Norsat International Inc.

# Norsat NewsLink™

## Operator's Manual

June 2003

Be certain.

**Please read this entire guide**

**Veuillez lire entièrement ce guide**
**Bitte das gesamte Handbuch durchlesen**
**Sírvase leer completamente la presente guía**
**Si prega di leggere completamente questa guida**

**Important**

Please read this entire guide before you install or operate this product. Give particular attention to all safety statements.

**Important**

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**Zu Beachten**

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**Importante**

Sírvase leer la presente guía antes de instalar o emplear este producto. Preste especial atención a todos los avisos de seguridad.

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# Preface

## Text Conventions

- Text appearing in `Courier` font indicates characters to be typed in; e.g. type `Shell` indicates that the word “Shell” must be entered exactly as it appears, with the first letter capitalized.
- Text appearing in Bookman Old Style font indicates a directory path or filename; e.g. c:\Program Files.
- Text enclosed in angle brackets indicates a field entry; e.g. `<PID>` indicates that a PID value must be entered.
- Text appearing in SMALL CAPS and Century Gothic font in an instruction indicates either a button that must be clicked, a key that must be pressed or a particular screen; e.g. BUTTON indicates a button that must be clicked.

# Definitions, Abbreviations and Acronyms

| | |
|---|---|
| A | Ampheres |
| AC | Alternating Current |
| BER | Bit Error Rate |
| CW | Continuous Wave |
| dB | Decibels |
| dBi | Decibels Relative to an Isotropic Radiator |
| dBm | Decibels Relative to 1 Milliwatt |
| dBW | Decibels Relative to 1 Watt |
| DC | Direct Current |
| DTS | Decoding Time Stamp |
| DVB | Digital Video Broadcast |
| DVB-S | DVB over Satellite |
| EIRP | Equivalent Isotropic Radiated Power |
| ETSI | European Telecommunications Standards Institute |
| FCC | Federal Communications Commission |
| FEC | Forward Error Correction |
| GHz | Giga-Hertz |
| GOP | Group of Pictures |
| GPS | Global Positioning System |
| GUI | Graphical User Interface |
| IF | Intermediate Frequency |
| IFL | Interfacility Link |
| IP | Internet Protocol |
| IRD | Integrated Receiver Decoder |
| Ka | 18 GHz to 36 GHz Frequency Band |
| LED | Light Emitting Diode |
| LNB | Low Noise Block Downconverter |
| Mbps | Megabits Per Second |
| MHz | Mega-Hertz |
| MPEG-2 | Moving Pictures Expert Group |
| NTSC | National Television Standards Committee |
| OMT | Ortho Mode Transducer |
| PAL | Phase Alternation Line |
| PID | Packet Identifier |
| PLLs | Phase-Locked Loops |
| QEF | Quasi Error Free |
| QPSK | Quadrature Phase Shift Keying |
| RF | Radio Frequency |
| Rx | Receive / Receiver |

| | |
|---|---|
| SDI | Synchronous Digital Interface |
| SES | Société Européenne Des Satellites |
| SNG | Satellite News Gathering |
| SSPA | Solid State Power Amplifier |
| TS | Transport Stream |
| Tx | Transmit / Transmitter |
| USB | Universal Serial Bus |
| W | Watt |

## Protocols and Standards

| | |
|---|---|
| 10BaseT | IEEE 802.3 10Base-T Standard |
| 100BaseT | IEEE 802.3 100Base-T Standard |
| ANSI | American National Standards Institute, web.ansi.org |
| ARP | Address Resolution Protocol |
| ASI | Asynchronous Serial Interface |
| DAVIC | Digital Audio-Visual Council, www.davic.org |
| DSM-CC | ISO/IEC 13818-6 |
| DVB | Digital Video Broadcast Project, www.dvb.org |
| DVB-S | ETS 300 421 Digital Satellite Transmission Systems |
| IEEE | Institute of Electrical and Electronic Engineers, www.ieee.org |
| ISO/IEC | International Organization for Standardization, www.iso.ch |
| IP | RFC 791 Internet Protocol, Version 4 (IPv4) |
| IPSec | RFC 2401, Security Architecture for the Internet Protocol |
| MIB | Management Information Base |
| MMDS | DVB (M)MDS ETS 300 748 & ETS 300 749 Digital (Micro-wave) Multipoint Distribution Systems (MDS) |
| MPEG-2 | Moving Picture Experts Group: Generic Coding of Moving Pictures and Associated Audio Information ISO/IEC DIS 13818 |
| ODBC | Open DataBase Connectivity |
| PPP | RFC 1661, Point-to-Point Protocol |
| PPTP | Point-to-Point Tunnelling Protocol |
| RADIUS | RFC 2138, Remote Authentication Dial In User Service |
| RIPv2 | Routing Information Protocol, Version 2 |
| SMPTE 325M | SMPTE 325M-1999 Opportunistic Data Broadcast Flow Control; RP 206-1999 Opportunistic Data Flow Control Using Ethernet as a Control Channel in an MPEG-2 Trans-port Emissions Multiplex |
| SNMP | RFC 1905, Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2) |
| SQL | ISO/IEC 9075:1992, Information Technology Database Lan-guages - SQL & ANSI X3.135-1992, Database Language SQL |
| TCP | RFC 793, Transmission Control Protocol |
| TCP/IP | Transmission Control Protocol/Internet Protocol |

CHAPTER 1

# Safety Precautions

**IMPORTANT** **All safety precautions should be read and understood prior to deploying the Norsat NewsLink.**

**WARNING** **FCC INFORMATION FOR UNINTENTIONAL RADIATOR PORTIONS AS PER FCC 15.19, 15.21 AND 15.105**

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

**WARNING** Changes or modifications not expressly approved by Norsat International could void the user's authority to operate the equipment.

**WARNING** **FCC RF EXPOSURE INFORMATION**

To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of **2.5 meters** or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.

**WARNING** **FCC FREQUENCY COORDINATION AS PER FCC 25.203(C), 25.251 AND 101.103**

To satisfy FCC frequency coordination requirements, the user must ensure that they co-ordinate proposed frequency and power usage with other terrestrial and satellite users prior to transmission.

**WARNING** **MICROWAVE RADIATION: HAZARDS CAUSED BY ELECTROMAGNETIC FIELDS**

When in operation, i.e. power on, the area directly in front of the Norsat NewsLink antenna dish must be considered an Area of Restricted Occupancy.

Limit human exposure time to this area when the Norsat NewsLink is in operation.

Never place any part of the body between the antenna dish and the antenna feed horn assembly, or in line with the direction of the antenna transmission path when the Norsat NewsLink is in operation.

Locate the terminal as far as practical from ungrounded metal.

**GROUNDING**

When used within urban areas, it is suggested that the Norsat NewsLink be earthed via a grounding electrode in strict accordance with National and Local electrical codes.

**CAUTION** Wherever possible, operate the Norsat NewsLink with the grounding conductor connected.

**WARNING** **HIGH VOLTAGE AND HIGH CURRENT POWER PRESENT**

During periods of rain or strong wind, as well as in wet conditions, be especially attentive to the connectors and power cords of the Norsat NewsLink. Be on the look out for any electrical dangers caused by the Norsat NewsLink power coming in contact with water. Disconnect the Norsat NewsLink from the power source prior to moving it out of danger spots.

Immediately disconnect the Norsat NewsLink from the power source when unit power malfunction is suspected.

**CAUTION** The Baseband Unit together with all its parts, including the bulkhead connectors, are not rated as water resistant and therefore must always be sheltered from rain or any other source of water. Failure to do so can result in Norsat NewsLink system damage, and/or serious user injury due to electrical hazards.

CHAPTER 2

# Norsat NewsLink Overview

The Norsat NewsLink is a portable satellite terminal that provides broadcast quality MPEG-2 video transmission, communicating with a central teleport or HUB station. Its design allows it to be carried by two people, with an in field deployment and setup time by a camera operator of less than 15 minutes.

## Features

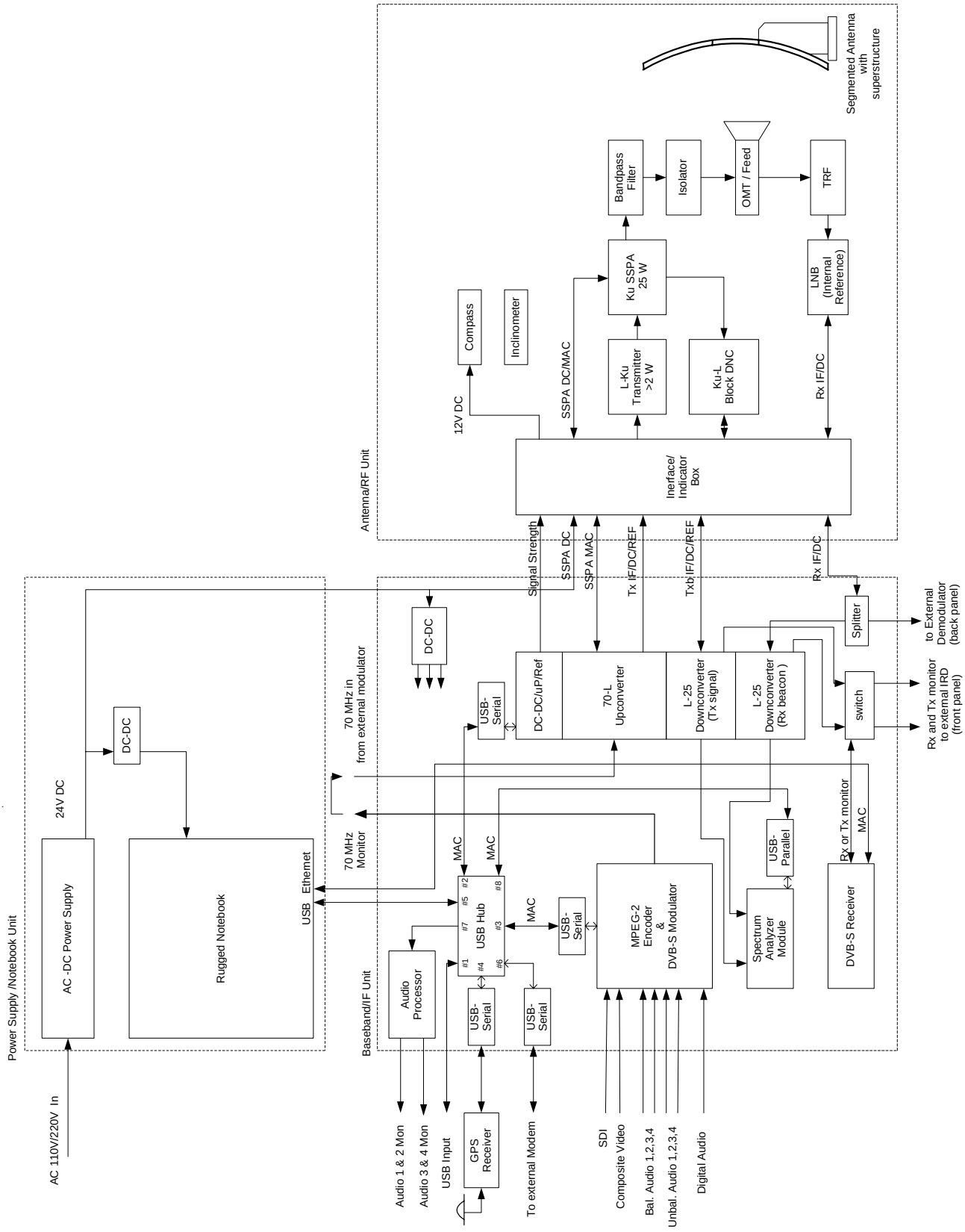
The Norsat NewsLink:

- Allows for quick on-location arrival and setup time, in order to begin broadcasting for major international news events before a typical flyaway system could arrive and be operational
- Provides more flexibility to the on-site news team as to the location of where the uplink system can be operated, as opposed to traditional flyaway systems which require a fixed major center for the duration of the transmission
- Allows for quick transport due to its portability, thus enabling news teams to easily cover small live international events or reach a location that is typically not considered by conventional flyaway operations

## System Operation

A block diagram of the Norsat NewsLink is given in Figure 1 on page 4.

**FIGURE 1. Norsat NewsLink Block Diagram.**



Satellite information may be setup prior to on-location arrival, in addition to Transmission Profile(s) that detail the system settings, including the creation of a transport stream and setup of video and audio PIDs.

The Norsat NewsLink is enclosed in three cases; the Baseband/IF case and the two Antenna/RF cases: RF and Antenna Unit case, Model 3200-RF, and Accessories case, Model 3200-AC. Once the news team is on location, the antenna is removed from the case and assembled; the Baseband unit may be removed from the carrying case, or may be in a shock mounted chassis. After the antenna is assembled, it is connected to the Baseband/IF unit. The Norsat NewsLink is now ready to be configured.

The antenna must be aligned to the proper elevation, azimuth and polarization for the desired satellite transponder. Using the Norsat NewsLink *graphical user interface* (GUI), the user selects the desired satellite and polarization from which the *global positioning system* (GPS) determines the current location of the antenna. Once this is obtained the proper azimuth, polarization and elevation are calculated.

The polarization is set using the indicator located on the feed assembly. A compass located on the base of the antenna indicates the current azimuth, and an inclinometer located on the back of the dish indicates the current elevation. The azimuth and elevation values are set to the values indicated in the Norsat NewsLink GUI. Then, while watching the signal strength meter, the antenna is fine tuned in order to obtain an optimal signal strength. In addition, the Norsat NewsLink GUI contains a spectrum analyzer, which can also be used to align the antenna and verify that locked onto correct satellite.

After the antenna is properly aligned, the camera and external equipment are then connected to the Baseband unit.

**NOTE** This step is done after antenna alignment as the Baseband/IF unit may need to be moved.

Using the Norsat NewsLink GUI, the previously configured Transmission Profile is selected.

The satellite operator is now called to obtain approval for transmission. The user indicates to the satellite operator the selected satellite and transponder (frequency and polarization) they wish to transmit on. When authorization is given by the satellite operator, the news crew brings up a *continuous wave* (CW) signal at the requested power setting. This setting will be adjusted to the proper levels as indicated by the satellite operator. The polarization will then be checked using a cross-pol signal. The satellite operator will then request that the news crew turns modulation ON at low power. The power level is gradually increased until the maximum power level is reached. Once properly set, the satellite operator will give the news team authorization to begin news transmission.

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CHAPTER 3

# Norsat NewsLink Cases

The cases that house the Norsat NewsLink Antenna/RF and Baseband/IF units are weatherproof, and there should be no water penetration when all winglocks are properly secured.

The cases will provide shock and vibration protection during storage, transport and, in the case of the Baseband/IF unit, operation. However, care should be taken when handling the cases in consideration of the enclosed electronic equipment of the Norsat NewsLink.

The Antenna/RF unit is stored in two cases, the RF and Antenna Unit case, Model 3200-RF, and the Accessories case, Model 3200-AC; refer to Figure 2 on page 8. The Baseband/IF unit is stored in one case; refer to Figure 3 on page 8.

The Antenna/RF cases are equipped with a pressure relief valve that equalizes the pressure inside and outside the case. This relief is provided automatically should the pressure difference become too large, thus preventing the case from exploding due to extreme differences in atmospheric pressure. Alternatively, the case may be under a vacuum and hard to open. The valve can also be depressed by the user to manually equalize the pressure.

**NOTE** This procedure is necessary before opening a case to ensure that unlocking the latches on the case is both safe and easy; refer to “Opening the RF Unit Case” on page 22 for instructions.

**FIGURE 2.** **Antenna/RF Unit Cases.**

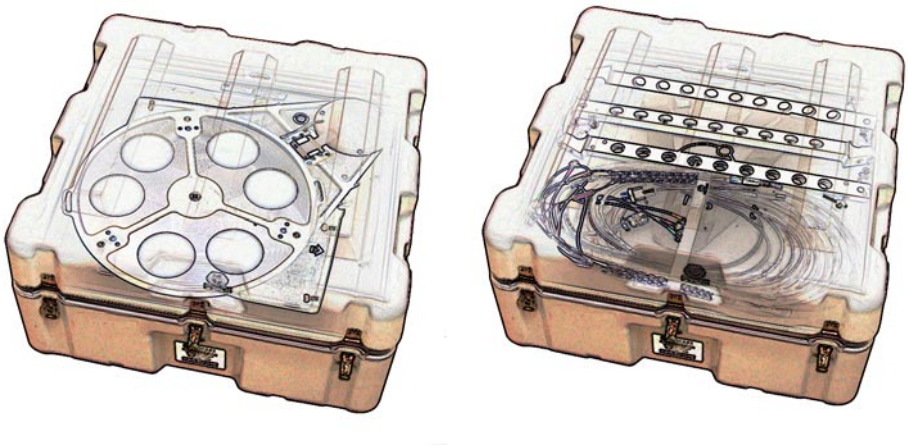


**FIGURE 3.** **Baseband/IF Unit.**

CHAPTER 4

# Antenna/RF Unit

The Antenna/RF unit is comprised of the following components:

- Antenna
- Transceiver
- Peripherals

A diagram of the Antenna/RF unit cases are given in the next section, followed by descriptions and specifications for each of the above listed components.

## Antenna/RF Unit Cases

The Antenna/RF unit contains the components that comprise the antenna. Figure 4 on page 10 shows the disassembled antenna components when stored, and Figure 5 on page 10 shows the assembled antenna.

**FIGURE 4.** **Antenna/RF Unit Stored. RF and Antenna Unit case, Model 3200-RF, on the left and Accessories case, Model 3200-AC, on the right**.

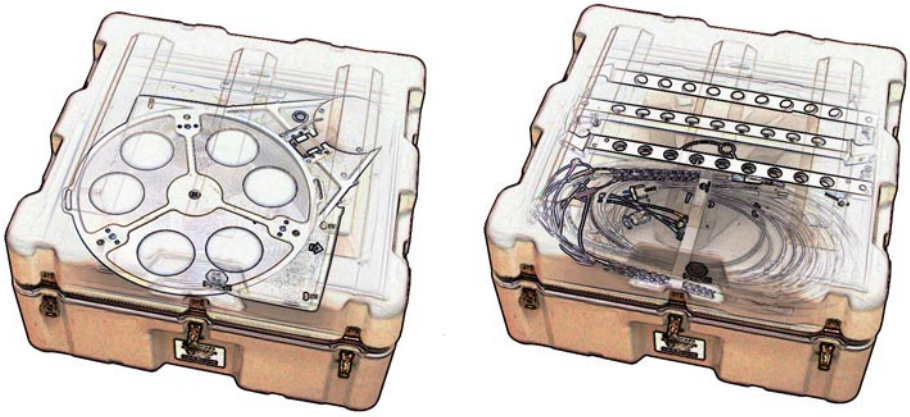
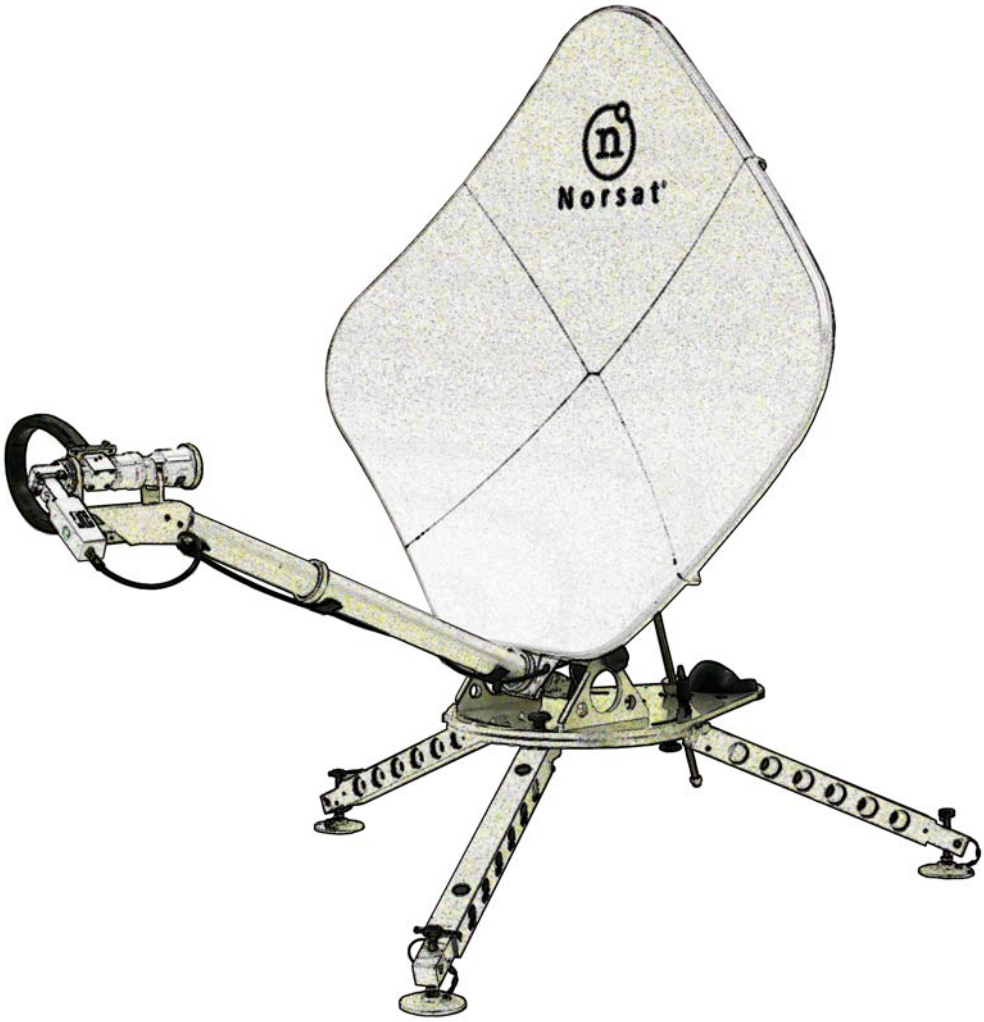


**FIGURE 5.** **Antenna/RF Unit Deployed.**



## Antenna

The antenna consists of the dish reflector, feed horn, OMT, flex waveguides, boom arm with built in rigid waveguide and mechanical support structure. The mechanical support structure positions and points the antenna reflector in order to aim the antenna beam at the required satellite.

## Transceiver

The Transceiver consists of block upconverter/transmitter, a 15 W or 25 W *solid state power amplifier* (SSPA) and a *low-noise block* (LNB) downconverter. The block upconverter converts the incoming L-band (950-1450 MHz) signal to Ku-band (14 -14.5 GHz). That signal is then amplified by the 15 W or 25 W SSPA, and fed through the antenna. Thus, after converting to dBW, the system provides a maximum *effective isotropic radiated power* (EIRP) of 53 dBW for the 15 W SSPA and 55.5 dBW for the 25 W SSPA.

The LNB then down-converts the down-linked Ku-band signal:

- A: 11.7 - 12.2 GHz
- B: 12.25 - 12.75 GHz
- C: 10.95 - 11.7 GHz

to an L-band signal:

- A: 0.95 - 1.45 GHz
- B: 0.95 - 1.45 GHz
- C: 0.95 - 1.7 GHz

## Peripherals

The peripherals aid in antenna pointing and include the following:

- Compass: used for azimuth settings
- Inclinometer: used for elevation settings
- Level: used to ensure antenna is level
- Interface/Indicator: interface for IFL connections, indicates when the transmitter is on and indicates the receive signal strength
- Ku-L Block Down-converter

### Compass

The fluxgate compass has a digital display with an accuracy of $\pm 1$ degree. The compass is mounted on the base of the antenna in order to accurately indicate the azimuth of the antenna beam. The compass is powered by 12 V supplied from the Baseband/IF unit. It is connected to the Interface Indicator unit by a flying lead with a multi-pin connector.

As with all fluxgate compasses, best performance occurs when the compass is level and there is no ferrous metal objects around. To compensate for both hard and soft magnetic interference, the compass should be calibrated. The compass is calibrated at the factory, however, it is beneficial to re-calibrate it

at new locations or if the magnetic environment/interface changes. Refer to “Compass Calibration” on page 89 for instructions on re-calibration.

## Inclinometer

The inclinometer has a digital display with an accuracy greater than 0.5 degrees and is powered by a standard 9 V battery. The inclinometer is mounted on the mechanical support of the antenna, located on the right hand side of the RF back plate, in order to accurately indicate the elevation of the antenna beam. The antenna has an offset angle of 18.9 degrees, which is pre-programmed into the inclinometer so that the angle indicated is the elevation angle of the antenna boresight.

