

SOFTWARE MANUAL

LINKCONTROL 7



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PREFACE

Purpose and Scope of the User Guide

The user guide explains the system specifics of the Norsat LINKCONTROL 7 SOFTWARE SUITE for use with Norsat satellite terminals.

This user guide is specifically written for the LINKCONTROL 7 SOFTWARE SUITE

Audience

The guide will be of interest to the following personnel:

- Field users
- Systems administrators (or IT; Lifecycle/Sustainment Managers)

**READ THE MANUAL BEFORE YOU INSTALL OR OPERATE THE
LINKCONTROL 7 SOFTWARE SUITE**

1. LinkControl Basics

LinkControl is a substantial Suite of Software that assists users in using their Norsat Satellite Equipment in all environments

1.1 Overview

Norsat's LinkControl software offers an intuitive and powerful set of tools for satellite communications professionals and amateurs. Delivering a robust and complete package of acquisition and control interfaces, LinkControl empowers new users to run complex VSAT systems and enables professionals to work more efficiently in the field. LinkControl seamlessly integrates the various hardware and procedures into user-friendly steps. LinkControl features include:

- Component auto-detection for easy modem or bandwidth switching
- Pre-configurable user LinkProfiles
- Compatibility with both Windows and MacOS/X
- Step by step guidance for satellite acquisition

Norsat's LinkControl Software uses a client-server model. The server is deployed on a control computer directly connected to the Norsat Satellite terminal. The server operates in a headless manner and is driven by one or more user interfaces.

The user interfaces communicate to the server by basic IP technology and may be either local to the server or on a different machine that is connected via IP.

LinkControl is supported on Windows® XP and MacOS/X.

1.2 Installing LinkControl

Most Norsat-supplied systems will include a built-in control computer or a laptop computer that has been configured to run LinkControl. No additional installation is required for these systems. Systems that do not ship with any control computer or laptop will include a USB drive with a preconfigured installation of LinkControl that can be copied to a PC or laptop to allow that PC or laptop to control the system.

To install LinkControl from the USB drive:

1. Ensure that the target PC or laptop has its IP Address set to **192.168.77.3**.
2. Navigate to the **C:\Program Files** directory on the target computer.
3. Create a subdirectory called **Norsat International**.
4. If on Windows XP, copy the **LinkControl 7** directory from the root directory on the USB drive to the **Norsat International** subdirectory on the target computer.
5. If on Windows 7, open the LinkControl 7 directory from the root directory on the USB drive and copy all files and folders except for the **ServerData** and **ClientData** folders to **C:\Program Files\Norsat International**
6. If on Windows 7, copy the **ServerData** and **ClientData** folders to **C:\ProgramData\Norsat International\LinkControl 7**
7. Note: The ProgramData folder will be hidden by default, access it directly by entering **C:\ProgramData** in the Windows Explorer address bar.
8. Create a shortcut to the following target program and place it on the desktop:

```
C:\Program Files\Norsat International\LinkControl 7\LC7M.exe
```

The shortcut on the desktop can be used to start LinkControl.

Disclaimer: With every system, Norsat also provides customers a USB containing the full backup of the system image. This USB should not be used for any purpose other than the application of the contained image to a system.

1.3 Migrating LinkControl to Windows 7

Detailed instructions for migrating LinkControl to Windows 7 can be found in the [Appendix](#) under Windows 7 Migration Instructions.

1.4 Launching LinkControl

On Norsat-supplied systems LinkControl is launched at boot, however this may not be the case on user-installed systems. LinkControl is a standard application and may be launched as a common application without administrator privileges.

Users will be prompted to accept an End User License Agreement (EULA) the first time the LinkControl software is run. This EULA must be accepted in order to use the LinkControl software. If the EULA is not accepted, LinkControl will automatically exit and the EULA will be displayed again the next time the LinkControl software is run. Once the EULA has been accepted it will no longer be shown when LinkControl starts. It can be accessed at any time from the **Help > View EULA** entry in LinkControl's main menu.

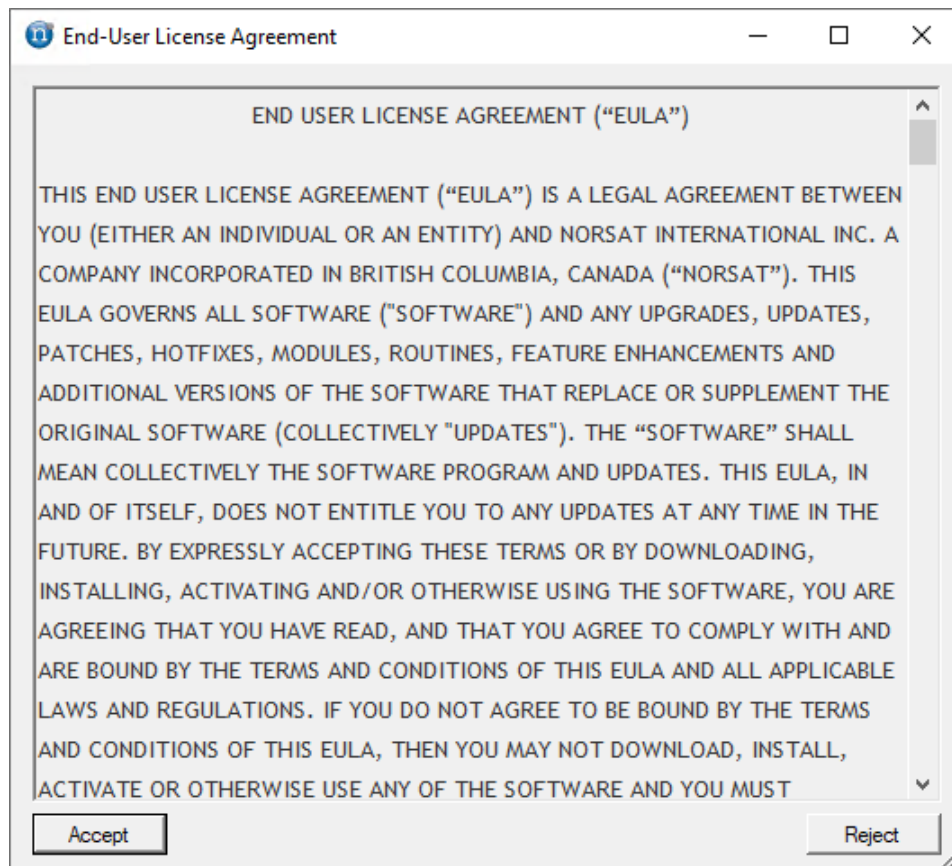


Figure 1: LinkControl End-User License Agreement (EULA)

At start-up LinkControl performs numerous diagnostics and connection tests as the various equipment of the system is initialized. Please wait until the overall status indicator registers “System OK”.



Figure 2: LinkControl Start-Up Screen

If the overall status indicator indicates an alarm, use the built-in troubleshooter to assist you in diagnosing the issue. The troubleshooter can be accessed at any time through the Help Menu at the top of the screen.

1.5 LinkProfiles

LinkProfiles are the heart of your system, as they guide the acquisition process and assist in configuring the RF equipment for transmission. LinkControl uses LinkProfiles to control all aspects of its operation.

To view the basic information for a LinkProfile, click on the **LinkProfiles** navigation button on the left side of the screen. Click on the name of a LinkProfile in the LinkProfile List to display a summary of the LinkProfile on the right-hand side of the screen.

