

SkyDSL® Network—SkyDSL® Router (AL50) User Manual—Version 1.31—September 1, 2004—  
Paul Ward

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## Revision History

<b>When</b>	<b>Details</b>	<b>By Whom</b>	<b>Release Number</b>
2/25/02	First Version	Paul Ward	.5
9/10/02	Production Version	Paul Ward	1.0
1/29/03	Added route save and route flush commands; removed notes regarding multicast and network address translation incompatibilities; added multicast feature to tcp dump command; added note regarding the need for rebooting after enabling multicast; replaced show versions graphic; changed technical support contact information from telephone number to e-mail addresses	Paul Ward	1.01
6/11/03	Reorganized and rearranged layout and flow; added changes for software versions 1.3 and 1.31; added ODU setup and alignment; added Quick Start section; reviewed and revised text; added grounding and lightning arrestor caution; changed IDU to ODU cable length limit from 100 ft to 200 ft; updated power-up section to reflect default “on” power setting; added DVB net time support information; added note regarding use of “OFF” setting in Tx Inhibit Mode; added Service Disruption subsection; added web interface Maintenance page section; changed Upgrade section to include manual upgrade and downgrade options using web interface; changed Upgrade section to reflect that reboots are not necessarily required after upgrades; added note regarding use of dielectric weather proofing filler on ODU coaxial connections; added sdrmon screenshot and description; moved FCC compliance statement to end of document; added CAUTION to section “Acquiring the DVB Signal” regarding using a powered satellite finder and the SDR together and the need for DC blocks in the RF splitter; rewrote DHCP server section of “Post-Configuration Considerations” section to correct errors; updated Technical Specifications appendix; corrected verbiage pertaining to PIDs to clarify that PIDs are dependent upon the setup at the Teleport; added that Eb/No values are approximations; changed ODU cable length note to reflect dependence upon cable and ODU types; added spectral inversion and descrambling to DVB setup procedures; added spectral inversion to SAMA setup procedures.	Paul Ward	1.1
3/29/04	Changed instances of <u><a href="mailto:hwsupport@alohonet.com">hwsupport@alohonet.com</a></u> and <u><a href="mailto:swsupport@alohonet.com">swsupport@alohonet.com</a></u> to <u><a href="mailto:techsupport@alohonet.com">techsupport@alohonet.com</a></u> . Updated trademark statement to remove TCP/I+ and TCP/IPLUS and include SkyTCP and SkyNMS.	Paul Ward	1.11
N/A	Updated to reflect software versions 1.4 and 1.41 changes; replaced all instances of “SkyDSL Remote Unit” with “SkyDSL VSAT Terminal”; replaced “Internet Over Satellite” with “IP Networking over Satellite”; added CLI commands “snmpaces,” “rip,” “set dvb lnctype,” “set sama patype,” and “profile”; added new “show” command screen shots; changed instances of “sdr>” to “CLI”; updated	Paul Ward	1.2

	technical specifications; added RF hazard warning; added magnetic declination calculation information; added two additional coaxial cables to required equipment; expanded installation procedures to expound on lightning suppression; added online CLI help access information; replaced all instances of “program ID” with “protocol ID”; added “Commissioning the SkyDSL Outdoor Unit” section; added new “show sama” (SAMA Code Profile, Symbol Rate, & FEC Scheme) and “show dvb” (Freq. Scan Range) information; inserted new ODU, SkyDSL Router, VSAT Terminal topology, and SkyDSL Network images		
6/22/04	Updated to reflect software version 2.0x changes; updated default parameters; updated tcpproxy; command; added port forward commands and information; added SkyQoS information; updated web interface information and screenshots to reflect new GUI design; replaced shutdown procedures with a paragraph describing flash memory advantage; added additional FCC statement; enhanced ODU polarization setup with info re: LNB vs. PA polarization; added “Standby” to list of Slotting States; added information regarding 3-minute limit on testmode transmission; added ODU commissioning steps to include modulated signal creation with testmode random	Paul Ward	1.3
9/1/04	Updated SkyQoS information	Paul Ward	1.31



# SkyDSL® Network

## SkyDSL® Router (AL50) User Manual

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## **FCC COMPLIANCE**

This equipment has been tested and found to comply with the limits for a Class A 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 harmful interference, in which case the user will be required to correct the interference at his or her own expense.

## **CAUTION**

Changes or modifications not expressly approved by Aloha Networks, Inc. could void the user's authority to operate the equipment.



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## | THE SKYDSL® NETWORK

The SkyDSL Network is the cost-effective, high-speed, two-way IP Networking over Satellite solution. Using existing Ku- and C-band communication satellites, the network supports popular applications targeted for enterprise and governments in globally diverse and underserved areas. Both the SkyDSL® SAMA® Receiver (SSR) and the SkyDSL® Router (SDR) feature SAMA® (Spread ALOHA® Multiple Access) technology which offers connection-free, spread-spectrum, single-code, two-way communications for most wireless and broadband environments.

SAMA is an advancement of the simple and flexible Aloha protocol that has been in use since the early 1970's. Its connection-free access is optimized for bursty traffic, and since it is spread spectrum it reduces adjacent satellite interference.

The SkyDSL Network offers up to 72 Mbps on the forward channel, 256 kbps on the return channel, and full bandwidth on demand with minimal latency. It also provides for eight times the number of users per channel than conventional Internet-over-satellite systems.

SkyDSL Network features include:

- Patented SAMA technology
- Always-available broadband IP Networking over Satellite
- Standards-based DVB forward channel
- Independence from terrestrial telephone and cable infrastructures
- Easy installation and configuration
- QPSK modulation
- 500 kbps DVB forward channel (configurable to 72 Mbps)
- 129 kbps and 256 kbps instantaneous transfer rate on the SAMA return channel
- Supports two-way Internet, intranet, and VPN (Virtual Private Network)

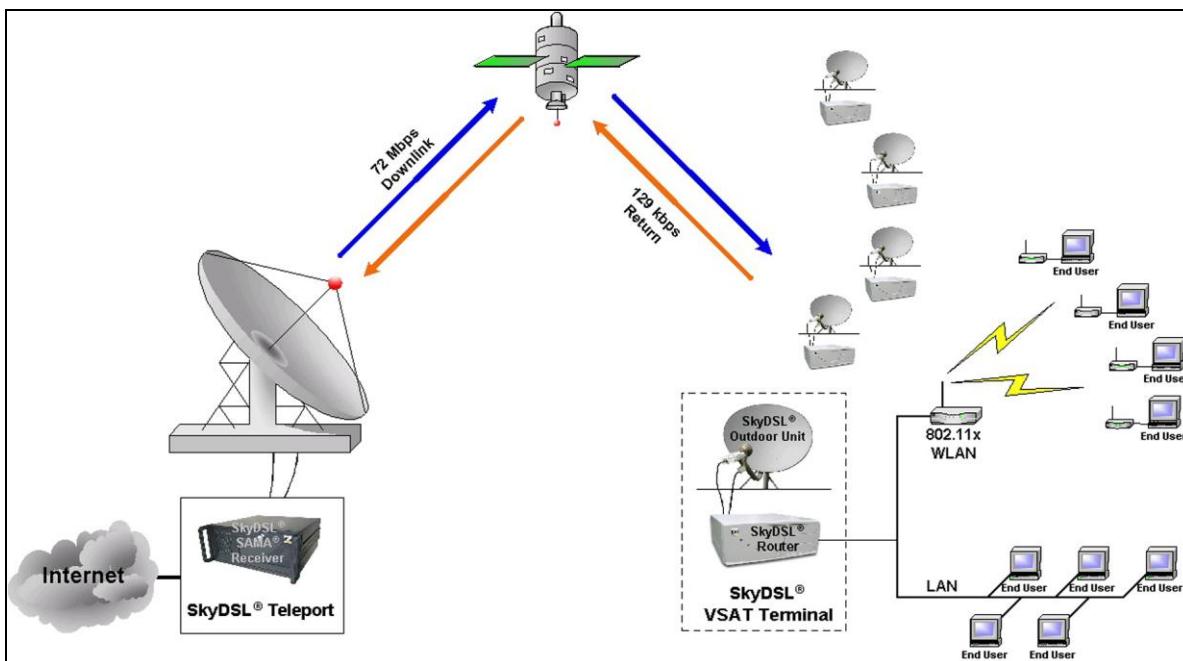


Figure 1—SkyDSL Network

The SkyDSL Network is made up of two elements:

- The SkyDSL® Teleport
- The SkyDSL® VSAT Terminal

## 1.1 THE SKYDSL® TELEPORT

The SkyDSL Teleport is the installation at a transmission "teleport" or "hub" station and includes the SkyDSL SAMA Receiver and other equipment such as an IP (Internet Protocol) encapsulator, a DVB® (digital video broadcasting) modulator, a network management service (NMS), and a TCP acceleration server.

The Teleport is the central hub for the SkyDSL Network and physically connects to the primary broadband Internet access. IP data are transmitted from the Teleport to all SkyDSL VSAT Terminals via satellite using a standards-based DVB channel.

## 1.2 THE SKYDSL® VSAT TERMINAL

This is the assembly at a geographically remote end-user site. It includes the SkyDSL Router (the indoor unit) and the antenna with its peripheral equipment (the SkyDSL Outdoor Unit).

A SkyDSL VSAT Terminal is installed at each remote location to receive DVB signals from the SkyDSL Teleport over satellite for dissemination

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<sup>®</sup> DVB is a registered trademark of DVB Project, Switzerland.

throughout its local area network (LAN). The VSAT Terminal, in turn, transmits data to the SkyDSL Teleport using the SAMA protocol.

## I.3 ABOUT THIS MANUAL

This user manual will guide you through the process of installing, configuring, and commissioning your SkyDSL VSAT Terminal, enabling communications between it and the SkyDSL Teleport via satellite. It is divided into nine sections that address the various principles and procedures involved in the aforementioned processes, as well as a number of appendixes providing important supplementary information.

### QUICK START GUIDE

This manual is written to the installer with little experience in setting up and configuring the SkyDSL VSAT Terminal. If you are already familiar with the setup process, a Quick Start Guide with abbreviated procedures is available in Appendix A on page 107.

**Section 1—The SkyDSL® Network** introduces the SkyDSL Network and its component parts and technologies.

**Section 2—Installing the SkyDSL VSAT Terminal** provides lists of all components and tools needed to install your SkyDSL VSAT Terminal. It continues with a discussion of SkyDSL Outdoor Unit setup, including site selection. It concludes with step-by-step instructions for installing the SkyDSL Router and powering the SkyDSL VSAT Terminal.

**Section 3—Accessing the SkyDSL Router** introduces the Command Line Interpreter (CLI), the SkyDSL Router’s primary user interface, including procedures for logging in and out, changing passwords, and shutting down the Router. Remote access via Telnet and SSH are discussed, as well as an overview of the CLI’s online help feature. Lastly, the show commands, which display the SkyDSL Router and Network parameters, are explained.

**Section 4—Commissioning the SkyDSL Outdoor Unit** provides instructions for orienting the SkyDSL Outdoor Unit to the correct satellite and transmitting a test signal for evaluation by the satellite service provider in preparation for participation in the SkyDSL Network.

**Section 5—Configuring the SkyDSL Router** discusses procedures for setting SkyDSL Router parameters to transmit and receive signals over the SkyDSL Network.

**Section 6—Commissioning the SkyDSL VSAT Terminal** completes the setup process with procedures for acquiring the SkyDSL Teleport’s DVB, transmitting a SAMA signal, and testing for an acceptable link.

**Section 7—Post-Commissioning Considerations** addresses issues that, while not actually part of the commissioning process, play important roles in SkyDSL Network functionality.

**Section 8—Using the Web Interface** provides an overview of the SkyDSL Router's web-based graphical user interface (GUI) and its use.

**Section 9—Upgrading the SkyDSL Router Software** discusses the SkyDSL Router's ability to receive upgrades automatically over the DVB channel and provides a walk-through of the upgrade procedures using both the CLI (Command Line Interpreter) and the web interface.

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## 2 INSTALLING THE SKYDSL VSAT TERMINAL

SkyDSL VSAT Terminal describes an assembly that includes a SkyDSL Router (the indoor unit) and an antenna assembly (the outdoor unit, or ODU). Figure 2 depicts the VSAT Terminal topology.

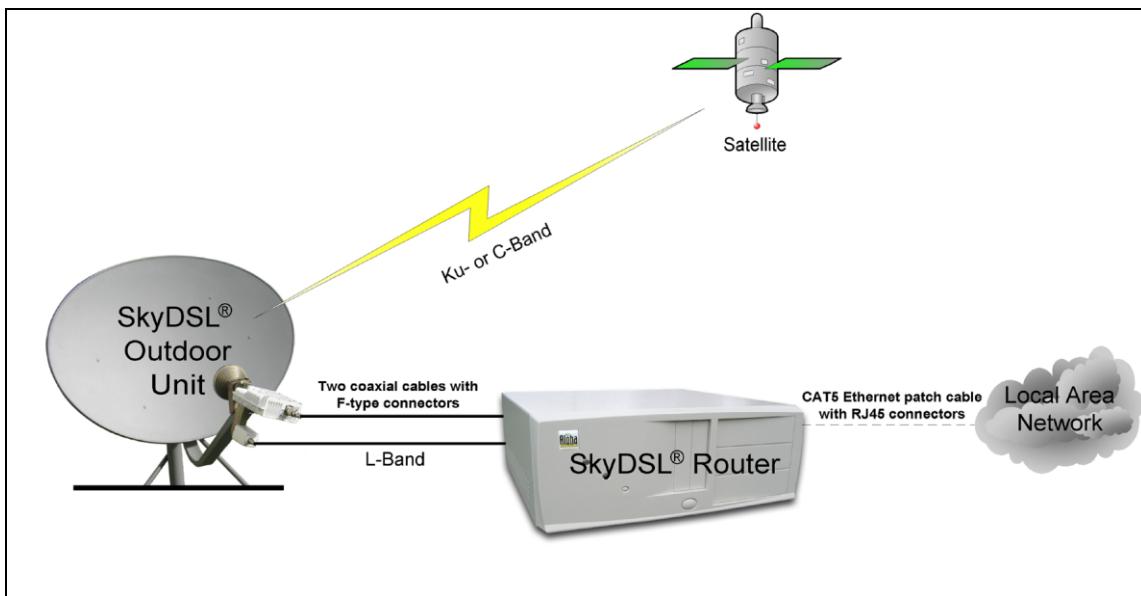


Figure 2—SkyDSL VSAT Terminal Topology

### 2.1 REQUIRED COMPONENTS

Following is a list of necessary components for installing your SkyDSL VSAT Terminal:

- **SkyDSL Outdoor Unit.**
  - **Antenna.** The ODU's parabolic dish assembly, consisting of a reflector, ortho mode transducer (OMT)/filter/feedhorn, feed support arms, and outdoor unit mount. Your Internet Service Provider (ISP) can provide you with the required specifications.
  - **Power Amplifier (PA)/Block Upconverter (BUC).** Boosts the SkyDSL Router's SAMA transmission power, upconverts it from L-band to the satellite's uplink frequency, and transmits it to the satellite. Contact your ISP for required specifications.

- **Low Noise Block Downconverter (LNB).** Receives the SkyDSL Teleport's DVB signal from the satellite and downconverts it from the satellite's downlink frequency to L-band before passing it to the SkyDSL Router. Contact your ISP for required specifications.
- **VSAT Indoor Unit.**
  - **SkyDSL Router.** Receives data from, and transmits data to, the SkyDSL Teleport over satellite using standards-based DVB (receive) and SAMA technology (transmit).
  - **SkyDSL Router power cable.** Connects the Router to an AC power source. Included with the SkyDSL Router.
  - **10/100 Ethernet patch cable (RJ45, CAT5).** Connects the SkyDSL Router to your local area network (LAN).
  - **Four (4) coaxial cables with F-type connectors.** Used in conjunction with lightning suppressors to connect the SkyDSL Router to the SkyDSL Outdoor Unit's PA/BUC and LNB. The cables must be long enough to reach the Outdoor Unit from the Router's permanent location (stringing multiple cables together is allowed).

**NOTE**

The maximum allowed cable length depends upon the cable type and the type of outdoor unit equipment you are using. For length information specific to your SkyDSL VSAT Terminal setup, please contact technical support at [techsupport@alohanet.com](mailto:techsupport@alohanet.com).

- **Two (2) coaxial lightning suppressors.** Grounds the VSAT Terminal's equipment in case of a lightning strike on the outdoor unit.

### 2.1.1 OPTIONAL COMPONENTS

The following are required only if you plan to interface directly with the SkyDSL Router, as opposed to using a separate workstation connected via the serial or Ethernet ports (see section 2.4.2), or remotely via Telnet, SSH, or web-based interface.

- **VGA monitor.** Any size and specification is acceptable.
- **VGA monitor data cable.** Connects the VGA monitor to the SkyDSL Router.
- **VGA monitor power cable.** Connects the VGA monitor to an AC power source.
- **PS/2-compatible keyboard.** Connects to the SkyDSL Router and allows you to enter commands.

## 2.2 REQUIRED TOOLS

The following tools are necessary to successfully install and configure your SkyDSL VSAT Terminal:

- **SkyDSL Outdoor Unit Assembly Tools.** Refer to your antenna's assembly instructions for a complete list of required tools.
- **Magnetic Compass.** Used to align your SkyDSL Outdoor Unit with the azimuth of the satellite. A compass with 1-degree graduations is recommended, as precision is important.
- **Crescent (or similar) Wrench.** Used to tighten the coaxial cables' F-type RF connectors.
- **Satellite Finder.** An electronic device that connects to your SkyDSL Outdoor Unit's LNB to acquire and fine-tune your satellite's signal. Various types are available, and the number and types of features available on each tend to be proportional to its cost. More expensive models provide a spectral analysis display that helps to assess whether or not you have acquired the correct satellite.
- **Dielectric waterproofing filler (such as STUF, produced by Cross Devices).** Used to waterproof the F-connectors that connect the coaxial cables to the outdoor unit's power amplifier and low noise block downconverter to prevent corrosion (see Appendix G for the STUF material safety data sheet).
- **Sealing compound (such as COAX-SEAL, produced by Universal Electronics, Inc.).** Used to waterproof the outdoor unit's F-connectors and seams (see Appendix G for the COAX-SEAL material safety data sheet).

## 2.3 SETTING UP THE SKYDSL OUTDOOR UNIT

The first order of business in establishing your SkyDSL VSAT Terminal is to set up the SkyDSL Outdoor Unit. Before assembling the antenna, you should contact your Internet Service Provider to obtain the name and manufacturer of the satellite you will use. You will use this information to choose a location for the ODU, locate your satellite, and fine-tune the signal.

### 2.3.1 CHOOSING THE SKYDSL OUTDOOR UNIT'S LOCATION

The satellite's look angle will help you determine where to locate your ODU. Look angle is defined as the satellite's direction from your geographic location in relation to magnetic north (azimuth) and the horizon (elevation). Most satellite manufacturers provide a look angle calculator on their web site that computes this information automatically when you enter your location information. This is the most convenient look angle calculation method.

Your ODU must have an unobstructed line of sight to the satellite, since trees and structures can affect your signal reception or block it altogether. Use a

magnetic compass to determine the azimuth and make a close estimation of the elevation, choose a location, and begin assembling your ODU.

**IMPORTANT**

Look angle calculators typically provide the look angle azimuth in relation to true north. You must convert the true azimuth to its magnetic equivalent to orient your ODU with a compass.

You can find detailed information regarding Earth's geomagnetic field on the National Geophysical Data Center's Geomagnetic Field Frequently Asked Questions web page at:  
<http://www.ngdc.noaa.gov/seg/geomag/faqgeom.shtml>.

### 2.3.1.1 CONVERTING A TRUE AZIMUTH TO MAGNETIC

The National Geophysical Data Center (NGDC) also provides a magnetic declination calculator on their web site. This value differs from location to location and should be recalculated for different SkyDSL VSAT Terminals. You will apply magnetic declination to the true azimuth provided by the satellite manufacturer's true azimuth look angle.

- 1) Determine magnetic declination for the SkyDSL VSAT Terminal's location.
  - o In the United States:
    - i) Open a web browser to  
<http://www.ngdc.noaa.gov/seg/geomag/jsp/Declination.jsp>.  
The National Geophysical Data Center's **Estimated Value of Magnetic Declination** page opens.
    - ii) Enter the zip code for the VSAT Terminal's location in the **Search for a place in the USA by Zip Code** text box and click the **Get Location** button.  
The calculator determines the location's latitude and longitude and places those values in their respective boxes in the **Enter Location** area.
    - iii) Click the **Compute Declination** button.  
The calculator displays the location's magnetic declination value in the cell below the **Enter Location** area. The value is given in number of degrees and minutes east or west of true north. Round this value up or down to the nearest degree (there are 60 minutes in 1 degree).

- Outside the United States:
    - i) Open a web browser to  
<http://www.ngdc.noaa.gov/seg/geomag/jsp/Declination.jsp>.  
 The National Geophysical Data Center's **Magnetic Declination and Field Value Calculator** page opens.
    - ii) Click the **Getty Thesaurus** link.  
 The **Getty Thesaurus of Geographic Names On Line** (TGN) opens in a new window.
    - iii) In the **Find Name** text box, enter the city in which the SkyDSL VSAT Terminal is located.
    - iv) In the **Nation** text box, enter the country in which the VSAT Terminal is located.
    - v) Click the **SEARCH** button.  
 The **TGN Search Results List** page appears.
    - vi) Check the check box next to the result or results most closely matching the VSAT Terminal's location and click the **VIEW CHECKED RECORD(S)** button.  
 The **TGN Full Record Display** page appears. The first entry for each location is its latitude and longitude. Use the **degrees minutes** values to alleviate confusion.
    - vii) Return to the Magnetic Declination and Field Value Calculator page and enter the location's latitude and longitude in the **Latitude** and **Longitude** text boxes, respectively, and select the appropriate **N, S, E, or W** radio buttons.
    - viii) Click the **Compute Declination** button.  
 The calculator displays the location's magnetic declination value in the cell below the **Enter Location** area. The value is given in number of degrees and minutes east or west of true north. Round this value up or down to the nearest degree (there are 60 minutes in 1 degree).
- 2) Apply the magnetic declination to the true azimuth provided by the look angle calculator.
- East magnetic declination.
    - i) Subtract your magnetic declination from the look angle's true azimuth (for example, the true azimuth is 175° and magnetic declination is 15 degrees east:  $175 - 15 = 160$ ° magnetic).  
 The result is the magnetic azimuth required for orienting your ODU.

- West magnetic declination.
- ii) Add your magnetic declination to the look angle's true azimuth (for example, the true azimuth is 175° and magnetic declination is 15 degrees west:  $175 + 15 = 190^\circ$  magnetic).

The result is the magnetic azimuth required for orienting your ODU.

### **2.3.2 ASSEMBLING THE SKYDSL OUTDOOR UNIT**

You should first assemble your antenna in accordance with the manufacturer's instructions. The antenna is mounted on a base assembly, the outdoor unit mount, which should be securely anchored to the surface upon which it sits to ensure the antenna cannot be easily moved by wind or other disturbances. This can typically be achieved by either fastening the rack to the mounting surface or by weighting it with ballast of some sort (cinder blocks, for example).

#### **⚠ CAUTION**

The feedhorn, power amplifier/block upconverter, and low noise block downconverter are susceptible to damage from weather. It is highly recommended that you use a sealing compound such as COAX-SEAL (produced by Universal Electronics, Inc.) to help keep moisture from entering the joints where the parts join.

**Refer to Appendix G for Material Safety Data Sheets on this product.**

When finished, attach the power amplifier to the feedhorn's transmit port and the low noise block downconverter to the feedhorn's receive port. Waterproof the joints where the parts attach with sealing compound. The feedhorn, power amplifier, and low noise block downconverter will be referred to, collectively, as the feedhorn assembly.

#### **⚠ WARNING**

An RF energy hazard exists during normal operation of the SkyDSL VSAT Terminal. Do not attach coaxial cables to the PA and LNB at this time. You will do this during the ODU commissioning process as outlined in section 4 on page 43.

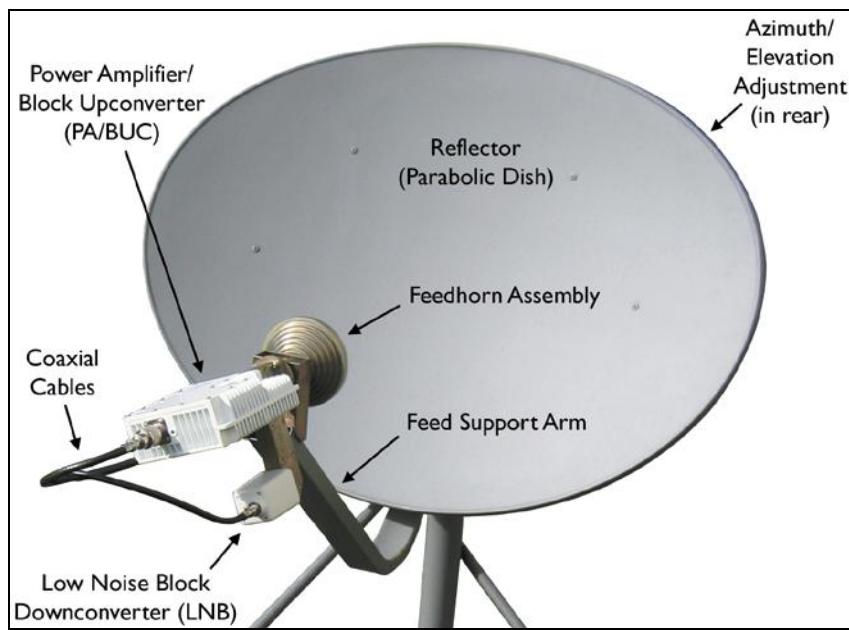


Figure 3—Assembled SkyDSL Outdoor Unit

Using your magnetic compass, aim the ODU so that it points at the correct look angle azimuth. The exact look angle elevation can be difficult to determine if the ODU is not mounted on a surface that is relatively level with the Earth's horizon, so do not elevate the ODU for now, as this will be discussed in a later section.

Another adjustment that will be addressed later during ODU commissioning is polarization. For now, be aware that it is tuned by rotating the feedhorn assembly.

You are now ready to begin setting up your SkyDSL Router.

## 2.4 SETTING UP THE SKYDSL ROUTER

Physically, the SkyDSL Router is similar in size and appearance to an ordinary personal computer (PC) and possesses many of the same features.



Figure 4—The SkyDSL Router

## 2.4.1 SKYDSL ROUTER NOMENCLATURE

The SkyDSL Router will be described here in terms of its front and rear panels, both of which follow PC conventions, but also have Router-specific features.

### 2.4.1.1 THE FRONT PANEL

The SkyDSL Router's front panel features two indicator lights and two switches, each of which shall be described here. Figure 5 depicts the Router's front panel; a larger illustration can be found in Appendix H.

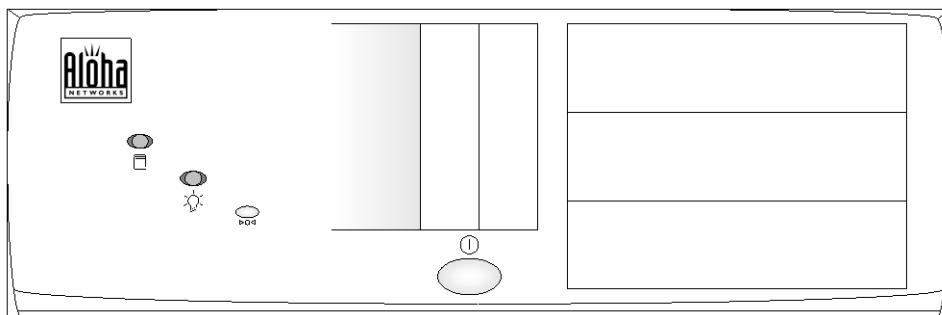


Figure 5—SkyDSL Router Front Panel

#### 2.4.1.1.1 INDICATOR LIGHTS

- **Flash Memory.** A **red** light that illuminates when the SkyDSL Router accesses its flash memory.

#### NOTE

In lieu of a conventional hard drive, the SkyDSL Router uses a flash module/ramdisk combination. The unit's operating software resides in the flash module and is installed on the ramdisk at boot time. As a result, there is no danger of system corruption should the Router suffer a sudden power loss.

- **Power.** A **green** light that indicates power is applied to the SkyDSL Router.

#### 2.4.1.1.2 SWITCHES

- **Reset.** A push button that temporarily interrupts power to the SkyDSL Router. Pressing the button momentarily and releasing it will cause the Router to reboot. Doing so will cause all unsaved Router parameters to revert to their default settings.

- **Power.** A push button that applies power to the SkyDSL Router. Depressing the button will power up the Router, causing it to boot. Pressing the button with power already applied turns the Router off.

**NOTE**

The Power button will not function unless the power supply power switch on the rear panel is set to **I** (see section 2.4.1.2.1 below).

#### 2.4.1.2 THE REAR PANEL

There are fifteen connection ports on the SkyDSL Router's rear panel. Of these fifteen, however, only seven or less are used during the installation process. Consequently, only those seven ports will be discussed here.

In addition, there is one switch (the power supply power switch) and two indicator lights (**TX** and **RX**) on the rear panel.

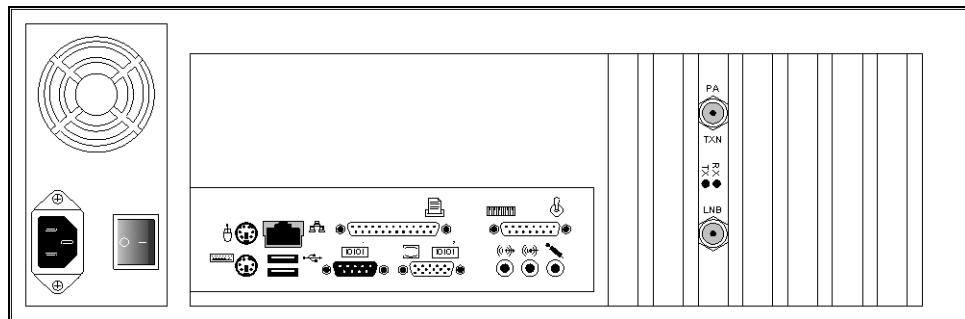


Figure 6—SkyDSL Router Rear Panel

##### 2.4.1.2.1 INDICATOR LIGHTS

- **Receive (RX).** A **red** light that illuminates when the SkyDSL Router receives a PID (protocol identifier) match on the inbound DVB signal.
- **Transmit (TX).** A **red** light that illuminates when the SkyDSL Router transmits a SAMA cell.

