Zone

Packets which are not listed above will be forwarded to the DMZ host you specify.

Saving your work

When you are finished configuring Port Forwarding settings, click the **Save NAPT Settings** button to save the changes.

IP Filtering



Figure 20. IP Filtering window

Filter IP Range

A computer having an IP address that falls within the specified IP address range will not be allowed to access the Internet.

Saving your work

When you are finished configuring settings, click the **Save Settings** button to save the changes.

Service Access

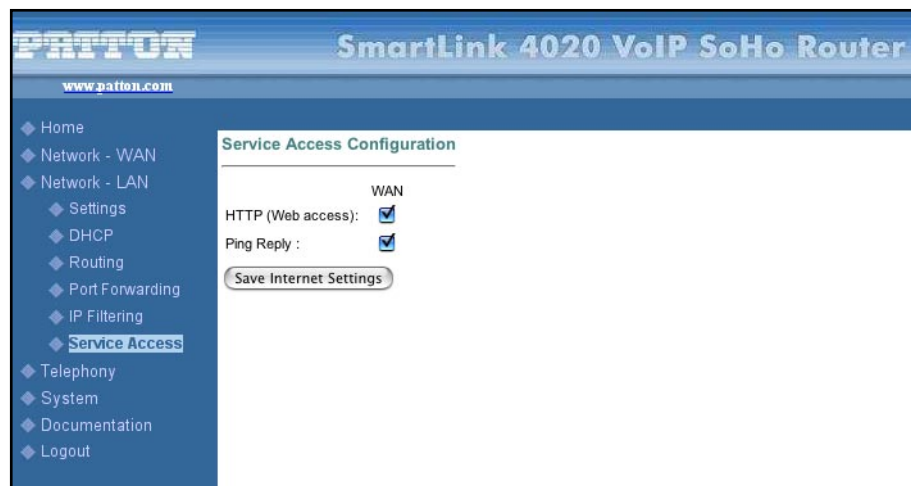


Figure 21. Service Access window

HTTP

Enable/disable WAN access by HTTP.

Ping Reply

Enable/disable PING echo.

Saving your work

When you are finished configuring settings, click the **Save Service Access Settings** button to save the changes.

Chapter 6 **Telephony**

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VoIP Status

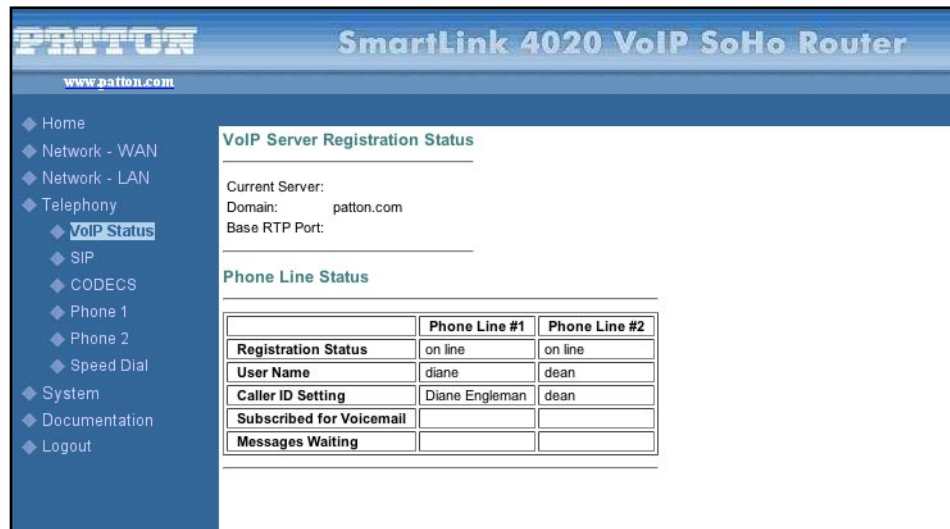


Figure 22. VoIP Status window

VoIP Server Registration Status

Current Server

Shows the current VoIP server.

Domain

The VoIP domain name is the domain name that is hosting the VoIP server..

Base RTP Port

Displays the base RTP port number for the RTP-RTCP port pair.

Phone Line Status

The *Phone Line Status* table shows the current operational status of phones 1 and 2. It displays the VoIP registration status, the configured VoIP usernames, whether they are subscribed to voicemail or have messages waiting, and the caller ID setting.

SIP

The *SIP* window contains the following sections:

- SIP Configuration (see [figure 23](#) on page 52)
- SIP Extensions (see [figure 24](#) on page 53)
- RTP Telephone Event Configuration (see [figure 25](#) on page 53)
- VoIP VLAN Configuration (see [figure 26](#) on page 54)
- SIP Parameters (see [figure 27](#) on page 54)
- NAT Traversal (see [figure 28](#) on page 55)

Note After configuring the sections, click the **Save SIP Settings** button (see figure 28 on page 55) to save the new configuration.

SIP Configuration

The screenshot shows the web interface of a Patton SmartLink 4020 VoIP SoHo Router. The title bar at the top reads "PATTON SmartLink 4020 VoIP SoHo Router" and "www.patton.com". The left sidebar contains a tree view with the following items: Home, Network - WAN, Network - LAN, Telephony (expanded), SIP (selected), CODECS, Phone 1, Phone 2, Speed Dial, System, Documentation, and Logout. The main content area is titled "SIP Configuration" and contains two sections: "SIP Server Settings" and "Gateway Settings".

SIP Server Settings (Current Server: patsip.patton.com : 5060 ; Domain: patton.com; Base RTP Port:)

- * Server Address: (IP or FQDN)
- * Port:
- Domain Name:
- Voice Port:
- ☒ Send Registration Request with Expire Time;
- ☒ Send Unregistration when boot
- ☒ Send SUBSCRIBE when boot

Gateway Settings

- Dial Plan:

* Leaving a setting blank will force the unit to use the information obtained via DHCP and/or DNS

Figure 23. SIP Configuration section of the SIP window

SIP Server Settings

The SmartLink 4020 will automatically attempt to locate the VoIP server by using the domain name specified in the WAN interface or the server will be discovered via DHCP on the WAN interface. When found, the discovered server will be listed as the *Current Server*.

Enter the following information:

- Server address—The IP address or domain name hosting the VoIP SIP server
- Port—The UDP port of the VoIP SIP server. The default is *5060*.
- Domain name—The VoIP domain name (realm) is used for validation of each phone's username
- Expiration time unit (if you choose to send registration request with an expiration time)
- Unregistration—If checked, the SmartLink will send a SIP unregistered at system reload before sending a SIP registration request.