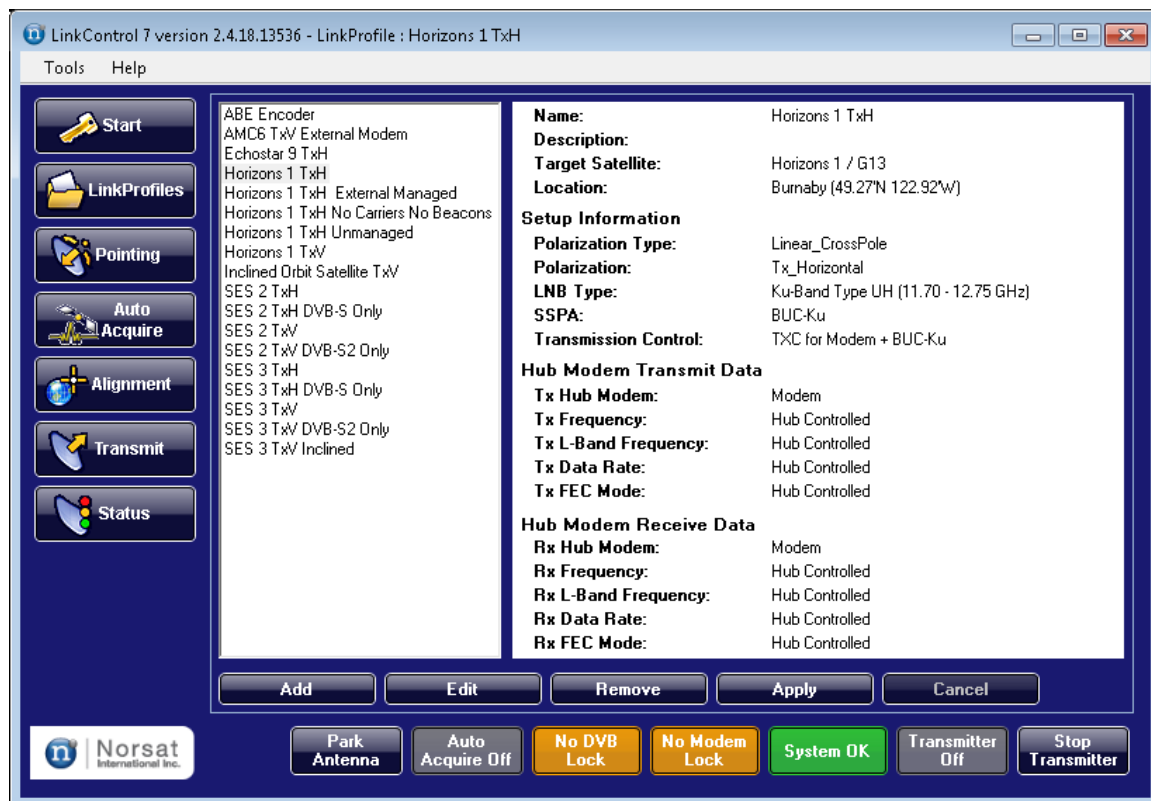


Figure 3: LinkProfile Summary

Once you have selected a LinkProfile to use, click on the **Apply** button to apply the LinkProfile's settings to the system. It may take several seconds for all of the settings to be applied to all of the appropriate hardware components.

When configuring your system, compare the information provided by the Satellite Operator (target satellite, polarization, GPS coordinates and LNB to use) with the data for the existing LinkProfiles defined in the system. If there is a difference between the information provided by the Satellite Operator and the information in the LinkProfiles, you must decide whether to create a new LinkProfile or edit an existing LinkProfile.

- If you do not plan to use one of the existing LinkProfiles ever again, then you may wish to edit an existing LinkProfile.
- If you would instead like to preserve all of the existing LinkProfiles, create a new LinkProfile using the **Add** button as described below.
- You may also use an existing LinkProfile as a starting point for a new LinkProfile:
 - Open an existing LinkProfile using the **Edit** button as described below.
 - Change the LinkProfile name.
 - Make any other desired changes to the LinkProfile.
 - Click on the **Save As** button to save the new LinkProfile.

To create or edit a LinkProfile:

1. Click the **LinkProfiles** navigation button on the left side of the screen to bring up the **LinkProfile Settings Screen**.
 - To create a new LinkProfile, click on the **Add** button.
 - To edit an existing LinkProfile, ensure that the LinkProfile has been selected in the LinkProfile List and then click on the **Edit** button.

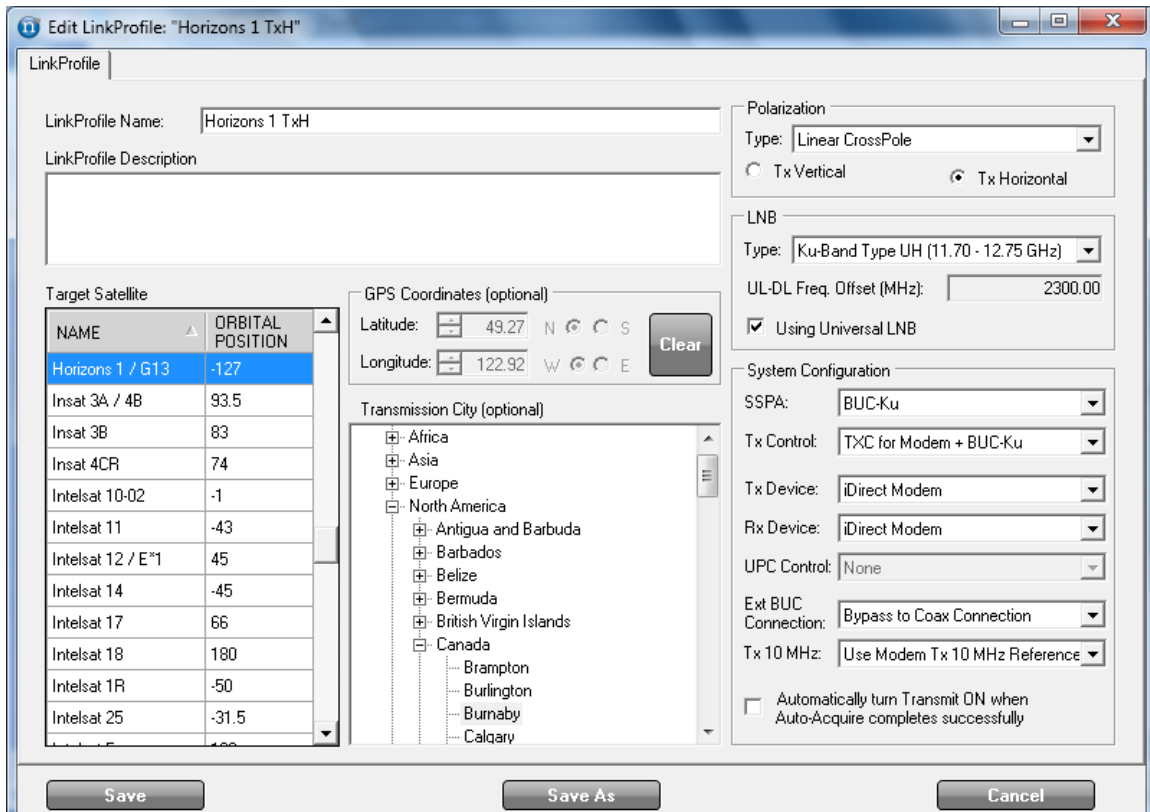


Figure 4: Create / Edit a LinkProfile

2. Type the desired LinkProfile name in the **LinkProfile Name** box.
3. Optionally enter a brief LinkProfile description in the **LinkProfile Description** box.
4. Choose a target satellite from the **Target Satellite** list.
5. Optionally specify the GPS Coordinates for the location that the system will be operated from. This can be done by either manually entering the latitude and longitude using the Latitude and Longitude fields provided in the **GPS Coordinates** area, or by selecting a city from the **Transmission City** list.