#### 2.4.1.2.2 SWITCHES

- **Power.** A rocker switch on the SkyDSL Router's power supply that makes power available to the Router's internal components. It is turned on prior to using the front panel power switch and is labeled with an **I** (In or On) and an **O** (Out or Off). Placing the switch in the **I** position makes power available to the Router.

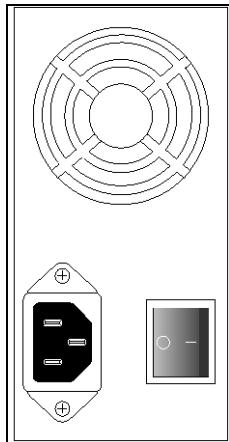


Figure 7—SkyDSL Router Power Supply

#### 2.4.1.2.3 CONNECTION PORTS

- **Power Connection.** A connection port that supplies AC power to the SkyDSL Router's power supply.
- **Keyboard.** A PS/2 port that, with a keyboard attached, provides a means of entering commands into the SkyDSL Router.
- **Ethernet.** An Ethernet port that connects the SkyDSL Router to your LAN using a 10/100 Ethernet patch cable (RJ45, CAT5).
- **Com 1.** A serial port to which a PC or laptop computer may be attached for interfacing with the SkyDSL Router (Bits per second: 9600, Data bits: 8, Parity: None).
- **Video.** A VGA video port used to connect a monitor for viewing commands entered via keyboard and for observing the Router's output.
- **PA.** An F-type port (resembling the video connector on a home television cable system) that connects the SkyDSL Router to the SkyDSL Outdoor Unit's power amplifier via coaxial cable.

- **LNB.** An F-type port that connects the SkyDSL Router to the SkyDSL Outdoor Unit's low noise block downconverter via coaxial cable.

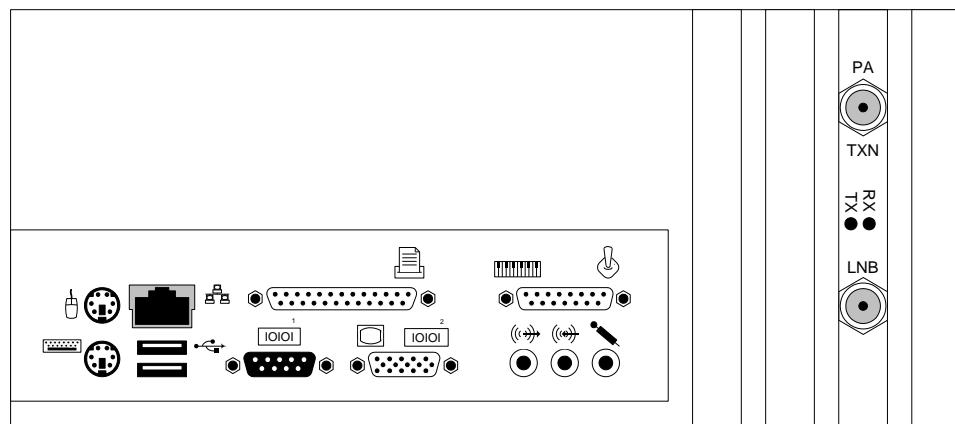


Figure 8—SkyDSL Router Connection Ports

#### 2.4.2 CONNECTING THE SKYDSL ROUTER

The following procedures will walk you through the physical installation of your SkyDSL Router. Three interface configurations are available for the initial Router setup:

- Direct access using a VGA monitor and a keyboard connected directly to the Router.
- Direct access using a PC or laptop computer connected to the Router's serial port (Bits per second: 9600, Data bits: 8, Parity: None).
- Remote access in a stand-alone (non-LAN) environment using a PC workstation that is connected to the Router via an Ethernet crossover cable (this is usually done for testing purposes only).

The following procedures will enable you to access the SkyDSL Router using the first method above. Steps 2b through 2d are specific to this method, and you may skip them if you prefer to use one of the alternatives.

#### CAUTION

The SkyDSL Router is designed for use indoors only.

Like any computer, the SkyDSL Router is susceptible to damage from heat, moisture, and dust. Keep it in a secure location, away from extremes in temperature, direct exposure to sunlight, humidity, and dust.

In addition, make certain that nothing obstructs the ventilation ports in the Router's case, as this could cause the machine to overheat.

**⚠ CAUTION**

Do not place items and equipment on top of the SkyDSL Router. Doing so could result in damage to the unit.

- 1) Carefully place the SkyDSL Router in its permanent location.
- 2) Make the physical LAN and access connections.
  - a) Orient the SkyDSL Router so that the rear panel is accessible.

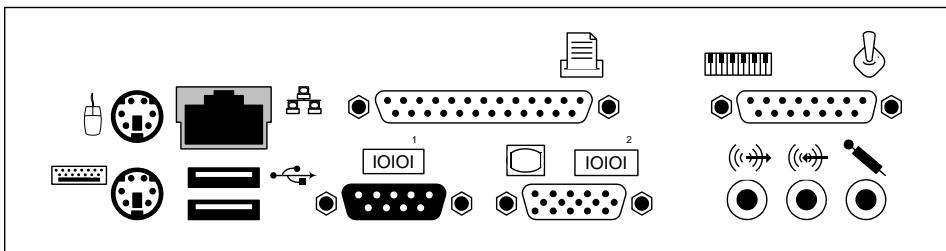


Figure 9—SkyDSL Router LAN and Interface Connectors

- b) Plug the PS/2-compatible keyboard into the **keyboard** port.
- c) Plug the VGA monitor into the **video** port using the VGA monitor data cable.
- d) Plug the VGA monitor's power cord into an AC power source using an adequate surge protector or uninterruptible power supply (UPS).
- e) Plug the 10/100 Ethernet patch cable (RJ45, CAT5) into the **Ethernet** port. Connect the other end to an Ethernet hub or router to supply Internet connectivity to your LAN.

**ACCESSING THE SKYDSL ROUTER  
THROUGH A STAND-ALONE PC**

If you are accessing the SkyDSL Router directly through a single stand-alone PC, bypassing your LAN, you must use a special Ethernet patch cable called a “crossover” cable.

3) Make the RF connections.



Figure 10—SkyDSL Router RF Connection Ports

**⚠ CAUTION**

All cables must be grounded, and lightning suppressors should be installed where cables exit to the outdoors. Always make certain that the lightning suppressors are installed and properly grounded according to the manufacturer's instructions to prevent damage to the SkyDSL VSAT Terminal's equipment.

**⚠ CAUTION**

F-type connectors are susceptible to corrosion and can become damaged by weather. It is highly recommended that you use a dielectric waterproofing filler such as STUF (produced by Cross Devices) and a sealing compound such as COAX-SEAL (produced by Universal Electronics, Inc.) to help keep moisture out of connectors that will be exposed to the elements.

**Refer to Appendix G for Material Safety Data Sheets on these products.**

**⚠ CAUTION**

Do not overtighten the F-type connectors. A firm fit is all that is required.

- a) Attach a coaxial cable to the **LNB** port and tighten the connector with a crescent wrench (or equivalent). Attach the other end to a properly installed lightning suppressor.
- b) Attach a coaxial cable to the **PA** port and tighten the connector. Attach the other end to a properly installed lightning suppressor.

**IMPORTANT**

To ensure the SkyDSL Router makes no inadvertent transmissions, do not connect it to the Outdoor Unit at this point. You will do this after the antenna has been correctly oriented during ODU commissioning.

**4)** Connect power.

- a) Plug the female end of the SkyDSL Router's power cord into the **power connection** port.
- b) Plug the male end of the power cord into a standard AC power source using an adequate surge protector or uninterruptible power supply (UPS).

## 2.5 STARTING THE SKYDSL ROUTER

The following procedure describes the SkyDSL Router startup process.

**1)** Apply power.

- a) Move the VGA monitor's power switch to the **ON** position (if using a monitor).
- b) Move the In/Out (**I/O**) rocker switch on the SkyDSL Router rear panel to the **I** position.

The SkyDSL Router powers up and boots, as indicated by the power and flash memory indicator lights on the front panel. Upon booting, the monitor displays the **sdr login:** prompt.

**NOTE**

When initially powering the Router, it is unnecessary to depress the front panel's power button, as the default power setting is **ON**. This setting facilitates an automatic restart should a power interruption occur.

The front panel power button may still be subsequently used, however, to manually power the Router up and down (see section 2.5.1 below).

You have completed the SkyDSL Router's installation. The next section describes the SkyDSL Router's command line interpreter and how to use it to access the SkyDSL Router and display its various parameters.

### **2.5.1 SHUTTING DOWN THE SKYDSL ROUTER**

One of the SkyDSL Router's advantages is its use of flash memory in lieu of a conventional hard drive. As a result, there is no danger of system corruption should the Router suffer a sudden power loss, and you do not need to go through any shutdown process before powering down the Router; simply turn off the front and/or rear panel power switch.



---

## 3 ACCESSING THE SKYDSL ROUTER

The primary means of interfacing with the SkyDSL Router is through the **CLI** (**C**ommand **L**ine **I**nterpreter), which facilitates configuration and monitoring of the Router. In addition, the CLI offers extensive online help. You will use the CLI to initially configure your SkyDSL Router.

**NOTE**

A complete list of CLI commands is available in Appendix D on page 115.

### 3.1 LOGGING IN TO THE SKYDSL ROUTER

After system boot, the SkyDSL Router will present you with a login prompt.

Two login options are available, depending on the user's level of administrative privilege, **admin** and **lanadmin**.

- **lanadmin.** Administrative access is limited to changing LAN settings and performing software upgrades. The user may only monitor SAMA, DVB, and link parameters.
- **admin.** Full administrative privileges are available. In addition to making alterations to LAN settings, the user may change the SAMA and DVB settings.

For demonstration purposes, all procedures in this manual will use the **admin** login.

**NOTE**

If you make an error when entering information into the command line interpreter, pressing <**CTRL+U**> will delete the entire entry, allowing you to begin again.

- 1) Log in to the SkyDSL Router.
  - a) At the login prompt, type **admin** and press **ENTER**.  
The password prompt appears.

### DEFAULT PASSWORD

The SkyDSL Router ships with a password of *aloha* in place for the **lanadmin** login and *alOha* (a zero in place of the letter *o*) for the **admin** login. Use these passwords to initially log in to the Router, but to ensure security it is highly recommended that you immediately change the password to one of your own choosing (see section 3.1.1 below).

- b) Type your password and press **ENTER**.

If all information is entered correctly, the CLI command prompt will appear. If an entry error is made, the Router displays a **Login incorrect** message, followed by the login prompt.

```
login as: admin
Sent username "admin"
admin@192.168.1.1's password:
sdr> █
```

Figure 11—Successful Login Display

### 3.1.1 CHANGING THE LOGIN PASSWORD

You may change your login password at any time subsequent to your initial login.

- 1) Change your login password.
  - a) Log in to the SkyDSL Router.
  - b) At the CLI prompt, type **passwd** and press **ENTER**.

The **Enter new password** prompt appears, preceded by the following message:

**Please use a combination of upper and lower case letters and numbers.**

- c) Type a new password containing no more than eight alphanumeric characters and press **ENTER**.

The **Re-enter new password** prompt appears. This may or may not be preceded by a password-quality message, depending on how the SkyDSL Router evaluates the password you entered. For example:

**Bad password: too simple.**

**Warning: weak password (continuing) .**

- If you wish to continue, re-type your password and press **ENTER**.

**Password changed** is displayed followed by the CLI prompt.

- If you wish to choose another password, press **ENTER**.

The following message is displayed, followed by the **skydsl>** prompt:

**Passwords do not match.**

**passwd: the password for admin is unchanged.**

Return to Step 1b.

### 3.1.2 LOGGING OFF OF THE SKYDSL ROUTER

If you wish to log off after finishing work at the SkyDSL Router, simply type **exit** at the CLI prompt. The Router will log you off and display the login prompt.

## 3.2 ACCESSING THE SKYDSL ROUTER REMOTELY

After initial setup and configuration, there may be occasions in which you will want to access your SkyDSL Router from remote locations. The Router allows for remote access over the LAN using Telnet or over the Internet using Secure Shell (SSH).

### 3.2.1 TELNET

The Telnet (**T**eletecommunications **n**etwork) protocol provides a means of remotely accessing the SkyDSL Router over your LAN. There are several Telnet client applications available, and the Microsoft® Windows® operating system comes bundled with the Microsoft Telnet Client.

#### NOTE

Telnet is not a secure means of communicating with the SkyDSL Router, since it does not encrypt login name and password. For purposes of security, therefore, Telnet should only be used over your LAN. If you are accessing the Router over the Internet, you should use Secure Shell, which encrypts this information (see section 3.2.2).

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<sup>®</sup> Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

The following procedures describe SkyDSL Router access via Microsoft Telnet Client. If you are using another client application, please refer to its documentation for its specific connection instructions.

**1)** Start Microsoft Telnet Client.

- a) In Windows, click **Start**.

The **Start** menu appears.

- b) Select **Run**.

The **Run** dialog box appears.

- c) In the **Open** text box, type **telnet** and click **OK**.

An MS-DOS command prompt window appears with a **Microsoft Telnet>** prompt.

**2)** Access the SkyDSL Router.

- a) At the prompt, type **Open <SkyDSL Router LAN IP address>** and press **ENTER**.

The operating system name and version is displayed along with an **sdr login:** prompt.

**3)** Log in to the SkyDSL Router.

- a) At the **sdr login:** prompt, type **admin** and press **ENTER**.

A **Password:** prompt appears.

- b) Type your login password and press **ENTER**.

The CLI prompt is displayed. You may begin entering commands.

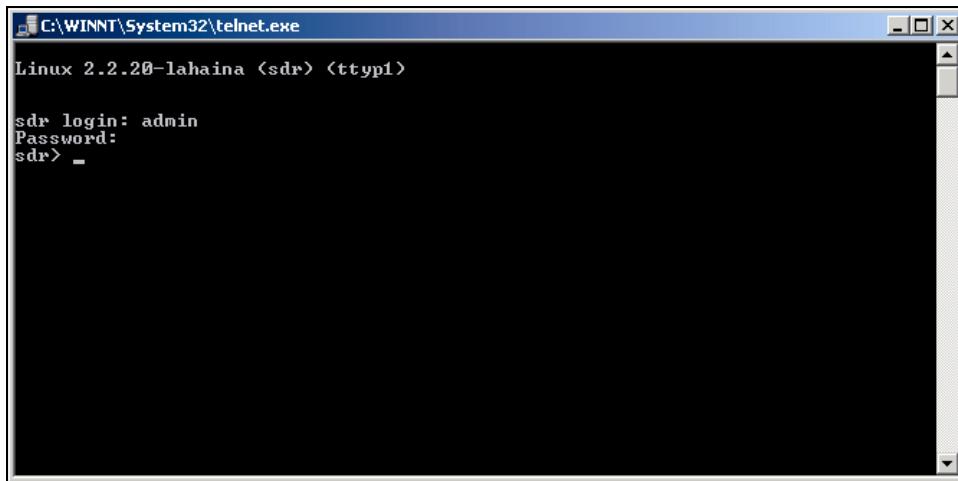


Figure 12—Telnet Login Screen

**NOTE**

The prompt displayed by Telnet and SSH reflects the SkyDSL Router's host value (see section 3.4.5 below. The factory default is **sdr** and may be changed as desired.

When finished, log out by typing **exit** at the CLI prompt. The message, **Connection to the host lost**, is displayed, followed by a prompt to **press any key to continue**. Doing so will display the **Microsoft Telnet>** prompt. Typing **quit** will close the MS-DOS command prompt window.

### 3.2.2 SECURE SHELL (SSH)

As the name implies, Secure Shell provides a secure means of accessing your SkyDSL Router over the Internet (your login name and password are encrypted) from a remote location. Like Telnet, you must have an SSH client installed on the computer from which you are accessing the Router. The type of client you have will depend on the computer's operating system. A number of free clients for a variety of operating systems are available from the OpenSSH project at <http://www.openssh.org>.

The following procedures apply to the Win32 Secure Shell client, **PuTTY**<sup>1</sup>. This is a freeware application that can be downloaded from the Internet at <http://www.chiark.greenend.org.uk/~sgtatham/putty/>. The download consists of the client in its entirety in executable file format; there is no need to perform an installation—simply execute the downloaded file.

Access procedures may vary from client to client, and you should refer to your client's documentation for instructions. Once you have accessed the SkyDSL Router, however, use of the command line interpreter is the same no matter your client or platform.

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<sup>1</sup> PuTTY is copyright 1997-2004 Simon Tatham.

- 1) Start PuTTY SSH client.
  - a) On your desktop, double-click the **putty** icon.

The **PuTTY Configuration** dialog box appears.

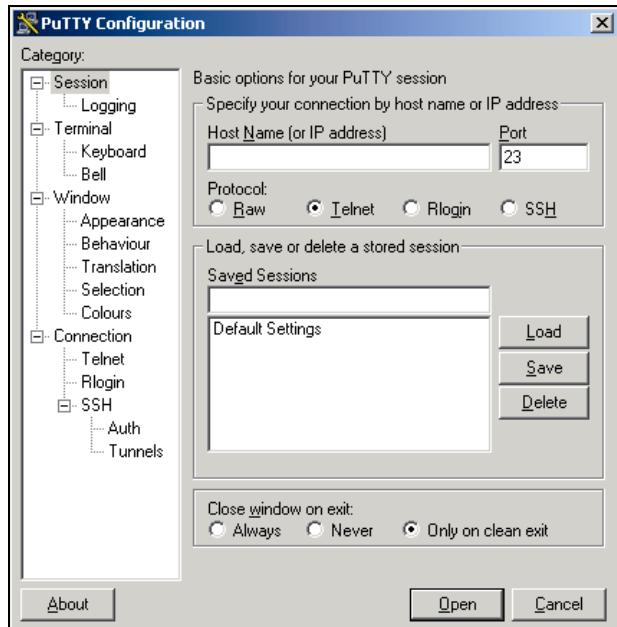


Figure 13—PuTTY Configuration Dialog Box

- b) In the **Host Name (or IP address)** text box, enter your SkyDSL Router's IP address.
- c) Select the **SSH** radio button ().
- d) Click the **Open** button.

PuTTY launches and a **login as:** prompt appears.

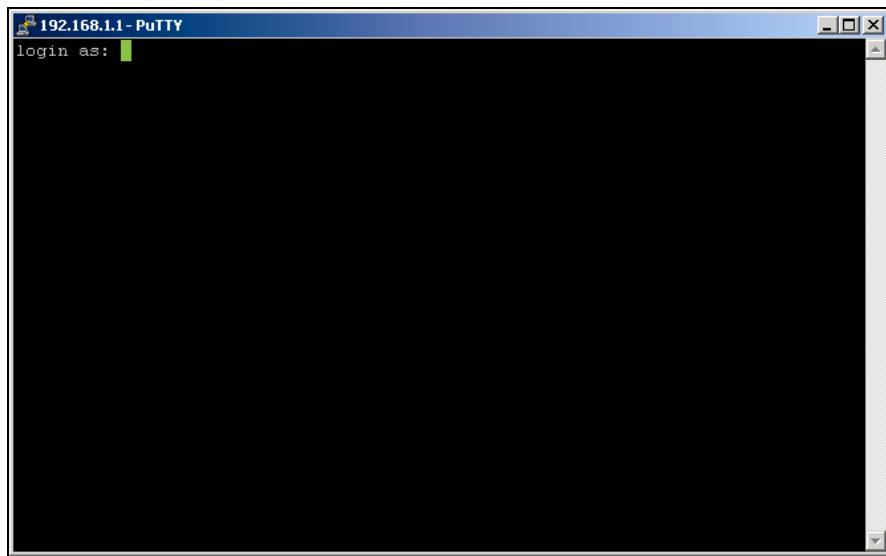


Figure 14—PuTTY Login Prompt

- 2) Log in to the SkyDSL Router.
  - a) At the **login as:** prompt, type **admin** and press **ENTER**.  
PuTTY displays a message stating that it has **Sent username "admin"** and prompts you to enter your password.
  - b) Type your login password and press **ENTER**.

The CLI prompt is displayed. You may begin entering commands.

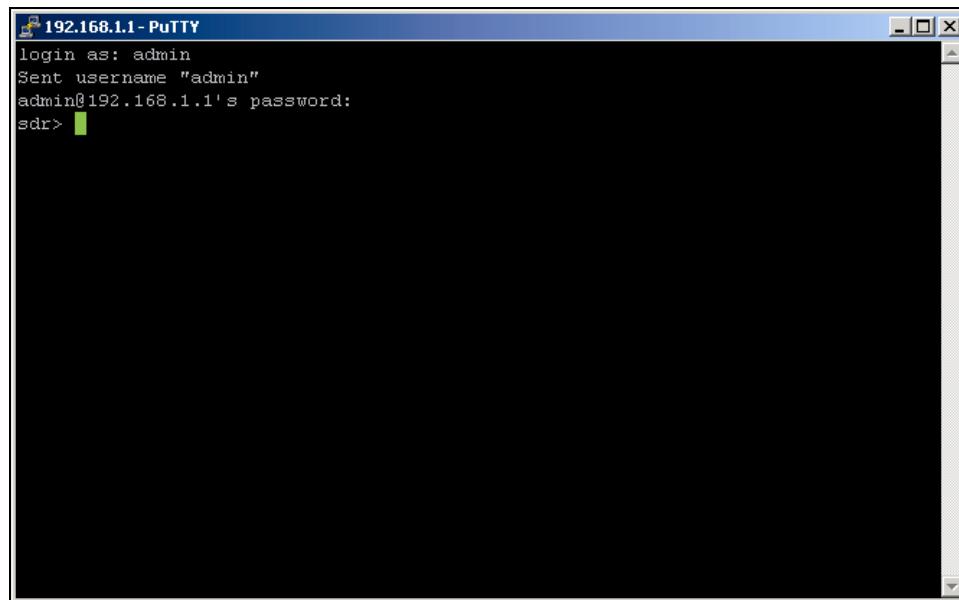


Figure 15—PuTTY Login Screen

**NOTE**

The prompt displayed by Telnet and SSH reflects the Router's **host** value (see section 3.4.5 below. The factory default is **sdr** and may be changed as desired.

When finished, log out by simply typing **exit** at the CLI prompt. Both the Router session and PuTTY will close.

### 3.3 ACCESSING COMMAND LINE INTERPRETER HELP

As stated previously, extensive online help for CLI commands is available. This is accessed through the CLI command prompt and can be divided into two major categories.

#### 3.3.1 TOP-LEVEL HELP

Using the **help** command, you may display lists of available CLI commands, all of which fall within two categories, **skydsl** and **system**.

- **help skydsl.** Displays a list of SkyDSL commands and their uses.
  - **get.** Displays the current setting of a specific configuration parameter.
  - **pid.** Add or delete a protocol identifier.
  - **save.** Save the current configuration to the active profile.
  - **set.** Sets a specific configuration parameter.
  - **show.** Displays current configuration parameters for SAMA, DVB, link, revision, versions, LAN, WAN, and profile.
  - **skydsl.** Restore configuration parameters to their factory defaults.
- **help system.** Displays a list of system commands and their uses.
  - **arp.** Display Address Resolution Protocol information.
  - **dhcp.** Enable or disable the Router's Dynamic Host Configuration Protocol feature.
  - **dhrange.** Configure the DHCP server address pool.
  - **domain.** Configure the domain name.
  - **exit.** Log off of the SkyDSL Router.
  - **gateway.** Configure the default gateway.
  - **host.** Configure the host name.
  - **iplan.** Configure the SkyDSL Router's Internet Protocol address on the Local Area Network.

- **lan.** Local Area Network interface control.
- **log.** Display the log files.
- **nat.** Enable or disable the Router's Network Address Translation feature.
- **passwd.** Change the login password.
- **ping.** Execute the ping program.
- **portfwd.** Configure port forwarding.
- **qos.** Configure QoS.
- **reboot.** Reboot the SkyDSL Router.
- **rip.** Enable or disable the Routing Information Protocol feature.
- **ripmetr.** Set the RIP metric value.
- **route.** Modify the static routes.
- **shutdown.** Shut down the SkyDSL Router.
- **snmpaccs.** Configure the Simple Network Management Protocol access communities.
- **tcpdump.** Execute the Transmission Control Protocol dump program.
- **tcpproxy.** Enable or disable the Transmission Control Protocol acceleration client.
- **telnet.** Execute the telecommunications network protocol program.
- **traceroute.** Execute the trace route program.
- **wan.** Wide Area Network interface control.

### 3.3.2 COMMAND-SPECIFIC HELP

You can access a specific command's use, syntax, and options with the help command or the question mark (?) command. For example:

- **help set.** Displays a list of **set** commands, their use, and their options.
- **set sama ?.** Displays use and options specific to the **set sama** command.

## 3.4 VIEWING SKYDSL ROUTER PARAMETERS

The CLI has two commands available for viewing SkyDSL Router parameters, each with its own advantage. The **sdmon** command displays a select group of commonly used Router parameters in real-time and is useful for moment-by-moment monitoring of the Router's functions. When a complete list of parameters is required, the **show** command provides a static display for a specified area. Both commands are explained in detail below.

Regardless of the command used, when viewed with an ANSI® monitor, the CLI displays the parameters' values in one of four colors, indicating their status:

- **Green.** The parameter permits normal SkyDSL Router operation.
- **Yellow.** The parameter permits Router operation, but may produce errors.
- **Red.** The parameter prohibits normal Router operation
- **White.** Neutral/inconsequential.

### 3.4.1 THE **SDRMON** COMMAND

#### NOTE

The **sdrmon** command may not display correctly in the Microsoft Windows Telnet client if it is using ANSI terminal emulation. If the **sdrmon** display appears garbled, you must change the terminal emulation to vt100. At the CLI, enter **TERM=vt100** and press **ENTER**. The display will now be in black and white, but the display will be correct.

Other Telnet clients (PuTTY, for example) do not exhibit this misbehavior.

The **sdrmon** command starts the SkyDSL Router monitor, providing a real-time display of the most commonly observed SkyDSL Router parameters. This is convenient in getting a broad picture of your Router's "health" on the SkyDSL Network. Be advised, however, that no other commands are available until you press **<Q>** on your keyboard, which terminates the monitor.

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<sup>®</sup> ANSI is a registered trademark of American National Standards Institute, Incorporated.

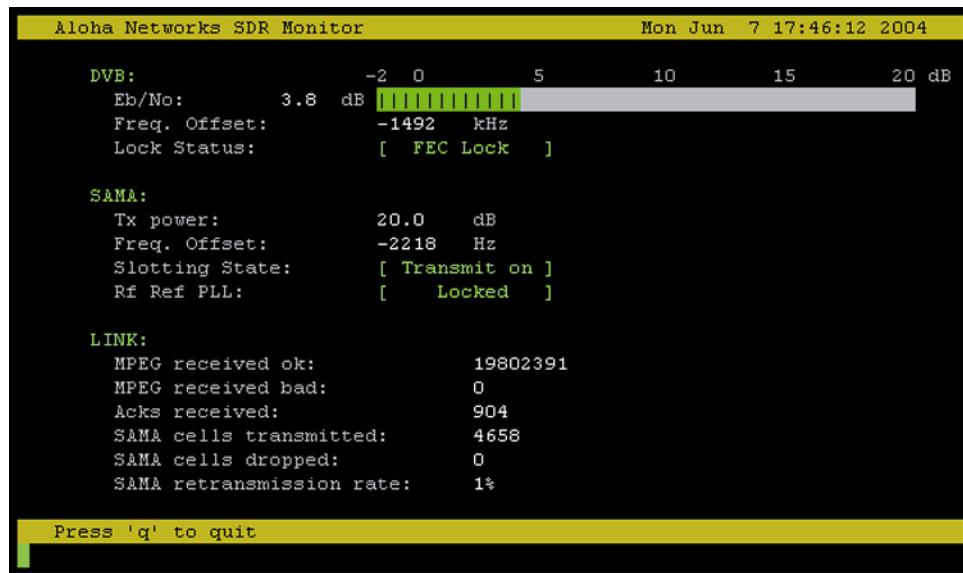


Figure 16—sdrmon Command Display

- **Eb/No.** The current approximate signal-to-noise ratio (in decibels) of the DVB signal. The signal is roughly within operational tolerance as long as it is above the Eb/No threshold (see section 3.4.3 below). Its quality becomes questionable below this level. A gauge to the immediate right provides an easily readable graphical representation of the parameter. A yellow bar indicates the level is below the Eb/No threshold, green means it is above.
- **Freq. Offset.** This value reflects the DVB receiver's compensation for off-frequency errors of up to approximately  $\pm 2$  MHz.
- **Lockstatus.** Reflects the status of the Router's DVB signal lock.
  - **Not Locked.** No signal is being received.
  - **Signal Lock.** The Router is receiving a signal of indeterminate type.
  - **Viterbi Lock.** The Router is receiving a signal with the correct viterbi sequence.
  - **FEC Lock.** A reliable lock is present on a signal that matches the entire required forward error correction scheme.
- **Tx Power.** The power level (in decibels) of the SAMA transmission (-13.0 to +36.0 dB).
- **Freq. Offset.** The amount by which the SkyDSL Router is offsetting its frequency reference ( $\pm 10,000$  hertz) to compensate for crystal variation.
- **Slotting State.** The current state of slotting. When the slotting feature is enabled, the slotting state cycles through each of these stages until slotting is achieved, at which point the transmitter is enabled.
  - **Unslotted.** Slotting is off.
  - **Receive on.** Slotting is enabled, and the SkyDSL Router is waiting for correction information from the SkyDSL SAMA Receiver.