Only the top button of the inclinometer should be used. The top button has the following functions:

- First press turns the inclinometer ON
- Pressing the button again for less than three seconds turns on the light; when the light is on, the inclinometer holds the last measurement
- Pressing the button again for less than three seconds turns off the light
- Pressing and holding the button for more than three seconds turns off the inclinometer

The inclinometer is calibrated at the factory. The mechanical variation is calibrated out at the factory.

**NOTE** The angular offset between the aluminum backplate of the antenna and the antenna boresight is 10.3 degrees. Thus, if the antenna is adjusted so that the aluminum backplate is perfectly vertical, a normal inclinometer will read 90 degrees. In this position, the antenna boresight is 10.3 degrees above the horizon.

## Level

The spirit bulls-eye level is mounted on the antenna base in order to accurately indicate how level the support base is. The level is 1.250 inches in diameter, filled with clear mineral spirits. The mounting case is brass with a black finish. The sensitivity per 0.1 inch is 45 minutes, with a tolerance of ±10 %.

## Interface/Indicator Unit

The Interface/Indicator unit is the interface point with the IFL. The Interface/Indicator contains an LED which becomes illuminated when the transmitter is ON. A three character display indicates the received power within a specified 10 MHz window. The center frequency of this window is set in the ALIGNMENT screen of the Norsat NewsLink GUI.

## Ku-L Block Down-converter

Converts the Ku-band transmit signal, received from the SSPA monitor port, to transmit monitoring L-band (950-1450 MHz) signal.

CHAPTER 5

# Baseband/IF Unit

## Baseband/IF Unit Case

The Baseband/IF unit case contains:

- 70-L upconverter
- L-25 MHz receive signal downconverter
- L-25 MHz transmit monitoring signal downconverter
- Spectrum Analyzer module
- DVB-S receiver card
- Modulator
- MPEG-2 Encoder

**FIGURE 6. Baseband/IF Unit.**

## Baseband/IF Unit Interfaces

The Baseband/IF unit interfaces are:

- IFL interface panel
- Test interface panel
- Power interface panel
- Auxiliary interface panel
- Audio Monitor interface panel
- Analog Audio In interface panel
- Video In interface panel
- Digital Signal In interface panel
- L-Band interface panel
- GPS Receiver interface panel

The following sections describe the connectors located on each panel.

### IFL Interface Panel

#### Transmit IF (Tx)

The Transmit IF (Tx) connector is a 50 ohm N-type female connector, which is colour coded red. The signals supplied on this interface are:

- Transmit IF (950 and 1450 MHz): the signal to be upconverted, amplified and transmitted to the satellite. This signal may be either a *continuous wave* (CW) or a modulated signal.
- 24 V DC: provides power to the Transmitter/Upconverter.
- 10 MHz reference: provides a reference signal for the Transmitter/Upconverter.

### Receive IF (Rx)

The Receive IF (Rx) connector is a 50 ohm N-type female connector, which is colour coded green. The signals supplied on this interface are:

- Receive IF: the received signal amplified and downconverted by the LNB.
- 24 V DC: supplied by the Baseband/IF unit to power the LNB.

**NOTE** This cable is a 50 ohm cable rather than the usual 75 ohm cable for receive systems. The LNB has a 75 ohm connection, however, the impedance is changed in the Interface/Indicator unit.

### Transmit Monitor In (Tx Monitor)

The Transmit Monitor In (Tx Monitor) connector is a 50 ohm N-type female connector, which is colour coded blue. The signals supplied on this interface are:

- Transmit Monitor IF: a downconverted sample of the transmitted signal; the transmitted signal is coupled and downconverted to L-band (950-1450 MHz).
- 24 V DC: supplied by the Baseband/IF unit to power the Downconverter Module.
- 10 MHz reference: supplied by the Baseband/IF unit to the Downconverter Module to lock the local oscillators used in the downconversion.

### SSPA Control and DC (DC/Control)

The SSPA Control and DC (DC/Control) connector is a multi-pin amphenol female connector. The signals supplied on this interface are:

- SSPA Mute Control: allows the SSPA to be turned off by the Baseband/IF unit.
- SSPA Temperature Sensor Reading: provides an indication of the SSPA temperature; this measurement is used in the temperature compensation algorithms found in the Baseband/IF unit.
- SSPA Power Detector Reading: provides an indication of the SSPA transmitted power; this measurement is displayed on the user interface and is used in the power control algorithms.
- Received Signal Strength Indication: provides an indication of the received signal strength in a specified 10 MHz window. The 10 MHz window is specified on the NewsLink GUI, with the bandwidth of the window being fixed. The receive signal strength is measured in the Baseband/IF unit and is displayed on the NewsLink GUI. This Received Signal Strength is provided to the Antenna/RF unit for display via the Receive Signal Strength Indication signal.
- Ground: ties the chassis of the Baseband/IF and Antenna/RF units together.

## Test Interface Panel

### Receive Out (Rx Out)

The Receive Out connector is a 50 Ω N female connector. The L-band receive signal is split prior to the downconverter; one portion is provided to an external

receiver modem via this interface. There is no DC on this interface and no DC should be supplied by any equipment attached to this interface.

### Modulator Output (Tx 70 MHz Out)

The Modulator Output connector is a 50 Ω BNC female connector. This interface provides the 70 MHz output of the modulator to the user. Normally this interface is looped back to the Upconverter Input connector.

### Upconverter Interface (Tx 70 MHz In)

The Upconverter Interface connector is a 50 Ω BNC female connector. This interface is the 70 MHz input to the Upconverter. Normally the Modulator Output connector is looped to this interface. An external modem can be connected to this interface.

## Power Interface Panel

### AC Input

The AC Input connector is a IEC 320 male socket with cable retention clip. The Baseband/IF unit will accept 110-220 V AC at 50 or 60 Hz. There is an RFI filter at the input to the Baseband/IF unit.

### ON/OFF Switch

The ON/OFF switch controls the AC power to the interior of the Baseband/IF unit.

### Ground Stud

The ground stud provides a means to ground the chassis of the Baseband/IF unit to earth ground.

**Note** The ground of the AC input is connected to this ground stud.

**Note** Ground studs are located on both the power supply and Baseband/IF unit tray.

### Safety Switch

The Safety Switch is a momentary action switch that causes the SSPA to be muted whenever the switch is pressed. When the switch is held for several seconds, the Baseband/IF unit detects an alarm and shuts down the transmitter and SSPA. Transmission can only be restarted by deliberate user action.

## Auxiliary Interface Panel

### Serial (RS-232)

This interface is a DB-9 connector, provided for control of an external modulator.

### USB Port

The USB port provides a means to access the USB port of the Norsat NewsLink.

### Control In

The Control In connector is a multi-pin amphenol female connector. This connects the laptop to the baseband/IF chassis.

## Audio Monitor Interface Panel

### Receive Audio Out Ports 1 & 2

Receive Audio Out Port 1 contains audio channels 1 and 2, and Receive Audio Out Port 2 contains audio channels 3 and 4. Each Receive Audio Port consists of two 1/8 inch mini jacks. The receive audio out port monitors the audio input to the MPEG encoder.

## Analog Audio In Interface Panel

### Balanced Audio Input

The balanced audio input is a 4-input XLR female balanced connectors, two for the left channels of Audio PIDs 1 and 2, and two for the right channels of Audio PIDs 1 and 2. The audio input can be set to dual mono and stereo.

### Unbalanced Audio Input

The unbalanced audio input is a 4-input RCA female connectors, two for the left channels of Audio PIDs 1 and 2, and two for the right channels of Audio PIDs 1 and 2. The audio input can be set to dual mono and stereo.

**NOTE** Only one audio input, i.e. balanced or unbalanced, can be used at a time.

## Video In Interface Panel

### Composite Video Input

The Composite Video input consists of a BNC female and an RCA female socket.

**NOTE** Only one input video input can be used at a time.

## Digital Signal In Interface Panel

### SDI Video Input (optional)

The SDI video input is a 70 Ω BNC connector.

**NOTE** Only one input video input can be used at a time.

## L-Band Interface Panel

### Rx Monitor

The Rx Monitor connector is an F-type female connector.

### Tx Monitor (Out)

The Tx Monitor (out) connector is an F-type female connector.

### GPS Receiver

The GPS Receiver connector is a multi-pin amphenol female connector.

## Baseband/IF Unit Functionality

The Baseband/IF unit performs the following functions:

- Transmit power settings
- Output power settings
- Maintenance and indication
- Setting transmission frequency
- MPEG-2 encoding of user supplied video and audio
- DVB-S compliant coding, interleaving, scrambling and modulation
- Upconversion of the modulated signal to L-band
- Reception of DVB-S compliant MPEG-2 TS
- Display of transmitted video
- Antenna pointing calculations
- Spectrum Analyzer

The following sections provide descriptions and specifications for each of the above listed functions.

### Transmit and Output Power Settings

The transmit power settings are controlled via the TRANSMITTER CONTROL panel of the Norsat NewsLink GUI. The power can be entered manually, or via transmit power quick keys which store assigned values for low and nominal power. The low and nominal power levels of the for the quick keys are set in the TRANSMIT POWER panel of the Norsat NewsLink GUI.

### Maintenance and Indication

If the desired output power setting is above 25 dBm, for both the 15 W and 25 W SSPA, the output power level will be maintained at its current level independent of temperature drift. However, if the desired output power level is below 25 dBm, the actual output power level may fluctuate with temperature.
The Antenna Alignment screen of the Norsat NewsLink GUI indicates the signal strength.

### Transmission Frequency Setting

The transmission frequency setting is controlled via the TRANSMITTER CONTROL panel of the Norsat NewsLink GUI. The transmission frequency can be entered manually, or via transmit frequency presets which store frequently used transmit frequencies, and are set in the FREQUENCY PRESETS panel of the Norsat NewsLink GUI.

## Audio & Video Encoding

The MPEG-2 Encoder accepts a single video and four mono audio inputs, which are processed and compressed to produce an MPEG-2 transport stream.

The video inputs accepted are either:

- Composite video
- SDI (optional)

A latency of either NORMAL (HIGH QUALITY) or LOW (REDUCED QUALITY) may be selected.

**NOTE** There is a trade-off between the encoder latency and the quality.

The audio inputs, both the *left* (L) and *right* (R) channels, accepted are either:

- Analog balanced audio (L and R)
- Analog unbalanced audio (L and R)

in one of the following modes:

- Stereo
- Dual mono

The video processing is compliant with ISO/IEC 13818-2 and the audio processing is compliant with ISO/IEC 13818-3.

## Channel Coding and Modulation

The DVB Modulator accepts the MPEG-2 transport stream containing the audio, video and data packets, and processes it as defined in ETS 300-421.

## Upconversion, Frequency Level Control

The modulated signal is upcoverted to L-band; the center frequency of the modulated signal is configurable with a resolution of 100 Hz. The Baseband/IF unit provides greater than 30 dB of level control.

## Reception of DVB-S/MPEG-2 TS

The Baseband/IF unit receives and demodulates, decodes and recreates IP data from an MPEG-2/DVB-S transport stream received via satellite.

## Encoded Video Display

The Baseband/IF unit can display the encoded video being transmitted in real-time.

The audio is provided to the user via a 1/8 inch mini jack.

**NOTE** The receiver must be set to Tx Local Loopback in order to monitor your own audio and video.

## Antenna Pointing Calculations

The Baseband/IF unit calculates the antenna azimuth, elevation pointing angles and polarization using either a manually entered location or GPS loca-

tion data. The GPS data is accurate to within 100 m in longitude, latitude and altitude. Both the GPS receiver and antenna are part of the Baseband/IF unit.

## Spectrum Analyzer

The Spectrum Analyzer provides the capability to view the received and transmitted spectrums.

On the receive side, the Spectrum Analyzer aids in alignment and verification of correct satellite acquisition. The Spectrum Analyzer is capable of monitoring a satellite beacon with a narrow bandwidth, and enables the user to view the entire receive frequency spectrum. In addition, it is possible to monitor the Norsat NewsLink transmit signal that is translated and broadcasted by the satellite to the central hub.

On the transmit side, the Spectrum Analyzer monitors the occupied bandwidth and sideband regrowth of the transmitted signal.

CHAPTER 6

# Norsat NewsLink Deployment

The following procedures describe the steps required to deploy the Norsat NewsLink.

**WARNING**

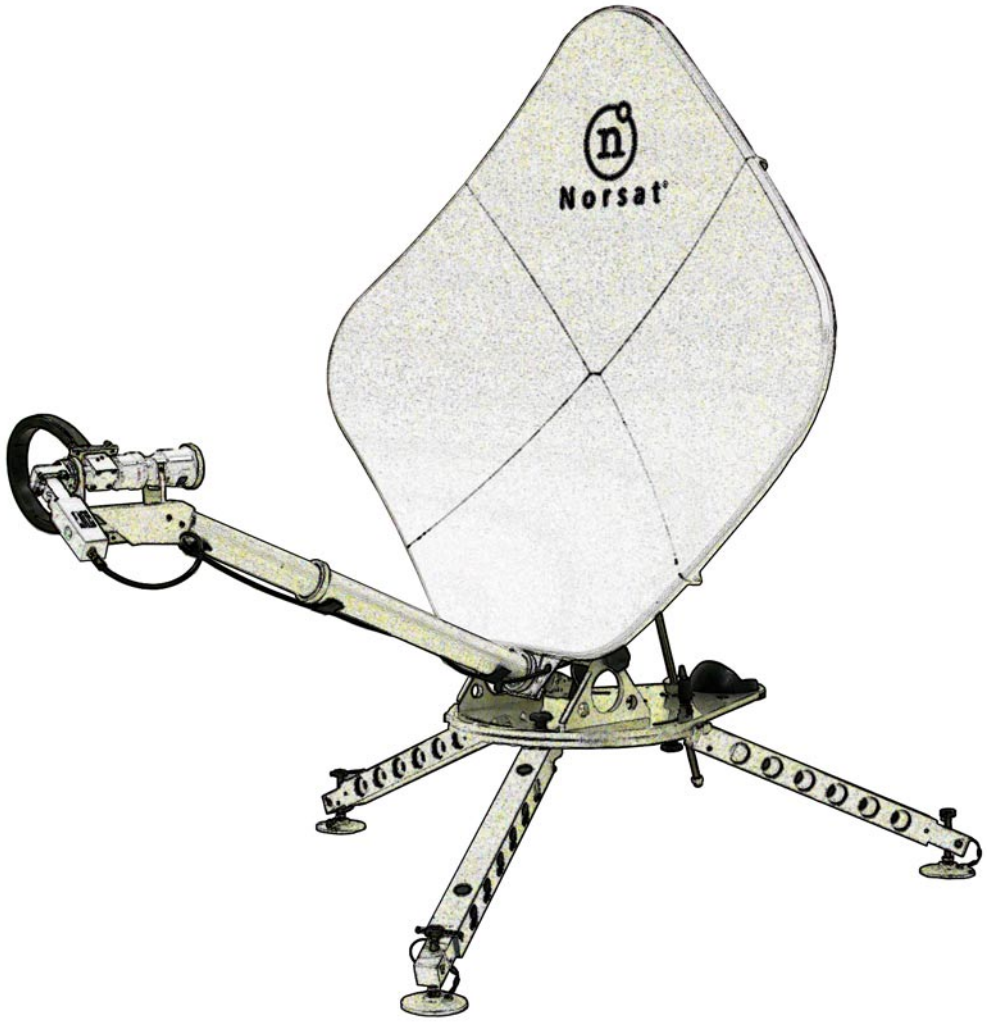
**FCC RF EXPOSURE INFORMATION**

To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of **2.5 meters** or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.

## Deploying the Antenna/RF Unit

The Antenna/RF cases contain the components of the antenna; the RF and Antenna Unit case, Model 3200-RF, and the Accessories case, Model 3200-AC. The following steps describe the procedure for opening the case and assembling the antenna. Figure 7 on page 22 shows the antenna once assembled.

**FIGURE 7.** **Assembled Antenna.**




## Opening the RF Unit Cases

1. Position the RF unit cases such that the arrow label on the unit points upward.
2. Press the button in the center of the pressure-equalization valve until the airflow through the valve ceases.

**CAUTION** This valve must be manually pressed in order to equalize the pressure inside the case before opening the case. Failure to do so may result in injury to the user, due to pressurization differences forcing the case open when the case latches are unlocked. Alternatively, the case may be under a vacuum and hard to open.

3. Unfasten the seven latches keeping the case lid shut:
   i. Lift the winglever and turn it counter-clockwise.
   ii. Fold in the winglever until it is once again flush with the latch mechanism.

## Deploying the Antenna

This section details the procedure for assembling the components of the antenna.

1. The RF and Antenna Unit case, model 3200-RF, contains the base of the antenna; refer to Figure 8 on page 23.

**FIGURE 8. RF and Antenna Unit Case (Model 3200-RF).**

2. The Accessories case, model 3200-AC, contains the remaining components of the antenna; refer to Figure 9 on page 23. The top layer contains the legs, IFL cable and Power cord. The middle layer consists of the pouch that contains the remaining three reflector panels of the antenna. The bottom layer contains the waveguide, feed assembly, boom arm, elevation support rods and LNBs.

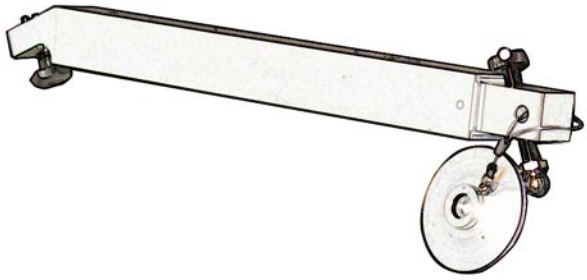
**FIGURE 9. Accessories Case. (Model 3200-AC)**

3. Remove the IFL cable and Power cord.

## Support Legs

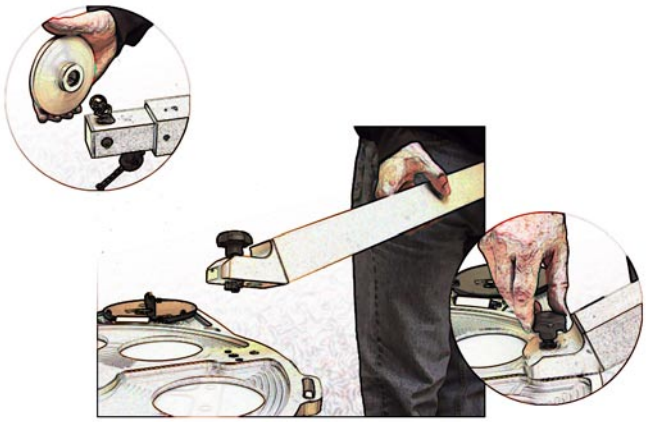
1. Remove the three base support legs and feet; refer to Figure 10 on page 24.

**FIGURE 10. Support Leg and Foot.**



2. Insert the foot support rod into the foot.
3. With the support base remaining in the case, attach each of the three support legs to the support base; refer to Figure 11 on page 24:
   i. Slip the two pins at the top of the leg into the guide slots on the support base.
   ii. Once in place, turn the hand wheel clockwise, until tight, to secure.

**FIGURE 11. Attaching Legs to Support Base.**



4. Remove the support base, with legs attached, from the case.

## Reflector Dish Pouch

1. Remove the pouch containing the antenna reflector panels.

## Dish Elevation Rod

1. Locate the following; refer to Figure 12 on page 25:
   i. Elevation rod: quantity 2 of different lengths; select the length appropriate for the required elevation.
   ii. Quick action knobs: quantity 2

iii. Elevation fastening collars: quantity 2

**FIGURE 12.** **Elevation Rod, Knobs and Nuts.**

2. Remove the two elevation fastening collars and one quick action knob from the elevation rod.
3. Slide the first quick action knob onto the elevation rod to the required position, approximately 1/3” from the bottom, by depressing button.
4. Insert the elevation rod through the elevation base support hole, from the underside of the base; refer to Figure 13 on page 25.

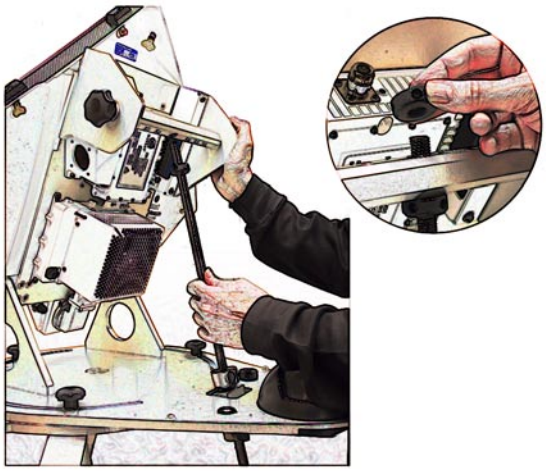
**FIGURE 13.** **Elevation Base Support Hole.**

5. Slide the second quick action knob onto the elevation rod to required position by depressing the button; refer to Figure 14 on page 26.

**FIGURE 14. Elevation Rod Inserted into Support Base.**

6. Thread one fastening collar on the elevation rod approximately 2 inches.
7. Slide the elevation rod into the dish elevation support hole; refer to Figure 15 on page 26.

**FIGURE 15. Elevation Rod Inserted into Dish Elevation Support Hole.**



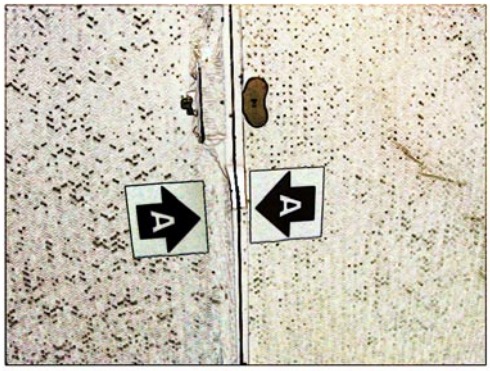
8. Thread the second fastening collar to the elevation rod, and tighten both collars to block to lock in place.

## Reflector Dish

The dish is divided into four reflector panels that each comprise a quarter of the dish. One reflector panel is permanently fastened to the support base, leaving three reflector panels to be assembled.

1. Remove the three unsecured reflector panels from the Dish Reflector Pouch.
2. Locate the reflector panel with the A label, and align it with the A label on the permanently secured reflector panel; refer to Figure 17 on page 28.
3. Insert the pins into the guide holes and fasten the camlocks by turning them clockwise, to secure the dish quarter; refer to Figure 16 on page 27 and Figure 17 on page 28.

**FIGURE 16. Guide Holes and Cam Locks.**




4. Align the B label on each of the remaining reflector panels; refer to Figure 17 on page 28.
5. Secure the two reflector panels together by inserting the pins into the guide holes, then fasten the camlocks by turning them clockwise.
6. Align this piece with the panels already fastened to the support base; refer to Figure 17 on page 28.
7. Secure the piece by inserting the pins into the guide holes and fastening the camlocks by turning them clockwise.

**FIGURE 17. Assembling Reflector Panels.**

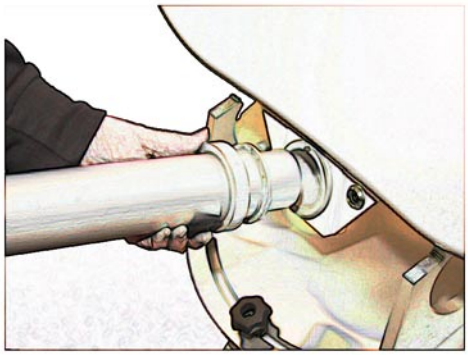
## Boom Arm

1. Locate the Boom Arm; refer to Figure 18 on page 28.

**FIGURE 18. Boom Arm.**

2. Insert the boom arm into the socket located at the bottom of the dish. A steel pin is provided to ensure alignment; refer to Figure 19 on page 29.

**FIGURE 19.** **Boom Arm Assembly.**



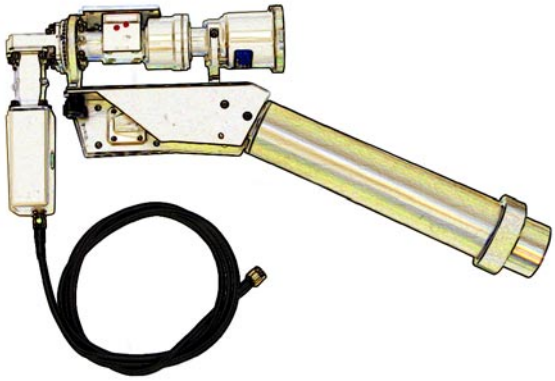
3. Spin collar until secured.

