

HX System

HX200 Satellite Router Installation Guide

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Understanding safety alert messages

Safety alert messages call attention to potential safety hazards and tell you how to avoid them. These messages are identified by the signal words **DANGER**, **WARNING**, **CAUTION**, or **NOTICE**, as illustrated below. To avoid possible property damage, personal injury, or in some cases possible death, read and comply with all safety alert messages.

Messages concerning personal injury

The signal words **DANGER**, **WARNING**, and **CAUTION** indicate hazards that could result in personal injury or in some cases death, as explained below. Each of these signal words indicates the severity of the potential hazard.



DANGER indicates a potentially hazardous situation which, if not avoided, *will* result in death or serious injury.



WARNING indicates a potentially hazardous situation which, if not avoided, *could* result in death or serious injury.



CAUTION indicates a potentially hazardous situation which, if not avoided, *could* result in *minor or moderate* injury.

Messages concerning property damage

A **NOTICE** concerns property damage only.

A blue rectangular box containing the word "NOTICE" in white, bold, uppercase letters.

NOTICE

NOTICE is used for advisory messages concerning possible property damage, product damage or malfunction, data loss, or other unwanted results—but *not* personal injury.

Safety symbols

The generic safety alert symbol



calls attention to a potential personal injury hazard. It appears next to the **DANGER**, **WARNING**, and **CAUTION** signal words as part of the signal word label. Other symbols may appear next to **DANGER**, **WARNING**, or **CAUTION** to indicate a specific type of hazard (for example, fire or electric shock). If other hazard symbols are used in this document they are identified in this section.

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Chapter 1

Introduction

Scope and audience

This manual explains how to install, commission, and service the Hughes HX200 satellite router.

This manual is intended for use by the following audiences:

- Professional installers
- Installer trainers, who prepare separate instructions for the installers
- Call center operators, who respond to customers' calls
- Call center trainers, who train call center operators

HX200 satellite router overview

The HX200, as shown in Figure 1 on page 2, is a high-performance satellite router designed to support provide carrier-grade IP services using dynamically assigned high-bandwidth satellite IP connectivity. The HX200 supports high-bandwidth links with star capability and quality of service (QoS) features such as Min/Max CIR together with dynamic allocation of bandwidth. With integrated IP features including RIPv1, RIPv2, BGP, DHCP, NAT/PAT, and DNS Server/Relay functionality, together with a high-performance satellite modem, the HX200 is a full-featured IP router. The HX200 enables superior IP connectivity for a variety of applications including:

- Cellular backhaul
- MPLS extension services
- Virtual leased line
- Maritime, air, and ground-based mobile networks

The HX200 satellite router provides two 10/100 LAN ports. The Ethernet LAN port and the 10/100 LAN ports can be connected via a straight-through or crossover Cat-5 cable to a single computer or to an Ethernet hub/switch port.

The HX200 is completely self-contained requiring no external PC to host any functions or software. The software is automatically updated from the Network Operations Center (NOC).

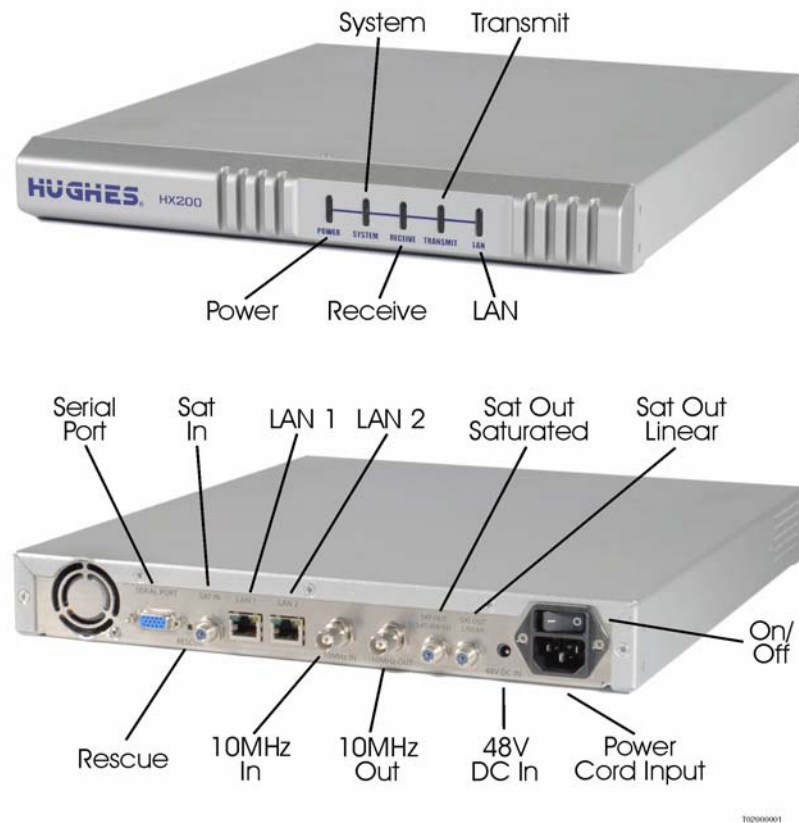


Figure 1: HX200 satellite router (front and back)

An optional rack mount kit is available for the HX200, which allows the HX200 to be installed in an industry standard 19" (0.45 m) rack.

HX200 for stabilized platforms

An enhancement to the HX200 supports stabilized platforms for the Coastal Maritime Service. In this capacity the HX200 uses either the Seatel DAC 220 antenna or the Azimuth KNS-150 antenna.

HX200 features

A low cost self-hosted device HX terminal with MIPS processor.

- Transmission types:
 - Linear Ku-band
 - Linear C-band

- Saturated Ku-band
- Saturated C-band
- DVB-S and DVB-S2 compliant outroutes
- Mobility

The HX200 satellite router provides support for the following capabilities:

- L-band transmitter
- Serial NMEA interface to global positioning system (GPS)
- Inroute spreading
 - 256 Ksps X 2
 - 256 Ksps X 4
 - 512 Ksps X 2
 - 512 Ksps X 4
 - 1024 Ksps X 2
 - 1024 Ksps X 4
 - 2048 Ksps X 2

Transmission types The HX200 supports both saturated and linear transmit outdoor units (ODUs).

Table 1: Radios and LNBs

Description	Vendor	Hughes product number
Saturated Ku-Band Radios		
TG 2W, 2M. DOM	HNS	1500192-0221
TG 2W, 1M, EUT	HNS	1500192-0122
TG 2W, 1M, INT	HNS	1500192-0123
1W Pure Anubis/LNB/Tria	HNS	1500172-0101
2W Pure Anubis/LNB/Tria	HNS	1500172-0102
Saturated C-Band Radios		
2W MTI (India-C)	HNS	1028050-0006
2W MTI (Extended-C)	HNS	1036720-0001
Linear Ku-Band Radios		
1W Linear BUC	NJRC / NJT5115F	9506265-0001
2W Linear BUC	NJRC / NJT5037F	9506221-0001
3W Linear BUC	NJRC / NJT5116F	9506252-0001
4W Linear BUC	NJRC / NJT5017FL	9502667-0002
4W Linear BUC/Tria/LNB	Andrew Corp / DRU15F16HX	1502302-0001
6W Linear BUC	NJRC / NJT5127N	9505264-0001
8W Linear BUC	NJRC / NJT5118N	9506220-0001

Table 1: Radios and LNBs (Continued)

Description	Vendor	Hughes product number
Linear C-Band Radios		
5W Linear BUC	NJRC / NJT5669F	9502666-0001
10W Linear BUC	NJRC/ NJT5762N	9506222-0001
Ku-Band Low Stability LNBs		
Dom/Intl LNB	MTI	1500320-0006
Intelsat	MTI	1500287-0001
AsiaSat/Eutelsat	MTI	1500287-0003
Universal Ku-Band LNB	Invacom	1501882-0002
C-Band Low Stability LNBs		
Extd C-Band LNB	MTI	1024573-0001
India C-Band LNB	HNS (MTI)	1024573-0002
Ku-Band Internal PLL (High Stability) LNBs		
Universal Ku Band HS LNB	ASC / 1501654-0001	
Ku-Band External Reference PLL LNBs		
Domestic Ku Band PLL LNB	Invacom / SPV-65SM	1502442-0002
Intelsat Ku Band PLL LNB	Invacom / SPV-55SM	1502442-0001
Asia/Eutelsat Ku Band PLL LNB	Invacom / SPV-75SM	1502442-0003
C-Band External Reference PLL LNBs		
C Band PLL LNB	Norsat / 3020XF	1502443-0001

DVB-S2 compliant outroute The HX200 receives a single Digital Video Broadcast - second generation (DVB-S2) compliant outroute.

Mobility The HX200 provides doppler compensation for radial speeds up to 150 mph.

Signal and data interfaces The following signal and data interfaces are supported:

- Dual 10/100 Ethernet LAN ports with Auto-MDIX support, configurable as a two-port switch or as two independent LAN segments
- EIA-232 receive and transmit ports for control signaling in Maritime applications
- EIA-232 receive and transmit ports for communication to a GPS terminal
- 10MHz reference circuitry allows simultaneous receive and transmit of 10MHz reference to/from the rear panel
 - 10 MHz reference clock output
 - 10 MHz reference clock input

- 100 to 253 V AC input through detachable power cord
- 48 V power supply DC voltage input port for supporting > 5 W radios

HX200 specifications

Physical, satellite, and mechanical specifications Table 2 lists the physical, satellite, and mechanical specifications for the HX200 satellite router.

Table 2: HX200 satellite router specifications

Product element	Specification
Physical Interfaces	
	Two 10/100 BaseT Ethernet LAN RJ45 ports (independent subnets)
	One Serial Port (RS-232)
Satellite Specifications	
Outbound Channel	DVB-S2 with Adaptive Coding and Modulation
Outbound Rate	1-45 Msps (in 0.5 Msps steps)
Outbound Modulation	QPSK, 8PSK (Adaptive Modulation)
Outbound Coding	BCH with LDPC 3/5, 1/2, 2/3, 3/4, 5/6, 8/9, 9/10 (Adaptive Coding)
Inbound Channel	IPoS (FDMA/TDMA)
Inbound Channel Rate	256, 512, 1024, 2048, 4096, 6144 kbps
Inbound Channel Modulation	OQPSK
Inbound Channel Coding	Rate 1/2, 2/3, 4/5 with TurboCode (Adaptive Coding)
Bit Error Rate (Receive)	10^{-7} or better
Bit Error Rate (Transmit)	10^{-5} or better
Interface to ODU	Industry standard BUC qualified by Hughes (L-Band) or Hughes saturated carrier BUC
Mechanical and Environmental	
Weight	5.5 lb (2.5 kg)
Height	1.5 inches (3.8 cm)
Width	12.5 inches (32 cm)
Depth	15 inches (38 cm)
Safe operating temperature range	5 to 40°C (Above 5000 ft altitude, reduce maximum temperature by 1°C per 1000 ft)
Safe operating humidity range	5% to 95% non-condensing
Safe altitude	10,000 ft
Cooling method	Dual fan
Protocol support	TCP/IP (Transmission Control Protocol/Internet Protocol) protocol suite

Transmitter and receiver specifications Tables 3 and 4 list the HX200 transmitter specifications and receiver specifications, respectively.

Table 3: HX200 Transmitter Specifications

Property	Value
Linear transmit radio	
L-band output frequency range	950 — 1700 MHz
	L-band output with OQPSK modulation
Supported inroutes	Up to 6 MSPS turbo coded inroutes
	Designed to operate with commercially off-the-shelf L-band linear BUCs qualified by HNS
IPoS output frequency ranges	<ul style="list-style-type: none"> • 107.42187 - 113.28125 MHz inclusive • 81.25 - 89.236 MHz inclusive • 105.078125-109.765625 MHz • 230.46875 - 234.375 MHz inclusive
Frequency step size	100 Hz
Maximum RF output power	0 dBm at 0 dB TX attenuation
IF coaxial Interface	F-type female connector
IF impedance	75 ohm
Transmit power control range	40 dB in 0.5 dB increments

Table 4: HX200 Receiver Specifications

Property	Value
IFL cable	Accepts block down-converted TDM signal via the IFL cable
Input frequency range	950 MHz - 2150 MHz
	QPSK and 8PSK with DVB-S2
	DVB-S2 reception up to 45 Msps BCH and LDPC decoding
IF coaxial interface	F-type female connector
IF impedance	75 ohm
Minimum input level	-74 dBm (per carrier at 1 Msps)
Maximum input level	-20 dBm (per carrier at 45 Msps); -8 dBm (composite) (When using a 1.8m or larger antenna with this indoor unit (IDU), use 100 ft minimum of RG-11 IFL cable.)

DVB-S2 compliant outroute rates and ratios The HX200 receives a single Digital Video Broadcast - second generation (DVB-S2) compliant outroute as defined in Table 5.

Table 5: Outroute rates and ratios

Encapsulation	Signaling Rates	Modulation	FEC Mode	Rate	BER/PER	Acquisition (sec)
DVB-S2	1 – 4 Msps (in 1 Msps steps)	<ul style="list-style-type: none"> • QPSK • 8-PSK 	LDPC/BCH Short and Normal FEC frame	<ul style="list-style-type: none"> • 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10** • 3/5, 2/3, 3/4, 5/6, 8/9, 9/10** 	QEF PER < 1E-7	10
DVB-S2	5-35 Msps (in 1 Msps steps)	<ul style="list-style-type: none"> • QPSK • 8-PSK 	LDPC/BCH Short and Normal FEC frame	<ul style="list-style-type: none"> • 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10** • 3/5, 2/3, 3/4, 5/6, 8/9, 9/10** 	QEF PER < 1E-7	1
DVB-S2	35-45 Msps (in 1 Msps steps)	<ul style="list-style-type: none"> • QPSK • 8-PSK 	LDPC/BCH Short FEC frame	<ul style="list-style-type: none"> • 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9 • 3/5, 2/3, 3/4, 5/6, 8/9 	QEF PER < 1E-7	1
DVB-S2	35-45 Msps (in 1 Msps steps)	<ul style="list-style-type: none"> • QPSK 	LDPC/BCH Normal FEC frame	<ul style="list-style-type: none"> • 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 	QEF PER < 1E-7	1

** 9/10 supported for Normal codeblock only.

The HX200 supports Constant Coding and Modulation (CCM) and Adaptive Coding and Modulation (ACM) on the outroute.

Installation and commissioning

The installation and commissioning of the HX200 satellite router is a multi-step process. The workflow and chapter reference numbers for the process steps follow.

1. Preparing the satellite router for installation
Chapter 2 on page 11
2. Assembling the HX200 satellite router
Chapter 2 on page 11
3. Commissioning the HX200 satellite router
Chapter 3 on page 21
4. Connecting the satellite router to a computer
Chapter 4 on page 55

Commissioning is the process of registering an HX200 satellite router for service. During the commissioning process you may use auto selection or manual entry of parameters.

- Auto Selection - Allows you to choose the Network Access Provider (NAP) from a predetermined list of providers. Many of the commissioning parameters are automatically configured for the provider chosen.
- Manual Entry - This mode requires you to enter all parameters manually.

Contact information

If you experience installation problems with the HX200 satellite router, try the *Diagnostic Utilities* on page 64.

For warranty or repair support, the contact information varies depending on the location. If the customer needs service, warranty or repair support, they should contact their customer service representative in accordance with their service agreement.

Table 6: Radios and LNBs

Description	Vendor	Hughes product number
Saturated Ku-Band Radios		
TG 2W, 2M. DOM	HNS	1500192-0221
TG 2W, 1M, EUT	HNS	1500192-0122
TG 2W, 1M, INT	HNS	1500192-0123
1W Pure Anubis/LNB/Tria	HNS	1500172-0101
2W Pure Anubis/LNB/Tria	HNS	1500172-0102
Saturated C-Band Radios		
2W MTI (India-C)	HNS	1028050-0006
2W MTI (Extended-C)	HNS	1036720-0001
Linear Ku-Band Radios		
1W Linear BUC	NJRC / NJT5115F	9506265-0001
2W Linear BUC	NJRC / NJT5037F	9506221-0001
3W Linear BUC	NJRC / NJT5116F	9506252-0001
4W Linear BUC	NJRC / NJT5017FL	9502667-0002
4W Linear BUC/Tria/LNB	Andrew Corp / DRU15F16HX	1502302-0001
6W Linear BUC	NJRC / NJT5127N	9505264-0001
8W Linear BUC	NJRC / NJT5118N	9506220-0001
Linear C-Band Radios		
5W Linear BUC	NJRC / NJT5669F	9502666-0001

Table 6: Radios and LNBs

Description	Vendor	Hughes product number
10W Linear BUC	NJRC/ NJT5762N	9506222-0001
Ku-Band Low Stability LNBs		
Dom/Intl LNB	MTI	1500320-0006
Intelsat	MTI	1500287-0001
AsiaSat/Eutelsat	MTI	1500287-0003
Universal Ku-Band LNB	Invacom	1501882-0002
C-Band Low Stability LNBs		
Extd C-Band LNB	MTI	1024573-0001
India C-Band LNB	HNS (MTI)	1024573-0002
Ku-Band Internal PLL (High Stability) LNBs		
Universal Ku Band HS LNB	ASC / 1501654-0001	
Ku-Band External Reference PLL LNBs		
Domestic Ku Band PLL LNB	Invacom / SPV-65SM	1502442-0002
Intelsat Ku Band PLL LNB	Invacom / SPV-55SM	1502442-0001
Asia/Eutelsat Ku Band PLL LNB	Invacom / SPV-75SM	1502442-0003
C-Band External Reference PLL LNBs		
C Band PLL LNB	Norsat / 3020XF	1502443-0001

Chapter 2

Assembling and connecting HX200 hardware

This chapter explains how to assemble and make the connections to the HX200 satellite router.

Preparing for the installation

Items required for installation

To install an HX200 satellite router, first ensure that you have the following items listed below:

- HX200 satellite router
- Power cord
- *SBC.cfg* file (if you are instructed to upload it)
- Installation specification or work order

Items required for stabilized platforms

If you installing the HX200 for a stabilized platform, you will need the items listed below:

Seatel antenna

Components provided by Hughes:

- NMEA cables and RS232/RS422 converter - Part Numbers: 1502199-0001 and 1502200-0001.
- RX Lock/TX Mute Cable - Part Number: 1502198-0001
- 48V Power supply
- IFL (F connectors) for RX and TX interconnect between the HX200 and the ACU
- Mounting kit for the terminal mounting strip.
- Mounting kit for the splitter.

For all other information regarding the Seatel install, refer to the ***Installation and Operation Manual for the Sea Tel Model DAC-2202 Antenna Control Unit (Document No. 126523 Revision D).***

Azimuth antenna

Components provided by Hughes:

- NMEA cables and RS232/RS422 converter - Part Number: 1502035-0001

- RX Lock/TX Mute Cable - Part Number: 1502036-0001
- Diagram
- IFL (F connectors) for RX and TX interconnect between the HX200 and the ACU

For all other information regarding the Azimuth install, refer to the *A117 3 Axis Stabilizer Installation and Operations Manual (Version 2.0)*.

Confirming installer laptop and site requirements

Before installing the HX200, you must confirm that the installer laptop and the computer at the installation site meet specific requirements.

Installer laptop requirements

The installer laptop must meet the following requirements:

- Ethernet-enabled network interface card (NIC) and Ethernet cable.
- Operating system with graphical user interface, such as Windows, Linux with X Windows, or Mac OS X; and with TCP/IP protocol support and client-side DHCP enabled. See Appendix A – *Configuring a Windows computer to support DHCP*, on page 105.
- A Web browser such as Internet Explorer with proxy settings disabled. See Appendix C – *Disabling a Web browser proxy connection*, on page 121.
- The latest version of the *sbcr.cfg* file (if instructed to install it).

Remote site requirements

IP devices connected to an HX200 satellite router must implement the standard TCP/IP stack and provide an Ethernet interface; otherwise there is no constraint to the platforms and operating systems of devices attached to the satellite routers.

For example, PCs, MACs, SPARC and Alpha workstations, AS400 systems, and so on, can all be used on LANs connected to an HX200 satellite router, running operating systems such as Windows, Linux, Solaris, MAC OS X, AIX, VMS and others..



Note: Prior to beginning the installation, confirm that the installer laptop is configured to support DHCP. See Appendix A – *Configuring a Windows computer to support DHCP* for instructions on configuring DHCP on a Windows computer.

CAUTION



- Do not block any ventilation openings. Do not install near heat sources, such as radiators, heat registers, ovens, stoves, or other apparatus (including amplifiers) that produce heat.
 - To ensure ventilation and prevent overheating, leave six inches of space between the front and rear panels of the satellite router assembly and any adjacent equipment or structure. Ventilation is necessary to avoid overheating.
-

Conducting the site survey

Survey the installation site to confirm that it fulfills all the requirements for using the HX system service. This includes confirming that there is an unobstructed line-of-sight to the appropriate satellite.

Additionally, review the installation specification or work order for site-specific instructions.

Connecting the receive and transmit cables

Connect the receive cable to the Satellite In connector on the HX200 satellite router as shown in Figure 2.

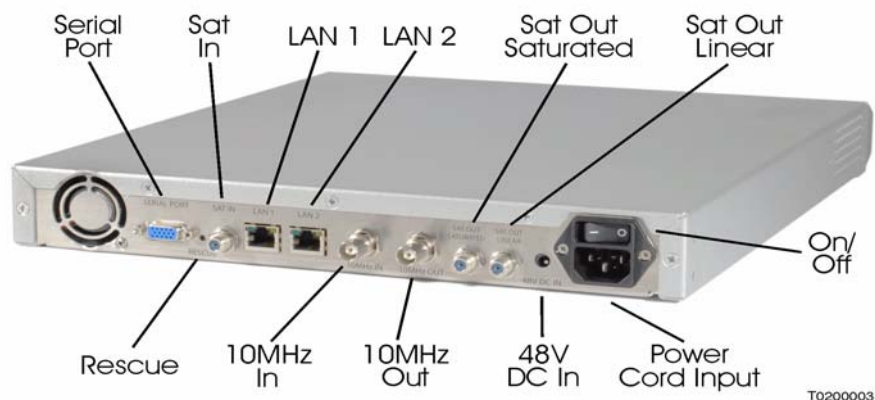


Figure 2: Connecting the receive and transmit cables to the satellite router

The HX200 offers three radio transmit options: Ku-band, saturated, or linear.

Connecting radio cables

Take precautions when connecting the radio cables as there are potential ramifications to both software and hardware if a cable is secured to the incorrect output connector or if cables are connected to both outputs. For instance, a **Linear Radio** transmit

cable should *not* be connected to the **Sat Out Saturated** connector on the back of the HX200 satellite router.

 **CAUTION**



Do not connect or disconnect a radio cable while the IDU is powered on; this action may result in damage to the BUC.

 **CAUTION**



Caution: The transmit and receive cable connectors must be securely tightened.

- **Make sure each connector is properly aligned (not cross-threaded).**
 - **Finger tight with no connector play is adequate.**
-



Note: The satellite router may operate correctly when first installed even if the transmit and receive cable connectors are not adequately tightened. However, problems could develop later. Therefore, correct operation of the satellite router is not an indication that the cables are adequately tightened.

Use either the Manual Commissioning screen or one of the Satellite Based Commissioning screens to select the radio type as described in Chapter 3 – *Commissioning the HX200 satellite router* on page 21. You may select only one radio transmit option at any time.

Connecting the Ethernet and power cables

Select a location for the satellite router that accommodates all required cable connections, including the power source.

Using Figure 2 as a reference, connect the Ethernet cable:

1. Place the satellite router in the desired installation location.
2. Connect the installer PC to the satellite router with an Ethernet cable. Make sure no Ethernet routers or switches are currently connected between the satellite router and the installer PC.
3. Connect the power cable.



Note: A surge protector is recommended.



Note: Do not connect any devices to the HX200 at this time. Connect serial and Ethernet devices to the device only after it is fully installed and commissioned.

CAUTION



Do not connect or disconnect the Tx or Rx IFL cable while the IDU is powered on; this action may result in damage to the BUC, LNB and/or IDU.

Serial port interface connections

Figure 3 shows signals supported by the HX200 for the control and status of servo actuated antenna systems.

HX200 Rear View

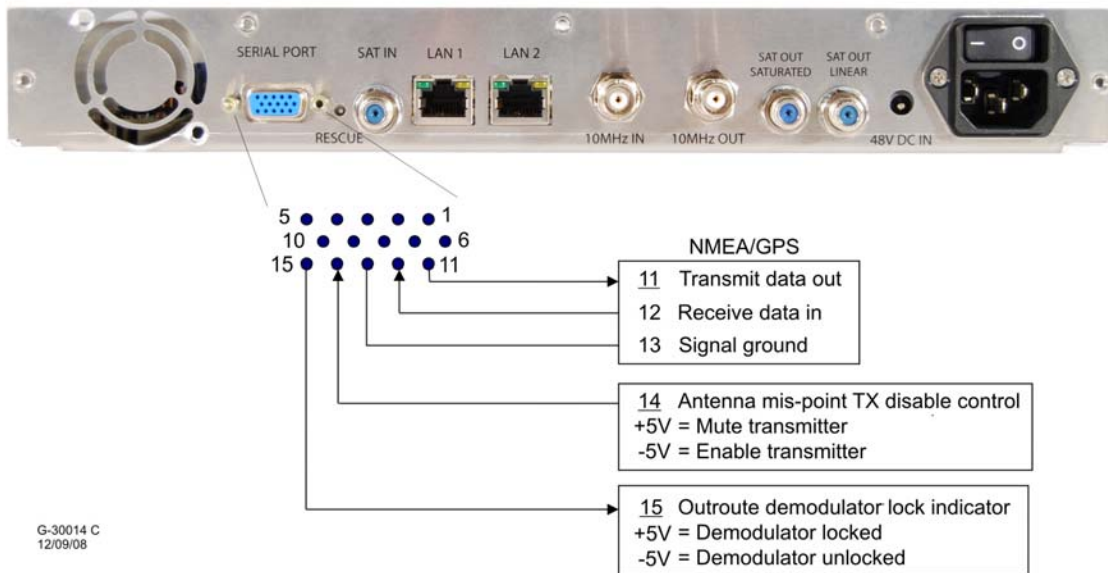


Figure 3: HX200 antenna signals

Signal details are as follows:

- Signals: on pins 14 and 15 of the Serial2 female-D connector at the rear of the unit
- Interface: RS232 electrical levels
- 15kV ESD protection
- Suggested maximum cable length: not to exceed approximately 150 ft
- Antenna mis-point transmitter disable control
 - Input to HX200 on serial port pin 14

- This HX200 input signal is used to indicate the antenna system has detected a mis-point
- The HX200 disables its transmitter within 45 milliseconds after this signal transitions from -5 volts to +5 volts
- The HX200 enables its transmitter within 45 milliseconds after this signal transitions from +5 volts to 15 volts
- This signal defaults to transmit enable in the absence of external connection
- HX200 demodulator lock indicator
 - Output from the HX200 on serial port pin 15
 - This HX200 output signal is used to indicate to the antenna system the current status of the HX-200 demodulator
 - Signal reaction time to demodulator lock state change - nominally 20 milliseconds
 - Demodulator lock is indicated by +5 volts
 - Demodulator unlock is indicated by -5 volts
 - +5V volts is output on this signal with SQF values from 31-99
 - -5V volts is output on this signal with SQF values from 1-30
- NMEA/GPS serial data interface
 - Transmit data from the HX200 on pin 11
 - Receive data to the HX200 on pin 12
 - Signal ground on pin 13

Connecting the hardware for stabilized platforms

The hardware components for stabilized platforms can be assembled in one of two configurations as shown in Figure 4 on page 17 and Figure 5 on page 18. Select the correct configuration for your site and assemble according to the following figures based on whether a Seatel or Azimuth antenna is deployed with the HX200.