- **Coarse synchronization.** The Router has been assigned a transmission slot from the SAMA Receiver, but has not yet achieved the proper level of synchronization.
- **Fine synchronization.** The Router has achieved the proper level of synchronization, but awaits notification from the SAMA Receiver that the synchronization is stable.
- **Transmit on.** The transmission is slotted.
- **Standby.** The SkyDSL Router is unable to achieve a slotted state and will make a new attempt after a short period of time. This will interrupt SAMA transmissions only if the Transmit Inhibit feature has been set to **Require Slotting Synch** mode.
- **Rf Ref PLL.** An internal oscillator check advisory. [ **Locked** ] should be displayed during normal operations.
- **MPEG received ok.** The total number of valid DVB frames received.
- **MPEG received bad.** The total number of erroneous DVB frames received.
- **Acks received.** The total number of DVB acknowledgement protocol packets received from the SkyDSL SAMA Receiver.
- **SAMA cells transmitted.** The total number of SAMA cells transmitted since the last reboot.
- **SAMA cells dropped.** Number of SAMA cells dropped during transmission due to buffer overload.
- **SAMA retransmission rate.** The percentage of transmitted SAMA cells that required retransmission.

### 3.4.2 THE SHOW SAMA COMMAND

The **show sama** command displays the SkyDSL Router's SAMA parameters. Default SAMA parameters are listed in Appendix C.

```
sdr> show sama
SAMA physical:
  Sama Code Profile      : 0 (Single Code, 129kbps, QPSK, BCH)
  Center Freq.           : 1386500 kHz
  Center Freq Offset.   : -900 Hz
  Symbol Rate             : 64.5 kSps
  PA Type (Freq. band)  : Ku-Band
  TX Emissions            : ON
  Transmit inhibit mode  : Require DVB FEC lock
  PA Power                : ON
  Transmit Power          : 19.0 dB
  Auto Mute               : ON
  FEC                      : ON
  FEC Scheme              : BCH
  Spectral Inversion       : ON
  Test Mode                 : OFF
  Frequency Tracking       : ON
  Power Tracking            : ON
  Transmit Probability     : 100 % (ON)
  Slotting                  : ON
  Slotting state           : [ Transmit_on ]
  Rf Ref PLL                : [ Locked ]
```

Figure 17—show sama Command Display

- **Sama Code Profile.** Displays the SAMA channel's current code profile (spreading code, data rate, modulation type, and FEC code).
  - **0 (Single Code, 129 kbps, QPSK, BCH)**
  - **3 (Single Code, 266 kbps, QPSK, BCH)**

Future expansion of this feature is planned.
- **Center Freq.** The frequency at which the SkyDSL Router transmits SAMA signals to the satellite (950000–1450000 kilohertz).
- **Center Freq Offset.** The amount by which the SkyDSL Router is offsetting its frequency reference ( $\pm 10,000$  hertz) to compensate for crystal variation.
- **Symbol Rate.** The rate (in kilosymbols per second) at which data is transmitted over the SAMA channel. Determined by the data rate in use (as determined by the selected SAMA code profile).
- **PA Type (Freq. band).** The operating frequency band of your ODU's power amplifier/block upconverter (**C-band**, **Ku-band**, or **L-band (No PA)**).
- **Tx Emissions.** The Router's transmitter status (**ON** or **OFF**).
- **Transmit Inhibit Mode.** The status of a safety mechanism that, when enabled, inhibits SAMA transmissions unless certain conditions are met.
  - **Off (Always Transmit).** Do not inhibit SAMA signal transmission.

**IMPORTANT**

To reduce the risk of interference to adjacent satellites, never use the **Off** setting during live, over-the-air operations. Instead, always use one of the two **On** modes to automatically interrupt transmission if FEC lock on the DVB signal is lost. This will prevent errant transmissions should the outdoor unit, for any reason, move off-axis.

- **Require DVB FEC Lock.** Inhibit SAMA signal transmission if no FEC lock is present on the incoming DVB signal (for example, if the antenna is blown off-axis).
- **Require Slotting Synch.** Inhibit SAMA signal transmission if no FEC lock is present on the incoming DVB signal *and* if slotting is enabled, but not synchronized. This helps to ensure the SkyDSL Router's transmissions do not interfere with other Routers' transmissions.
- **PA Power.** The status of the SkyDSL Outdoor Unit's power amplifier (**ON** or **OFF**).
- **Transmit Power.** The power level (in decibels) of the SAMA transmissions (-13.0 to +36.0 dB).
- **Auto Mute.** The status of the automatic mute feature that, when enabled, automatically inhibits the SAMA channel's carrier signal if no SAMA cells are being transmitted (**ON** or **OFF**).
- **FEC.** The status of Forward Error Correction, which adds extra redundant data to the SAMA cells to allow the SkyDSL SAMA Receiver to determine if the cell was transmitted correctly and to correct any errors (**ON** or **OFF**).
- **FEC Scheme.** The Forward Error Correction scheme currently in use. Determined by the current SAMA code profile in use.
- **Spectral Inversion.** The status of inversion of the SAMA transmission. Some power amplifiers require that this feature be enabled (**ON** or **OFF**).
- **Test Mode.** Assists with initial startup and troubleshooting. Four settings are available:
  - **Off.** Test mode is off.

- **Continuous Wave.** Transmits a constant signal allowing technicians to monitor the quality of the signal. *Automatically disabled after five minutes.*

**NOTE**

When using Continuous Wave test mode, you must disable the **Auto Mute** feature. Otherwise no transmissions will occur.

- **Data All Hi.** Transmits a data stream with all bits set to 1. Used primarily by technical support for troubleshooting purposes. *Automatically disabled after five minutes.*
- **Pseudo Random Data.** Transmits a pseudo-random stream of data. Used primarily by technical support for troubleshooting purposes. *Automatically disabled after five minutes.*
- **Frequency Tracking.** The status of frequency tracking, which, when enabled, allows the SkyDSL SAMA Receiver to control the Router's center frequency offset. If the SAMA signal received is off-frequency, the SAMA Receiver sends the necessary correction information to the Router (**ON** or **OFF**).
- **Power Tracking.** The status of power tracking, which, when enabled, allows the SkyDSL SAMA Receiver to control the Router's transmission power level. If the SAMA signal's power level is incorrect, the SAMA Receiver sends the necessary correction information to the Router (**ON** or **OFF**).
- **Transmit Probability.** The rate of SAMA transmissions as dictated by the SkyDSL SAMA Receiver. The display is a percentile value with 100 representing a full rate of SAMA transmission. The value may be lower at any given time depending on the SkyDSL Network's current load.
- **Slotting.** The status of the slotting feature, which, when enabled, assists in decreasing the amount of data collisions with transmissions from other SkyDSL Routers by allowing the Router to transmit only at specific times (**ON** or **OFF**).
- **Slotting State.** The current state of slotting. When the slotting feature is enabled, the slotting state cycles through each of these stages until slotting is achieved, at which point the transmitter is enabled.
  - **Unslotted.** Slotting is off.
  - **Receive on.** Slotting is enabled, and the SkyDSL Router is waiting for correction information from the SkyDSL SAMA Receiver.
  - **Coarse synchronization.** The Router has been assigned a transmission slot from the SAMA Receiver, but has not yet achieved the proper level of synchronization.

- **Fine synchronization.** The Router has achieved the proper level of synchronization, but awaits notification from the SAMA Receiver that the synchronization is stable.
- **Transmit on.** The transmission is slotted.
- **Standby.** The SkyDSL Router is unable to achieve a slotted state and will make a new attempt after a short period of time. This will interrupt SAMA transmissions only if the Transmit Inhibit feature has been set to **Require Slotting Synch** mode.
- **Rf Ref PLL.** An internal oscillator check advisory. [ **Locked** ] should be displayed during normal operations.

### 3.4.3 THE SHOW DVBT COMMAND

The **show dvbt** command displays the SkyDSL Router's DVB parameters. Default DVB parameters are listed in Appendix C.

```
sdr> show dvbt
DVB physical:
  Sample Freq.          : 45 Mhz
  Center Freq.          : 1030000 kHz
  Center Freq. Offset   : 254 kHz
  Freq Scan Range       : 2000 kHz
  Viterbi Rate          : 3/4
  Spectral Inversion    : OFF
  Descrambling          : ON
  Symbol Rate            : 14468 kSps
  Data Rate              : 20000 kBps
  LNB Type (Freq. band) : Ku-Band
  LNB Power              : ON
  Eb/No Threshold        : 3 dB
  Eb/No power estimation : 11.4 dB
  Lockstatus             : [ FEC Lock ]
sdr>
```

Figure 18—**show dvbt** Command Display

- **Sample Freq.** The frequency at which the DVB analog-to-digital converter samples the receive signal. The value must be at least twice the symbol rate, but must not be excessively higher (e.g., if symbol rate is 30 megasymbols, sample frequency cannot be less than 60 MHz). Valid settings are 45, 61, 81, and 91 MHz.
- **Center Freq.** The frequency at which the SkyDSL Router receives DVB signals from the satellite (950000–1450000 kilohertz).

- **Center Freq. Offset.** A fine-tuning feature. This is a read-only value that reflects the DVB receiver's compensation for off-frequency errors of up to approximately  $\pm 2$  MHz.
- **Freq Scan Range.** The range (in kilohertz) to either side of the center frequency that the SkyDSL Router will automatically scan to acquire the DVB signal. Default is 2000; maximum is 5000.
- **Viterbi Rate.** Displays the current viterbi setting, which may be 1/2, 2/3, 3/4, 5/6, or 7/8. The value determines how much of the symbol rate includes real data versus viterbi encoding, and must match the SkyDSL SAMA Receiver's viterbi setting. Viterbi encoding is a method of including correctional data in a transmitted bit stream, which allows for the bit stream's reconstruction should any portion be lost.
- **Spectral Inversion.** The status of inversion of the received DVB signal. Some low noise block downconverters require that this feature be enabled (**ON** or **OFF**).
- **Descrambling.** The status of descrambling. This feature must be enabled if scrambling is enabled at the SkyDSL Teleport's DVB modulator (**ON** or **OFF**).
- **Symbol Rate.** The rate (in kilosymbols per second) at which data are received over the DVB channel.
- **Data Rate.** The rate (in kilobits per second) at which bits are being received within the DVB channel. This is a function of symbol rate and viterbi rate, and is not adjustable except as a result of adjusting the symbol rate.
- **LNB Type (Freq. band).** The operating frequency band of your ODU's low noise block downconverter. (**C-band**, **Ku-band**, or **L-band (No LNB)**).
- **LNB Power.** Reflects the current power status of the SkyDSL Outdoor Unit's low noise block downconverter (**ON** or **OFF**).
- **Eb/No Threshold.** A "placeholder" value that is set at the factory. If the Eb/No Power Estimation value falls below the threshold, the DVB signal's quality is questionable.
- **Eb/No Power Estimation.** The current approximate signal-to-noise ratio (in decibels) of the DVB signal. The signal is roughly within operational tolerance as long as it is above the Eb/No threshold.
- **Lockstatus.** An advisory field that reflects the state of lock on the DVB signal.
  - **Not Locked.** No signal is being received.
  - **Signal Lock.** The Router is receiving a signal of indeterminate type.
  - **Viterbi Lock.** The Router is receiving a signal with the correct viterbi sequence.
  - **FEC Lock.** A reliable lock is present on a signal that matches the entire required forward error correction scheme.

### 3.4.4 THE SHOW LINK COMMAND

Displays the status of the SAMA and DVB links. Default link parameters are listed in Appendix C.

```
sdr> show link
SAMA link:
  SAMA Address          : 20d5 (hex)
  SAMA Cells xmit       : 47536
  SAMA Cells rexmit     : 10916
  SAMA Cells rexmit x 2 : 5323
  SAMA Cells rexmit x 3 : 3167
  SAMA Cell TX Retries  : 3 (Ack protocol active)
  SAMA Cells dropped    : 5580

DVB link:
  DVB MPEG2 received ok   : 305296100
  DVB MPEG2 received bad   : 48
  DVB Ack packets received : 22401
  DVB Net Time Support    : DVB SI TDT
  DVB Pid Filter          : ON
  Enabled pid streams      : MPEGok  MPEok  MPEbad  LLCSNAP SkyCtrl
    pid 14 (hex)          : 57863   0       0       0       0
    pid 2a (hex)          : 29315521 4659179 0       0       0
    pid 2b (hex)          : 1        0       0       0       0
    pid 2c (hex)          : 24058873 3735712 0       0       0
    pid 2d (hex)          : 35333980 3533254 0       0       174230

sdr>
```

Figure 19—show link Command Display

- **SAMA Address.** The SkyDSL Router's unique SAMA address, which the SkyDSL SAMA Receiver sets and uses for recognition.
- **SAMA Cells xmit.** The total number of SAMA data cells transmitted since the last reboot.
- **SAMA Cells rexmit.** The total number of SAMA cells the SkyDSL Router has retransmitted due to errors since the last reboot.
- **SAMA Cells rexmit x 2.** The total number of SAMA cells the SkyDSL Router has retransmitted a second time since the last power up or reboot.
- **SAMA Cells rexmit x 3.** The total number of SAMA cells the SkyDSL Router has retransmitted a third time since the last reboot.
- **SAMA Cell TX Retries.** Reflects the user-entered number of allowed SAMA cell retransmission attempts (0, 1, 2, or 3). Setting the value to 1, 2, or 3 enables the acknowledgment (or **ack**) protocol, which asks the SkyDSL SAMA Receiver to send transmission-receipt data to the SkyDSL Router. Failure to receive an acknowledgment message results in data retransmission.
- **SAMA Cells Dropped.** The number of SAMA cells dropped during transmission due to buffer overload.
- **DVB MPEG2 Received OK.** The total number of valid frames received.
- **DVB MPEG2 Received Bad.** The total number of erroneous frames received.

- **DVB Ack Packets Received.** The total number of acknowledgement protocol packets received from the SkyDSL SAMA Receiver.
- **DVB Net Time Support.** Enabling this feature allows the SkyDSL Router to receive time synchronization signals from the SkyDSL Teleport, allowing the Router to be in synch with the Teleport's time. Three settings are available:
  - **OFF.** Network time synchronization is disabled.
  - **DVB SI TDT.** The Router is using DVB-standard time and date table network time synchronization.
  - **SkyCtrl.** The Router is using the SkyDSL Network's proprietary network time synchronization (use this only if the teleport's encapsulator does not support DVB SI TDT or if you do not have an available PID slot (DVB SI TDT enables PID 14)).
- **DVB PID Filter.** Reflects the current status of protocol ID (PID) filtering (**ON** or **OFF**).
- **Enabled PID Streams.** Provides a breakdown of statistics by PID.
  - **MPEGok.** The total number of valid frames received for the PID.
  - **MPEok.** The total number of valid packets received for the PID.
  - **MPEbad.** The total number of erroneous packets received for the PID.
  - **LLCSNAP.** Logical Link Control/SubNetwork Access Protocol. Not presently used in the SkyDSL Network.
  - **SkyCtrl.** The total number of SkyControl™ packets received from the SkyDSL SAMA Receiver.

### 3.4.5 THE SHOW LAN COMMAND

Displays your local area network's parameters. Default LAN parameters are listed in Appendix C.

```
sdr> show lan

Current LAN configuration
=====
dhcp          yes
dhrange       192.168.1.100 192.168.1.199
domain        private.network
firewall      yes
gateway       wan
host          sdr
iplan         192.168.1.1/24
mcast         no
nat           yes
portfwd       no
rip            no
ripmetr       1
tcpproxy      none
sdr> █
```

Figure 20—show lan Command Display

- **dhcp.** The status of the **Dynamic Host Configuration Protocol** server feature (**yes** or **no**). When enabled, the SkyDSL Router will automatically assign IP addresses to user workstations from within the dhrange parameters.

**NOTE**

When DHCP is enabled at the SkyDSL Router, it is important to ensure that no other DHCP servers exist on the LAN. See section 7.2 on page 63 for additional information.

- **dhrange.** The current range of IP addresses available for automatic assignment to user workstations on the LAN. This parameter is only in effect when the DHCP server feature is enabled. In addition, changing the iplan parameter while DHCP is turned on will cause dhrange to change automatically to encompass the new value. In instances where the configured range cannot be moved to a new subnet, DHCP will automatically be disabled. If you subsequently desire to enable the DHCP server feature, you should manually set the new dhrange, followed by the **dhcp on** command.
- **domain.** The name of your domain. This is any name of your choosing.
- **firewall.** Not presently active. For future implementation.
- **gateway.** The name of the SkyDSL Router gateway. Do not change the default setting (**wan**) unless you are knowledgeable in this area.
- **host.** The name by which the SkyDSL Router is referred. This setting is used as the CLI prompt (for example, **sdr>** or **skydsl>**).
- **iplan.** The SkyDSL Router's assigned LAN IP address and network mask setting.
- **mcast.** The status of multicast (**yes** or **no**). When enabled, this feature allows users to subscribe to and receive multicast transmissions.

**NOTE**

After changing the multicast setting, you must reboot the SkyDSL Router.

- **nat.** The status of **Network Address Translation** (**yes** or **no**). **NAT.** When enabled, this feature allows the LAN to use one set of IP addresses for internal traffic and a second set for external traffic.
- **portfwd.** The status of port forwarding (**yes** or **no**). Port forwarding allows the SkyDSL Router operator to set rules to forward data packets arriving on particular port numbers to specific computers on the LAN. The NAT feature must be enabled to use port forwarding (see section 7.6 on page 77 for more information).

- **rip.** The status of Routing Information Protocol, which transmits RIP messages to the LAN; workstations monitor it and other routes, switching automatically to the one most appropriate (see section 7.4 on page 65).
- **ripmetr.** The RIP level (metric) assigned to the SkyDSL Router.
- **tcpproxy.** The selected mode of the SkyDSL Router's TCP proxy client (**skytcp**, **nettgain**, **both**, or **none**). Use of this feature requires that a SkyTCP™ proxy server, a Nettgain proxy server, or both be present at the SkyDSL Teleport. When enabled, it works with the proxy server to significantly increase performance.

### 3.4.6 THE SHOW REV COMMAND

Displays the SkyDSL Router's hardware and software versions. This information is presented primarily as a troubleshooting aid and will be helpful when contacting technical support.

```
sdr> show rev
Revisions:
Software : 3.31
Fpga TX (SAMA) : 2.31
Fpga RX (DVB) : 1.18
Board Type : Maui Rev C
TX RF Module : Hana Rev B
Receiver (DVB) : Conexant CX24110
DVB Mac address : 00:90:81:00:01:79
Sama Code Profile Revision: 5
sdr>
```

Figure 21—show rev Command Display

### 3.4.7 THE SHOW WAN COMMAND

Displays the wide area network (WAN) parameters. This information is presented primarily as a troubleshooting aid and will be helpful when contacting technical support.

```
sdr> show wan

Current WAN configuration
=====
ipwan      10.1.0.1/16
samaaddr   0x2020
dnserver   10.1.1.30
ssh        yes
telnet    no
sdr>
```

Figure 22—show wan Command Display

### 3.4.8 THE SHOW VERSIONS COMMAND

Displays the version numbers of the various SkyDSL Router software modules. This information is presented primarily as a troubleshooting aid and will be helpful when contacting technical support.

```
sdr> show versions
SkyDSL Router Release: 2.03 RC-2 (5/24/2004)

Module versions:
aams : 2.35
cli : 2.07-[qos cfg]
dhcpd : 1.01
dnscache : 2.07
etc : 2.08 [Removed portfwd]
fwall : 2.14
hfx : 2.00
initrd : 2.04
kernel : 2.4.20
misc : 2.08-[qos cfg]
modules : 2.4.22NF-dep
proxy : 2.28
qos : 1.08
rip : 1.02
root : 2.04
skydsl : 3.35-[unified driver build 6 w/ skyd]
ssh : 3.2.3
thttpd : 2.13 [Removed skyd]
upgrd : 1.11
sdr> █
```

Figure 23—show versions Command Display

---

## 4 COMMISSIONING THE SKYDSL OUTDOOR UNIT

### WARNING

An RF energy hazard exists during normal operation of the SkyDSL VSAT Terminal. To avoid injury, never connect the power amplifier to the SkyDSL Router before it has been integrated into the outdoor unit's feedhorn assembly.

In addition, never place body parts between the outdoor unit's feedhorn and antenna dish while the power amplifier is connected to the SkyDSL Router.

Likewise, if you need to remove the power amplifier from the outdoor unit, always power down the SkyDSL Router and disconnect the coaxial cables before doing so.

The first step in bringing your SkyDSL VSAT Terminal up on the SkyDSL Network is to commission your SkyDSL Outdoor Unit (ODU). This involves transmitting a test signal to the satellite for evaluation by the satellite bandwidth provider. Of course, before you can do this you must locate your satellite.

Finding a satellite requires the use of a satellite finder in conjunction with the ODU so that you can "listen" for its signal. There are various types of satellite finders available at various prices, but you must use one that has its own power supply. This is necessary because the satellite finder will be supplying power to the ODU's LNB. Even more desirable is a satellite finder with a spectral analyzer, which eliminates much of the guesswork. Comparing the analyzer display to the satellite's spectral plot (obtained from the satellite bandwidth provider) allows you to quickly verify that you have acquired the correct satellite.

**1) Acquire the satellite.**

**⚠ CAUTION**

Do not overtighten the F-type connectors. A firm fit is all that is required.

**⚠ CAUTION**

F-type connectors are susceptible to corrosion and can become damaged by weather. It is highly recommended that you use a dielectric waterproofing filler such as STUF (produced by Cross Devices) and a sealing compound such as COAX-SEAL (produced by Universal Electronics, Inc.) to help keep out moisture.

**Refer to Appendix G for Material Safety Data Sheets on these products.**

- a)** Using waterproofing filler and sealing compound, attach a coaxial cable to the ODU's low noise block downconverter.

**NOTE**

Do not use waterproofing filler and sealing compound when connecting the coaxial cable to the satellite finder, as this is a temporary connection.

- b)** Attach the other end of the coaxial cable to the satellite finder's input jack and turn it on.
- c)** Using a magnetic compass, verify that the ODU is pointing at the correct azimuth (see section 2.3.1 on page 7 for information determining satellite look angle).
- d)** Verify the ODU's feedhorn is oriented to the correct polarization.
- e)** Increase the ODU's elevation until a signal is acquired.  
If your satellite finder has a spectral analyzer, verify the signal against the spectral plot to ensure you have acquired the correct satellite.

**NOTE**

Even if the ODU is pointing at the correct look angle, it is possible to pick up signals from the wrong satellite due to adjacent satellite interference, a common occurrence with smaller antenna dish sizes. A spectral analyzer is especially useful in such cases.

- 2) Connect the LNB to the SkyDSL Router.
    - a) Turn off the satellite finder and detach the coaxial cable from its input jack.
    - b) If your SkyDSL Router is turned on, power it down.
- ! CAUTION**
- All cables must be grounded, and lightning suppressors should be installed where cables exit to the outdoors. Always make certain the lightning suppressors are installed and properly grounded according to the manufacturer's instructions to prevent damage to SkyDSL VSAT Terminal components.
- c) Connect the coaxial cable to the lightning suppressor attached to the SkyDSL Router's LNB port.
- IMPORTANT**
- At this time, do not use waterproofing filler and sealing compound when connecting the LNB coaxial cable to the lightning suppressor, in case you need to reattach the satellite finder at some point during the ODU commissioning process.
- 3) Connect the PA to the SkyDSL Router.
    - a) Using waterproofing filler and sealing compound, connect a coaxial cable to the ODU's power amplifier.
    - b) Using waterproofing filler and sealing compound, connect the other end of the coaxial cable to the lightning suppressor attached to the SkyDSL Router's PA port.
  - 4) Commission the SkyDSL Outdoor Unit.
    - a) Contact the satellite bandwidth provider to coordinate your test transmission and obtain the test transmission frequency.

- b) Turn on the SkyDSL Router and log in.

**NOTE**

If your SkyDSL Network is already operating, you can verify that you have acquired the correct satellite by entering your DVB parameters and observing the **show dvb** command display. If the **Lockstatus** field displays [ **FEC Lock** ], you are receiving SkyDSL Network signals.

It is easier to do this with two people, as it will likely be necessary to rotate the feedhorn assembly to achieve the correct polarization.

Procedures for setting DVB parameters can be found in section 5.4 on page 52.

- c) Type **show sama** and verify that **PA Power** is disabled.
- d) At the CLI prompt, type **set patype <value>**, where **<value>** is the frequency band of your ODU's power amplifier, and press **ENTER**.  
**PA Type (Freq. band)** is set to the entered frequency band.
- e) Type **set sama cntrfreq <value>**, where **<value>** is the test transmission frequency, and press **ENTER**.  
The SkyDSL Router is set to the test transmission frequency.
- f) Type **set sama inhibit off** and press **ENTER**.  
The **Transmit inhibit mode** feature is disabled.
- g) Type **set sama automute off** and press **ENTER**.  
The **Automatic Mute** feature is disabled.
- h) Type **set sama pwrlvl 36.0** and press **ENTER**.  
The transmitter's power level is set to maximum (36.0 dB).
- i) Type **set sama testmode cw** and press **ENTER**.  
The SkyDSL Router is set to continuous wave test mode.

**NOTE**

Test mode only enables for three (3) minutes at a time before disabling. If your testing lasts longer than this period, you will have to reenable it.

- j) When the satellite bandwidth provider is ready to commence, type **set sama papoweradm on** and press **ENTER**.

The SkyDSL Router begins transmitting test signals to the satellite.

**NOTE**

When powering the ODU's PA, there is a 10-second delay before transmissions actually begin. This delay allows the SkyDSL Router's internal hardware to stabilize before transmitting live signals.

- k) Coordinate with the satellite bandwidth provider until you achieve an acceptable signal.

This typically consists of rotating the feedhorn assembly until the satellite bandwidth provider is satisfied with your signal's polarization.

**NOTE**

If, at any time, you determine that you have acquired the wrong satellite, it will be necessary to realign the ODU to acquire an adjacent satellite.

Refer to Appendix B for procedures.

- l) When cued by the satellite bandwidth provider to transmit modulated signals, type **set sama testmode off** and press **ENTER**.

**NOTE**

It is not possible to toggle between test modes. If the Router is still in **cw** test mode you must disable it before enabling **random** test mode.

- m) Type **set sama testmode random** and press **ENTER** to test in modulated mode.

The SkyDSL Router is set to pseudorandom test mode.

- n) Coordinate again with the satellite bandwidth provider until you achieve an acceptable signal.

- 5) Set SkyDSL Router parameters for normal transmission.

- a) At the CLI prompt, type **set sama papoweradm off** and press **ENTER**.

The SkyDSL Router ceases transmitting test signals to the satellite.

- b) Type `set sama testmode off` and press **ENTER**.

The SkyDSL Router reenters normal transmission mode.

- c) Type `set sama pwrlvl 12.0` and press **ENTER**.

The transmission power level is set to a level appropriate to SkyDSL VSAT Terminal commissioning.

- d) Type `set sama automute on` and press **ENTER**.

The **Automatic Mute** feature is reenabled.

- e) Type `set sama inhibit nolock` and press **ENTER**.

The **Transmit inhibit mode** feature is set to **Require DVB FEC Lock**.

- 6) Secure the ODU.

 CAUTION

Do not forget to apply waterproofing filler and sealing compound to the F-type connector connecting the coaxial cable from the LNB to the lightning suppressor.

- a) Tighten all movable ODU parts, including the azimuth, elevation, and polarization adjustment to reduce the chance of the ODU being moved by wind or other disturbance.

Commissioning of the ODU is complete. SkyDSL Router configuration is the next step in establishing your SkyDSL Network.

---

## 5 CONFIGURING THE SKYDSL ROUTER

The bulk of the SkyDSL Router's default parameters are designed to be appropriate to most situations. Depending on your situation, however, you may need to configure some parameters to make your Router compatible with your SkyDSL Network and LAN.

### IMPORTANT

Any changes to the SkyDSL Router's parameters are temporary until you save them to the **active profile** using the **save** command. Failing to do so will cause the parameters to revert to their previous settings upon rebooting. (For more information on profiles, see section 6.3.)

### 5.1 SETTING THE LAN IP ADDRESS

### IMPORTANT

By default, the SkyDSL Router's DHCP feature is enabled. When integrating the Router into your LAN, it is important to take this into account and deal with conflicts appropriately. Section 7.2 on page 63 provides more information.

### NOTE

You must restart the SkyDSL Router's LAN interface after changing any LAN parameters to ensure that new the settings have taken effect.

Your SkyDSL Router must have a unique IP address on your LAN. This address is preconfigured at the factory and can be used as-is, but you may also change it as required for your LAN. If you are using two or more SkyDSL Routers on the same LAN they must both have unique LAN IP addresses.

- 1) Log in to the SkyDSL Router (if you have not already).
- 2) Set the LAN Internet protocol (IP) address.
  - a) Type **iplan <ip address/netmask>** and press **ENTER**. (The format for the parameter is **a.b.c.d/n** (e.g., 192.168.1.1/24).)  
The SkyDSL Router accepts the new IP address. Confirm the setting with the **show lan** command.
  - b) Type **lan restart** and press **ENTER**.  
A number of messages appear as LAN processes are stopped and restarted.

## 5.2 SETTING THE TCP PROXY CLIENT

To increase its speed and efficiency, the SkyDSL Network usually includes one or more TCP acceleration servers at the SkyDSL Teleport. The Network supports two types of TCP acceleration, Flash Networks® NettGain software and Aloha Networks® SkyTCP™ software; the SkyDSL Router includes clients for each.

Ideally, a SkyDSL Network will employ both types, as each is more effective than the other in particular areas. For example, NettGain software works better for general Internet browsing, and SkyTCP software is better used with traffic types like FTP, VPN, and VoIP.