Gateway Settings

Dial Plan. Refer to appendix C, [Dial plans](#) on page 91

SIP Extensions

SIP Extensions

☐ Support PRACK method with provisional response reliability

☐ Encode SIP URI with user parameter

☐ Send INVITE with Timer header value:

☒ Call Hold using c=0.0.0.0 in SDP

☒ send NOTIFY for REFER request

RTP Telephone Event Configuration

Send DTMF Events: Out-of-Band(RFC2833) ▾

RFC2833 signalling using payload value:

☒ Regenerate OOB DTMF tone

VoIP VLAN Configuration

Call Signalling Packets

VLAN Tag:

RTP Packets

VLAN Tag:

Figure 24. SIP Extensions section of the SIP window

Support PRACK method

Select to enable SIP PRACK support.

Encode SIP URI with user parameter

Select to encode user=phone parameter in SIP URI.

Send INVITE with Timer header

Select to encode Timer header in all INVITE requests for ringing timeout.

Call Hold using C=0.0.0.0

Using the call hold method described in RFC 2543. If unchecked, the call hold would follow the RFC 3263 method.

Send NOTIFY

Send out NOTIFY request to transferer for unattended and attended call transfer.

RTP Telephone Event Configuration

This sub-page allows configuration of the out-of-band signaling options for SIP. Select whether OOB telephone event signaling is to be done using the SIP INFO message, or to be done via RFC2833 RTP signaling. For additional information please refer RFC2833.

RTP Telephone Event Configuration

Send DTMF Events: Out-of-Band(RFC2833) ▾

RFC2833 signalling using payload value:

☒ Regenerate OOB DTMF tone

Figure 25. RTP Telephone Event Configuration section of the SIP window

VoIP VLAN Configuration

This sub-page allows configuration of specific VLAN tags that are to be applied to all SIP signalling and RTP packets used for VoIP calls. These VLAN settings will override any general VLAN settings applied to the interface.

VoIP VLAN Configuration	
Call Signalling Packets	
VLAN Tag:	
RTP Packets	
VLAN Tag:	

Figure 26. VoIP VLAN Configuration section of the SIP window

SIP Parameters

SIP Parameters	
Hook Flash MIME Type:	
SIP Timer Values (sec)	
SIP T1:	0.5
SIP T2:	4
SIP T4:	5
RTP Parameters	
RTP Port Min:	
RTP Port Max:	

Figure 27. SIP Parameters section of the SIP window

Hook Flash MIME Type

This is the MIME Type to be used in a SIP INFO message used to signal hook flash event.

SIP Timer Values (sec)

SIP T1. RFC 3261 T1 value (RTT estimate). Range: 0–64 seconds.

SIP T2. RFC 3261 T2 value (maximum retransmit interval for non-INVITE requests and INVITE responses). Range: 0–64 seconds.

SIP T4. RFC 3261 T4 value (maximum duration a message will remain in the network). Range: 0–64 seconds.

RTP Parameters

RTP Port Min and *RTP Port Max* define a range that contains at least four even-numbered ports (100–106, for example).

NAT Traversal

The screenshot shows a window titled "NAT Traversal". It contains three radio button options: "Outbound Proxy", "Stun Server IP", and "UPnP". The "NONE" option is selected. There are input fields for "Outbound Proxy IP:" and "Outbound Proxy Port:". There are also input fields for "Stun Server IP:" and "Stun Server Port:". A "Save SIP Settings" button is at the bottom.

Figure 28. NAT Traversal section of the SIP window

Outbound Proxy IP

Type the outbound proxy IP address provided by your service provider.

Outbound Proxy Port

Type the outbound proxy IP port number provided by your service provider.

Stun Server IP

Type the stun server IP address provided by your service provider.

Stun Server Port

Type the stun server port number provided by your service provider.

UPnP

Universal plug-and-play method. This method works with NAT routers that support UPnP gateway.

NONE

Select this if you will not be using NAT traversal methods.

Saving your work

When you are finished configuring SIP settings, click the **Save SIP Settings** button (see [figure 28](#)) to save the changes.

Audio/CODEC Configuration

Patton SmartLink 4020 VoIP SoHo Router

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Audio/CODEC Configuration

Selected	Silence Suppression	Preferred-Codec
☒ G711U	ON	☐
☒ G711A	ON	☐
☒ G723	ON	☐
☒ G726	ON	☐
☒ G729	ON	☐

Packetization 10ms

Jitter Buffer

☒ Adaptive Jitter Buffer: 100ms (maximum playout delay in milliseconds)

☐ Fixed Jitter Buffer: 40ms (fixed playout delay in milliseconds)

☐ Automatically switch to Fixed Jitter Buffer upon fax/modem tone detection

Save CODECS Settings

Figure 29. Audio/CODEC Configuration window

CODECS

- *Selected* column: Check the codecs that are acceptable to use
- *Silence Suppression* column: Configure as appropriate
- *Preferred-Codec* column: Select the codec to be used as the first choice when encoding voice

Packetization

Configure the packet sending increments.

Jitter Buffer

Configure the timing of the voice buffering:

- Selection between adaptive or fixed jitter buffer. Default = ADAPTIVE .
- Set the adaptive jitter buffer maximum playout delay. Default = 100ms or Fixed jitter buffer playout delay. Default = 40ms
- Whether or not to automatically switch from an adaptive jitter buffer to a fixed jitter buffer upon fax/modem tone detection

Saving your work

When you are finished configuring CODEC settings, click the **Save CODECS Configuration** button to save the changes.

Phone 1 & Phone 2

The *Phone 1* and *Phone 2* windows contains the following sections:

- User Information (see [figure 30](#))
- Supplementary Service Settings (see [figure 31](#) on page 58)
- Dial Out Type (see [figure 32](#) on page 60)
- Call Forward Settings (see [figure 26](#) on page 54)
- Selective Call Forward Settings (see [figure 27](#) on page 54)
- Incoming Call Block (see [figure 28](#) on page 55)
- Distinctive Ring Settings (see [figure 28](#) on page 55)
- HTTP Digest Setting (see [figure 28](#) on page 55)

Note After configuring the sections, click the **Save** button (see [figure 37](#) on page 62) to save the new configuration.