Follow all installation and safety instructions in the ***Installation and Operation Manual for Sea Tel Model DAC-2202 Antenna Control Unit*** (Document No. 126523, Revision D) or the ***A117 3***

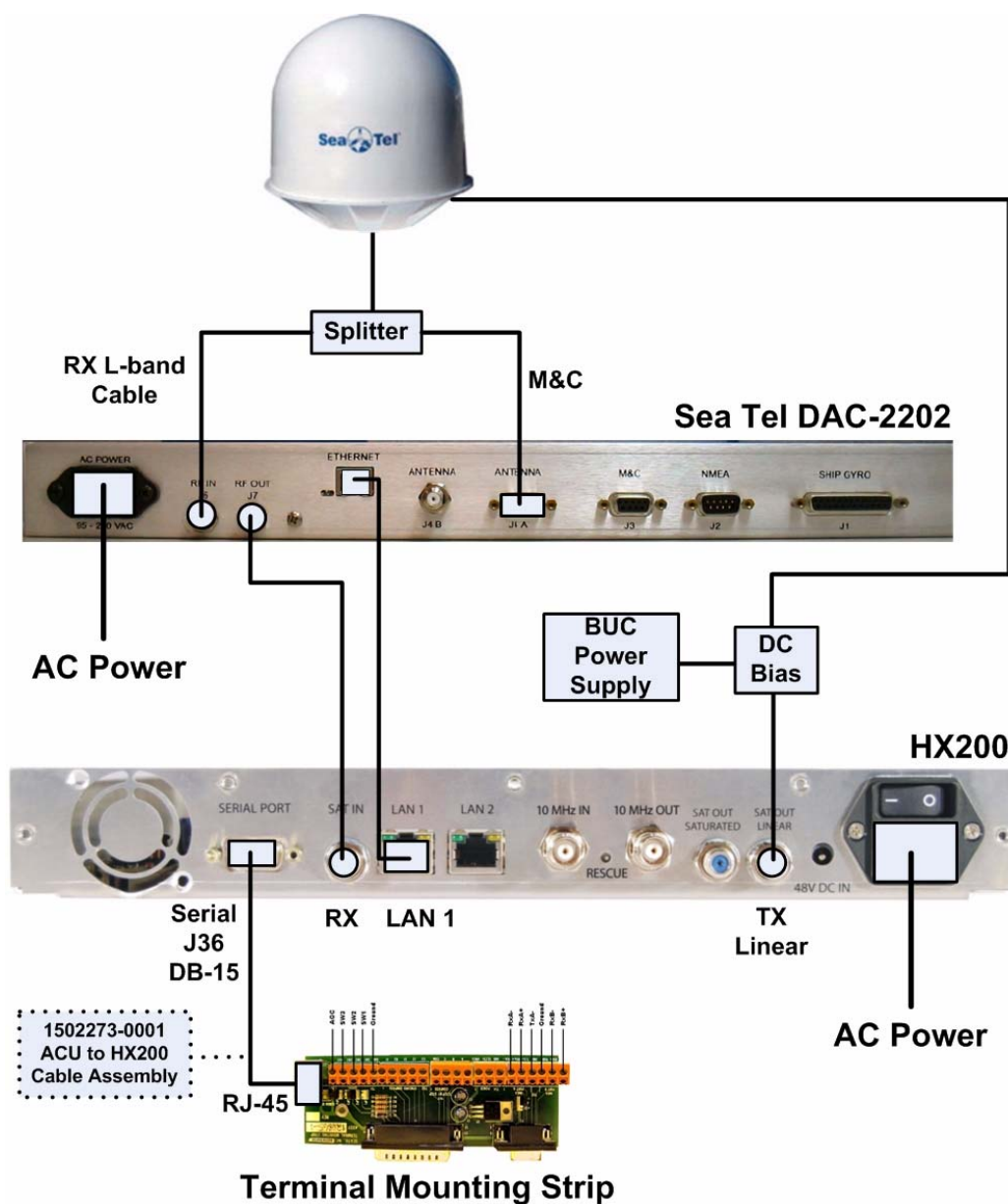


Figure 4: Connecting the hardware components - Seatel DAC 2200 configuration

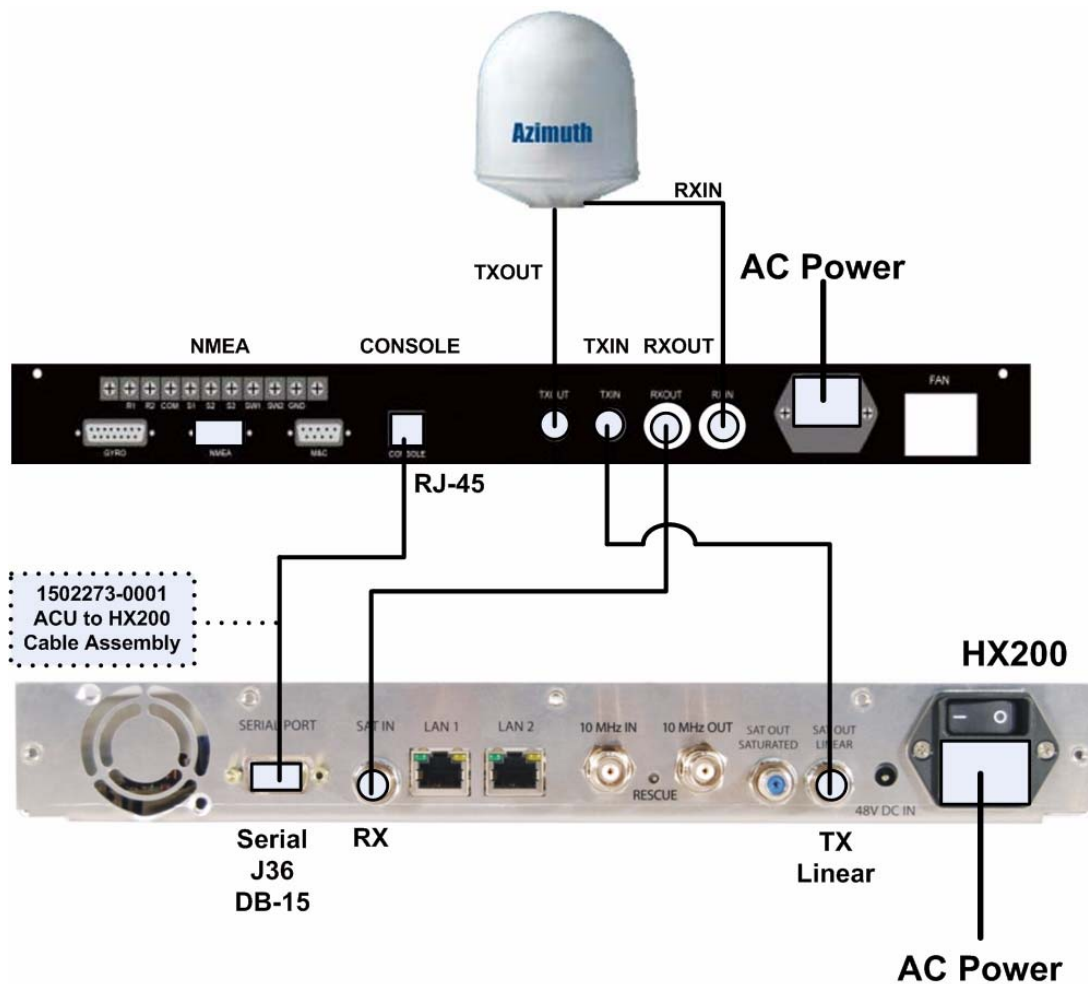


Figure 5: Connecting the hardware components - Azimuth KNS-150 configuration

Powering up and observing the LEDs

Turn the AC power switch located on the satellite router to ON.

When power is applied to the HX200, or after it resets, the satellite router light-emitting diodes (LEDs) will light in the following sequence.

1. All LEDs illuminate for 1/2 second.
2. The Power LED lights up steadily, indicating that the HX200 is powered up.

3. The LAN LED lights up within 30 seconds, indicating that LAN connectivity is detected.
4. The Power LED blinks, indicating that the unit is not commissioned and therefore is running *fallback.bin* rather than *main.bin*.



Note: In countries outside North America, the HX200 may be plugged directly into a 240V outlet with a replacement power cord. Different countries may have different standards and requirements.

CAUTION



- To remove power from a satellite router, turn the power switch to the OFF position.
 - Satellite routers must be used with 100/240-volt AC Input.
 - If the satellite router is installed in any country outside the United States and Canada, always observe the power standards and requirements of that country.
-

Stabilized platforms Refer to the *Installation and Operation Manual for Sea Tel Model DAC-2202 Antenna Control Unit* (Document No. 126523, Revision D) or the *A117 3 Axis Stabilizer Installation and Operations Manual* (Version 2.0) for detailed installation instructions.

Chapter 3

Commissioning the HX200 satellite router

This chapter explains how to register or *commission* a satellite router for service. Procedures are provided for the following commissioning methods:

- *Manual commissioning* on page 21
- *Satellite-based commissioning* on page 37



Note: The procedures in this chapter assume that a Windows computer is used to commission the satellite router. If a different platform is used, substitute commands appropriate to that platform.

Manual commissioning

The most common method of commissioning the satellite router is manual commissioning. Manual commissioning assumes the HX200 satellite router has already been pre-configured at the NOC, the outdoor unit (ODU) and indoor unit (IDU) have been successfully installed, and the dish is pointed correctly. If all the above conditions are met, you can manually commission the router. The router can be commissioned through the Manual Commissioning Web Interface using any computer that has an Ethernet port and an HTTP browser installed on it.

The following configuration for the installer laptop is recommended:

- Windows 2000 or higher
- Ethernet card or Ethernet port connected directly to the VSAT and set to **Auto-Negotiate**
- TCP/IP settings for the Ethernet card set to **Obtain an IP address automatically** and **Obtain DNS server address automatically**
- Firewall software (such as Norton Internet Security) disabled since these may interfere with commissioning by not allowing execution of CGI scripts
- Internet Explorer 5.5 or later, configured as follows:

- Under **Tools** → *Internet Options* → *General Tab* → *Settings* → Check for newer versions of stored pages, select the *Every Visit to the Page* option.
- Under **Tools** → *Internet Options* → *Connections Tab* verify that *Never dial a connection* is selected.
- Under **Tools** → *Internet Options* → *Connections Tab* → *LAN Settings* verify that all checkboxes are unchecked.
- Browsers supported: Internet Explorer 5.0 (or higher), Netscape 6.0 (or higher), and Mozilla Firefox 1.0.2 (or higher)

The manual commissioning process consists of the following tasks:

- *Accessing the manual commissioning interface*
- *Antenna pointing*



Note: The satellite router's serial number must be loaded at the system gateway by an HX system operator in order to complete the manual commissioning process.

Accessing the manual commissioning interface

Follow these steps to access the manual commissioning interface:

The Manual Commissioning interface can be accessed from any browser as follows:

1. Type the following URL to navigate to the Advance page:
`http://192.168.0.1/fs/advanced/advanced.html`

2. Click the **Setup** link (Figure 6) to display the Setup page shown in Figure 7.

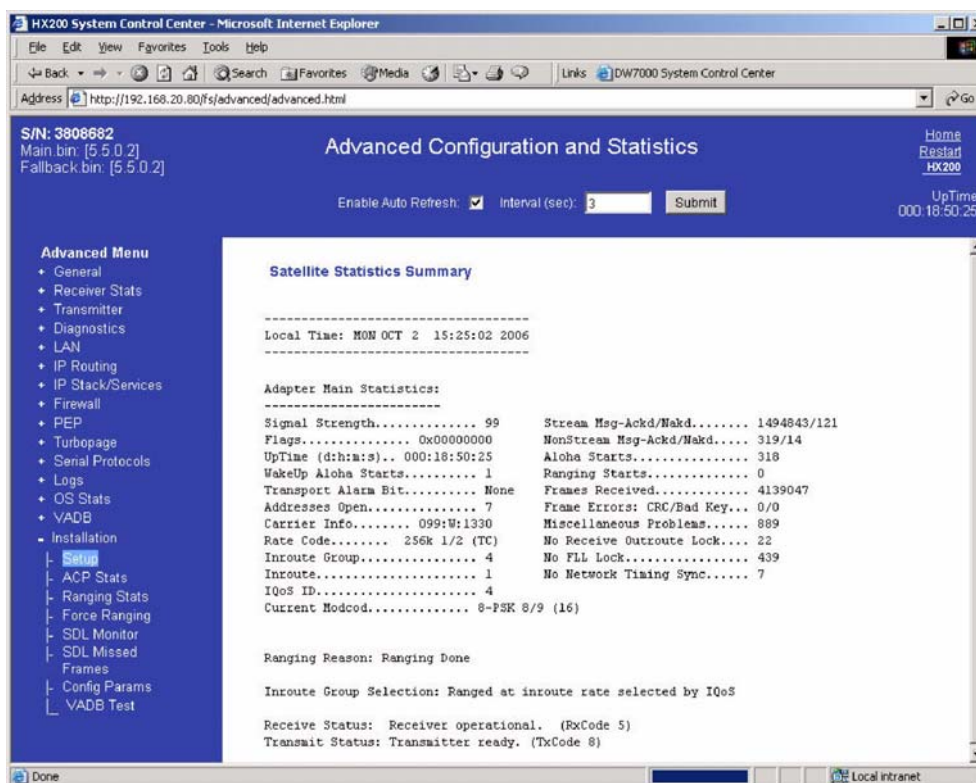


Figure 6: Advance page

3. Click the **VSAT Manual Commissioning** link on the Setup page (Figure 7) to display the HX200 Manual Commissioning Page as shown in Figure 8.

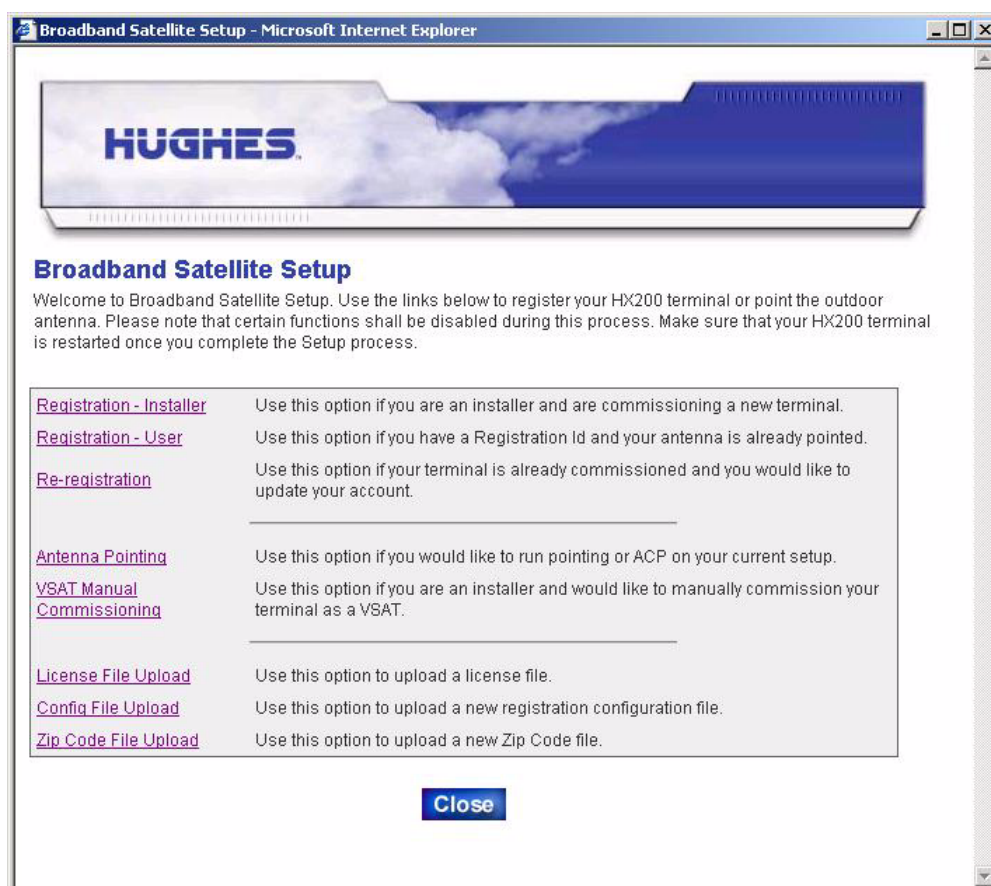


Figure 7: Commissioning Setup page

Alternately, you can navigate to the Terminal Manual Commissioning Page from the System Control Center as follows:

- a. Type the following URL:
http://192.168.0.1
- b. When running fallback, click the **Advanced Commissioning Options** link.
- c. Click the **VSAT Manual Commissioning** link on the Setup page as shown in Figure 7.
4. Enter or select the appropriate parameters. These parameters may be provided to you in an installation specification, work order, or in another form of communication from the installation point-of-contact.

The parameters on the Manual Commissioning page are divided into the following six sections as shown in Figure 8:

- Satellite Parameters
- VSAT parameters
- LAN Parameters
- Management Parameters
- Receive Radio Parameters
- Transmit Radio Parameters

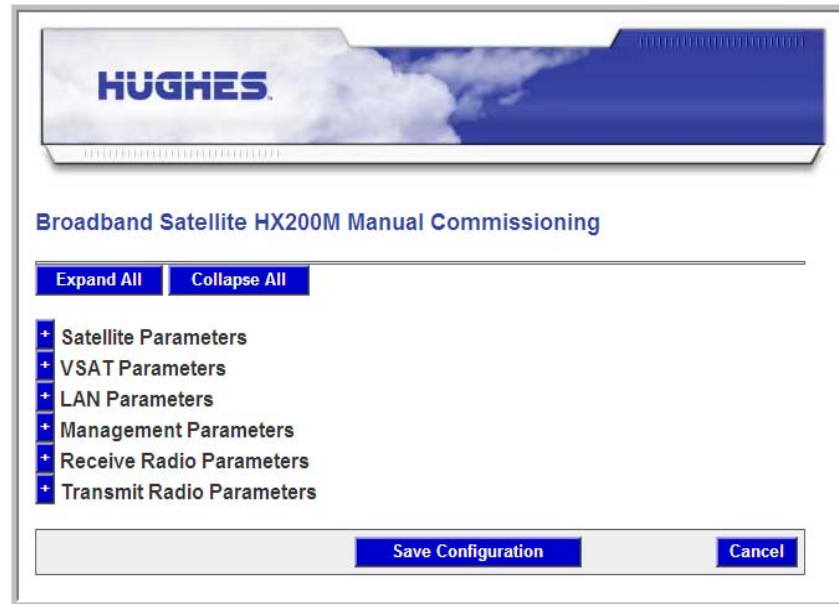


Figure 8: Broadband Satellite HX200 Manual Commissioning screen

5. As an example, enter or select the appropriate section by clicking the + sign to expand the category as shown Figure 9.

HUGHES

Broadband Satellite HX200M Manual Commissioning

Expand All **Collapse All**

+ Satellite Parameters
- VSAT Parameters
+ LAN Parameters
+ Management Parameters
+ Receive Radio Parameters
+ Transmit Radio Parameters

	Degree	Minute	Hemisphere		Degree	Minute	Hemisphere
Longitude	77	12	West	Latitude	39	6	North

Save Configuration **Cancel**

Figure 9: Expanded categories

After entering the information for all sections, click **Save Configuration**.

The terminal reboots after saving the configuration.



Note: Clicking the **Cancel** button discards all the changes and closes the Manual Commissioning page.



Note: If an incorrect value is entered for any field on the Manual Commissioning page, an error message displays and the form cannot be submitted until the error is corrected.

Entering Satellite Parameters These parameters are used to lock the tuner and the demod to the outroute. The following parameters must be entered (Figure 10). Use your work order to enter these parameters.

The screenshot shows the 'Broadband Satellite HX200M Manual Commissioning' window. At the top is the Hughes logo. Below it are 'Expand All' and 'Collapse All' buttons. The 'Satellite Parameters' section is expanded, showing the following fields:

DVB Framing Mode	DVB-S2-ACM	Longitude [Degree/Hemisphere]	113	West
Symbol Rate [Sps]	1000000	Frequency [x 100Khz]	12346	
Receive Polarization	Horizontal/Left	OTA Frequency [x 100Khz]	0	
Transmit Polarization	Horizontal/Left			

Below the Satellite Parameters section are links for VSAT Parameters, LAN Parameters, Management Parameters, Receive Radio Parameters, and Transmit Radio Parameters. At the bottom are 'Save Configuration' and 'Cancel' buttons.

Figure 10: Satellite Parameters section

- DVB Framing Mode (drop-down) - Required
 - DVB-S
 - DVB-S2 CCM
 - DVB-S2 ACM
- Longitude - Defines the location of the satellite being used.
 - Degrees
 - Hemisphere (drop-down)
 - East
 - West
- Frequency (x 100Khz) - Required
- Symbol Rate (Sps) - Required
- LNB 22KHz Switch (drop-down)
- Receive Polarization - Required
 - Vertical
 - Horizontal
 - Left

- Right
- Transmit Polarization (drop-down) - Required
 - Horizontal
 - Vertical
 - Right
 - Left
- OTA Frequency (X 100KHz) - Normally not used unless the sbc.cfg file is not up to date and the LNB does not appear on the LNB drop-down list.

Entering VSAT Parameters These parameters gives the geographic location of the satellite router. The following parameters must be entered (Figure 11):

The screenshot shows the 'Broadband Satellite HX200M Manual Commissioning' window. At the top is the Hughes logo. Below it are 'Expand All' and 'Collapse All' buttons. A list of parameter sections is shown with expand/collapse icons: Satellite Parameters, VSAT Parameters (selected), LAN Parameters, Management Parameters, Receive Radio Parameters, and Transmit Radio Parameters. The VSAT Parameters section is expanded, showing fields for Longitude and Latitude. Longitude is set to 77 degrees, 12 minutes, West. Latitude is set to 39 degrees, 6 minutes, North. At the bottom are 'Save Configuration' and 'Cancel' buttons.

	Degree	Minute	Hemisphere		Degree	Minute	Hemisphere
Longitude	77	12	West	Latitude	39	6	North

Figure 11: VSAT Parameters section

- Longitude
 - Degrees
 - Minutes
 - Hemisphere (drop-down)
 - East
 - West
- Latitude
 - Degrees

- Minutes
- Hemisphere (drop-down)
 - North
 - South

Entering LAN Parameters The following parameters must be entered. Verify these parameters on your work order.

HUGHES

Broadband Satellite HX200M Manual Commissioning

Expand All **Collapse All**

- + Satellite Parameters
- + VSAT Parameters
- **LAN Parameters**

LAN 1 IP Address	<input type="text" value="16.16.16.16"/>	LAN 1 Subnet Mask	<input type="text" value="255.255.255.0"/>	Validate	<input checked="" type="checkbox"/>
LAN 2 IP Address (optional)	<input type="text" value="0.0.0.0"/>	LAN 2 Subnet Mask (optional)	<input type="text" value="255.255.255.0"/>	Validate	<input checked="" type="checkbox"/>
- + Management Parameters
- + Receive Radio Parameters
- + Transmit Radio Parameters

Save Configuration **Cancel**

Figure 12: LAN Parameters section

- LAN 1 IP Address - A typical installation uses the IP address of **192.168.0.1**.
- LAN 1 Subnet Mask
- LAN 2 IP Address
- LAN 2 Subnet Mask

Entering Management Parameters The following parameters must be entered (Figure 13):

The screenshot shows the Hughes Broadband Satellite HX200M Manual Commissioning web interface. At the top is the Hughes logo. Below it, the title "Broadband Satellite HX200M Manual Commissioning" is displayed. There are two buttons: "Expand All" and "Collapse All". A list of parameter sections is shown on the left: "Satellite Parameters", "VSAT Parameters", "LAN Parameters", and "Management Parameters" (which is selected and expanded). The "Management Parameters" section contains the following fields:

IPGateway IP Address	67.142.149.208	SDL Control Channel IP Address	224.0.2.6
DVB Program Num for User Data	20500	DVB Program Num for DNCC Data	40000
VSAT Management IP Address	13.1.1.7	Default Gateway IP Address (LAN RETURN only)	0.0.0.0
VSAT Return Path	Inroute	Dynamic Routing Enabled	Disabled
Encrypted Traffic Types	User Only		

Below the "Management Parameters" section are the sections "Receive Radio Parameters" and "Transmit Radio Parameters", both of which are collapsed. At the bottom of the interface are two buttons: "Save Configuration" and "Cancel".

Figure 13: Management Parameters section

- IPGateway IP Address - Required
- SDL Control Channel IP Address - Required
- DVB Program Num for User Data - Use the default value.
- DVB Program Num for DNCC Data - Use the default value.
- VSAT Management IP Address - Enter the VSAT Management IP Address exactly as it appears on your work order.
- Default Gateway IP Address (LAN RETURN only)
- VSAT Return Path (drop-down) - Typical installations use the inroute default.
 - Receive Only - Use where not return path is used.
 - Inroute - Typical installations use the inroute default.
 - LAN 1
 - LAN 2
- Dynamic Routing Enabled (drop-down)

- Disabled - Typical installations use this value.
- Enabled
- Encrypted Traffic Types (drop-down)

Entering Receive Radio Parameters Figure 14 shows the Receive Radio Parameters screen. Enter/verify all parameters as they appear on your work order.

The screenshot displays the 'Broadband Satellite HX200M Manual Commissioning' window. At the top is the Hughes logo. Below it are 'Expand All' and 'Collapse All' buttons. A list of parameter categories is shown on the left: Satellite Parameters, VSAT Parameters, LAN Parameters, Management Parameters, and Receive Radio Parameters (which is selected and expanded). The 'Receive Radio Parameters' section contains the following fields:

- Receive LNB Type: A drop-down menu with 'Invacom_UniversalKu' selected.
- LNB 22KHz Switch: A drop-down menu with 'Off' selected.
- LNB 10 MHz On: A checkbox that is currently unchecked.
- LO Freq (MHz): A text input field containing '10600'.
- Sweeping Range (KHz): A text input field containing '0'.
- Band Lower Edge (MHz): A text input field containing '11700'.
- Band Upper Edge (MHz): A text input field containing '12750'.

Below these fields is the 'Transmit Radio Parameters' section, which is currently collapsed. At the bottom of the window are 'Save Configuration' and 'Cancel' buttons.

Figure 14: Receive Radio parameters

- Receive LNB Type (drop-down) - Select the LNB is use from the list. This populates the read only fields with the characteristics of the selected LNB.
- LNB 22KHz Switch (drop-down) - Typical installations use the value the default value of OFF.
- LNB 10 Mhz On (check-box) - Check the box for LNBs that require external 10 MHz reference.
- LO Freq (MHz)
- Band Lower Edge (MHz)
- Band Upper Edge (MHz)

Entering Transmit Radio Parameters

Figure 15 shows the Transmit Radio Parameters screen.

1. Enter/verify all parameters as they appear on your work order.
2. Select the transmit radio used - Saturated or Linear.

The screenshot shows the 'HughesNet HX200M Manual Commissioning' window. At the top, there are 'Expand All' and 'Collapse All' buttons. Below them is a list of parameter categories: Satellite Parameters, VSAT Parameters, LAN Parameters, Management Parameters, Receive Radio Parameters, and Transmit Radio Parameters (which is selected and expanded). The 'Transmit Radio Parameters' section contains the following controls:

- Radio Type: Two radio buttons for 'Saturated Radio' and 'Linear Radio'. 'Linear Radio' is selected.
- Radio Selection: A drop-down menu showing 'NJT5017_4W_Ku'.
- Enable Spreading?: A checkbox, currently unchecked.
- Use External 10 MHz Signal?: A checkbox, currently unchecked.
- Transmitter 10 MHz Off?: A checkbox, currently unchecked.
- Set Maximum Tx Power?: A checkbox, currently checked.
- Minimum Attenuation (dB): A text box with the value '20.0'.
- LO Frequency (MHz): A text box with the value '13050'.
- Band Lower Edge (MHz): A text box with the value '14000'.
- Band Upper Edge (MHz): A text box with the value '14500'.
- Radio Wattage (W): A text box with the value '4'.
- Total Gain (dB): A text box with the value '56'.
- 1 db G.C.P(dB): A text box with the value '36'.

At the bottom of the window are 'Save Configuration' and 'Cancel' buttons.

Figure 15: Transmit Radio Parameters screen

Saturated Radio

- Select either 1 or 2 watts.
- No other saturated radio selections are required.

Linear Radio

- Select the radio from the drop-down list. This populates the following read only fields.
 - LO Frequency (MHz)
 - Band Lower Edge (MHz)
 - Band Upper Edge (MHz)
 - Radio Wattage (W)
 - Total Gain (dB)
 - 1 db G.C.P(dB)

- Transmitted 10 MHz Off - Typical installations use the default value, unchecked (10 MHz is on to BUC).
- Set Maximum Tx Power/Minimum Attenuation - See section below for details.
- Enable Spreading - Typical installations use the default value - unchecked.
- Use External 10 MHz Signal - Typical installations use the default value - unchecked.

3. Click **Save Configuration**.

Set Maximum Tx Power/Minimum Attenuation

These values are used to control the maximum output power a modem can transmit. The reason this must be set correctly is so that the BUC input level is not high enough to cause the BUC to saturate. If the BUC saturates it can cause ACI, transmit carrier distortion, or excessive power compared to other terminals, any of which could cause network degradation or outage conditions.

The maximum modem output power is 0 dB, and there is an attenuator that is used by the modem operational software to control the output power. If the Set Maximum Tx Power box is checked, then the terminal will ensure that the attenuation applied to the output signal never drops below the configured Minimum Attenuation value, effectively limiting the maximum modem output power.

The appropriate Minimum Attenuation value must be calculated based on the TX IFL cable length, cable attenuation, and BUC maximum power input. To determine this setting, you must first know the maximum allowable input level into the BUC. This is found by taking the maximum allowable BUC power out in dB, then subtracting the BUC gain. Then, knowing the cable loss over the length of TX IFL in use, the maximum modem output value is known, and therefore the Minimum Attenuation value can be calculated.

As an example, assume we are using an ODU with a maximum allowable power output of 36 dB, with a gain of 56 dB. The maximum allowable input to the BUC in the ODU is -20 dB (i.e. 36 dB - 56 dB). With a typical 100 foot cable run, where the cable loss is 8 dB per 100 feet, the cable will introduce an 8 dB signal loss. Thus the maximum allowable power out at the input to the cable (i.e. the output from the modem) is -12 dB. Given the modem output power with no attenuation is 0 dB, the Minimum Attenuation value should be set at 12 dB.

NOC override In some cases the NOC may need to override the allowed inroute symbol rates mask due to the installer's selection. In order to override the selection from the NOC, the following parameter must be set in the satellite router's InrouteProfile:

```
shinrtCfLocalInrtMaskOverride=2
```

As a result of the NOC override, the satellite router uses the inroute rates specified by the NOC instead of the transmit radio selection.

Error checks The Javascript Form Check is used on all relevant fields in the Manual Commissioning interface. If the installer enters an incorrect value for any field, an error message displays and the form cannot be submitted until the error is corrected.