Regardless of the TCP acceleration employed, the SkyDSL Router's TCP client setting should match the SkyDSL Teleport's configuration. This is controlled using the CLI's **tccproxy** command to set the Router's TCP proxy client to **nettgain**, **skytcp**, **none**, or **both**. Contact the Teleport administrator or ISP for this setting information.

- 1) Set the TCP proxy client selection.
  - a) Type **tccproxy <value>** and press **ENTER** (where **<value>** is **nettgain**, **skytcp**, **both**, or **none**).  
The SkyDSL Router accepts the new proxy client setting. Confirm the setting with the **show lan** command.
  - b) Type **lan restart** and press **ENTER**.  
A number of messages appear as LAN processes are stopped and restarted.

## 5.3 SETTING THE SAMA® PARAMETERS

SAMA parameters control data transmissions from your SkyDSL Router to the SkyDSL SAMA Receiver at the SkyDSL Teleport. Contact your Teleport administrator or ISP for these settings.

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**1) Set the power amplifier (PA) frequency band.**

Set this feature to match your outdoor unit's power amplifier (if you did not do so already during ODU commissioning).

- a) Type **set sama patype <value>** (where **<value>** is **c** (C-band), **k** (Ku-band), or **l** (L-band (primarily used for testing))) and press **ENTER**.

The SkyDSL Router accepts the PA type as reflected with the **show sama** command.

**2) Set the SAMA center frequency.**

Your SkyDSL Network's satellite, as well as your VSAT Terminal's LNB and PA, will determine the SAMA and DVB frequencies that you will use.

Check the Router's current SAMA frequency setting with the **show sama** CLI command and adjust it as necessary.

- a) Type **set sama cntrfreq <value>** (**<value>** must fall within the range of 950000–1450000 kHz) and press **ENTER**.

The SkyDSL Router accepts the new SAMA center frequency. Use the **show sama** command to confirm.

#### SAMA CENTER FREQUENCY OFFSET

The SkyDSL Router will determine the SAMA channel's frequency offset value automatically. For troubleshooting purposes, however, you may set the value manually up to ±10,000 hertz using the **set sama cntrfreqoffset <value>** command.

**A manually-entered offset value is not savable and will not persist after the SkyDSL Router is rebooted.**

**3) Set SAMA spectral inversion.**

#### NOTE

Your SkyDSL Router's SAMA spectral inversion setting must match the requirement of your outdoor unit's power amplifier. Refer to the PA's specifications for this value.

Check the SkyDSL Router's current SAMA spectral inversion setting with the **show sama** command, and adjust it as necessary.

- a) Type `set sama specinv <value>` (<value> is 0/no/off or 1/yes/on) and press **ENTER**.

The new spectral inversion setting is accepted. Confirm with the `show sama` command.

- 4) Set SAMA code profile.

#### IMPORTANT

The SkyDSL Router is configured with code profile **0** at the factory. If you need to change to code profile **3**, contact technical support at [techsupport@alohanet.com](mailto:techsupport@alohanet.com) for additional instructions.

#### NOTE

Your SkyDSL Router's SAMA code profile setting must match the settings at the SkyDSL Teleport.

Check the SkyDSL Router's current SAMA code profile setting with the `show sama` command, and adjust it as necessary.

- a) Type `set sama codeprofile <value>` (<value> is **0** or **3** (see section 3.4.2)) and press **ENTER**.

The new SAMA code profile rate is accepted. Confirm with the `show sama` command.

## 5.4 SETTING THE DVB PARAMETERS

DVB parameters control data reception from the SkyDSL Teleport. Contact your Teleport administrator or ISP for these settings.

#### NOTE

Your SkyDSL Router's viterbi rate, symbol rate, sample frequency, and descrambling settings must match those at the SkyDSL Teleport in order for the Router to correctly receive the DVB signal.

- 1) Set the low noise block downconverter (LNB) frequency band.

Set this feature to match your outdoor unit's LNB.

- a) Type `set dvb lnbtype <value>` (where <value> is **c** (C-band), **k** (Ku-band), or **l** (L-band (primarily used for testing))) and press **ENTER**.

The SkyDSL Router accepts the LNB type as reflected with the **show dvb** command.

**2) Set the DVB center frequency**

Check the Router's current DVB frequency setting with the **show dvb** command, and adjust it as necessary.

- a) Type **set dvb cntrfreq <value>** (**<value>** must fall within a range of 950000–1450000 kHz) and press **ENTER**.

The SkyDSL Router accepts the new DVB center frequency. Use the **show dvb** command to confirm.

**NOTE**

Any time you change the DVB frequency, you must restart the WAN interface with the **wan restart** command.

There is no need, however, to perform a WAN restart at this time. At the end of the configuration process you will reboot the SkyDSL Router, which also restarts the WAN.

**3) Set viterbi rate.**

Check the SkyDSL Router's current viterbi rate setting with the **show dvb** command, and adjust it as necessary.

- a) Type **set dvb viterbi <value>** (where **<value>** is **1/2**, **2/3**, **3/4**, **5/6**, or **7/8**) and press **ENTER**.

The new viterbi coding rate is accepted. Confirm with the **show dvb** command.

**4) Set symbol rate.**

Check the SkyDSL Router's current symbol rate setting with the **show dvb** command, and adjust it as necessary.

- a) Type **set dvb symrate <value>** (**<value>** must fall within a range of 1000–45000 ksps) and press **ENTER**.

The new symbol rate is accepted. Confirm with the **show dvb** command.

**5) Set sample frequency.**

Check the SkyDSL Router's current sample frequency setting with the **show dvb** command, and adjust it as necessary.

- a) Type **set dvb smplfreq <value>** (where **<value>** is **45**, **61**, **81**, or **91** MHz) and press **ENTER**.

The new sample frequency is accepted. Confirm with the **show dvb** command.

**6)** Set descrambling.

Check the SkyDSL Router's current descrambling setting with the **show dvb** command, and adjust it as necessary.

- a) Type **set dvb descramble <value>** (<value> is **0/no/off** or **1/yes/on**) and press **ENTER**.

The new descrambling setting is accepted. Confirm with the **show dvb** command.

**7)** Set DVB spectral inversion.

Check the SkyDSL Router's current DVB spectral inversion setting with the **show dvb** command, and adjust it as necessary.

- a) Type **set dvb specinv <value>** (<value> is **0/no/off** or **1/yes/on**) and press **ENTER**.

The new spectral inversion setting is accepted. Confirm with the **show dvb** command.

**NOTE**

Your SkyDSL Router's DVB spectral inversion setting must match the requirement of your outdoor unit's low noise block downconverter. Refer to the LNB's specifications for this value.

**8)** Set DVB net time support source.

DVB net time support allows the Router to synchronize its clock with the Teleport's. This is especially helpful when reconstructing timelines for troubleshooting purposes.

Check the SkyDSL Router's current DVB net time support setting with the **show link** command, and adjust it as necessary.

- a) Type **set nettime <value>** and press **ENTER** (where <value> is **0**, **1**, or **2**).

- **0 = Off.** Network time synchronization is disabled.
- **1 = DVB SI TDT.** The Router uses the DVB time/date table standard for time synchronization.

**NOTE**

This is the preferred setting, but may only be used if the Teleport's IP encapsulator supports it. Otherwise, you must use the SkyControl setting.

**NOTE**

When enabled, DVB SI TDT uses a dedicated PID (14) that is automatically entered into the PID table. If eight PIDs are already in use, however, you will not be able to use this feature; you must use the SkyControl setting.

- **2 = SkyCtrl.** The Router uses the Network Management System's proprietary time synchronization feature.

The new DVB net time support source is accepted. Confirm with the **show link** command.

**9) Set the protocol IDs (PIDs).**

The SkyDSL Teleport setup determines which PIDs you will use with your SkyDSL Network. Contact the Teleport administrator to obtain them. You may add and delete PIDs as necessary using the following procedures.

**IMPORTANT**

PID values less than hex 0x20 are reserved for the MPEG2 standard and must not be used for data.

**a) Type `pid add <PID hex value>` and press **ENTER**.**

The PID is entered into the SkyDSL Router. Confirm by typing the **show link** command. Repeat for up to seven additional PIDs.

If you make a PID entry error, type **pid del <PID hex value>** and press **ENTER** to delete the errant PID.

**NOTE**

Using the **DVB SI TDT** setting for **DVB net time support** (see section 3.4.4) automatically enables PID 14 in the PID table. This decreases the **total** number of available PID slots to seven. If you require eight PIDs, you must disable **DVB SI TDT** and use **SkyControl** instead.

**NOTE**

Since a PID addition is permanent until it is deleted, it is not necessary to use the **save** command to save PIDs in your configuration unless you want them retained as part of a saved profile (see section 6.3 on page 59).

**NOTE**

After manually entering protocol IDs, you must reboot the SkyDSL Router for the entries to take effect (see next section).

## 5.5 SAVING THE SKYDSL ROUTER PARAMETERS

- 1) Save all parameters.
  - a) Type **save** and press **ENTER**.  
All SkyDSL parameters are saved to the active profile.
- 2) Reboot the SkyDSL Router.
  - a) Type **reboot** and press **ENTER**.  
The SkyDSL Router reboots.

Saving and rebooting the SkyDSL Router retains all previously entered parameters and puts them into effect. The Router is now prepared for VSAT Terminal commissioning.

---

## 6 COMMISSIONING THE SKYDSL VSAT TERMINAL

The first step in commissioning your SkyDSL VSAT Terminal is acquisition of the DVB signal. The SkyDSL Teleport must therefore be transmitting before you can proceed.

### 6.1 ACQUIRING THE DVB SIGNAL

Since you have already commissioned your SkyDSL Outdoor Unit and entered your SkyDSL Router's configuration parameters, acquisition of the DVB signal should simply be a matter of checking for reception.

- 1) Acquire the SkyDSL Teleport's DVB signal.
  - a) At the SkyDSL Router's CLI, type **show dvb** and press **ENTER**.  
The Router's DVB parameters are displayed.
  - b) Check the **Lockstatus** field.

If the value reads [ **FEC Lock** ], the channel is engaged, and the Router is receiving data from the Teleport.

#### NOTE

If the Router is displaying [ **Signal Lock** ] or [ **Viterbi Lock** ], it is receiving a signal and may achieve FEC lock imminently. Wait for a minute or two to see if this occurs.

If [ **Not Locked** ] is displayed, the Router is not receiving the DVB signal for some reason. Try the following:

- Verify the DVB center frequency, Viterbi rate, symbol rate, sample frequency, descrambling, and spectral inversion values are correct. (**show dvb**). If an error is found, enter the correct value and recheck for FEC lock.
- Check all physical connections between the ODU and Router to verify that none are compromised.
- Recheck the ODU to ensure it is still set to the correct polarization.

If the [ **Not Locked** ] display persists, there is likely another cause. Contact technical support at [techsupport@alohanet.com](mailto:techsupport@alohanet.com) for assistance.

Once you have successfully acquired the DVB signal, you are ready to proceed to SAMA channel setup.

## 6.2 SETTING UP SAMA SIGNAL TRANSMISSIONS

### IMPORTANT

Do not proceed with SAMA transmissions until you have an FEC lock on your DVB signal. This will reduce the possibility of transmitting with an incorrectly aligned SkyDSL Outdoor Unit.

The final step in commissioning the SkyDSL Router is to set up and initiate SAMA transmissions from the Router to the SkyDSL Teleport.

**1)** Set Transmit Power.

- a) Type **show sama** and press **ENTER** to verify **Transmit Power** is set to 12.0 dB.

This is the power level that was set at the end of the Outdoor Unit commissioning process (section 4).

- b) If it is not, type **set sama pwrlvl 12** and press **ENTER**.

The power level is set to 12.0 dB.

**2)** Enable TX Emissions.

- a) Type **show sama** and press **ENTER** to verify **TX Emissions** is set to **ON**.

The factory default setting is **ON**.

- b) If it is not, type **set sama txstate on** and press **ENTER**.

TX Emissions are enabled.

**3)** Enable the SkyDSL Outdoor Unit's power amplifier.

- a) At the SkyDSL Router's CLI, type **set sama papoweradm on** and press **ENTER**.

The SkyDSL Outdoor Unit's power amplifier is enabled. Verify this with the **show sama** command.

**4)** Test the SAMA transmission.

- a) Type **ping <SkyDSL SAMA Receiver's SAMA interface address>** and press **ENTER**.

The SkyDSL Router transmits continuous pings to the Teleport. If the round-trip SAMA/DVB link is unimpeded, the CLI displays a series of ping confirmations. Press <**Ctrl+C**> to end ping transmission.

- b) If ping confirmations are not received, try the following:
  - Reconfirm that you have FEC lock (**show dvb**).
  - Make certain your SAMA center frequency and spectral inversion are correctly set, and that PA Power and TX Emissions are enabled.
  - Increase transmit power and resend the ping transmission. Repeat this incrementally until confirmations appear.  
If 36.0 dB (maximum) is reached without a successful ping, return **Transmit Power** to 0.0 dB and contact technical support at [techsupport@alohonet.com](mailto:techsupport@alohonet.com).

## 6.3 SKYDSL ROUTER PROFILES

After finalizing your SkyDSL configuration you may save it as a profile, which allows you to instantly retrieve that configuration's settings at any time. Up to four (4) profiles may be saved at any one time, so different situations' configurations can be at your fingertips.

### 6.3.1 SAVING THE ACTIVE PROFILE

When you initially configure your SkyDSL Router with the **set** command, the parameters are saved in a “buffer area” within the Router’s memory. They will be lost during a Router reboot, however, unless the **save** command is used. This action saves the current configuration in “permanent” memory as the **active profile**.

- 1) At the CLI prompt, enter all SkyDSL Router parameters with the **set** command.
- 2) Save the parameters to the active profile.
  - a) Type **save** and press **ENTER**.

The parameters are saved to the active profile.

### 6.3.2 CREATING A PROFILE

If at any time you make a change to the active profile, the previous configuration is lost. If you know you will want to eventually return to the previous configuration, or if you use the configuration often, you can create a saved profile with the settings in the active profile, saving them to one of the four available saved profile slots, allowing for fast and easy recovery.

- 1) Save the active profile to a saved profile.
  - a) Type **profile save <profile number>** and press **ENTER**.

- If the slot is empty, an **Enter a description:** prompt appears.
- If the slot is not empty, a **You are about to overwrite profile <profile number>: <profile name>** appears, followed by an **Are you sure? [no]** prompt.

If you wish to continue, type **yes** and press **ENTER**. Otherwise, press **ENTER** with no entry to return to the CLI command prompt.

- b) Type a profile name and press **ENTER**.

The profile is saved with the name you chose to the selected slot. Use the **show profile** command to confirm.

### 6.3.3 LOADING A PREVIOUSLY SAVED PROFILE

After saving a profile, you may easily reload it as the active profile using the **profile select** command, which will instantly restore its settings.

- 1) Load a desired profile.

- a) At the CLI prompt, type **profile select <profile number>** and press **ENTER**.

A message appears prompting you to restart the wan for the changes to take effect.

- b) Type **wan restart** and press **ENTER**.

The selected profile becomes the active profile. The profile it replaced is retained in the Router's memory in the **Profile saved** position as viewed with the **show profile** command.

#### NOTE

The active profile is independent of the saved profiles. Once a profile is loaded as the active profile, therefore, changes to its parameters will not affect the saved version unless you update it with the **profile save** command.

### 6.3.4 RESTORING THE PREVIOUSLY ACTIVE PROFILE

You may revert to the previously active profile at any time.

**NOTE**

Only the most recently replaced active profile is retained in the **Profile saved** position. Each time a new profile is loaded, the **Profile saved** is overwritten by the active profile being replaced. Only the last active profile, therefore, is available for restoration.

- 1) Restore the most recent active profile.
  - a) At the CLI prompt, type **profile restore** and press **ENTER**.  
A message appears, prompting you to restart the wan for the changes to take effect.
  - b) Type **wan restart** and press **ENTER**.  
The profile is restored and placed into effect.

### **6.3.5 DELETING A PREVIOUSLY SAVED PROFILE**

You may delete saved profiles as desired.

- 1) Delete a selected profile.
  - a) At the CLI prompt, type **profile delete <profile number>** and press **ENTER**.  
The selected profile is deleted from the Router. The **show profile** command displays **Empty** in that profile's slot.

---

## 7 POST-COMMISSIONING CONSIDERATIONS

After commissioning your SkyDSL VSAT Terminal, there are some additional issues you will need to consider to ensure proper operation and end-user access.

### 7.1 END-USER PROXY SETTINGS

As discussed earlier in the SkyDSL Router configuration section, implementation of a TCP acceleration server or servers at the SkyDSL Teleport increases the SkyDSL Network's speed and efficiency. Both Flash Networks' NettGain and Aloha Networks' SkyTCP are supported.

In a NettGain-enabled SkyDSL Network, it is recommended that end users make an adjustment to their web browsers' proxy settings. While not required for regular web browsing, this adjustment is helpful with some other types of web traffic (HTTPS, for example) and only takes a moment to set up. Appendix E contains procedures for making the adjustment on several versions of the most popular Internet browsers.

#### NOTE

This adjustment is only used on SkyDSL Networks using Nettgain. SkyTCP does not require any browser adjustments.

### 7.2 DHCP SERVERS

The SkyDSL Router is able to act as a DHCP server. This is an optional feature that you may enable within the Router itself (the feature is disabled by default). If you plan to use this feature, however, you must disable any DHCP servers already present on your LAN. Failure to do so may result in DHCP assignment conflicts that can produce network connectivity problems for users. Contact your system administrator to determine if a DHCP server is present on your LAN and to determine what course of action to take.

## 7.3 USING SNMP

The primary purpose of SNMP on the SkyDSL Router is to allow the SkyDSL Teleport's Network Management System (NMS) server to monitor and interact with the Router over the SkyDSL Network.

In addition, SNMP allows those users who prefer to create their own tailored interface for the Router to do so rather than use the provided proprietary CLI or web interfaces. The required Management Information Base (MIB) files are available for download from the web interface's **System Information** page.

### 7.3.1 SETTING UP ACCESS FOR THE NETWORK MANAGEMENT SYSTEM

The SkyDSL Router ships with default SNMP access communities in place that allow for remote access using both read-only and/or read-write. Display the current settings with the CLI's **snmpacccs** command.

```
sdr> snmpacccs
rocommunity aloha 10.1.1.0/24
rwcommunity skydsl 10.1.1.200/32

sdr> [REDACTED]
```

Figure 24—**snmpacccs** command Display

Figure 24 shows the factory default SNMP access communities. In this case, read-only access is provided to the community called *aloha*, which includes any unit on 10.1.1.0/24 (typically, all SkyDSL Routers on the Network). Read-write access is granted the community called *skydsl*. This community has only one unit in it, 10.1.1.200/32, and is intended to resolve to the NMS server at the SkyDSL Teleport. If your Teleport's NMS server has a different address, you should change this community to reflect this.

You may add or delete communities to and from this list as necessary. You may also restore the factory defaults with the **snmpacccs restore** command.

- 1) Add a new SNMP access community or change an existing one.
  - a) Type **snmpacccs add <access type> <community name> <IP address/mask length>** and press **ENTER** (where **<access type>** is **ro** (read only) or **rw** (read-write), **<community name>** is an existing name or one of your choosing, and **<IP address/mask length>** is the address or range of addresses you wish to include in the community).

The new community is added (more than one community can have the same name provided they do not share the same access type and IP address/mask length)

- 2) Delete an existing SNMP community.
- a) Type `snmpacccs del <access type> <community name> <IP address/mask length>` and press **ENTER**.

The community is removed.

## 7.4 ROUTING INFORMATION PROTOCOL

If your LAN has one or more gateways in addition to the SkyDSL Router, you will likely want to enable the Routing Information Protocol (RIP) feature in both the Router and the other gateways. Doing so will designate their priority to end users. The SkyDSL Router supports the following RIP versions:

- **Version 1.** A broadcast version for older systems.
- **Version 2.** A multicast version.
- **Compatible.** A setting for use in Microsoft Windows environments. This setting uses version 2 packets in a broadcast mode.

### 7.4.1 ENABLING RIP AT THE SKYDSL ROUTER

The following procedures enable and configure the SkyDSL Router's RIP feature. To enable RIP at other gateways, refer to the documentation for those pieces of equipment.

- 1) Enable RIP at the SkyDSL Router.
  - a) At the CLI, type `rip <rip version>` and press **ENTER** (where `<rip version>` is **0** (off), **1** (version 1), **2** (version 2), or **3** (compatible)).

The `show lan` display is presented with the new version highlighted.
- 2) Designate the SkyDSL Router RIP metric.
  - a) Type `ripmetr <metric value>` and press **ENTER** (where `<metric value>` equals the metric designation of the SkyDSL Router).

The `show lan` display is presented with the metric value highlighted.

If RIP is not already in use on your LAN you must enable RIP listening on each end user workstation. Procedures can be found in the operating system's help files.

## 7.5 SKYQOS™ TRAFFIC CONTROL

Oftentimes, certain types of data passed over the SAMA channel are considered more important than others. It is therefore necessary to be able to manage the way the SkyDSL Router handles this traffic to ensure it is given the precedence it deserves. The SkyDSL Router's SkyQoS traffic control feature facilitates this management.

### IMPORTANT

SkyQoS traffic control applies only to outgoing SAMA channel traffic. It has no effect on incoming DVB traffic.

### 7.5.1 SKYQOS CLASSES

When enabled, SkyQoS traffic control places transmitted data into one of eight predefined QoS (Quality of Service) classes, as configured by the SkyDSL Router operator. Each class is assigned a numeric priority value (Figure 25)—the higher the value, the higher the priority. Using priorities and bandwidth allotments, SkyQoS classes control traffic on the SAMA channel, as explained below.

#### 7.5.1.1 CLASS PRIORITY

When data is transmitted over the SAMA channel, data classified as high priority data takes precedence over less urgent traffic. For example, in a particular situation data with a classification of **BESTEFFORT** is being transmitted when a user suddenly attempts to transmit data classified as **VITAL**. Because **VITAL** is considered a higher priority than **BESTEFFORT**, the SkyDSL Router will stop transmitting the **BESTEFFORT** data in favor of the **VITAL** traffic. Once the **VITAL** data has been transmitted, the lower priority data will continue transmitting.

### NOTE

Unclassified traffic is automatically assigned to the **BESTEFFORT** class.

- 1) Display the available SkyQoS classes.
  - a) At the Router's CLI, type **qos show classes** and press **ENTER**.  
The list of SkyQoS classes and their priority values is displayed.

```
sdr> qos show classes

      QoS Class      Priority
-----+
BLOCKED          9
LOWEST           10
BESTEFFORT       20
BULK              30
THROUGHPUT       40
MINDELAY          50
VIP               60
MINDELAY_HIGH    70
VITAL             80
sdr>
```

Figure 25—**qos show classes** Command Display

#### 7.5.1.2 CLASS BANDWIDTH

In addition to establishing priority, class assignments determine how much of the total SAMA channel bandwidth is allocated to traffic. This information is reflected in the SkyQoS statistics display, which allows you to track each SkyQoS class's total configured bandwidth, the actual bandwidth used (averaged over 10 seconds), the number of bytes and data packets transmitted, the number of packets dropped due to lack of available bandwidth, and the number of packets transmitted using bandwidth borrowed from another class (overlimits).

The exception to this rule is the **BLOCKED** class. Since no data in this class is ever actually transmitted, no bandwidth is allotted to it, and there is no need to display anything more for it than how many bytes and data packets have been blocked. If no data has been blocked, the **BLOCKED** class will not appear in the display.

- 1) Display SkyQoS traffic control statistics.
  - a) At the CLI, type **qos stats** and press **ENTER**.  
SkyQoS statistics are displayed.

Each SkyQoS class is allotted a portion of the **Total WAN** bandwidth, the amount of which is shown in the **Config** column of the **qos stats** display (Figure 26).

QoS Class	Config	Actual
Total WAN:	126.0kbit/sec	0.1kbit/sec (at 100%)
	Sent 269915 bytes	1833 pkts
LOWEST:	2.3kbit/sec	
BESTEFFORT:	4.6kbit/sec	Sent 60807 bytes 461 pkts (dropped 0, overlimits 0)
BULK:	11.3kbit/sec	Sent 3816 bytes 78 pkts (dropped 0, overlimits 0)
THROUGHPUT:	18.1kbit/sec	Sent 480 bytes 10 pkts (dropped 0, overlimits 0)
MINDELAY:	27.1kbit/sec	Sent 42156 bytes 228 pkts (dropped 0, overlimits 0)
VIP:	33.9kbit/sec	0.0kbit/sec Sent 145896 bytes 645 pkts (dropped 0, overlimits 0)
MINDELAY_HIGH:	24.8kbit/sec	Sent 16760 bytes 411 pkts (dropped 0, overlimits 0)
VITAL:	4.0kbit/sec	
BLOCKED:	144 bytes	3 pkts

Figure 26—**qos stats** Command Display

Generally speaking, this is the amount of bandwidth each class is allowed in a saturated SAMA channel. There can be two exceptions to this rule, however. First, under normal circumstances, a saturated SAMA channel is relatively rare. There will more likely be instances where a particular class will need to exceed its allotted bandwidth. In such instances, as long as the channel is not saturated, the class is allowed to “borrow” bandwidth from one of the other classes. The number of packets transmitted on “borrowed” bandwidth is reflected in the **overlimits** statistic.

**NOTE**

The **LOWEST** class is not allowed to “borrow” bandwidth from other classes.

The second exception occurs in a saturated SAMA channel situation when there’s more high-urgency traffic than can be transmitted within its class (**VITAL**, for example) allotment. In this case, data packets transmitted in the **LOWEST** class are dropped to free up bandwidth for the higher priority data. If all **LOWEST** class bandwidth is used and still more bandwidth is required, **BESTEFFORT** data packets will begin to be dropped to free up yet more bandwidth. This progression continues until sufficient bandwidth is obtained or until the urgent traffic has saturated the channel. Lost data packets are reflected in each class’s **dropped** statistic.

### 7.5.2 SKYQoS SERVICES

Before data can be assigned to a class, however, they must be categorized into services. This is an administrative process that facilitates classification by first defining the type of data affected and also by grouping like data traveling over related ports into single services before assigning them to a particular class. For example, one SkyQoS default service groups all TCP e-mail traffic types (pop-3, pop3s, smtp, and imaps) into one service called **MAIL** that is assigned to the **BULK** QoS class. SkyQoS traffic control is preconfigured with several default services.

**1)** Display SkyQoS services.

**a)** Type **qos show services** and press **ENTER**.

A list of SkyQoS services and the classes to which they are assigned is displayed.

Service Name	reX	QoS Class	Parameters
Aimster		BLOCKED	tcp 7668
bcast16		BLOCKED	dst 0.0.255.255/0.0.255.255
bcast24		BLOCKED	dst 0.255.255.255/0.255.255.255
bcast32		BLOCKED	dst 0.0.0.0/255.255.255.255
bcast8		BLOCKED	dst 0.0.0.255/0.0.0.255
DELL-OMI		BLOCKED	tcp 1026
Domain		MINDELAY_HIGH	tcp domain
eDonkeyT		BLOCKED	tcp 2000,4661,4662
eDonkeyU		BLOCKED	udp 4665
FlashProxy	2	VIP	destination 10.1.1.30
ftp		THROUGHPUT	tcp 20,21
GNUTellaT		BLOCKED	tcp 6346:6349
GNUTellaU		BLOCKED	udp 6346:6349
Hotline		BLOCKED	tcp 5500:5503
icmp		BLOCKED	icmp ALL
icmp-Echo	0	BESTEFFORT	icmp 8
icmp-EchoReply	0	BESTEFFORT	icmp 0
icmp-TimeExceed	0	BESTEFFORT	icmp 11
kaZaa		BLOCKED	protocol kaZaa
MAIL		BULK	tcp pop-3,pop3s,smtp,imaps
mcast		BLOCKED	dst 224.0.0.0/4
MSN-Chat		MINDELAY	tcp 1863,4736,4737,4738,4739,4740,4741,4742,4743
netbios-tcp		BLOCKED	tcp 135,netbios-ns,netbios-dgm,netbios-ssn,445
netbios-udp		BLOCKED	udp 135,netbios-ns,netbios-dgm,netbios-ssn,445
private_A		BLOCKED	dst 10.0.0.0/8
private_B		BLOCKED	dst 172.16.0.0/12
private_C		BLOCKED	dst 192.168.0.0/16
spooler		BLOCKED	tcp spooler
SSH		MINDELAY	tcp ssh
synoptics-trap		BLOCKED	tcp 412
Teleport		MINDELAY	dst \$TELEPORT
TESTONLY		---	tcp 5001
UDP	1	---	udp ALL
WanSubnet		VIP	dst \$IPWANSUBNET/\$IPWANMASKLEN
Web		VIP	tcp http,https
WinMX		BLOCKED	tcp 6699
YM-Chat		MINDELAY	tcp 119,5050

Figure 27—**qos show services** Command Display

An alternative display method is the **rules** display. This lists the classes, followed by all services assigned to each. Services not assigned to a class will not appear in this display.

**2)** Display the SkyQoS rules.

- a) At the CLI, type **qos show rules** and press **ENTER**.