**NOTE** Be careful to not overtighten the collar as this could make it difficult to remove.

## Feed Assembly

1. Locate the Feed Assembly; refer to Figure 20 on page 29.

**FIGURE 20.** **Feed Assembly.**



2. Insert the feed assembly into the boom arm socket. A steel pin is provided to ensure alignment; refer to Figure 21 on page 30.

**FIGURE 21.** **Feed Assembly Attachment.**

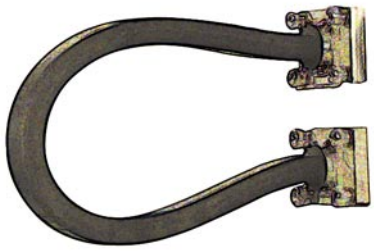
3. Fasten the collar until secure.

**NOTE** Be careful to not overtighten the collar as this could make it difficult to remove.

## Flexible Waveguide

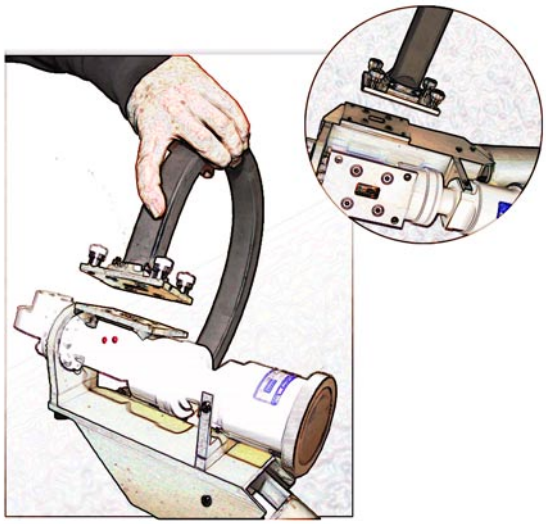
1. Locate the flexible waveguide; refer to Figure 22 on page 30.

**FIGURE 22.** **Flexible Waveguide.**



2. Insert one side of the flexible waveguide into the waveguide flange located in the feed assembly, and secure with the hand-tighten screws; refer to Figure 23 on page 31.

**FIGURE 23.** **Flexible Waveguide Attachment Location.**



3. Turn the knobs clockwise to secure.
4. Insert the other end of the flexible waveguide into the OMT located in the feed assembly and secure with the hand-tighten screws.

## LNB Cable

1. The LNB cable will be attached to the LNB, and coiled with the feed assembly; refer to Figure 24 on page 31.

**FIGURE 24.** **LNB Cable.**

2. Insert the cable to the connector on the Interface/Indicator unit.

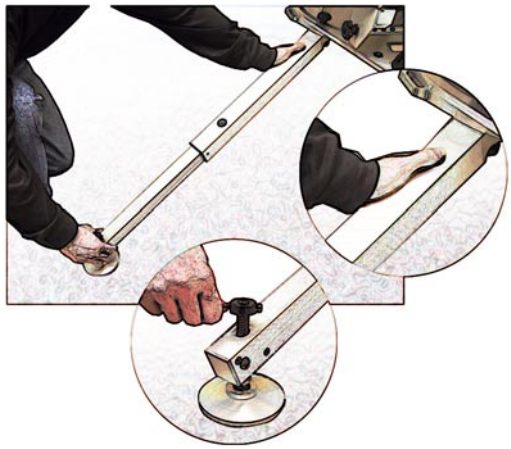
**FIGURE 25. LNB Cable Connection on LNB.**

3. Secure cable to the feed assembly with nylon clips.
4. Secure cable to the boom arm with nylon clips.

### Level Antenna Base

1. Using the knobs on each foot, adjust the height of the support legs until the bubble of the level indicator is centered in the target; refer to Figure 26 on page 32.
2. Telescopic Legs (optional): adjust the length of the length of the support legs until the bubble of the level indicator is centered in the target; refer to Figure 26 on page 32.

**FIGURE 26. Adjust the Height of Leg and Adjust the Length of the Leg (optional).**



## Deploying the Baseband/IF Unit

The following steps describe the procedure for opening the Baseband/IF unit case.

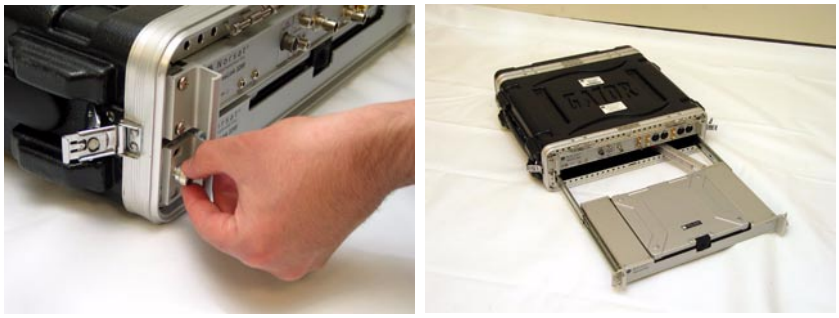
### Opening the Baseband/IF Unit Case

1. Position the Baseband/IF unit case such that the arrow label on the unit points upward.
2. Unfasten the four latches that attach the case end caps:
   i. Lift the winglever and turn it counter-clockwise.
   ii. After unlatched, fold in the winglever until it is once again flush with the latch mechanism.

**CAUTION** The Baseband/IF unit and all of its parts are not rated as water resistant, and therefore must always be sheltered from rain or any other sources of water. Failure to do so could result in terminal system damage, and/or serious injury to the user due to electrical hazards.

3. Extend the laptop tray by turning the side knobs counter-clockwise, and then pulling the unit forward; refer to Figure 27 on page 33.

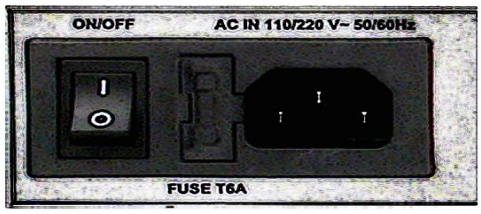
**FIGURE 27. Extending Laptop Tray.**



### Baseband/IF Unit Cable Connections

1. Connect one end of the power cord to the Baseband/IF unit and the other end to the power source; refer to Figure 28 on page 33.

**FIGURE 28. Power Cord Connector on Baseband/IF Unit.**




## Antenna and Baseband Unit Interconnections

The following steps describe the procedure for interconnecting the Antenna and Baseband units.

**CAUTION** All connections/disconnections should be made while the power is off.

## Interfacility Link

The Baseband/IF unit and Antenna/RF unit are connected via a 10 meter multi-cable assembly called the *interfacility link* (IFL); a 30 meter cable is provided as an option.

**NOTE** The calibration files may need to be changed in order to accommodate the 10 meter and 30 meter cables.

The IFL is comprised of five individually shielded cables encased in a braided sheath:

- Transmit IF
- Receive IF
- Transmit Monitor IF
- SSPA Power
- Monitor and Control

The three IF cables are 50 ohm co-axial cables with N-male connectors on each end. In addition to the L-band IF signals, these cables also carry a 24 V DC and a 10 MHz reference. Each of the co-axial cables is colour coded:

- Transmit IF: Red
- Receive IF: Green
- Transmit Monitor: Blue

**CAUTION** All co-axial cables in the IFL carry 24 V DC.

The SSPA power cable supplies 24 V to the SSPA. The current in the cable can be in excess of six amperes.

The Monitor and Control cable contains the following control signals:

- SSPA Mute
- Temperature Sensor Reading
- SSPA Power Detector Reading
- SSPA Fan Alarm
- Receive Signal Strength

The SSPA Power and the Monitor and Control cables are terminated in a common multi-pin connector. The Baseband/IF unit side uses a male connector and the Antenna/RF unit side uses a female connector. The cable ends are labeled ANTENNA and BASEBAND accordingly. Each end of the cable has a strain relief.

## Interconnection

The following steps describe the procedure for interconnecting the Baseband/IF unit and Antenna/RF unit.

1. Assemble the Antenna/RF unit.
2. Locate the IFL cable; refer to Figure 29 on page 35.

**FIGURE 29. IFL Cable and Power Cord.**

3. Attach the strain relief cable to the hook on the Antenna/RF superstructure.
4. Attach the Red co-axial cable to the N-connector marked TX and colour coded red.
5. Attach the Blue co-axial cable to the N-connector marked TX MONITOR and colour coded blue.
6. Attach the Green co-axial cable to the N-connector marked RX and colour coded green.
7. Attach the multi-pin connector to the connector marked DC/CONTROL.
8. Repeat steps 3 through 7 for the Baseband/IF unit end. shows the strain relief cable hooked up to the Baseband unit, and shows the Baseband unit with the IFL cable connected.

**FIGURE 30. Baseband Strain Relief Cable Hook.**

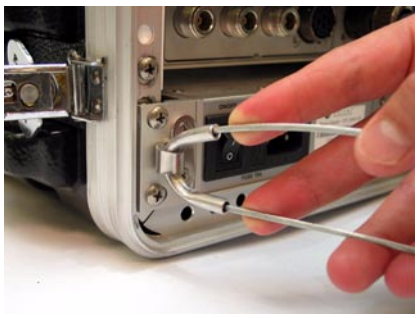
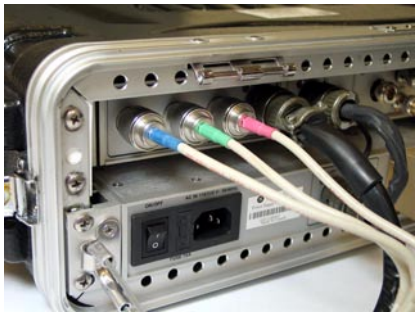


**FIGURE 31. Baseband IFL Cable Connections.**



**NOTE** The Norsat NewsLink IFL is a calibrated cable assembly and must be used to interconnect the Antenna/RF and Baseband/IF units. Use of alternate cable assemblies will result in incorrect power settings.

## Connecting Peripherals to the Baseband/IF Unit

Refer to “Baseband/IF Unit Interfaces” on page 14 for descriptions of the interfaces for connecting peripherals to the Baseband/IF unit.

## Powering Up the Baseband/IF Unit

1. Switch the power switch located at the rear of the chassis to ON.
2. To power up the laptop:
   i. Open the laptop by pressing the latch on the laptop lid.
   ii. Press the power button.

CHAPTER 7

# Norsat NewsLink Configuration

This chapter is designed to give step by step instructions for configuring the Norsat NewsLink, including antenna alignment, transmitter control, transmission profiles and satellite information, using the Norsat NewsLink GUI application.

## Setup Procedure Overview

The Norsat NewsLink GUI, accessed via the Baseband/IF unit, provides the utilities for:

- Configuring system settings
- Determining antenna alignment settings
- Transmitter control

The following sections explain and describe the three main steps for typical system set-up.

### Step 1: Configure System Settings

This step involves pre-configuring the Baseband/IF unit with all of the custom uplink settings:

- Satellite information: storing the orbital position, horizontal and vertical carrier frequency of the satellite, and the operator phone number.
- Transmission profiles: setting up a transport stream, video PIDs and audio PIDs.
- Transmit frequency presets: storing frequently used transmit frequencies.

- Transmit power quick keys: storing of assigned low and nominal power values for convenience and reduction in the chance of error when beginning transmission. The starting of a typical satellite transmission follows:
  - Transmission of a low power carrier and adjustment of the operating parameters
  - Raising of the power level to the assigned operating level; i.e. nominal power
  - Modulation of the carrier
- LNB selection: selecting which LNB is attached to the antenna.

This step is typically done at headquarters prior to the unit being sent out into the field.

### Step 2: Antenna Alignment

In this step, the current location of the antenna is determined via the GPS or by manually entering its coordinates. The desired satellite is then selected from the pre-entered satellite information list, as entered in step 1, or by entering the orbital position of the satellite. The transmit polarization is then selected. With this information, the required antenna settings are calculated and displayed via the Norsat NewsLink GUI. The user then aligns the antenna according to the displayed values. The DVB carrier search functionality allows the user to confirm that they are locked on to the correct satellite.

### Step 3: Transmitter Control

Transmission will commence during this step. The user selects a transmission profile from the pre-entered transmission profile list, as entered in step 1. The user then selects a transmit frequency preset from the preset frequency list as, entered in step 1, or manually enters a value for the transmit frequency.

While on the phone with the satellite operator, the operator will advise the selection of different modulations and power levels in order to verify that there is a properly adjusted and reliable uplink signal. Transmission will start automatically as the final stage of this step.

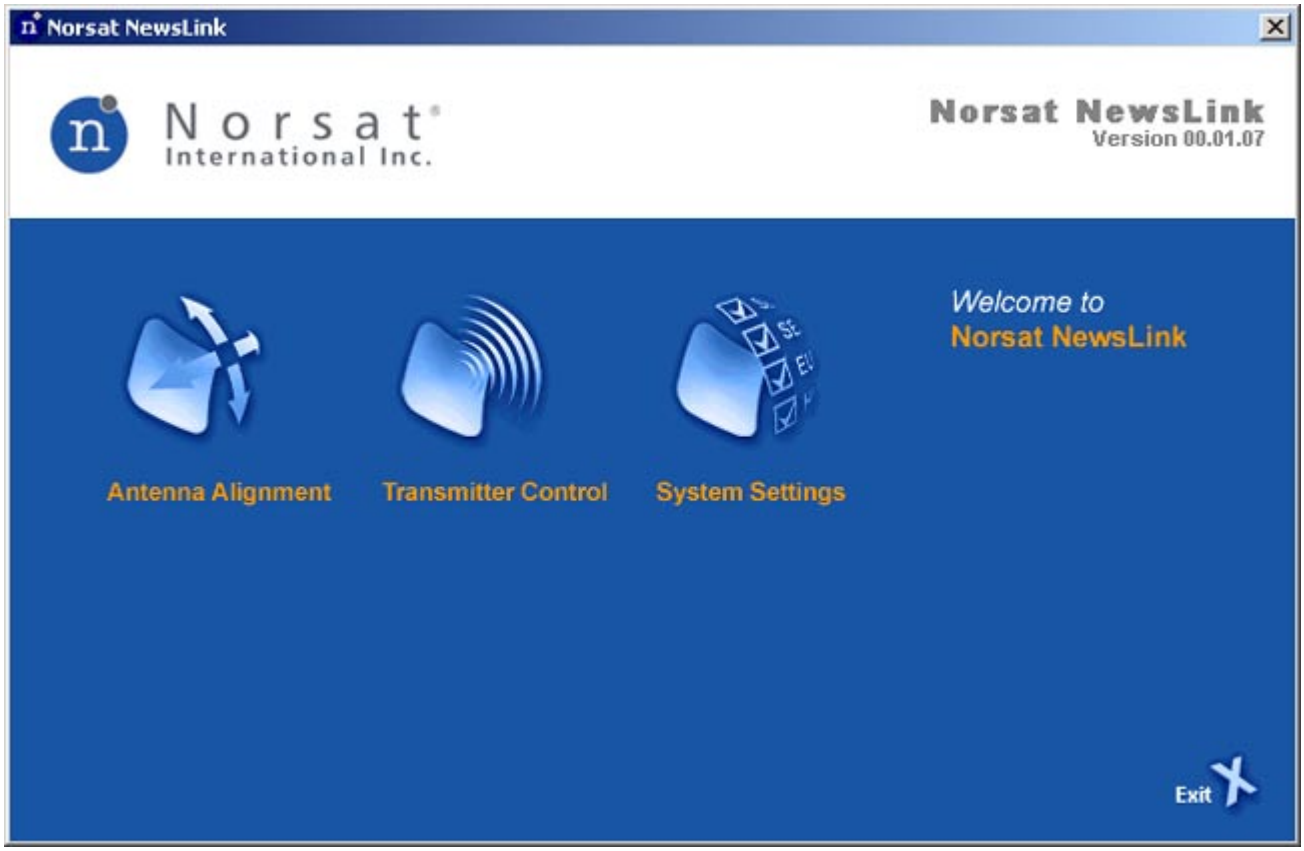
## Norsat NewsLink GUI

The Norsat NewsLink GUI will automatically be launched when the laptop boots.

To manually launch the Norsat NewsLink GUI:

1. From the Windows toolbar, select START → PROGRAMS → NORSAT INTERNATIONAL → NORSAT NEWSLINK.
2. The NORSAT NEWSLINK panel is then launched; refer to Figure 32 on page 39.

**FIGURE 32. NORSAT NEWSLINK Panel.**



# System Settings

This section describes the steps required for configuring transmission profiles and satellite information.

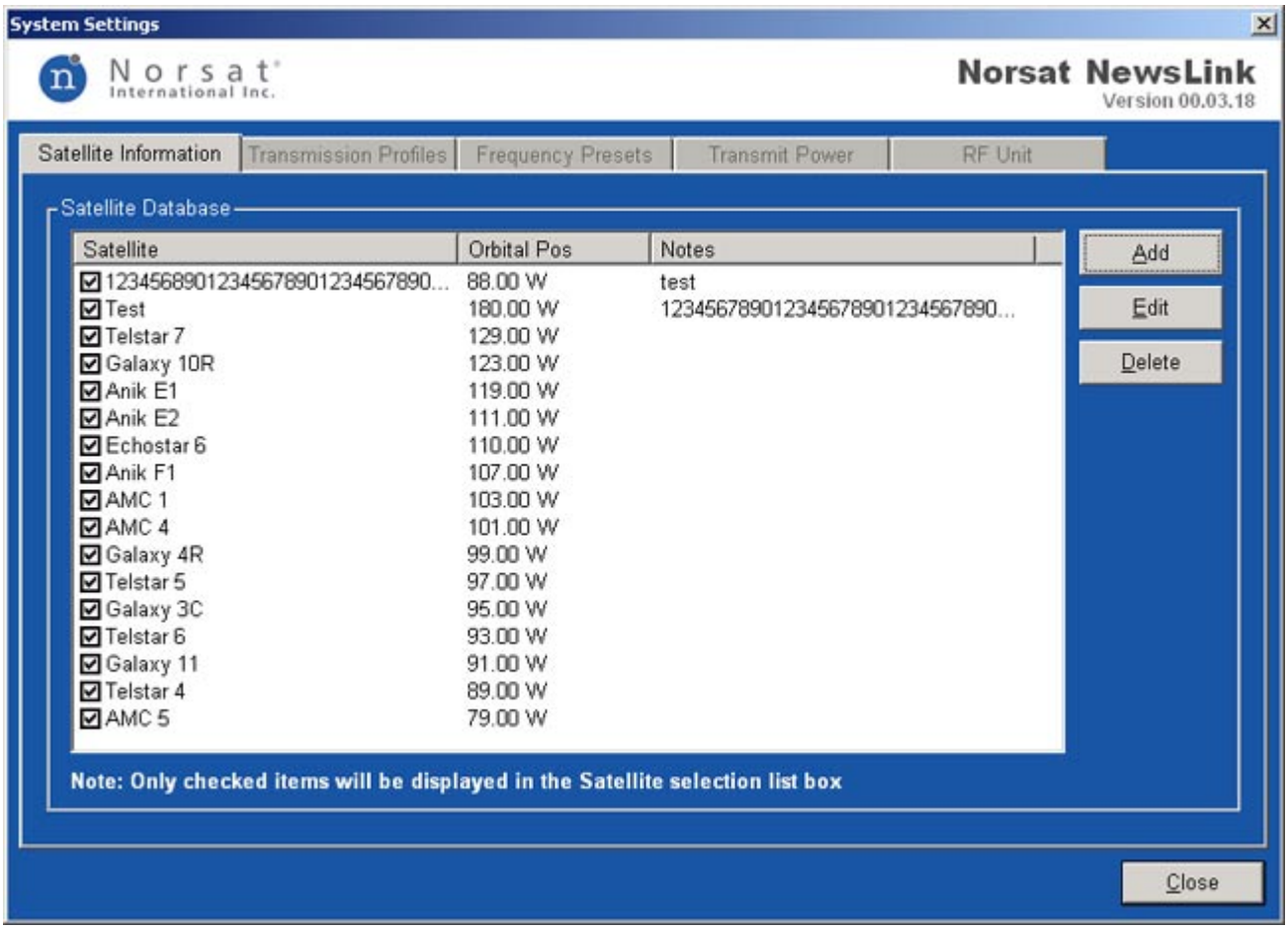
1. Click on the SYSTEM SETTINGS icon in the main screen of the Norsat NewsLink GUI.

## Satellite Information

This section describes the steps required to add, edit and delete satellite information.

1. Click on the SATELLITE INFORMATION tab in the SYSTEM SETTINGS panel; refer to Figure 33 on page 40.

**FIGURE 33. SATELLITE INFORMATION Tab.**

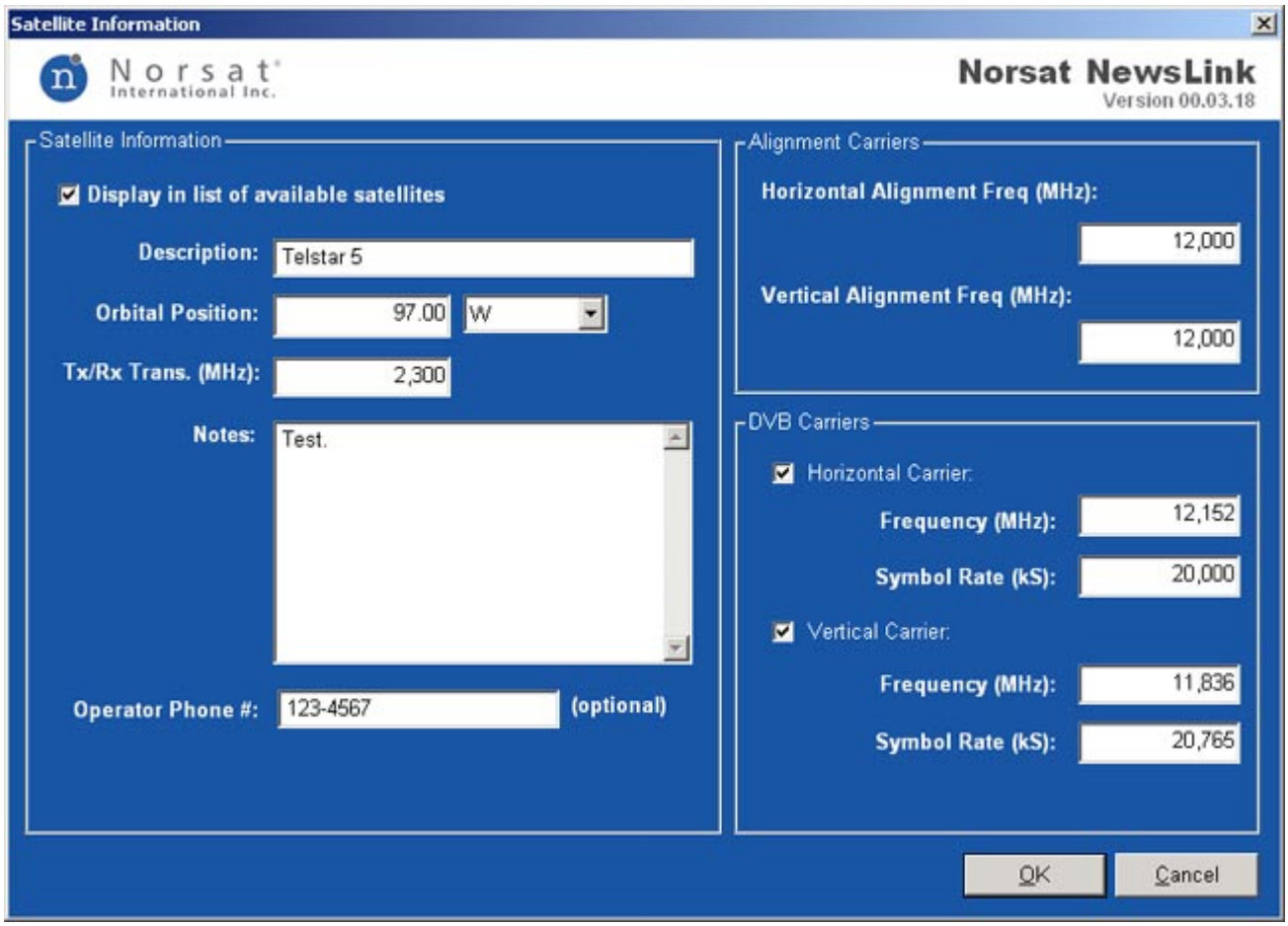



### Adding New Satellite Information

The following procedure details the steps required to add a new satellite to the satellite selection list.

1. Click ADD in the SATELLITE INFORMATION tab. The SATELLITE INFORMATION panel is launched; refer to Figure 34 on page 41.