Antenna pointing

Follow these steps to use the Antenna Pointing feature on the HX200 web-based interface to peak the receive and transmit signals:

1. Turn off the HX200 using the power switch on the rear panel.
2. Connect the receive and transmit coaxial cables to the HX200.
3. Place the DAPT in the receive cable line, if applicable.
4. Apply power to the HX200.
5. Open a web browser on the installer laptop and navigate to the Broadband Satellite Setup screen as explained in *Accessing the manual commissioning interface* on page 22.

- At the setup screen, click [Antenna Pointing](#). The Antenna Pointing screen appears as shown in Figure 16. If an OPI is used to point the antenna, select the Enable OPI check box.

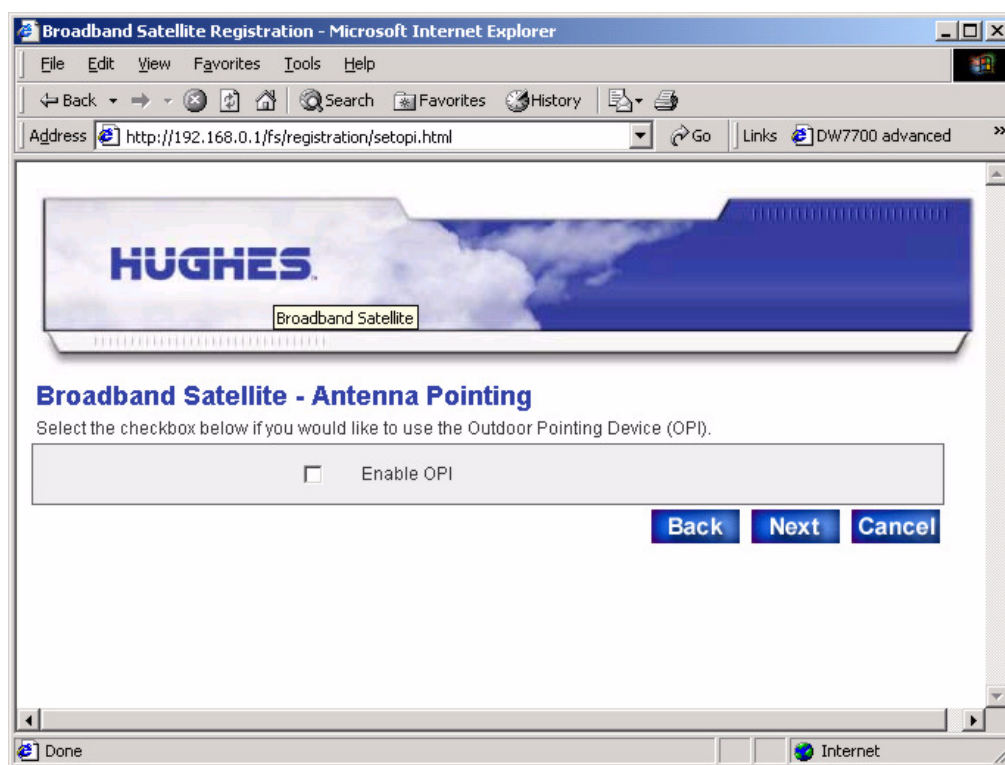


Figure 16: Antenna pointing screen

- Click **Next**. The Receive Antenna Pointing screen appears as shown in Figure 17.

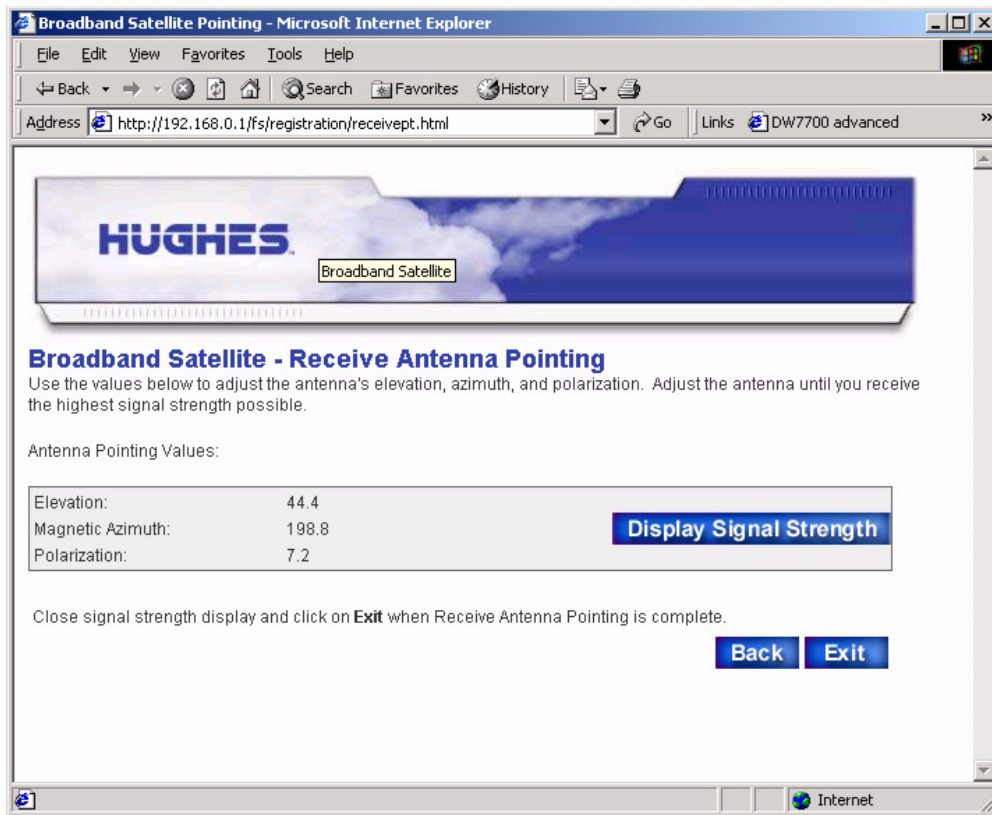


Figure 17: Receive pointing

8. To view a graphic representation of the current signal quality, click **Display Signal Strength**.



Note: If the Signal Quality window is not visible on the display, minimize the other windows until you can see it.

9. Use the Signal Quality indication to peak the receive pointing as instructed in the antenna installation manual.



Note: You must peak the signal even when the antenna is locked to it.

10. After peaking the signal, close the Signal Quality window and click **Exit** on the Receive Antenna Pointing screen to exit the Antenna Pointing feature.
11. If required, the satellite router may need to run automatic cross-polarization (ACP) if it is present. If ACP is present, the timing units tells the satellite router it is present, and this

forces the timing units to run ACP. The satellite router automatically inquires for validation when the timing unit indicates ACP is present. Based on the ACP configuration, the satellite router may occasionally request re-validation.

Satellite-based commissioning

Satellite-based commissioning (SBC) is the another commissioning method. Commissioning the satellite router using SBC consists of the following tasks:

- *Obtaining an IP address from the HX200 satellite router*
- *Uploading the SBC configuration file to the HX200*
- *Commissioning the HX200*

Obtaining an IP address from the HX200 satellite router



Note: In the following procedure, *installer laptop* refers to the computer—typically a laptop—used to connect to and commission the HX200.

1. Ensure that the installer laptop is configured to support the Dynamic Host Control Protocol (DHCP) to obtain an IP address. Refer to Appendix A for instructions on how to configure a Windows computer to use DHCP.
2. Verify that the installer laptop is connected to the HX200 by an Ethernet cable.
3. Open a command window on the installer laptop and obtain an IP address from a DHCP server. For example, on a Windows computer, type:
ipconfig /release <Enter>
4. Type **ipconfig /renew <Enter>**.



Note: To view all IP configuration commands on a Windows platform, type **ipconfig /help** at a command line prompt and press **ENTER**.

If the HX200 does not assign an IP address to the installer laptop, restart the laptop to obtain the IP address. The assigned IP address will be on the same subnet as the IP of the connected satellite router LAN port, typically **192.168.0.2**.

5. Execute a ping test to verify an active Ethernet connection between the HX200 and the installer laptop:

- a. Open a command window on the installer laptop.
- b. Type **ping 192.168.0.1**.



Note: If an alternate IP address was assigned to the satellite router at the system gateway, ping that IP address instead.

- c. Press **ENTER**.

A successful ping test is shown in Figure 18.

```
C:\WINNT\system32\cmd.exe
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

C:\Documents and Settings\Houman1>ping 192.168.0.1

Pinging 192.168.0.1 with 32 bytes of data:

Reply from 192.168.0.1: bytes=32 time=3ms TTL=64
Reply from 192.168.0.1: bytes=32 time=1ms TTL=64
Reply from 192.168.0.1: bytes=32 time=1ms TTL=64
Reply from 192.168.0.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

C:\Documents and Settings\Houman1>_
```

Figure 18: Successful ping

A failed ping test is shown in Figure 19. If the ping test fails, make sure that the installer laptop Network Interface Card (NIC) is properly installed and that the installer laptop is properly configured to use DHCP. See Appendix A for more information.

```
C:\WINNT\system32\cmd.exe
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

C:\Documents and Settings\Houman1>ping 192.168.0.1

Pinging 192.168.0.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\Houman1>_
```

Figure 19: Failed ping

If the NIC is installed properly and the installer laptop is configured properly, make sure all cable connections are secure. (See the Caution statement that follows Figure 2 on page 13).

If all cable connections are secure:

- Shut down and power off the satellite router.
- Shut down and power off the installer laptop.
- Turn the satellite router back on.
- Turn the installer laptop back on.

Also, make sure that neither an Ethernet router nor a switch is currently connected to the satellite router, then try the ping test again. If the test is still unsuccessful, contact Technical Support for assistance.

Uploading the SBC configuration file to the HX200

The SBC configuration file (*sbc.cfg*) contains satellite information that SBC and the auto-commissioning server (ACS) must use during the commissioning process. Once you have obtained the *sbc.cfg* file, save it on the installer laptop, making sure to note the location in which the file is saved; then complete the steps below.



Note: If you do not have to upload an *sbc.cfg* file to the satellite router, skip this section and go to *Commissioning the HX200* on page 41.

1. Open a browser on the installer laptop.
2. Type **http://192.168.0.1/fs/registration/setup.html** in the address bar and press **ENTER**. If an alternate IP address was assigned to the satellite router at the

HX system gateway, enter that IP address instead. The Broadband Satellite Setup screen appears as shown below.

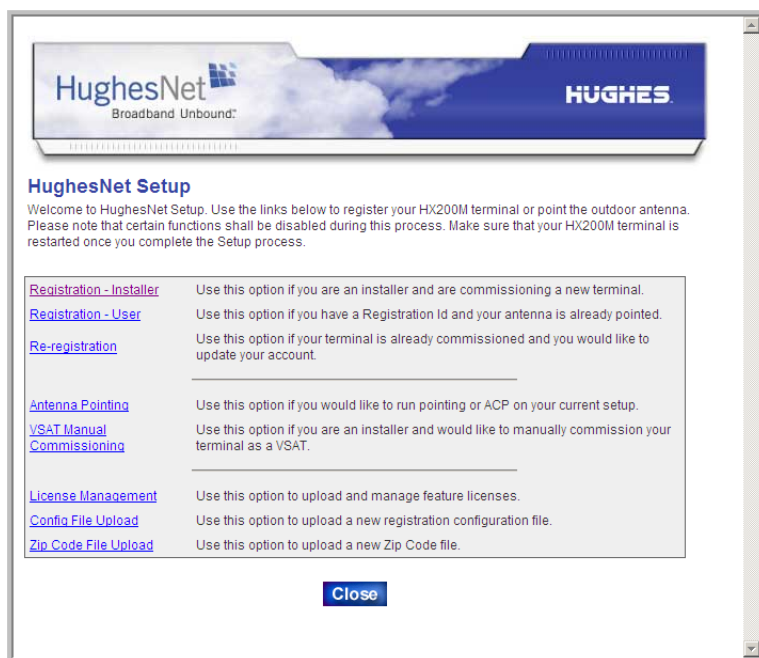


Figure 20: Setup screen

3. Click [Config File Upload](#).



Note: Do not click [Zip Code File Upload](#); this link is used to update the ZIP code table in the satellite router.

4. On the Configuration File Upload screen, click **Browse** and navigate to the location on the installer PC where the *sbc.cfg* file is saved.
5. Select the file and click **Open**.
6. Click **Upload**.
7. Click **Close** to return to the Setup screen.

Commissioning the HX200

Follow these steps to commission the satellite router:

1. From the Broadband Satellite Setup screen, click **Registration - Installer**. The Antenna Location screen appears as shown in Figure 21.

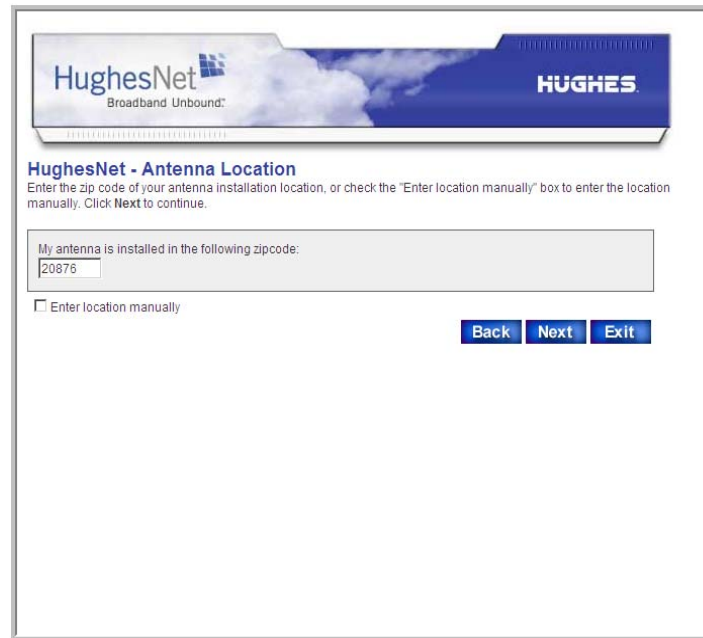


Figure 21: Antenna Location screen

2. Enter the ZIP code of the location in which you are installing the satellite router and click **Next**.

If installing the HX200 outside the United States, you can enter the location manually by completing steps a and b below.

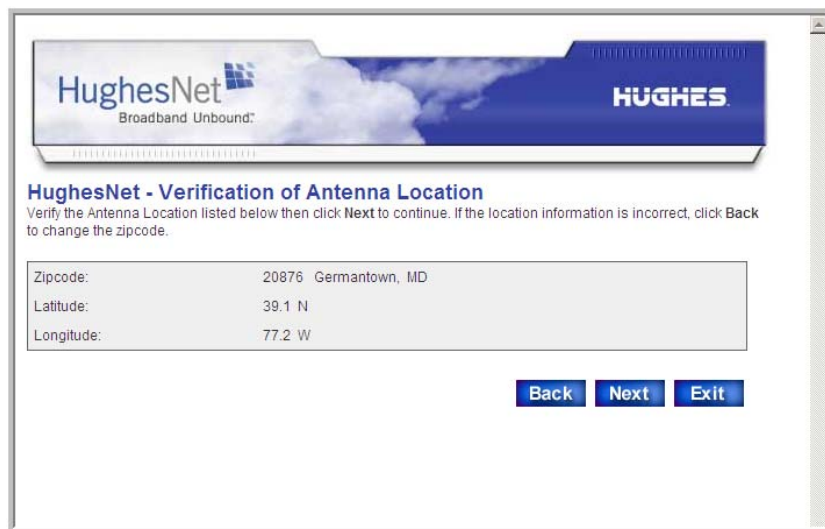
- a. Select the Enter Location Manually check box and click **Next**. The Manual Entry of Antenna Location screen appears as shown in Figure 22.

- b. Enter the correct latitude and longitude for the location and click **Next**.

The screenshot shows a Microsoft Internet Explorer window titled "Broadband Satellite Pointing - Microsoft Internet Explorer". The address bar displays the URL: `2.168.0.1/sbc.cgi/pointing/vsatlocation.bin?VSAT_Zipcode=208748&ManualEnter=on&x=29&y=14`. The page features a Hughes logo at the top. Below the logo, the heading "Broadband Satellite - Manual Entry of Antenna Location" is displayed, followed by the instruction: "Please enter the Latitude and Longitude information for your antenna installation location. Click **Next** to continue." The form contains two rows of input fields. The first row is for Latitude, with a text box containing "39.1" and a dropdown menu set to "North". The second row is for Longitude, with a text box containing "77.2" and a dropdown menu set to "West". Below these fields, a note states: "Values must be entered in decimal notation." At the bottom right of the form, there are three buttons: "Back", "Next", and "Exit". The status bar at the bottom of the browser window shows "Done" and "Internet".

Figure 22: Entering location manually

3. The Verification of Antenna Location screen appears as shown in Figure 23 on page 43. Click **Next**.



The screenshot shows a web browser window with the HughesNet logo and tagline 'Broadband Unbound.' at the top. Below the header, the title 'HughesNet - Verification of Antenna Location' is displayed. A sub-instruction reads: 'Verify the Antenna Location listed below then click Next to continue. If the location information is incorrect, click Back to change the zipcode.' Below this, a table contains the following information:

Zipcode:	20876	Germanatown, MD
Latitude:	39.1	N
Longitude:	77.2	W

At the bottom right of the form area, there are three buttons: 'Back', 'Next', and 'Exit'.

Figure 23: Verification of Antenna Location screen

4. At the Satellite Parameters screen as shown in Figure 24, click the *Satellite Transponders* drop-down menu, select the satellite and transponder listed either on the work order or in the installation specification, and click **Next**.


The satellite parameters should have been provided to you in either a technical update e-mail or an installation specification. If the satellite and transponder for your installation are not listed in the drop-down menu, and you were not provided with an *sbc.cfg* file, you must complete steps a through d below to enter the satellite parameters manually.

- a. Select the Enter satellite parameters manually check box on the Satellite Parameters screen.

The image shows a software window titled "HughesNet - Satellite Parameters". At the top, there is a banner with the "HughesNet" logo and the tagline "Broadband Unbound." on the left, and the "HUGHES" logo on the right. Below the banner, the title "HughesNet - Satellite Parameters" is displayed in blue. Underneath the title, a paragraph of instructions reads: "Please select the Satellite/Transponder combination from the list provided, or check the 'Enter satellite parameters manually' box to enter the satellite parameters manually. Click Next to continue." Below this text is a form with a label "My antenna is pointing to:" followed by a dropdown menu showing "HZN1 HXNOC2". Below the dropdown is a checkbox labeled "Enter satellite parameters manually". At the bottom right of the window are three buttons: "Back", "Next", and "Exit".

Figure 24: Selecting the satellite and transponder

- b. Click **Next**. The Manual Entry of Satellite Parameters screen appears as shown in Figure 25.
- c. Enter or select the appropriate parameters.
 - Longitude
 - Frequency
 - Symbol rate
 - Receive polarization
 - Transmit polarization
 - 22KHz tone
 - Frequency Band/Modulation
 - Digital video broadcast (DVB) Mode
 - DVB Program Number (User Data)
 - DVB Program Number (DNCC Data)



Broadband Satellite - Manual Entry of Satellite Parameters

Please enter the Satellite Parameters below then click **Next** to continue.

Longitude (Degrees):	99	West	22KHz Tone:	Off
Frequency:	1330.0	MHz	Frequency Band / Modulation:	Ku Band - QPSK
Symbol Rate:	10.00	Msp/s	DVB Mode:	DVB-S2
Receive Polarization:	V		DVB Program Num(User Data):	20500
Transmit Polarization:	H		DVB Program Num(DNCC Data):	40000
			Enable OPI Display:	<input type="checkbox"/>

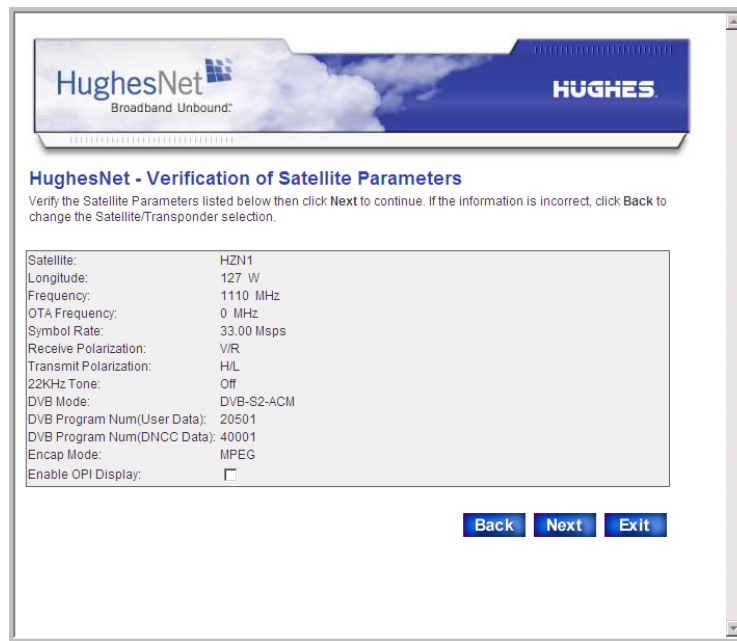
Back **Next** **Exit**

Figure 25: Entering satellite parameters manually

- d. If a DAPT is used to point the antenna, check the Enable OPI Display check box.
- e. Click **Next**.
5. Verify that the information on the Verification of Satellite Parameters screen shown in Figure 26 is correct. If using an OPI, check the Enable OPI Display check box.



Note: You are only required to verify satellite parameters if you selected the satellite and transponder as shown in Figure 24. If you entered the satellite parameters manually, the Verification of Satellite Parameters screen does not appear.



HughesNet
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HughesNet - Verification of Satellite Parameters

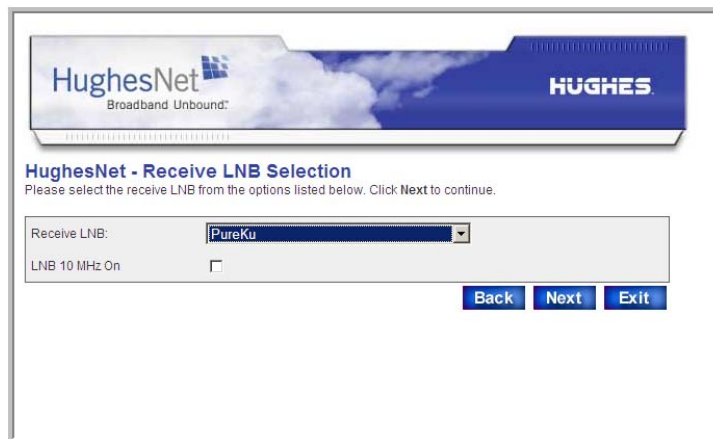
Verify the Satellite Parameters listed below then click **Next** to continue. If the information is incorrect, click **Back** to change the Satellite/Transponder selection.

Satellite:	HZN1
Longitude:	127 W
Frequency:	1110 MHz
OTA Frequency:	0 MHz
Symbol Rate:	33.00 Msps
Receive Polarization:	VR
Transmit Polarization:	HL
22KHz Tone:	Off
DVB Mode:	DVB-S2-ACM
DVB Program Num(User Data):	20501
DVB Program Num(DNCC Data):	40001
Encap Mode:	MPEG
Enable OPI Display:	<input type="checkbox"/>

Back **Next** **Exit**

Figure 26: Verifying satellite parameters

6. Click **Next**.
7. The Receive LNB Selection screen appears as shown in Figure 27.



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HughesNet - Receive LNB Selection

Please select the receive LNB from the options listed below. Click **Next** to continue.

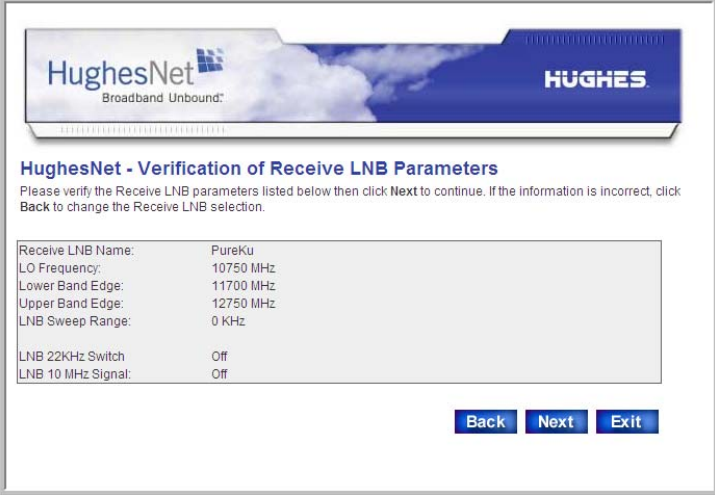
Receive LNB:

LNB 10 MHz On ☐

Back **Next** **Exit**

Figure 27: Select Receive LNB Selection screen

8. Select the LNB in use from the drop-down list. Click **Next**.
9. Verify your information is correct on the Verification of Receive LNB Parameters screen as shown in Figure 28 on page 47. Click **Next**.



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HughesNet - Verification of Receive LNB Parameters

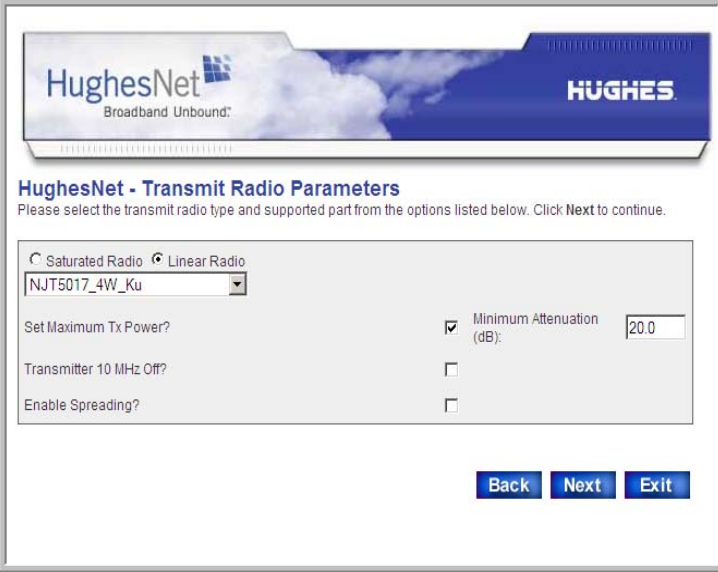
Please verify the Receive LNB parameters listed below then click **Next** to continue. If the information is incorrect, click **Back** to change the Receive LNB selection.

Receive LNB Name:	PureKu
LO Frequency:	10750 MHz
Lower Band Edge:	11700 MHz
Upper Band Edge:	12750 MHz
LNB Sweep Range:	0 KHz
LNB 22KHz Switch:	Off
LNB 10 MHz Signal:	Off

Back **Next** **Exit**

Figure 28: Verification of Receive LNB Parameters screen

- The Transmit Radio Parameters screen appears as shown in Figure 29. Select the transmit radio part number from the drop-down menu on the Transmit Radio parameters screen. Click **Next**.



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HughesNet - Transmit Radio Parameters

Please select the transmit radio type and supported part from the options listed below. Click **Next** to continue.

☐ Saturated Radio ☒ Linear Radio

Set Maximum Tx Power? ☒ Minimum Attenuation (dB):

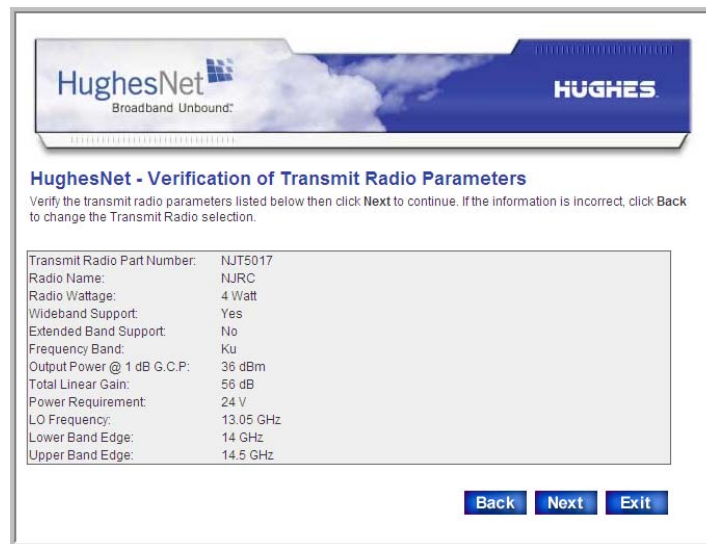
Transmitter 10 MHz Off? ☐

Enable Spreading? ☐

Back **Next** **Exit**

Figure 29: Transmit Radio Parameters screen

- Verify your information is correct on the Verification of Transmit Radio Parameters screen as shown in Figure 30. Click **Next**.