The list of SkyQoS services and the classes to which they are assigned is displayed.

```
sdr> qos show rules

QoS Class      Service Name      Parameters
-----
MINDELAY_HIGH  Domain          tcp      domain
BLOCKED        Aimster         tcp      7668
                bcast16        dst      0.0.255.255/0.0.255.255
                bcast24        dst      0.255.255.255/0.255.255.255
                bcast32        dst      0.0.0.0/255.255.255.255
                bcast8         dst      0.0.0.255/0.0.0.255
                DELL-OMI       tcp      1026
                eDonkeyT      tcp      2000,4661,4662
                eDonkeyU      udp      4665
                GNUtellaT     tcp      6346:6349
                GNUtellaU     udp      6346:6349
                Hotline        tcp      5500:5503
                mcast          dst      224.0.0.0/4
                netbios-tcp   tcp      135,netbios-ns,netbios-dgm,netbios-ssn,445
                netbios-udp   udp      135,netbios-ns,netbios-dgm,netbios-ssn,445
                spooler        tcp      spooler
                synoptics-trap  tcp      412
                WinMX          tcp      6699
                kaZaa          protocol kaZaa
MINDELAY       MSN-Chat        tcp      1863,4736,4737,4738,4739,4740,4741,4742,4743
                YM-Chat         tcp      119,5050
VIP            Web             tcp      http,https
                FlashProxy     destination 10.1.1.30
BULK           MAIL            tcp      pop-3,pop3s,smtp,imaps
BESTEFFORT    icmp-EchoReply  icmp     0
                icmp-Echo      icmp     8
                icmp-TimeExceed  icmp     11
BLOCKED       icmp            icmp     ALL
VIP            WanSubnet      dst      $IPWANSUBNET/$IPWANMASKLEN
MINDELAY      Teleport        dst      $TELEPORT
BLOCKED       private_A       dst      10.0.0.0/8
                private_B       dst      172.16.0.0/12
                private_C       dst      192.168.0.0/16
MINDELAY      SSH             tcp      ssh
THROUGHPUT    ftp             tcp      20,21
sdr>
```

Figure 28—**qos show rules** Command Display

Lastly, all three of the aforementioned lists can be displayed simultaneously using the **qos show all** command.

### 7.5.3 CONFIGURING SKYQOS TRAFFIC CONTROL

As previously stated, several commonly configured services regulating such data as e-mail, file sharing, HTTP Internet traffic, and many others are predefined and classified at the factory. Most of these services are static and

cannot be changed or deleted. You may, however, redefine, reclassify, or delete the following default services: **TESTONLY**, **MSN-Chat**, **YM-Chat**, **FlashProxy**, **UDP**, **SSH**, and **ftp**.

Of course, new services can be defined and classified, too. When doing so, however, there are several elements you will need to define, some of which work in particular combinations and some of which are optional.

### 7.5.3.1 DEFINING AND CLASSIFYING A NEW SERVICE

The CLI command syntax for defining a new service is: `qos def <service name> <value 1> <value 2> rex <value 3>`.

- **<service name>**. This is at the discretion of the SkyDSL Router operator and can be anything of your choosing.
- **<value 1>**. There are two choices for this value:
  - **Protocol**. There are three protocol options for services:
    - **tcp**. Use with a port number or port numbers.
    - **udp**. Use with a port number or port numbers.
    - **icmp**. Use with an ICMP type.
- If you want to classify both TCP and UDP data on the same port or ports, you must create a service for each.
  - **Direction**. Two options are available here:
    - **source**. Use with an IP address to denote where the data is coming from.
    - **destination**. Use with an IP address to denote where the data is going to.
- **<value 2>**. There are three choices for this value. The use of each is dependent on **value 1**.
  - **Port Number or Numbers**. Used with the TCP and UDP protocols. There are three ways to express this value:
    - A single port number (`qos def <service name> tcp 9033`).
    - Multiple port numbers (each port is separated with a comma: `qos def <service name> udp 101,3067,7291`).
    - A range of port numbers (the first and last port numbers are separated with a colon: `qos def <service name> tcp 6703:6710`).
  - **ICMP Type**. Used with ICMP. Only one ICMP type may be defined per service.
  - **IP Address**. Used with direction only. Specifies the computer that is the source or destination of the data.

- <value 3>. This, used together with the **rex** keyword, is **optional** and dictates how many times SAMA cells will be retransmitted should errors occur. If you do not include this value when defining your service, the number of cell retransmits is dictated by the general SAMA retransmit rule as shown in the **show link** display.

**1)** Define a new service.

- a)** At the SkyDSL Router's CLI, type **qos def <service name> <value 1> <value 2> rex <value 3>** (for example, **qos def snmp tcp 161 rex 2**) and press **ENTER**. (Omit the **rex** keyword and value if not desired.)

The new service is added to the existing list of SkyQoS services. Confirm with the **qos show services** command.



Service Name	reX	QoS Class	Parameters
Aimster		BLOCKED	tcp 7668
bcast16		BLOCKED	dst 0.0.255.255/0.0.255.255
bcast24		BLOCKED	dst 0.255.255.255/0.255.255.255
bcast32		BLOCKED	dst 0.0.0.0/255.255.255.255
bcast8		BLOCKED	dst 0.0.0.255/0.0.0.255
DELL-OMI		BLOCKED	tcp 1026
Domain		MINDELAY_HIGH	tcp domain
eDonkeyT		BLOCKED	tcp 2000,4661,4662
eDonkeyU		BLOCKED	udp 4665
FlashProxy	2	VIP	destination 10.1.1.30
ftp		THROUGHPUT	tcp 20,21
GNUTellaT		BLOCKED	tcp 6346:6349
GNUTellaU		BLOCKED	udp 6346:6349
Hotline		BLOCKED	tcp 5500:5503
icmp		BLOCKED	icmp ALL
icmp-Echo	0	BESTEFFORT	icmp 8
icmp-EchoReply	0	BESTEFFORT	icmp 0
icmp-TimeExceed	0	BESTEFFORT	icmp 11
kaZaa		BLOCKED	protocol kaZaa
MAIL		BULK	tcp pop-3,pop3s,smtp,imaps
mcast		BLOCKED	dst 224.0.0.0/4
MSN-Chat		MINDELAY	tcp 1863,4736,4737,4738,4739,4740,4741,4742,4743
netbios-tcp		BLOCKED	tcp 135,netbios-ns,netbios-dgm,netbios-ssn,445
netbios-udp		BLOCKED	udp 135,netbios-ns,netbios-dgm,netbios-ssn,445
private_A		BLOCKED	dst 10.0.0.0/8
private_B		BLOCKED	dst 172.16.0.0/12
private_C		BLOCKED	dst 192.168.0.0/16
snmp	3	---	tcp 161
spooler		BLOCKED	tcp spooler
SSH		MINDELAY	tcp ssh
synoptics-trap		BLOCKED	tcp 412
Teleport		MINDELAY	dst \$TELEPORT
TESTONLY		---	tcp 5001
UDP	1	---	udp ALL
WanSubnet		VIP	dst \$IPWANSUBNET/\$IPWANMASKLEN
Web		VIP	tcp http,https
WinMX		BLOCKED	tcp 6699
YM-Chat		MINDELAY	tcp 119,5050

Figure 29—SkyQoS with Newly Defined SNMP Service

Notice in Figure 29 that the **QoS Class** field is empty since the service has not yet been assigned to a class. The service will be ignored until a classification is made.

**IMPORTANT**

Be certain to double-check the parameters of all newly defined services. Definition errors will prevent the service from functioning correctly.

Avoid creating conflicting services. That is, two or more services having identical parameters. If such a case were to occur, the one appearing first in the **qos show rules** display takes precedence.

- 2) Add a service to a SkyQoS class.

- a) Type **qos add <service name> to <class>** (for example, **qos add snmp to vip**) and press **ENTER**.

The service is added to the VIP class. Confirm with the **qos show services** or **qos show rules** commands.



Service Name	reX	QoS Class	Parameters
Aimster		BLOCKED	tcp 7668
bcast16		BLOCKED	dst 0.0.255.255/0.0.255.255
bcast24		BLOCKED	dst 0.255.255.255/0.255.255.255
bcast32		BLOCKED	dst 0.0.0.0/255.255.255.255
bcast8		BLOCKED	dst 0.0.0.255/0.0.0.255
DELL-OMI		BLOCKED	tcp 1026
Domain		MINDELAY_HIGH	tcp domain
eDonkeyT		BLOCKED	tcp 2000,4661,4662
eDonkeyU		BLOCKED	udp 4665
FlashProxy	2	VIP	destination 10.1.1.30
ftp		THROUGHPUT	tcp 20,21
GNUTellaT		BLOCKED	tcp 6346:6349
GNUTellaU		BLOCKED	udp 6346:6349
Hotline		BLOCKED	tcp 5500:5503
icmp		BLOCKED	icmp ALL
icmp-Echo	0	BESTEFFORT	icmp 8
icmp-EchoReply	0	BESTEFFORT	icmp 0
icmp-TimeExceed	0	BESTEFFORT	icmp 11
kaZaa		BLOCKED	protocol kaZaa
MAIL		BULK	tcp pop-3,pop3s,smtp,imaps
mcast		BLOCKED	dst 224.0.0.0/4
MSN-Chat		MINDELAY	tcp 1863,4736,4737,4738,4739,4740,4741,4742,4743
netbios-tcp		BLOCKED	tcp 135,netbios-ns,netbios-dgm,netbios-ssn,445
netbios-udp		BLOCKED	udp 135,netbios-ns,netbios-dgm,netbios-ssn,445
private_A		BLOCKED	dst 10.0.0.0/8
private_B		BLOCKED	dst 172.16.0.0/12
private_C		BLOCKED	dst 192.168.0.0/16
snmp	3	VIP	tcp 161
spooler		BLOCKED	tcp spooler
SSH		MINDELAY	tcp ssh
synoptics-trap		BLOCKED	tcp 412
Teleport		MINDELAY	dst \$TELEPORT
TESTONLY		---	tcp 5001
UDP	1	---	udp ALL
WanSubnet		VIP	dst \$IPWANSUBNET/\$IPWANMASKLEN
Web		VIP	tcp http,https
WinMX		BLOCKED	tcp 6699
YM-Chat		MINDELAY	tcp 119,5050

Figure 30—SkyQoS with SNMP Service Added to VIP Class

- 3) Restart SkyQoS traffic control.
  - a) Type **qos restart** and press **ENTER**.

The new service/class rule is now in effect.

**IMPORTANT**

SkyQoS traffic control must be restarted with the **qos restart** command after making *any* changes to its configuration.

### 7.5.3.2 MODIFYING A SERVICE

After defining a service, it is possible to change its cell retransmit without having to redefine the entire service using the **qos mod** command.

- 1) Modify a SkyQoS service.
  - a) Type **qos mod <service name> rex <value>** (where **<value>** is **0–3**) and press **ENTER**.
- 2) Restart SkyQoS traffic control.
  - a) Type **qos restart** and press **ENTER**.

The service's retransmit value is changed to the new level. Confirm the removal with the **qos show services** or **qos show rules** commands.

### 7.5.3.3 REMOVING SERVICE CLASSIFICATIONS

Using the previous example, any TCP data now transmitted over port 161 will be given a priority of **VIP**. If you wish to dissociate the SNMP service from the **VIP** class, you may remove its classification. Also, if you want to change the service's classification, you must first dissociate it from its current class and then reassign it to the new one.

- 1) Remove a service's SkyQoS classification.
    - a) Type **qos del <service name> from <class>** (for example, **qos del snmp from vip**) and press **ENTER**.
  - 2) Restart SkyQoS traffic control.
    - a) Type **qos restart** and press **ENTER**.
- The service's classification is removed, and all traffic associated with the service will be transmitted with the default priority (**BESTEFFORT**). Confirm the removal with the **qos show services** or **qos show rules** commands.

#### 7.5.3.4 DELETING SERVICES

If you determine a service is no longer required, you may remove it from SkyQoS traffic control (except for the non-configurable default services). This may be performed on any eligible service whether or not it is assigned to a class. The only difference is that after deleting a classified service, you must restart traffic control.

- 1) Undefine a service.
  - a) Type **qos undef <service name>** (for example, **qos undef snmp**) and press **ENTER**.
- 2) Restart SkyQoS traffic control (if the service was classified).
  - a) Type **qos restart** and press **ENTER**.

The service is deleted. Confirm with the **qos show services** command.

#### 7.5.3.5 RESTORING FACTORY DEFAULTS

You may, at any time, restore the SkyQoS traffic control configuration to its factory default settings.

- 1) Restore SkyQoS traffic control defaults.
  - a) Type **qos default** and press **ENTER**.
- 2) Restart SkyQoS traffic control.
  - a) Type **qos restart** and press **ENTER**.

The default service restoration is placed into effect.

#### 7.5.4 MANAGING SKYQOS TRAFFIC CONTROL

SkyQoS traffic control is enabled at the factory and may not be disabled. There could be instances, however, in which the feature is disabled by external factors (for example, troubleshooting by the SkyDSL Teleport administrator or ISP). You may check the traffic control status at any time.

- 1) Check the current status of SkyQoS traffic control.
  - a) At the SkyDSL Router's CLI, type **qos status** and press **ENTER**.

The status of SkyQoS traffic control is displayed.

```
sdr> service skyqos status
skyQoS traffic shaping is not active.
sdr> █
```

Figure 31—**qos status** Command Display

Traffic control status can also be checked using the show wan command. The **qos value** at the bottom of the display will reflect either **yes** (enabled) or **no** (disabled).

### 7.5.4.1 ENABLING SKYQOS TRAFFIC CONTROL

Should SkyQoS traffic control become disabled for any reason, you can reenable at the SkyDSL Router. Enabling SkyQoS traffic control is a two-step procedure. The feature must first be enabled and then started.

- 1) Enable SkyQoS traffic control.
  - a) At the SkyDSL Router's CLI, type **qos on** and press **ENTER**.  
SkyQoS traffic control is turned on.
- 2) Start SkyQoS traffic control.
  - a) Type **qos start** and press **ENTER**.  
SkyQoS traffic control is started.

### 7.5.4.2 SETTING VITAL CLASS CONFIGURED BANDWIDTH

The sum of the configured bandwidth values for all classes equals **Total WAN** bandwidth value displayed at the top of the **qos stats** display. They are not adjustable with the exception of the **VITAL** class (the highest priority), which may be manually adjusted in 1-kilobit increments. Doing so automatically increases or reduces the other class configured bandwidths so that they all once again equal the **Total WAN** value.

- 1) Adjust the **VITAL** class configured bandwidth.
  - a) At the CLI, type **qos guarantee <value>** (where **<value>** equals 1–12 (kilobits)) and press **ENTER**.  
The new value is accepted and the CLI prompts you to restart SkyQoS for the new setting to take effect.
- 2) Restart SkyQoS traffic control.
  - a) Type **qos restart** and press **ENTER**.  
The new value goes into effect. Confirm with the **qos stats** command.

```
sdr> qos guarantee 8
Guaranteed class (VITAL) bandwidth was changed from 4kbit to 8kbit.
You need to restart skyQoS for the change to take effect.
sdr> qos restart
Stopping skyQoS traffic shaper done
Starting skyQoS traffic shaping done
sdr> qos stats
QoS Class      Config        Actual
-----
Total WAN:    126.0kbit/sec  0.1kbit/sec (at 100%)
              Sent 24317 bytes 111 pkts
LOWEST:       2.2kbit/sec
BESTEFFORT:   4.7kbit/sec      0.1kbit/sec
              Sent 21728 bytes 102 pkts (dropped 0, overlimits 0)
BULK:         10.9kbit/sec
THROUGHPUT:  17.4kbit/sec
MINDELAY:     26.2kbit/sec
VIP:          32.7kbit/sec      0.4kbit/sec
              Sent 2589 bytes 9 pkts (dropped 0, overlimits 0)
MINDELAY_HIGH: 24.0kbit/sec
VITAL:        8.0kbit/sec
BLOCKED:      15252 bytes    127 pkts
sdr> █
```

Figure 32—Changing the VITAL Class Configured Bandwidth

## 7.6 PORT FORWARDING

When the SkyDSL Router's NAT (Network Address Translation) feature is enabled, workstations on the LAN are no longer visible to the outside world because only the Router itself is using a public IP address. As a result, incoming packets from applications like Voice over IP and Telnet that are addressed to specific workstations on the LAN often become undeliverable.

The SkyDSL Router offers a port-forwarding feature to resolve this issue. Using the **portfwd** commands, you may set up rules to automatically forward specific packet protocol types (TCP, UDP, or both) arriving on a particular port or range of ports to a specific workstation on the LAN.

- 1) Display the current port-forwarding rules.

- a) At the SkyDSL Router CLI, type **portfwd** and press **ENTER**.

The SkyDSL Router displays its current set of port-forwarding rules.

```
sdr> portfwd
Port forwarding:

Rule:    Protocol:      Local Port:      Destination:
1        tcp            23                  192.168.233.208:23
2        tcp            5000-6000        192.168.233.31:5000-6000
3        tcp            666                192.168.233.42:666
4        tcp            7000                192.168.233.42:7000
sdr>
```

Figure 33—portfwd Command Display

### 7.6.1 ADDING PORT-FORWARDING RULES

For example, a user working from home desires to use TelNet to access his or her LAN workstation. As the administrator you would set up a port-forwarding rule to route packets arriving on the SkyDSL Router's port 23 (the TelNet port) to port 23 on the user's workstation (IP address 192.168.1.1 for the purposes of this example).

#### IMPORTANT

Be careful not to set up conflicting rules. That is, two or more rules that forward the same port. For example:

Rule:	Protocol:	Local Port:	Destination:
1	tcp	5000	192.168.1.1:5000
2	tcp	5000-5500	192.168.1.10:5000-5500

The rules conflict because they both attempt to forward port 5000.

- 1) Set a port-forwarding rule.
  - o Forward a single port.
    - i) At the SkyDSL Router CLI, type `portfwd add <tcp, udp, or both> <local Router port number> <destination IP address>:<destination port number>` and press **ENTER**.

The rule is added. Verify by typing `portfwd` and pressing **ENTER**.

#### NOTE

When forwarding single ports, you must designate a port at the destination workstation regardless of whether it's the same as the local SkyDSL Router port or not. This is not the case when forwarding a range of ports, as they *must* forward to the same ports at the destination.

- o Forward a range of ports.
  - ii) At the SkyDSL Router CLI, type `portfwd add <tcp, udp, or both> <local Router port range starting number>~<local Router port range ending number> <destination IP address>` and press **ENTER**.

The rule is added. Verify by typing `portfwd` and pressing **ENTER**.

So, using the example from the beginning of this section, you would enter `portfwd add tcp 23 192.168.1.1:23`.

As a second example, since TelNet is well-known and popular (and insecure), you might make an agreement with the user that he or she will use TelNet to access their workstation over a particular port number that you assign arbitrarily, say 7981. This also adds a layer of security since only you and the user know the agreed-upon port number. You would then set up a port forward rule commanding the SkyDSL Router to forward packets arriving on port 7981 to port 23 on the user's workstation (`portfwd add tcp 7981 192.168.1.1:23`)

## 7.6.2 DELETING PORT-FORWARDING RULES

Deleting a port-forwarding rule is a simple matter:

- 1) Delete a port-forwarding rule.
  - a) Type `portfwd del <port-forwarding rule number>` and press **ENTER**.

The rule is deleted. Verify by typing `portfwd` and pressing **ENTER**.

### 7.6.3 ACTIVATING PORT-FORWARDING RULES

After making additions or deletions to the port-forwarding rules, you must then activate them before they will take effect.

- 1) Activate the current set of port-forwarding rules.

- a) Type **portfwd activate** and press **ENTER**.

The rules go into effect.

## 7.7 SERVICE DISRUPTIONS

At times, it may become necessary for the SkyDSL Teleport administrator to interrupt service (to perform maintenance, for example). When this occurs, the administrator will announce the disruption with a message that is transmitted over the SkyDSL Network to the affected SkyDSL Routers.

Figure 34 shows an example of such a message.

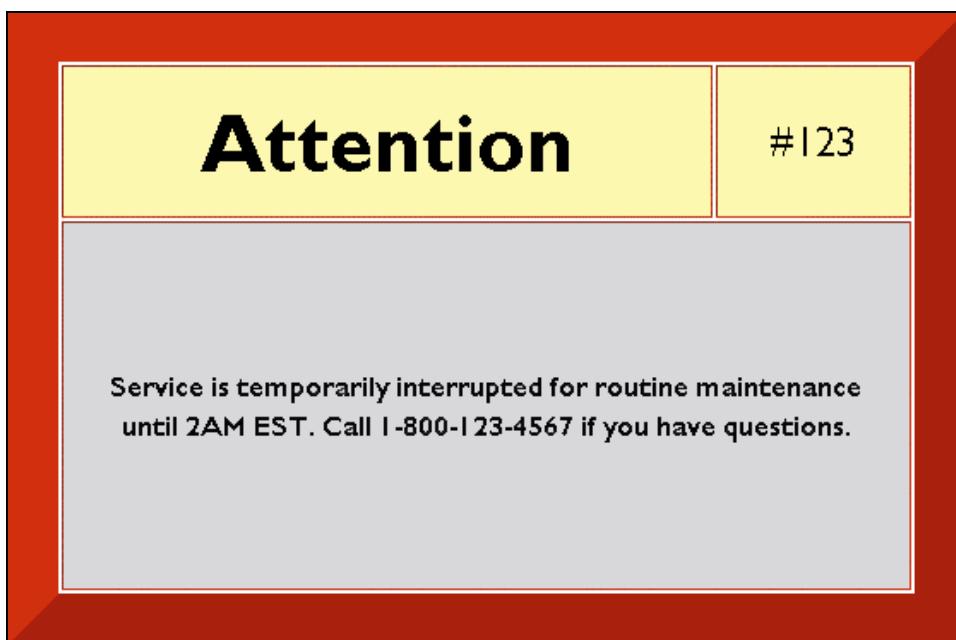


Figure 34—SkyDSL Network Service Disruption Message

The message will appear in the web browser of any workstation attempting to access the SkyDSL Network for the duration of the service interruption. SkyDSL Network access will not be possible during this period. Upon restoration of service, however, the Teleport administrator will remove the message and SkyDSL Network access will again function normally.

If you need to contact the administrator regarding the message or disruption, providing him or her with the ticket number in the upper right-hand corner of the message (#123 in the example above) will facilitate service.

---

## 8 USING THE WEB INTERFACE

For added convenience, the SkyDSL Router also offers a web-based graphical user interface (GUI) that you can use to access the Router over your LAN. Its point-and-click nature makes the web interface more intuitive and user-friendly than the CLI. Despite its ease of use, however, the web interface does not possess every feature available in the CLI (though most are present), and you should keep this in mind when using it.

### NOTE

Because user name and password are not encrypted, the web interface is designed for access only over your LAN. If you wish to access the Router over the Internet, you must use the CLI with a Secure Shell client (see section 3.2.2 on page 25 for more information).

- 1) Access the web interface.
  - a) Open a web browser (the web interface may be accessed with any of the most popular browsers, including Microsoft Internet Explorer, Netscape Navigator®, Mozilla®, and Opera® Internet browsers).
  - b) In the browser's address box, enter the Router's LAN IP address and press **ENTER**.

A dialog box prompts you for your user name and password.

- 2) Log in to the web interface.
  - a) In the **User name** text box, type **admin**.
  - b) In the **Password** text box, type your password.
  - c) Click .

The **SkyDSL Router Web Interface Home Page** is displayed. From this page, you may access pages to monitor and configure three different areas—**SAMA**, **DVB**, and **System**—by mousing over and clicking their respective **Monitor** or **Configure** buttons.

---

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Figure 35—SkyDSL Router Web Interface Home Page

## 8.1 NAVIGATING THE WEB INTERFACE

There are two methods of navigating the SkyDSL Router web interface, depending on the page you are presently viewing, the **SkyDSL Router Home Page**, or one of the **Monitor** or **Configuration** pages.

### 8.1.1 NAVIGATING FROM THE SKYDSL ROUTER HOME PAGE

Upon logging in, the home page is displayed. From here, you can navigate to the other pages by mousing over the **SAMA**, **DVB**, and **System** buttons and clicking either **Monitor** or **Configure** in the resulting dropdown menus.

### 8.1.2 NAVIGATING FROM A MONITOR OR CONFIGURATION PAGE

When viewing one of the **Monitor** or **Configuration** pages, you can navigate using one of three buttons present at page bottom.

- **home** Navigates to the **SkyDSL Router Home Page**.
- **prev** Navigates to the preceding page in the navigation sequence.
- **next** Navigates to the next page in the navigation sequence.

### 8.1.2.1 NAVIGATION SEQUENCE

Clicking the **prev** or **next** buttons progresses through the web interface pages in the following order:

**SAMA Statistics | SAMA Configuration | DVB Statistics |**  
**DVB Configuration | System Information | System Configuration |**  
**SkyDSL Router Home Page**

#### NOTE

The **Maintenance** page (accessed via the link on the **System Configuration** page) also has navigation buttons, but does not appear in the navigation sequence. When viewing this page, clicking **prev** returns you to the **System Configuration** page and clicking **next** navigates to the **SkyDSL Router Home Page**.

## 8.2 THE SAMA STATISTICS PAGE

The **SAMA Statistics** page allows you to monitor the SkyDSL Router's SAMA transmission channel's configuration and operational states.

<b>SAMA Statistics</b>	
Sama Address	0x20d5
Total Transmitted Cells	10930
Data Cells Transmitted	10930
Data Cells Retransmitted	35
Data Cells Retransmitted x2	0
Data Cells Retransmitted x3	0
Control Cells Transmitted	0
Symbol Rate	64516 Sps
PA Type (Freq Band)	KU-Band
FEC Scheme	BCH
Load Balance	On
PA Power Opr. State	On
Center Frequency Offset	-2214
External Reference Type	10 MHz
Tx Probability	100
Slotting State	Transmit On
RF Reference PLL	Locked
<input type="checkbox"/> Automatic Refresh	<input type="text" value="5"/> Refresh Time
<b>prev</b> <b>home</b> <b>next</b>	
All Rights Reserved. © 2004 Aloha Networks Inc.	

Figure 36—SAMA Statistics Page

- **SAMA Address.** The SkyDSL Router's unique SAMA address, which is set at and used by the SkyDSL SAMA Receiver for recognition.
- **Total Transmitted Cells.** Total number of SAMA cells, both data and control, that were transmitted since the last power up or reboot.
- **Data Cells Transmitted.** Number of SAMA cells that were transmitted since the last power up or reboot.
- **Data Cells Retransmitted.** Number of erroneous SAMA cells that were retransmitted since the last power up or reboot.
- **Data Cells Retransmitted x2.** Number of erroneous SAMA cells that were retransmitted a second time since the last power up or reboot.
- **Data Cells Retransmitted x3.** Number of erroneous SAMA cells that were retransmitted a third time since the last power up or reboot.
- **Control Cells Transmitted.** Number of control cells that were transmitted since the last power up or reboot.
- **Symbol Rate.** The rate (in symbols per second) at which data are sent across the SAMA channel.
- **PA Type (Freq Band).** The frequency band of the ODU's power amplifier as entered through the CLI.
- **Load Balance.** The state of load balancing (**On** or **Off**). When enabled, this feature allows the SAMA Receiver to control the queuing of the Router's SAMA transmitter. For example, in a SkyDSL Network where many Routers are transmitting simultaneously, there may be instances of SAMA channel oversaturation. In such cases, the SAMA Receiver would decrease the rate of transmission from all Routers using the channel.
- **PA Power Opr. State.** The operational state of your SkyDSL Outdoor Unit's power amplifier (**On** or **Off**).
- **Center Frequency Offset.** The amount by which the Router is offsetting its frequency reference ( $\pm 10,000$ ) to compensate for its crystal variation.
- **External Reference Type.** The type of external reference used to adjust for satellite frequency offset. This is factory-set to a 10-MHz reference.
- **Tx Probability.** Works in conjunction with the **Load Balance** feature and displays the rate of SAMA transmissions as dictated by the SkyDSL SAMA Receiver. The displayed value is a percentile with 100 representing a full rate of SAMA transmission; it may be lower at any given time depending on the SkyDSL Network's traffic load.
- **Slotting State.** The current slotting state of your SAMA transmission. When slotting is enabled, slotting state displays each of the following stages until slotting is achieved, at which point the transmitter is enabled.
  - **Unslotted.** Slotting is off.
  - **Receive on.** Slotting is turned on and the SkyDSL Router is waiting for correction information from the SkyDSL SAMA Receiver.
  - **Coarse synchronization.** The Router has been assigned a transmission slot from the SAMA Receiver, but has not yet achieved the proper level of synchronization.

- **Fine synchronization.** The Router has achieved the proper level of synchronization, but awaits notification from the SAMA Receiver that the synchronization is stable.
- **Transmit on.** The transmission is slotted.
- **Standby.** The SkyDSL Router is unable to achieve a slotted state and will make a new attempt after a short period of time. This will interrupt SAMA transmissions only if the Transmit Inhibit feature has been set to **Require Slotting Synch** mode.
- **RF Reference PLL.** An internal oscillator check advisory. Displays **Locked** during normal operations.

You can manually refresh this page's information by clicking your browser's refresh button. You can also have the page update automatically by entering a periodicity (in seconds) in the **Refresh Time** text box at the bottom of the page and checking the **Automatic Refresh** check box (✓) to its left.

To make adjustments to the values on this page, you must go to the **SAMA Configuration** page by either clicking the **next** button at the bottom of the page, or by clicking the **home** button to return to the **SkyDSL Router Home Page** and then selecting **SAMA>>Configure**.

### 8.3 THE SAMA CONFIGURATION PAGE

The **SAMA Configuration** page gives you the ability to configure many aspects of your SAMA transmission channel.

The screenshot shows the 'SAMA Configuration' page with various settings for the SAMA transmission channel. The settings include:

- Tx Emissions:** Radio buttons for On (selected) and Off.
- Transmit Power:** Input field containing '2.8' dB.
- SAMA Code Profile:** Input field containing '0' dB.
- Center Frequency:** Input field containing '1144500' kHz.
- Auto Mute:** Radio buttons for On (selected) and Off.
- FEC:** Radio buttons for On (selected) and Off.
- PA Power Admin:** Radio buttons for On (selected) and Off.
- Power Tracking:** Radio buttons for On (selected) and Off.
- Frequency Tracking:** Radio buttons for On (selected) and Off.
- Tx Inhibit Mode:** Drop-down menu set to 'Require DVB FEC Lock'.
- Slotting:** Radio buttons for On (selected) and Off.
- Cell Retries:** Input field containing '3'.
- Spectral Inversion:** Radio buttons for On (selected) and Off.
- Test Mode:** Drop-down menu set to 'Off'.
- Permanent Change:** Check box checked (✓).