User Information

The screenshot shows the Patton SmartLink 4020 VoIP SoHo Router configuration interface. The left sidebar contains a navigation menu with options: Home, Network - WAN, Network - LAN, Telephony (selected), VoIP Status, SIP, CODECS, Phone 1 (highlighted), Phone 2, Speed Dial, System, Documentation, and Logout. The main content area is titled 'User Information' and contains the following fields and settings:

Phone Number:	diane	CallerID Name:	Diane Engleman
User Name:	diane	Password:	XXXX
Port:	5060	SIP Registration status:	on line

Below the User Information section is the 'Supplementary Service Settings' section, which contains a grid of settings with dropdown menus:

Cfwd All Serv:	no	Cfwd Busy Serv:	yes
Cfwd Sel Serv:	no	Cfwd Conditional Serv:	no
Three Way Conf Serv:	yes	Call Waiting Serv:	yes
Incoming Call Block Serv:	yes	Block ANC Serv:	no
Dist Ring Serv:	no	CID Serv:	yes
Call Transfer Serv:	yes	Call Return Serv:	yes
IP Dialing Serv:	no	DND Serv:	no
Speed Dial Serv:	yes	Self CID Block Serv:	no
MWI Serv:	yes		

Figure 30. User Information section of Phone 1 or Phone 2 window

Phone Number

Type the telephone number or the user part of the SIP registration.

User Name

Type the user name that will be used for validation of the VoIP SIP registration or call invitation.

Port

Specify the signaling port.

CallerID Name

Input the caller ID name.

Password

Input the password.

Supplementary Service Settings

These settings enable or disable each of following calling features. Most features can also be enabled or disabled by using the telephone handset (see section “[Supplementary Service Keys](#)” on page 72 for details).

Supplementary Service Settings			
Cfwd All Serv:	no	Cfwd Busy Serv:	yes
Cfwd Sel Serv:	no	Cfwd Conditional Serv:	no
Three Way Conf Serv:	yes	Call Waiting Serv:	yes
Incoming Call Block Serv:	yes	Block ANC Serv:	no
Dist Ring Serv:	no	CID Serv:	yes
Call Transfer Serv:	yes	Call Return Serv:	yes
IP Dialing Serv:	no	DND Serv:	no
Speed Dial Serv:	yes	Self CID Block Serv:	no
MWI Serv:	yes		

Figure 31. Supplementary Service Settings section of Phone 1 or Phone 2 window

Cfwd All Serv

Enable call forward all service—All received calls will be forwarded to the destination specified under the call forwarding settings.

Cfwd No Ans Serv

Enable call forward no answer service—All received calls that are not answered will be forwarded to the destination specified under the call forwarding settings.

Three Way Conf Serv

Enable three way conference service—This service enables you to add a third party to an existing two-way conversation, and hold a three-party conference call.

Incoming Call Block Serv

Enable incoming call block service—Allows for selected inbound caller IDs to be blocked.

Dist Ring Serv

Enable distinctive ringing service—This service allows additional telephone numbers to be added to an existing telephone line and when a caller dials one of these “distinctive ringing” numbers, the telephone will ring in a unique pattern to indicate which number is being dialed.

Call Transfer Serv

Enable call transfer service—This service allows you to transfer calls to another number.

IP Dialing Serv

Enable IP dialing service—This service allows user addresses formatted as aliases or e-mail addresses to be used to make calls.

MWI Serv

Enable MWI service—The message-waiting indicator (MWI) is a common feature of telephone networks and uses an audible indication (such as a special dial tone) to indicate that a voice mail message is waiting.

Speed Dial Serv

Enable speed dial service.

Cfwd Busy Serv

Enable call forward on busy service.

Cfwd Sel Serv

Enable call forward selective service.

Call Waiting Serv

Enable call waiting service.

Block ANC Serv

Enable block anonymous calls service—When enabled, blocks calls from anonymous callers.

CID Serv

Enable caller ID service.

Call Return Serv

Enable call return service—When enabled, allows you to return a call to the last incoming call, whether answered or not.

DND Serv

Enable do not disturb service.

Self CID Block Serv

Enable blocking self caller ID shown in the outgoing message.

Dial Out Type



Dial Out Type	
Dial Out Type:	NORMAL
Hot Line Number:	
Warm Line Number:	227

Figure 32. Dial Out Type section of Phone 1 or Phone 2 window

Dial Out Type

This syntax allows for the implementation of Hot-Line and Warm-Line services. To achieve this, one sequence in the plan must start with a pause, with a 0 delay for a Hot Line, and a non-zero delay for a Warm Line.

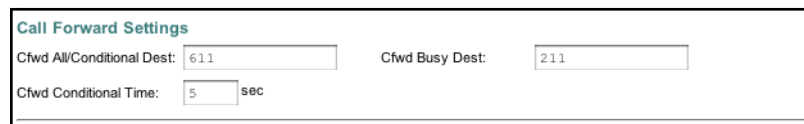
Hot Line Number

Input the number for Hot Line function—This number will be called immediately when the telephone goes off-hook.

Warm Line Number

Input the number for Warm Line function—The warm line function provides a 6-second period after the telephone goes off-hook for the user to dial a number different than that specified for the warm line. If the 6 seconds have expired with no other number being dialed, the warm line number will be dialed.

Call Forward Settings



Call Forward Settings	
Cfwd All/Conditional Dest:	611
Cfwd Busy Dest:	211
Cfwd Conditional Time:	5 sec

Figure 33. Call Forward Settings section of Phone 1 or Phone 2 window

Cfwd All Dest

Input the destination for all call forwarding.

Cfwd Busy Dest

Input the destination for all busy call forwarding.

Selective Call Forward Settings

Selective Call Forward Settings			
Incoming caller #1	dblatt	forward destination #1	611
Incoming caller #2	joe@patton.com	forward destination #2	611
Incoming caller #3		forward destination #3	
Incoming caller #4		forward destination #4	
Incoming caller #5		forward destination #4	
Incoming caller #6		forward destination #4	
Incoming caller #7		forward destination #7	
Incoming caller #8		forward destination #8	

Figure 34. Selective Call Forward Settings section of Phone 1 or Phone 2 window

Incoming caller #1–8

Up to 8 incoming calls can be selected for call forwarding.

Forward destination #1–8

Up to 8 destinations to which incoming calls can be forwarded.

Incoming Call Block

Incoming Call Block	
Block Caller ID:	joe@patton.com

Figure 35. Incoming Call Block section of Phone 1 or Phone 2 window

Block Caller ID

Specify a Caller ID for call block.

Distinctive Ring Settings

Distinctive Ring Settings			
Ring #1 Caller:		Ring #2 Caller:	dblatt
Ring #3 Caller:	benham	Ring #4 Caller:	
Ring #5 Caller:		Ring #6 Caller:	
Ring #7 Caller:		Ring #8 Caller:	

Figure 36. Distinctive Ring Settings section of Phone 1 or Phone 2 window

Ring #1–8 Caller

Up to 8 callers can be assigned a specific ring tone.