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HughesNet - Verification of Transmit Radio Parameters

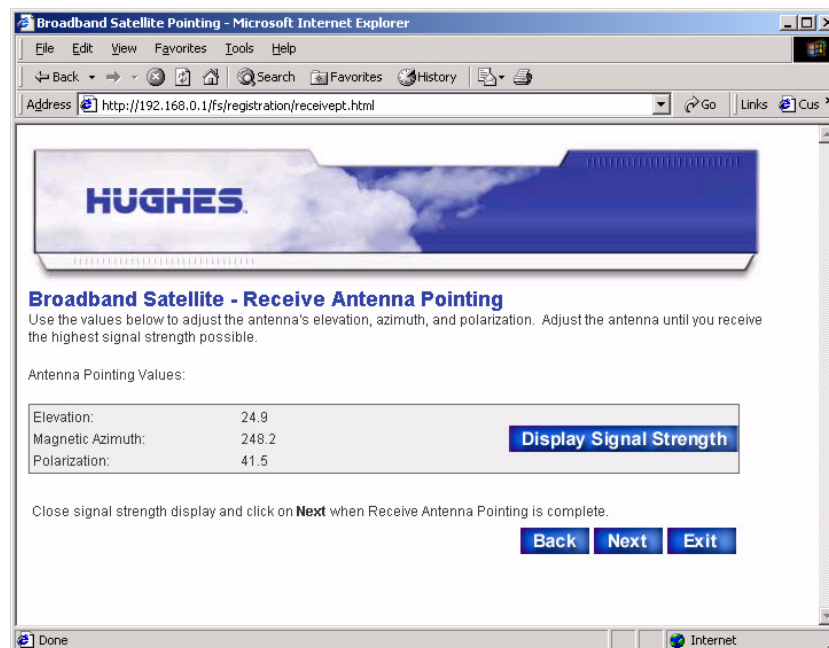
Verify the transmit radio parameters listed below then click **Next** to continue. If the information is incorrect, click **Back** to change the Transmit Radio selection.

Transmit Radio Part Number:	NJT5017
Radio Name:	NJRC
Radio Wattage:	4 Watt
Wideband Support:	Yes
Extended Band Support:	No
Frequency Band:	Ku
Output Power @ 1 dB G.C.P.:	36 dBm
Total Linear Gain:	56 dB
Power Requirement:	24 V
LO Frequency:	13.05 GHz
Lower Band Edge:	14 GHz
Upper Band Edge:	14.5 GHz

Back **Next** **Exit**

Figure 30: Verification of Transmit Radio Parameters screen

- The Receive Antenna Pointing screen appears as shown in Figure 31.



Broadband Satellite Pointing - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites History Print

Address <http://192.168.0.1/fs/registration/receivept.html> Go Links Cus

HUGHES

Broadband Satellite - Receive Antenna Pointing

Use the values below to adjust the antenna's elevation, azimuth, and polarization. Adjust the antenna until you receive the highest signal strength possible.

Antenna Pointing Values:

Elevation:	24.9
Magnetic Azimuth:	248.2
Polarization:	41.5

Display Signal Strength

Close signal strength display and click on **Next** when Receive Antenna Pointing is complete.

Back **Next** **Exit**

Done Internet

Figure 31: Receive Antenna Pointing

- To view a graphic representation of the current signal quality (Figure 32), click **Display Signal Strength**. Click **Close**.



Note: If the Signal Quality window is not visible on the display, minimize the other windows until you can see it.

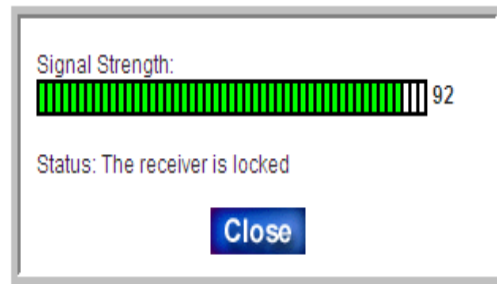


Figure 32: Signal strength

14. Peak the receive pointing as instructed in the antenna installation manual.



Note: You must peak the signal even when the antenna is locked to it.

15. After peaking the signal, click **Close** to close the Signal Quality window.
16. Click **Next**.
17. The satellite router will need to run automatic cross-polarization (ACP). The timing units tells the satellite router it is present, and this forces the timing units to run ACP. The satellite router automatically inquires for validation when the timing unit indicates ACP is present. Based on the ACP configuration, the satellite router may occasionally

request re-validation. You must perform Manual ACP, first. After completion, perform Automatic ACP. See Figure 33.

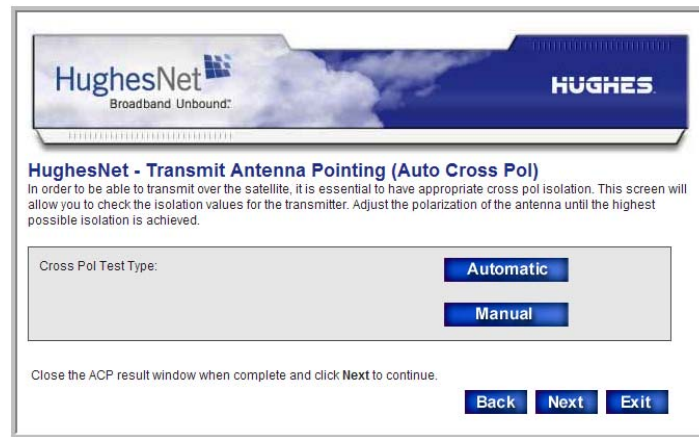
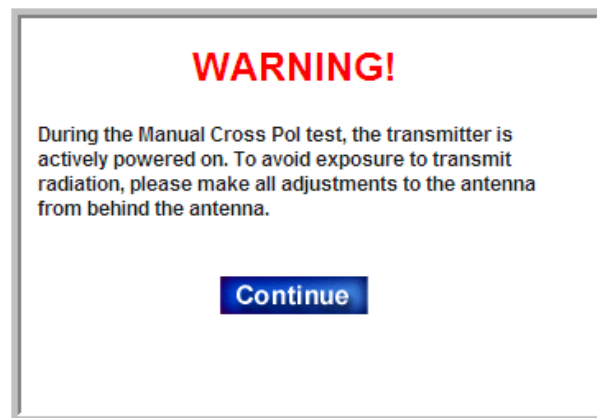


Figure 33: Auto Cross Pol screen

18. During this process a series of messages appear as testing progresses as shown in the screens that follow.



19. Click **Continue**.



20. Click **Close**.

21. The Registration Server Selection screen appears as shown in Figure 34.

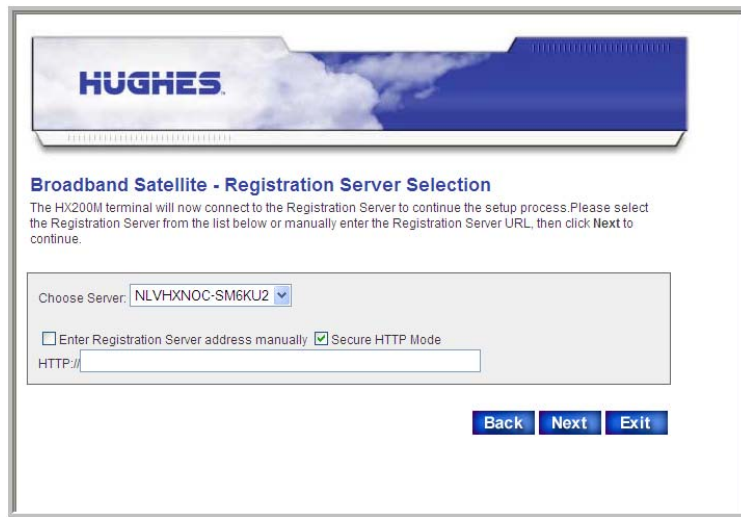
The screenshot shows a web browser window with the Hughes logo at the top. Below the logo, the title is "Broadband Satellite - Registration Server Selection". A message states: "The HX200M terminal will now connect to the Registration Server to continue the setup process. Please select the Registration Server from the list below or manually enter the Registration Server URL, then click Next to continue." There is a "Choose Server:" label followed by a drop-down menu showing "NLVHXNOC-SM6KU2". Below this, there are two checkboxes: "Enter Registration Server address manually" (unchecked) and "Secure HTTP Mode" (checked). An "HTTP://" text box is positioned below the checkboxes. At the bottom right, there are three buttons: "Back", "Next", and "Exit".

Figure 34: Registration Server Selection screen

22. Select the server from the drop-down list on the screen. You may also manually enter the registration server address by following these steps:
- Select the Enter Registration Server address manually check box.
 - Enter the registration server's address in the HTTP:// field.
 - Select the Secure HTTP Mode check box to enable a secure connection to the registration server.
23. Click **Next**.
- The satellite connection is established.
24. Click **Next** when prompted to do so.
25. Click **OK** on the pop-up dialog shown in Figure 35 to access the registration server.

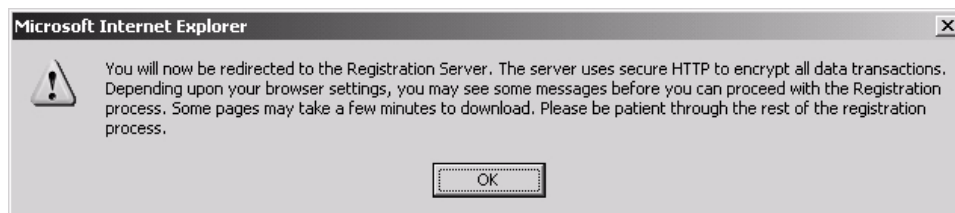


Figure 35: Accessing the registration server

26. If the Security Alert pop-up dialog appears as shown in Figure 36, click **Yes** to accept the security certificate.



Figure 36: Accepting the security certificate

27. Enter the site ID on the enterprise Registration screen shown in Figure 37 and click **Continue**.



Figure 37: Registering a satellite router (enterprise user) – entering site ID

28. Click **Continue** on the Registration Welcome screen that appears.
29. Click **Continue** on the Registration screen to download configuration parameters to the satellite router.
30. Click **Restart** on the Registration Complete screen to restart the satellite router.
31. To complete the commissioning process, close the Terminal Reset screen.
The satellite router resets and is now commissioned.
Continue with Chapter 4 – *Completing the installation*, on page 55.

Chapter 4

Completing the installation

This chapter discusses tasks that must be completed after the HX200 satellite router has been installed and commissioned.

Confirming that all files are current

Follow these steps to confirm that the HX200 satellite router is operating with the most current software version:

1. Access the HX200 System Control Center and click the System Status indicator. For more information, see Chapter 5 – *The System Control Center*.
2. At the System Status page, check the Software Download Status line message. If it reads `All files are up-to-date`, the unit has been successfully commissioned.



Note: It may take up to 15 minutes after completing the commissioning process for all files to be downloaded to the satellite router from the system gateway. Once the latest software has downloaded to the HX200 satellite router, the HX200 resets itself. After the HX200 resets, a message displays confirming that `All files are up-to-date`. If the message does not appear after 15 minutes, power cycle the unit by turning it off using the power switch on the rear panel, waiting 10 seconds, and then turning it back on. If the message still does not appear, contact Technical Support.

Connecting the HX200 satellite router to a computer

Using an Ethernet cable, connect the HX200 satellite router to the remote user's computer as shown in Figure 38. You can also connect an Ethernet hub, router, or switch to the HX200 to support additional computers that may be connected to remote user's local area network (LAN).

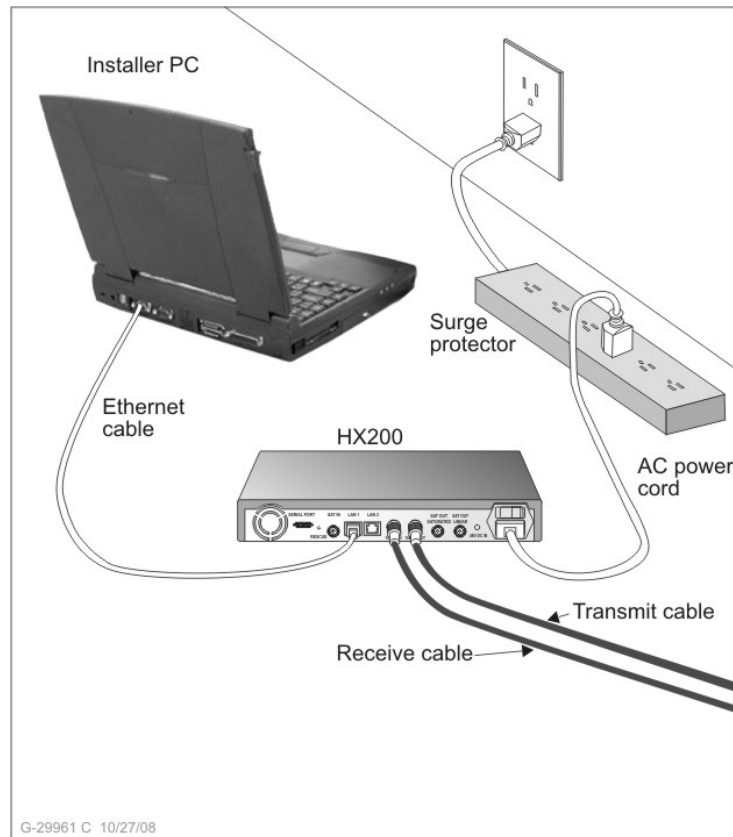


Figure 38: Final configuration

Unable to access enterprise resources

If, after connecting the HX200 satellite router to the computer, resources on the enterprise network cannot be accessed, perform the following procedures:

1. Configure the installer laptop so that its network properties match those of the remote user's PC. Refer to *Appendix D* for detailed instructions for setting network properties.
2. Connect the installer laptop to the HX200 with an Ethernet cable and open a web browser.
3. Attempt to access the HX200 System Control Center as explained in Chapter 5 – *The System Control Center* or by

typing the site's specific IP address or LAN IP address in the browser address bar and pressing **ENTER**.

If the System Control Center appears, the satellite router is functioning properly. If it does not appear, contact Technical Support.

4. Assuming that Internet connectivity is provided through the system gateway, type the URL of a known Website such as **www.HUGHES.com**; otherwise, attempt to use an enterprise network resource.
5. Instruct the user that for routine technical support, access and refer to the contact information on the System Control Center Help page.

Printing the System Information page

Follow the steps below to walk the user through the process of printing a copy of the System Control Center System Information page. If a problem should occur, this page may not be accessible and the user can use information on the printed copy to contact Technical Support for assistance.

1. Have the user access the System Control Center by typing **www.systemcontrolcenter.com** from their web browser and pressing **ENTER**.
2. At the System Control Center Home page, click the **System Info** indicator to access the System Information page.
3. Have the user print a hard copy of the page. If they do not have access to a printer, show them how to capture an image of the page by pressing **Alt+Print Scrn**. They can then paste the image into a word processing program such as Microsoft Word, or a graphics program such as Microsoft Paint, and save the file as System Info Backup.

Creating a shortcut to the System Control Center

Follow these steps to create a shortcut to the HX200 System Control Center on the user's computer desktop:

1. Right-click anywhere on the computer desktop and select **New—Shortcut** from the popup menu as shown in Figure 39.

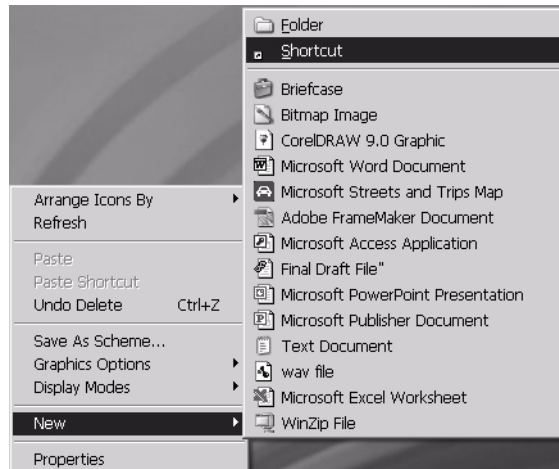


Figure 39: Creating a shortcut to the System Control Center

2. Type **http://192.168.0.1** in the field on the Create Shortcut window as shown in Figure 40.

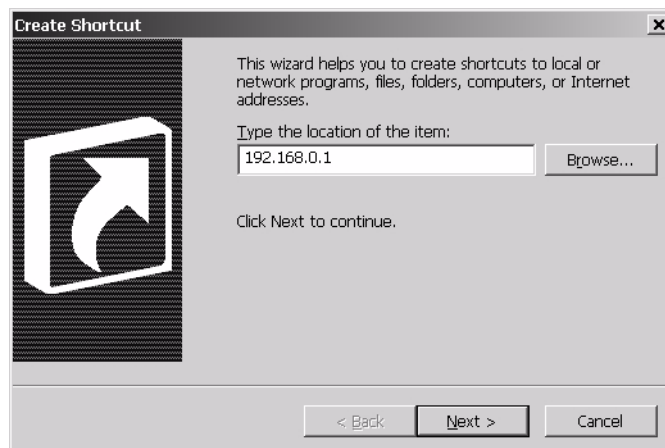


Figure 40: Entering the System Control Center URL in the Create Shortcut window

3. Click **Next**.

4. Type **System Control Center** in the field on the Select a Title for the Program dialog as shown in Figure 41.

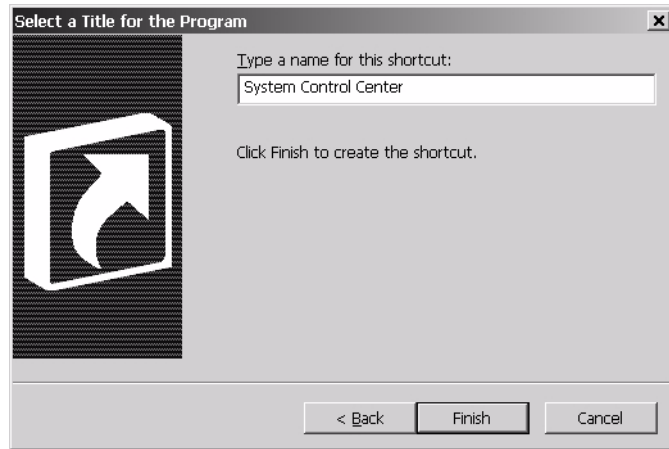


Figure 41: Entering the name of the shortcut

5. Click **Finish** to save the shortcut to the user's desktop.



Note: It may be useful to add the System Control Center to your browser's Favorites or Bookmark list. Refer to the browser documentation for instructions on how to do so.

Chapter 5

The System Control Center

This chapter describes the HX200 System Control Center, which provides system status, configuration information, and online documentation. The HX200 internal software is updated periodically over the satellite link to the HX system gateway. Refer to *System Control Center Help page* on page 88 for current information about the System Control Center and satellite router software.



Note: If you are unable to access the System Control Center, refer to *Cannot access the System Control Center* on page 96.

Accessing the System Control Center

You can access the System Control Center through any web browser, such as Internet Explorer or Netscape. Follow the steps below to access the System Control Center through a browser. Although this procedure is written specifically for Internet Explorer or Netscape, you can use a similar procedure for any browser.

1. Open the web browser.
2. Type **192.168.0.1**, in the browser address field or, if an alternate IP address was assigned to the satellite router at the HX system gateway, use that IP address instead.
3. Press **ENTER**. The System Control Center home page appears as shown in Figure 42.



Note: The computer used to browse to the System Control Center must be on the same subnet as the satellite router.

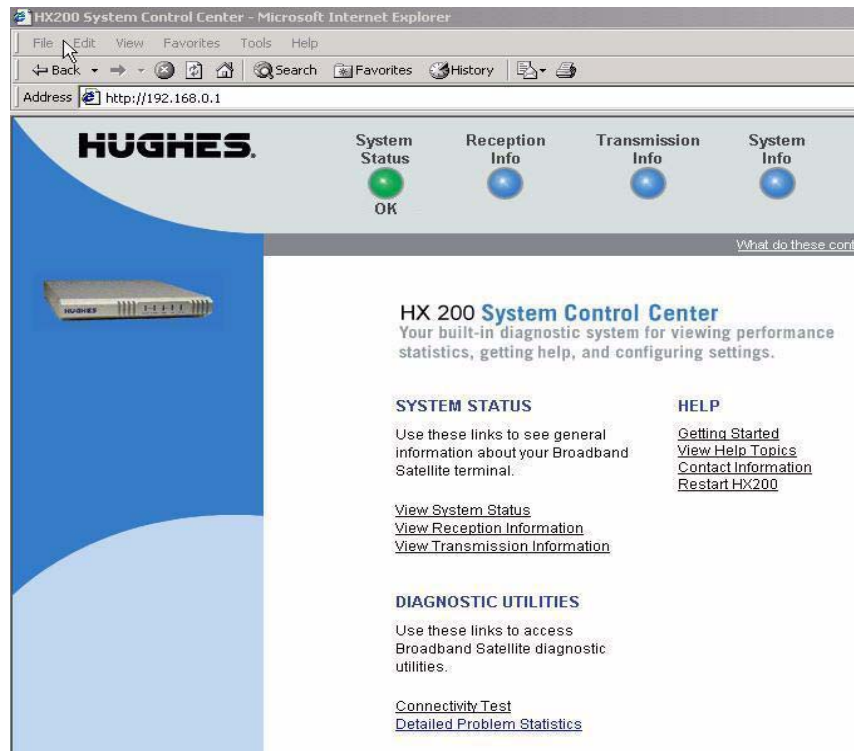


Figure 42: System Control Center home page

System Control Center Home page

The System Control Center Home page contains system indicators and links to HX200 features and important information regarding the operation of the HX200 satellite router.

System indicators

At the top of the Home page, you will see four *system indicators* which provide access to the four main System Control Center pages. Each of these system indicators is described below.

- **System Status** provides access to the System Status page, which displays general system information such as signal strength and commissioning status. See *System Status page* on page 65 for more information. Additionally, the System Status indicator can be used to monitor satellite connectivity.



Note: The System Status indicator may be green, yellow, or red; the other system indicators are always blue.

If the System Status indicator is green and **OK** appears below it as shown in Figure 43, the satellite connection is operating properly.

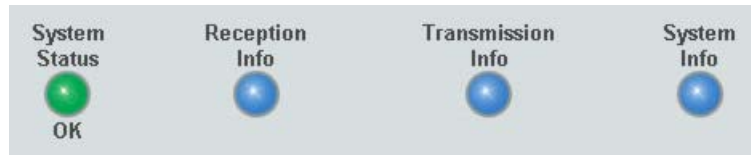


Figure 43: System indicators

If the indicator is red and **Problem** appears below it as shown in Figure 44, there is a problem with satellite connectivity. Click on the indicator to access the System Status page to view problem details.

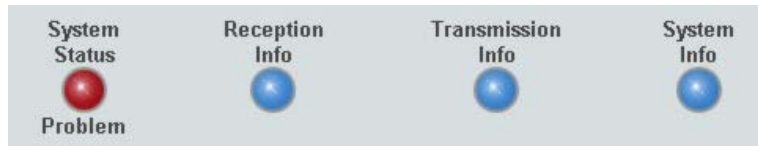


Figure 44: System Status indicator reporting a problem

If the indicator is yellow, the Web Acceleration feature may not be functioning.

- **Reception Info** provides access to the Reception Information page, which displays satellite router receive data. See *Reception Information page* on page 66 for more information.
- **Transmission Info** provides access to the Transmission Information page, which displays satellite router transmit data. See *Transmission Information page* on page 70 for more information.
- **System Info** provides access to the System Information page, which displays general system information such as satellite router IP address and site ID. See *System Information page* on page 76 for more information.

Links The System Control Center home page also contains three groups of links:

- System Status
- Diagnostic Utilities
- Help

System Status The System Status links provide another means to access the System Status page, the Reception Information page, and the Transmission Information page.

Diagnostic Utilities These links allow you to perform tests and store diagnostic information. The [Connectivity Test](#) link provides access to the Connectivity Test page, which can be used to test the connection between the satellite router and the HX system gateway. See *Connectivity Test page* on page 78.

Help The links in the Help group provide access to various Help topics.

- [Getting Started](#) provides an overview of satellite router operation as well as access to HX200 operating instructions and recommended settings.
- [View Help Topics](#) provides access to the Help page, which offers a variety of informational topics ranging from an overview of the HX200 satellite router to answers to frequently asked questions. See *Help page* on page 88 for more information.
- [Contact Information](#) provides technical support and contact information. This information may vary according to service plan.
- [Restart HX200](#) restarts the satellite router.

System Status page

The System Status page shown in Figure 45 displays general status information such as signal strength, receive status, transmit status, commissioning status, transmission control protocol (TCP) acceleration status, and Web acceleration status. Each of these categories is explained below.

To access the System Status page, click on the System Status indicator on the Home page.

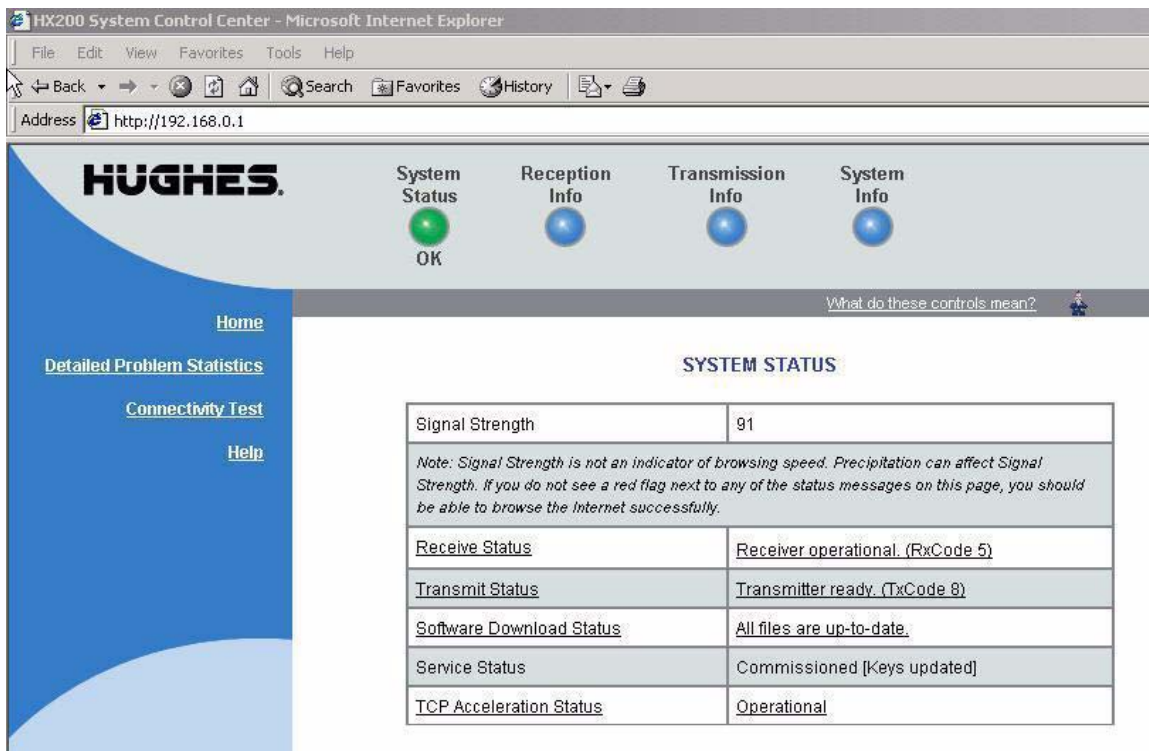


Figure 45: System Status page

- **Signal Strength** – Indicates the current strength of the receive signal.
- **Receive Status** – Indicates whether the receive data path is operational. Click on the status message to call up relevant Help information. For more information on receive code messages, see *Receive status messages* on page 67.
- **Transmit Status** – Indicates whether the transmit data path is operational. Click on the status message to call up relevant Help information. For more information on receive code messages, see *Transmit status messages* on page 70.
- **Software Download Status** – Indicates whether satellite router software and configuration are up-to-date. Click on the status message to call up relevant Help information

- Commission Status – Indicates whether the satellite router has been commissioned.
- TCP Acceleration Status – Indicates whether TCP Acceleration is operational. TCP Acceleration provides the expected performance on a satellite router.

Reception Information page

The Reception Information page shown in Figure 46 provides satellite router receive data such as receive status, number of frames received, frames that contain errors, and bad key frames. Each of these fields is explained below.

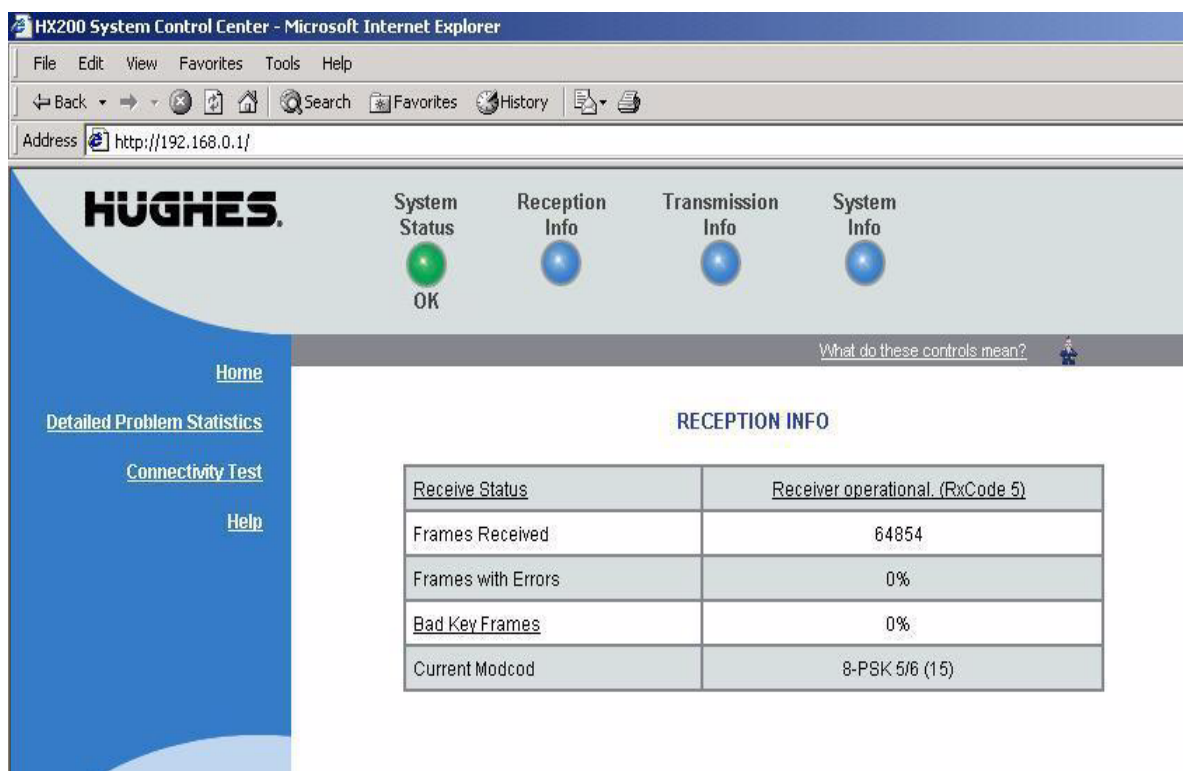


Figure 46: Reception Information page

- Receive status – Reports the status of the receive data path. Click on the blue status message to display relevant Help information. *Receive status messages* on page 67 describes the associated RxCodes in detail.
- Frames received – Reports the number of data messages received by the satellite router over the satellite link.
- Frames with Errors – Reports the percentage of received frames that were found to be corrupt. A continuously increasing value of frames with errors is an indication that

problems exist within the receive path. This may be the result of adverse weather conditions or a problem with either the receive cable or the antenna. However; a low number of frames with errors is no reason for concern, as long as the number does not increase and the system is functioning properly.