FIGURE 34. SATELLITE INFORMATION Panel.




2. In the SATELLITE INFORMATION sub-panel:
   i. Select DISPLAY IN LIST OF AVAILABLE SATELLITES if the satellite is to be shown in the list.
   ii. Enter a DESCRIPTION for the satellite; maximum length of 20 characters.
   iii. Enter the ORBITAL POSITION of the satellite.
   iv. Enter the TX/RX TRANS in MHz. This indicates the amount your frequency is down-converted by the satellite.
   v. NOTES associated with the satellite may optionally be added.
   vi. Enter the OPERATOR PHONE #; maximum length of 20 characters.
3. In the ALIGNMENT CARRIERS sub-panel, the horizontal and vertical frequencies of the known carrier, or beacon, are entered. These are used to set the center frequency of the signal strength meter.
   i. Enter the horizontal polarization carrier frequency of the satellite in the HORIZONTAL ALIGNMENT FREQ (MHZ) field.
   ii. Enter the vertical polarization carrier frequency of the satellite in the VERTICAL ALIGNMENT FREQ (MHZ) field.

When using the Spectrum Analyzer, if the ALIGN CARRIER quick key is pressed, it will center the spectrum on the alignment carrier specified in the satellite profile.

4. In the DVB CARRIERS sub-panel, the horizontal and vertical frequencies are set on the same satellite that the video is to be played/recorded. These are used to set the DVB-S receiver.
   i. To enter the horizontal carrier frequency of the satellite, select the HORIZONTAL CARRIER check box. Enter the frequency in the FREQUENCY (MHz) field, and the symbol rate in the SYMBOL RATE (kS) field.
   ii. To enter the vertical carrier frequency of the satellite, select the VERTICAL CARRIER check box. Enter the frequency in the FREQUENCY (MHz) field, and the symbol rate in the SYMBOL RATE (kS) field.
5. Click OK.

### Editing Satellite Information

1. From the SATELLITE INFORMATION tab, select the satellite to be edited and click EDIT. The form in Figure 34 on page 41 will be displayed.
2. Enter the required changes, then click OK.

### Deleting a Satellite

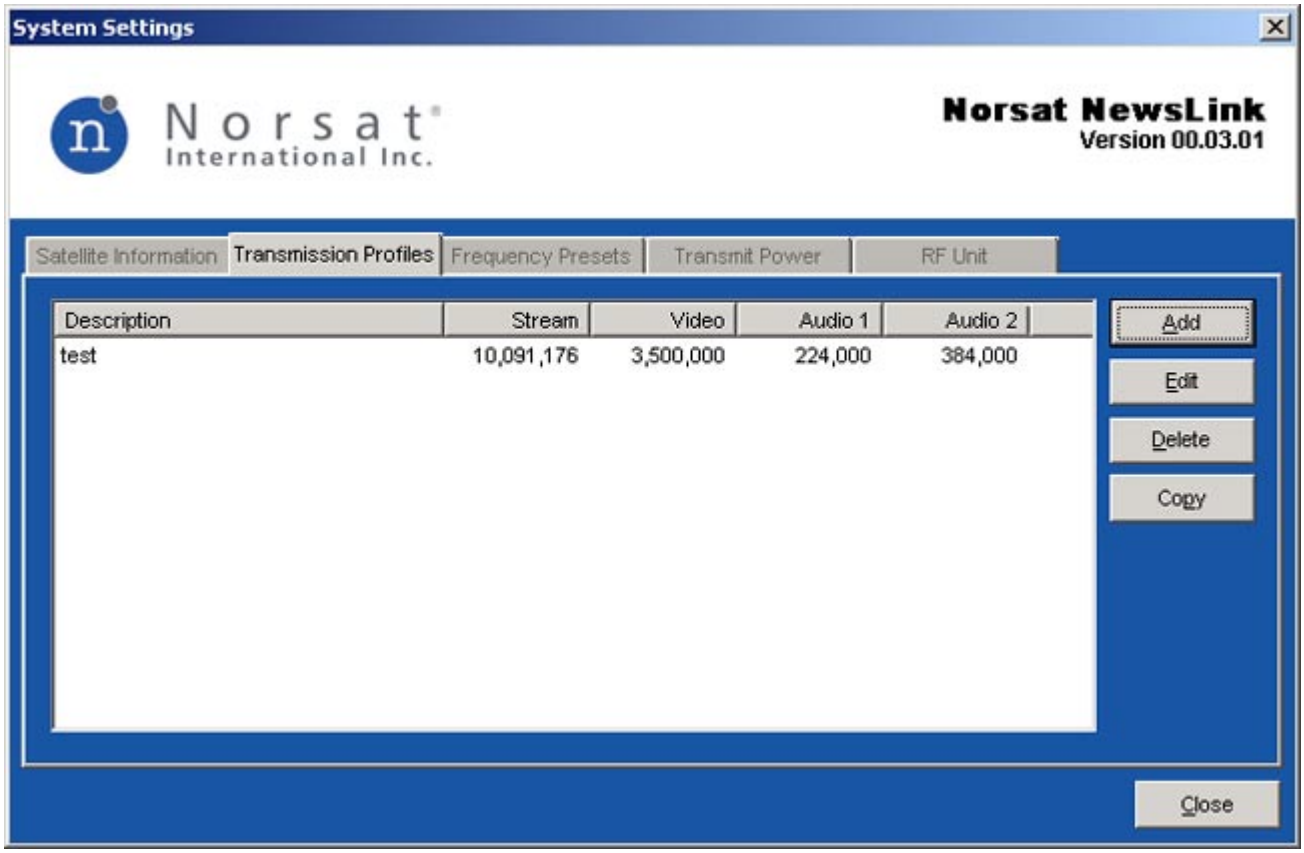
1. From the SATELLITE INFORMATION tab, select the satellite to be removed and click DELETE.
2. Click YES to confirm the removal of the satellite, or NO to cancel.

## Transmission Profiles

This section describes the steps required to add, edit, delete and copy transmission profiles.

1. Click on the TRANSMISSION PROFILES tab in the SYSTEM SETTINGS panel; refer to Figure 35 on page 43.

FIGURE 35. SYSTEM SETTINGS: TRANSMISSION PROFILES Tab

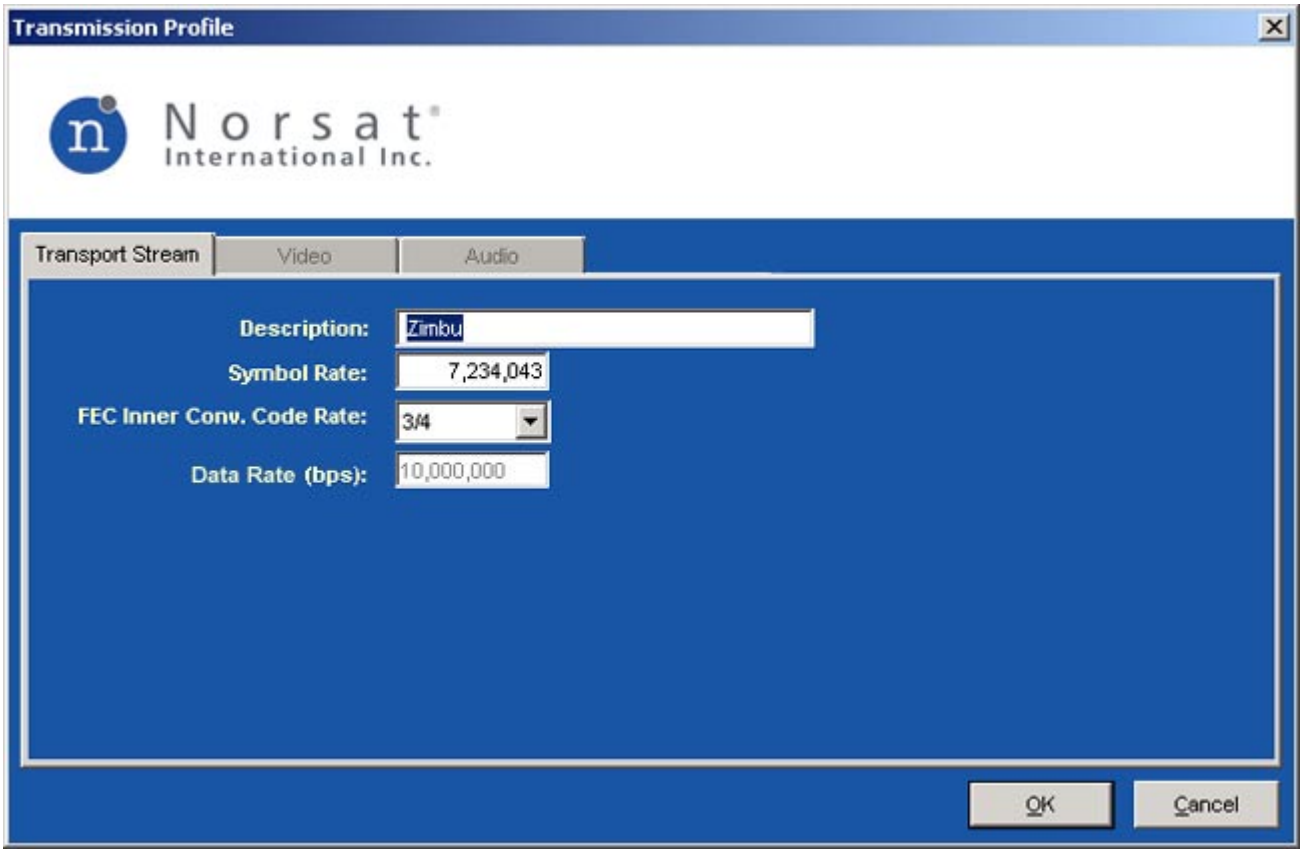



### Adding a Transmission Profile

The following procedure details the steps required to add a new transmission profile, which includes creating a transport stream, video PID and two audio PIDs.

1. Click ADD in the TRANSPORT PROFILES tab. The TRANSPORT PROFILE panel is launched; refer to Figure 36 on page 44.

FIGURE 36. TRANSMISSION PROFILE: TRANSPORT STREAM Setup Panel.




### Create the TRANSPORT STREAM

1. Enter a DESCRIPTION for the transport stream; maximum length of 50 characters.

**NOTE** While duplicate profile descriptions are allowed, to allow for easier identification it is suggested that each profile is given a unique description.

2. Enter a value for the SYMBOL RATE between 2,000,000 and 8,000,000.
3. Select an FEC INNER CONV. CODE RATE from the drop-down box.

**NOTE** The DATA RATE, i.e. the maximum allowable bitrate, will automatically be calculated in accordance with the following formula:

$$\text{DATA RATE} = \text{SYMBOL RATE} \times 2 \times \text{FEC} \times \frac{188}{204}$$

In other words, the DATA RATE is equal to the SYMBOL RATE, multiplied by:

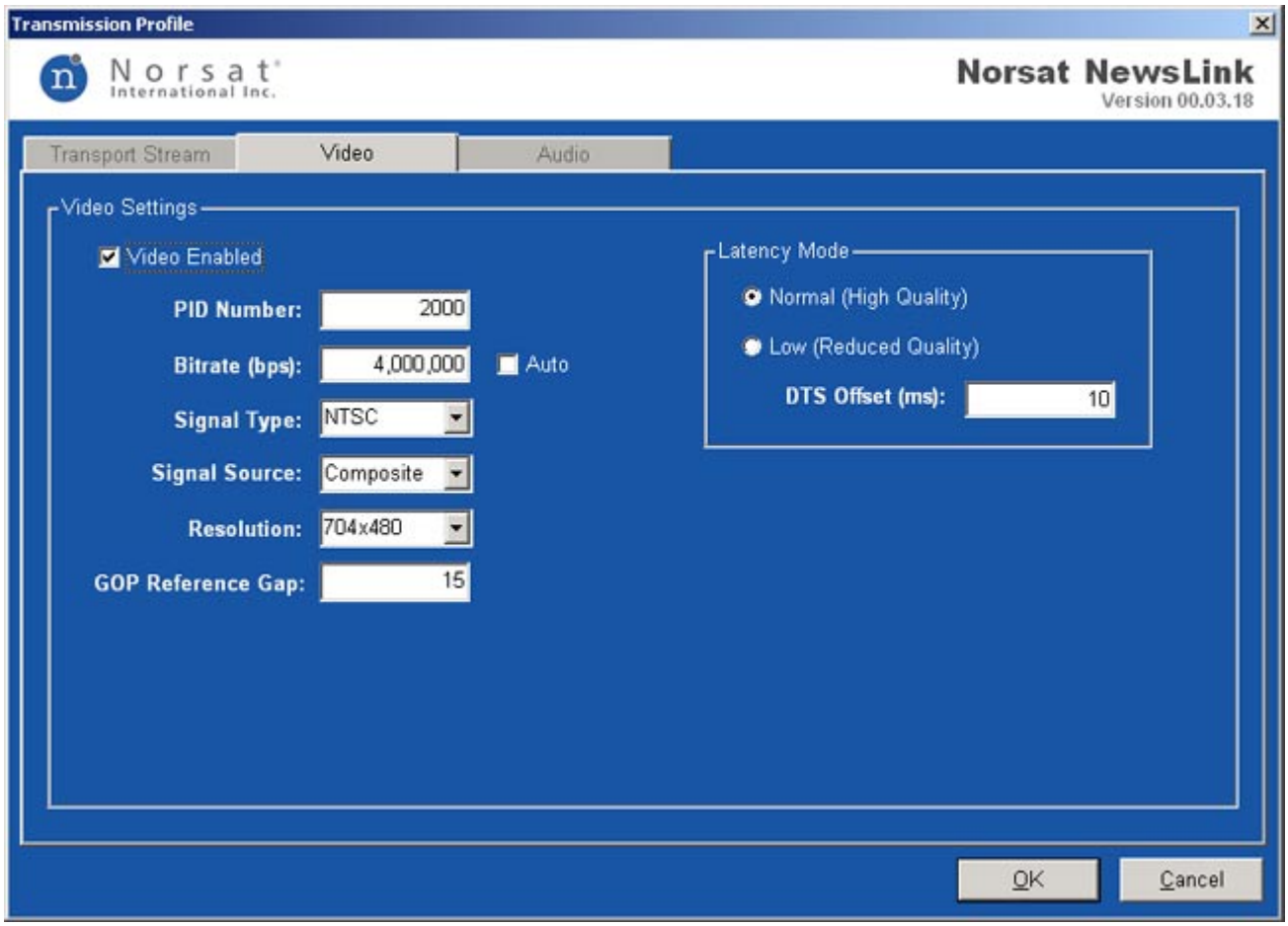
- 2: QPSK modulation is 2 bits per symbol
- FEC: the fraction actual data (i.e. does not include error bits)
- 188/204: the fraction of actual bits to total bits in Reed Solomon coding

**NOTE** The sum of the bitrates for the video PID, audio 1 PID and audio 2 PID must be less than or equal to the DATA RATE.

**NOTE** The actual video PID bitrate by be adjusted down slightly to accommodate the transport overhead.

4. Next click on the VIDEO tab; refer to Figure 37 on page 45.

FIGURE 37. TRANSMISSION PROFILE: VIDEO Setup Panel.




### Create the VIDEO PID

1. If a video PID is required, select VIDEO ENABLED.
2. Enter a PID number in the range of 34 to 8190 in the PID NUMBER field.

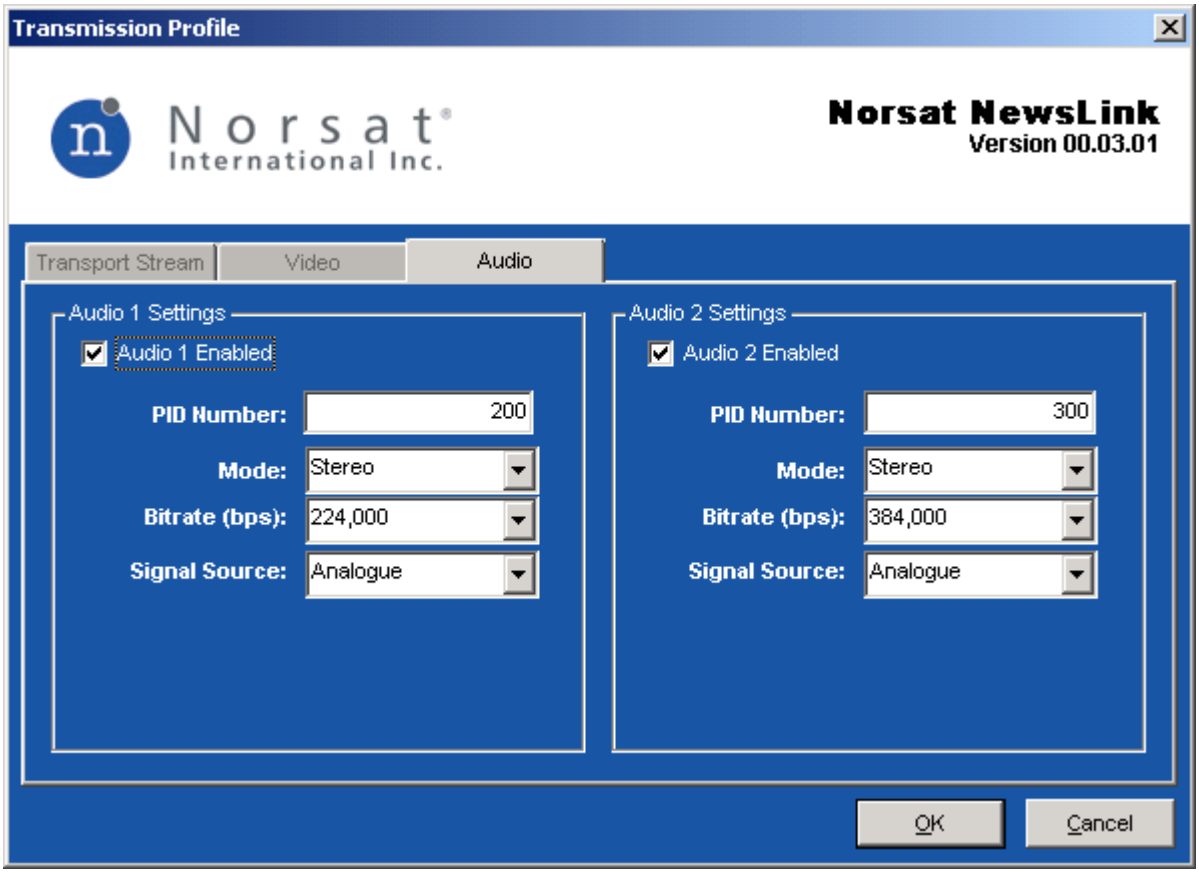
**NOTE** The VIDEO PID number cannot be the same as the AUDIO PID numbers.

3. Enter a value in the BITRATE field in the range of 1.5 Mbps to 10 Mbps, or select AUTO to set to the highest allowable bitrate for the given SYMBOL RATE entered in the TRANSPORT STREAM tab.
4. From the SIGNAL TYPE drop-down box, select either NTSC or PAL.
5. From the SIGNAL SOURCE drop-down box, select either COMPOSITE or SDI (optional signal source).
6. From the RESOLUTION drop-down box:
   i. If the SIGNAL TYPE is NTSC, select either 704x480 or 352x480.
   ii. If the SIGNAL TYPE is PAL, select either 704x576 or 352x576.
7. Enter a value from 1 to 15 for the GOP REFERENCE GAP field, M. The default value for this setting is 15.
8. Select either NORMAL (HIGH QUALITY) or LOW (REDUCED QUALITY) for the LATENCY MODE.

**NOTE** There is a trade-off between the encoder latency and the quality.

9. Enter a value for the DTS OFFSET (MS). This field allows the user to improve the compatibility of the video and audio stream with the IRD. If NORMAL (HIGH QUALITY) is selected, the default value is 10. If LOW (REDUCED QUALITY) is selected, the default value is 15.
10. Next click on the AUDIO tab; refer to Figure 38 on page 46.

**FIGURE 38. TRANSMISSION PROFILE: AUDIO Setup Panel.**




### Create the AUDIO PID

To enable Audio PID 1, select AUDIO 1 ENABLED. Likewise, to enable Audio PID 2, select AUDIO 2 ENABLED. For each of the enabled PIDs:

1. Enter a PID number in the range of 34 to 8190 in the PID NUMBER field.

**NOTE** The AUDIO PID numbers cannot be the same as the VIDEO PID number.

2. From the MODE drop-down box, select either:
   i. DUAL MONO: each channel always uses exactly half of the bitrate. For example, if you select DUAL MONO at 160 kbps, then the left channel will always receive 80 kbps and the right channel will always receive 80 kbps.
   ii. STEREO: the bitrate is dynamically balanced between the left and right channels. For example, if you select STEREO at 160 kbps and the left channel is silent, then the right channel will receive almost the full 160 kbps while the left one receives only the remainder.
3. The SAMPLING RATE (HZ) is 48000.

4. Select a bitrate from the BITRATE (BPS) drop-down box. The bitrates available, for both DUAL MONO and STEREO, are:
   - 128,000 bps
   - 160,000 bps
   - 192,000 bps
   - 224,000 bps
   - 256,000 bps
   - 320,000 bps
   - 384,000 bps
5. From the SIGNAL SOURCE drop-down box, select either ANALOGUE, TEST TONE (an internally-generated tone used for testing) or SDI EMBEDDED (available only if selected SDI for Video).
6. Click OK.

The newly created transmission profile will now appear in the TRANSMISSION PROFILES tab.

### Editing a Transmission Profile

1. From the TRANSMISSION PROFILES tab, select the transmission profile to be edited and click EDIT.
2. Enter the required changes, then click OK.

### Deleting a Transmission Profile

1. From the TRANSMISSION PROFILES tab, select the transmission profile to be removed and click DELETE.
2. Click YES to confirm the removal of the profile, or NO to cancel.

### Copying a Transmission Profile

1. From the TRANSMISSION PROFILES tab, select the transmission profile to be duplicated and click COPY.

**NOTE** While duplicate profile descriptions are allowed, to allow for easier identification it is suggested that each profile is given a unique description.

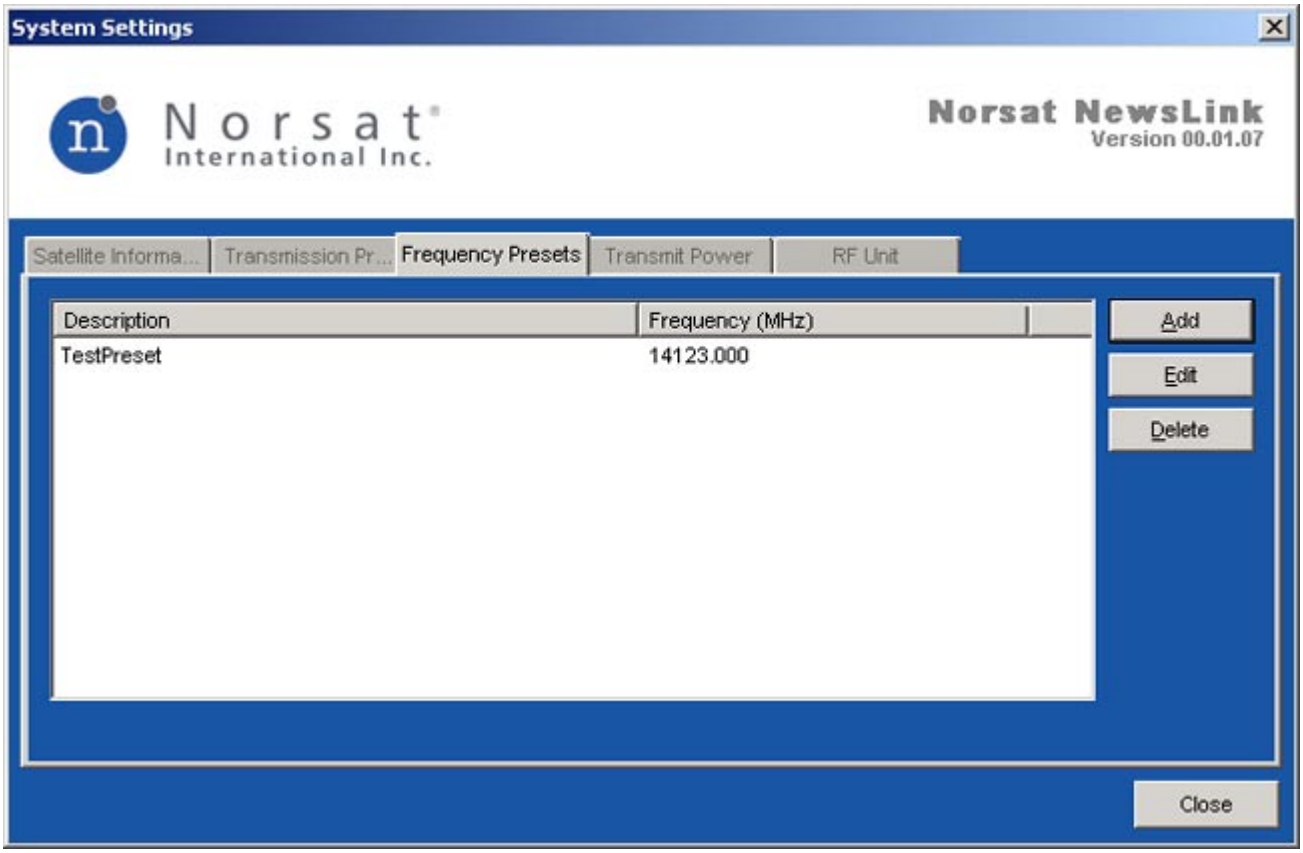
2. Enter any required modifications to the profile, then click OK.