HTTP Digest Setting

SIP INVITE must contain a valid Authorization header that is based on an Auth ID and a password using MD5 digest algorithm. The Auth ID must be specified in the username parameter in the Authorization header.

HTTP Digest Setting

Password:

Figure 37. HTTP Digest Setting section of Phone 1 or Phone 2 window

Saving your work

When you are finished configuring settings, click the **Save** button (see [figure 37](#)) to save the changes.

Speed Dial

PATTON SmartLink 4020 VoIP SoHo Router
www.patton.com

◆ Home
◆ Network - WAN
◆ Network - LAN
◆ Telephony
 ◆ VoIP Status
 ◆ SIP
 ◆ CODECS
 ◆ Phone 1
 ◆ Phone 2
 ◆ **Speed Dial**
◆ System
◆ Documentation
◆ Logout

Speed Dial Settings

Line 1 Speed Dial Settings

Speed Dial 1 Phone Number/IP Dialing: @ :

Speed Dial 2 Phone Number/IP Dialing: @ :

Speed Dial 3 Phone Number/IP Dialing: @ :

Speed Dial 4 Phone Number/IP Dialing: @ :

Speed Dial 5 Phone Number/IP Dialing: @ :

Speed Dial 6 Phone Number/IP Dialing: @ :

Speed Dial 7 Phone Number/IP Dialing: @ :

Speed Dial 8 Phone Number/IP Dialing: @ :

Line 2 Speed Dial Settings

Speed Dial 1 Phone Number/IP Dialing: @ :

Speed Dial 2 Phone Number/IP Dialing: @ :

Speed Dial 3 Phone Number/IP Dialing: @ :

Speed Dial 4 Phone Number/IP Dialing: @ :

Speed Dial 5 Phone Number/IP Dialing: @ :

Speed Dial 6 Phone Number/IP Dialing: @ :

Speed Dial 7 Phone Number/IP Dialing: @ :

Speed Dial 8 Phone Number/IP Dialing: @ :

Figure 38. Speed Dial window

Line 1 Speed Dial Settings

Speed Dial Serv

Enable Speed Dial Service.

Speed Dial 1–8 Phone Number/IP Dialing

Target 1–8 phone number (or URL) assigned to speed dial.

Line 2 Speed Dial Settings

Speed Dial Serv

Enable Speed Dial Service.

Speed Dial 1–8 Phone Number/IP Dialing

Target 1–8 phone number (or URL) assigned to speed dial.

Saving your work

When you are finished configuring settings, click the **Save Settings** button (see [figure 38](#)) to save the changes.

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Set Security Password



The screenshot shows the 'Set Security Password' window of the SmartLink 4020 VoIP SoHo Router web interface. The interface has a blue header with the 'PATTON' logo and the title 'SmartLink 4020 VoIP SoHo Router'. Below the header is a navigation menu on the left with options: Home, Network - WAN, Network - LAN, Telephony, System, Security (highlighted), Configuration, Manual Upgrade, Auto Upgrade, Localization, SNMP, Reload, Documentation, and Logout. The main content area is titled 'Set Security Password' and contains the following fields and controls:

- Text: Password is currently installed
- Web Page Protect: YES (with a dropdown arrow)
- New Root Password: [text input field]
- Confirm new password: [text input field]
- New User Password: [text input field]
- Confirm new password: [text input field]
- Save Settings button

Figure 39. Set Security Password window

Web Page Protect

Enable or disable web access protection.

New Root Password

Type the password for administrator.

New User Password

Type the password for User.

Confirm new password

Re-enter the password for confirmation.

Saving your work

When you are finished configuring security settings, click the **Save Settings** button to save the changes.

Configuration



Figure 40. Configuration window

Logging

Enable Syslog

Enable or disable system logging.

Syslog Server

Specify the syslog server IP address. This feature specifies the server for logging IAD system information and critical events.

Enable Debug

Enable or disable System Debug.

Debug Server

The debug server IP address and port. This feature specifies the server for logging IAD debug information. The level of detailed output depends on the debug level parameter setting.

Debug Connect Port

The port number of the debug server to be used for receiving debug messages from the IAD.

Saving your work

When you are finished configuring settings, click the **Save** button to save the changes.

Manual Upgrade

For both HTTP and TFTP methods, the device will reboot itself into the downloader mode if the main application is executing, and proceed with the ROM file download and permanent write of the application to the device's flash memory. After the download is completed, the download status page will be displayed.

The screenshot shows the 'Manual Upgrade' window of the SmartLink 4020 VoIP SoHo Router web interface. The interface has a blue header with the Patton logo and the title 'SmartLink 4020 VoIP SoHo Router'. Below the header is a navigation menu on the left with options: Home, Network - WAN, Network - LAN, Telephony, System, Security, Configuration, Manual Upgrade (highlighted), Auto Upgrade, Localization, SNMP, Reload, Documentation, and Logout. The main content area is titled 'Download' and contains a warning: 'Warning! The download process will reset the unit into the download mode. This will terminate all network connections and reset your browser connection.' Below the warning, there are two sections: 'TFTP Download method (Select remote TFTP server IP address and filename)' and 'HTTP Download method (Select filename on local browser machine)'. The TFTP section has input fields for 'TFTP Server IP:' and 'Filename:', and a 'Start TFTP Download' button. The HTTP section has a 'Filename:' label, a 'Choose File' button, and a 'Start HTTP Download' button.

Figure 41. Manual Upgrade window

Auto Upgrade

The screenshot shows the 'AutoUpgrade' window of the SmartLink 4020 VoIP SoHo Router web interface. The interface has a blue header with the Patton logo and the title 'SmartLink 4020 VoIP SoHo Router'. Below the header is a navigation menu on the left with options: Home, Network - WAN, Network - LAN, Telephony, System, Security, Configuration, Manual Upgrade, Auto Upgrade (highlighted), Localization, SNMP, Reload, Documentation, and Logout. The main content area is titled 'AutoUpgrade' and contains the following settings: 'Enable Auto Upgrade:' with a dropdown menu set to 'NO', 'Auto Upgrade Protocol:' with a dropdown menu set to 'HTTP', 'Upgrade Server:' with a text input field containing 'update.patton.com', and 'Auto Upgrade URL:' with an empty text input field. Below these settings is a 'Start TFTP Download' button.