If a city has been selected (disabling the Latitude and Longitude fields) and you would like to enter a latitude and longitude manually instead, click on the **Clear** button to ensure that no city is selected and to re-enable the latitude and longitude fields.

6. In the **Polarization** section, select the Transmit Polarization Type from the pull-down list, and then specify the Transmit Polarization using the radio buttons.
7. In the **LNB** section, specify the LNB Type that is applicable for your transmission location from the pull-down list. If your system uses a Universal LNB, please ensure that the "Using Universal LNB" flag is marked.
8. Select the BUC/SSPA to be used for this LinkProfile from the **SSPA** list.
9. Select the transmission control from the **Tx Control** list.

- For LinkProfiles that use a device whose output power level cannot be adjusted (e.g. Encoder/Modulator with no separate UpConverter) as the Tx Device, select a Transmission Control that uses Variable Attenuation.
 - For LinkProfiles that use a device whose output power level can be adjusted (e.g. Encoder/Modulator with a separate UpConverter, most modems) as the Tx Device, select a Transmission Control that uses Fixed Attenuation.
10. If you are using a modem that has been configured to be controlled by LinkControl, select the appropriate Transmit and Receive modem(s) from the **Tx Device** list and the **Rx Device** list.
- If you are not using a modem, or if you are using an external modem that has not been configured to be controlled by LinkControl, then set the **Tx Device** and **Rx Device** to Unmanaged Modem.
11. If you are using a modem that has been configured to be controlled by LinkControl, then you will need to fill in the data on the second tab. Refer to [Modems and Encoders](#) on page 49 for the details for your modem.
12. If you are using a Tx Device that requires an external UpConverter, select the UpConverter from the **UPC Control** list.
13. If your terminal connects to an external BUC using a fiber optic cable, then select the Fiber Optic option from the **Ext BUC Connection** pull-down list. Otherwise, select the Bypass to Coax Connection option. If your terminal connects to an external modem, select the Bypass to Coax Connection option regardless of the type of connection used to connect to the external modem. If you are uncertain which value to select, select the Bypass to Coax Connection option.
14. If your system allows the Tx 10 MHz Reference Signal Source to be specified, then select the Tx 10 MHz Reference Signal Source from the **Tx 10 MHz** list:
- The *Use Modem Tx 10 MHz Reference* option is typically used if you have specified an internal modem or encoder/modulator as the Tx Device, or if the Tx Device is set to Unmanaged Modem and the unmanaged modem supplies a 10 MHz reference signal.
 - The *Use Internal 10 MHz Reference* option is typically used if the Tx Device is set to Unmanaged Modem and if the unmanaged modem does not supply a 10 MHz reference signal.

Note that the BUC requires a 10 MHz reference in order to transmit.

15. If you would like the system to start transmitting automatically whenever the Auto-Acquire process completes successfully, please ensure that the “Automatically turn Transmit ON when Auto-Acquire completes successfully” flag is set.

Note that this flag is typically only used with GLOBETrekker™ systems that rely on Two-Button Interface functionality (described on page 31) for operation.

16. Click on the **Save** button to save the LinkProfile. Alternatively, click on the **Save As** button if you are currently editing an existing LinkProfile and would like to save a new separate LinkProfile based on the current settings.
17. Optionally, ensure that the LinkProfile is selected in the LinkProfile List and then click on the **Apply** button to apply its settings to the system.

LinkProfile Tips and Tricks

LinkControl can support any number of LinkProfiles and we recommend that full advantage be taken of this. Some recommendations:

1. Pick descriptive names that are easy to communicate via phone or voice radio links.
2. Populate back up satellites when available; you never know when a mountain will be in the way.
3. If possible, test your LinkProfile in a depot environment.
4. Use LinkProfiles to manage different modem configurations, such as low bandwidth and high bandwidth uses.
5. Make sure you select an LNB Type that covers a frequency range that includes the beacons and carriers you wish to use for the selected Target Satellite.
6. Most BUCs require a 10 MHz reference signal to be provided to them in order to enable transmission. Don't forget to set the Tx 10 MHz Source in the LinkProfile!

Note that if the Tx 10 MHz Source parameter is not changeable or is not shown on the Edit LinkProfile page, then it does not need to be configured for your system.

1.6 LinkProfile Import and Export

LinkControl provides the ability to import and export LinkProfiles so that they can easily be transferred from one system to another. The import and export functionality are available for both local and remote LinkControl clients.

To export a LinkProfile, begin by clicking on **Tools > LinkProfile Tools > Export LinkProfiles...** in the LinkControl main menu to bring up the Export LinkProfiles window:

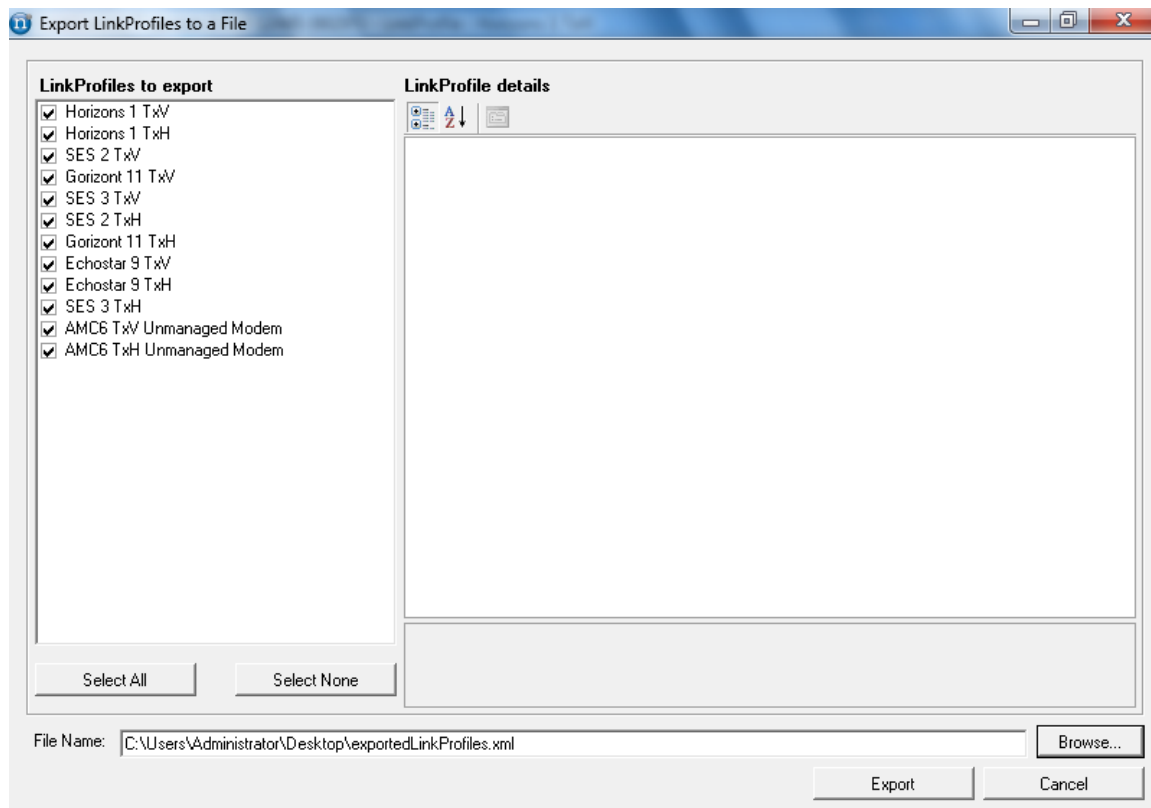


Figure 5: Export LinkProfiles Window

Click on the name of a LinkProfile in the list on the left side of the window to display the details for that LinkProfile. Click on a selected LinkProfile name to toggle whether it is selected for export (which is indicated by the check mark to the left of the LinkProfile name). The **Select All** and **Select None** buttons may also be used to ensure that all LinkProfiles or no LinkProfiles (respectively) are selected for export.

Once all of the desired LinkProfiles have been selected for export, use the **Browse...** button to browse for the location on your computer that the exported LinkProfile file will be saved to. Once a target folder and file name have been specified, click on the **Export** button to save the LinkProfile data to the specified file. The saved file can be copied to any other computer running a LinkControl client application that is connected to a system running a LinkControl server so that the LinkProfile data may be imported.

To import one or more LinkProfiles from an exported LinkProfile data file, begin by clicking on **Tools > LinkProfile Tools > Import LinkProfiles...** in the LinkControl main menu to bring up the Import LinkProfiles window:

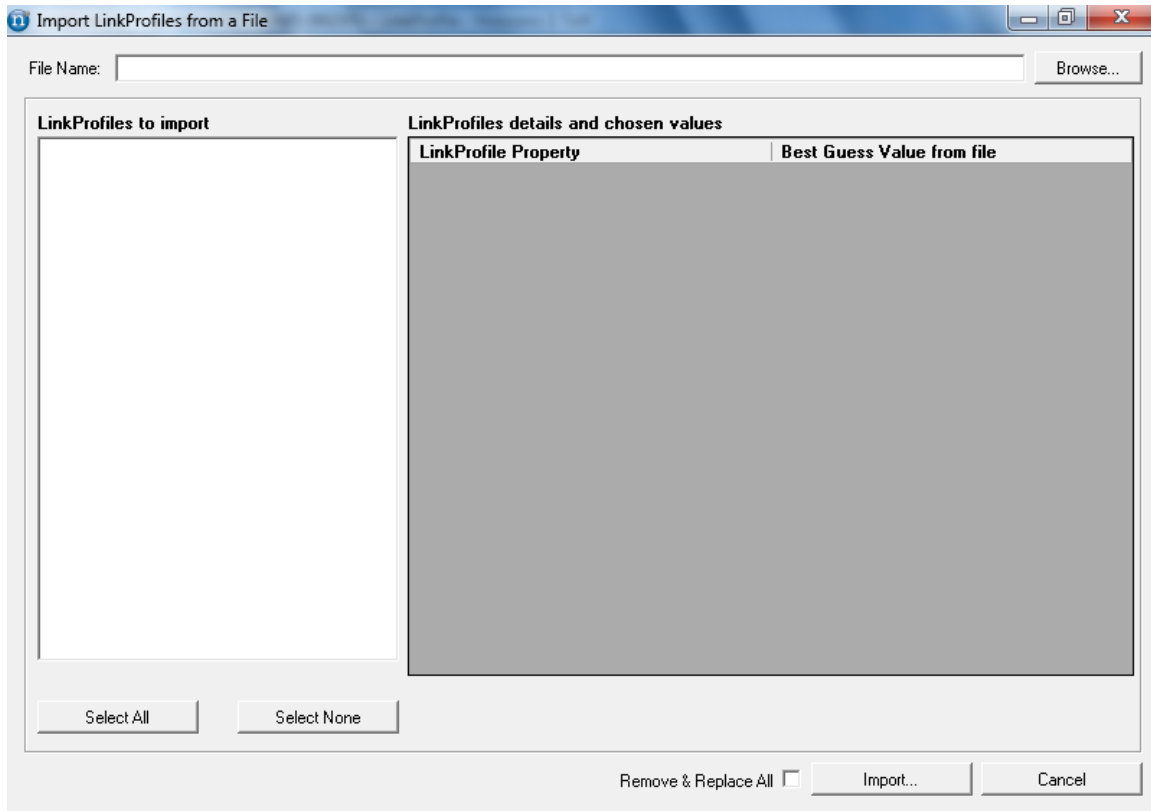
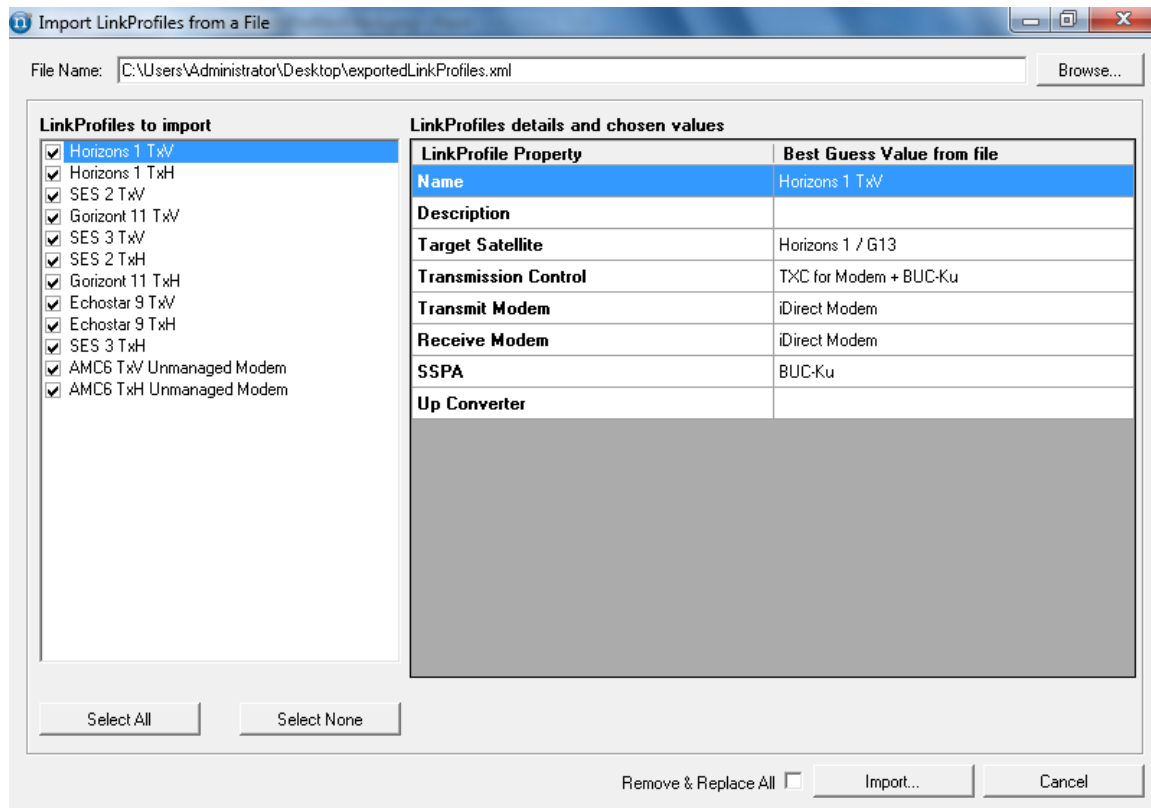