## Transmit Frequency Presets

This section describes the steps required to add, edit and delete preset transmit frequency values. Refer to “Step 1: Configure System Settings” on page 37 for a description of frequency presets.

1. Click on the FREQUENCY PRESETS tab in the SYSTEM SETTINGS panel; refer to Figure 39 on page 48.

FIGURE 39. FREQUENCY PRESETS Panel.

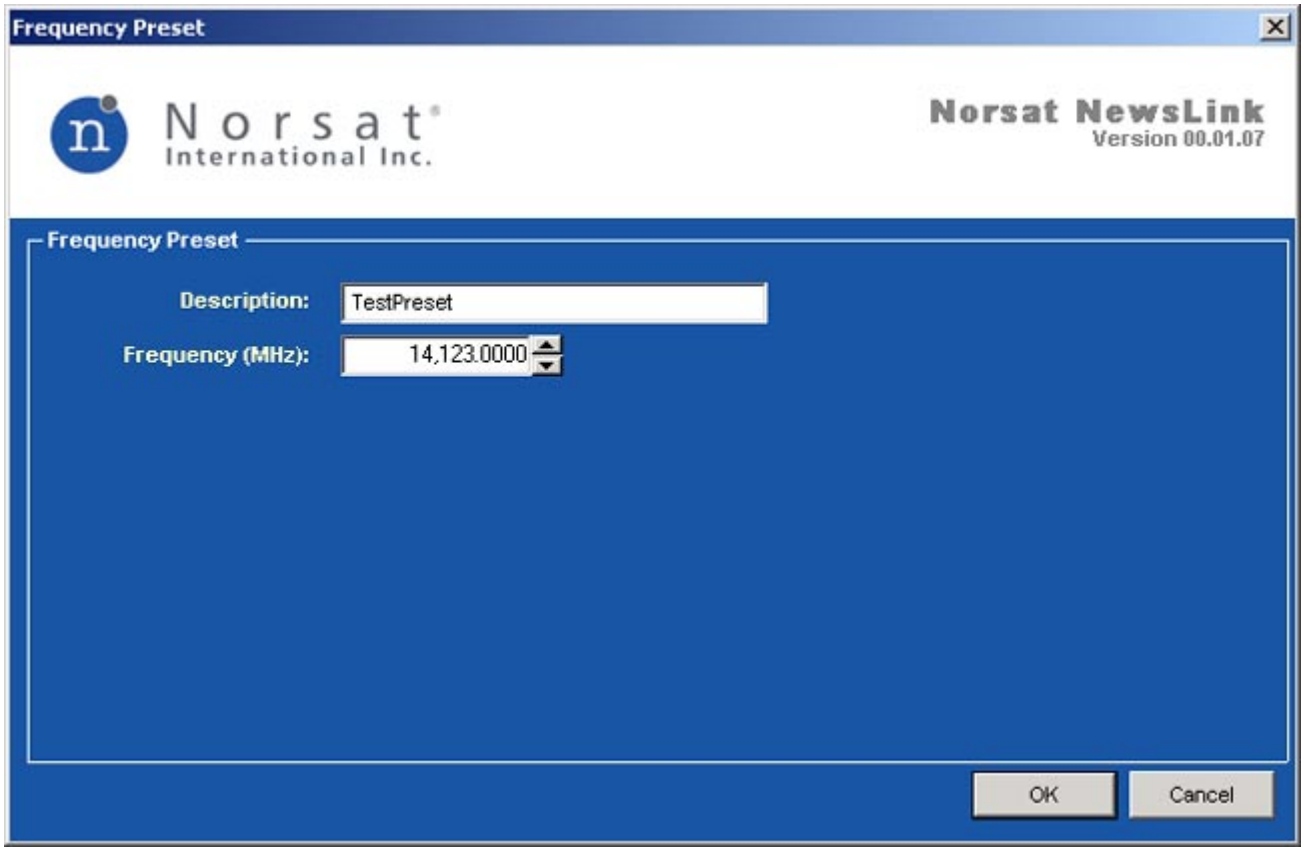



### Adding a Preset Transmit Frequency

The following procedure details the steps required to add a preset transmit frequency.

1. Click ADD in the FREQUENCY PRESETS tab. The FREQUENCY PRESET panel is launched; refer to Figure 40 on page 49.

FIGURE 40. FREQUENCY PRESET Panel.




2. Enter a DESCRIPTION for the frequency preset; maximum length of 50 characters.

**NOTE** While duplicate descriptions are allowed, to allow for easier identification it is suggested that each preset is given a unique description.

3. Enter a value in the FREQUENCY field in the range of 14000 MHz to 14500 MHz, in 125 KHz steps.
4. Click OK.

### Editing a Preset Transmit Frequency

1. From the FREQUENCY PRESETS tab, select the preset frequency to be edited and click EDIT.
2. Enter the required changes, then click OK.

### Deleting a Transmit Preset Frequency

1. From the FREQUENCY PRESETS tab, select the preset frequency to be removed and click DELETE.
2. Click YES to confirm the removal of the preset, or NO to cancel.

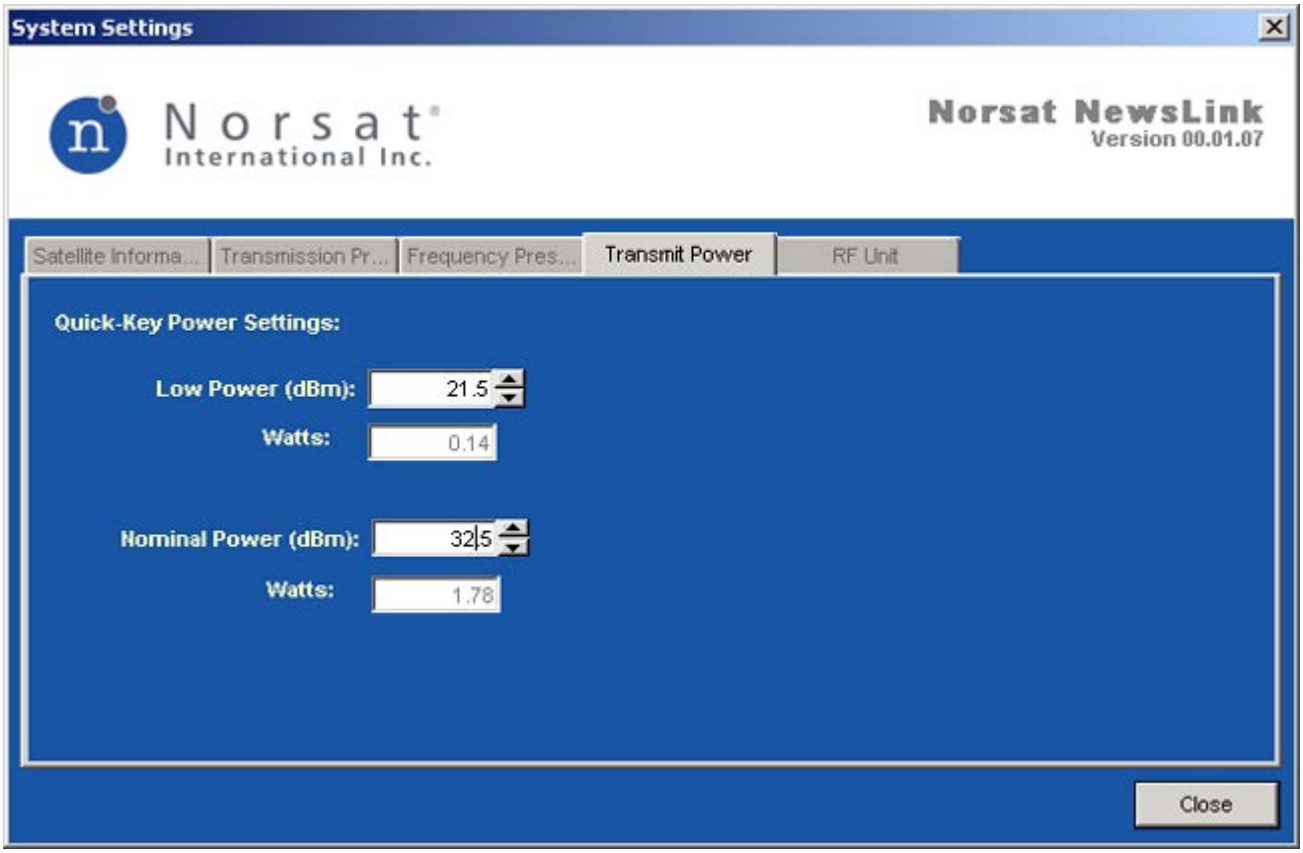
## Transmit Power Quick Keys

There are three quick keys that can be used to begin transmission, each of which start the transmission at either LOW or NOMINAL power; refer to “Step 1:

Configure System Settings" on page 37 for a description of the transmit power quick keys. This section describes the steps required to set the quick key values for LOW POWER and NOMINAL POWER.

1. Click on the TRANSMIT POWER tab in the SYSTEM SETTINGS panel; refer to Figure 41 on page 50.

**FIGURE 41. TRANSMIT POWER Panel.**




2. Enter a value in the LOW POWER field in the range of 20 dBm to 41.6 dBm. The corresponding value in WATTS will be displayed. The UP/DOWN arrow buttons can also be used to increment/decrement the LOW POWER.
3. Enter a value in the NOMINAL POWER field in the range of 20 dBm to 41.6 dBm. The corresponding value in WATTS will be displayed. The UP/DOWN arrow buttons can also be used to increment/decrement the NOMINAL POWER.

**NOTE** The value for the NOMINAL POWER level must be greater than the value for the LOW POWER level.

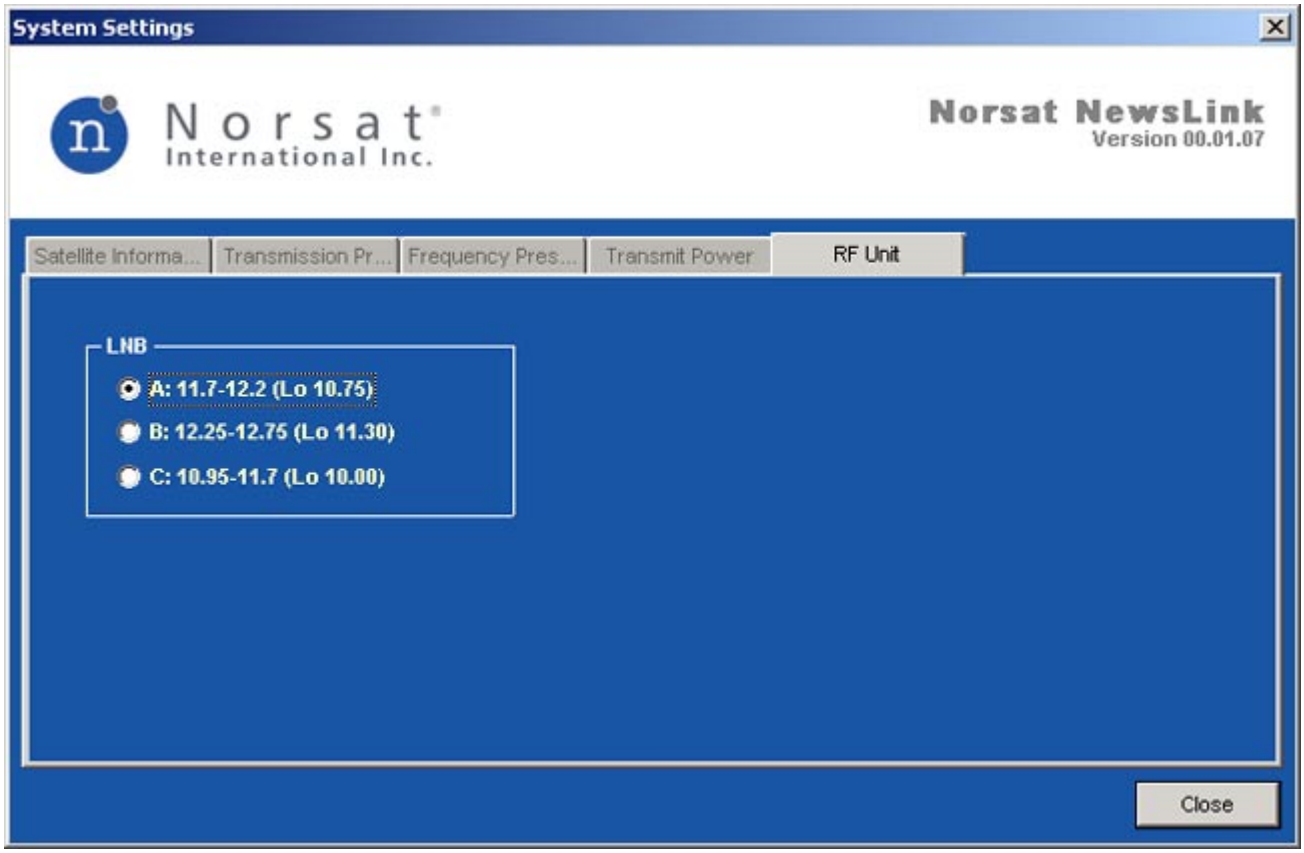
4. Click CLOSE.

## LNB Selection

This section describes the steps required to select which LNB is attached to the antenna.

1. Click on the RF UNIT tab in the SYSTEM SETTINGS panel; refer to Figure 42 on page 51.

FIGURE 42. **RF UNIT Panel.**




2. In the LNB sub-panel, select one of the following:
   i. A: 11.7-12.2 (LO 10.75) (GHz)
   ii. B: 12.25-12.75 (LO 11.30) (GHz)
   iii. C: 10.95-11.7 (LO 10.00) (GHz)

## Antenna Alignment

This section describes the steps required to obtain antenna alignment parameters for elevation, azimuth and polarization, based on the satellite that is to be transmitted to.

Information required beforehand:

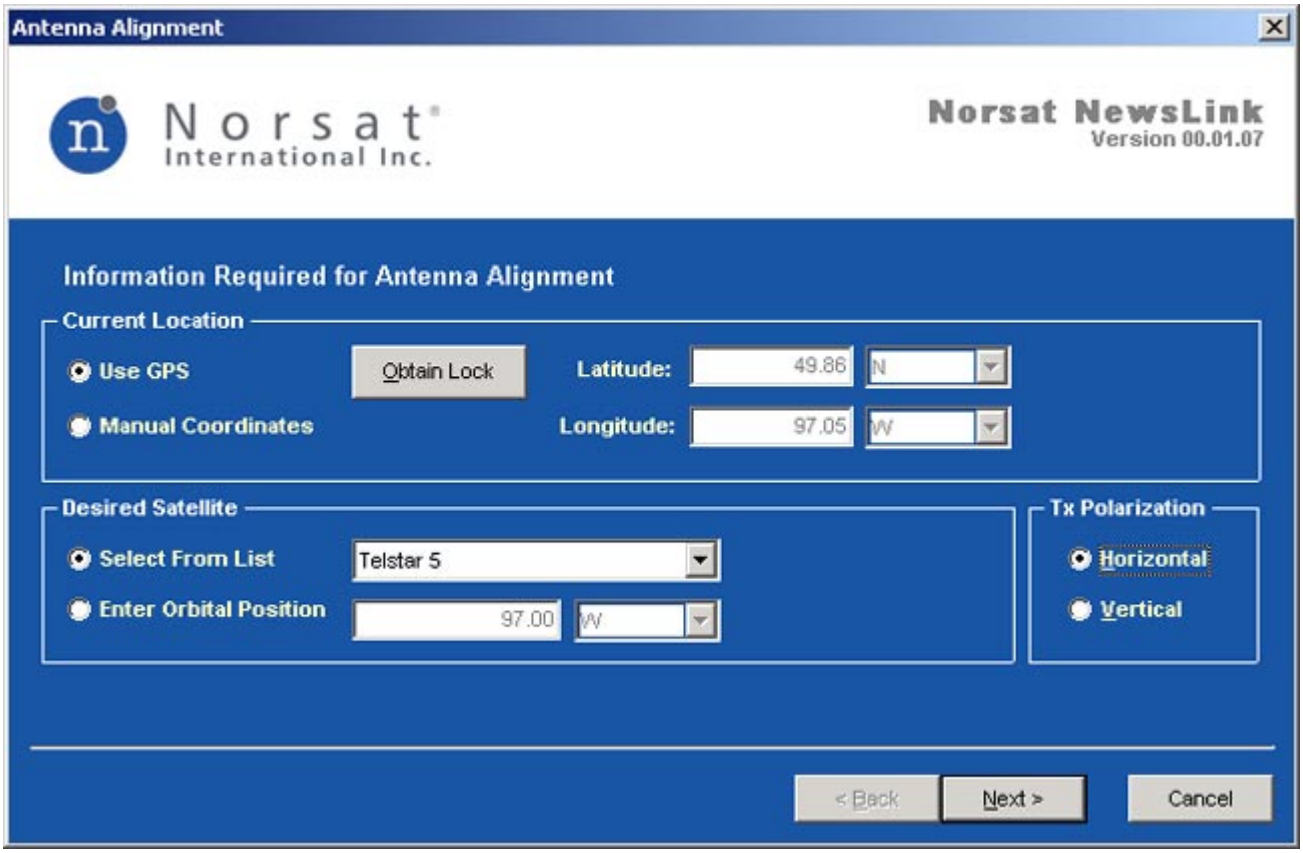
- Satellite to be used
- Transmit frequency allocation
- Transmit polarization
- Receive beacon or other known carrier frequency
- Spectral signature of the satellite

External equipment required:

- Sand-bags (optional)

1. Ensure the GPS is connected to the GPS Receiver port on the front of the Baseband/IF chassis.
2. Place the GPS antenna in an area with a clear view of the sky.
3. From the NORSAT NEWSLINK GUI main panel, click on ANTENNA ALIGNMENT. The ANTENNA ALIGNMENT INFORMATION panel is then launched; refer to Figure 43 on page 52.

**FIGURE 43. ANTENNA ALIGNMENT INFORMATION Panel.**




**NOTE** The last selected settings for the LATITUDE, LONGITUDE, DESIRED SATELLITE and TX POLARIZATION will be used as default settings upon exit of this screen.

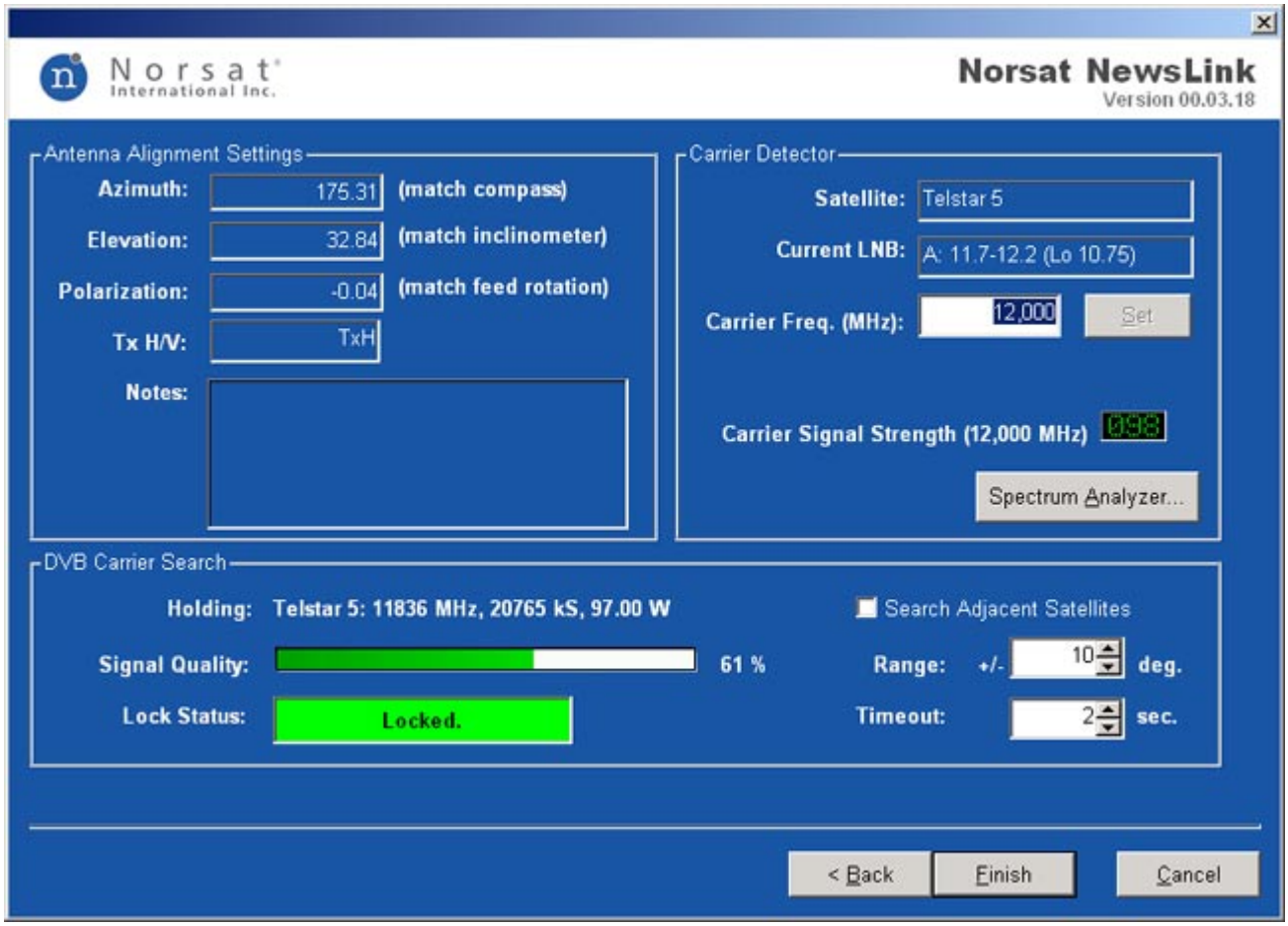
4. From the CURRENT LOCATION sub-panel, either:
   i. Select the USE GPS radio button and click OBTAIN LOCK to have the position of the terminal acquired automatically by the GPS component, or
   ii. Select the MANUAL COORDINATES radio button and enter the current position of the terminal in the LATITUDE and LONGITUDE fields, in the format <degrees.minutes>.

**NOTE** An error message will appear if a GPS reading cannot be obtained, instructing the operator to reposition the system such that it has a clear view of the sky.

5. From the DESIRED SATELLITE sub-panel, select the satellite from the SELECT FROM LIST drop-down box, or select ENTER ORBITAL POSITION to manually enter the satellite orbital position.
6. From the TX POLARIZATION sub-panel, select either HORIZONTAL or VERTICAL.

7. Click NEXT. The ANTENNA ALIGNMENT panel will be displayed; refer to Figure 44 on page 53.

**FIGURE 44. ANTENNA ALIGNMENT Panel.**




8. In the ANTENNA ALIGNMENT SETTINGS sub-panel:
   i. The following antenna alignment settings will be displayed:
      - AZIMUTH (degrees): set the compass to this value; refer to Figure 45 on page 54. The azimuth bearing is calculated from the satellite position and the terminal position. Magnetic declination is included in the calculation so no adjustments are necessary.
      - ELEVATION (degrees): set the inclinometer to this value; refer to Figure 46 on page 55.
      - POLARIZATION (degrees): set the feed rotation to the value indicated here and in the diagram; refer to Figure 47 on page 55.
      - TX H/V: displays the selected polarization form the ANTENNA ALIGNMENT INFORMATION panel.
   ii. Additional information, provided by the user when the satellite information was entered, will be displayed in the NOTES field.