Figure 42. AutoUpgrade window

Enable Auto Upgrade

Enable or disable auto upgrade—If enabled, the SmartLink 4020 will automatically check the upgrade server for new system firmware and software upon reload or power cycle.

Auto Upgrade Protocol

Select the protocol for auto upgrade

Upgrade Server

Specify the auto upgrade server IP address

Auto Upgrade URL

Specify the auto upgrade server by URL. This field is dependent on the auto upgrade service package installation. The default value is iadmgr.

Localization

The *Localization* window contains the following sections:

- Call Progress Tones (see [figure 43](#))
- Distictive Ring Setting (see [figure 44](#) on page 71)
- Supplementary Service Keys (see [figure 45](#) on page 72)
- Control Timer Values (see [figure 46](#) on page 74)
- Ring Setting (see [figure 47](#) on page 75)
- Miscellaneous (see [figure 48](#) on page 75)
- FXS Port Polarity (see [figure 49](#) on page 76)

Note After configuring the sections, click the **Save** button (see [figure 49](#) on page 76) to save the new configuration.

Call Progress Tones

Choose the correct country for a proper impedance match, as well as the NTP Server, and Time Zone. Select *Adjust clock for daylight savings* if applicable.

The screenshot displays the web interface of a Patton SmartLink 4020 VoIP SoHo Router. The top header includes the Patton logo and the router model name. Below the header is a navigation sidebar with a tree view of configuration options. The 'Localization' option is selected and highlighted. The main content area shows the 'Call Progress Tones' configuration page, which includes input fields for various tones: DIALTONE, PROMPT, CONFIRM, HOLDING, BUSY, RINGBACK, and OFF HOOK WARNING. Each field is represented by a text input box.

Figure 43. Call Progress Tones section of Localization window

Dial Tone

Played when prompting the user to enter a phone number.

Prompt Tone

Played when prompting the user to enter a call forward phone number.

Confirm Tone

This should be a brief tone to notify the user that the last input value has been accepted.

Holding Tone

Indicate to the local user that the far end has placed the call on hold.

Busy Tone

Played when a 486 RSC is received for an outbound call.

Ring Back Tone

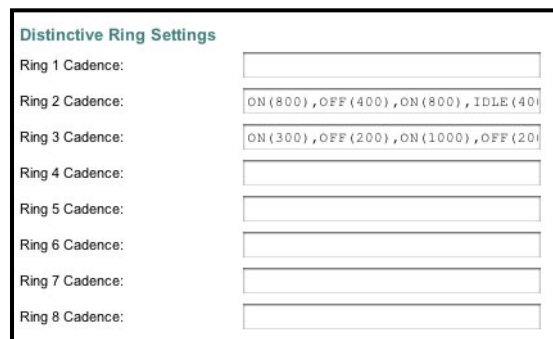
Played for an outbound call when the far end is ringing.

Off Hook Warning

Played when the subscriber does not place the handset on the cradle properly.

Distinctive Ring Setting 1-8

Specify up to 8 sets of distinctive ring cadence (refer the [Appendix 2](#)).



The screenshot shows a window titled "Distinctive Ring Settings". It contains eight rows, each with a label "Ring X Cadence:" followed by a text input field. The input fields for Ring 2 and Ring 3 contain pre-filled cadence strings: "ON(800),OFF(400),ON(800),IDLE(400)" and "ON(300),OFF(200),ON(1000),OFF(200)" respectively. The other input fields are empty.

Ring X Cadence:	Value
Ring 1 Cadence:	
Ring 2 Cadence:	ON(800),OFF(400),ON(800),IDLE(400)
Ring 3 Cadence:	ON(300),OFF(200),ON(1000),OFF(200)
Ring 4 Cadence:	
Ring 5 Cadence:	
Ring 6 Cadence:	
Ring 7 Cadence:	
Ring 8 Cadence:	

Figure 44. Distinctive Ring Setting section of Localization window

Supplementary Service Keys

Note Following function key must be start by ‘*’, ‘#’ character, or f(flash hook) and follow a 1 or 2 numeric digit(s).

Supplementary Service Keys			
Cfwd All Serv Act Keys:	* 97	Deact Keys:	# 97
Cfwd Busy Act Keys:	* 98	Deact Keys:	* 98
Cfwd Sel Act Keys:	* 96	Deact Keys:	# 96
Call Waiting Act Keys:	* 91	Deact Keys:	# 91
Incoming Call Block Act Keys:	* 95	Deact Keys:	# 95
Block ANC Act Keys:	* 94	Deact Keys:	# 94
Dist Ring Act Keys:	* 90	Deact Keys:	# 90
Warm Line Act Keys:	* 99	Deact Keys:	# 99
DND Act Keys:	* 82	Deact Keys:	# 82
IP Dialing Act Keys:	* 80	Deact Keys:	# 80
Speed Dialing Act Keys:	* 81	Deact Keys:	# 81
Income CID Act Keys:	* 92	Deact Keys:	# 92
Self CID Block Keys:	* 93	Deact Keys:	# 93
Call Return Keys:	* 60	W-L Num Keys:	* 70
SP-D Num Keys:	* 71	IP-D Num Keys:	* 72
CFWALL Num Keys:	* 73	Call Hold Keys:	f1
Call Alternative Keys:	f*	Conference Keys:	f7
Conference drop Keys:	f8	Transfer Keys:	f4

Figure 45. Supplementary Service Keys section of Localization Window

Cfwd All Serv Act Keys

Forward all calls to the target specified after the activation key.

Cfwd Busy Act Keys

Forward busy calls to the target specified after the activation key.

Cfwd Sel Act Keys

Specified after the activation key.

Call Waiting Act Keys

Call wait specified after the activation key.

Incoming Call Block Act Keys

Incoming call specified after the activation key.

Block ANC Act Keys

Block Anonymous Calls specified after the activation key.

Dist Ring Act Keys

Dist Ring specified after the activation key.

Warm Line Act Keys

Warm Line specified after the activation key.

DND Act Keys

DND Act specified after the activation key.

IP Dialing Act Keys

IP Dialing specified after the activation key.

Speed Dialing Act Keys

Speed Dialing specified after the activation key.

Income CID Act Keys

Activate incoming caller ID display.

Self CID Block Keys

Blocking self CID shown in the outgoing message after the activation key.

Deact Keys

The key for deactivate all above settings.

Call Return Keys

Start Call Return Function key.

W-L Num Keys

Start to config Warm Line number function key (i.e., *xx+ warm line number).

SP-D Num Keys

Start to config Speeding Dialing function key.

IP-D Num Keys

Start to config IP Dialing function key.