Figure 6: Import LinkProfiles Window

Click on the **Browse...** button to browse for the file containing the LinkProfile data that is to be imported. Once a file is selected, the file data will be read and the list of importable LinkProfiles will be populated using the imported data as shown below:



[Figure 7: Import LinkProfiles Window with Imported Data](#)

Click on the name of a LinkProfile to display the summary details for that LinkProfile. Click on a selected LinkProfile name to toggle whether it is selected for import (which is indicated by the check mark to the left of the LinkProfile name). The **Select All** and **Select None** buttons may also be used to ensure that all LinkProfiles or no LinkProfiles (respectively) are selected for import.

Ensure that the **Remove & Replace** option is set properly before transferring the imported LinkProfile data to the system using the **Import** button. If this option is selected, then all of the existing LinkProfiles on the system will be deleted prior to transferring the imported LinkProfile data to the system. If the option is not selected, then the selected LinkProfiles will be added to the existing set of LinkProfiles on the system once the imported data is transferred. Click on the **Import** button to actually transfer the imported LinkProfile data to the system.

1.7 Satellite Almanac

LinkControl maintains a user-editable satellite almanac. This data is used to assist the user in acquiring a satellite and is critical for Auto-Acquisition, as targets for the Satellite are defined by the information in the almanac and in the LinkProfile.

To View or Edit the Almanac, select **Tools > Satellite Almanac Tools > Satellite Almanac** from the LinkControl Main Menu.

Name	Orbital Position	Carriers	Inclined Orbit?
Galaxy 28 / IA8	-89	6	No
Galaxy 3C	-95	4	No
GE 23	172	7	No
Gorizont 11	-103	3	Yes
Hellas Sat 2	39	5	No
Hispasat 1C/D/E	-30	6	No
Horizons 1 / G13	-127	6	No
Insat 3A / 4B	93.5	7	No
Insat 3B	83	2	No

Inclined Orbit Satellites Two-Line Elements

Line 0:

Line 1:

Line 2:

Carrier Name	Type	Polarization	Frequency (MHz)	Symbol Rate (KS)	Modulated
HughesNet	DVB-S Carrier	Linear Vertical	12140.00	30000.00	Unknown
Vertical Beacon	Beacon	Linear Vertical	11700.50	0.00	Unknown
Horizontal Beacon	Beacon	Linear Horizontal	12199.00	0.00	Unknown
C-Band Beacon	Beacon	Linear Vertical	4198.50	0.00	Unknown
NBA Test Card	DVB-S Carrier	Linear Vertical	4160.00	29270.00	Unknown
ADN	DVB-S Carrier	Linear Horizontal	4066.00	3310.00	Unknown

Figure 8: Satellite Almanac

The Satellite Almanac provides a List of Satellites at the top of the interface, with Two-Line Element details for the selected satellite provided below this list. A List of Satellite Carriers is shown below the Two-Line Element fields. Clicking on a satellite in the List of Satellites will populate the List of Satellite Carriers with the Satellite Carriers associated with that satellite.

To add a new satellite:

1. Click on the **Add Satellite** button to the right of the List of Satellites to bring up the Add New Satellite interface:

The screenshot shows a software dialog box titled "Add New Satellite". It features several input fields: "Satellite Name" (a text box), "Orbital Position" (a spin box with the value "0" and radio buttons for "E" and "W"), "Polarization Offset" (a spin box with the value "0.000"), and "Operator Phone" (a text box). Below these is a "Notes" text area. A section titled "Inclined Orbit Satellites Two Line Elements" contains three text boxes labeled "Line 0:", "Line 1:", and "Line 2:". There is a checkbox labeled "This is an inclined orbit satellite" and an "Import TLE" button. At the bottom are "Save" and "Close" buttons.

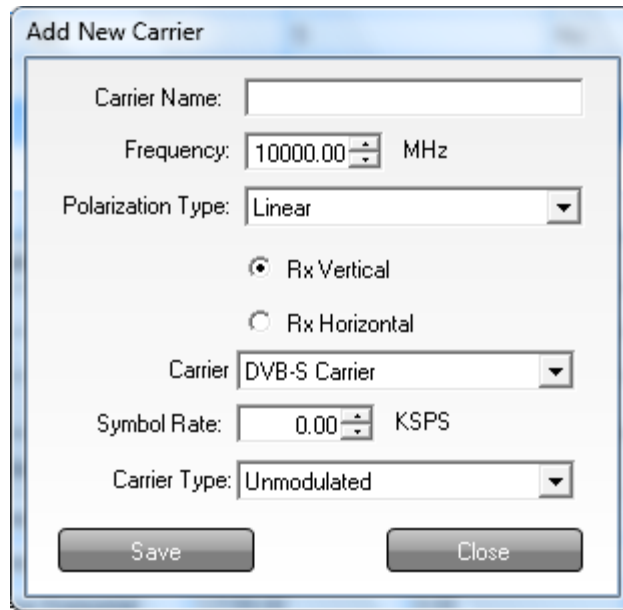
[Figure 9: Add New Satellite](#)

2. Enter the name for the satellite in the top data box.
3. Enter the satellite's Orbital Position and Polarization Offset.
4. Optionally enter the Operator Phone Number and any relevant notes for the satellite.
5. If the satellite is in an inclined orbit, you must enter the Two-Line Element for the satellite:
 - a. Mark the **This is an Inclined Orbit Satellite** flag.
 - b. Enter the NORAD standard Two-Line Element into the three boxes. Typically, the satellite name goes in Line 0 and the two data lines go in Line 1 and Line 2.

Note: The format of the Two-Line Element is rigid and includes a requirement on the number of spaces between each of the numbers. It is advisable that you copy and paste

the two-line element data from a text file or web page or use the “Import TLE” button to import the TLE from a valid .tle or .txt file.

6. Click on the **Save** button to add the new satellite to the database.
7. Add any new known beacons and carriers on the satellite using the **Satellite Almanac** interface and clicking on the **Add Carrier** button to the right of the List of Satellite Carriers.



[Figure 10: Add/Edit Carrier](#)

- a. Enter a name or description for the beacon or carrier. This will allow you to identify the beacon or carrier when using the spectrum analyzer.
- b. Enter the frequency for the beacon or carrier.
- c. Enter the receive polarization type for the carrier:
 - i. Select *Rx Vertical* or *Rx Horizontal* for beacons or carriers with linear polarization
 - ii. Select *Rx Right-Hand* or *Rx Left-Hand* for beacons or carriers with circular polarization
- d. Select the **Carrier Type**:
 - Select *Beacon* for beacons
 - Select *DVB-S Carrier* for DVB-S carriers
 - Select *DVB-S2 Carrier* for DVB-S2 carriers
- e. Enter the modulation type for the carrier:
 - Select *Modulated* if you know that the carrier is modulated

- Select *Unmodulated* if you know that the carrier is unmodulated or if you do not know the carrier's modulation type
- f. Enter the symbol rate if adding a carrier
 - g. Click on the **Save** button.