### Setting the Antenna Azimuth

9. This is done by either moving the whole antenna, or by loosening the three azimuth plate hand wheels/levers and rotating the reflector relative to the legs.

**NOTE** If the entire antenna is moved, ensure that the tripod is leveled. If required, place sand-bags or weights on the tripod feet to stabilize the antenna.

10. The azimuth should be adjusted until the compass bearing matches the AZIMUTH (degrees) calculated by the NewsLink GUI; refer to Figure 45 on page 54.

**FIGURE 45. Compass.**

### Setting the Antenna Elevation

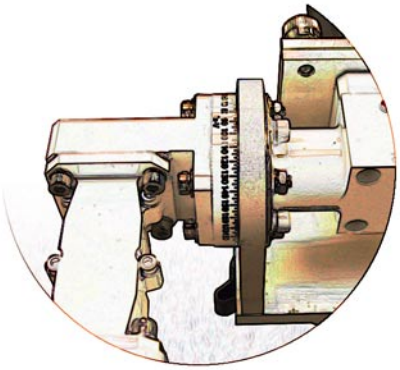
11. Adjust the elevation of the antenna to the ELEVATION (degrees) calculated by the Norsat NewsLink GUI.
    i. Coarse adjustment is made by sliding the quick adjust collar to the approximate position.
    ii. Fine adjustment is done by turning the collar to engage the threaded rod.
12. The elevation should be adjusted until the inclinometer value matches the ELEVATION (degrees); Figure 46 on page 55.

**FIGURE 46. Inclinometer.**

## Setting the Antenna Polarization

13. Set the polarization to the value indicated in the POLARIZATION (degrees) field.
14. Unlock the Feed Rotation by loosening the thumb screw under the feed Assembly; refer to Figure 47 on page 55.
15. Align the dot on the feed bracket with the specified angle and then re-tighten the thumb screw.

**FIGURE 47. Polarization Scale on the Feed Rotation.**



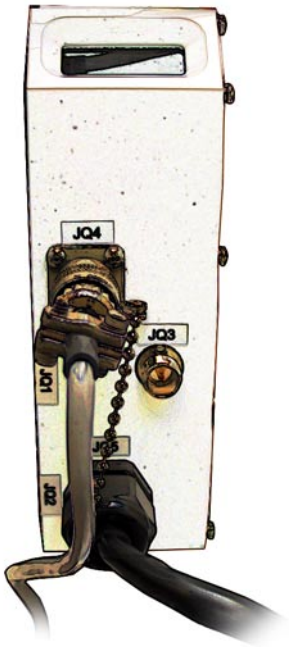
The Signal Strength meter on both the NewsLink GUI and the LED display on the antenna should indicate the presence of a signal. The value indicated is highly variable and depends on the beacon/carrier power. A strong digital carrier could easily be 500 or greater, while a beacon could be 120.

16. In the CARRIER DETECTOR sub-panel:
    i. The following antenna alignment settings will be displayed:
    - SATELLITE: indicates the satellite being aligned
    - CURRENT LNB: indicates which LNB is selected; ensure that the LNB selected is correct for this location
    - Enter the CARRIER FREQ. (MHz) of the signal strength meter within the range indicated in the CURRENT LNB field, then click SET. A

reading of 90 for the signal strength meter is typical. The default value is the alignment carrier that is set up in your satellite profile.

- CARRIER SIGNAL STRENGTH: indicates the signal strength for the carrier; value in the range 0 - 999. A digital display located on the junction box also displays the carrier signal strength; refer to Figure 48 on page 56.

**FIGURE 48.** **Signal Strength Indicator.**



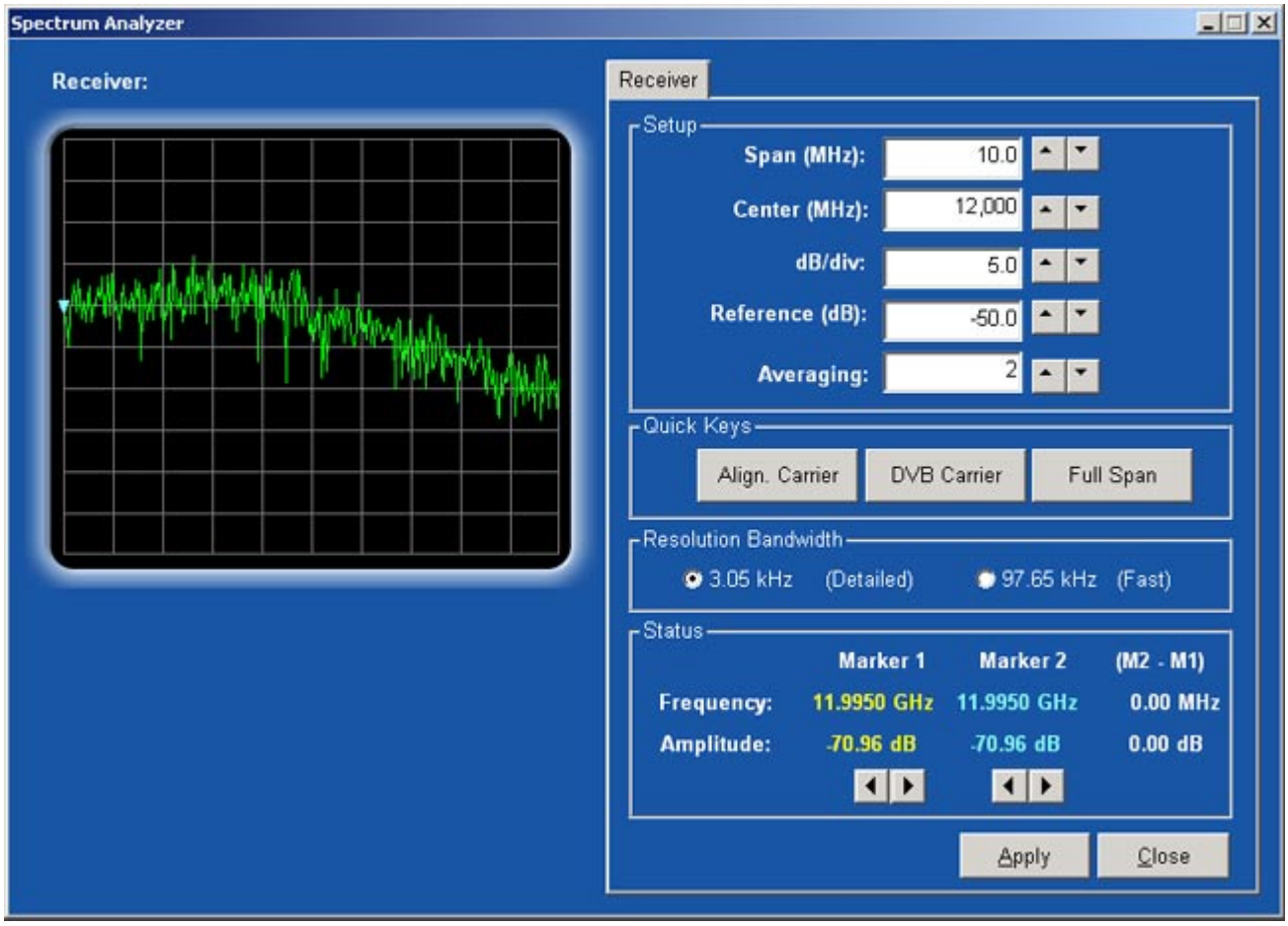

## Spectrum Analyzer

To verify that the antenna is pointed at the correct satellite, check the spectral signature on the Spectrum Analyzer and compare it with the known signature. Alternatively, if a beacon frequency is known, find the beacon on the Spectrum Analyzer.

17. To launch the Spectrum Analyzer, click on the SPECTRUM ANALYZER button. The spectrum for the receiver is displayed in the RECEIVER panel, with frequency [MHz] on the horizontal axis and decibels on the vertical axis; refer to Figure 49 on page 57.

**NOTE** The CARRIER SIGNAL STRENGTH meter will be disabled.

**FIGURE 49.** **Spectrum Analyzer.**




18. In the RECEIVER SETUP panel, set the following fields:
    i. SPAN: the total length of the horizontal axis. This value can be between 1 and 500 MHz, in 0.1 MHz increments.
    ii. CENTER: the center frequency in GHz; the range for this value is dependant on the LNB selected.
    iii. DB/DIV: the number of dBm per division on the vertical axis. This value can be between 0.5 and 30 dB.
    iv. REFERENCE: maximum value of the horizontal axis. This value can be between -200 and 0 dB.
    v. AVERAGING: the number of samples the signal is averaged over. This value can be between 1 and 16.
19. In the QUICK KEYS panel, select one of the following to set the bandwidth of the analyzer:
    i. ALIGN. CARRIER: default bandwidth of 10 MHz, centered to alignment carrier frequencies set in the SATELLITE INFORMATION panel.
    ii. DVB CARRIER: bandwidth set to two times the symbol rate, centered to DVB carrier frequencies set in the SATELLITE INFORMATION panel.
    iii. FULL SPAN: bandwidth set to full range of selected LNB.

**NOTE** The ALIGN. CARRIER and DVB CARRIER buttons are disabled if a satellite was entered manually, as opposed to selected.

20. In the RESOLUTION BANDWIDTH panel, the span of the filter is being set; i.e. the number of samples. Select:
    i. 3.05 KHZ: for a detailed, but slower display.
    ii. 97.65 KHZ: for a fast, but less detailed display.
21. The STATUS panel displays the frequency (GHz) and amplitude (dB) for the two markers on the graph, and for the difference between the two markers. The markers can be placed at a particular point on the graph by:
    i. Using the left and right arrows for each marker.
    ii. Clicking, or clicking and dragging, the left mouse button to move marker 1; right mouse button for marker 2.

**NOTE** The amplitude is relative.

22. If pointing is very inaccurate, signal peaking may be required before a clear signature or beacon is seen.
    i. Slowly sweep the azimuth to peak the signal.
    ii. Tighten the azimuth hand wheels/levers.
    iii. Slowly sweep the elevation to peak the signal by turning the quick adjust collars on the elevation jack screw.
    iv. Tighten the quick adjust screws to lock the elevation position.
    v. Verify that the antenna is pointed at the correct satellite by checking the spectral signature or known beacon frequencies.
    vi. Polarization is best peaked by maximizing a cross-pol signal. Attempt to find a cross-pol signal in an area without a carrier present: determine a clear area and zoom in on this area with the Spectrum Analyzer.
    vii. Set the center frequency of the Signal Strength meter to the center of this clear area, and note the signal strength reading.
    viii. Slowly sweep the polarization in one direction until the signal strength reading rises.
    ix. Verify on the Spectrum Analyzer that the signal level rises; ideally 10 dB. Note this polarization setting and signal strength reading.
    x. Sweep the polarization back through the starting point until the signal strength reading is the same as the reading noted in step ix. The signal on the Spectrum Analyzer should also be the same as in step ix. Note this polarization setting.
    xi. Calculate the mid-point of the two extremes and set the polarization setting to this value.
    xii. Tighten the thumb screw.

**NOTE** It may take several attempts to find a suitable cross-pol signal; note the cross-pol signal frequency for future use. If a cross-pol signal cannot be found, attempt to maximize the signal by slowly rotating the feedhorn and watching the Signal Strength meter and/or the Spectrum Analyzer.

The antenna is now aligned with the satellite, and the satellite access process can begin.

23. In the DVB Carrier Search sub-panel, functionality is provided to verify that the antenna is locked on to the correct satellite.
    i. HOLDING: indicates the satellite that the antenna is locked on to, if it is indeed locked.
    ii. SIGNAL QUALITY: indicates the strength of the signal. This bar is green if the signal quality is good, yellow if the signal quality is poor.

iii. LOCK STATUS: is green and indicates LOCKED if the signal is locked; yellow otherwise.
iv. SEARCH ADJACENT SATELLITES: if selected, all of the entered satellite profiles will be searched, where the orbital position of the satellite is in the search range specified in the RANGE field.
v. RANGE: indicates how many degrees around the current satellite location to search.
vi. TIMEOUT: indicates the length of time to attempt to find a carrier on each adjacent satellite.

**NOTE** If, during the search, the satellite is found, the search will stop.

**NOTE** Only satellites with DVB carriers of the correct polarization will be searched.

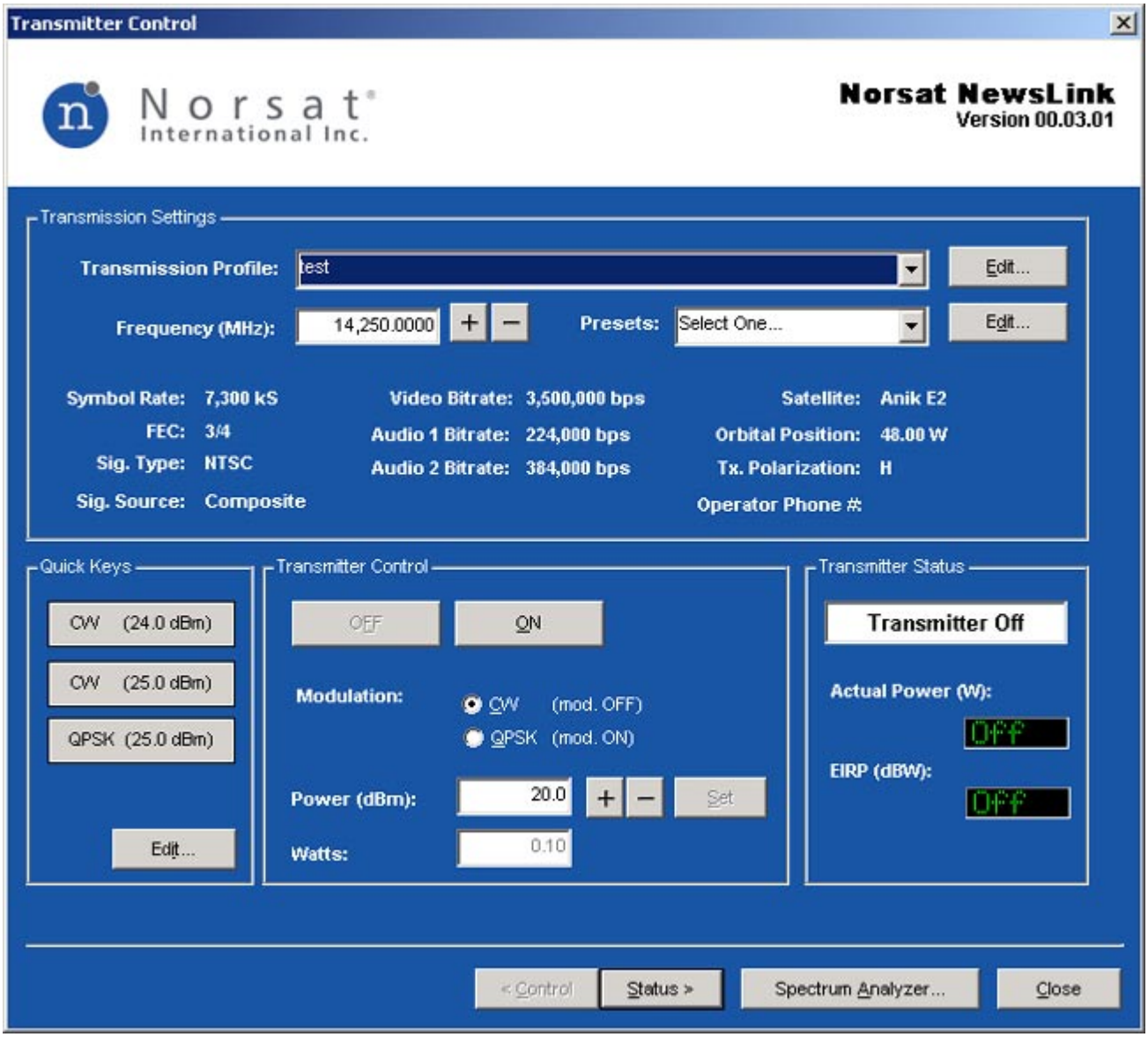
24. Click FINISH.

## Transmitter Control

This section describes the steps required to configure the transmitter control settings in order to start a satellite transmission. In addition, information regarding the transmitter status indicators are also described.

1. From the NORSAT NEWSLINK main panel, click on TRANSMITTER CONTROL. The TRANSMITTER CONTROL panel is then launched; refer to Figure 50 on page 60.

**FIGURE 50. TRANSMITTER CONTROL Panel.**




**NOTE** The operator phone number is indicated at the bottom of the screen. If required, call the operator before beginning transmission.

**NOTE** The last selected settings for the TRANSMISSION PROFILE and FREQUENCY (MHZ) will be used as default settings upon exit of this screen.

2. In the TRANSMITTER SETTINGS sub-panel:
   i. From the TRANSMISSION PROFILE drop-down box, select the desired transmission profile. A summary of the transmission profile is displayed.

**NOTE** To edit a profile, select the profile from the TRANSMISSION PROFILE drop-down box and click on EDIT.

   ii. Enter the TRANSMIT FREQUENCY in MHz; press the + and - buttons to fine tune, or

iii. Select a preset transmit frequency value from the PRESETS drop-down box.

**NOTE** To edit a preset, select the preset from the PRESETS drop-down box and click on EDIT.

3. To begin a transmission using the quick keys pre-set in the TRANSMIT POWER tab of the SYSTEM SETTINGS, in the QUICK KEYS sub-panel click:
   i. CW (24.0 DBM): to turn the transmitter on with MODULATION set to OFF, *continuous wave* (CW), at the low power setting, in this case 24.0 dBm.
   ii. CW (25.0 DBM): to turn the transmitter on with MODULATION set to OFF (CW) at the nominal power setting, in this case 25.0 dBm.
   iii. QPSK (25.0 DBM): to turn the transmitter on with MODULATION set to ON (QPSK), at the nominal power setting, in this case 25.0 dBm.

**NOTE** To edit the transmission quick keys, click on EDIT; Figure 41 on page 50 is then displayed.

**WARNING** **FCC RF EXPOSURE INFORMATION**

To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of **2.5 meters** or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended. Do not stand in front of the antenna while it is on.

**WARNING** **FCC FREQUENCY COORDINATION AS PER FCC 25.203(C), 25.251 AND 101.103**

To satisfy FCC frequency coordination requirements, the user must ensure that they co-ordinate proposed frequency and power usage with other terrestrial and satellite users prior to transmission.

The transmitter may also be turned on using a manually entered modulation scheme and power level. Once these levels are set, in the TRANSMITTER CONTROL sub-panel press ON to begin transmission, and OFF to cease transmission.

4. In the TRANSMITTER CONTROL sub-panel, for the MODULATION field, select either:
   i. ON to modulate the carrier using *quadrature phase shift keying* (QPSK), or
   ii. OFF to have a CW carrier.
5. In the TRANSMITTER CONTROL sub-panel, enter a value in the TRANSMIT POWER field. The minimum setting is 20 dBm, while the maximum value is dependent on the wattage of the SSPA and varies unit to unit. The corresponding value in WATTS will be displayed. The + and - buttons may also be pressed to fine tune this setting.
6. The TRANSMITTER STATUS sub-panel displays the following:
   i. An indicator stating whether the transmitter is ON or OFF
   ii. The ACTUAL POWER in Watts
   iii. The EIRP in dBW
7. To return to the main screen, click CLOSE.

**NOTE** The user may only return to the main screen when the transmitter is OFF.

## Keyboard Shortcuts

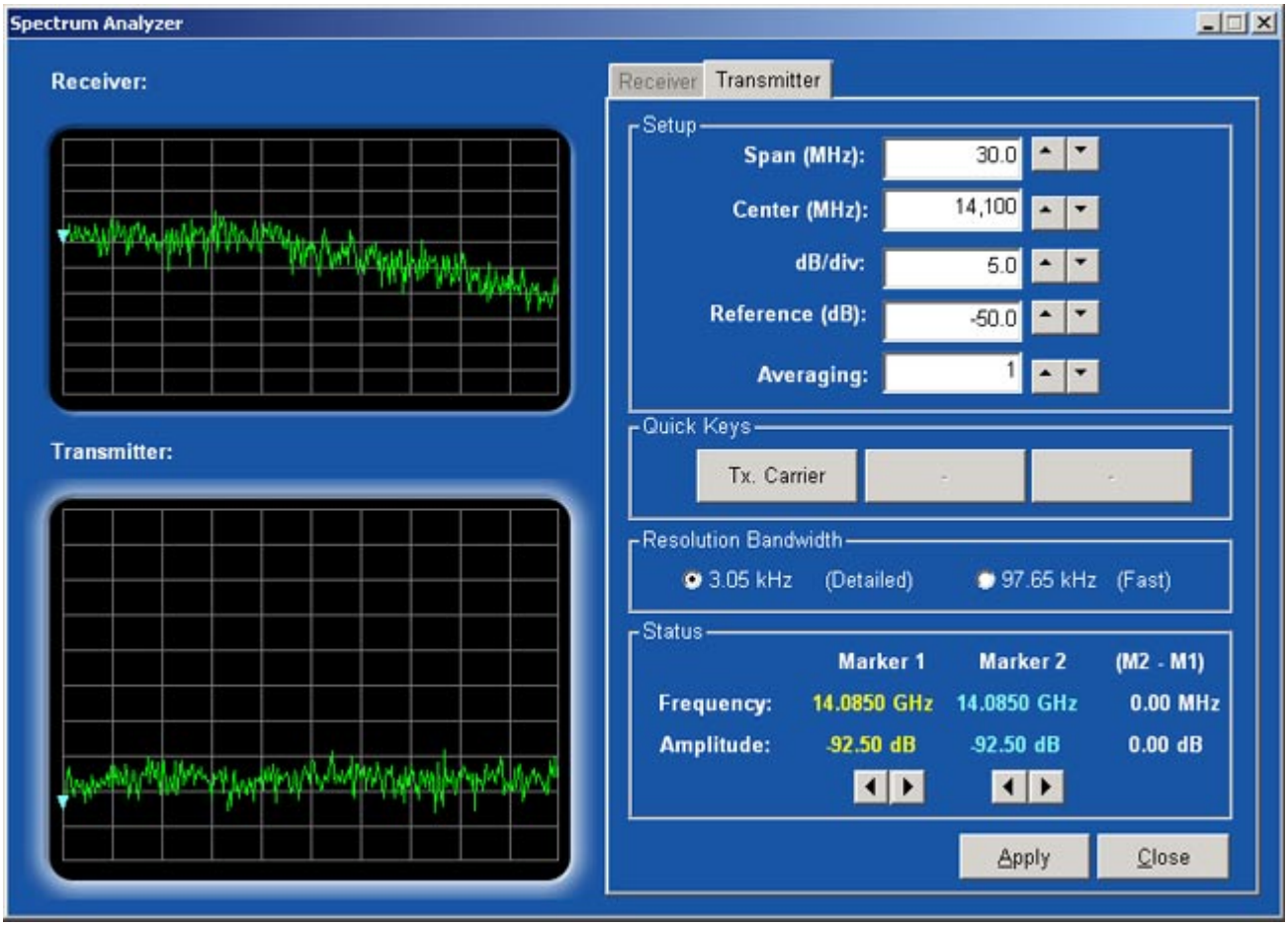
The following list indicates the keyboard shortcuts for transmitter control:

- F5: sets transmitter to OFF
- F6: sets transmitter to CW (<LOW POWER>)
- F7: sets transmitter to CW (<NOMINAL POWER>)
- F8: sets transmitter to QPSK (<NOMINAL POWER>)
- PAGE UP: increases power by 0.5 dBm
- PAGE DOWN: decreases power by 0.5 dBm
- ALT-M: toggles modulation ON/OFF

### Spectrum Analyzer

8. To launch the Spectrum Analyzer, click on the SPECTRUM ANALYZER button. The spectrum for the transmitter is displayed in the TRANSMITTER panel, with frequency [MHz] on the horizontal axis and decibels on the vertical axis; refer to Figure 51 on page 62. A description of the fields is given in “Spectrum Analyzer” on page 56.