CFWALL Num Keys

Start to config Call forward all number function key.

Call Hold Keys

Call hold function key.

Call Alternative Keys

Call alternative function key.

Conference Keys

Conference function key.

Conference Drop Keys

Drop conference call function key.

Transfer Keys

Call Transfer function key.

Control Timer Values

Control Timer Values			
Hook Flash Timer: (100 ~ 1100 ms)	1100	ms	SIP Session Timer value:
Conditional Call Forwarding Timer:	10	sec	Warm Line Delay: 6000 ms
Interdigit Timer:	4000	ms	Offhook Idle Time: 8000 ms
Offhook Warning Tone Time:	12000	ms	

Figure 46. Control Timer Values section of Localization window

Hook Flash Timer

Maximum on-hook time before off-hook to qualify as hookflash. More than this the on-hook event is treated as on-hook.

Minimum on-hook time before off-hook to qualify as hookflash. Less than this the on-hook event is ignored.

SIP Session Timer value

SIP Session Timer.

Conditional Call Forwarding Timer

Specified a time period as a call forward condition.

Warm Line Delay

Specify a time period as a delay time for warm line dialing.

Interdigit Timer

Specify a time period between entering digits when dialing.

Offhook Idle Time

Specify a time period for offhook dialing.

Offhook Warning tone time

Specify a time period as a delay time to play a warning tone.

Ring Setting



The screenshot shows a window titled "Ring Setting". It contains three fields: "Ring Waveform:" with a dropdown menu set to "Sinusoid", "Ring Frequency:" with an empty text box, and "Ring Voltage:" with an empty text box.

Figure 47. Ring Setting section of Localization window

Ring Waveform

Specify the ring tone waveform.

Ring Frequency

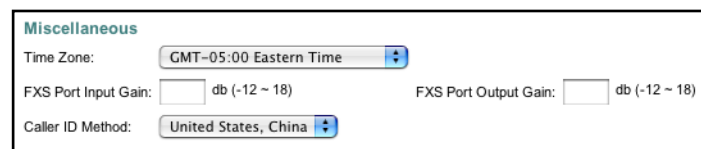
Specify the ring tone frequency.

Ring Voltage

Specify the ring tone voltage.

Miscellaneous

Choose the correct country for a proper impedance match, as well as the NTP Server, and Time Zone. Select *Adjust clock for daylight savings* if applicable.



The screenshot shows a window titled "Miscellaneous". It contains four fields: "Time Zone:" with a dropdown menu set to "GMT-05:00 Eastern Time", "FXS Port Input Gain:" with a text box and "db (-12 ~ 18)" label, "FXS Port Output Gain:" with a text box and "db (-12 ~ 18)" label, and "Caller ID Method:" with a dropdown menu set to "United States, China".

Figure 48. Miscellaneous section of Localization window

Time Zone

Specify your time zone.

NTP Server

Specify the NTP server if available

FXS port Input Gain

Adjust the input gain level for FXS port.

FXS port Output Gain

Adjust the output gain level for FXS port.

Caller ID Method

Specify the Caller ID format.

FXS Port Polarity Configuration

FXS Port Polarity Configuration

Idle Polarity: Forward Caller Conn Polarity: Forward

save

Figure 49. FXS Port Polarity section of Localization window

Idle Polarity

Polarity before call connected.

Caller Conn Polarity

Polarity after outbound call connected.

Saving your work

When you are finished configuring settings, click the **Save** button (see [figure 49](#)) to save the changes.

SNMP Configuration

Patton SmartLink 4020 VoIP SoHo Router

www.patton.com

◆ Home
◆ Network - WAN
◆ Network - LAN
◆ Telephony
◆ System
 ◆ Security
 ◆ Configuration
 ◆ Manual Upgrade
 ◆ Auto Upgrade
 ◆ Localization
 ◆ **SNMP**
 ◆ Reload
◆ Documentation
◆ Logout

SNMP Configuration

SNMP Trap Configuration

IP address: Trap Community:

SNMP Community Configuration

Read Community: Write Community:

SNMP System Configuration

System Description:

System Objectid:

Save SNMP Settings

Figure 50. SNMP Configuration window

SNMP Trap Configuration

IP address

Trap host IP address.

Trap Community

The community name used by the SNMP manager to verify traps. The default value is *public*.

SNMP Community Configuration

Read Community

The community name used by the SNMP manager when reading SNMP data items from a client MIB. The default value is *public*.

Write Community

The community name used by the SNMP manager when setting SNMP data items in a client's MIB. The default value is *public*.

SNMP System Configuration

System Description

Description of the unit (e.g. "John's phone")

System Object Id

A vendor's enterprise ID

Saving your work

When you are finished configuring settings, click the **Save SNMP Settings** button to save the changes.

Reload

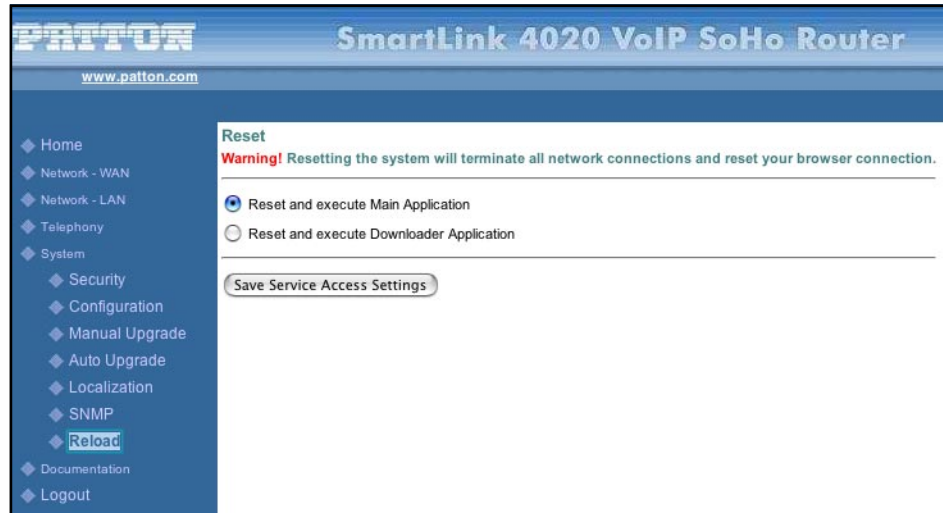


Figure 51. Reset window



Resetting the system will terminate all network connections and reset your browser connection.

Chose the *Reset and execute Main Application* option, for execution of the main application which you have configure, once you reset the system.