At the bottom of the page are navigation buttons: **prev**, **home**, and **next**. A copyright notice at the very bottom reads: **All Rights Reserved. © 2004 Aloha Networks Inc.**

Figure 37—SAMA Configuration Page

- **Tx Emissions.** Select the appropriate radio button ( ) to turn SAMA transmissions **On** or **Off**.
- **Transmit Power.** Set the power of transmissions in decibels (dB). Valid range: -13.0 to +36.0.
- **SAMA Code Profile.** Set the SAMA channel's code profile (spreading code, data rate, modulation type, and FEC code).
  - **0 (Single Code, 129 kbps, QPSK, BCH)**
  - **3 (Single Code, 266 kbps, QPSK, BCH)**

Future expansion of this feature is planned.
- **Center Frequency.** Set the center frequency of SAMA transmissions (in kilohertz).
- **Auto Mute.** Select a radio button ( ) to turn automatic mute **On** or **Off**. When enabled, automatic mute turns the SAMA channel's carrier signal off automatically if no transmission is being made.
- **FEC.** Select the appropriate radio button ( ) to turn Forward Error Correction **On** or **Off**. When enabled, FEC adds extra redundant data to SAMA cells to allow the SkyDSL SAMA Receiver to determine if the cell was transmitted correctly; it also allows for error correction.
- **PA Power Admin.** Select the appropriate radio button ( ) to turn the SkyDSL Outdoor Unit's power amplifier **On** or **Off**.
- **Power Tracking.** Select the appropriate radio button ( ) to turn power tracking **On** or **Off**. When enabled, this feature allows the SkyDSL SAMA Receiver to control the SkyDSL Router's SAMA transmission power setting if it is transmitting signals at an inappropriate power level.
- **Frequency Tracking.** Select the appropriate radio button ( ) to turn frequency tracking **On** or **Off**. When enabled, this feature allows the SkyDSL SAMA Receiver to control the SkyDSL Router's center frequency offset if it is transmitting signals that are off frequency.
- **Tx Inhibit Mode.** Select the appropriate setting from the dropdown menu. When enabled, inhibits SAMA transmissions unless certain conditions are met.
  - **Always Transmit.** Do not inhibit SAMA signal transmission.

#### IMPORTANT

To reduce the risk of interference to adjacent satellites, never use the **Always Transmit** setting during live, over-the-air operations. Instead, always use one of the two inhibit modes to automatically interrupt transmission if their transmissions should the outdoor unit, for any reason, move off-axis.

- **Require DVB FEC Lock.** Inhibit SAMA signal transmission if no FEC lock is present on the incoming DVB signal (for example, if the antenna is blown off-axis).
- **Require Slotting Sync.** Inhibit SAMA signal transmission if no FEC lock is present on the incoming DVB signal *and* if slotting is enabled, but not synchronized. This helps to ensure the SkyDSL Router's transmissions do not interfere with other Routers' transmissions.
- **Slotting.** Select the appropriate radio button ( or ) to turn slotting **On** or **Off**. When enabled, this feature assists in decreasing the amount of data collisions with other SkyDSL Routers' transmissions by allowing the Router to transmit only at specific times.
- **Cell Retries.** Set the number of data cell retransmission attempts (valid range: 0–3).
- **Spectral Inversion.** Select the appropriate radio button ( or ) to turn spectral inversion **On** or **Off**. Enable the feature if required by your SkyDSL Outdoor Unit's power amplifier.
- **Test Mode.** Use the dropdown menu to select a test mode, or to turn Test Mode off. Available selections are:
  - **Off.**
  - **Continuous Wave.** Transmits a constant signal allowing technicians to monitor the quality of the signal.

**NOTE**

When using Continuous Wave test mode, make certain to disable the **Auto Mute** feature, else no transmissions will occur.

- **All High.** Transmits a data stream with all bits set to 1. Used primarily by technical support for troubleshooting purposes.
- **Pseudo Random.** Transmits a pseudo-random stream of data. Used primarily by technical support for troubleshooting purposes.

After altering the SAMA configuration settings, you must click the  button for them to take effect. The new configuration will be accepted for that session only, however, and will be reset to its former configuration after the next reboot. To make the configuration settings permanent, ensure the **Permanent Change** check box () is selected prior to clicking the  button.

## 8.4 THE DVB STATISTICS PAGE

The **DVB Statistics** page allows you to monitor your DVB parameters.

The screenshot shows the 'DVB Statistics' page with the following data:

Lock State	FEC Lock
MPEG OK	64923
MPEG Bad	0
Offset from the Center Frequency	-428 Hz
LNB Type	KU-Band
Eb/No	7.4 dB

[PID Table](#)

Automatic Refresh  Refresh Time

[prev](#) [home](#) [next](#)

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Figure 38—DVB Statistics Page

- **Lock State.** An advisory field that reflects the state of lock on the DVB signal.
  - **No Lock.** No signal is present.
  - **Signal Lock.** The Router is receiving a signal of some type.
  - **Viterbi Lock.** The Router is receiving a signal with the correct viterbi sequence.
  - **FEC Lock.** A reliable lock is present on a signal that matched the entire forward error correction scheme.
- **MPEG OK.** The total number of valid frames received.
- **MPEG Bad.** The total number of erroneous frames received.
- **Offset from the Center Frequency.** A fine-tuning feature. This is a read-only value that reflects the DVB receiver's compensation for off-frequency errors of up to approximately ± 2 MHz.
- **LNB Type.** The frequency band of the ODU's low noise block downconverter as entered through the CLI.
- **Eb/No.** The current approximate signal-to-noise ratio (in decibels) of the DVB signal.

As is the case with the **SAMA Statistics** page, you may manually refresh the data on this page by clicking browser's refresh button. You may also have the page update itself automatically by entering a periodicity (in seconds) in the **Refresh Time** text box and checking the **Automatic Refresh** check box () to its left.

### 8.4.1 THE PID TABLE

From the **DVB Statistics** page, you may also access your PIDs (protocol IDs) by clicking the **PID Table** link located just beneath the statistics. Doing so will open a new window displaying the **PID Table** page.

The screenshot shows a web-based application window titled "PID Table". The main content is a table with columns: PID, MPEGOK, MPEOK, MPEBAD, LLCSNAP, SKYCTRL, and a checkbox column. The rows contain the following data:

PID	MPEGOK	MPEOK	MPEBAD	LLCSNAP	SKYCTRL	
0x14	6117	0	0	0	0	<input type="checkbox"/>
0x2a	13799153	1953759	0	0	0	<input type="checkbox"/>
0x2b	0	0	0	0	0	<input type="checkbox"/>
0x2c	58607306	8626979	0	0	0	<input type="checkbox"/>
0x2d	5605494	5605494	0	0	34369	<input type="checkbox"/>

Below the table are several buttons: a checked checkbox labeled "Permanent Change", a "Delete Checked" button, a "HEX" input field, an "Add New" button, and a "Close Window" button. At the bottom of the window is a blue footer bar with the text "All Rights Reserved. © 2004 Aloha Networks Inc."

Figure 39—Protocol ID (PID) Table

The **PID Table** page is where you enter and monitor all applicable PIDs. It includes the following PID statistics:

- **PID.** The PID's hex value.
- **MPEGOK.** The total number of valid frames received for the PID.
- **MPEOK.** The total number of valid packets received for the PID.
- **MPEBAD.** The total number of erroneous packets received for the PID.
- **LLCSNAP.** Logical Link Control/SubNetwork Access Protocol. Not presently used in the SkyDSL Network.
- **SKYCTRL.** The total number of control packets received from the SkyDSL SAMA Receiver.

Clicking the **Close Window** button will close the **PID Table** page and return you to the **DVB Statistics** page.

#### 8.4.1.1 CONFIGURING PIDS

The SkyDSL Teleport setup determines the PIDs you will use with your SkyDSL Router. Contact the Teleport administrator or ISP to obtain them. You may add and delete PIDs as necessary using the following procedures.

**IMPORTANT**

PID values below hex 0x20 are reserved for the MPEG2 standard and must not be used for data.

## 1) Add a PID.

- Enter the PID's hex value into the **HEX** text box.
- Click **Add New**.

The new PID is added to the PID Table. Repeat for up to seven PIDs.

**NOTE**

Using the **DVB SI TDT** setting for **DVB net time support** (section 3.4.4) automatically enables PID 14. This decreases the **total** number of PIDs available for your use to seven. If you require eight PIDs, you must disable **DVB SI TDT** and use **SkyControl** instead.

## 2) Delete a PID.

- Select the check box () for the PID you wish to remove.
- Click **Delete Checked**.

The PID is removed from the PID Table.

## 8.5 THE DVB CONFIGURATION PAGE

You will make adjustments to the SkyDSL Router's DVB parameters on the **DVB Configuration** page.

**DVB Configuration**

Symbol Rate	1447 kSps
Viterbi Rate	3/4
Eb/No Threshold	3 dB
Center Frequency	1147000 kHz
Sample Frequency	45 MHz
LNB Power	<input checked="" type="radio"/> On <input type="radio"/> Off
Descrambling	<input checked="" type="radio"/> On <input type="radio"/> Off
Spectral Inversion	<input type="radio"/> On <input checked="" type="radio"/> Off
PID Filter	<input checked="" type="radio"/> On <input type="radio"/> Off
Freq Scan Range	1892 kHz
Net Time	DVB SI TDT
<input checked="" type="checkbox"/> Permanent Change	<b>Submit</b> <input type="checkbox"/> Acquire Lock
<a href="#">PID Table</a>	
<a href="#">prev</a> <a href="#">home</a> <a href="#">next</a>	

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Figure 40—DVB Configuration Page

- **Symbol Rate.** Set your symbol rate in kilosymbols per second. This is the rate at which data are received over the DVB channel and is a function of data rate and viterbi rate.
- **Viterbi Rate.** Select your viterbi rate (**1/2**, **2/3**, **3/4**, **5/6**, or **7/8**) from the dropdown menu. The value determines how much of the symbol rate includes real data versus viterbi encoding and must match the SkyDSL SAMA Receiver viterbi setting. Viterbi encoding is a method of including correctional data in a transmitted bit stream to provide for its reconstruction should any portion be lost during transmission.
- **Eb/No Threshold.** Set the Eb/No threshold in decibels. If the Eb/No Power Estimation value (see section 8.4 above) is higher than the threshold, the signal is acceptable.
- **Center Frequency.** Set your DVB center frequency in kilohertz.
- **Sample Frequency.** Set the sample frequency (**45**, **61**, **81**, or **91** MHz). This is the frequency at which the DVB signal is sampled at the DVB analog-to-digital converter. The value must be at least twice the symbol rate (e.g., if symbol rate is 30 megasymbols, sample frequency cannot be less than 60 MHz), but must not be excessively higher.
- **LNB Power.** Select the appropriate radio button ( ) to turn the SkyDSL Outdoor Unit's low noise block downconverter **On** or **Off**.
- **Descrambling.** Select the appropriate radio button ( ) to turn descrambling **On** or **Off**. This feature must be enabled if it is enabled at the SkyDSL Teleport.
- **Spectral Inversion.** Select the appropriate radio button ( ) to turn spectral inversion **On** or **Off**. Enable the feature if required by your SkyDSL Outdoor Unit's low noise block downconverter.
- **PID Filter.** Select the appropriate radio button ( ) to turn PID filtering **On** or **Off**. When enabled, the only protocol IDs that the SkyDSL Router will accept are those that appear in the PID table.
- **Freq Scan Range.** The range (in kilohertz) to either side of the center frequency that the SkyDSL Router will automatically scan to acquire the DVB signal. Default is 2000; maximum is 5000.
- **Net Time.** Select the appropriate setting from the dropdown menu. Enabling this feature allows the SkyDSL Router to receive time synchronization signals from the SkyDSL Teleport, allowing the Router to be in synch with the Teleport's time. Three settings are available:
  - **Off.** Network time synchronization is disabled.
  - **DVB SI TDT.** The Router is using the DVB-standard time and date table network time synchronization.
  - **Sky Control.** The Router is using the SkyDSL Network's proprietary network time synchronization (use this only if the teleport's encapsulator does not support DVB SI TDT or if you do not have an available PID slot (using DVB SI TDT enables PID 14)).

After altering the DVB configuration settings, you must click the [Submit](#) button for them to take effect. There is a **Permanent Change** check box () present that is checked by default, making your changes effective even after a reboot. If you do not want your changes to be permanent, you must uncheck the box prior to clicking [Submit](#).

In addition, you may instruct the SkyDSL Router to automatically acquire a DVB lock with the new settings by checking the **Acquire Lock** check box () prior to clicking [Submit](#).

### 8.5.1 THE PID TABLE

As is the case with the **DVB Statistics** page, you may access your PIDs (protocol IDs) by clicking the [PID Table](#) link located just beneath the configuration controls. Doing so will open a new window displaying the **PID Table** page. Refer to section 8.4.1 above for instructions in using the PID table.

## 8.6 THE SYSTEM INFORMATION PAGE

This page displays SkyDSL Router hardware and software information and is provided primarily as a troubleshooting aid. You may need to provide this information when contacting technical support.

System Information	
FPGA Rx (DVB)	1 . 18
FPGA Tx (SAMA)	2 . 31
Software(DVB)	1 . 20
Software(SAMA)	3 . 35
Receiver (DVB)	Conexant CX24110
Physical address of DVB card	00:90:81:00:01:79
Sama Board Rev	MAUI Rev C
RF Module Rev	Hana Rev B
Download <a href="#">SkyDSL SDR MIB</a>	
Download <a href="#">Aloha Networks MIB</a>	
<a href="#">prev</a> <a href="#">home</a> <a href="#">next</a>	
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Figure 41—System Information Page

Additionally, there are two download links at the bottom of the page, [SkyDSL SDR MIB](#) and [Aloha Networks MIB](#), that enable you to download MIB files for use in creating an SNMP interface (see section 7.3).

## 8.7 THE SYSTEM CONFIGURATION PAGE

The **System Configuration** page is where you make adjustments to your SkyDSL Router's system settings.

The screenshot shows the 'System Configuration' page with the following settings:

LAN IP Address	192.168.1.1/24
NAT	yes
DHCP	no
DHCP Range	192.168.1.100 192.168.1.199
Domain	private.network
Firewall	no
Gateway	wan
Host	sdr
Multicast	no
RIP	no
RIP Metric	1
Port Forwarding	yes
TCP Proxy	both

Administrative Action: None  To activate the changes, execute "Restart LAN Interface"

[TCP Proxy](#) [Port Forwarding](#) [Maintenance](#)

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Figure 42—System Configuration Page

### IMPORTANT

You must restart the SkyDSL Router's LAN interface after changing any LAN parameters to ensure that new the settings have taken effect. Use the **Administrative Action** dropdown menu to execute a LAN interface restart (see below).

- **LAN IP Address.** Set the SkyDSL Router's assigned IP address and network mask value.
- **NAT.** Turn Network Address Translation on or off (**yes** or **no**). When enabled, this feature allows the LAN to use one set of IP addresses for internal traffic and a second set for external traffic.

- **DHCP.** Turn Dynamic Host Configuration Protocol server on or off (**yes** or **no**). When enabled, the SkyDSL Router will automatically assign internal traffic IP addresses to user workstations from within the dhrange parameters.

**NOTE**

When DHCP is enabled at the SkyDSL Router, it is important to ensure that no other DHCP servers exist on the LAN. See section 7.2 on page 63 for additional information.

- **DHCP Range.** Set the range of IP addresses available for automatic assignment to user workstations on the LAN. This parameter is only in effect when the DHCP server feature is enabled. In addition, changing the iplan parameter while DHCP is turned on will cause dhrange to change automatically to encompass the new value. In instances where the configured range cannot be moved to a new subnet, DHCP will automatically be disabled. If DHCP server is subsequently desired, the new dhrange should be set manually and then DHCP enabled.
- **Domain.** Set the name of your domain. This can be any name of your choosing.
- **Firewall.** Not presently active. For future implementation.
- **Gateway.** The name of the SkyDSL Router gateway. Do not change the default setting (**wan**) unless you are knowledgeable in this area.
- **Host.** Set the name by which the SkyDSL Router may be referred. The factory setting is **sdr**.
- **Multicast.** Turn multicast on or off (**yes** or **no**). When enabled, this feature allows users to subscribe to and receive multicast transmissions.

**NOTE**

After changing the multicast setting, you *must* reboot the SkyDSL Router.

- **RIP.** Enable or disable (**yes** or **no**) Routing Information Protocol, which transmits RIP messages over the LAN to users, allowing them to monitor multiple routes and switch automatically to the most appropriate one (see section 7.4 on page 65).
- **RIP Metric.** The RIP level (metric) assigned to the SkyDSL Router.
- **Port Forwarding.** Enable or disable (**yes** or **no**) the Router's port-forwarding feature. When enabled, rules configured on the Port Forwarding page (see section 8.7.2 below) are placed into effect.

- **TCP Proxy.** Enable or disable the SkyDSL Router's TCP Proxy client (**none**, **nettgain**, **skytcp**, or **both**). When enabled, this feature works with the SkyDSL Teleport's proxy server to significantly increase performance. (Refer to section 5.2 on page 50 for additional information.)

After changing System Configuration settings, click the **Submit** button to accept them. In addition, you must restart the SkyDSL Router's LAN interface to ensure the new settings have been put into effect. You may instruct the SkyDSL Router to execute this or any of several other administrative actions by making a selection from the **Administrative Action** dropdown menu and clicking **Execute**. The available actions are:

- **None.** Take no action.
- **Shutdown.** Shut down the SkyDSL Router.
- **Reboot.** Reboot the SkyDSL Router.
- **Restore factory default values.** Restore all SkyDSL Router parameters to their factory default settings.
- **Restart TCP Proxy.** Restart the SkyDSL Router's TCP proxy client.
- **Restart LAN interface.** Restart the SkyDSL Router's interface with the local area network.
- **Restart WAN interface.** Restart the SkyDSL Router's interface with the SkyDSL Teleport.

Three hyperlinks are present at page bottom, [\*\*TCP Proxy\*\*](#), [\*\*Port Forwarding\*\*](#), and [\*\*Maintenance\*\*](#).

### 8.7.1     TCP PROXY

The [\*\*TCP Proxy\*\*](#) hyperlink accesses the Nettgain proxy client software. This software is preconfigured at the factory and should not require any adjustments.

**NOTE**

If you need to make adjustments the Nettgain TCP proxy software, please e-mail technical support at [techsupport@alohanet.com](mailto:techsupport@alohanet.com).

### 8.7.2     PORT FORWARDING

The [\*\*Port Forwarding\*\*](#) hyperlink opens the corresponding page, which displays the SkyDSL Router's current port-forwarding configuration. It also allows you to add and delete port-forwarding rules, as well as activate port forwarding rule changes. See section 7.6 on page 77 for detailed information on port forwarding.

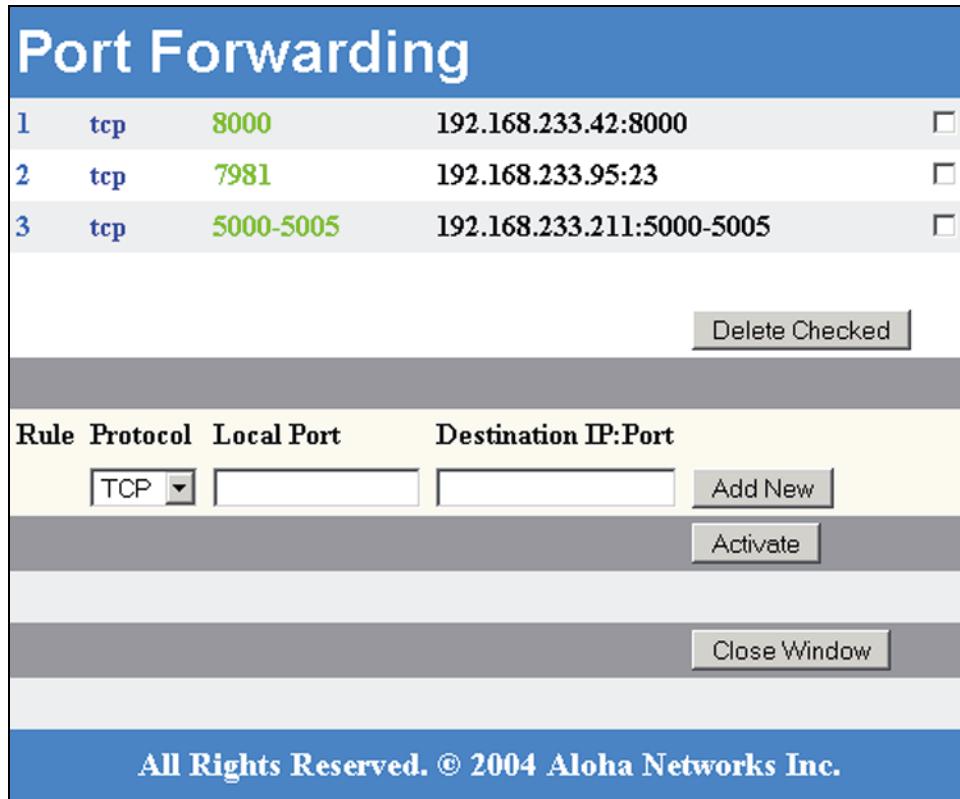


Figure 43—Port Forwarding Page

#### 8.7.2.1 ADDING PORT-FORWARDING RULES

##### IMPORTANT

Be careful not to set up conflicting rules. That is, two or more rules that forward the same port. For example:

Rule:	Protocol:	Local Port:	Destination:
1	tcp	5000	192.168.1.1:5000
2	tcp	5000-5500	192.168.1.10:5000-5500

The rules conflict because they both attempt to forward port 5000.

- 1) Set a port-forwarding rule.
  - o Forward a single port.
    - i) Select **TCP**, **UDP**, or **both** from the **Protocol** dropdown menu.
    - ii) Enter the SkyDSL Router port number to be forwarded in the **Local Port** text box.
    - iii) Enter the destination computer's IP address and port number in the **Destination IP:Port** text box.

- iv) Click the **Add New** button.

The rule is added to the port forwarding rule list at the top of the page.

#### NOTE

When forwarding single ports, you must designate a port at the destination workstation regardless of whether it's the same as the local SkyDSL Router port or not. This is not the case when forwarding a range of ports, as they *must* forward to the same ports at the destination.

- o Forward a range of ports.
  - i) Select **TCP**, **UDP**, or **both** from the **Protocol** dropdown menu.
  - ii) Enter the range of SkyDSL Router port numbers to be forwarded in the **Local Port** text box (for example, **5000-6000**).
  - iii) Enter *only* the destination computer's IP address in the **Destination IP:Port** text box.
  - iv) Click the **Add New** button.

The rule is added to the port forwarding rule list at the top of the page.

- 2) Activate the new list of port-forwarding rules.

- a) Click the **Activate** button.

The list of rules is placed into effect.

### 8.7.2.2 DELETING PORT-FORWARDING RULES

Deleting a port-forwarding rule is a simple matter.

- 1) Delete a port-forwarding rule.

- a) Select the check box () of the rule you want to delete and click **Delete Checked**.

The rule is deleted and removed from the port forwarding rule list.

- 2) Activate the new list of port-forwarding rules.

- a) Click the **Activate** button.

The list of rules is placed into effect.

### 8.7.3 THE MAINTENANCE PAGE

The **Maintenance** page is where SkyDSL Router software upgrades are controlled.

**Maintenance**

Software Revision Status	<input type="button" value="ok"/>
Upgrade Version	34
Time Since the Upgrade	8 days 21:07:24
SAMA Maintenance Level	0
SAMA Test Mode	0
DVB Maintenance Level	0
DVB Test Mode	0
<input checked="" type="checkbox"/> Permanent Change	<input type="button" value="Submit"/>

[prev](#) [home](#) [next](#)

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Figure 44—Maintenance Page

This page includes many features, including:

- **Software Revision Status.** This dropdown menu is dual purpose. During normal operations, it displays one of six messages indicating the current status of the SkyDSL Router's software. (Selecting one of these items and clicking the  button will have no effect, as these are automatically generated advisory messages.)
  - **none.** No upgrade has been installed.
  - **ok.** The last upgrade installation was successful.
  - **fail.** The last upgrade installation was unsuccessful.
  - **upgrade available.** An upgrade has been uploaded to the Router and is available for installation.
  - **in progress.** The Router is receiving a new upgrade from the SkyDSL Teleport, a previously received upgrade is currently being installed, or a previously installed upgrade is currently being uninstalled.
  - **undone.** The most recently installed upgrade has been uninstalled.

In addition, at the bottom of the menu are two selectable action commands that control software installs and uninstalls. These two selections will perform their respective actions when selected and the  button is clicked.

- **upgrade.** Install the latest upgrade, if available.

**NOTE**

This command will only function if a status of either **upgrade available** or **undone** is displayed.

- **downgrade.** Uninstall the last upgrade and revert to the previous version.

**NOTE:** This command will only function if a status of **ok** is displayed.

- **Upgrade Version.** The version number of the current upgrade. This number is primarily for the use of the SkyDSL Teleport administrator and does not indicate the actual SkyDSL Router software version.
- **Time Since the Upgrade.** The amount of time that has passed since the last **Software Revision Status** change.
- **SAMA Maintenance Level.** For future implementation.
- **SAMA Test Mode.** For future implementation.
- **DVB Maintenance Level.** For future implementation.
- **DVB Test Mode.** For future implementation.

Remember that after selecting **upgrade** or **downgrade** from the **Software Revision Status** dropdown menu, you must click the  button to execute that action.



---

## 9 UPGRADING THE SKYDSL ROUTER SOFTWARE

An important feature of the SkyDSL Network is the SkyDSL Teleport's ability to multicast software upgrades to all SkyDSL Routers on the Network over the satellite's DVB channel. This feature provides for upgrade timeliness and eliminates the need for costly and burdensome hard media.

### 9.1 RECEIVING THE UPGRADE

When an upgrade becomes available, the SkyDSL Teleport administrator will, at a time of his or her choosing, upload the software to all SkyDSL Routers over the DVB channel. Since this activity can be bandwidth-intensive, the Teleport administrator will typically perform the upload during non-peak hours, such as late night or early morning. Upon receipt of an upgrade, the Router will store it to the internal flash memory, where it will reside until installed.

Notification of an upgrade is the responsibility of the Teleport administrator. The SkyDSL Router provides no cue that an upgrade is available until the first time you log in subsequent to the upload, at which time the CLI or web interface will prompt you regarding the upgrade's availability.

### 9.2 INSTALLING THE UPGRADE

Once the SkyDSL Teleport uploads the software upgrade, you can install it using either the CLI or the web interface. The urgency of the upgrade is written into the software, and it may or may not give you the option to postpone installation for 24 hours. The urgency also determines the number of postponements allowed before installation becomes mandatory.

Since installation may involve a reboot of the SkyDSL Router, taking advantage of a postponement allows you to install the upgrade during non-peak hours. If you do not perform the upgrade within 24 hours, however, the SkyDSL Router will once again notify you of the upgrade during your next login. Once again, you may or may not have the option to postpone for another 24-hour period, depending on the urgency of the upgrade.

With the exception of a possible Router reboot, software upgrades are seamless. All previously set parameters are retained, and Internet connectivity is restored immediately. Should problems arise as a result of the

upgrade, however, reverting to the previous version is a simple matter and is discussed below.

## 9.2.1 INSTALLING WITH THE COMMAND LINE INTERPRETER

Upon logging in to the SkyDSL Router, it immediately presents you with the **Upgrade Alert** screen.

```
Linux 2.2.20-lahaina <sdr> <ttyp0>

sdr login: admin
Password:
#####
# # Upgrade Alert: New software was downloaded to your SDR that is #
# now ready for installation! #
# #####
You may postpone the installation, but proceeding is recommended.
You must type [postpone] to prevent the upgrade process from continuing.
Upgrade now? _
```

Figure 45—Upgrade Alert

At this point, you must decide whether to continue the installation or postpone it (if allowed). To continue the installation, simply press **ENTER**. The CLI displays a new message notifying you that you have chosen to proceed with the installation and asks you to press **ENTER** a second time.

```
Linux 2.2.20-lahaina <sdr> <ttyp0>

sdr login: admin
Password:
#####
# # Upgrade Alert: New software was downloaded to your SDR that is #
# now ready for installation! #
# #####
You may postpone the installation, but proceeding is recommended.
You must type [postpone] to prevent the upgrade process from continuing.
Upgrade now?

The upgrade will now be installed. Press [Enter] to continue.
_
```

Figure 46—Upgrade Confirmation

Upon doing so, the Router will install the upgrade followed by a reboot (if required). On completion, the Router should reacquire the DVB signal automatically and begin functioning normally.

### 9.2.1.1 POSTPONING THE UPGRADE

If the **Upgrade Alert** screen gives you the option to postpone the upgrade installation, and you wish to do so, simply type **postpone** at the **Upgrade now?** prompt and press **ENTER**. The CLI will display a message notifying you of the number of additional postponements you may make before installation becomes mandatory, followed by the regular CLI prompt.

```

Linux 2.2.20-lahaina <sdr> <ttyp0>

sdr login: admin
Password:
#####
#      Upgrade Alert: New software was downloaded to your SDR that is      #
#                          now ready for installation!                      #
#
You may postpone the installation, but proceeding is recommended.
You must type [postpone] to prevent the upgrade process from continuing.
Upgrade now? postpone

You may postpone this process 1 more times.

sdr> -

```

Figure 47—Upgrade Postponement

At this point, you may either wait for the alert to reappear after 24 hours, or you may perform the upgrade installation at a time of your choosing within the 24-hour period. To do the latter, type the command **upgrade software** when you are ready. The SkyDSL Router will display a message asking you to confirm the action. Typing **yes** and pressing **ENTER** proceeds with the installation. Typing **no** or pressing **ENTER** with no entry will abort the installation (the alert will reappear at the end of the initial 24-hour period).