- **Bad Key Frames** – All data received over the satellite is encrypted. This field indicates the percentage of received frames that could not be decrypted successfully. A continuously increasing value indicates that the satellite router has not been properly commissioned.
- **Current Modcod** – Indicates the current modulation and coding scheme used on the HX200 DVB-S2 outroute.

Receive status messages

Table 7 lists the messages that may appear in the Receive Status field. The Corrective Actions column provides detailed information about each code and describes any possible corrective measures.

If a problem cannot be resolved by following the corrective measures, contact Technical Support.

RxCode 5 indicates that the satellite router is receiving data properly. This is the code you should see most often.



Note: The messages and associated corrective actions listed in Table 7 are current only as of this document's release. To ensure that you have the most recent information regarding these messages, click on the blue Reception Info indicator at the top of the screen and select the Receive Status option.

Table 7: Receive code (RxCode) messages and corrective actions

Code	Message	Corrective actions
1	The receiver is in pointing mode	Indicates that the installer is performing antenna pointing. In this mode, the transmitter is disabled because the installer is working near the antenna. If this occurs during normal operation, power-cycle the satellite router by turning the unit off, waiting 15 seconds, and turning it back on.
2	The receiver is in factory or gateway mode	Used for satellite router testing purposes only and should never appear during normal operation. If it appears during normal operation, power-cycle the satellite router by turning the unit off, waiting 15 seconds, and turning it back on.
3	The receiver is not locked to a signal	If the satellite router was operating before, this condition is probably caused by inclement weather conditions and may resolve itself when the weather improves. Could also indicate that the satellite router cannot receive the signal from the system gateway. This message indicates a signal level lower than 30, which could result from a weather outage at the user location, a system gateway outage, a misaligned or faulty antenna, or faulty cabling. If this message continues to appear under normal weather conditions, power-cycle the satellite router by turning the unit off, waiting 15 seconds, and turning it back on.
4	The receiver is locked to the wrong network	Should only occur during installation. Otherwise it indicates that the receiver is locked to an incorrect system satellite. Can also appear if the installer entered incorrect information during manual pointing. If this condition occurs during normal operation, it could indicate a manual change to the satellite parameters, or that the antenna has become misaligned. Ensure that the antenna is aimed at the correct satellite and verify that the correct satellite parameters were entered during registration.

Table 7: Receive code (RxCode) messages and corrective actions (Continued)

Code	Message	Corrective actions
5	The receiver is operational	Normal operating state for the receiver. Indicates that data is being received from the system gateway. The transmitter will only operate correctly when the receiver is in this state.
6	The receiver is not detecting a signal	Occurs when the unit is not detecting a radio signal from the antenna. May indicate a faulty receiver or faulty cabling between the receiver and the antenna. Check that the cables are firmly connected to the satellite router. (See the Caution statement that follows Figure 2 on page 13.) If this condition persists, power-cycle the satellite router by turning the unit off, waiting 15 seconds, and turning it back on.
7	The receiver is locked to an unknown network	Should only occur during installation or when the receiver is locked to a non-system satellite. In rare cases, may also be due to a transient outage at the system gateway. If this condition occurs during pointing or commissioning, the antenna has not been pointed correctly. If it occurs during normal operation, could indicate a change in satellite parameters, or that the antenna has become misaligned. If the satellite parameters have been changed, re-commission the site. Otherwise, repoint the antenna.

Transmission Information page

The Transmission Information page shown in Figure 47 displays satellite router transmit data such as transmit status, the number of packets submitted for transmission, the number of successful transmissions, and the number of failed transmissions. Each of these fields is described below.

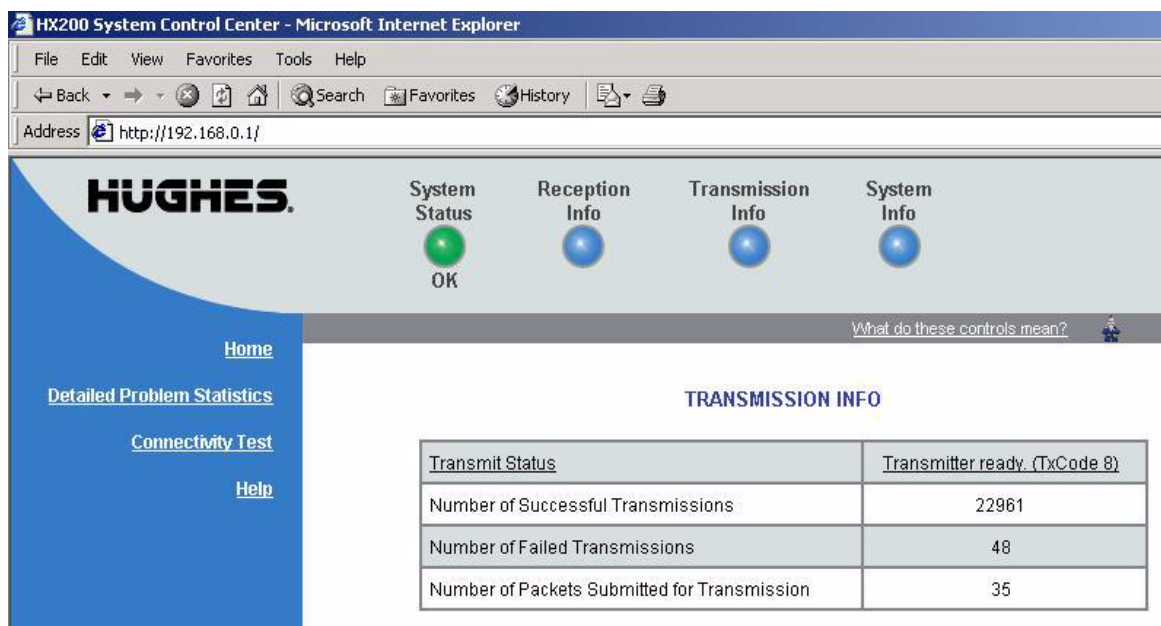


Figure 47: Transmission Information page

- Transmit status — Provides the status of the transmit data path. Click on the blue status message to display relevant Help information. *Transmit status messages* on page 70 describes the associated TxCodes in detail.
- Number of successful transmissions — Reports the number of frames transmitted to the satellite.
- Number of failed transmissions — Reports the number of frames that could not be sent. A continuously increasing value indicates a transmit problem. However; a low number of failed transmissions is no reason for concern, as long as the number does not increase and the system is functioning properly.
- Number of packets submitted for transmission – Indicates the total amount of data queued for transmission to the satellite.

Transmit status messages

Table 8 lists messages that may appear in the Transmit field. The Corrective Actions column provides detailed information about each code and describes any possible corrective measures.

If a problem cannot be resolved by following the corrective measures, contact Technical Support.

TxCode 8 indicates that the transmitter is working properly. This code should appear most often.



Note: The messages and associated corrective actions listed in Table 8 are current only as of this document's release. To ensure that you have the most recent information regarding these messages, click on the blue Transmission Info indicator at the top of the screen and select the Transmit Status option.

Table 8: Transmit code (TxCode) messages and corrective actions

Code	Message	Corrective actions
1	The transmitter has been disabled by the gateway	This condition occurs when the transmitter is disabled. A transmitter may be disabled for short periods of time by the system gateway either for service or troubleshooting. It may also be disabled if the user discontinues the satellite service. If this condition persists, it can only be corrected by requesting that the unit be enabled.
2	The transmitter has been placed in test mode by the gateway	This status requires no user action and usually takes no more than 15 minutes to complete. This condition occurs when the system gateway places the transmitter into special transmission modes to measure the performance of the transmitter. When in this mode, the unit is unable to transmit normal user data to the system gateway.
3	The transmitter is locking to the receive carrier	Occurs during initial startup or possibly when the receiver is locking to the receive signal. If this condition persists for more than 10 seconds, disconnect and reconnect the receiver coaxial cable and wait 10 seconds. If the situation still persists, it may be necessary to replace the satellite router.
5	The transmitter is not locked to the network timing	No action is required if this condition occurs occasionally and resolves itself quickly. However, if this condition persists, it is likely due to a system gateway-related service issue. The condition may also be due to satellite router failure; in rare cases, the unit may fail and may have to be replaced.
6	The transmitter is not available because the receiver is not detecting a signal or is not locked to the correct network	Check the receive signal. This condition occurs when the satellite router does not detect a strong enough signal. The receiver must be locked to the correct network for the transmitter to operate. If the receiver is not locked (no signal) or is locked to the wrong network, the transmitter is unable to transmit data. Check the System Status page to verify that the signal strength is satisfactory. This condition may also be caused by inclement weather.

Table 8: Transmit code (TxCode) messages and corrective actions (Continued)

Code	Message	Corrective actions
7	The transmitter is not available because the satellite receiver is not tuned for normal operation	Occurs when the transmitter is disabled for safety reasons. If this condition occurs during installation or commissioning, close the Antenna Pointing program and resolve the problem.
8	The transmitter is available	This is the normal operational state and indicates that the transmitter is ready to transmit data.
9	The transmitter is adjusting for optimal network timing	Typically occurs when the satellite router is first commissioned or the first time it is used for data traffic. This condition will normally occur before the satellite router can transmit successfully. Typically, this process usually takes less than a minute.
10	The transmitter is unable to communicate with the gateway	Indicates that the satellite router has stopped transmitting user data due to a number of failures when sending data to the system gateway over the satellite link. This condition could be the result of packet loss due to inclement weather conditions or, rarely, return channel equipment failures in the system gateway.
11	The transmitter is not available because the receiver software is out of date	Indicates that the software version currently running is out of date and no longer viable. From time to time, software updates are required to accommodate network infrastructure and feature upgrades as well as to maintain network efficiency and fix known problems. To ensure uninterrupted operation, these updates occur automatically. However, it is possible to miss an update if the satellite router is shut down for an extended period of time. Instruct the user to contact their service provider to obtain the software update.
12	The transmitter is not receiving network control messages from the gateway	Indicates an equipment outage at the HX system gateway. This should be a transient condition and the system should recover automatically. If it does not, contact Technical Support.

Table 8: Transmit code (TxCode) messages and corrective actions (Continued)

Code	Message	Corrective actions
13	The transmitter is unable to range because it cannot communicate with the gateway	<p>Ranging is the automated process of adjusting satellite transmitter timing and power. The satellite transmitter performs ranging as necessary to ensure that it can communicate successfully with the HX system gateway. This condition can indicate any of the following:</p> <ul style="list-style-type: none"> • The system gateway is not receiving ranging information from the transmitter. This may indicate a problem at the gateway and should resolve itself within a few minutes. • The transmitter is unable to achieve enough power to send ranging information to the system gateway. • The transmitter is sending incorrect timing data because incorrect latitude/longitude information was entered during installation. • The outdoor transmitter unit (ODU) is not operating properly or is not properly connected to the satellite router. Ensure that the transmit cable is securely fastened to the TRANSMIT connector. (See the Caution statement that follows Figure 2 on page 13.)
14	The transmitter is not available because ranging has failed	<p>Indicates that the transmitter is not operational due to a ranging failure. Ranging is the automated process of adjusting satellite transmitter timing and power. The satellite transmitter performs ranging as necessary to ensure that it can communicate successfully with the system gateway. A ranging failure may occur due to antenna misalignment or after several failed ranging attempts. Realign the antenna as necessary. This condition may also be caused by adverse weather conditions. In rare cases, this condition may also indicate system gateway issues but, in such cases, should clear within a few minutes. For repeated messages of this type on a system that was previously operational, try to force ranging by performing the Connectivity Test.</p>
15	The transmitter is waiting for a ranging request to be processed by the gateway	<p>Occurs when the system is busy adjusting power and timing for other users. This process may take up to a minute or more.</p>
16	The transmitter is waiting for a transmit request to be processed by the gateway	<p>Occurs when the system is unable to provide transmit bandwidth due to a large number of users signing on simultaneously. This condition should clear itself within a few minutes.</p>

Table 8: Transmit code (TxCode) messages and corrective actions (Continued)

Code	Message	Corrective actions
17	The satellite transmitter is unable to obtain an available transmission rate	Occurs if the transmitter is unable to range successfully. Ranging is the automated process of adjusting the satellite transmitter timing and power. The satellite transmitter performs ranging as necessary to ensure that it can communicate successfully with the gateway. This condition may be caused by incorrect bit rate mask usage or if the transmitter is unable to generate enough power to enable it to transmit, most likely because the antenna is not accurately pointed. However, it may also be problem with the transmitter power supply. Repoint the antenna. If the problem persists, check the power supply.
18	The transmitter is requesting a transmit pointing test	Occurs during initial installation when the Antenna Pointing program requests that the transmitter perform a transmit pointing test. This condition will continue until the system gateway responds that the transmitter is either actively performing the test or is queued to perform the test when gateway test resources become available. The transmitter may also report this condition for short periods of time (less than 5 seconds) when performing periodic transmit pointing tests during normal operation. No action is required.
19	The transmitter is queued for a transmit pointing test	May occur during initial installation after the Antenna Pointing program requests that the transmitter perform a transmit pointing test and the system gateway responds that the transmitter is queued for the next available test time. It may also occur when the transmitter is performing periodic background transmit pointing tests at the same time as other users on the network have requested tests. This is a normal state after initial installation.
20	The transmitter is performing a transmit pointing test	Occurs when one of the following tests are active: <ul style="list-style-type: none"> • During installation, the Antenna Pointing software requests that the transmitter performs a transmit pointing test. This condition will continue until the test is concluded and the Antenna Pointing software returns to normal operating mode. • The satellite router performs a periodic background transmit pointing test to make sure that the antenna is still pointed correctly. This periodic test takes less than 5 seconds. If this condition persists, power-cycle the satellite router by turning the unit off, waiting 15 seconds, and turning it back on.

Table 8: Transmit code (TxCode) messages and corrective actions (Continued)

Code	Message	Corrective actions
21	The transmitter is disabled because a transmit pointing test failed	Occurs when the transmitter fails a transmit pointing test, thereby indicating that the transmitter did not meet the minimum specifications required. This is likely due to an antenna installation problem. Fine-point the antenna. The transmitter will not transmit until the transmit pointing test passes.
22	The transmitter is disabled pending a transmit pointing test	Occurs when the transmitter is unable to perform a periodic background transmit pointing test within the allotted time frame. The transmitter is expected to be in this condition at random periodic intervals for no more than two minutes at a time. This condition can also occur after the transmitter is first powered on after it has been powered off for more than a 24 hours. If this condition persists for more than two minutes, it is likely that the automated transmit pointing components in the system gateway are experiencing problems. This condition should clear in a few minutes.
23	The transmitter is disabled because a transmit pointing test cannot be performed	Occurs when the transmitter cannot perform a transmit pointing test during initial installation or when ranging. Ranging is the automated process of adjusting the satellite transmitter timing and power. The satellite transmitter performs ranging as necessary to ensure that it can communicate successfully with the system gateway. The condition indicates that the system gateway components required to perform the transmit pointing test are not operational.
24	The transmit cable is disconnected	Indicates that the satellite router unit cannot detect the transmit cable connection. Ensure that the transmit cable is securely attached to the satellite router unit and to the transmitter on the antenna assembly. (See the Caution statement that follows Figure 2 on page 13.) Inspect the transmit cable and the antenna assembly to make sure that they are not damaged.
25	Uplink reset is in progress	This is a transitional state and requires no interaction. If the problem persists, contact Technical Support.
26	No inroute groups support Closed Loop timing	Indicates a problem at the HX System Gateway. If the problem persists, contact Technical Support.

System Information page

The System Information page shown in Figure 48 displays system information such as satellite router IP address, and site ID.

While all the information displayed on the System Information page may be useful, this section describes only the most important items.

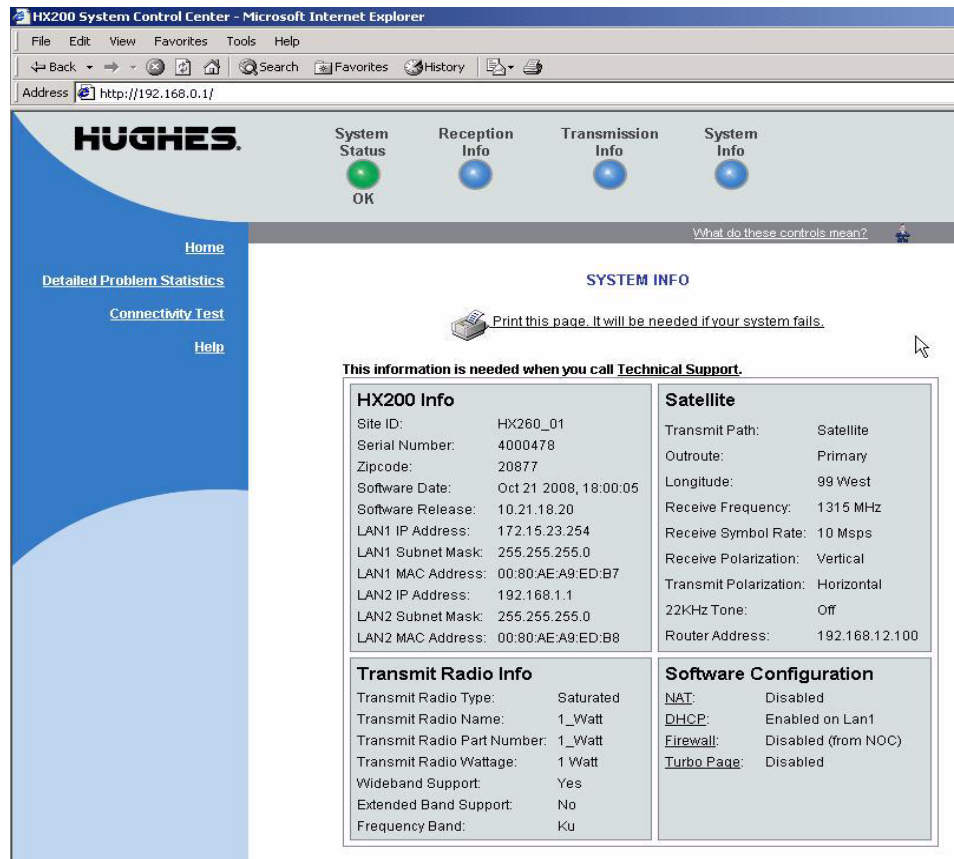


Figure 48: System Information page



Note: Print the System Information page and give it to the person at the remote site who is responsible for maintaining site equipment for safe keeping. Remote personnel may need this information if they need assistance and cannot access the System Control Center.

- Satellite section
 - Longitude – The satellite's longitude.
 - Receive frequency – Transponder frequency configured for the satellite router.

- Receive Polarization – Polarization orientation; either horizontal or vertical.
- Router Address – IP address of the primary system gateway router used to route data sent by the satellite router.
- Software Configuration section – Network address translation (NAT), DHCP, and firewall features are enabled or disabled at the system gateway per site requirements and cannot be changed by remote users.
 - Network Address Translation (NAT) – Typically used to allow multiple computers to share a single address on the Internet, also allows pre-configured remote networks to be integrated easily with the system network.
 - Dynamic Host Configuration Protocol (DHCP) – If enabled, simplifies network configuration of the computers. The computers need only to be set up to “Obtain IP address automatically.”
 - Turbo Page – An *optional* feature; enabled if the HX gateway is configured for Web Acceleration.
 - Firewall – If enabled, implements firewall rules and related policies. Firewall rules are configured on the system gateway in satellite router profiles.
- Transmit Radio Info
 - Transmit radio type
 - Transmit radio name
 - Part number
 - Transmit radio wattage
 - Wideband support
 - Extended band support
 - Frequency band

Connectivity Test page

The Connectivity Test page shown in Figure 49 may be used to test the connection between the satellite router and the system gateway. Instructions for executing a connectivity test are provided in *Checking system gateway connectivity* on page 100.

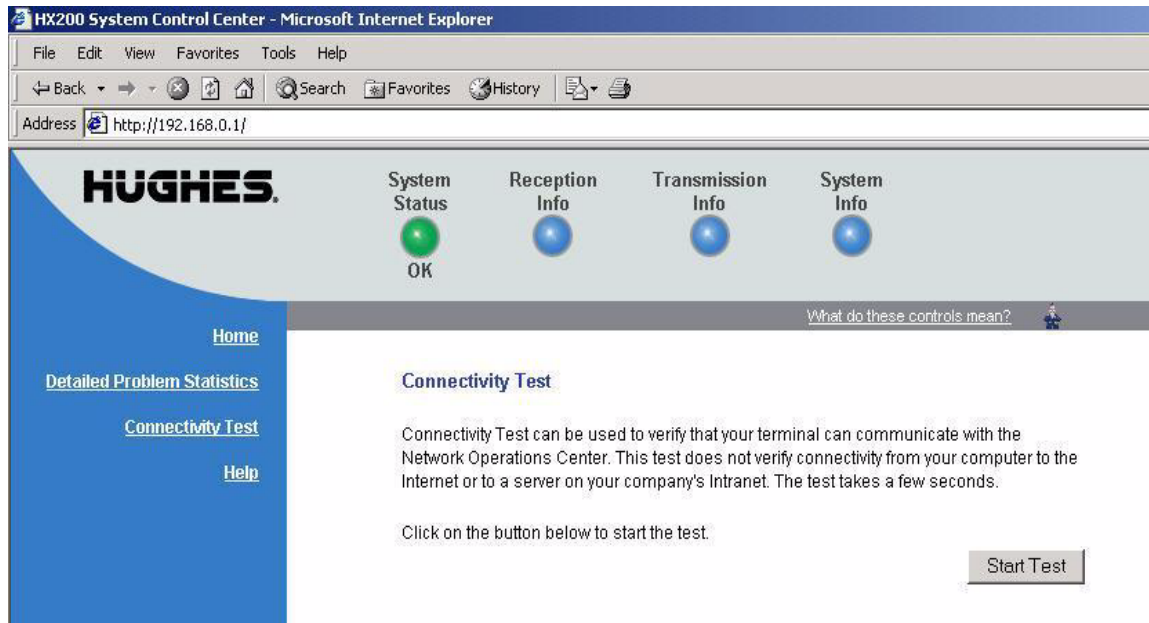


Figure 49: Connectivity Test page

Optional Features Pages

The HX200 satellite router has two optional features that, once enabled at the NOC, allow the operator to configure at the System Control Center.

The optional features are:

- Firewall
- Port Forwarding

The links to the configuration screens related to these features appear in the left area of the main pages.

A screen for viewing firewall statistics is also available when the firewall option is enabled. Note that the port forwarding option can only be configured when network address port translation (NAPT) has been enabled for the HX200 at the HX system gateway.

Firewall Configuration page

When remote firewall configuration for a satellite router is allowed at the system gateway, links for viewing Firewall Configuration and Firewall Statistics pages appear in the

navigation area of the four main System Control Center pages. The [Firewall Configuration](#) link opens the Firewall Configuration page shown in Figure 50.

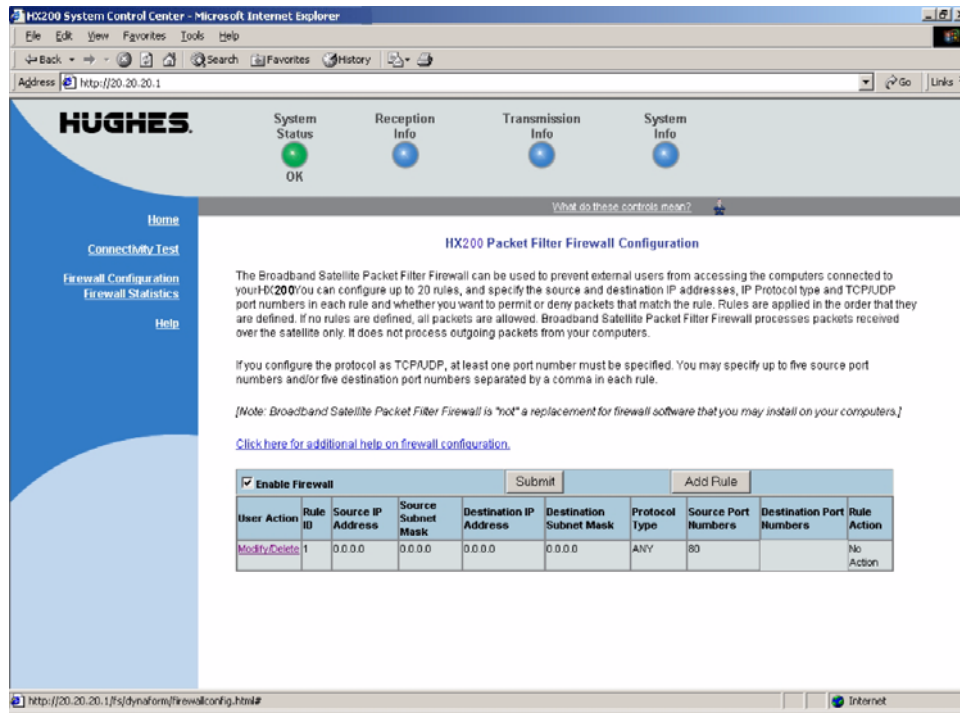


Figure 50: Firewall configuration page

Understanding how the firewall works

The Firewall Configuration page provides controls for creating and managing firewall rules. The firewall feature provides firewall protection for the computers connected to the HX200. The firewall rules that you create apply only to inbound traffic; that is, network traffic sent from the HX system gateway to the satellite router.

Think of firewall rules as templates against which network packets received from the system gateway are compared. When a packet matches the value or values defined in a rule, the *rule action* is applied to the packet. For example, if you:

- create a firewall rule that matches all traffic targeted to port 22 (that is, traffic from any source IP address to any destination IP address with a destination port of 22), and
- define the rule action as **BLOCKED**,

then packets with a destination port number of 22 addressed to any IP device behind the satellite router will be dropped.

Traffic is matched against firewall rules in the order that the rules are listed in the firewall rule table. The action of the first matching firewall rule is applied; no further matching is attempted after the first successful match.

Firewall rule restrictions

The following restrictions apply to firewall rules:

- The number of rules is limited to 20
- The number of ports defined in the Source Port and Destination Port fields is limited to 5 individually enumerated ports. Entering a port range is not supported.
- Rules are applied in the order listed in the firewall rule list. The rules cannot be reordered without deleting and recreating them.
- If ICMP is selected as the Protocol Type, all ICMP packets (ICMP Type 255) are filtered.

If the Protocol Type is set to either TCP or UDP, a minimum of one port number must be defined in either the Source or Destination Port Number fields.

Creating firewall rules

To create firewall rules:

1. Click the [Firewall Configuration](#) link in the System Control Center navigation area.
The Firewall Configuration page appears.
2. Click **Add Rule**.

The Firewall Rule Configuration page shown in Figure 51 appears. Note Figure 51 shows the page with the *Protocol Type* pull-down menu displayed.

3. Enter values in the Firewall Rule Configuration page as indicated in the field definitions in Table 9.



Note: To clear the fields in the rule configuration page and start over, click **Restore**.

4. Click **Save Rule**. The rule is saved.

Repeat Step 2 through Step 4 to add additional rules.

Figure 51: Create firewall rule page

Table 9: Firewall rule configuration fields

Field name	Value	Description
Rule ID	Integer	The rule ID is automatically generated and cannot be edited.
Rule Action	PERMIT BLOCK NOACTION	The action to perform on packets that match the rule IP address/port criteria. BLOCK drops the packet. PERMIT passes the packet. A rule which has NOACTION is the default catch-all rule and it should be the last rule in the table.
Source IP Address	IP address Default: 0.0.0.0	This is the source IP address for the packets received at the satellite router. This is used in conjunction with Source Subnet Mask to define the set of matching source IP addresses.
Source Subnet Mask	IP address	This is the IP address mask associated with Source IP Address . An address mask of 0.0.0.0 is considered as a <i>don't care</i> value, where any IP address matches the configured IP address. Set bits in the mask do not have to be contiguous.
Destination IP Address	IP address Default: 0.0.0.0	This is the destination IP address for the packets received at the satellite router. This is used in conjunction with Destination Subnet Mask to define the set of matching destination IP addresses.
Destination Subnet Mask	IP address	This is the IP address mask associated with Destination IP Address . An address mask of 0.0.0.0 is considered as a <i>don't care</i> value, where any IP address will match the configured IP address. Set bits in the mask do not have to be contiguous.