To edit an existing satellite:

1. Select the satellite in the List of Satellites.
2. Click on the **Edit** button to the right of the List of Satellites.
3. Edit the information in the fields, in the same way as adding a new satellite.
4. Click on the **Save** button to save the changes.

To delete an existing satellite:

1. Select the satellite in the List of Satellites.
2. Click on the **Delete** button to the right of the List of Satellites.

Note: Deleting a satellite will delete all of the satellite carriers associated with that satellite as well.

To edit an existing satellite carrier:

1. Select the satellite associated with the satellite carrier in the List of Satellites.
2. Select the satellite carrier in the List of Satellite Carriers.
3. Click on the **Edit** button to the right of the List of Satellite Carriers.
4. Edit the information in the fields, in the same way as adding a new satellite carrier.
5. Click on the **Save** button to save the changes.

To delete an existing satellite carrier:

1. Select the satellite associated with the satellite carrier in the List of Satellites.
2. Select the satellite carrier in the List of Satellite Carriers.
3. Click on the **Delete** button to the right of the List of Satellite Carriers.

Satellite Almanac Tips and Tricks

LinkControl can support any number of entries and we recommend that full advantage be taken of this. Some recommendations:

1. Pick descriptive names that are easy to communicate via phone or voice radio links
2. Populate cross polarization elements in the event of changes in beacons and carriers on your main polarization
3. LinkControl stores these satellites so be aware that secure satellites can be retrieved
4. DVB carriers and beacons may be changed, so update your almanac regularly

1.8 Status Monitoring

LinkControl monitors, reports and repairs the system as it runs. During operation the health of various systems is monitored continually. In many cases LinkControl will intervene and fix any problems without user intervention. However, some events will trigger an alarm that requires human intervention.

The alarm entries at the bottom of the main user interface will keep you updated of major system occurrences:

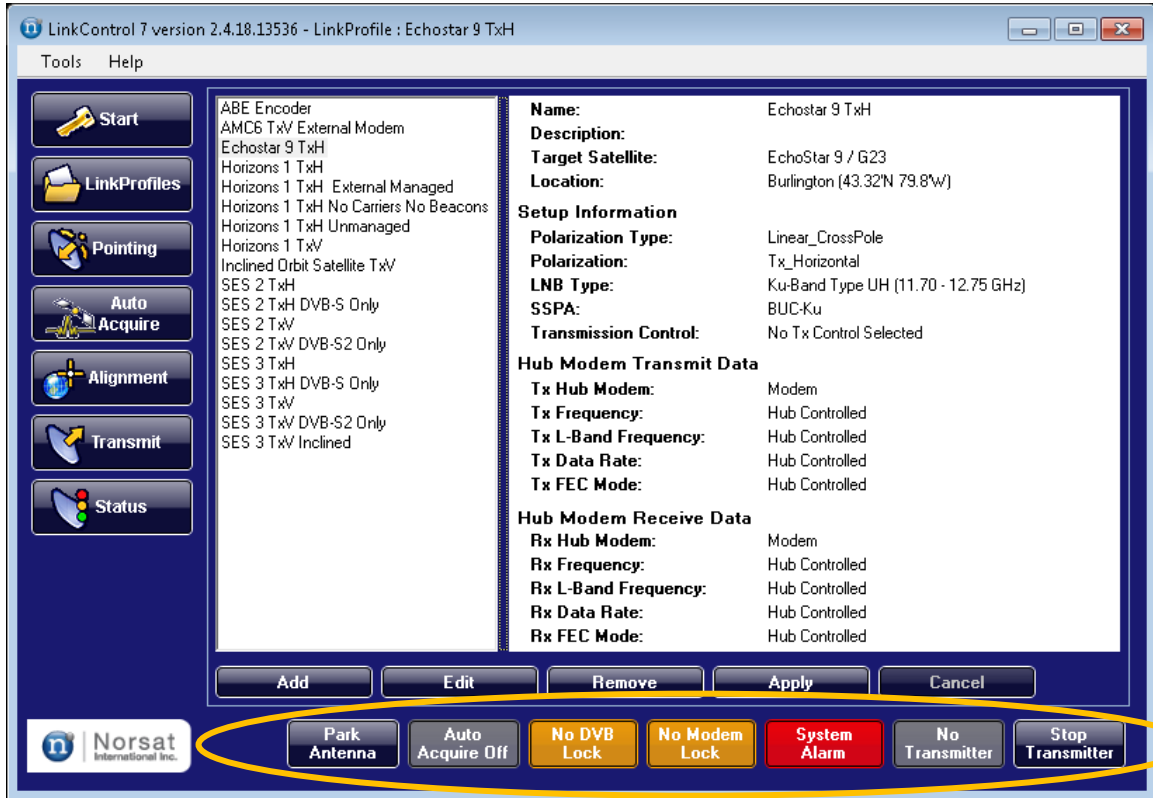


Figure 11: Alarm Entries

In the event of an alarm, clicking on the **System Alarm** button (located on the bottom, third from the right) will bring up the troubleshooting window which will guide you through steps to rectify the situation.

To view detailed system status, select the “Status” icon from the left-hand tool set. Major system component health will be presented in real time. The Status Screen displays information on the BUC Output Power, BUC Status, Orientation, Attenuation, LNB and Environmental Status.



Figure 12: Status Screen

The Status Screen provides detailed information about the current transmit state of the terminal. If the terminal is currently transmitting, then the following information is displayed:

- **Target BUC Power:** The BUC Output Power that LinkControl's automatic power control algorithm is attempting to achieve
- **Actual BUC Power:** The current BUC Output Power reading provided by the BUC
- **BUC Power Delta:** The difference between the Target BUC Power and the Actual BUC Power
- **Minimum Seen:** The minimum BUC Output Power reading seen since the BUC started transmitting.
- **Average Seen:** The average BUC Output Power reading seen since the BUC started transmitting.
- **Maximum Seen:** The maximum BUC Output Power reading seen since the BUC started transmitting.

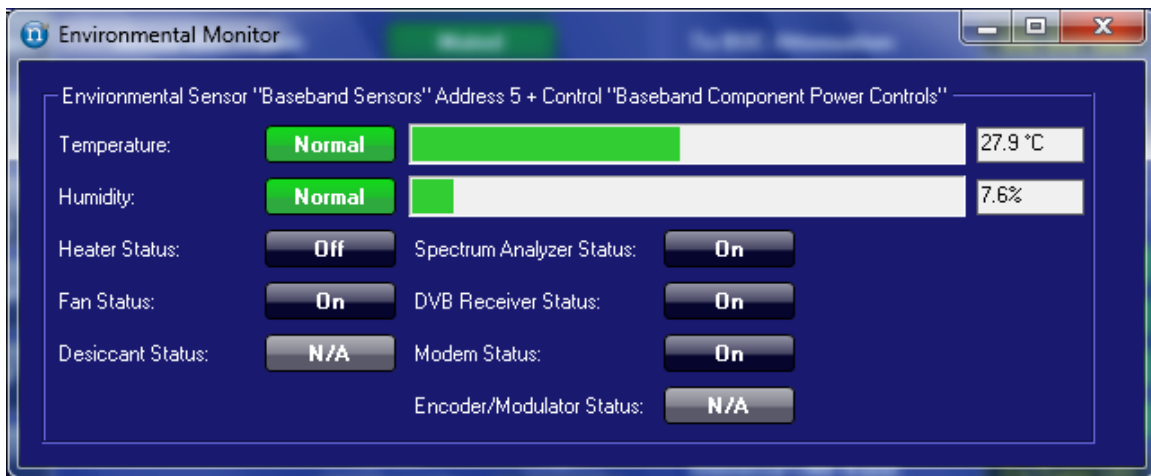
The BUC internal temperature is also displayed regardless of whether the BUC is transmitting.