**FIGURE 51. Spectrum Analyzer.**



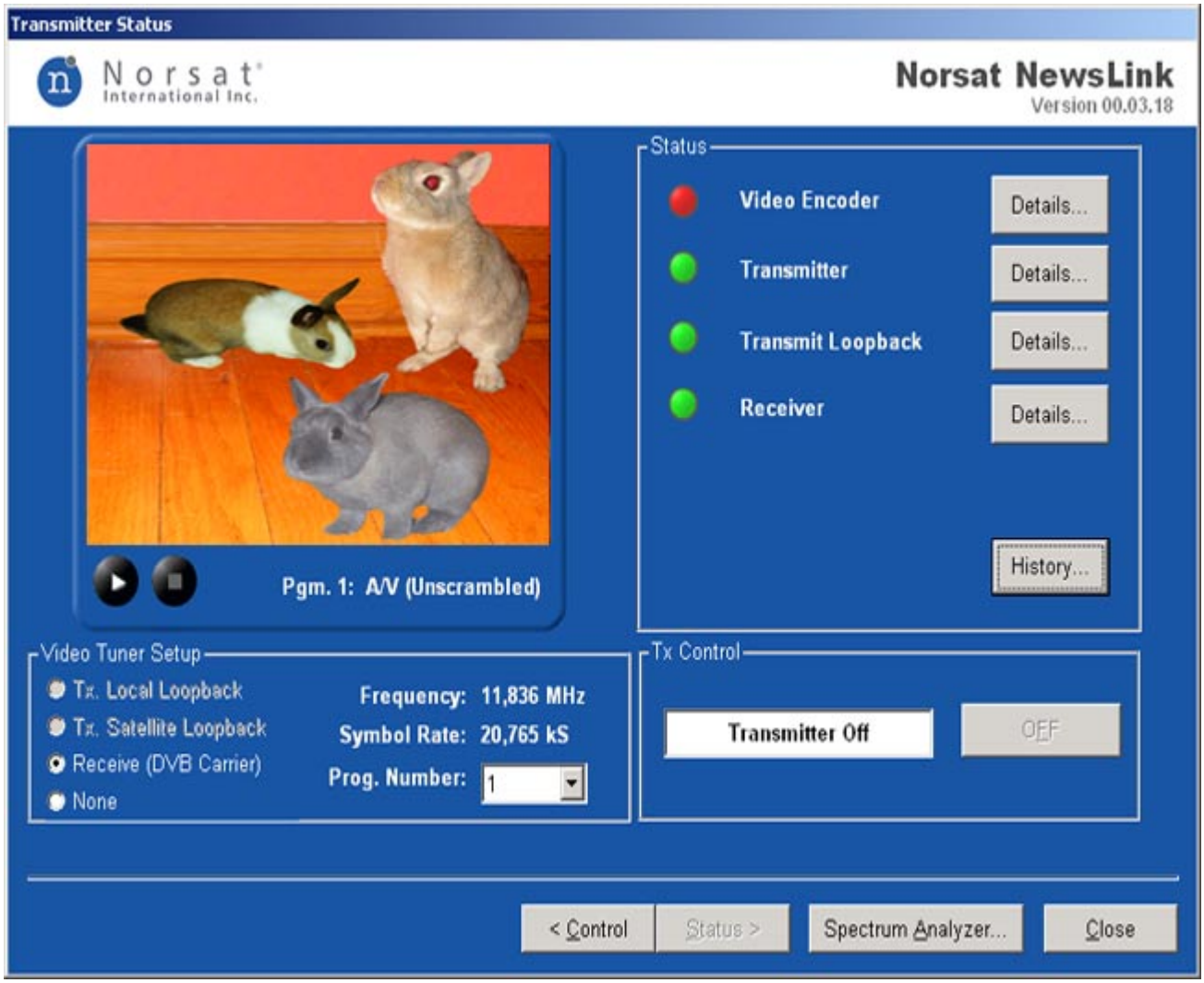
9. The spectrum will be displayed for the transmitted signal. To switch between the spectrum display for the received and transmitted signals, either:
   i. Click on the desired tab (RECEIVER or TRANSMITTER).
   ii. Click on the desired graph (RECEIVER or TRANSMITTER).
10. When TRANSMITTER is selected, in the QUICK KEYS panel, clicking TX CARRIER sets the bandwidth to two times the symbol rate, centered to transmission frequency set in the TRANSMITTER CONTROL panel.

## Transmitter Status

The TRANSMITTER STATUS panel gives the user status on various aspects of the system.

1. From the TRANSMITTER CONTROL panel, refer to Figure 50 on page 60, click on STATUS >. The TRANSMITTER STATUS panel is then launched; refer to Figure 52 on page 63.

**FIGURE 52. TRANSMITTER STATUS Panel.**



To return to the TRANSMITTER CONTROL panel, click on < CONTROL.

To launch the Spectrum Analyzer, click on SPECTRUM ANALYZER.

2. In the VIDEO TUNER SETUP sub-panel, select:
   i. TX LOCAL LOOPBACK: pressing play, ,will display the encoded version of the stream being transmitted. The transmitter must be ON.
   ii. TX SATELLITE LOOPBACK: the antenna receives, and upon pressing play the TRANSMITTER STATUS will display, the signal that is being transmitted. The transmitter must be ON.
   iii. RECEIVE (DVB CARRIER): displays the received program as selected from the PROG. NUMBER drop-down box. This option does not require the transmitter to be ON.

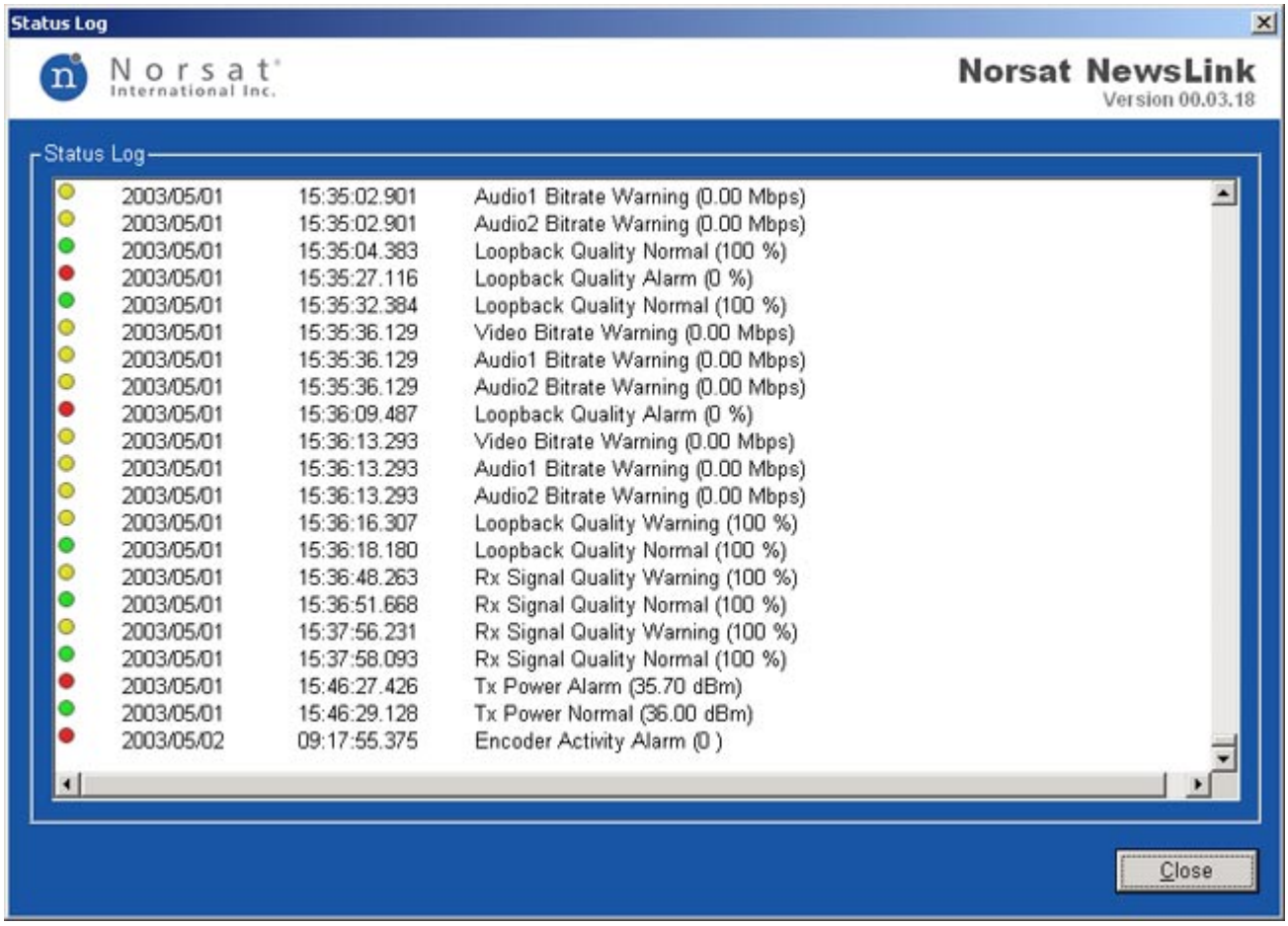
   The FREQUENCY and SYMBOL RATE for the carrier will be displayed. Press stop, , to cease viewing the stream.

   iv. NONE: no stream will be displayed.
3. In the TX CONTROL sub-panel:
   i. The status of the transmitter, i.e., either ON or OFF, is indicated.
   ii. If the transmitter is ON, to stop the transmitter, click OFF.

The STATUS sub-panel contains LEDs indicating the state of the VIDEO ENCODER, TRANSMITTER, TRANSMIT LOOPBACK and RECEIVE signal. To obtain detailed information for an LED, click on DETAILS for a given LED to launch the ALARM DETAILS panel for that LED.

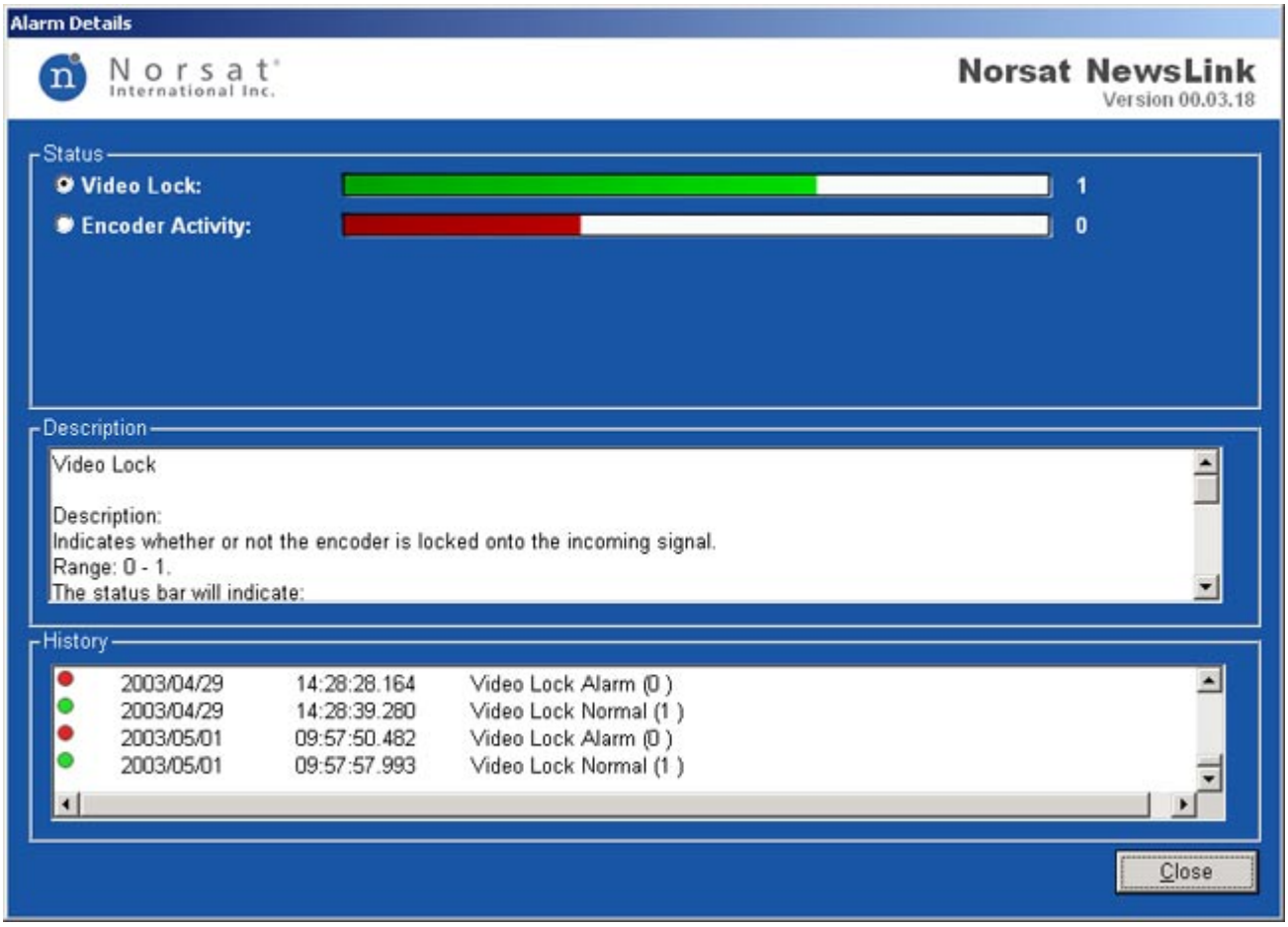
4. To view the history of the alarms, click on HISTORY. The STATUS LOG panel is then launched; refer to Figure 53 on page 65.

FIGURE 53. STATUS LOG Panel.



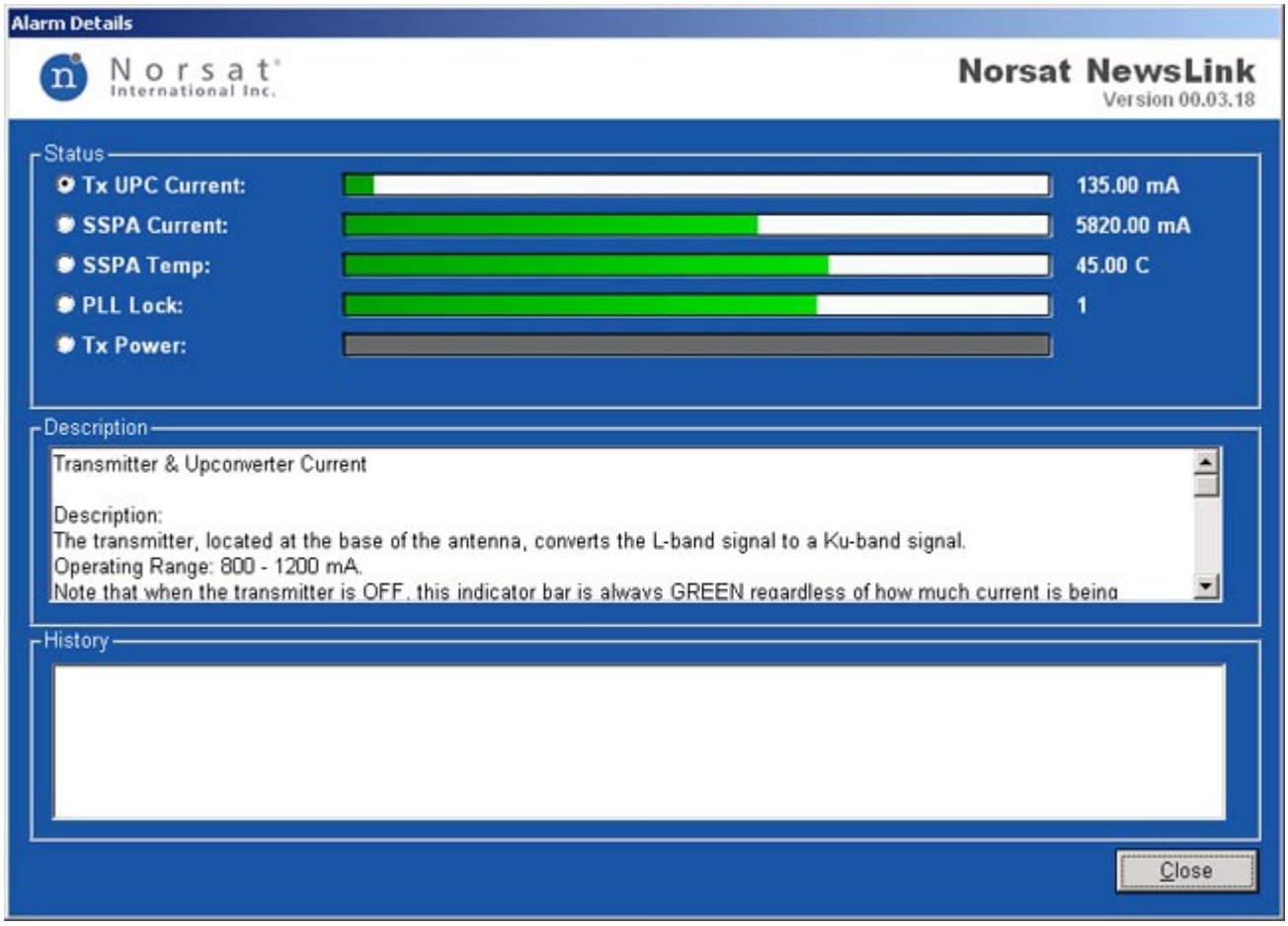

5. To view the alarm panel for the VIDEO ENCODER, click on DETAILS for the VIDEO ENCODER LED. The ALARM DETAILS panel is then launched; refer to Figure 54 on page 66. A full description of the alarms for the VIDEO ENCODER are given in “Video Lock” on page 81 and “Encoder Activity” on page 81. A history of the alarms for the VIDEO ENCODER are given in the HISTORY sub-panel.

**FIGURE 54. Video Encoder ALARM DETAILS Panel.**



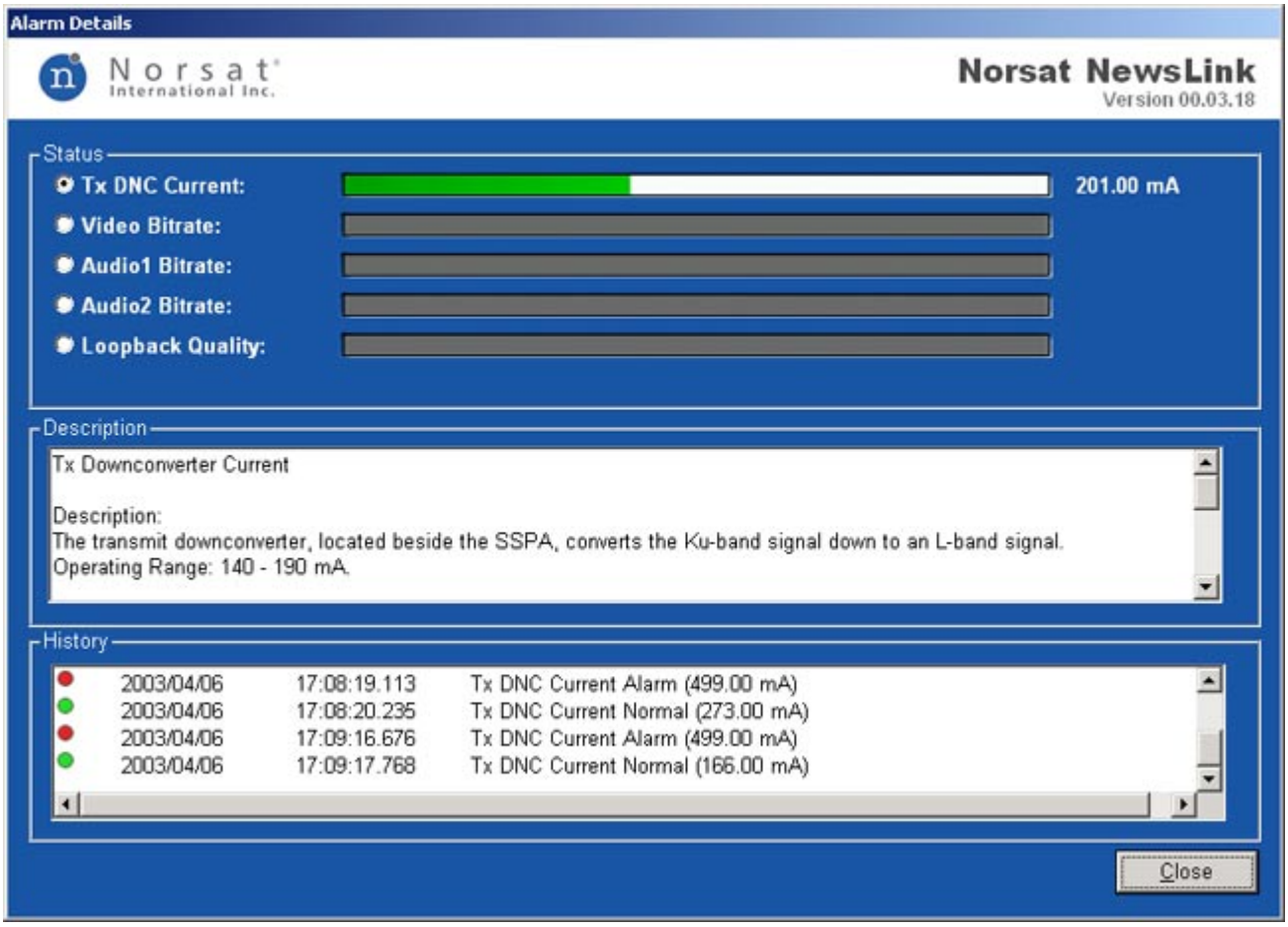

6. To view the alarm panel for the TRANSMITTER, click on DETAILS for the TRANSMITTER LED. The ALARM DETAILS panel is then launched; refer to Figure 55 on page 67. A full description of the alarms for the TRANSMITTER are given in “Transmitter and Upconverter Current” on page 82, “SSPA Current” on page 82, “SSPA Temperature” on page 83, “PLL Lock” on page 83 and “Tx Power” on page 84. A history of the alarms for the TRANSMITTER are given in the HISTORY sub-panel.

**FIGURE 55. Transmitter ALARM DETAILS Panel.**



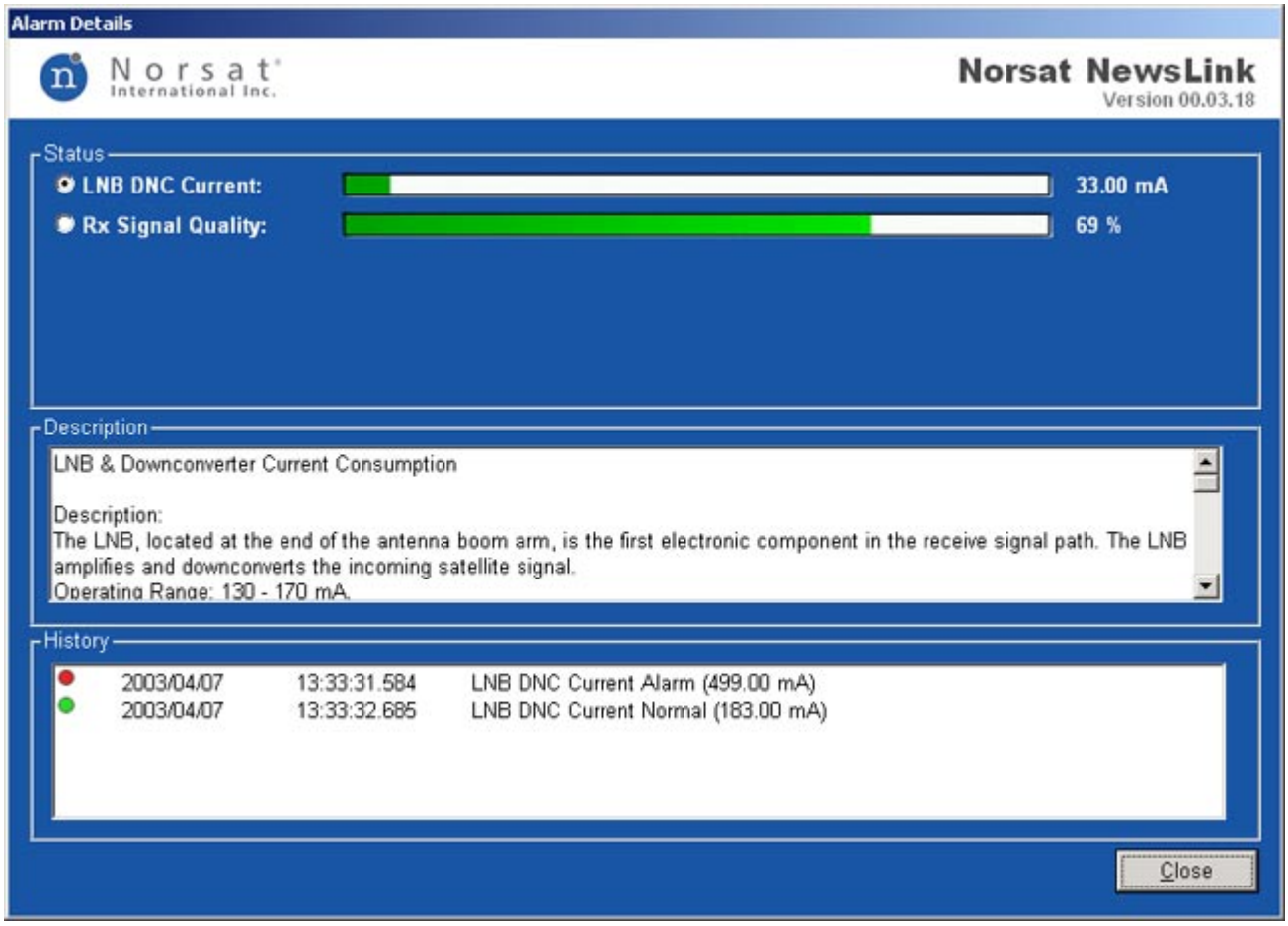

7. To view the alarm panel for the TRANSMIT LOOPBACK, click on DETAILS for the TRANSMIT LOOPBACK LED. The ALARM DETAILS panel is then launched; refer to Figure 56 on page 68. A full description of the alarms for the TRANSMIT LOOPBACK are given in “Tx Downconverter Current” on page 84, “Video Bitrate” on page 85, “Audio Bitrate” on page 85 and “Transmit Loopback Quality” on page 85. A history of the alarms for the TRANSMIT LOOPBACK are given in the HISTORY sub-panel.