Chose the *Reset and execute Downloader Application* option, to being downloading, once you reset the system.

Chapter 8

Documentation

Chapter contents

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Introduction

Clicking the **Documentation** link (see [figure 52](#)) connects to the Patton website to display the most current version of the *SmartLink 4020 Getting Started Guide* in portable document format (PDF).



Figure 52. Documentation link

Chapter contents

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Introduction

Clicking the **Logout** button (see [figure 53](#)) exits you from the SmartLink management utility and returns you to the password verification page (see [figure 54](#)).



Figure 53. Logout window



Figure 54. Password verification page

Chapter 10 **Contacting Patton for assistance**

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Introduction

This chapter contains the following information:

- “[Contact information](#)”—describes how to contact Patton technical support for assistance.
- “[Warranty Service and Returned Merchandise Authorizations \(RMAs\)](#)”—contains information about the RAS warranty and obtaining a return merchandise authorization (RMA).

Contact information

Patton Electronics offers a wide array of free technical services. If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

Patton support headquarters in the USA

- Online support: available at **www.patton.com**
- E-mail support: e-mail sent to **support@patton.com** will be answered within 1 business day
- Telephone support: standard telephone support is available five days a week—from **8:00 am to 5:00 pm EST (1300 to 2200 UTC/GMT)**—by calling **+1 (301) 975-1007**
- Fax: **+1 (253) 663-5693**

Alternate Patton support for Europe, Middle East, and Africa (EMEA)

- Online support: available at **www.patton-inalp.com**
- E-mail support: e-mail sent to **support@patton-inalp.com** will be answered within 1 business day
- Telephone support: standard telephone support is available five days a week—from **8:00 am to 5:00 pm CET (0900 to 1800 UTC/GMT)**—by calling **+41 (0)31 985 25 55**
- Fax: **+41 (0)31 985 25 26**

Warranty Service and Returned Merchandise Authorizations (RMAs)

Patton Electronics is an ISO-9001 certified manufacturer and our products are carefully tested before shipment. All of our products are backed by a comprehensive warranty program.

Note If you purchased your equipment from a Patton Electronics reseller, ask your reseller how you should proceed with warranty service. It is often more convenient for you to work with your local reseller to obtain a replacement. Patton services our products no matter how you acquired them.

Warranty coverage

Our products are under warranty to be free from defects, and we will, at our option, repair or replace the product should it fail within one year from the first date of shipment. Our warranty is limited to defects in workmanship or materials, and does not cover customer damage, lightning or power surge damage, abuse, or unauthorized modification.

Out-of-warranty service

Patton services what we sell, no matter how you acquired it, including malfunctioning products that are no longer under warranty. Our products have a flat fee for repairs. Units damaged by lightning or other catastrophes may require replacement.

Returns for credit

Customer satisfaction is important to us, therefore any product may be returned with authorization within 30 days from the shipment date for a full credit of the purchase price. If you have ordered the wrong equipment or you are dissatisfied in any way, please contact us to request an RMA number to accept your return. Patton is not responsible for equipment returned without a Return Authorization.

Return for credit policy

- Less than 30 days: No Charge. Your credit will be issued upon receipt and inspection of the equipment.
- 30 to 60 days: We will add a 20% restocking charge (crediting your account with 80% of the purchase price).
- Over 60 days: Products will be accepted for repairs only.

RMA numbers

RMA numbers are required for all product returns. You can obtain an RMA by doing one of the following:

- Completing a request on the RMA Request page in the *Support* section at **www.patton.com**
- By calling **+1 (301) 975-1007** and speaking to a Technical Support Engineer
- By sending an e-mail to **returns@patton.com**

All returned units must have the RMA number clearly visible on the outside of the shipping container. Please use the original packing material that the device came in or pack the unit securely to avoid damage during shipping.

Shipping instructions

The RMA number should be clearly visible on the address label. Our shipping address is as follows:

Patton Electronics Company

RMA#: xxxx

7622 Rickenbacker Dr.

Gaithersburg, MD 20879-4773 USA

Patton will ship the equipment back to you in the same manner you ship it to us. Patton will pay the return shipping costs.

Appendix A **Compliance information**

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Compliance

EMC Compliance:

FCC Part 15, Class B

EN55022, Class B

EN55024

Safety Compliance

EN60950-1

FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the Instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause radio interference in which case the user will be required to correct the interference at his or her own expense.

Radio and TV Interference

The SmartLink router generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. The SmartLink router have been tested and found to comply with the limits for a Class B computing device in accordance with specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the SmartLink router does cause interference to radio or television reception, which can be determined by disconnecting the unit, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

CE-Mark Warning

This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

CE notice (Declaration of Conformity)

We certify that the apparatus identified in this document conforms to the requirements of Council Directive 1999/5/EC on the approximation of the laws of the member states relating to Radio and Telecommunication Terminal Equipment and the mutual recognition of their conformity.

The safety advice in the documentation accompanying this product shall be obeyed. The conformity to the above directive is indicated by the CE sign on the device.

Appendix B Specifications

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Voice Connectivity

2-wire Loopstart, RJ-11/12

Short haul loop 1.1 km @3REN

Caller-ID Type-1/2 FSK and ITU V.23/Bell 202 generation

Connectivity

2 10/100 Full Duplex/Autosensing Ethernet RJ-45

Voice Processing (signalling dependent)

SIP

MGCP

- Packet Cable NCS 1.0
- IETF MGCP 1.0

Voice codes

- G.711 A-Law/ μ -Law (64 kbps)
- G.726 (ADPCM 40, 32, 24, 16 kbps)
- G.723.1 (5.3 or 6.3 kbps)
- G.729ab (8 kbps)

G.168 echo cancellation

4 parallel voice connections

DTMF detection and generation

Carrier tone detection and generation

Silence suppression and comfort noise

Configurable dejitter buffer

DTFM in-band & out-of-band

Configurable transmit packet length

RTP/RTCP (RFC 1889)

Fax and Modem Support

G.711 transparent FAX

T.38 Fax relay (9.6 k, 14.4 k)

Voice Services/Features

Call forwarding
Call transfer
Call hold
Call waiting
3-way calling

IP Services

IPv4 router; RIPv1, v2 (RFC 1058 and 2453)
IP filtering
NAPT
NTP
DHCP client & server
PPPoE
IPSEC VPN
Programmable static routes
ICMP redirect (RFC 792); Packet fragmentation
DiffServe/ToS set or queue per header bits
VLAN support 802.1p/q
AES/DES/3DES Encryption

Management

Browser configuration interface
TFTP configuration & firmware loading
SNMP v2 agent (MIB II and private MIB)

Operating Environment

Operating temperature: 0–40°C (32–104°F)
Operating humidity: 5–80% (non condensing)

System

Power: 100–240 VAC (50/60 Hz)

Appendix C **Dial plans**

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Introduction

The H.323 and SIP code will allow provisioning (via web browser) of the dial plan. A dial plan gives the unit a map to determine when a complete number has been entered and should be passed to the gatekeeper for resolution into an IP address. Dial plans are expressed using the same syntax as used by MGCP NCS specification.