For motorized terminals, the Status Screen shows the current position of each of the terminal's three motors: azimuth, elevation, and polarization. The target orientation for each motor (calculated based on details provided in the active LinkProfile and taken from various hardware components) is also shown for comparison.

The Status Screen additionally provides information about the variable attenuation applied to the terminal's RF paths. The Tx Line attenuation and BUC attenuation are shown, as is their combined total. The Rx Line attenuation is also shown.

If the appropriate detection hardware is present in the terminal, voltage and current data for the LNB are displayed in real time. These values can help determine whether the LNB is connected properly. If a quad-band Universal LNB is in use, the current settings for the voltage and tone control signals are shown, as is the resulting operational band for the LNB.

The Environmental Monitor indicator shows the current system status at a glance. If the measured temperature or humidity goes outside of the terminal's operational range, the indicator will show an alarm. Use the **Details** button to bring up the Environmental Monitor window, which shows the temperature and humidity information in more detail along with the power status for system components affected by temperature or humidity.



[Figure 13 - Environmental Monitor Screen](#)

The Environmental Monitor window displays the current temperature and humidity readings, and also indicates whether the current values are within the terminal's operational range. The Environmental Monitor also indicates whether the following system components are powered on or powered off:

- Heater
- Fans

- Spectrum Analyzer
- DVB Receiver
- Internal Modem (if present)
- Internal Encoder/Modulator (if present)

Terminals that include desiccant placed within the baseband will additionally have the estimated desiccant status shown.

2. Auto-Acquisition

This chapter explains how you can use LinkControl's Auto-Acquire capability to automatically point and peak your antenna on the correct satellite.

Note: Auto-Acquisition is only available with Norsat's GLOBETrekker™ product line.

Tip: Before using the Auto-Acquisition function for the GLOBETrekker™, ensure that a LinkProfile has been set up for the desired satellite. The LinkProfile must contain sufficient information about the location of the desired satellite and the location of the GLOBETrekker™ system—for example, satellite name, alignment/beacon, and DVB-S or DVB-S2 carriers (if applicable); GPS coordinates for latitude and longitude.

2.1 Initiating Auto-Acquire

When LinkControl starts, the **Startup Screen** appears. To start the Auto-Acquisition process, first click on the **Auto-Acquire** button in the left-hand tool bar to bring up the **Auto-Acquire Start Screen** if it is not already displayed. Click on a LinkProfile in the List of LinkProfiles, and then verify that the details for the LinkProfile are correct. If your system uses a manually-adjusted polarization feed, then ensure that the feed polarization has been set to the value specified in the target orientation. Lastly, click on the **Start Auto Acquire** button to begin the Auto-Acquire process.

The *Auto-Acquire* indicator at the bottom of the screen will turn green once the Auto-Acquire process has started, and will remain green while the Auto-Acquire process runs. Once the process has finished, the indicator will turn grey.

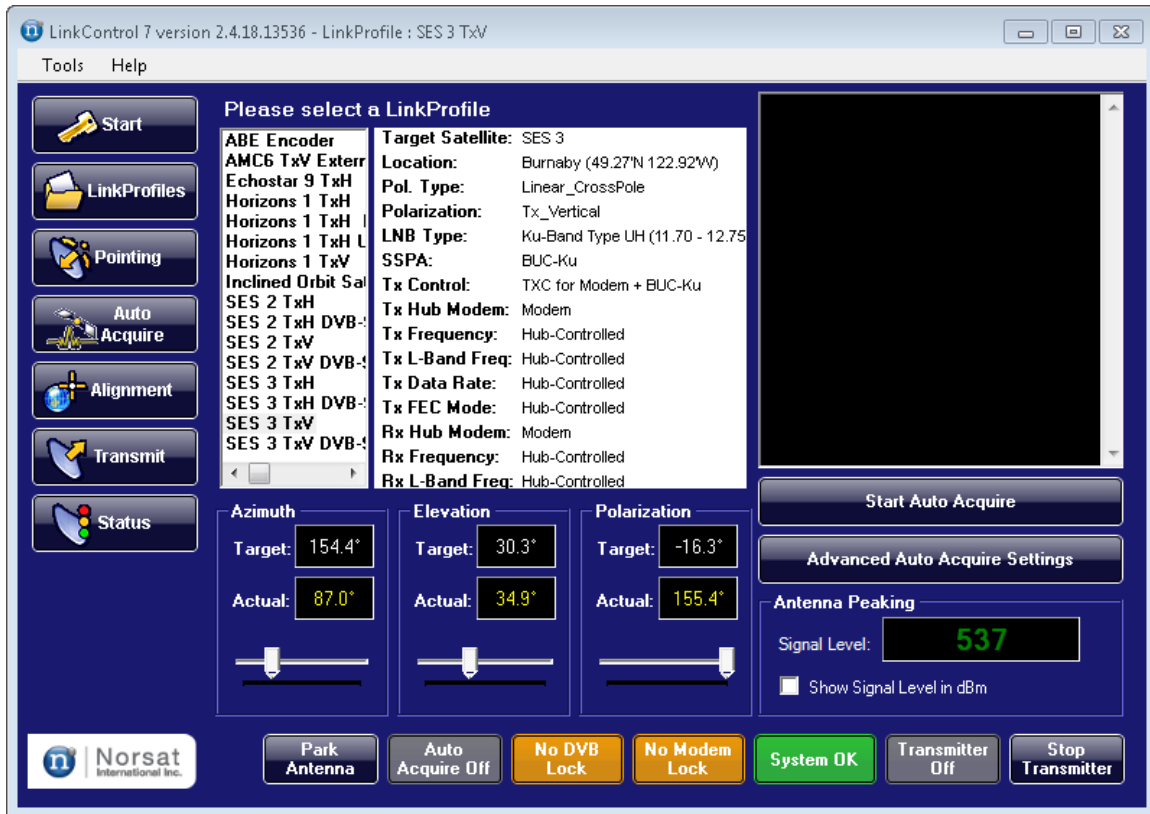


Figure 14: Auto-Acquire Start Screen

Note: LinkControl compensates for uneven terrain, but the more level the system, the faster your acquisition.

Note: Azimuth reports geographical azimuth, not magnetic.

To change your selected LinkProfile, click on the **Stop Auto Acquire** button to return to the Auto-Acquire Start Screen and then select another LinkProfile from the List of LinkProfiles.

2.2 Initializing

LinkControl will begin by validating all the basic parameters available to ensure that it will be able to find a satellite. The upper right status window will update itself regularly to inform the user of progress. LinkControl will validate that the LinkProfile has sufficient data to pick a satellite and that the almanac entries have sufficient carriers to find the satellite. Link Control will also check the status of necessary system components. If the GPS is not able to resolve a location, the user will be prompted to validate or select the location of the terminal.