### 9.2.2 INSTALLING WITH THE WEB INTERFACE

You may also use the SkyDSL Router's web interface to resolve upgrade alerts. As with the CLI, the **Software Upgrade Alert** appears immediately upon logging in to the Router.

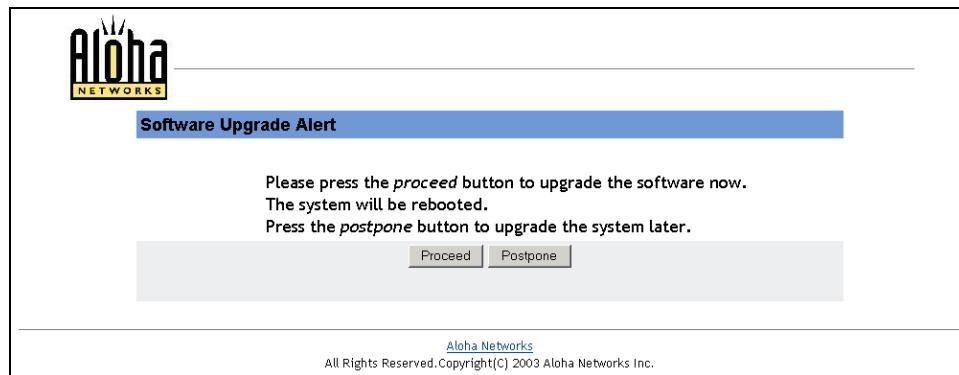


Figure 48—Upgrade Alert with Postpone Option

If postponement of the upgrade is allowed, the alert will display two buttons, **Proceed** and **Postpone**. If postponement is not allowed, the latter button is not present, as illustrated in Figure 49.

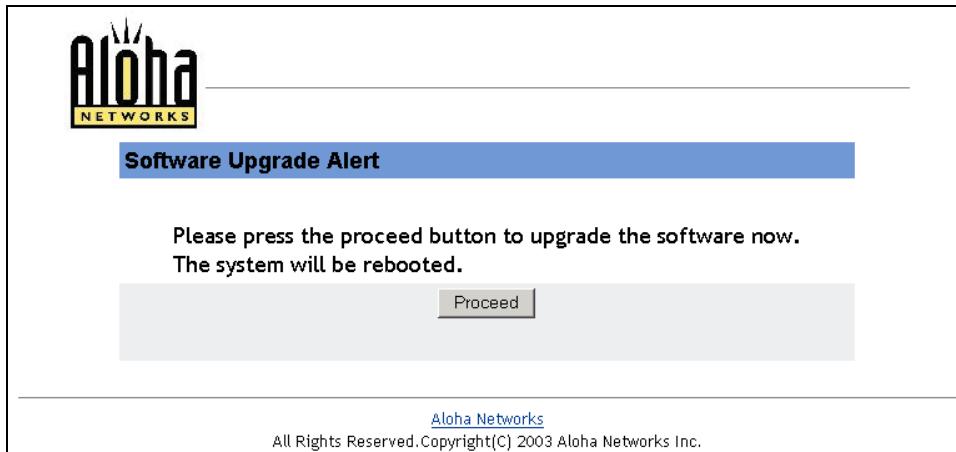


Figure 49—Upgrade Alert without Postpone Option

In either case, to proceed with the upgrade installation, click **Proceed**. The SkyDSL Router will install the new software, reboot if necessary, and automatically reestablish connectivity with the SkyDSL Teleport.

### 9.2.2.1 POSTPONING THE UPGRADE

If the postponement option is available and you wish to take advantage of it, click the **Postpone** button. The web interface will replace the **Software Upgrade Alert** page with the **SkyDSL Router Home Page**. If you do not perform the upgrade within 24 hours, the **Software Upgrade Alert** page will reappear, prompting you to either upgrade your software or, if given the option, postpone for up to another 24 hours.

If, during the 24-hour postponement period, you desire to manually upgrade your Router's software, you may do so from the web interface's **Maintenance** page.

- 1) Open the web interface's **Maintenance** page.
  - a) From the **SkyDSL Router Home Page**, select **System>>Configure**. The **System Configuration** page appears.
  - b) Click the **Maintenance** hyperlink near page bottom. The **Maintenance** page appears, and the **Software Revision Status** dropdown menu indicates **upgrade available**.
- 2) Install the upgrade.
  - a) In the **Software Revision Status** dropdown menu, select **upgrade**, and click **Submit**. The **Software Revision Status** menu may briefly indicate **in progress** before indicating either **ok** or **fail**.

If, after the installation, **ok** appears in the **Software Revision Status** field, the process was successful; the **Upgrade Version** field will change, and the **Time Since the Upgrade** field will reset to zero. If **fail** appears, there was an

unexpected error in the installation. Contact technical support at [techsupport@alohonet.com](mailto:techsupport@alohonet.com).

## 9.3 UNINSTALLING THE UPGRADE

Should you experience difficulties with any software upgrade, you may uninstall it and revert to the previous version. During upgrade installation, the previous version remains present within the Router's memory, allowing you to restore it any time prior to a new software upload from the SkyDSL Teleport. Such an upload will overwrite the previous version.

### 9.3.1 UNINSTALLING WITH THE COMMAND LINE INTERPRETER

To uninstall an upgrade using the CLI, type **undo upgrade** and press **ENTER**. The SkyDSL Router will display a message asking you to confirm the action. Typing **yes** will uninstall the upgrade and restore the previous software version. Typing **no** or pressing **ENTER** will abort the uninstall process.

If, after uninstalling the upgrade, you wish to reinstall it, you may do so with the **upgrade software** command, which will reinstall the upgrade.

### 9.3.2 UNINSTALLING WITH THE WEB INTERFACE

The procedures for using the web interface to uninstall an upgrade are nearly identical to those used during installation.

- 1) Open the web interface's **Maintenance** page.
  - a) From the **SkyDSL Router Home Page**, select **System>>Configure**.  
The **System Configuration** page appears.
  - b) Click the **Maintenance** hyperlink near page bottom.  
The **Maintenance** page appears and the **Software Revision Status** dropdown menu indicates **ok**.
- 2) Uninstall the upgrade.
  - a) In the **Software Revision Status** dropdown menu, select **downgrade**, and click **Submit**.  
The **Software Revision Status** menu may briefly indicate **in progress** before indicating either **undone** or **fail**.

After the installation, if **undone** appears in the **Software Revision Status** field, the uninstall process was successful; the **Upgrade Version** field will revert to the previous version number, and the **Time Since the Upgrade** field will reset to zero. If **fail** appears, there was an unexpected error in the uninstall process. Contact technical support at [techsupport@alohonet.com](mailto:techsupport@alohonet.com).

If, after uninstalling the upgrade, you wish to reinstall it, you may do so by selecting the **upgrade** option from the **Software Revision Status** dropdown menu and clicking  as described in section 9.2.2.1 above.

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## 10 APPENDICES

### Appendix A SkyDSL VSAT Terminal Quick Start Guide

This quick start reference provides basic instructions for installing and configuring your SkyDSL VSAT Terminal.

#### CAUTIONS AND WARNINGS

There are a number of cautions and warnings outlined in this manual that should be adhered to when setting up the SkyDSL VSAT Terminal. Please make certain you are familiar with all of them before using this Quick Start Guide.

#### Set Up the SkyDSL Outdoor Unit

- 1) Choose the ODU's location, based on your satellite's look angle.
- 2) Assemble the antenna in accordance with the manufacturer's instructions.
- 3) Attach the power amplifier to the feedhorn's transmit port.
- 4) Attach the low noise block downconverter to the feedhorn's receive port.
- 5) Aim the ODU at the satellite's azimuth (do not elevate the ODU at this time).

#### Set Up the SkyDSL Router

- 1) Plug the PS2-compatible keyboard into the **KEYBOARD** port (**optional**).
- 2) Plug the VGA monitor into the **VIDEO** port using the VGA monitor data cable (**optional**), and plug its power cord into a standard AC power source.
- 3) Plug one end of the 10/100 Ethernet patch cable into the **NET** port, and plug the other end into an Ethernet hub or router to provide Internet connectivity to your LAN.
- 4) Plug a coaxial cable into the **LNB** port and tighten the connector; plug the other end into a properly installed lightning suppressor.
- 5) Plug a coaxial cable into the **PA** port and tighten the connector; plug the other end into a properly installed lightning suppressor.

- 6) Plug the female end of the SkyDSL Router's power cord into the power connection port and plug the male end into standard AC power source.

### Start the SkyDSL Router

- 1) Apply power to the monitor (if used).
- 2) Apply power to and boot the SkyDSL router by turning on the **I/O** rocker switch on the rear panel.

### Access the SkyDSL Router

- 1) At the **sdr login:** prompt, type your login name and press **ENTER**; at the **Password:** prompt, type your password and press **ENTER**.

### Commission the SkyDSL Outdoor Unit

- 1) Attach one end of a coaxial cable to the ODU's LNB; attach the other end to the satellite finder.
- 2) With a magnetic compass, verify the ODU is pointing at the correct azimuth.
- 3) Verify the ODU's feedhorn assembly is oriented to the correct polarization.
- 4) Increase the ODU's elevation until a signal is acquired.
- 5) Power down the satellite finder and detach the coaxial cable from its input jack.
- 6) Power down the SkyDSL Router (if powered up).
- 7) Connect the coaxial cable to the lightning suppressor attached to the SkyDSL Router's **LNB** port.
- 8) Connect a coaxial cable to the ODU's power amplifier; connect the other end to the lightning suppressor attached to the SkyDSL Router's **PA** port.
- 9) Contact the satellite bandwidth provider and obtain the test frequency.
- 10) Power up the SkyDSL Router and log in.
- 11) Type **show sama** and verify that **PA Power** is set to **OFF**.
- 12) Set the test frequency band by typing **set patype <value>** and pressing **ENTER**.
- 13) Set the test frequency by typing **set sama cntrfreq <value>** and pressing **ENTER**.
- 14) Disable the Transmit Inhibit feature by typing **set sama inhibit off** and pressing **ENTER**.
- 15) Disable the Automute feature by typing **set sama automute off** and pressing **ENTER**.
- 16) Set the test transmission power level by typing **set sama pwrlvl 36.0** and pressing **ENTER**.

- 17) Set the transmission test mode to CW by typing `set sama testmode cw` and pressing **ENTER**.
- 18) When the satellite bandwidth provider is ready to commence, apply power to the ODU's power amplifier by typing `set sama papoweradm on` and pressing **ENTER**.
- 19) Coordinate with the satellite bandwidth provider until an acceptable signal is achieved.
- 20) When cued by the satellite bandwidth provider to create modulated signals, type `set sama testmode off` and press **ENTER**.
- 21) Type `set sama testmode random` and press **ENTER** to test in modulated mode.
- 22) Coordinate again with the satellite bandwidth provider until you achieve an acceptable signal.
- 23) When commissioning is complete, turn off the PA by typing `set sama papowerlvl off` and pressing **ENTER**.
- 24) Disable the test transmission test mode by typing `set sama testmode off` and pressing **ENTER**.
- 25) Reduce the transmission power level to 12.0 dB by typing `set sama pwrlvl 12.0` and pressing **ENTER**. This is an appropriate level for VSAT Terminal commissioning.
- 26) Reenable the Automute feature by typing `set sama automute on` and pressing **ENTER**.
- 27) Reenable the Transmit Inhibit feature by typing `set sama inhibit nolock` and pressing **ENTER**.
- 28) Secure the ODU by tightening all movable parts, including azimuth, elevation, and polarization adjustments.

### Configure the SkyDSL Router

- 1) Set the LAN IP address by typing `iplan <ip address/netmask>` and pressing **ENTER**.
- 2) Set the TCP proxy client by typing `tccproxy <value>` and pressing **ENTER**.
- 3) Restart the LAN by typing `lan restart` and pressing **ENTER**.
- 4) Set the PA frequency band by typing `set sama patype <value>` and pressing **ENTER**.
- 5) Set the SAMA center frequency by typing `set sama cntrfreq <value>` and pressing **ENTER**.
- 6) Set SAMA spectral inversion by typing `set sama specinv <value>` and pressing **ENTER**.

- 7) Set the SAMA code profile by typing `set sama codeprofile <value>` and pressing **ENTER**.
- 8) Set the LNB frequency band by typing `set dvb lnbttype <value>` and pressing **ENTER**.
- 9) Set the DVB center frequency by typing `set dvb cntrfreq <value>` and pressing **ENTER**.
- 10) Set the viterbi rate by typing `set dvb viterbi <value>` and pressing **ENTER**.
- 11) Set the symbol rate by typing `set dvb symrate <value>` and pressing **ENTER**.
- 12) Set the sample frequency by typing `set dvb smplfreq <value>` and pressing **ENTER**.
- 13) Set descrambling by typing `set dvb descramble <value>` and pressing **ENTER**.
- 14) Set DVB spectral inversion by typing `set dvb specinv <value>` and pressing **ENTER**.
- 15) Set the desired DVB net time support source by typing `set nettime <value>` and pressing **ENTER**.
- 16) Add applicable protocol IDs to the PID filter by typing `pid add <PID hex value>` and pressing **ENTER**. Repeat as necessary.
- 17) Save the configuration settings by typing `save` and pressing **ENTER**.
- 18) Reboot the SkyDSL Router to implement new settings by typing `reboot` and pressing **ENTER**.

### Acquire the DVB Signal

- 1) Test DVB signal reception by logging into the SkyDSL Router and typing `show dvb`; check that the `Lockstatus` field reads [ `FEC Lock` ].  
If FEC lock is not present, refer to section 6.1 for troubleshooting suggestions.

### Set Up the SAMA Signal Transmission

- 1) Verify that **SAMA Transmit Power** is set to 12.0 and that **Transmit Emissions** is enabled by typing `show sama` and pressing **ENTER**. (If they are not, use the `set sama pwrlvl 12` and `set sama txstate on` commands respectively to set them.)
- 2) At the SkyDSL Router, turn on the power amplifier by typing `set sama papoweradm on` and pressing **ENTER**.

### Test the SAMA Signal Transmission

- 1) Test the SAMA signal transmission by typing `ping <SkyDSL SAMA Receiver SAMA interface address>` and pressing **ENTER**; the CLI

should display ping confirmations, indicating a good SAMA link (press <Ctrl+C> to end ping transmissions).

If no ping confirmation is displayed, refer to section 6.2 for troubleshooting suggestions.



## Appendix B Geostationary Satellite Basics

When searching for adjacent satellites, it is important to realize their positions in the sky are predictable. So they remain stationary in relation to the Earth, all are positioned at a specific altitude directly over the equator. As a result, the line of satellites forms an arc in the sky, called the **geostationary arc** (Figure 50), with approximately two degrees spacing between each.

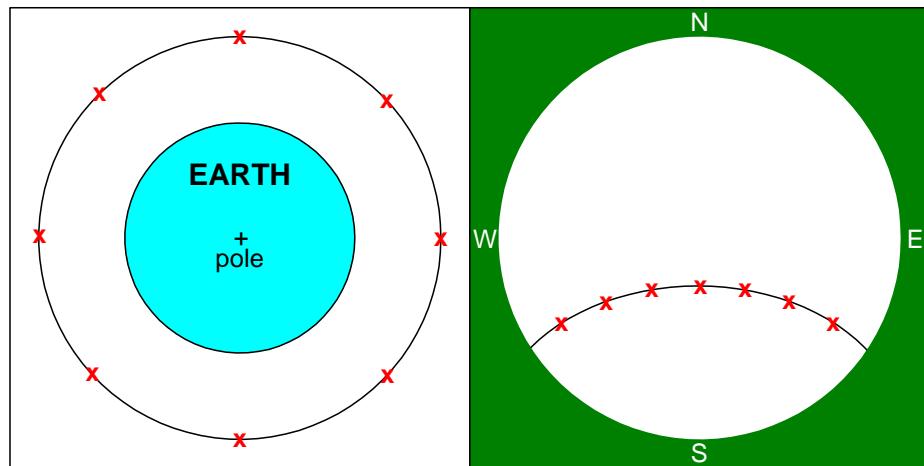


Figure 50—Geostationary Arc as Viewed From Above Earth's Pole (left)  
and From the Earth's Surface in the Northern Hemisphere (right)

The actual appearance of the arc and its location in the sky will depend on the latitude of your location. At the equator, it appears as a straight line running directly overhead from the east horizon to the west horizon. In the northern hemisphere, it appears as an actual arc in the southern sky, again beginning and ending in the east and west. In the southern hemisphere, the arc appears in the northern sky. The further north or south of the equator you are, the lower in the sky the arc appears.

### Acquiring an Adjacent Satellite

When attempting to acquire a signal from your satellite, you may experience difficulty due to interference from satellites situated adjacent to your own. The smaller dish sizes used with the SkyDSL VSAT Terminal are particularly susceptible to this adjacent satellite interference (ASI). If you know your SkyDSL Outdoor Unit is oriented correctly, but the signal you are receiving is not that of your Teleport, the best solution is to begin looking for your DVB signal in the vicinity of adjacent satellites.

If you are located at or near the equator, locating an adjacent satellite may be simply a matter of moving the ODU's azimuth to the east or west, as illustrated in Figure 51. This is because, at that latitude, the geostationary arc follows a more or less straight line across the sky. Adjacent satellite acquisition becomes more complicated, though, the further north or south of the equator you are.

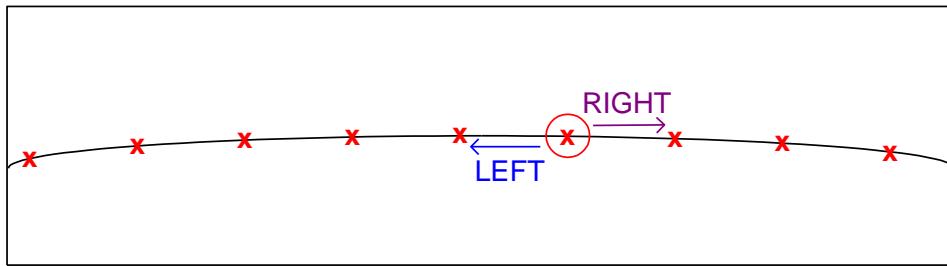


Figure 51—Locating Adjacent Satellites Near the Equator

Due to the more pronounced north/south distances within the geostationary arc in higher latitudes, it can be difficult to predict in which direction to move the ODU if you do not know your satellite's exact location within the arc.

Figure 52 shows an example of satellite placement within the geostationary arc at higher latitudes. As a rule of thumb, when attempting to locate adjacent satellites, it is best to move the ODU to the east or west first, in case your starting point is near the top of the arc (**point B**) where there is very little vertical separation between satellites.

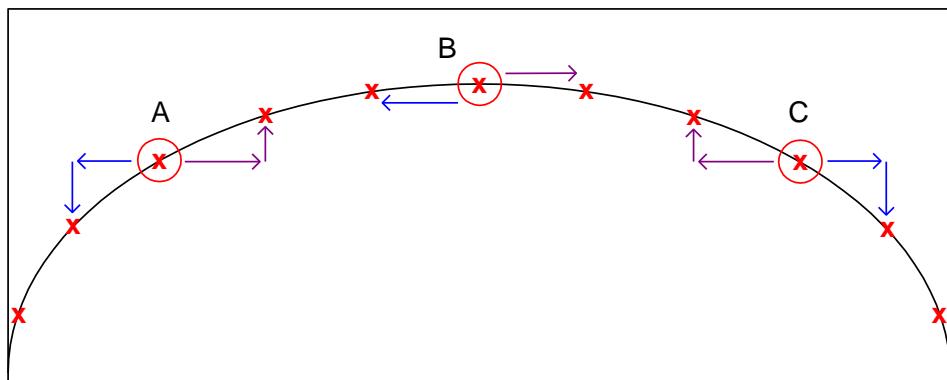


Figure 52—Locating Adjacent Satellites in the Geostationary Arc In the Northern and Southern Hemispheres

As you progress along the arc, north/south distances become more pronounced (**points A and C**), which make it necessary to raise or lower the ODU after moving it to horizontally. Again, unless you know where your satellite is located within the arc, there is no way of knowing in which direction to move the ODU, so some experimentation may be required.

Your satellite finder will be invaluable in acquiring adjacent satellites' signals, and you should rely on it during the process.

#### IMPORTANT

Remember, satellites in the geostationary arc are separated by only a couple of degrees, so keep your ODU movements small.

## Appendix C Default SkyDSL Router Parameters

Following are the SkyDSL Router's factory default configuration parameters. These parameters are in place when the Router is shipped, and also after use of the `skydsl default` and `lan default` commands.

### Default SAMA Settings

- SAMA Code Profile..... 0 (Single Code, 129 kbps, QPSK, BCH)
- Center Freq. .... 1071800 kHz
- PA Type (Freq. band) ..... Ku-Band
- Tx Emissions ..... On
- Tx Inhibit Mode ..... Require DVB FEC Lock
- PA Power ..... Off
- Transmit power..... 0.0 dB
- Auto Mute ..... On
- FEC ..... On
- Spectral Inversion ..... Off
- Test Mode ..... Off
- Frequency tracking ..... On
- Power tracking ..... On
- Slotting..... On

### Default DVB Settings

- Sample Freq. .... 45 MHz
- Center Freq. .... 1074000 kHz
- Freq. Scan Range ..... 2000 kHz
- Viterbi Rate..... 2/3
- Spectral Inversion ..... Off
- Descrambling ..... On
- Symbol Rate..... 1221 ksps
- LNB Type (Freq. band) ..... Ku-Band
- LNB Power ..... On

### Default Link Settings

- SAMA link
  - SAMA Cell TX Retries ..... 2 (Ack protocol active)
- DVB Link
  - DVB Net Time Support..... Off
  - DVB Pid Filter ..... On

### **Default LAN Settings**

- dhcp.....yes
- dhrange.....192.168.1.100 192.168.1.199
- domain .....private.network
- firewall .....yes
- gateway .....wan
- host.....sdr
- iplan .....192.168.1.1/24
- mcast .....no
- nat .....yes
- portfwd.....no
- rip.....no
- ripmetr.....1
- tcpproxy .....none

## Appendix D SkyDSL Router Command Line Interpreter Commands

Valid SkyDSL Router commands are divided into two groups, **SkyDSL** and **System**.

### Usage: command <required option> <elective option>

Should you use incorrect syntax when entering a command, the Command Line Interpreter will display an error message. It will also provide you with either an example of the command's syntax, or a prompt to type **help** followed by the command you are trying to use. Performing the latter will display an example of the command's syntax.

You may access command help at any time by either typing **help** followed by the command (e.g., **help skydsl**), or by typing the command followed by a question mark (?) (e.g., **set ?**).

### SkyDSL Commands

Command	Required Option(s)	Elective Option(s)	Description
get	<b>dlnettime</b>		Show current NetTime setting
get	<b>dvb acquirelock</b>		Show current acquire lock status ( <b>0</b> =OFF, <b>1</b> =ON)
get	<b>dvb cntrfreq</b>		Show current DVB receiver center frequency
get	<b>dvb descramble</b>		Show current descrambling status ( <b>0</b> =OFF, <b>1</b> =ON)
get	<b>dvb lnbtype</b>		Show LNB frequency band ( <b>0</b> =L-band, <b>1</b> =Ku-band, <b>2</b> =C-band)
get	<b>dvb lnbpower</b>		Show current LNB power status ( <b>0</b> =OFF, <b>1</b> =ON)
set	<b>dvb scanrange</b>		Show current scan range setting
get	<b>dvb smplfreq</b>		Show current sample frequency setting
get	<b>dvb specinv</b>		Show current spectral inversion status ( <b>0</b> =OFF, <b>1</b> =ON)
get	<b>dvb symrate</b>		Show current receive symbol rate setting
get	<b>dvb viterbi</b>		Show current viterbi coding rate setting

<b>get</b>	<b>link cellretries</b>		Show current retransmission attempts setting
<b>get</b>	<b>link pidfilter</b>		Show current PID filtering status ( <b>0</b> =OFF, <b>1</b> =ON)
<b>get</b>	<b>sama automute</b>		Show current automatic mute status ( <b>0</b> =OFF, <b>1</b> =ON)
<b>get</b>	<b>sama cntrfreq</b>		Show current SAMA transmitter center frequency
<b>get</b>	<b>sama cntrfreqoffset</b>		Show current SAMA transmitter frequency offset
<b>get</b>	<b>sama codeprofile</b>		Show current SAMA code profile
<b>get</b>	<b>sama fec</b>		Show current FEC status ( <b>0</b> =OFF, <b>1</b> =ON)
<b>get</b>	<b>sama freqtrk</b>		Show current frequency tracking status ( <b>0</b> =OFF, <b>1</b> =ON)
<b>get</b>	<b>sama inhibit</b>		Show current status of Tx inhibit mode ( <b>0</b> =OFF (Always transmit), <b>1</b> =Require DVB FEC lock, <b>2</b> =Require slotting synch)
<b>get</b>	<b>sama papoweradm</b>		Show current PA power status ( <b>0</b> =OFF, <b>1</b> =ON)
<b>get</b>	<b>sama patype</b>		Show PA frequency band ( <b>0</b> =L-band, <b>1</b> =Ku-band, <b>2</b> =C-band)
<b>get</b>	<b>sama pwrlvl</b>		Show current SAMA transmitter power level setting
<b>get</b>	<b>sama pwrtrk</b>		Show current power tracking status ( <b>0</b> =OFF, <b>1</b> =ON)
<b>get</b>	<b>sama specinv</b>		Show current spectral inversion status ( <b>0</b> =OFF, <b>1</b> =ON)
<b>get</b>	<b>sama slotting</b>		Show current slotting status ( <b>0</b> =OFF, <b>1</b> =ON)
<b>get</b>	<b>sama state</b>		Show current status of SAMA transmitter emissions ( <b>0</b> =OFF, <b>1</b> =ON)
<b>get</b>	<b>sama testmode</b>		Show current test mode status ( <b>0</b> =OFF, <b>1</b> =ON)
<b>help</b>	<b>skydsl</b>		Display the SkyDSL help

<b>pid</b>	<b>add &lt;value&gt;</b>		Add a protocol ID to the list of active protocol IDs. (<value> = the hex value of the PID)
<b>pid</b>	<b>del &lt;value&gt;</b>		Delete a protocol ID from the list of active protocol IDs. (<value> = the hex value of the PID)
<b>profile</b>	<b>delete &lt;profile number&gt;</b>		Delete the selected profile ( <b>1</b> , <b>2</b> , <b>3</b> , or <b>4</b> )
<b>profile</b>	<b>restore</b>		Restore the profile saved as the active profile
<b>profile</b>	<b>save &lt;profile number&gt;</b>		Save the current active profile to the selected profile number ( <b>1</b> , <b>2</b> , <b>3</b> , or <b>4</b> )
<b>profile</b>	<b>select &lt;profile number&gt;</b>		Make the selected profile number ( <b>1</b> , <b>2</b> , <b>3</b> , or <b>4</b> ) the active profile.
<b>profile</b>	<b>show</b>		Display profile list: current active profile, archived profiles 1–4, and profile saved
<b>save</b>			Save configuration parameters as the <b>Active profile</b>
<b>sdrmon</b>			Enable real-time SkyDSL Router monitor (press <b>Q</b> to exit)
<b>set</b>	<b>dvb acquirelock &lt;value&gt;</b>		Acquire lock ( <b>1/yes/on</b> =acquire)
<b>set</b>	<b>dvb cntrfreq &lt;value&gt;</b>		Set receiver center frequency in kilohertz ( <b>950000-1450000</b> )
<b>set</b>	<b>dvb descramble &lt;value&gt;</b>		Enable/disable descrambling ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
<b>set</b>	<b>dvb lnbpower &lt;value&gt;</b>		Enable/disable LNB power ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
<b>set</b>	<b>dvb lnbtype &lt;value&gt;</b>		Set LNB frequency band ( <b>l</b> =L-band, <b>c</b> =C-band, <b>ku</b> =Ku-band)

set	<b>dvb scanrange &lt;value&gt;</b>		Set the range to either side of center frequency for the Router to scan for the DVB signal (where <value> = 0–5000)  <b>Note:</b> Due to the internal chipset's algorithm, the actual frequency range used by the SkyDSL Router may differ slightly from the entered value
set	<b>dvb smplfreq &lt;value&gt;</b>		Set sample frequency in megahertz (<value> = <b>45</b> , <b>61</b> , <b>81</b> , or <b>91</b> )
set	<b>dvb specinv &lt;value&gt;</b>		Enable/disable spectral inversion ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
set	<b>dvb symrate &lt;value&gt;</b>		Set receive symbol rate in kilobits per second (<value> = <b>1000–4500</b> )
set	<b>dvb viterbi &lt;value&gt;</b>		Set viterbi coding rate (<value> = <b>1/2</b> , <b>2/3</b> , <b>3/4</b> , <b>5/6</b> , or <b>7/8</b> )
set	<b>link cellretries &lt;value&gt;</b>		Configure retransmission attempts (<value> = <b>0</b> , <b>1</b> , <b>2</b> , or <b>3</b> )
set	<b>link pidfilter &lt;value&gt;</b>		Enable/disable PID filtering ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
set	<b>link nettime &lt;value&gt;</b>		Configure network time ( <b>0</b> =off, <b>1</b> =DVB SI DTD, <b>2</b> =SkyControl)
set	<b>sama automute &lt;value&gt;</b>		Enable/disable automatic mute ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
set	<b>sama cntrfreq &lt;value&gt;</b>		Set SAMA transmitter center frequency in kilohertz (<value> = <b>950000–1450000</b> )
set	<b>sama cntrfreqoffset &lt;value&gt;</b>		Set the SAMA transmitter center frequency offset in hertz (<value> = <b>-10000–10000</b> )

set	<b>sama codeprofile &lt;value&gt;</b>		Set the SAMA code profile (spreading code, data rate, modulation type, and forward error correction (FEC) code) ( <b>0</b> =single code, 129kbps, QPSK, BCH   <b>3</b> =single code, 266kbps, QPSK, BCH)  <b>IMPORTANT:</b> The SkyDSL Router is configured with code profile <b>0</b> at the factory. If you need to change to code profile <b>3</b> , contact technical support at <a href="mailto:techsupport@alohanet.com">techsupport@alohanet.com</a> for additional instructions.
set	<b>sama fec &lt;value&gt;</b>		Enable/disable FEC ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
set	<b>sama freqtrk &lt;value&gt;</b>		Enable/disable frequency tracking ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
set	<b>sama inhibit &lt;value&gt;</b>		Set Tx inhibit mode ( <b>0</b> =OFF (Always transmit), <b>1</b> =Require DVB FEC lock, <b>2</b> =Require slotting synch)
set	<b>sama papoweradm &lt;value&gt;</b>		Enable/disable PA power ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
set	<b>sama patype &lt;value&gt;</b>		Set PA frequency band ( <b>l</b> =L-band, <b>c</b> =C-band, <b>ku</b> =Ku-band)
set	<b>sama pwrlvl &lt;value&gt;</b>		Set SAMA transmitter power in decibels (<value> = <b>-13.0–36.0 dB</b> )
set	<b>sama pwrtrk &lt;value&gt;</b>		Enable/disable power tracking ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
set	<b>sama slotting &lt;value&gt;</b>		Enable/disable slotting ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
set	<b>sama specinv &lt;value&gt;</b>		Enable/disable spectral inversion ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
set	<b>sama state &lt;value&gt;</b>		Enable/disable SAMA transmitter emissions ( <b>0/no/off</b> =OFF, <b>1/yes/on</b> =ON)
set	<b>sama testmode &lt;value&gt;</b>		Set test mode (<value> = <b>off, cw, allhi, or random</b> )