Table 9: Firewall rule configuration fields (Continued)

Field name	Value	Description
Protocol Type	TCP UDP ICMP ANY OTHER	This is the Protocol that is encapsulated in the IP packet. A value of OTHER indicates the value in the If “Other”, specify Protocol Number field should be used.
Source Port Numbers	One or more comma-separated Integer values.	Up to 5 port numbers separated by commas. If the Protocol Type is TCP or UDP, you must enter at least one port number in this field or the Destination Port Number field.
Destination Port Numbers	One or more comma-separated Integer values.	Up to 5 port numbers separated by commas may be entered. Only enter port numbers if Protocol Type is TCP or UDP.

Modifying and deleting firewall rules

You can modify or delete firewall rules at the Firewall Configuration page. To modify or delete a firewall rule:

1. Click the [Modify/Delete](#) link in the leftmost column of a firewall rule.

The Firewall Rule Configuration page appears, as shown in Figure 52, with the rule values displayed in the fields. Note that Figure 52 shows the page with the *Rule Action* pull-down menu displayed.

Figure 52: Modify/delete firewall rule page

2. To modify a rule, change the values in one or more of the fields, then click **Save Rule**.
3. To delete a rule, click **Delete Rule**.

Enabling and disabling the firewall Once firewall rules have been created, you can enable the firewall. You can also disable the firewall at any time.

- *To enable the firewall*, select the Enable Firewall checkbox located in the upper left corner of the firewall rule list, then click **Submit**.
- *To disable the firewall*, clear the Enable Firewall checkbox located in the upper left corner of the firewall rule list, then click **Submit**.

The Firewall Statistics page The Firewall Statistics page shows:

- The firewall status (enabled or disabled)
- The number of packets processed by the firewall
- The number of packets discarded by the firewall
- The number of packets discarded by each firewall rule

The three packet-count statistics are the number counted since the last time the **Clear Counters** button was clicked.

Viewing firewall statistics To view the Firewall Statistics page, click the [Firewall Statistics](#) link in the navigation area on the left-hand side of the System Control Center page. The Firewall Statistics page shown in Figure 53 appears.

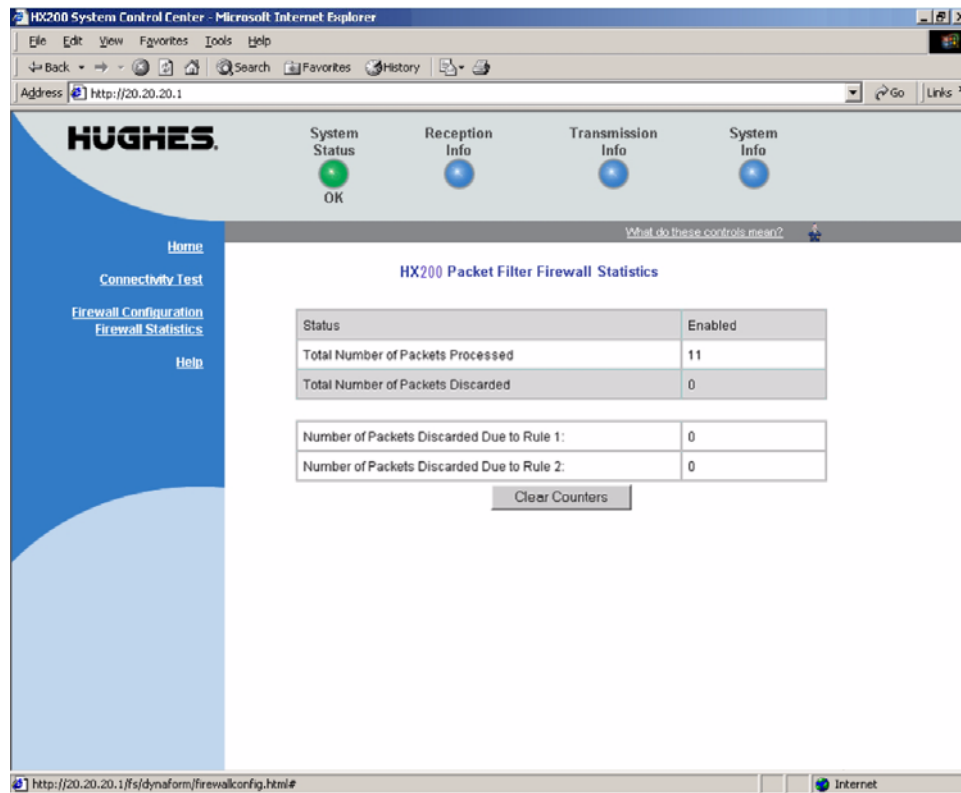


Figure 53: Firewall Statistics page

Resetting firewall statistics counters To reset the firewall statistics counters to zero, click **Clear Counters**.

Port Forwarding Configuration page

If an HX200 is connected to a system gateway that has NAPT enabled, and the satellite router is configured at the system gateway to allow local port forwarding control, a [Port Forwarding Configuration](#) link will appear in the navigation area on the left side of the System Control Center page. Clicking the link opens the Port Forwarding Configuration page shown in Figure 54, where you can create port forwarding rules.

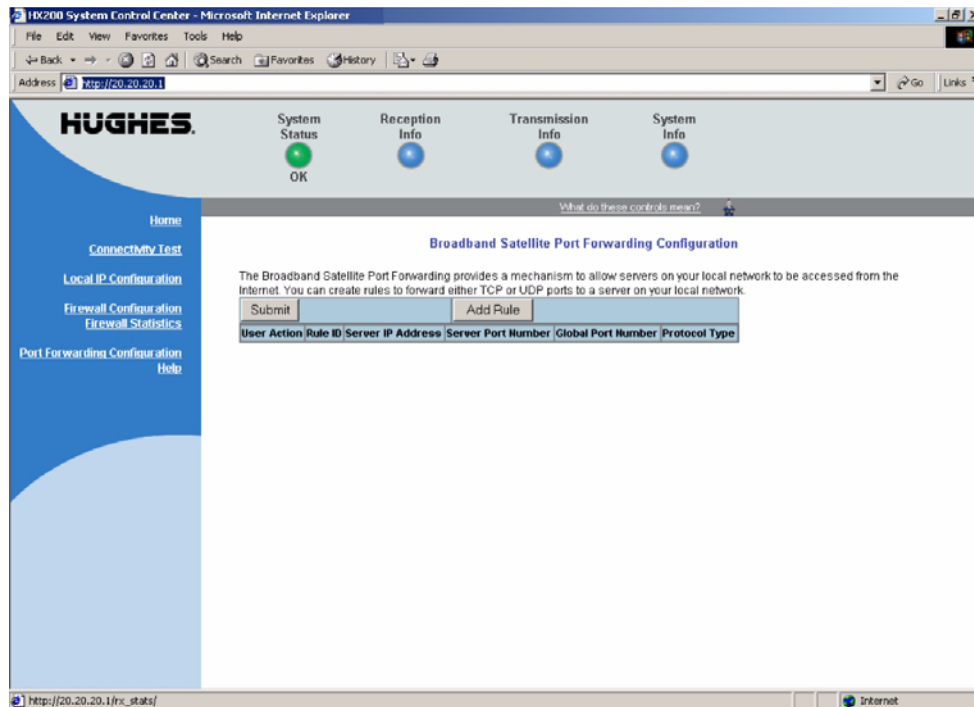


Figure 54: Port Forwarding Configuration page

Understanding port forwarding

NAPT, also called *port address translation*, or *PAT*, assigns private (non-routable) Internet addresses to computers on the LAN connected to the HX200. The HX200 IP address is used as the source address for all network traffic coming from the remote LAN, thus making it impossible for computers on the enterprise network behind the system gateway to directly address packets to, and communicate directly with, computers on the remote LAN.

The port forwarding feature provides a means for this communication to occur by mapping a port number to the IP address of a computer on the remote LAN. Computers behind the system gateway can address traffic to the HX200 IP address and this port number and the traffic will be forwarded to the IP address on the remote LAN associated with the port number.

The port forwarding feature also translates the port number in received traffic before sending it to its destination by replacing the received destination port value with a different one.

Port forwarding is configured using port forwarding rules. Controls for creating, modifying, and deleting port forwarding rules are provided. The rules are applied by matching the protocol type and destination port number in inbound packets (packets received from the HX system gateway) against the protocol type/port defined in the rules. If a packet matches, the port number in the packet header is rewritten with the port number defined in the rule and the packet is forwarded to the IP address defined in the rule.

Port forwarding rule restrictions

A maximum of 20 port forwarding rules can be created.

Creating port forwarding rules To create port forwarding rules:

1. Click the [Port Forwarding Configuration](#) link in the System Control Center navigation area.
The Port Forwarding Configuration page appears.
2. Click **Add Rule**.
The port forwarding rule configuration page shown in Figure 55 appears.

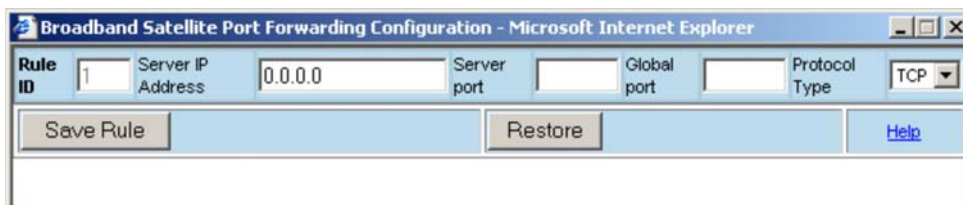


Figure 55: Create port forwarding rule page



Note: To clear the fields in the rule configuration page and start over, click **Restore**.

3. In the Server IP Address field, enter the IP address of the computer on the remote LAN to which traffic will be port-forwarded.
4. In the Server port field, enter the destination port number that should be used to replace the Global port value in matching packets before sending them to the remote LAN.
5. In the Global port field, enter the port number to match against inbound traffic from the HX system gateway. The

rule will be applied to traffic matching this port and the Protocol Type value.

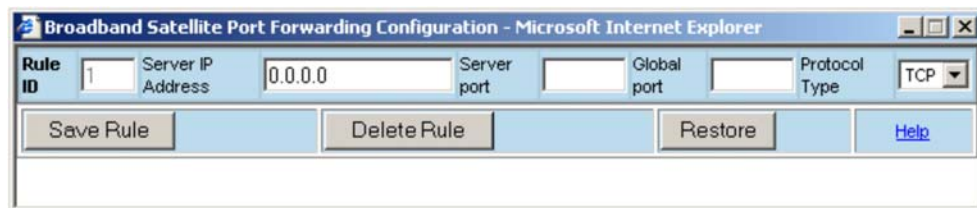
6. In the Protocol Type field, select the protocol type to match against inbound traffic.
7. Click **Save Rule**.
8. Repeat Steps 2 through 7 to add any additional port forwarding rules.
9. When you finish creating port forwarding rules, click **Submit** on the Port Forwarding Configuration page.

Modifying and deleting port forwarding rules

You can modify or delete port forwarding rules from the rule list displayed on the Port Forwarding Configuration page. To modify or delete a port forwarding rule:

1. Click the [Modify/Delete](#) link in the leftmost column of a port forwarding rule.

The port forwarding rule configuration page appears, as shown in Figure 56, with the rule values displayed in the fields.



The screenshot shows a web browser window titled "Broadband Satellite Port Forwarding Configuration - Microsoft Internet Explorer". The page contains a form with the following fields and controls:

- Rule ID:** A text box containing the value "1".
- Server IP Address:** A text box containing the value "0.0.0.0".
- Server port:** An empty text box.
- Global port:** An empty text box.
- Protocol Type:** A dropdown menu currently showing "TCP".
- Buttons:** Below the form are four buttons: "Save Rule", "Delete Rule", "Restore", and a "Help" link.

Figure 56: Modify/delete port forwarding rule page

2. To modify a rule, change the values in one or more of the fields according to the instructions in *Creating port forwarding rules* on page 86, then click **Save Rule**.
3. To delete a rule, click **Delete Rule**.
4. When you finish modifying or deleting port forwarding rules, click **Submit** on the Port Forwarding Configuration page

Help page

The Help page shown in Figure 57 contains information about receive and transmit status messages, installation, troubleshooting, and a number of other topics. Review the Help page to become familiar with the System Control Center and the satellite router.

Access the Help page by either clicking [View Help Topics](#) on the System Control Center home page or clicking the [Help](#) menu from any page.

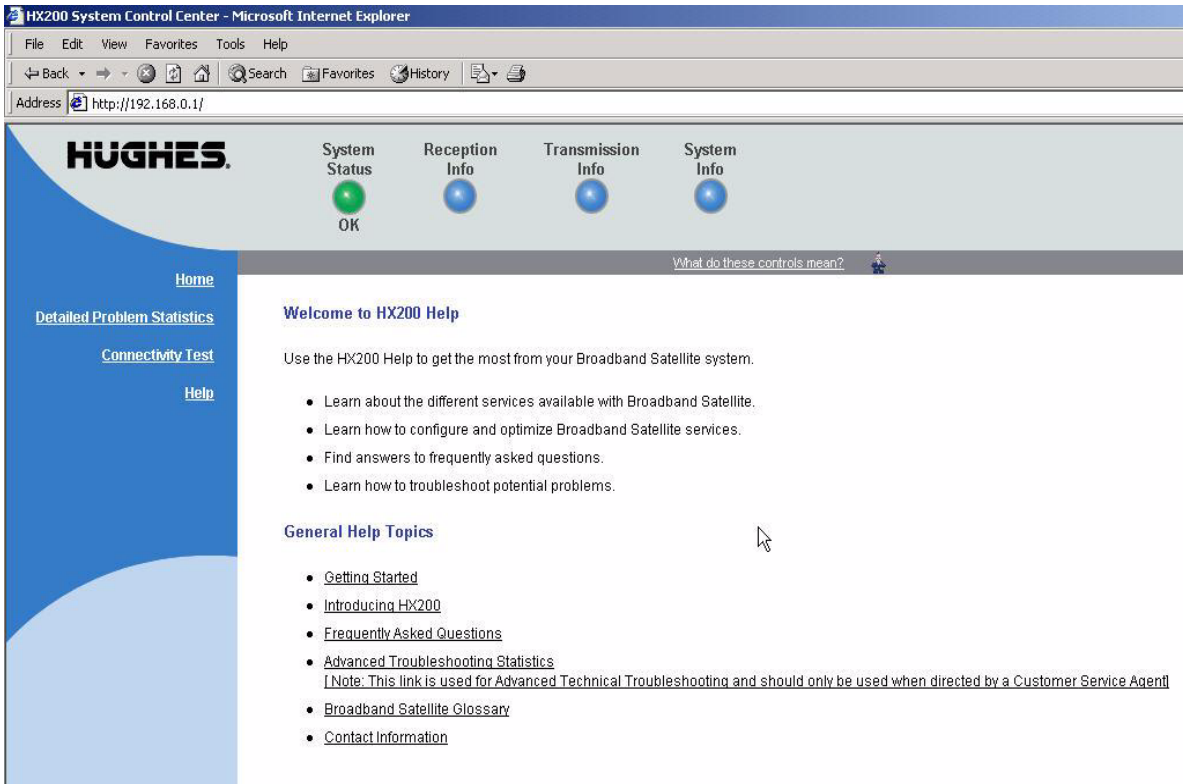


Figure 57: Help page

Advanced pages

The Advanced pages contain a great deal of information. You may need to access this information to communicate with Technical Support or to configure special features.

To access the Advanced pages, in the browser address bar type:

192.168.0.1/fs/advanced/advanced.html and press **ENTER**. The Advanced Configuration and Statistics page appears as shown in Figure 58.



Note: The Advanced pages provide access to critical configuration parameters and other functions. Do not use these pages unless you are a qualified technician who thoroughly understands how the satellite router operates or unless a Technical Support representative instructs you to access the Advanced pages for troubleshooting purposes.

S/N: 4000478
Main bin: [8.1.0.21]
Fallback bin: [8.1.0.18_PID]

Enable Auto Refresh: ☒ Interval (sec):

Advanced Menu

- General
 - Summary
 - SHM Monitor
 - SDL Config
 - Clear Stats
 - TCUP Config
 - TCUP Statistics
 - CAC Stats
 - Fallback Update
 - QOS Config
 - + -- More --
- + Outroute
- + Transmitter
- + Diagnostics
- + LAN/WAN
- + IP Routing
- + IP Stack/Services
- + Multi Star Mesh
- + MRI Stats
- + Firewall
- + PEP
- + Turbopage

Satellite Statistics Summary

Network Time: TUE DEC 09 20:08:08 2008

Adapter Main Statistics:

Signal Strength.....	98	Stream Msg-Ackd/Wakd.....	730/4
Flags.....	0x00000000	NonStream Msg-Ackd/Wakd.....	42/39
Stream Error Rate.....	0.54%	NonStream Error Rate.....	48.15%
UpTime (d:h:m:s)...	000:00:10:35	Aloha Starts.....	10
WakeUp Aloha Starts.....	1	Ranging Starts.....	1
Transport Alarm Bit....	0x0000	Frames Received.....	21426
Addresses Open.....	6	Frame Errors: CRC/Bad Key...	0/0
Carrier Info.....	099:W:13150	Miscellaneous Problems.....	160
Rate Code.....	512k 1/2 (TC)	No Receive Outroute Lock....	32
Inroute Group.....	2	No FLL Lock.....	1360
Inroute.....	-1	No Network Timing Sync.....	178
IQoS ID.....	2	Spreading Factor	Disabled
10 MHz Ref Clock.....	Internal		
Current Modcod.....	8-PSK 8/9 (16)		

Figure 58: Advanced page

Chapter 6

Troubleshooting

This chapter provides general troubleshooting procedures, including how to use the HX200 satellite router light-emitting diodes (LEDs) to troubleshoot problems with the unit.

HX200 LEDs

As shown in Figure 59, the HX200 has five LED indicators on its front panel that can be used for troubleshooting and fault isolation. If you cannot access the System Control Center, use the front panel LEDs to troubleshoot by following the procedures in this section in sequence.

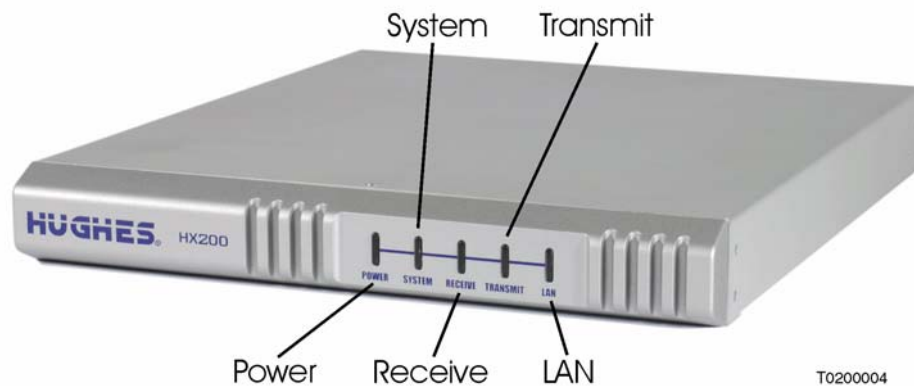


Figure 59: Satellite router LEDs

The functions of the LED indicators are:

- **Transmit** – The Transmit indicator shows whether the satellite router can transmit or is transmitting, or if some condition is preventing transmission.
- **Receive** – The Receive indicator shows whether the satellite router has acquired the correct outroute, is receiving, or if some condition is preventing reception.
- **Power** – The Power indicator shows whether or not the HX200 is powered on and operating normally.

- **System** – The System indicator shows whether or not the HX200 is operational.
- **LAN** – The LAN indicator shows whether the LAN is connected and usable, and whether there is receive or transmit activity.

LED appearances during normal operation

This section describes the appearance of the HX200 LEDs during normal satellite router operation.

When the satellite router is powered on and transmitting or receiving data or receiving data:

- The Transmit LED is on and blinks intermittently as frames are transmitted.
- The Receive LED is on and blinks intermittently as frames are received.
- The Power LED is on.
- The System LED is on.
- The LAN LED is on and blinks intermittently as packets are transmitted or received.

Table 10 provides additional information about the LEDs and what they indicate when they are on, off, blinking, or flashing. (*Blinking* means the LED is usually on, but intermittently turns off briefly. *Flashing* means the LED alternates between on and off for periods of 1/2 sec to 1 sec.) The table also suggests appropriate troubleshooting steps for each situation.

CAUTION



Do not power cycle the satellite router by unplugging the power cord from the back of the router. This could shock you and/or damage the satellite router.

Table 10: Satellite router front panel LED operation

LED	Appearance	Description
Transmit	On	OK.
	Blinking, mostly on	Transmitting data.
	Blinking, mostly off	The satellite router is ranging (measuring the distance to the satellite to calibrate transmit timing and transmit power).
	Off	Condition preventing transmission. If the HX200 is not operating normally and the receive LED is off, follow these steps: 1. Check all cable connections and tighten any connections that seem loose. (See the Caution statement that follows Figure 2 on page 13.) 2. If the LED still does not light up, power cycle the satellite router by turning it off using the power switch on the rear panel, waiting 10 seconds, and then turning it back on. 3. If the problem persists, contact Technical Support.
Receive	On	OK.
	Blinking	Receiving data.
	Off	Condition preventing acquisition of outroute (preventing receipt of data). If the HX200 is not operating normally and the receive LED is off, follow these steps: 1. Check all cable connections and tighten any connections that seem loose. (See the Caution statement that follows Figure 2 on page 13.) 2. If the LED still does not light up, power cycle the satellite router by turning it off using the power switch on the rear panel, waiting 10 seconds, and then turning it back on. 3. If the problem persists, contact Technical Support. Note: Often, if the Receive LED is off, the other LEDs may also be off.

Table 10: Satellite router front panel LED operation (Continued)

LED	Appearance	Description
Power	Solid	Power is on and the satellite router is functioning normally
	Flashing	<p>The satellite router is operating with the <i>fallback.bin</i> (backup) version of software.</p> <p>This usually happens when the satellite router is first installed. The satellite router operates with <i>fallback.bin</i> until the primary version of software, <i>main.bin</i>, successfully downloads over the satellite link.</p>
	Off	<p>No power.</p> <p>If the Power LED is off, take the following steps. Note that if the Power LED is off, it is likely that the remaining LEDs will be off as well.</p> <ol style="list-style-type: none"> 1. Check all cable connections and tighten any that seem loose. (See the Caution statement that follows Figure 2 on page 13.) 2. If the problem persists, contact Technical Support. <p>Fatal Error Indication:</p> <p>If after power-up or a reset the Power LED is off <i>and</i> one or more of the other LEDs is flashing, the unit could have a fatal error and may have to be replaced. If you do <i>not</i> see these LED indications, proceed to the next troubleshooting step.</p> <p>If there is a fatal error indication (Power LED off and other LED or LEDs flashing), try power cycling the satellite router by disconnecting the power cord from the power strip or surge protector, waiting 10 sec, and then plugging it back in. The satellite router may recover. If the fatal error indication continues, the satellite router must be replaced. Contact Customer Support.</p>
System	On	The satellite router has established a connection with the NOC.
	Off	<p>Condition preventing full operation.</p> <p>If the System LED does not light up, but the Transmit and Receive LEDs are functioning normally, there may be a problem at the system gateway. Perform the following steps:</p> <ol style="list-style-type: none"> 1. Wait 15 minutes. If there is a problem at the gateway, it may soon be corrected and the System LED light up. You can then resume normal operation. 2. If the LED does not come on after 15 minutes, power cycle the satellite router by turning it off using the power switch on the rear panel, waiting 10 seconds, and then turning it back on. 3. If the problem persists, contact Technical Support.

Table 10: Satellite router front panel LED operation (Continued)

LED	Appearance	Description
LAN	On	LAN is connected and usable.
	Blinking	There is transmit or receive activity on the LAN.
	Off	<p>If the LAN LED is off, perform the following steps:</p> <ol style="list-style-type: none"> 1. Make sure the Ethernet cable is connected to the satellite router LAN port and to the computer's Ethernet port. 2. If the LAN LED is still off, power cycle the satellite router by unplugging the power cord from the power source, waiting 10 sec, and plugging it back in. 3. If the LAN LED is still not off, check to see if the computer's NIC is installed correctly. (On a Windows computer, use the Device Manager to see if the NIC is functioning correctly.) 4. If the LAN LED is still off after fixing any NIC problems, power cycle the satellite router by turning it off using the power switch on the rear panel, waiting 10 seconds, then turning it back on. If this doesn't solve the problem, refer to the vendor that supplied the network equipment. 5. If the LAN LED is still off, connect the HX200 to another computer. If the Power and LAN LEDs light up, the problem is in the computer (the one first connected to the satellite router). If they still do not light up, contact Technical Support.
All	Flashing	If all LEDs are flashing simultaneously, this is an indication that the satellite router's firmware is corrupted. A satellite router in this state cannot be recovered. Contact Customer Support.
	Off	<p>If all the LEDs on the front panel are off:</p> <ol style="list-style-type: none"> 1. Make sure the power connections are secure. 2. If the satellite router is connected to a power strip or surge protector, make sure the power strip or surge protector is turned on. 3. If the power connections are secure, power cycle the satellite router by unplugging the power cord from the power source, waiting 10 sec, and then plugging it back in. 4. Make sure there is not a problem with the power source. 5. If the LEDs do not light, contact technical support for assistance.
<p>Shaded cells – Operational problem indicated. Unshaded cells – Normal operation.</p>		

Connectivity problems

When troubleshooting connectivity problems, start with these steps:

1. Connect the Ethernet port of the computer you will use for troubleshooting directly to the HX200 LAN1 port (or whichever LAN port on the unit has an assigned IP address, as indicated on the System Control Center System Information screen), bypassing any network equipment at the remote site.
2. On the computer connected to the HX200, disable firewall, intrusion detection/prevention, or any other software designed to block or alter network traffic.
3. If the satellite router has firewall rules configured that can be edited on the satellite router, disable the firewall as explained in *Enabling and disabling the firewall* on page 83.
4. Retest to confirm that the problem still exists.

If the problem persists, proceed with the remaining troubleshooting steps in this chapter.

Cannot access the System Control Center

If you cannot access the System Control Center, refer to the appropriate troubleshooting procedure for the hardware configuration:

- *Computer is connected directly to the satellite router*
- *Satellite router is connected to an Ethernet device*

Computer is connected directly to the satellite router

Follow the steps below if the computer is connected directly to the satellite router. If you complete a step and the System Control Center does not appear, continue with the next step. Repeat the steps once more before contacting Technical Support.

1. Make sure that the HX200 is powered up by checking the front panel LEDs. The Power and LAN LEDs should be steadily on.



Note: If there is LAN activity, the LAN LED may be blinking.

2. Open a web browser.
3. Type **192.168.0.1** in the browser address field or, if an alternate IP address was assigned to the satellite router at the HX system gateway, use that IP address instead. Press **ENTER**.
4. If you are still unable to access the System Control Center, continue with *HX200 LEDs* on page 91.

Satellite router is connected to an Ethernet device

Follow the steps below if the satellite router is connected to an Ethernet device such as a router or a wireless base station:

1. Disconnect the Ethernet cable from the HX200 satellite router and connect it to the Ethernet port on the computer.
2. Restart the computer.
3. Make sure that the HX200 satellite router is powered up by checking the front panel LEDs. The Power and LAN LEDs should be steadily on.



Note: If there is LAN activity, the LAN LED may be blinking.

4. Open a web browser.
5. Type **192.168.0.1** in the browser address field or, if an alternate IP address was assigned to the satellite router at the HX system gateway, use that IP address instead. Press **ENTER**.

If you are able to access the System Control Center after connecting the HX200 directly to the computer, the Ethernet device may not be configured properly. Refer to the Ethernet device documentation for instructions on how to configure it properly. Make sure to reconnect the HX200 to the Ethernet device before attempting to access the System Control Center again.

If you are still unable to access the System Control Center, continue with *HX200 LEDs* on page 91.

Cannot access network resources

Use the procedures in this section to troubleshoot problems reaching the enterprise network behind the HX system gateway, characterized by an inability to use enterprise services.

If you can access the System Control Center but are unable to reach the enterprise network—for instance, if you are unable to ping enterprise DNS servers that should be reachable behind the system gateway, complete the troubleshooting procedures in this section in sequence. If, after completing these procedures, the problem persists, contact Technical Support for assistance.

Accessing the System Control Center

Access the HX200 System Control Center by opening a web browser on a computer connected to the HX200 and using one of the following methods:

- Type **192.168.0.1** in the browser address field, or if an alternate IP address was assigned to the HX200 at the system gateway, use that IP address instead.
- Press **ENTER**.

Confirming that the satellite router is commissioned

Follow these steps to confirm that the HX200 satellite router has been properly commissioned:

1. Navigate to the System Control Center System Information page.
2. In the area labeled **HX200 Info**, check the Site ID field. If the numeric site ID appears, the HX200 has been commissioned properly. Proceed to *Checking the receive signal*.
If the phrase `Not Commissioned` appears, an error occurred during the commissioning process. Recommission the satellite router.

Checking the receive signal

Follow these steps to confirm that the HX200 is receiving satellite signals properly:

1. Navigate to the System Control Center Reception Information page.
2. In the Receive Status field, check the Rx Code.
If the Rx Code reads `Receiver operational (RxCode 5)`, the satellite router is receiving signals properly. Proceed to *Checking the transmit signal*. If any other Rx Code appears, the satellite router is not receiving signals properly. Click on the Rx Code and follow the troubleshooting procedures that appear on the screen.