**FIGURE 56. Transmit Loopback ALARM DETAILS Panel.**




8. To view the alarm panel for the RECEIVER, click on DETAILS for the RECEIVER LED. The ALARM DETAILS panel is then launched; refer to Figure 57 on page 69. A full description of the alarms for the RECEIVER are given in “Downconverter & LNB Current Consumption” on page 86 and “Rx Signal Quality” on page 86. A history of the alarms for the RECEIVER are given in the HISTORY sub-panel.

**FIGURE 57. Receiver ALARM DETAILS Panel.**



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# CHAPTER 8 Storing the Norsat NewsLink

The following procedures describe the steps required to disassemble and store the Norsat NewsLink.

**CAUTION** All connections/disconnections should be made while the power is off.

## Storing the Baseband/IF Unit

The following steps describe the procedure for powering down and storing the Baseband/IF unit.

### Powering Down the Baseband/IF Unit

1. Shutting down Windows:
   i. From the Windows toolbar, select START → SHUT DOWN.
   ii. Select SHUT DOWN and click OK.
2. Close the laptop lid and slide the laptop tray into the Baseband chassis.
3. Switch the power switch, located at the rear of the chassis, to OFF.

### Closing the IF Unit Case

1. Attach the case end caps and secure the four latches:
   i. Lift the winglever and turn it clockwise.
   ii. Fold in the winglever until it is once again flush with the latch mechanism.

## Disconnecting Peripherals from the Baseband Unit

**CAUTION** All connections/disconnections should be made while the power is off.

Disconnect all cables connecting the peripherals to the Baseband/IF unit.

## Disconnecting the Antenna and Baseband Units

**CAUTION** All connections/disconnections should be made while the power is off.

The following steps describe the procedure for disconnecting the Antenna and Baseband units, and storing the interconnection cables.

1. Disconnect the IFL cable from the Antenna/RF and Baseband/IF units.
2. Disconnect the power cord from the Baseband/IF unit and power source.
3. Wrap up the IFL cable and power cord, and secure with the provided velcro strap; refer to Figure 58 on page 72.

**FIGURE 58. Secured IFL Cable and Power Cord.**

## Storing the Antenna/RF Unit

The following steps describe the procedure for disassembling the antenna and storing it in the Antenna/RF unit cases.

### Accessories Case (Model 3200-AC): Bottom Layer

1. Locate and open the Accessories case, model 3200-AC.

**FIGURE 59. Accessories Case (Model 3200-AC): Bottom Layer.**

2. Disconnect the LNB cable from the connector on the Interface/Indicator unit.
3. Release the nylon clips fastenings located on the Boom Arm and Feed Assembly.
4. Turn the knobs counter-clockwise to disconnect the waveguide from the OMT and waveguide flange.
5. Place the waveguide in the allocated slot in the Accessories case.
6. To disconnect the Feed Assembly from the Boom Arm, unfasten the collar by turning it counter-clockwise.
7. Remove the Feed Assembly from the Boom Arm.
8. Place the the Feed Assembly in the allocated slot in the Accessories case.
9. To disconnect the Boom Arm from the antenna base, unfasten the collar by turning it counter-clockwise.
10. Remove the Boom Arm from the antenna base.
11. Place the Boom Arm in the allocated slot in the Accessories case.
12. For the section 2 reflector panels, unfasten the camlocks by turning them counter-clockwise.
13. Remove the section 2 reflector panels.
14. Disassemble the section 2 reflector panels by turning the camlocks counter-clockwise.
15. Remove the section 1 reflector panel by turning the camlocks counter-clockwise.
16. Remove the first nut securing the elevation rod and then remove the elevation rod from the dish elevation axle hole.
17. Remove the second nut and the first knob.
18. Remove the elevation rod from the support base.
19. Thread the knobs and nuts back onto the elevation rod for storage.
20. Place the elevation rod in the allocated slot in the Accessories case.

### Accessories Case (Model 3200-AC): Middle Layer

21. Locate the Reflector Dish Pouch and the panel foam pieces.
22. Packing the reflector panels: refer to Figure 60 on page 74.
    i. Place the first reflector panel on the 3/16” foam sheet, and cover with another piece of 3/16” foam.
    ii. Repeat step ii for the second and third reflector panels, with the panels rotated 180 degrees to that of the first panels.

**FIGURE 60. Packing the Reflector Panels.**

23. Place reflector panels into the Reflector Dish Pouch.
24. Place the Reflector Dish Pouch into the Accessories case; refer to Figure 61 on page 74.

**FIGURE 61. Accessories Case (Model 3200-AC): Middle Layer.**

### RF and Antenna Unit Case (Model 3200-RF)

25. Locate and open the RF and Antenna Unit case.
26. Invert the support base with legs attached into the RF and Antenna Unit case.

**FIGURE 62. RF and Antenna Unit Case (Model 3200-RF).**

### Accessories Case (Model 3200-AC): Top Layer

27. Remove each support leg by turning the knob counter-clockwise.
28. Place the legs in the allocated spots in the Accessories case; refer to Figure 63 on page 75.
29. Place the IFL cable and Power Cord in the allocated spot in the antenna component case; refer to Figure 63 on page 75.

**FIGURE 63. Accessories Case (Model 3200-AC): Top Layer.**

### Antenna Cases

30. For each antenna case, close the case lid and secure the seven latches:
    i. Lift the winglever and turn it clockwise.
    ii. Fold in the winglever until it is once again flush with the latch mechanism.

# CHAPTER 9 Troubleshooting

This chapter provides troubleshooting scenarios, along with suggested solutions.

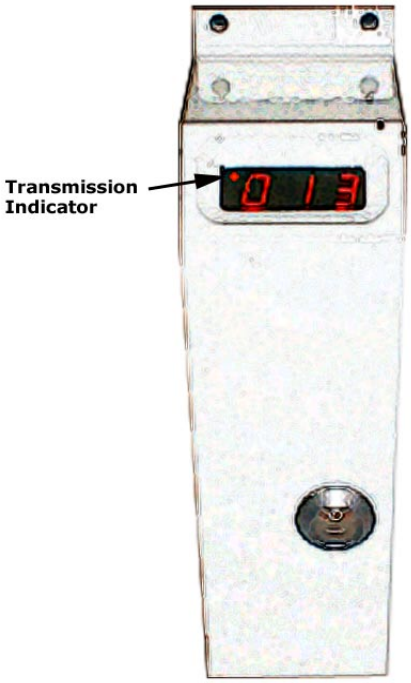
## General Troubleshooting Tips

1. Check all cable connections to ensure they are secure and correctly hooked up.
2. Check your external power source to ensure the source is stable.

## Transmission Problems

1. If an error is received when setting the transmitter, ensure that the state of the transmitter as indicated on the junction box display (refer to Figure 64 on page 78) is the same as that displayed by the Norsat NewsLink GUI.
   i. If the red LED is ON, this indicates that the transmitter is ON.
   ii. If the red LED is OFF, this indicates that the transmitter is OFF.

**FIGURE 64. Transmission Indicator.**




2. The transmitter turns OFF and reports the error COULD NOT TURN ON THE TRANSMITTER. This is likely due to over usage of the CPU.
   i. Close all running applications aside from the Norsat NewsLink GUI.
   ii. Turn the transmitter back ON.
3. The transmitter is ON and a sudden loss of reception of the signal occurs, however the Norsat NewsLink GUI still indicates the transmitter is ON. This may be caused by an alarm on the modulator.
   i. Turn the transmitter OFF and then ON again.
   ii. Wait a few seconds for the signal to be received. If the signal is not received, then a power down of the system is required.
4. The transmitter is ON and suddenly turns OFF with no alarm indication on the Norsat NewsLink GUI. This may be caused by a FIFO alarm on the modulator.
   i. Ensure that the 70 MHz output of the modulator is properly connected to the input of the upconverter with a 50 Ohm BNC cable.
   ii. Turn the transmitter back ON and wait a few seconds for the signal to be received. If the signal is not received, then a power down of the system is required.

## Video Problems

1. The transmitter is ON and there is a signal lock on the IRD, however there is no video or the video is a pixelated screen. This is likely caused when there is no video input signal going into the encoder.
   i. Check the video input connections and the video source.

2. The transmitter is ON and there is no video or the video is a pixelated screen when viewed from the NewsLink GUI. This is likely caused when there is no video input signal going into the encoder.
   i. Check the video input connections and the video source.

## Two-way Communication Problems

1. There is signal and data lock on the receivers at both locations, however a ping cannot be established across the link. Check for the following possible problems:
   i. Ensure the appropriate PIDs have been set up on the receivers.
   ii. Ensure the appropriate routes have been set up.
   iii. On the HUB side, ensure that the MAC address entered into the iperoute is correct and matches the address of the receiver card in the Norsat NewsLink terminal.

**NOTE** Note that when the TUNE button is pressed, the receiver will remove all PIDs; the PIDs will then have to be replaced.

2. There is a valid signal coming into the receiver, however the receiver is not locked. Check for the following possible problems:
   i. Ensure the LNB settings are correct.
   ii. Ensure the tuner settings are correct.
   iii. Ensure the symbol rate settings are correct.
   iv. Ensure the level coming into the receiver is between -25 to -60 dBm. At signal strengths above 60%, the receiver may not be able to achieve signal lock.

**NOTE** Note that when the TUNE button is pressed, the receiver will remove all PIDs; the PIDs will then have to be replaced.

## Persistent Problems

1. If the above troubleshooting does not correct the problem:
   i. Turn the transmitter OFF and ON; if the problem persists, proceed to step ii.
   ii. Turn the laptop OFF and ON; if the problem persists, proceed to step iii.
   iii. Turn the complete system OFF and ON.

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# Appendix A

## NewsLink GUI Status Indicators

The following sections give the help files for each of the status indicators on the TRANSMITTER STATUS screen.

### Video Lock

Indicates whether or not the encoder is locked onto the incoming signal.

Range:

- 0 to 1

The status bar will indicate:

- 0 (RED): if the encoder is not locked onto the incoming signal
- 1 (GREEN): if the encoder is locked onto the incoming signal

### Troubleshooting

1. If the value is zero (RED), determine the video input that is setup in your profile; i.e. COMPOSITE or SDI. Next, ensure the video source is connected to the corresponding jack on the front of the baseband chassis.
2. If the video source is connected to the proper jack, however signal lock is still zero, ensure that the video source is powered ON. Also, ensure that the signal type coming out of your video source, i.e. NTSC or PAL, matches the signal type that is currently setup in your profile.
3. If you are using a low grade VCR or a very long cable, it may be possible that the encoder will not be able to obtain a lock on the signal.

### Encoder Activity

Indicates whether or not the video encoder is active

Range:

- 0 - 1

The status bar will indicate:

- 0 (RED): if the video encoder is not responding
- 1 (GREEN): if the video encoder is actively responding to control commands

**Troubleshooting**

1. If the indicator remains RED, shut down the baseband unit and remove all power sources for at least 30 seconds.
2. If the problem persists, contact Norsat Customer Support.

## Transmitter and Upconverter Current

The transmitter, located at the base of the antenna, converts the L-band signal to a Ku-band signal.

Operating Range:

- 800 - 1200 mA

Note that when the transmitter is OFF, this indicator bar is always GREEN regardless of how much current is being consumed.

**Troubleshooting**

1. Ensure that the transmitter is turned ON; refer to the TRANSMITTER CONTROL screen.
2. If the current is too low, i.e. equal to zero, ensure that one end of the RED cable is plugged into the N jack marked RED, labeled TX, on the baseband unit, and the other end of the RED cable is plugged into the N jack marked RED, labeled TX, on the dish elevation support panel.
3. If the current is still too low, too high or if it keeps fluctuating between normal and alarm, turn the transmitter OFF, power down the system, and inspect the connectors on both sides of the RED marked; replace if necessary. If no replacement is available, the RED marked cable may be substituted with the BLUE marked cable by following the instructions in the Troubleshooting chapter.
4. Inspect the short jumper cable connected between the transmitter and the dish elevation support panel.
5. IF the current is between 100 and 200 mA, ensure that ambient temperature around transmitter is lower than 50 degrees C, or higher than -30 degrees C.
6. If the problem persists, contact Norsat Customer Support.

**NOTE** If this value exceeds the maximum allowable range, the transmitter will automatically shut down.

## SSPA Current

The SSPA, i.e. power amplifier, located at the base of the antenna, amplifies the transmitted Ku-band signal. Note that when the transmitter is OFF, this value is always GREEN regardless of how much current is being consumed.

Operating Range:

- 15W SSPA: 5000 - 8000 mA.

- 25W SSPA: 9000 - 12000 mA.

### Troubleshooting

1. Ensure that the transmitter is turned ON; refer to the TRANSMITTER CONTROL screen.
2. If the current is too low, ensure that one end of the multi-conductor IFL cable is plugged in to the multipin connector, labeled DC/CONTROL, at the back of the baseband unit, and the other end is plugged in to the multipin connector, labeled DC/CONTROL, on the dish elevation support panel.
3. If the problem persists, inspect the cable and both connectors; replace if necessary. If no replacement is available, contact Norsat Customer Support.
4. If this value is in the high or low warning (YELLOW) range, a device inside the SSPA may be degraded; contact Norsat Customer Support.

**NOTE** If this value exceeds the maximum allowable range, the SSPA will automatically shut down.

## SSPA Temperature

This is the temperature of the heat sink inside the SSPA.

Operating Range:

- -30 to +80 degrees Celsius

The normal operating temperature will depend on the output power and the ambient temperature.

### Troubleshooting

1. If this value is in the high warning (YELLOW) range, ensure that the SSPA fan is spinning.
2. Inspect the cooling vents on the SSPA to ensure that they are not clogged by debris or foreign matter.

**NOTE** If this value exceeds the maximum allowable range, the SSPA will automatically shut down.

## PLL Lock

The transmit frequency is generated by a set of oscillators phase locked to internal temperature stable reference. These oscillators must be locked at all times in order to insure an accurate transmit frequency. The oscillators, located in the baseband unit, are responsible for generating the L-band frequency (between 950-1450 MHz).

**NOTE** The oscillator that is located inside the transmitter that converts the L-band frequency to Ku-band frequency is not monitored by this status indicator. If the oscillator inside the transmitter is out of lock, then the transmitter will automatically shut down.

Range:

- 0 to 1

The status bar will indicate:

- 0 (RED): if the oscillator(s) is not locked

- 1 (GREEN): if the oscillators are locked

**Troubleshooting**

1. Shutdown the system and switch OFF power source(s) for 30 seconds.
2. If the problem persists, contact Norsat Customer Support.

**NOTE** If any of the oscillators are out of lock, the transmission will automatically shut down.

## Tx Power

This is the same TRANSMIT POWER indicator that is displayed on the TRANSMITTER CONTROL screen. The current detected transit power in Watts is displayed. If the requested transmit power is below +25 dBm (0.32 W), this bar graph will not show any information. If the requested transmit power is above 25 dBm (0.32 W), this bar graph will display the transmit power as detected by the power detector.

Operating Range:

- 15W SSPA: +20.0 - +41.8 dBm
- 25W SSPA: +20.0 - +44.0 dBm

If the difference between the new power value and current power value is large, the power status may briefly indicate YELLOW or RED as time is required to reach the new power level.

**Troubleshooting**

1. If the difference between the new power value and current power value is large, the power status may briefly indicate YELLOW or RED as time is required to reach the new power level; it is normal for the indicator to be YELLOW/RED for a brief period of time as the output power is changing.
2. If the indicator stays YELLOW/RED for an extended period of time, ensure that there is a short cable connected between the plug marked 70 MHZ OUT, and the plug marked 70 MHZ IN on the back of the baseband unit.
3. If the indicator stays YELLOW/RED for an extended period of time, turn the transmitter OFF, power down the system, and inspect the RED marked cable and both of the connectors; replace if necessary.If no replacement is available, the RED marked cable may be substituted with the BLUE marked cable by following the instructions in the Troubleshooting chapter.

## Tx Downconverter Current

The transmit downconverter, located beside the SSPA, converts the Ku-band signal down to an L-band signal.

Operating Range:

- 140 - 190 mA

**Troubleshooting**

1. If the current is too low, ensure that the one end of BLUE marked cable is connected to the BLUE marked jack, labeled TX MONITOR, on the base-band unit, and the other end of the BLUE marked cable is connected to the

BLUE marked jack, labeled TX MONITOR, on the dish elevation support panel.

2. If the current is too high or too low, inspect the short jumper cable connected between the downconverter and the dish elevation support panel.
3. If this value is too high or too low, inspect the BLUE marked cable and connectors; replace if necessary.

## Video Bitrate

This is the bitrate of the video signal as currently detected by the onboard DVB-S receiver through the transmit loopback downconverter. If you are currently viewing received video, this status indicator will be disabled. Normally this video bitrate will match the video bitrate setup in the transmission profile. If you have configured your video bitrate to be automatically set, it is normal for this indicator to remain at full scale.

### Troubleshooting

1. If the video bitrate is too low, the problem may be either with the transmitted signal or with one of the transmit loopback components. This does not necessarily indicate a problem with the transmitted signal.
2. If there is a problem with the transmit downconverter, this indicator will be invalid.
3. Refer to the troubleshooting section for the transmit downconverter.

## Audio Bitrate

This is the bitrate of the audio signal as currently detected by the onboard DVB-S receiver through the transmit loopback downconverter. If you are currently viewing received video, this status indicator will be disabled. Normally this audio bitrate will match the audio bitrate setup in the transmission profile.

### Troubleshooting

1. If the audio bitrate is too low, the problem may be either with the transmitted signal or with one of the transmit loopback components. This does not necessarily indicate a problem with the transmitted signal.
2. If there is a problem with the transmit downconverter, this indicator will be invalid.
3. Refer to the troubleshooting section for the transmit downconverter.

## Transmit Loopback Quality

This indicator corresponds to the current Viterbi *bit-error rate* (BER) as detected by the DVB-S receiver, and gives an approximation of the transmitted QPSK signal quality. As the transmit loopback signal is coming through a wired path, this indicator should always read 100% under normal conditions. If you are currently viewing received video, this status indicator will be disabled. If you are transmitting a CW signal, this indicator will not be functional.

**Troubleshooting**

1. If the signal quality appears low, the problem may be either with the transmitted signal or with one of the transmit loopback components. This does not necessarily indicate a problem with the transmitted signal.
2. Inspect both the RED and the BLUE cables and replace if necessary.

## Downconverter & LNB Current Consumption

The LNB, located at the end of the antenna boom arm, is the first electronic component in the receive signal path. The LNB amplifies and downconverts the incoming satellite signal.

Operating Range:

- 130 - 170 mA

**Troubleshooting**

1. If the current is < 130 mA, ensure that one end of the GREEN marked cable is plugged into the GREEN marked N connector, labeled RX, on the baseband unit, and the other end of the GREEN marked cable is plugged into the GREEN marked N connector, labeled RX, on the dish elevation support panel.
2. If the current is still < 130 mA, ensure that the LNB cable is connected between the junction box and the LNB.
3. If the current is still < 130 mA, try connecting the LNB cable to one of the two spare LNBs that are included in the antenna box. Note that you do not need to mount the LNB on the boom arm for this step. If the current consumption returns to normal, then this would indicate a faulty LNB.
4. If the current is still < 130 mA, try the bypass procedure described in Troubleshooting chapter. If this fails, contact Norsat Customer Support.
5. If the current consumption is > 170 mA, disconnect the cable from the LNB. If the current consumption drops, then this would indicate a faulty LNB.
6. If after disconnecting the LNB cable the current is still > 170 mA, disconnect the other end of the cable from the antenna junction box. If the current consumption drops, then this would indicate a fault in the cable. Examine the cable and connectors; replace if necessary.
7. If the current consumption is still > 170 mA, unplug the GREEN marked cable from the antenna junction box. If the current consumption drops, then this indicates a fault in the junction box. Refer to the Troubleshooting chapter for instructions on how to bypass the junction box, or contact Norsat Customer Support.
8. If the current consumption is still > 170 mA, unplug the other end of the GREEN marked cable from the Baseband unit. If the current consumption drops, then this would indicate a fault in the GREEN marked cable. Examine the cable and connectors; replace if necessary. If no replacement is available, the GREEN marked cable may be substituted with the BLUE marked cable by following the instructions in the Troubleshooting chapter.

## Rx Signal Quality

This status field indicates the relative quality of a received DVB-S carrier.

Range:

- 0 to 99

The status bar will indicate:

- RED: if the receiver is not locked on to any carrier
- YELLOW: if the receiver is locked on to a carrier, but the signal contains uncorrectable errors
- GREEN: if the receiver is locked on to a carrier and any received errors have been corrected by Viterbi and Reed-Solomon decoding, resulting in a *quasi-error-free* (QEF) digital signal

**Troubleshooting**

1. Ensure that the frequency and symbol rate of the received carrier is accurate.
2. Ensure the antenna is pointed at the proper satellite.
3. Ensure that one end of the GREEN marked cable is plugged into the GREEN marked N connector, labeled RX, on the Baseband unit, and the other end of the GREEN marked cable is plugged into the GREEN marked N connector, labeled RX, on the dish elevation support panel.
4. Ensure that the BLACK cable is connected from the junction box to the LNB.
5. Ensure that the carrier you are trying to receive is between 1.5 Msps and 45 Msps.
6. Consult the footprint map for your satellite, and ensure that the satellite's Ku-band EIRP at your current location is at least 41 dBW.

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# Appendix B

## Compass Calibration

To calibrate the compass, the antenna must be rotated slowly for one complete turn; two turns on initial calibration. The following steps describe the calibration procedure:

1. Set-up the Antenna/RF unit.
2. Connect the Antenna/RF unit to the Baseband/IF unit.
3. Power up the Baseband/IF unit.
4. Remove all three azimuth clamping handwheels/levers so that the top plate of the tripod rotates freely.
5. Put the antenna in the lowest elevation possible so that the jack screw clears the legs.

**NOTE** Verify this can be done, otherwise remove the jack screw.

6. Turn on the compass, and note the initial bearing.
7. Rotate the antenna through two complete revolutions. Each rotation should take at least two minutes; i.e. slow and steady.
8. When the rotations are complete, depress and hold both the MODE and SET buttons until CAL appears.
9. A three digit number (ABC) will appear which indicates the quality of the calibration:
   i. A: indicates the quality of the calibration, with 9 being highest, and 7 being the minimum acceptable level.
   ii. B: indicates quality of magnetic location, with 9 being the highest and three or lower being very poor.
   iii. C: indicates the number of calibrations completed.
10. To exit calibration mode, depress the MODE button briefly.

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Norsat®
International Inc.

NORSAT INTERNATIONAL, INC.

Head Office
100-4401 Still Creek Drive
Burnaby, BC V5C 6G9
Canada
Telephone: 1-604-292-9130
Fax: 1-604-292-9100

Winnipeg
11-1329 Niakwa Road East
Winnipeg, MB R2J 3T4
Canada
Telephone: 1-204-255-9800
Fax: 1-204-255-9833
E-mail: info@norsat.com

Singapore
126 Joo Seng Road
#02-14, Gold Pine Industrial Building
Singapore 368355
Telephone: 65-2896536
Fax: 65-2866562
E-mail: asiacons@singnet.com.sg