<b>show</b>	<b>dvb</b>		Display the DVB parameters
<b>show</b>	<b>lan</b>		Display the LAN configuration
<b>show</b>	<b>link</b>		Display the link parameters
<b>show</b>	<b>rev</b>		Display the SkyDSL Router's software revision information
<b>show</b>	<b>sama</b>		Display the SAMA parameters
<b>show</b>	<b>versions</b>		Display the SkyDSL Router's module version information
<b>show</b>	<b>wan</b>		Display the WAN configuration
<b>skydsl</b>	<b>default</b>		Restore configuration parameters to factory default. Must be followed by the <b>reboot</b> command

## System Commands

Command	Required Option(s)	Elective Option(s)	Description
<b>arp</b>			Displays Address Resolution Protocol information for any machines with which the SkyDSL Router established a connection in the last 900 seconds
<b>dhcp</b>	<i>&lt;value&gt;</i>		Enable/disable DHCP ( <b>0/no/off</b> =no, <b>1/yes/on/default=yes</b> )
<b>dhrange</b>	<i>&lt;lower ip address limit&gt;</i> <i>&lt;upper ip address limit&gt;</i>		Set DHCP server address pool
<b>domain</b>	<i>&lt;domain name&gt;</i>		Set domain name
<b>exit</b>			Exit or logout
<b>firewall</b>	<i>&lt;value&gt;</i>		Enable/disable firewall ( <b>0/no/off</b> =no, <b>1/yes/on/default=yes</b> )
<b>gateway</b>	<i>&lt;default gateway IP address&gt;</i>		Set LAN IP address that is reachable within IPLAN netmask range (if SkyDSL Router is not being used as gateway)
<b>gateway</b>	<i>&lt;device&gt;</i>		Set gateway to the wan
<b>gateway</b>	<b>default</b>		Set factory default gateway (wan)
<b>help</b>	<b>system</b>		Displays the system help

<b>host</b>	<b>&lt;host name&gt;</b>		Set host name
<b>iplan</b>	<b>&lt;lan ip address/mask length&gt;</b>		Set LAN IP address and mask (format is <i>a.b.c.d/n</i> )
<b>iplan</b>	<b>default</b>		Set LAN IP address and mask to factory default value <b>(192.168.1.1/24)</b>
<b>lan</b>	<b>&lt;value&gt;</b>		LAN network interface control ( <i>&lt;value&gt;</i> = <b>up</b> , <b>down</b> , <b>restart</b> , <b>show</b> , or <b>default</b> ( <b>default</b> resets all LAN settings to their factory values))
<b>log</b>	<b>system</b>	<b>-f</b>	Display log file (-f option displays the log continuously ( <b>CTRL+C</b> exits))
<b>nat</b>	<b>&lt;value&gt;</b>		Enable/disable network address translation ( <b>0/no/off</b> =no, <b>1/yes/on/default</b> =yes)
<b>mcast</b>	<b>&lt;value&gt;</b>		Enable/disable multicast ( <b>0/no/off/default</b> =no, <b>1/yes/on</b> =yes)  <b>Note:</b> After changing the multicast setting you must reboot the SkyDSL Router
<b>passwd</b>			Change your password
<b>ping</b>	<b>&lt;host&gt;</b>		Ping the <i>&lt;host&gt;</i> (ping continues until <b>CTRL+C</b> is pressed)
<b>portfwd</b>			Display current port-forwarding rules
<b>portfwd</b>	<b>activate</b>		Activate port-forwarding configuration to which additions and/or deletions have been made
<b>portfwd</b>	<b>add &lt;protocol&gt; &lt;local port #&gt; &lt;destination IP address&gt;:&lt;destination port #&gt;</b>		Add port-forwarding rule for one port (<protocol> = <b>tcp</b> , <b>udp</b> , or <b>both</b> )
<b>portfwd</b>	<b>add &lt;protocol&gt; &lt;first local port #&gt;-&lt;last local port #&gt; &lt;destination IP address&gt;</b>		Add port-forwarding rule for a range of ports (<protocol> = <b>tcp</b> , <b>udp</b> , or <b>both</b> ). Port range at destination IP address will and must match local port range

<b>portfwd</b>	<b>del &lt;rule number&gt;</b>		Delete a port-forwarding rule
<b>portfwd</b>	<b>flush</b>		Delete all port-forwarding rules
<b>portfwd</b>	<b>on/off</b>		Enable and disable port forwarding
<b>qos</b>	<b>add &lt;service name&gt; to &lt;class&gt;</b>		Add a service to a class
<b>qos</b>	<b>def &lt;service name&gt; &lt;value1&gt; &lt;value2&gt;</b>	<b>rex &lt;# of rexmits&gt;</b>	Define a new service (<value1> = <b>protocol</b> or <b>service</b> ; <value2> = port number(s), ICMP type, or IP address; <# of rexmits> = <b>0–3</b> )
<b>qos</b>	<b>default</b>		Restore default QoS settings
<b>qos</b>	<b>del &lt;service name&gt; from &lt;class&gt;</b>		Delete a service from a class
<b>qos</b>	<b>guarantee &lt;value&gt;</b>		Set the guaranteed allotted bandwidth (in kilobits) for the <b>VITAL</b> class (<value> = <b>1–12</b> )
<b>qos</b>	<b>mod &lt;service name&gt; rex &lt;value&gt;</b>		Modify the number of allowed retransmissions for a service (<value> = <b>0–3</b> )
<b>qos</b>	<b>on</b>		Turn on SkyQoS traffic control
<b>qos</b>	<b>restart</b>		Restart SkyQoS traffic control
<b>qos</b>	<b>status</b>		Display the current status of SkyQoS traffic control ( <b>active</b> or <b>not active</b> )
<b>qos</b>	<b>show &lt;value&gt;</b>		Display a list (<value> = <b>services</b> , <b>classes</b> , or <b>rules</b> )
<b>qos</b>	<b>start</b>		Start SkyQoS traffic control
<b>qos</b>	<b>stats</b>		Display the current bandwidth allotted to the SAMA channel's individual classes, the actual bandwidth used, and the amount of data passed on each class
<b>qos</b>	<b>undef &lt;name&gt;</b>		Undefine a service
<b>reboot</b>			Reboot the SkyDSL Router
<b>rip</b>	<b>&lt;value&gt;</b>		Enable or disable Routing Information Protocol (<value> = <b>1</b> , <b>2</b> , <b>compatible</b> , or <b>off/default/no</b> )

<b>ripmetr</b>	<i>&lt;value&gt;</i>		Set the Routing Information Protocol metric
<b>route</b>			Show all routes
<b>route</b>	<b>add &lt;ip/maskbits&gt; dev &lt;interface&gt;</b>		Add a static route to a device. For example: <b>route add default dev eth0</b>  <b>Note:</b> Route additions will not persist after reboot unless saved with the <b>route save</b> command
<b>route</b>	<b>add &lt;ip/maskbits&gt; via &lt;ip&gt;</b>		Add a static route via an IP address. For example: <b>route add 192.168.10.0/24 via 192.168.0.254</b>  <b>Note:</b> Route additions will not persist after reboot unless saved with the <b>route save</b> command.
<b>route</b>	<b>del &lt;ip/maskbits&gt;</b>		Delete a static route. For example: <b>route del 192.168.10.0/24</b> or <b>route del default</b>  <b>Note:</b> Route deletions will not persist after reboot unless saved with the <b>route save</b> command
<b>route</b>	<b>flush</b>		Delete current static routes  <b>Note:</b> Route deletions will not persist after reboot unless saved with the <b>route save</b> command
<b>route</b>	<b>save</b>		Save current static routes
<b>shutdown</b>			Shut the unit down
<b>snmpaccs</b>			Display current SNMP access settings
<b>snmpaccs</b>	<b>add &lt;access type&gt; &lt;community name&gt; &lt;IP address/mask length&gt;</b>		Add an SNMP access community (<access type> = <b>ro</b> (read-only) or <b>rw</b> (read/write); <community name> = an existing community or a name of your choosing)
<b>snmpaccs</b>	<b>del &lt;access type&gt; &lt;community name&gt; &lt;IP address/mask length&gt;</b>		Delete an SNMP access community (<access type> = <b>ro</b> (read-only) or <b>rw</b> (read/write); <community name> = an existing community or a name of your choosing)

			choosing)
<b>snmpaccs</b>	<b>restore</b>		Restore the community list to factory defaults
<b>tcpdump</b>	<b>&lt;interface&gt;</b>		Dump packets from <b>&lt;interface&gt;</b> ( <b>&lt;interface&gt;</b> = <b>lan</b> or <b>wan</b> ), excluding multicast packets
<b>tcpdump</b>	<b>&lt;interface&gt; host &lt;hostname&gt;</b>		Dump packets from <b>&lt;interface&gt;</b> to <b>&lt;hostname&gt;</b> ( <b>&lt;interface&gt;</b> = <b>lan</b> or <b>wan</b> )
<b>tcpdump</b>	<b>&lt;interface&gt; multicast</b>		Dump all packets on <b>&lt;interface&gt;</b> ( <b>&lt;interface&gt;</b> = <b>lan</b> or <b>wan</b> )
<b>tcpproxy</b>	<b>&lt;value&gt;</b>		Enable/disable TCP acceleration ( <b>&lt;value&gt;</b> = <b>skytcp</b> , <b>nettgain</b> , <b>both</b> , <b>none</b> , or <b>default</b> ) (default is <b>both</b> )
<b>telnet</b>	<b>&lt;hostname&gt;</b>		Telnet to <b>&lt;hostname&gt;</b>
<b>traceroute</b>	<b>&lt;hostname&gt;</b>		Trace the route to <b>&lt;hostname&gt;</b>
<b>undo</b>	<b>upgrade</b>		Remove a previously installed software upgrade and revert to the original version
<b>upgrade</b>	<b>software</b>		Install the latest software upgrade received from the SkyDSL Teleport
<b>uptime</b>			Display the current system time, number of days and hours the system has been up since the last reboot, as well load average statistics for the CPU over periods of 1, 5, and 15 minutes
<b>wan</b>	<b>&lt;value&gt;</b>		WAN network interface control ( <b>&lt;value&gt;</b> = <b>up</b> , <b>down</b> , <b>restart</b> , <b>show</b> )

## Appendix E Internet Browser Proxy Adjustment Procedures

### Microsoft Windows

Following are procedures for adjusting the proxy settings for various versions of Microsoft Internet Explorer, Netscape, and Netscape Navigator in a Microsoft Windows environment. These procedures will enhance compatibility with the SkyDSL Router's Nettgain TCP proxy client (see section 7.1 on page 63 for more information).

#### Microsoft Internet Explorer 5.x and 6.x

- 1) Start Internet Explorer.
- 2) Set the proxy configuration.
  - a) In the **Tools** menu, select **Internet Options**.  
The **Internet Options** dialog box appears.
  - b) Click the **Connections** tab.
  - c) In the **Local Area Network (LAN) settings** area, click **LAN Settings...**.  
The **Local Area Network (LAN) Settings** dialog box appears.
  - d) In the **Automatic configuration** area, click the **Use automatic configuration script** check box.
  - e) In the **Address** text box, enter **http://192.168.1.1/proxy/skydsl.pac** (where **192.168.1.1** is the actual IP address of your SkyDSL Router) and click **OK**.  
The **Local Area Network (LAN) Settings** dialog box closes, and the **Internet Options** dialog box reappears.
  - f) Click **OK**.  
The **Internet Options** dialog box closes, and Internet Explorer accepts the new proxy setting.

#### Microsoft Internet Explorer 4.x

- 1) Start Internet Explorer.
- 2) Set the proxy configuration.
  - a) In the **View** menu, select **Internet Options**.  
The **Internet Options** dialog box appears.
  - b) Click the **Connections** tab.
  - c) In the **Automatic configuration** area, click **Configure...**.  
The **Automatic Configuration** dialog box appears.

- d) In the **URL:** text box, enter **http://192.168.1.1/proxy/skydsl.pac** (where **192.168.1.1** is the actual IP address of your SkyDSL Router) and click .

The **Automatic Configuration** dialog box closes, and the **Internet Options** dialog box reappears.

- e) Click .

The **Internet Options** dialog box closes, and the Internet Explorer accepts the new proxy setting.

### Netscape 6.x and 7.x

- 1) Start Netscape.

- 2) Set the proxy configuration.

- a) In the **Edit** menu, select **Preferences**.

The **Preferences** dialog box appears.

- b) In the **Category:** tree, expand the **Advanced** category by clicking the arrow () to its left.

- c) Under the **Advanced** category, select **Proxies**.

- d) Click the **Automatic proxy configuration URL:** radio button ()

- e) In the text box, enter **http://192.168.1.1/proxy/skydsl.pac** (where **192.168.1.1** is the actual IP address of your SkyDSL Router) and click .

- f) Click .

The **Preferences** dialog box closes, and Navigator accepts the new proxy setting.

### Netscape Navigator 4.x

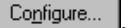
- 1) Start Navigator.

- 2) Set the proxy configuration.

- a) In the **Edit** menu, select **Preferences**.

The **Preferences** dialog box appears.

- b) In the **Category:** tree, expand the **Advanced** category by clicking the  to its left.

- c) In the **Automatic configuration** area, click .

The **Automatic Configuration** dialog box appears.

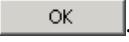
- d) In the **URL:** text box, enter **http://192.168.1.1/proxy/skydsl.pac** (where **192.168.1.1** is the actual IP address of your SkyDSL Router) and click .

The **Automatic Configuration** dialog box closes, and the **Internet Options** dialog box reappears.

- e) Click .

The **Internet Options** dialog box closes, and Netscape accepts the new proxy setting.

### Netscape Navigator 3.x

- 1) Start Navigator.
  - 2) Set the proxy configuration.
    - a) In the **Options** menu, select **Network Preferences**.  
The **Preferences** dialog box appears.
    - b) Select the **Proxies** tab.
    - c) Click the **Automatic proxy configuration** radio button ().
    - d) In the **Configuration location (URL)**: text box, enter **http://192.168.1.1/proxy/skydsl.pac** (where **192.168.1.1** is the actual IP address of your SkyDSL Router) and click .
    - e) Click .
- The **Preferences** dialog box closes, and Navigator accepts the new proxy setting.

### Netscape Navigator 2.x

- 1) Start Navigator.
  - 2) Set the proxy configuration.
    - a) In the **Options** menu, select **Network Preferences**.  
The **Preferences** dialog box appears.
    - b) Select the **Proxies** tab.
    - c) Click the **Automatic proxy configuration** radio button ().
    - d) In the **Configuration location (URL)**: text box, enter **http://192.168.1.1/proxy/skydsl.pac** (where **192.168.1.1** is the actual IP address of your SkyDSL Router) and click .
- The **Preferences** dialog box closes, and Navigator accepts the new proxy setting.



## Appendix F SkyDSL Router Technical Specifications

### Physical Specifications

<b>Dimensions</b>	6.25" x 16.75" x 17" (16cm x 42.5cm x 43cm)
<b>Operating Voltage</b>	90–264 VAC, 50–60 Hz, autosensing
<b>Operating Power</b>	Varies with ODU: 81–105W
<b>Connectors</b>	
<b>SAMA® Tx IF</b>	75 Ω F-type muxed L-band, 10 MHz ref, we VDC @ 1.65 A muxed on Rx IF cable
<b>DVB Rx IF</b>	75 Ω F-type muxed L-band, 19 VDC
<b>10/100 BaseT Ethernet RJ45</b>	
<b>RS232 Serial Port</b>	
<b>LNB Power</b>	19 VDC @ 200 mA muxed on Rx IF cable

### SAMA® Channel Parameters

<b>Multiple Access</b>	Spread ALOHA® Multiple Access (slotted or unslotted)
<b>Modulation</b>	QPSK
<b>SAMA Information Rate</b>	104 kbps
<b>Burst Data Rate</b>	129 kbps
<b>Symbol Rate</b>	64.5 ksps
<b>Spreading</b>	31 chips/bit
<b>IF Bandwidth</b>	2 MHz
<b>Occupied Bandwidth</b>	2.7 MHz
<b>Minimum Eb/No</b>	7dB (for 1% Cell Error Rate)
<b>Operating Eb/No</b>	9 dB (for 1e-5 Cell Error Rate)

### SAMA Transmit Specifications

<b>Protocol</b>	SAMA
<b>Frequency Range</b>	950–1450 MHz
<b>Frequency Step Size</b>	100 kHz
<b>Fine Frequency Adjust Range</b>	±5 kHz
<b>Frequency Stability</b>	±2E-8/month maximum
<b>Offstate Carrier Leakage</b>	40 dBc
<b>Transmit Thermal Noise</b>	-125 dBc/Hz
<b>Output Power</b>	-35 to +5 dBm, 1 dB steps
<b>Output Impedance</b>	75 ohms, -12 dB return loss
<b>Reference Output</b>	10 MHz, +4 dBm to 0 dBm

**DVB Receive Specifications**

<b>DVB Compliant Per ETSI EN 301 192</b>	
<b>Protocol</b>	DVB-S
<b>Data Rate</b>	Nominal 512 kbps per SkyDSL® Router (up to 72 Mbps)
<b>Symbol Rate Range</b>	1–45 Msps
<b>L-band Frequency</b>	95–1450 MHz
<b>DVB Rx IF</b>	75 Ω F-type muxed L-band, 19 VDC
<b>Modulation</b>	QPSK
<b>Reed Solomon</b>	(204, 188)
<b>Forward Error Correction</b>	Convolutional Rate 1/2, 2/3, 3/4, 5/6, 7/8
<b>MPE With Section Packing Support</b>	
<b>8 PID Filters</b>	
<b>Full Line Rate Decoding</b>	
<b>Unicast and Multicast</b>	
<b>Nominal Input Power</b>	$122 + 10 * \text{Log}(\text{DVB Data Rate [bps]}) [\text{dBm}]$
4.9 dB typical @ 1/2 FEC	
5.4 dB typical @ 2/3 FEC	
<b>Eb/No for 10E-7 BER</b>	5.9 dB typical @ 3/4 FEC
6.3 dB typical @ 5/6 FEC	
6.7 dB typical @ 7/8 FEC	

## Appendix G Material Safety Data Sheets

**UNIVERSAL ELECTRONICS, INC.**  
 ELECTRONIC PRODUCTS • PUBLICATIONS  
 4515 Little Savannah Rd, Cullowhee, NC 28723-2648  
 Phone: 828-293-2222 Fax: 828-293-2221

**MATERIAL SAFETY DATA SHEET**

DATE \_\_\_\_\_

BRAND NAME & NUMBER Sealing Compound

MATERIAL DESCRIPTION Mixture of rubber, polybutene, and inert fillers.

**HAZARDOUS INGREDIENTS** NONE

**SECTION II**

CHEMICAL NAME	CAS REGISTRY NUMBER	% BY WEIGHT
1. Butyl rubber	9010-85-9	
2. Aluminum Stearate	637-12-7	
3. Polybutene	8003-29-6	
4. Silica	7631-86-9	
5. Magnesium Silicate	1343-88-0	
6. Carbon Black	1333-86-4	
7.		
8.		
9.		
10.		

**PHYSICAL DATA**

**SECTION III**

Billing Point *F *C (Or range) _____ to _____	NA	Specific Gravity (H <sub>2</sub> O=1) _____ At _____ °F °C	Vapor Pressure (mmHg) _____ At _____ °F °C NA
Percent Volatile by Volume (%) _____ %		Vapor Density (Air=1) _____ At _____ °F °C NA	Evaporation Rate _____ → 1 _____ NA
Volatile Organic Compounds _____ lb./gal.	NA	pH at full strength _____ At recommended dilution _____ NA	Recommended Dilution Ratio Range From _____ /10 _____ /10 NA

Solubility in Water 1. Negligible (<0.1%) 3. Moderate (1-10%) 5. Complete (in all proportions)

Not Soluble 2. Slight (0.1-1 %) 4. Appreciable (>10%)

Appearance and Odor Black tacky mastic, mild odor.

**FIRE AND EXPLOSION HAZARD DATA**

**SECTION IV**

Flash Point (Method Used) <u>365</u> PPM 1. TCC 2. TOC 3. COC 4. PMCC 5. Seta	Flammability Limits Lb. _____ Use. _____ NA	Ignition Temperature ____ °F °C NA
---	--	---------------------------------------

Special Fire and Explosion Hazards Dense black smoke, CO<sub>2</sub>, CO, acrid odor, may cause tearing in e

Extinguishing Media Water; Treat as a Class "A" Fire.

Special Firefighting Procedures None

<b>HEALTH HAZARD DATA</b>		<b>SECTION V</b>				
Threshold Limit Value	NA					
Effects of Overexposure	NA					
Emergency and First Aid Procedures NA						
<b>REACTIVITY DATA</b>		<b>SECTION VI</b>				
Stability:	<input checked="" type="checkbox"/> Stable	<input type="checkbox"/> Unstable	Conditions to Avoid None			
Incompatibility (Materials to Avoid) NA						
Hazardous Decomposition Products Carbon monoxide when burning.						
Hazardous Polymerization:	<input checked="" type="checkbox"/> May Occur	<input type="checkbox"/> No	<input type="checkbox"/> Yes Conditions to Avoid None			
<b>SPILL OR LEAK PROCEDURES</b>		<b>SECTION VII</b>				
Steps To Be Taken In Case Material Is Released Or Spilled NA						
Waste Disposal Method In accordance with local solids disposal practices.						
EPA Hazardous Substance Category (40 CFR 116-117)	X 1.	A 2.	B 3.	C 4.	D 5.	NA 6.
<b>SPECIAL PROTECTION INFORMATION</b>		<b>SECTION VIII</b>				
Respiratory Protection (Specify Type) None needed.						
Ventilation:	<input type="checkbox"/> Local Exhaust	<input type="checkbox"/> Special				
	<input checked="" type="checkbox"/> Mechanical (General)	<input type="checkbox"/> Other				
Protective Gloves	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	Specify			
Eye Protection	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	Specify			
Other Protective Equipment None needed						
<b>SPECIAL PRECAUTIONS</b>		<b>SECTION IX</b>				
Precautions To Be Taken In Handling And Storing		None - Normal bulk storage and handling in accordance with NFPA recommendations.				
Other Precautions None						
<b>LABELING INFORMATION</b>						
DOT Labeling Information (49 CFR 100-199) None						
Proper Shipping Name Sealing Compound, NOIBN						
Hazard Classification: NA						
Label(s) Required: NA						
UN or NA Identification Number UN NA NA NA						
RCRA Information (40 CFR 122-124, 260-265)						
Hazardous Waste Number(s) NA						
Hazard Code(s) NA						
Is the above information based on laboratory tests? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
From supplier of MSDS of raw materials.						

## MATERIAL SAFETY DATA SHEET CROSS DEVICE / STUF

Updated 03/03

Cross Device.  
P.O. BX 574 / Main Road  
Cutchogue, N.Y. 11935

Phone: (631) 298-4517  
Responsibility For MSDS:  
David B. Cross

**Product Identification:**

S.T.U.F. - Dielectric Waterproofing Filler  
(Silica) - (Teflon) - (Unionizing) - (Filler)

**Physical Data:**

Packaging: 3.2 CU.IN. Tube  
Appearance: White Paste  
Volatile: 1% @ 250 Deg. C.  
Use: Waterproofing Filler For Coaxial Connectors  
Water Solubility: Nil

**Fire and Explosion Hazard:**

Flashpoint: 250 Deg. C.

Extinguishing Data: Dry Chemical, Water Spray (fog), Foam or Carbon Dioxide

Special Fire Fighting Procedure: As for petroleum products, use self contained breathing apparatus.

Unusual Fire or Explosion Hazards: Burned Material mixed with water form hydrofluoric acid, wear neoprene gloves when handling fire refuse.

Hazardous Thermal Decomposition Products: Oxides of Carbon, Toxic Gasses: Hydrogen Flouride and Perflouroolefins.

\* ( See First Aid-Inhalation )

**Reactivity Data:**

Stability: Stable

Incompatibility: Strong Oxidizers: Hydrofluoric Acid - Produces toxic gas: Silicon Tetra Flouride. Reacts with molten alkali metals and interhalogen compounds.

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Environmental Data:

Aquatic Toxicity: Prevent Migration of Spilled Material into Sewers or Streams.

Disposal: Dispose of in Sanitary Landfill. Incinerate Only if Incinerator Capable of Scrubbing Out Hydrogen Flouride and other Combustion Products.

=====  
Shipping: Non-Regulated / Not Controlled

=====  
Storage: Store Below 100 Deg. C. To Prevent Product Separation

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Carcinogenicity: None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen. \*(see California note)

=====  
\* CALIFORNIA:  
WARNING: Substances known to the state of California to cause cancer, Birth Defects or other Reproductive harm;  
Tetrafluoroethylene : TEFLON

=====  
Hazard Classifications:

This Product Contains No Known Toxic Chemicals Subject to the Reporting Requirements of Section 313 of the Emergency Planning and Community Right - To - Know Act of 1986 and of 40 CFR 372.

=====  
First Aid:

Skin Contact: This Mixture is not likely to be hazardous by skin contact. Contaminated skin should be washed with soap and water.  
Eye contact: Flush eyes with water. Contact Physician if irritation persists.

Inhalation: Inhalation of fumes from overheating or burning, or from smoking of tobacco or cigarettes contaminated with the product, may cause polymer fume fever. A flu-like illness with chills and fever. Symptoms may not occur for several hours after exposure, and may go away 24-48 hours even in the absence of treatment.

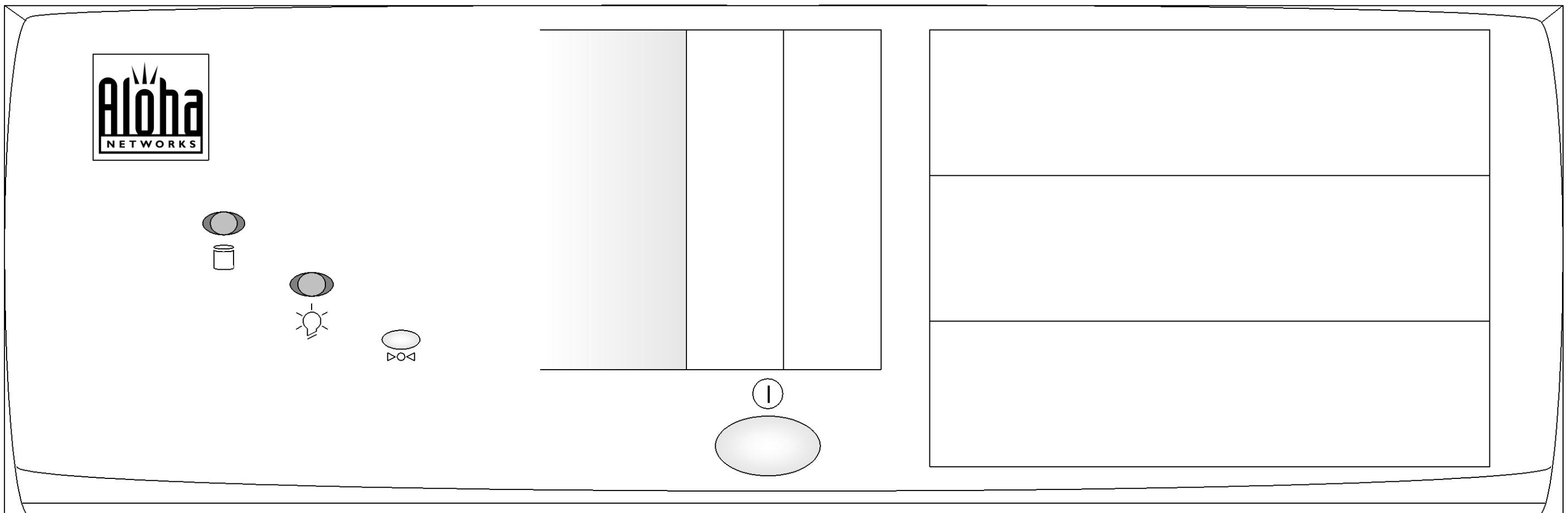
Chronic Effects: None Known

Medical Conditions Aggravated by Exposure: None Known

=====  
Note:

M.S.D.S. Data Based on M.S.D.S. Data on Mixture Ingredients.  
Ingredients are not known to be Reactive nor Form Secondary Compounds;  
Therefore, Component M.S.D.S. Data is Applicable.

## Appendix H SkyDSL Router Front Panel





## Appendix I SkyDSL Router Rear Panel