Weather and signal strength

Heavy rain or snow can interfere with signal strength. In such conditions, the satellite router may stop receiving satellite signals, and the Receive LED may go out as a result. Similar conditions at the HX system gateway can interfere with signals for brief periods of time as well. In addition, the buildup of moisture, snow, or ice on the antenna can interfere with the signal. Signal strength should be restored as the rain or snow subsides.

Checking the transmit signal

Follow these steps to confirm that the HX200 is properly transmitting signals to the satellite:

1. Navigate to the System Control Center Transmission Information page.
2. In the Transmit Status field, check the Tx Code.

If the Tx Code reads *Transmitter ready* (TxCode 8), the satellite router is transmitting signals properly. Proceed to *Checking that TCP Acceleration is operational*.

If any other Tx Code appears, the satellite router is not transmitting signals properly. Click on the Tx Code and follow the troubleshooting procedures that appear on the screen.

Checking that TCP Acceleration is operational

Transmission Control Protocol (TCP) Acceleration is a proprietary protocol provided by the HX system. It optimizes performance for TCP/IP-based applications, including faster downloads over satellite.

1. Navigate to the System Control Center System Status page.
2. Check the message in the TCP Acceleration Status field.

If the message reads *Operational*, TCP Acceleration is enabled. Proceed to *Checking that Web Acceleration is operational*.

If the message says *Inactive*, TCP Acceleration is disabled. Perform the following steps:

- a. Check the receive and transmit signals as explained above, to ensure that the satellite router is transmitting and receiving properly. If it is not, troubleshoot as previously described.
- b. If the satellite router is receiving and transmitting properly but TCP Acceleration is still not operational, power cycle the HX200 by turning it off using the power switch on the rear panel, waiting 10 seconds, then turning it back on.
- c. Check the TCP Acceleration Status field again. If it is enabled, but you still cannot access enterprise network resources, proceed to *Checking that Web Acceleration is operational*. If TCP Acceleration is still disabled, contact Technical Support.

Checking that Web Acceleration is operational

Web Acceleration is a system feature that enhances the browsing experience on non-secure web sites. Follow these steps to confirm that Web Acceleration is operating properly:

1. From the System Control Center Home page or any of its sub-pages, check the **System Status** indicator. If the indicator is yellow, Web Acceleration may not be operational. Continue with Step 2.
2. Access the System Status page by clicking the **System Status** indicator and check the message in the Web Acceleration Status field. If the message says *Operational*, Web Acceleration is enabled. Proceed to *Checking system gateway connectivity*.

If the message says **Not Operational**, Web Acceleration is disabled. Perform the following procedure:

- a. Check the receive and transmit signals as explained above, to ensure that the satellite router is transmitting and receiving properly. If it is not, troubleshoot as previously described.
- b. Wait two hours. If Web Acceleration has not returned to **Operational**, go to step c.
- c. Power cycle the satellite router by turning it off using the power switch on the rear panel, waiting 10 seconds, then turning it back on; then check the Web Acceleration status again. If it is still not operational, or operational but you cannot access enterprise services, contact Technical Support.

Checking system gateway connectivity

Use the System Control Center [Connectivity Test](#) link to check connectivity to the HX system gateway.



Note: It may be helpful to open a second web browser to access the Help page while executing the connectivity test.

1. Navigate to the System Control Center Connectivity Test page and click **Start Test**. Refer to *Connectivity Test* page on page 78 for more information.
2. If, after a successful connectivity test, you still cannot access enterprise resources, *ping* the router address from the computer. Ping is a network command that helps you check whether a remote computer can be reached on an IP network. By sending a packet to a designated address and waiting for a response, the ping command is used diagnostically to ensure that a host computer you are trying to reach is both operating and reachable.
 - a. Navigate to the System Information page and record the router address listed in the Satellite panel.
 - b. Open a command or terminal window to obtain a system command prompt. If you are running Windows, click **Start**→*Run*. At the Run dialog box, type **command** in the Open field and click **OK**.
 - c. At the system prompt, type **ping <router address>** using the router address recorded in Step a, then press **ENTER**.
 - d. Close the command window after viewing the results of the ping command.

A successful ping will display a Reply message from the router address, while a failed ping will notify you that the request timed out.

If, after a successful ping, you still cannot reach the enterprise network, proceed to *Checking enterprise network connectivity*. If pinging the Router Address fails and DHCP is disabled on the satellite router (as indicated in the Software Configuration panel of the Control Center System

Information screen), the default gateway address may not be set correctly in the computer's operating system settings. The default gateway address should be set to the satellite router IP address received during commissioning. This address is displayed in the IP address line of the HX200 LAN port connected to the workstation—that is LAN1, or LAN2—in the HX200 Info panel of the System Information screen.

Make the correction in the computer's operating system settings and repeat the sequence above.

If the tests still fail, power cycle the satellite router by turning it off using the power switch on the rear panel, waiting 10 seconds, and then turning it back on. If you still cannot access enterprise services, contact Technical Support.

Checking enterprise network connectivity

This section explains how to troubleshoot enterprise network connectivity issues.

1. If there is a firewall in place, check that none of its settings are blocking access to the enterprise network. If you are not familiar with this process, disable the firewall. If you can access the enterprise resources after disabling the firewall, you will need to set up the firewall in such a way that it does not block HX system operation. Refer to the firewall manufacturer's instructions.
2. Open a command or terminal window to obtain a system command prompt. If you are running Windows, click **Start**→**Run**. At the Run dialog box, type **command** in the Open field and click **OK**.
3. Ping a routable address on the enterprise network that you know responds to pings, such as an E-mail or Intranet server. For example, if the enterprise network provides Internet connectivity, try pinging **time.nist.gov** or any other Internet address that you know responds to pings.

Type **ping <address>**, then press **ENTER**.

If the ping test succeeds, there may be a temporary problem with the resource you originally tried to access. Wait a few minutes, then try to access the resource again.

If the ping test fails, continue with step 4.

4. Ping the IP address of an enterprise domain name server that serves the remote site.
 - a. Determine the IP address of the domain name server.



Note: If the enterprise network uses a naming system other than domain naming service (DNS), for example Windows Internet naming service (WINS), substitute the IP address of a WINS server serving the remote site.

- b. Type **ping <server IP>**, then press **ENTER**.
If you still cannot reach enterprise network resources after a successful ping test, proceed to *Checking DNS settings*.
If the ping test fails, contact Technical Support for assistance.

Checking DNS settings If you can ping the enterprise DNS (or WINS) server but cannot use resources on the enterprise network, follow the steps below to check the naming system settings on the computer. Note that the steps may vary slightly, based on the computer's operating system.

1. Open a command or terminal window to obtain a system command prompt. If you are running Windows, click **Start**→**Run**. At the Run dialog box, type **command** in the Open field and click **OK**.
2. If you are using a Windows computer, type **ipconfig /all** at the command prompt. If you are using Linux, type **ifconfig -a**
3. Press **ENTER**.
4. Locate the DNS or WINS addresses in the command output.
5. Close the command window.

If the addresses are correct, wait a few minutes, then try to access the network resource again. If you are still unable to access the resource, proceed to *Checking for viruses*.

If the addresses are not correct and the computer connected to the satellite router is running Windows, see the documentation for the naming system used by the operating system.

Checking for viruses

If you have completed all the steps in this section and still cannot browse the Internet, check the computer for viruses. If you find a virus, delete or disable it and try to browse again.

If a firewall is used, make sure none of its settings are blocking access to the Internet or to the Hughes servers. Make sure you are using the latest version of any anti-virus and/or firewall software.

No browsing issues

This release contains a troubleshooting tool for users having *no browsing* issues potentially caused by the TurboPage server. If a no-browsing issue is detected and the following conditions are true:

- Able to access the System Control Center to perform secure browsing
- Connectivity test works successfully

Resolve the problem possibly caused by the Turbo Page server, as follows:

1. Navigate to the Advanced Page.
2. Click the Turbo Page->Advanced Cfg link in the left menu bar.
3. Select the *Auto-Select TurboPage Server* option.
4. Click the **Tear down Turbo Page Connection** button.
5. Re-try browsing.

Hot cable connector

If the transmit or receive cable connector feels hot, it may be because the connector is loose or defective. Troubleshoot this problem as follows:

1. Remove power from the satellite router.
2. Allow the cable connector to cool for at least 5 min.
3. Make sure the connector feels cool.
4. Make sure the cable connector is finger tight with no play.
(See the Caution statement that follows Figure 2 on page 13.)
5. Reapply power to the satellite router by plugging the power supply into the surge protector or AC outlet.
A surge protector is recommended.
6. Wait 5 min.
7. Check the connector.

If the connector is hot, it may be defective and should be replaced.

Slow transmission speed or intermittent operation

If you notice that the satellite router's transmission speed is slow or that operation is intermittent, make sure the transmit and receive cable connectors are finger tight. (See the Caution statement that follows Figure 2 on page 13.)

Appendix A

Configuring a Windows computer to support DHCP

This appendix explains how to configure a site computer to support Dynamic Host Configuration Protocol (DHCP). All HX200 satellite router come from the factory with DHCP enabled. Therefore, the computer must have DHCP enabled and set to obtain IP addresses automatically.

Windows XP



1. From the Windows desktop, select **Start**→*Settings*→*Control Panel*. Double-click the Network and Dial-up Connections icon.

Note: If the Control Panel is in Category view, select *Network* and *Internet Connections*, then select *Network Connections*.

2. A list of network adapters appears as shown in Figure 60. The Local Area Connection icon must appear under the LAN or High-Speed Internet heading. If it does not, the network is not installed correctly.

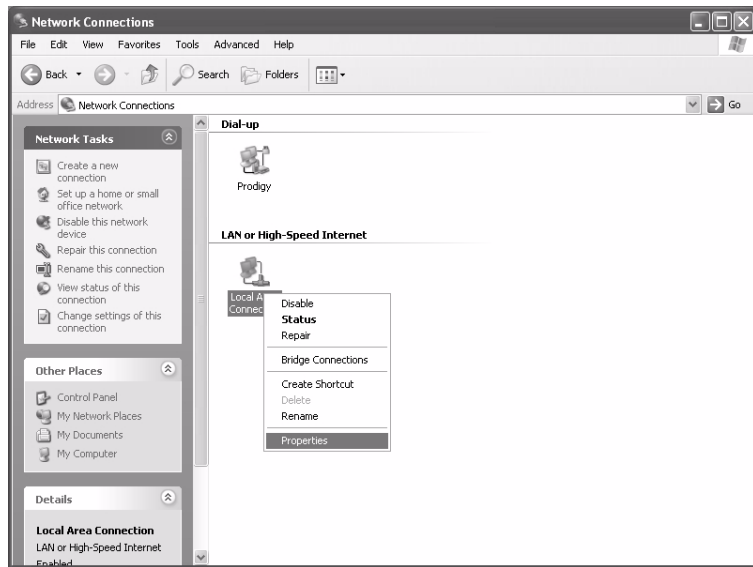


Figure 60: Network Connections - Windows XP

3. Right-click the Local Area Connection icon that represents the Network adapter connecting the computer to the Satellite Gateway, and select **Properties**.



Note: If the Local Area Connection icon appears with a red X, check the connections. You cannot successfully configure the system until the red X is cleared.

4. Ensure that the Client for Microsoft Networks and Internet Protocol (TCP/IP) are installed and checked as shown in Figure 61. If NetBEUI is installed, uninstall it.

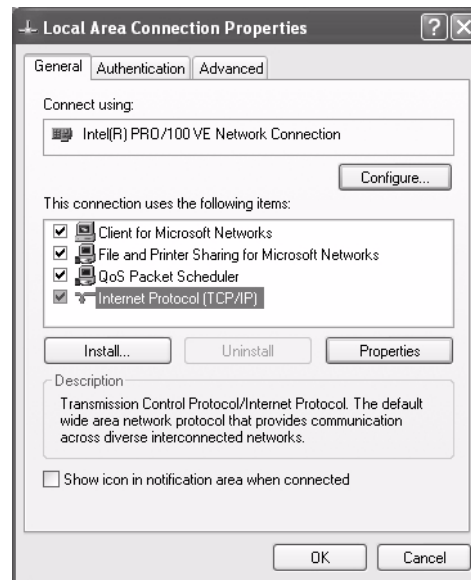


Figure 61: Local Area Connection Properties - Windows XP

5. Highlight Internet Protocol (TCP/IP). Be careful not to uncheck the check box.
6. Click **Properties**. The Internet Protocol Properties window appears as shown in Figure 62.

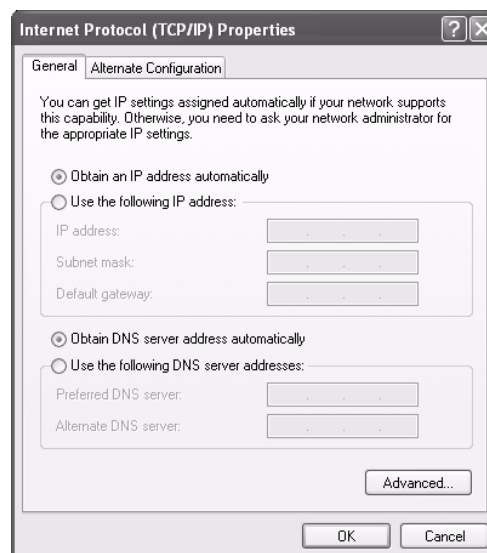


Figure 62: Internet Protocol Properties - Windows XP

7. Ensure that both Obtain an IP address automatically and Obtain DNS server address automatically options are selected. If not, select them.
8. Select **OK** to close the open dialog boxes and finish the configuration.
9. Restart the computer even if Windows does not require you to do so. This ensures that the network settings are automatically reset.

Windows 2000

1. On the client computer Windows desktop, select **Start**→*Settings*→*Control Panel* and double-click Network and Dial-up Connections.
2. A list of network connections appears as shown in Figure 63. The Local Area Connection icon must appear on the page. If it does not, the network is not installed correctly.

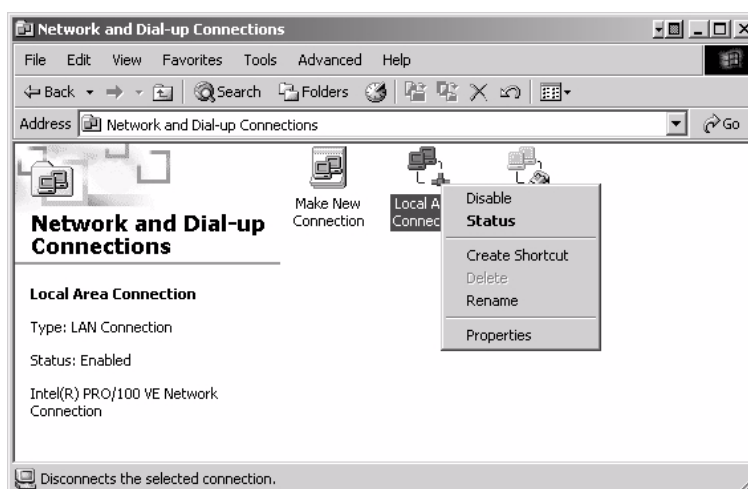


Figure 63: Network and Dialup Connections - Windows 2000

3. Right-click the Local Area Connection icon that represents the terminal network connection and select Properties from the popup menu. The Local Area Connections Properties window appears as shown in Figure 64.

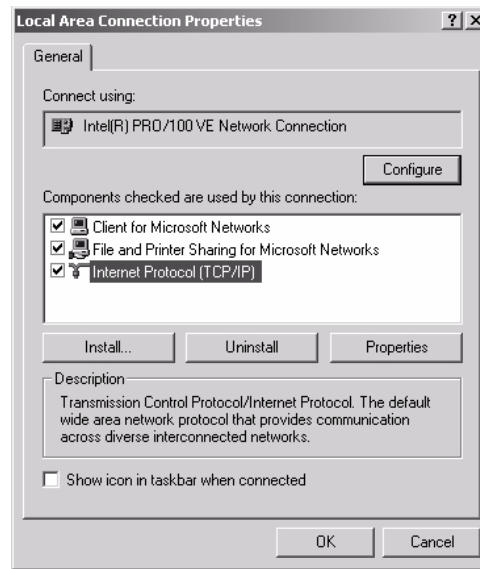


Figure 64: Local Area Connection Properties - Windows 2000

4. Ensure that the Client for Microsoft Networks and Internet Protocol (TCP/IP) are installed and checked. If NetBEUI is installed, uninstall it.
5. Select Internet Protocol (TCP/IP). Be careful not to uncheck the check box.

6. Click **Properties**. The Internet Protocol Properties window appears as shown in Figure 65.

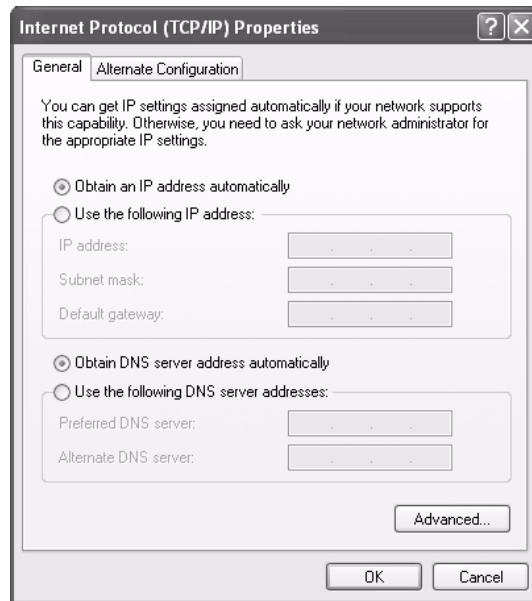


Figure 65: Internet Protocol Properties - Windows 2000

7. Ensure that both Obtain an IP Address Automatically and Obtain DNS Server Address Automatically are selected. If not, select them.
8. Select **OK** to close the open dialog boxes and finish the configuration.
9. Restart the computer even if Windows does not require you to do so. This ensures that the network settings are automatically reset.

Updating the satellite router software

This appendix explains how to use the Fallback Updater utility to update the satellite router *fallback.bin* file with the current software release. Use the procedures in this appendix only when instructed to do so by Hughes.

Before updating the *fallback.bin* file and installing the satellite router, you must first copy the Fallback Updater utility to the installer laptop. The utility is distributed to installers in an e-mail message and is available for download from the Hughes installation support web site. Contact Technical Support for the web site address, if necessary.

Saving the utility on the installer laptop

Follow these steps to save the Fallback Updater utility on the installer laptop:

1. Obtain the self-extracting file containing the Fallback Updater utility and its supporting files from either the e-mail message or the installation support web site.
2. Copy the self-extracting file to the installer laptop.
3. Open the self-extracting file. The Self-Extractor window appears as shown in Figure 66.

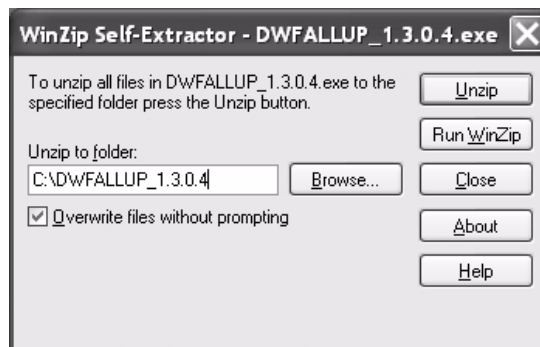


Figure 66: Saving the Fallback Updater utility

4. Use the **Browse** button to select a location in which to unzip and save the utility and its supporting files.



Note: Make a note of the location in which the utility and its supporting files are saved. You will need to know the location of these files to use the utility.

5. Click **Unzip**.

Configuring the TCP/IP properties on the installer laptop

Before using the Fallback Updater utility, you must first manually configure the TCP/IP properties on the installer laptop. This section explains how to configure TCP/IP properties for Windows 98 Second Edition (SE), Windows Millennium Edition (Me), Windows 2000, and Windows XP operating systems.

Windows XP

1. From the Windows desktop on the installer laptop, select **Start**→*Settings*→*Control Panel*. Double-click the *Network and Dial-up Connections* icon.



Note: If the Control Panel is in Category view, select *Network* and *Internet Connections*, then select *Network Connections*.

2. A list of network adapters appears as shown in Figure 67. The Local Area Connection icon must appear under the LAN or High-Speed Internet heading. If it does not, the network is not installed correctly.

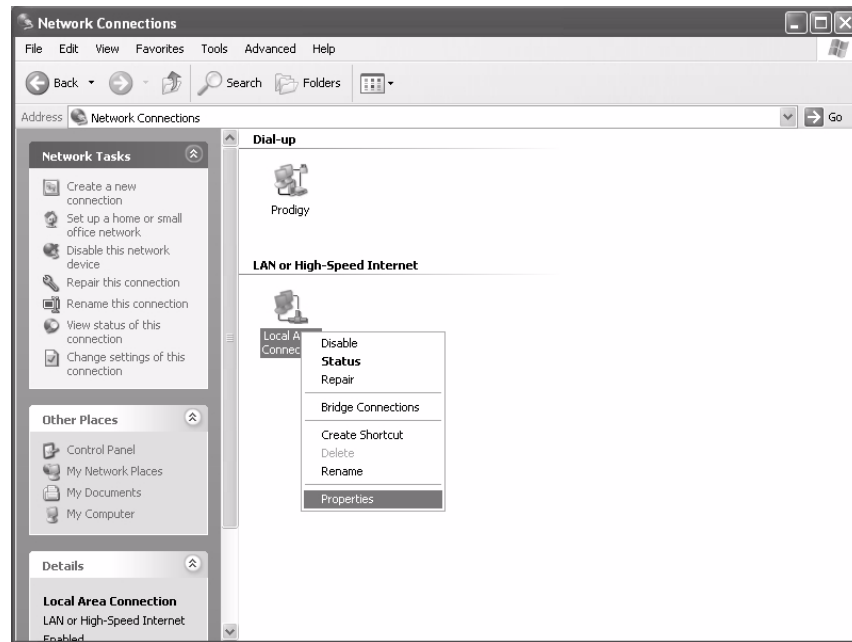


Figure 67: Network Connections - Windows XP

3. Right-click the Local Area Connection icon that represents the Network adapter connecting the computer to the Satellite satellite router, and click **Properties**.



Note: If the Local Area Connection icon appears with a red X, check the connections. You cannot successfully configure TCP/IP properties until the red X is cleared.

4. Ensure that the Client for Microsoft Networks and Internet Protocol (TCP/IP) are installed and checked as shown in Figure 68. If NetBEUI is installed, uninstall it.

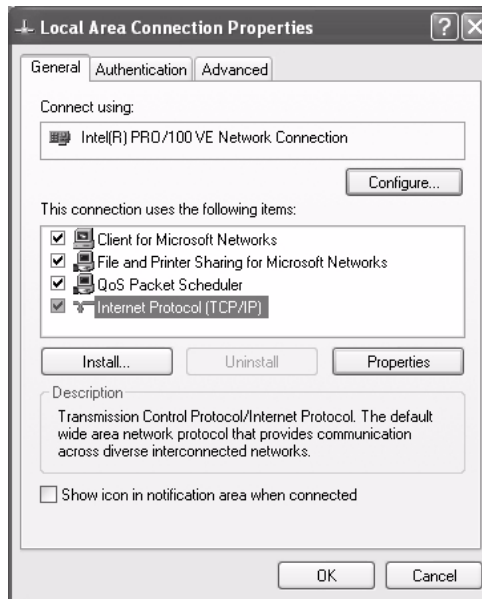


Figure 68: Local Area Connection Properties - Windows XP

5. Select Internet Protocol (TCP/IP). Be careful not to uncheck the check box.
6. Click **Properties**. The Internet Protocol Properties window appears as shown in Figure 69.

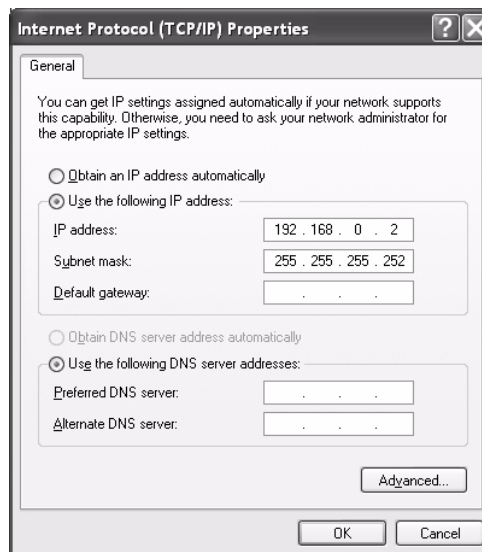


Figure 69: Internet Protocol Properties - Windows XP

7. Select **Use the following IP address**.
8. Type **192.168.0.2** in the IP address field.
9. Type **255.255.255.252** in the Subnet mask field.



Note: You do not need to enter information in the **Default gateway**, **Preferred DNS server**, or **Alternate DNS server** fields.

10. Click **OK**.

Windows 2000

1. On the installer laptop, select **Start**→**Settings**→**Control Panel** and double-click **Network and Dial-up Connections**.
2. A list of network adapters appears as shown in Figure 70. The **Local Area Connection** icon must appear on the page. If it does not, the network is not installed correctly.

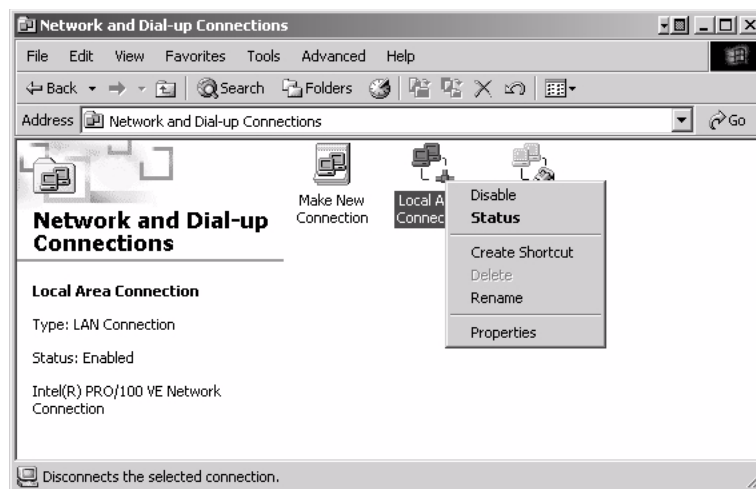


Figure 70: Network and Dial-up Connections - Windows 2000

3. Right-click the **Local Area Connection** icon that represents the network adapter connecting the computer to the satellite router, and select **Properties**. The **Local Area Connections Properties** window appears as shown in Figure 71.

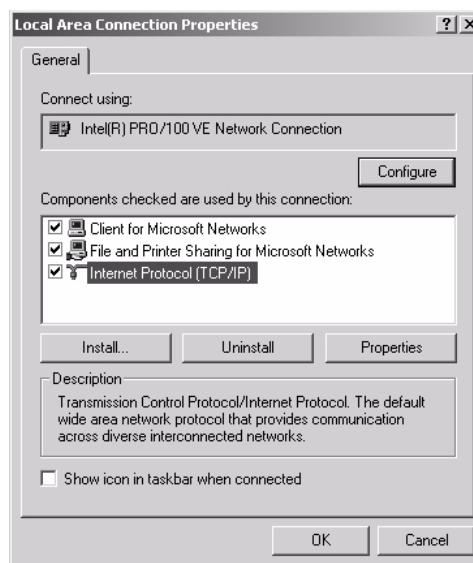


Figure 71: Local Area Connection Properties - Windows 2000

4. Ensure that the Client for Microsoft Networks and Internet Protocol (TCP/IP) are installed and checked. If NetBEUI is installed, uninstall it.
5. Select Internet Protocol (TCP/IP). Be careful not to uncheck the checkbox.
6. Click **Properties**. The Internet Protocol Properties window appears as shown in Figure 72.

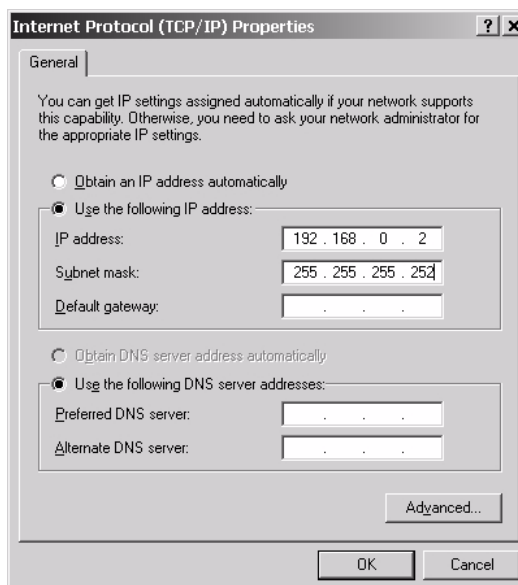


Figure 72: Internet Protocol Properties - Windows 2000

7. Select Use the following IP address.
8. Type **192.168.0.2** in the IP address field.
9. Type **255.255.255.252** in the Subnet mask field.



Note: You do not need to enter information in the Default gateway, Preferred DNS server, or Alternate DNS server fields.

10. Click **OK**.
11. Restart the computer even if Windows does not require you to do so. This ensures that the network settings are automatically reset.

Updating the fallback.bin file

Follow the steps below to update the *fallback.bin* file. During this process, the files containing the current software release are transferred to the satellite router, overwriting the older files.