The formal syntax of the dial plan is described by the following notation:

```
Digit ::= "0" | "1" | "2" | "3" | "4" | "5" | "6" | "7" | "8" | "9"
Timer ::= "T" | "t"
Letter ::= Digit | Timer | "#" | "*" | "A" | "a" | "B" | "b" | "C" | "c" | "D" | "d"
Range ::= "X" | "x" -- matches any digit
| "[" Letters "]" -- matches any of the specified letters
Letters ::= Subrange | Subrange Letters
Subrange ::= Letter -- matches the specified letter
| Digit "-" Digit -- matches any digit between first and last
Position ::= Letter | Range
StringElement ::= Position -- matches any occurrence of the position
| Position "." -- matches an arbitrary number of occurrences
including 0
String ::= StringElement | StringElement String
StringList ::= String | String "|" StringList
DialPlan ::= String | "(" StringList ")"
```

A dial plan, according to this syntax, is defined either by a (case insensitive) string or by a list of strings. Regardless of the above syntax a timer is only allowed if it appears in the last position in a string (12T3 is not valid). Each string is an alternate numbering scheme. The unit will process the dial plan by comparing the current dial string against the dial plan, if the result is underqualified (partial matches at least one entry) then it will do nothing further. If the result matches or is over-qualified (no further digits could possibly produce a match) then send the string to the gatekeeper and clear the dial string. The Timer T is activated when it is all that is required to produce a match. The period of timer T is 4 seconds. For example a dial plan of (xxxT|xxxxx) will match immediately if 5 digits are entered, it will also match after a 4 second pause when 3 digits are entered.

Sample Dial Plans

Simple Dial Plan

Allows dialing of 7-digit numbers (e.g. 5551234) or an operator on 0. Dial plan is (0T|xxxxxxx)

Non-dialed Line Dial Plan

As soon as handset is lifted the unit contacts the gatekeeper (used for systems where DTMF detection is done in-call). Dial plan is (x.) i.e. match against 0 (or more) digits. Note: the dot ‘.’

Complex Dial Plan

- Local operator on 0, long distance operator on 00
- 4-digit local extension number starting with 3, 4, or 5
- 7-digit local numbers are prefixed by an 8

- 2-digit star services (e.g. 69)
- 10-digit long distance prefixed by 91
- International numbers starting with 9011+variable number of digits.

Dial plan for this is:

```
(0T|00T|[3-5]xxx|8xxxxxxx|*xx|91xxxxxxxxxx|9011x.T)
```

Appendix D **Calling Features**

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Introduction

The SL4020 family supports advanced calling features that can be turned on and off from phones attached to the SL4020 (see [table 2](#)).

Note Your telephony service provider must enable your service for these calling features to work.

Note F in [table 2](#) refers to the *hook flash* event.

Table 2. Calling features

Feature	Keypad	Feature	Keypad
Call Hold	F1	Call Retrieve	F*
Conference	F7	Conference Drop	F8
Call Transfer	F4		
Do not Disturb ON	*82	Do not Disturb OFF	#82
Distinctive ON	*90	Distinctive OFF	#90
Call Waiting ON	*91	Call Waiting OFF	#91
Incoming Caller ID Display ON	*92	Incoming Caller ID Display OFF	#92
Self Caller ID Block Service ON	*93	Self Caller ID Block Service OFF	#93
Anonymous Call Reject ON	*94	Anonymous Call Reject OFF	#94
Incoming Call Block ON	*95	Incoming Call Block OFF	#95
Call Forward Selective ON	*96	Call Forward Selective OFF	#96
Call Forward All ON	*97	Call Forward All OFF	#97
Call Forward Busy ON	*98	Call Forward Busy OFF	#98
Warm Line ON	*99	Warm Line OFF	#99
IP Dialing ON	*80	IP Dialing OFF	#80
Speed Dialing ON	*81	Speed Dialing OFF	#81
Call Return	*60		
Config Warm Line Number (*70yyyyy where yyyyy = number to call)	*70		
Config Speed Dialing Number (*71xyyyyy where x = speed dial key and yyyyy = number to call)	*71		
Config IP Dialing (*72xxx*xxx*xxx*xxx*yyyy where xxx = IP address and yyyy = optional port number)	*72		
Set Call Forward Number (Wait for 3 short confirmation tones before hanging up)	*73		
Access Voicemail	*86		

Appendix E **Ring Cadence Configuration**

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Introduction

The following is a sample ring cadence patter configuration:

```
Timeval ::= time in milliseconds
Repeatval ::= # of cycles to repeat
Tonename ::= "RING_0" | "RING_1" | "RING_2" | "RING_3" | "RING_4"
| "RING_5" | "RING_6" | "RING_7" | "RING_8" | "RING_9"
Idle ::= "IDLE"
Active ::= "ON" | "OFF"
Inactive ::= Idle "(" Timeval ")"
Active ::= Active "(" Timeval ")"
Sequence ::= Active | Active "," Sequence
Repetition ::= "[" Sequence "]" Repeatval
Repeat ::= "R"
Cycle ::= Sequence | Repetition
Fullsequence ::= Cycle | Cycle "," Fullsequence
Cadence ::= Fullsequence | Fullsequence "," Repeat | Fullsequence
"," Inactive "," Repeat
Ring ::= Cadence
```

For the ring cadence pattern above, the configuration would be:

```
RING_0 ON(200),OFF(300),ON(100),OFF(400),ON(200),OFF(4000),R
```

Note The Bellcore standard ring cadence patterns are shown in [table 3](#).

Table 3. Bellcore standard ring cadence patterns

Name	Value
RING_0	ON(2000), IDLE(4000), R
RING_1	ON(800), OFF(400), ON(800), IDLE(4000), R
RING_2	ON(400),OFF(200)]2,ON(800),IDLE(4000),R
RING_3	ON(300), OFF(200), ON(1000), OFF(200), ON(300), IDLE(4000), R
RING_4	ON(500)
RING_5	