1. Confirm that the installer laptop Ethernet cable is connected to the HX200 satellite router by performing a ping test:
 - a. Open a DOS command line prompt or Command window on the installer laptop.
 - b. Type **ping 192.168.0.1**.
 - c. Press **ENTER**.

Continue with step 2 if the ping test is successful. Refer to *Troubleshooting the update* on page 119 if the ping test fails.

2. Navigate to the location on the laptop where you saved the Fallback Updater utility and its supporting files in Step 4 of *Saving the utility on the installer laptop* on page 111.
3. Launch the Fallback Updater utility by opening the *HX_Updater.exe* file.
4. Type **192.168.0.1** in the IP address field on the System Updater window as shown in Figure 73. This value is the HX200 IP address.

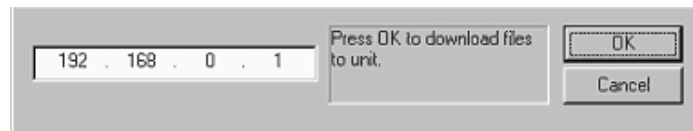


Figure 73: Entering the satellite router IP address

5. Click **OK**.

During the update process, status messages will appear in the message window between the address field and the **OK** button.

When the update is complete, the utility automatically closes and the HX200 reboots.

Refer to *Troubleshooting the update* if the utility does not automatically close or the HX200 fails to reboot.

Troubleshooting the update

Perform these troubleshooting procedures if you are unable to update the *fallback.bin* file using the Fallback Updater utility:

1. Observe the message in the System Updater window message field on the system.

Continue with step 2 if one of the following messages appears in the message window:

Waiting for remote to come up...

Unable to get login prompt

2. Test LAN connectivity between the installer laptop and satellite router by performing a ping test:
 - a. Open a DOS command line prompt or Command window on the installer laptop.
 - b. Type **ping 192.168.0.1**.
 - c. Press **ENTER**.

Continue with Step 3 if the ping test fails. Verify that the Ethernet cable is securely attached to the installer laptop and the satellite router.

3. Verify that the installer laptop has an IP address of 192.168.0.2.

If the address is incorrect or blank, refer to *Configuring the TCP/IP properties on the installer laptop* on page 112 for instructions on how to assign an IP address.

1. After verifying that the installer laptop is connected to the satellite router and its TCP/IP properties are properly configured, power cycle the satellite router by turning it off using the power switch on the rear panel, waiting 10 seconds, and then turning it back on.
2. Restart the utility and repeat the instructions in *Updating the fallback.bin file* on page 117.
3. Contact Technical Support if you are unable to update the *fallback.bin* file on the satellite router after completing steps 1 through 2.

Appendix C

Disabling a Web browser proxy connection

This appendix explains how to configure a web browser so that it does not connect to the Internet through a proxy server. These procedures may be used to configure the browser on either the installer laptop or the site computer.

Internet Explorer

1. Turn the computer on and launch Internet Explorer (IE).
2. Select **Tools**→*Internet Options*.
3. Select the Connections tab as shown in Figure 74.

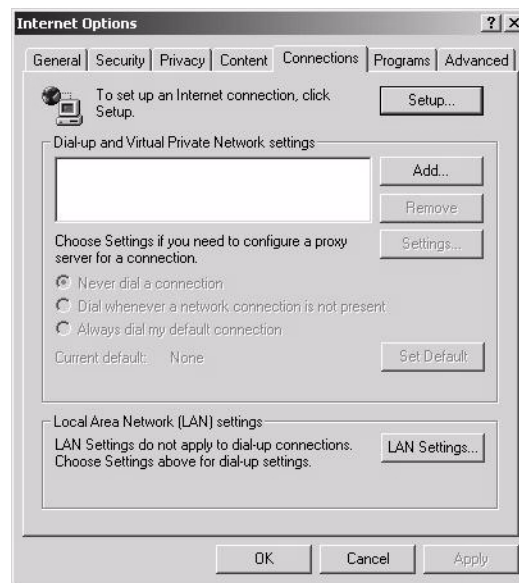


Figure 74: Selecting the Connections tab - IE

4. Deselect the Use a proxy server for the LAN check box as shown in Figure 75.
5. Click **OK**.

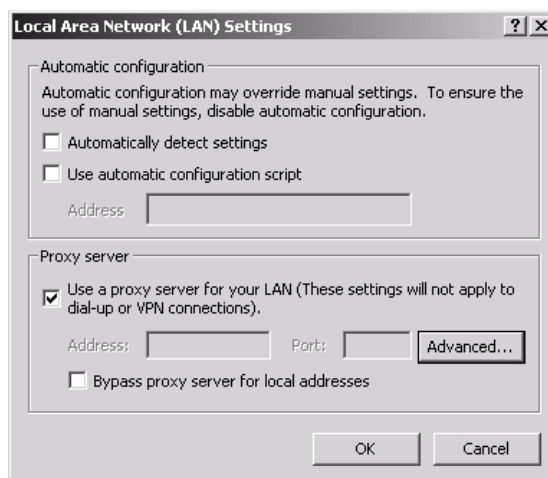


Figure 75: Accessing LAN settings - IE

6. Close Internet Explorer and relaunch it to enable the changes.

Firefox

1. Turn the computer on and launch Firefox.
2. Select **Tools** → **Options**.
3. Click the **Advanced** button
4. Select the **Network** tab as shown in Figure 76.

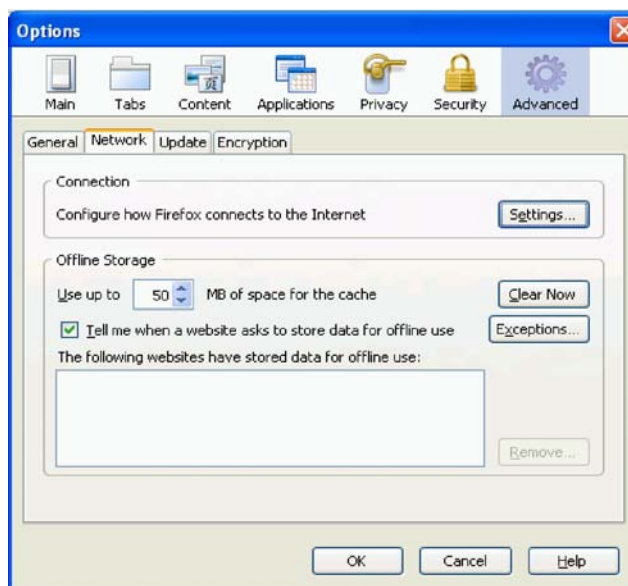


Figure 76: Options Window - Firefox

5. Click the **Settings** button; the Connection Settings window appears as shown in Figure 77.

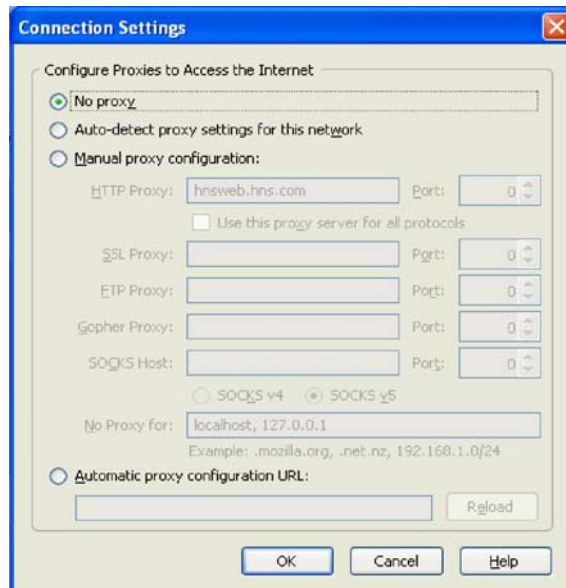


Figure 77: Connection Settings - Firefox

6. Select the No Proxy option and click OK.
7. Click OK.

Azimuth antenna setting and software version

Antenna setting

Table 11 gives the Azimuth antenna parameters and settings.

Table 11: Azimuth antenna setting

Parameter	Setting
Main Screen	74w AZi - 176.2 Rel - 0176 Agc = 03429 EI - 45 Pol - 86 HDG - 0
Button 1 - Ship Location	GPS - VLD Lat: 39N Long: 77W
Button 2 - Ship Heading	Set - 0
Button 3 - Sat Finding Method	Auto Searching
Button 4 - Polarity	86 Deg
Button 5	Sat Long - 74 W RxPol = V RX-RX Pol - Cross pol Search Ref = Ext lock Track Reg = DVB C/N Ratio Search trhld = 3700
Button 6	RX RF Freq = 11740000 Khz Symbol Rate = 05000 Khz FEc = Auto Mod = DVB QPSK
Button 7	Tem S&T Ref Test Search Ref = DVB C/N Track Ref = DVB C/N Search Thrsh = 3700
Button 8	Yaw Axis = Initialized
Installer Menu - SHP HDG	New Angle = 311.2 CR Angle = 311.2
GPS Output Format	NMEA DB9 output = GPRMC DB9 Baud Rate = 4800 RJ45 Baud Rate = 4800

Software version

The software versions used for the HX200 are:

- ACU version 3.22
- PCU version 1.92

Below are the installation and configuration mode screens used for the HX200.

Installation Mode for Int Magnetic Compass	
Ship Heading Offset =	<input type="text" value="0"/> Degree
Searching Parameter	
ELE Range =	<input type="text" value="10"/> Degree
AZI Range =	<input type="text" value="80"/> Degree
Step =	<input type="text" value="1"/> Degree
SCH Delay =	<input type="text" value="30"/> Second
ACU Gyro Compass Type =	<input type="text" value="NMEA"/>
PCU Compass Mode =	<input type="text" value="Int Mag"/>
GPS Format and Baud Rate	
NMEA DB9 Format =	<input type="text" value="GPRMC"/>
CON RJ45 Format =	<input type="text" value="GPRMC"/>
NMEA DB9 Baudrate =	<input type="text" value="4800"/>
CON RJ45 Baud Rate =	<input type="text" value="4800"/>
Transmit DC 48V Power =	<input type="text" value="On-TX mute enabled"/>
EXT LOCK TTL LEVEL =	<input type="text" value="1"/>
Block Area Setting	
Azimuth Block Zone setting	
Zone 1 Rel angle Start	<input type="text"/> Degree
Zone 1 Rel angle Stop	<input type="text"/> Degree
Zone 2 Rel angle start	<input type="text"/> Degree
Zone 2 Rel angle Stop	<input type="text"/> Degree
Zone 3 Rel angle Start	<input type="text"/> Degree
Zone 3 Rel angle Stop	<input type="text"/> Degree
Elevation Block Zone setting	
Zone 1 Rel angle Start	<input type="text"/> Degree
Zone 1 Rel angle Stop	<input type="text"/> Degree
Zone 2 Rel angle start	<input type="text"/> Degree
Zone 2 Rel angle Stop	<input type="text"/> Degree
Zone 3 Rel angle Start	<input type="text"/> Degree
Zone 3 Rel angle Stop	<input type="text"/> Degree

Figure 78: Installation mode

STR ID	61	STR Name	074W
Configuration Mode			
Key 3	Satellite finding method	AUTO Searching	
Key 4	Polarity	AUTO -->STD	
Key 5	S&T Ref Detail		
	Sat Longitude =	74	W
	RX Polarity =	Vertical	
	Satellite TX-RX POL=	CROSS-POL	
	Searching Ref =	EXT LOCK	
	Tracking Ref =	DVB C/N RATIO	
	RSSD L-band Freq =	NA	KHz
	Searching TRHSLD =	3500	KHz
	SKEW OFFSET =	0000	Deg
Key 6	DVB Tuner		
	LNB LOW Freq =	10750	MHz
	LNB High Freq =	10750	MHz
	RF RX Freq =	11,740,000	KHz
	Symbol rate =	05000	KHz
	Select LNB =	18V Low(22KHz off)	
	Select FEC Type =	AUTO	
	Eneter Network ID =	00000	
	Select Modulation Type =	DVB QPSK	

Figure 79: Configuration mode

Configuration Mode			
Key 3	Satellite finding method	AUTO Searching	
Key 4	Polarity	AUTO -->STD	
Key 5	S&T Ref Detail		
	Sat Longitude =	74	W
	RX Polarity =	Vertical	
	Satellite TX-RX POL=	CROSS-POL	
	Searching Ref =	DVB CN THRSILD	
	Tracking Ref =	DVB C/N RATIO	
	RSSD L-band Freq =	NA	KHz
	Searching TRHSLD =	3500	KHz
	SKEW OFFSET =	0000	Deg
Key 6	DVB Tuner		
	LNB LOW Freq =	10750	MHz
	LNB High Freq =	10750	MHz
	RF RX Freq =	11,740,000	KHz
	Symbol rate =	05000	KHz
	Select LNB =	18V Low(22KHz off)	
	Select FEC Type =	AUTO	
	Eneter Network ID =	00000	
	Select Modulation Type =	DVB QPSK	

Figure 80: Configuration mode #2

Appendix E

Seatel antenna settings and software version

Table 12: Seatel parameters and settings

Parameter	Setting
Main Screens - 1	Lat 39 N Long 77 W HDG 0000
Main Screens - 2	AZ 175 EL 045.6 REL 322 AGC 1602
Main Screen - 3	Sat 74 W THRS 1488 FREQ 1440 NID ABCD

Table 12: Seatel parameters and settings (Continued)

Parameter	Setting
Setup Screens	EL Trim - 28 Auto Thrs - 0000 Az trim - 1465 El Step Size - 0000 Az step size - 000 Setup Intg - 0000 Search limit - 0000 Search delay - 0015 Sweep Int - 0000 System Type - 215 Gyro type - 0002 Polang type - 0072 Pol offset - 0040 Pol search - 6090 Az limit 1 - 0000 Az limit 2 - 0000 El limit 3 - 0000 Az limit 3 - 0000 Az limit 4 - 0000 El limit 3 - 0000 Az limit 3 - 0000 Az limit 4 - 0000 El limit 34 - 0900 Az limit 5 - 0000 Az limit 6 - 0000 El limit 56 - 0000 5v offset - 0000 5v search - 0000 Tx Pol - 0002 Trck Disp - 0000

Software version

The software versions for the Seatel antenna are:

- PCU version 2.86
- ACU version 6.04J

Figure 81 on page 131 illustrates the Seatel TMS.

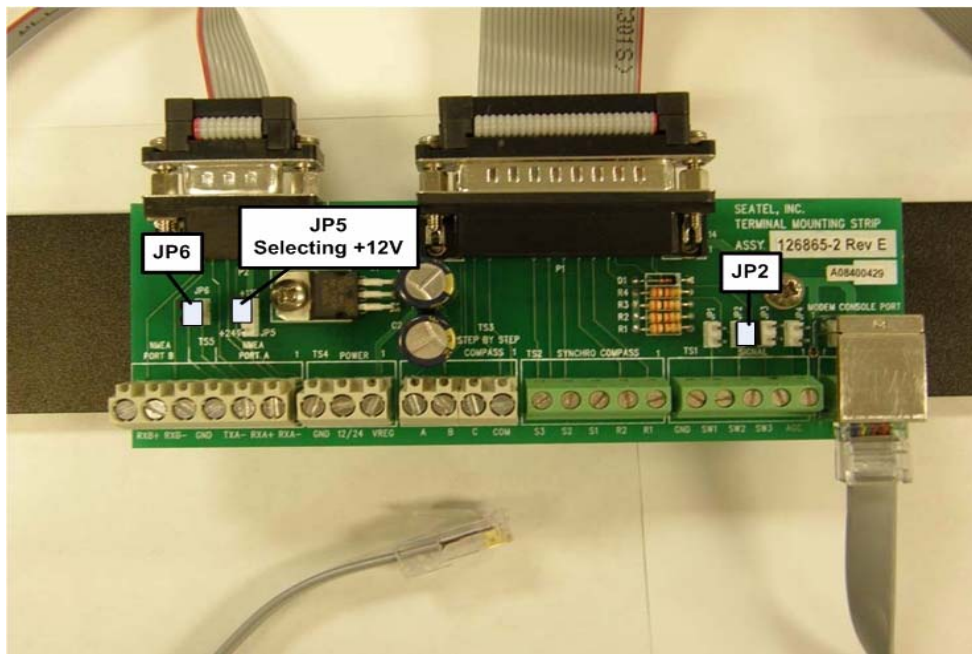


Figure 81: Seatel TMS

The terminal mounting strip requires the following jumpers to be connected:

- JP2
- JP6
- JP5 - Configured to select +12 V

Appendix F

Troubleshooting NMEA and TX mute/RX lock cable issues

In the event of any issues in NMEA information being sent between ACU and HX200 the following troubleshooting steps can be taken:

- Verify proper cable connectivity between HX200 and ACU.
- Verify in the HX200's Web interface that Total Rx and GLL Info or RMC Info msg Processed increases over a period of 5 minutes. Refer to Figure 82.

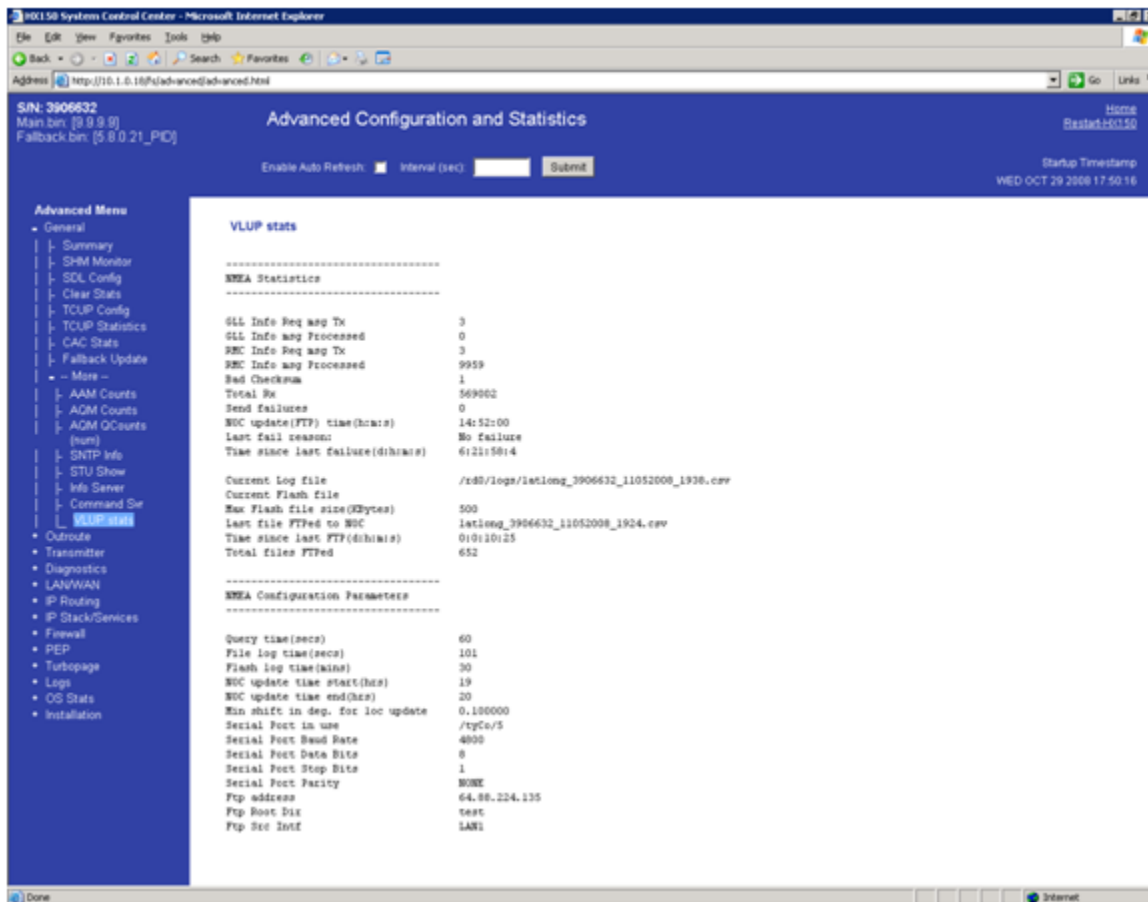


Figure 82: Advanced screen

- For an Azimuth ACU, if these statistics are not increasing, connect a null modem cable between laptop serial port and the NMEA interface (DB-9 RS-232) on the ACU. Launch the PC's HyperTerminal and verify that ACU is sending NMEA sentences via the port.
- For Seatel ACU, if these statistics are not increasing, connect a cable between laptop and the RJ-45 modem console port. Launch the PC's HyperTerminal and verify that ACU is sending NMEA sentences via the port.

If the problem continues to persist contact your Hughes support personnel for further assistance.

Appendix G

LNB selection reference

This appendix applies to the commissioning task of entering the radio parameters. As part of this task you select the LNB for your installation from a drop-down list.

If you are not sure which LNB to select on the Receive LNB Selection screen, the following illustrations may help you identify the installed LNB and which option you should select. The list of options you see depends on how the modem is configured. Refer to Figure 83 on page 136 for more information.

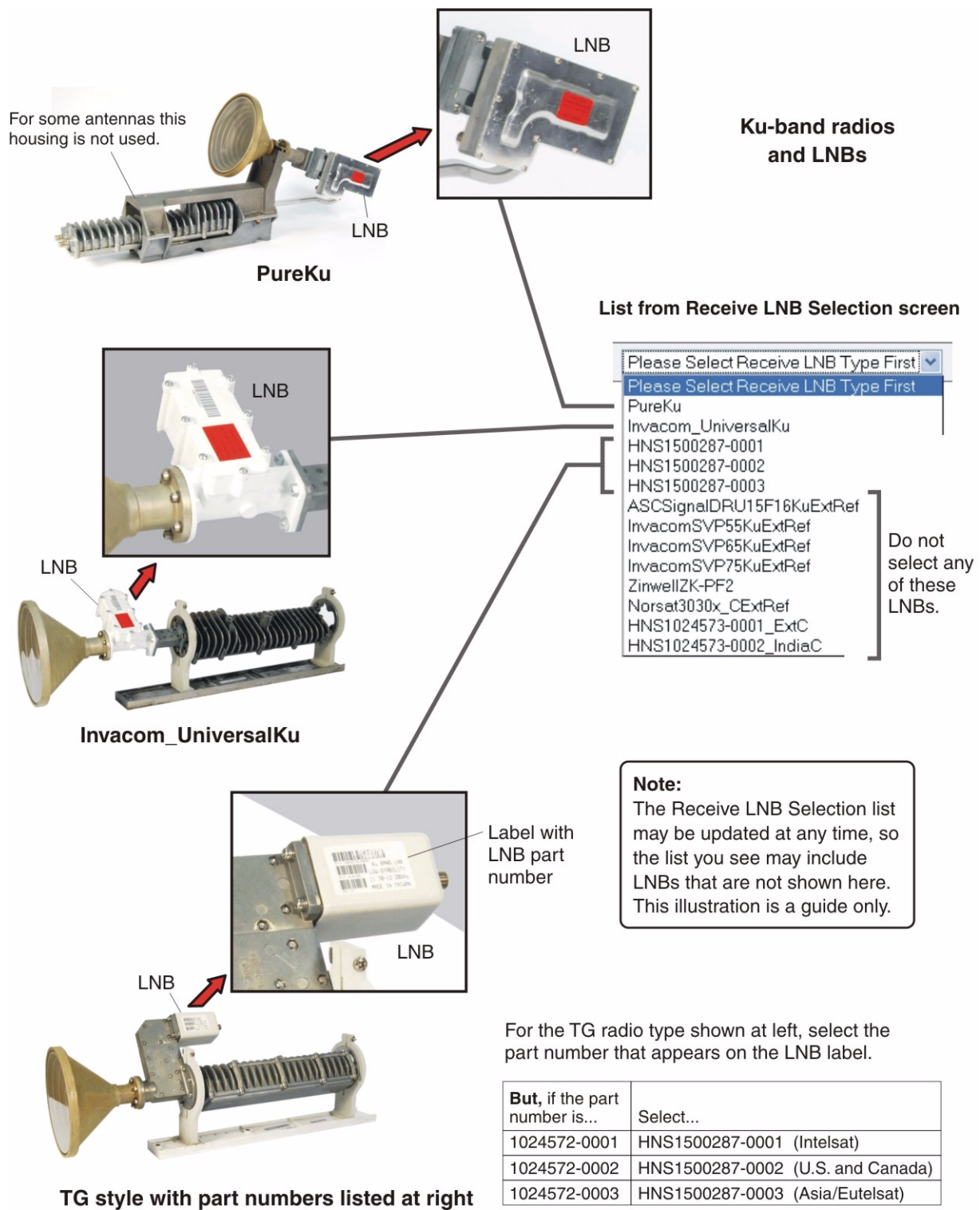


Figure 83: Select aid for Ku-band LNBs

Appendix H

Conforming with standards and directives

TIA IPoS standard

The HX200 and HX260 satellite routers are compliant with the IP over Satellite Standard (IPoS) ratified by the Telecommunications Industry Association (TIA-1008A), first published in October 2003 and issued as Revision A in May 2006.



Figure 84: IPoS symbol

Certifications and cautions

CAUTION



Any changes or modifications to this equipment not expressly approved by the manufacturer could void the manufacturer's warranty.

DANGER

Risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Safety-operating conditions for Canada

In addition to the warnings and safety guidelines listed in this document, the following operating conditions apply to the HX200 and HX260 satellite routers used in Canada:

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective operational and safety requirements. The Department does not guarantee that the equipment will operate to the user's satisfaction.

Before installing the equipment, users should make sure they are permitted connect to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs in Canada

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.



CAUTION

Do not attempt to make such connections, instead contact the appropriate electrical inspection authority or electrician as appropriate.

Safety, emission, and immunity standards

Table 13 identifies the system compliance with safety, emission, and immunity standards. The HX200 and HX260 comply with the European R&TTE (Radio and Telecommunications Terminal Equipment) directive as well as the EMI standards of the US (FCC) and Canada (CSA), as detailed in subsequent sections. The installation and maintenance procedures in the installation and configuration guides must be followed to ensure compliance with these standards.

Table 13: System safety, emission, and immunity standards compliance

Type of standard	United States and Canada
Safety	UL60950-1 for the United States
	CAN/CSA-C22.2 No. 60950-1 for Canada (See additional information below.)
	EN60950-1 for the European Union
Emissions	FCC Part 15 for the United States (See additional information below.)
	ICES-003 for Canada
	EN55022 and EN301-489-12 for Europe
Immunity	EN55024 and EN301-489-12 for Europe

Canada Class B warning This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

FCC part 15 notice This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation distance between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio TV technician for help.

 **CAUTION**



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

R&TTE notice This product is within the scope of the EU Radio Equipment and Telecommunications Terminal Equipment (R&TTE) Directive.

Material compliance

RoHS compliance Products supplied to this specification shall conform to Restriction of Hazardous Substances (RoHS).

The Directive 2002/95/EC of the European Parliament and of the Council of the 27th January 2003, on the restriction of the use of certain hazardous substances in electrical and electronic equipment, requires the reduction of the substances Lead, Mercury, Cadmium, Hexavalent Chromium, Polybrominated Biphenyls (PBB), and Polybrominated Diphenyl Ethers (PBDE) in electronic products by July 1, 2006. Unless otherwise noted, all materials used must be compliant with this directive and any subsequent revisions or amendments except Lead.

The *maximum* acceptable RoHS concentrations are listed in Table 14:

Table 14: Maximum acceptable RoHS concentration

Substance	Concentration
Cadmium	0.01% wt (max. concentration by weight in homogenous materials)
Lead	0.1% wt (max. concentration by weight in homogenous materials) Exempted
Mercury:	0.1% wt (max. concentration by weight in homogenous materials)
Hexavalent chromium	0.1% wt (max. concentration by weight in homogenous materials)
PBB	0.1% wt (max. concentration by weight in homogenous materials)
PBDE	0.1% wt (max. concentration by weight in homogenous materials)

RoHs compliance with exemptions Please note the following exemption of the Directive 2002/95/EC:

Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signaling, transmission as well as network management for

telecommunications (with a specific time limit for this exemption).

Acronyms and abbreviations

A

AC – Alternating current
ACM – Adaptive coding and modulation
ACP – Automatic cross-polarization

B

BCH – Bose Chahaudary Hocquenghum (algorithm)

C

C – Celsius
CCM – Constant coding modulation

D

dBm –
DNCC – Dynamic network control cluster
DNS – Domain name service
DVB – Digital video broadcast
DVB-S2 – Digital video broadcast - second generation

F

FEC – Forward error correction
ft – Foot

G

GPS – Global positioning system

H

HTTP – Hypertext transfer protocol

I

ICMP – Internet control message protocol
IDU – Indoor unit
IE – Internet Explorer
IFL – Interfacility link
IPoS – IP over satellite

L

lb – Pound

M

Max – Maximum
Min – Minimum
Mspm – Megasympol(s) per second

N

NAP – Network Access Provider
NAPT – Network address port translation
NAT – Network address translation
NIC – network interface card

O

ODU – Outdoor unit
OS – Operating system

P

PAT – Port address translation
PBB – Polybrominated biphenyls
PBDE – Polybrominated diphenyl ethers
PSK – Phase-shift keying

Q

QoS – Quality of service

QPSK – Quadriphase shift keying

R

R&TTE – Radio Equipment and
Telecommunications Terminal Equipment

RoHS – Restriction of Hazardous Substances

Rx – Receive

S

Sec – Seconds

T

TCP – Transmission control protocol

TIA – Telecommunications Industry Association

Tx – Transmit

U

UDP – User datagram protocol

URL – Uniform resource locator

W

WINS – Windows internet naming service

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