2.3 Antenna Positioning and Satellite Search

No user action is required on the **Pointing the Antenna** screen. If a problem occurs, follow LinkControl's instructions. LinkControl will move the antenna continually while finding your selected satellite. In the case of failure, the status window will indicate any applicable corrective actions.

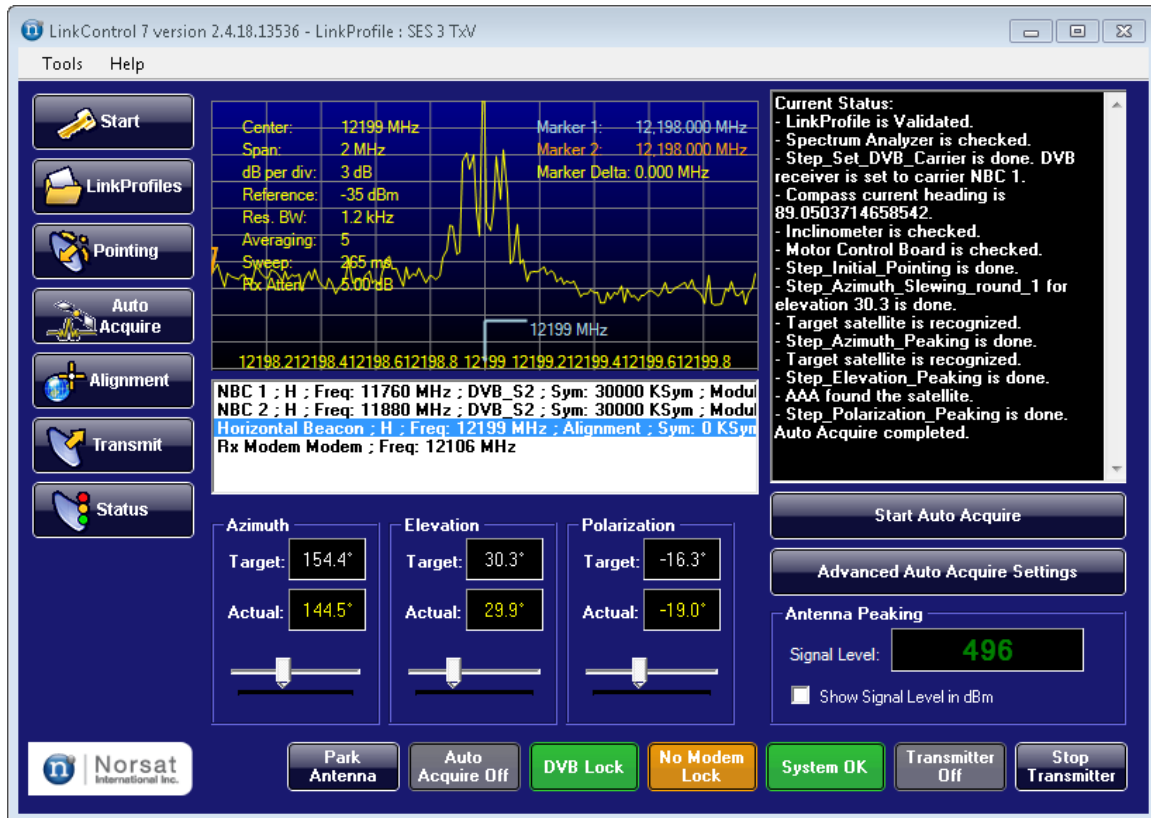


Figure 15: Satellite Search

2.4 Initiating the Transmission

When the terminal is ready to transmit, select the **Transmit tab**. Before you can start transmitting, you must call the Network Operations Center to gain access to the satellite by negotiating satellite access with the hub operator.

2.5 Call Network Operator to Access Satellite

This section is modem-specific; for your specific modem, please see [Modems and Encoders](#) on page 49.

Auto-Acquire tips and tricks

1. A level platform will have faster acquisition as the antenna will not be moving elevation constantly.
2. An up-to-date almanac will always improve your time to acquire.
3. Best acquisition has the front (parked) on the system slightly to the left of your target satellite.
4. Always check for obstructions.

2.6 Two-Button Interface

On some GLOBETrekker™ systems, external Go and Stow switches are available to facilitate the acquisition of a satellite without using the Graphical User Interface. The Two-Button Interface (TBI) is a part of the LinkControl Client that works with the physical switches.



[Figure 16: Two-Button Interface Controls](#)

When powering on the system, the TBI switches will indicate system readiness by their color coding as detailed in the chart on the next page. When both lights are green, the system is ready to operate.

To engage any operation, a button must be held down for **2 seconds** before the action will register. (This prevents activity by accident.)

Auto-Acquire

1. System should be in IDLE state. (If not, please wait.)
2. System in IDLE state. Ready for input.
3. PRESS + HOLD the **Go** button for 2 seconds then RELEASE. It will start to flash green. Wait for the Auto-Acquire process to complete.
4. On a successful acquisition, the transmitter will not be muted. It is your responsibility to ensure safety of personnel and communicate with your satellite vendor.

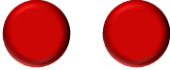

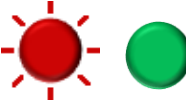
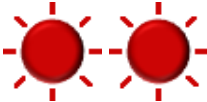




Parking

1. System should be in IDLE or IDLE-PARK state. (If not, please wait.)
2. PRESS + HOLD the **Stow** button for 2 seconds then RELEASE. It will start to flash green. Wait for the park process to complete.

Alarms

1. If the buttons are flashing red, the system is not able to be operated.
2. Engage the full user interface and daylight readable display or use a remote client to resolve the problem.

Reading the Two-Button Interface

State	State Name	Description
	START-UP	System is starting up and will transition to IDLE or ERROR. Please wait.
	IDLE	System is ready to park or Auto-Acquire. Hold STOW or GO button for 2 seconds.
	IDLE-PARK	System can park but cannot Auto-Acquire. Press STOW to park the antenna. See LinkControl 7 client for info/to fix the error.
	ERROR	System cannot park or Auto-Acquire. See LinkControl 7 client for more information to fix the error.
	AA-IN-PROGRESS	Auto-Acquire in progress. Please wait for the system to find the satellite.
	AA-DONE	Auto-Acquire complete. On the satellite. Will stay in AA-DONE until modem/DVB lock is lost. While in this state, the system can be parked using the STOW button.
	PARK-IN-PROGRESS	Park in progress. Please wait for the system to park.
	PARK-DONE	Park complete. System in parked position. Will transition to IDLE after 2 minutes (but will still be in the parked position). While in this state, the Auto-Acquire process can be started using the GO button.



Green



Green Flashing



Red



Red Flashing



Off

Two-Button Interface Tips and Tricks

1. When using this interface without a display, always assume the transmitter is ON and keep clear at all times.
2. The antenna may move significantly if it is acquiring location data before acquisition; ensure the boom arm is free of obstructions.
3. Use the parking feature to reduce your take-down time.
4. The last selected LinkProfile will be used, so be sure that you have picked this correctly before deployment.

2.7 Inclined Orbit Tracking

If the active LinkProfile specifies a satellite that has a valid Two-Line Element provided, then LinkControl will automatically begin tracking the orbit of that satellite once the Auto-Acquire process finishes successfully. The tracking details can be accessed by clicking on the **Alignment** button in the left-hand tool bar and then clicking on the **Inclined Orbit** button.

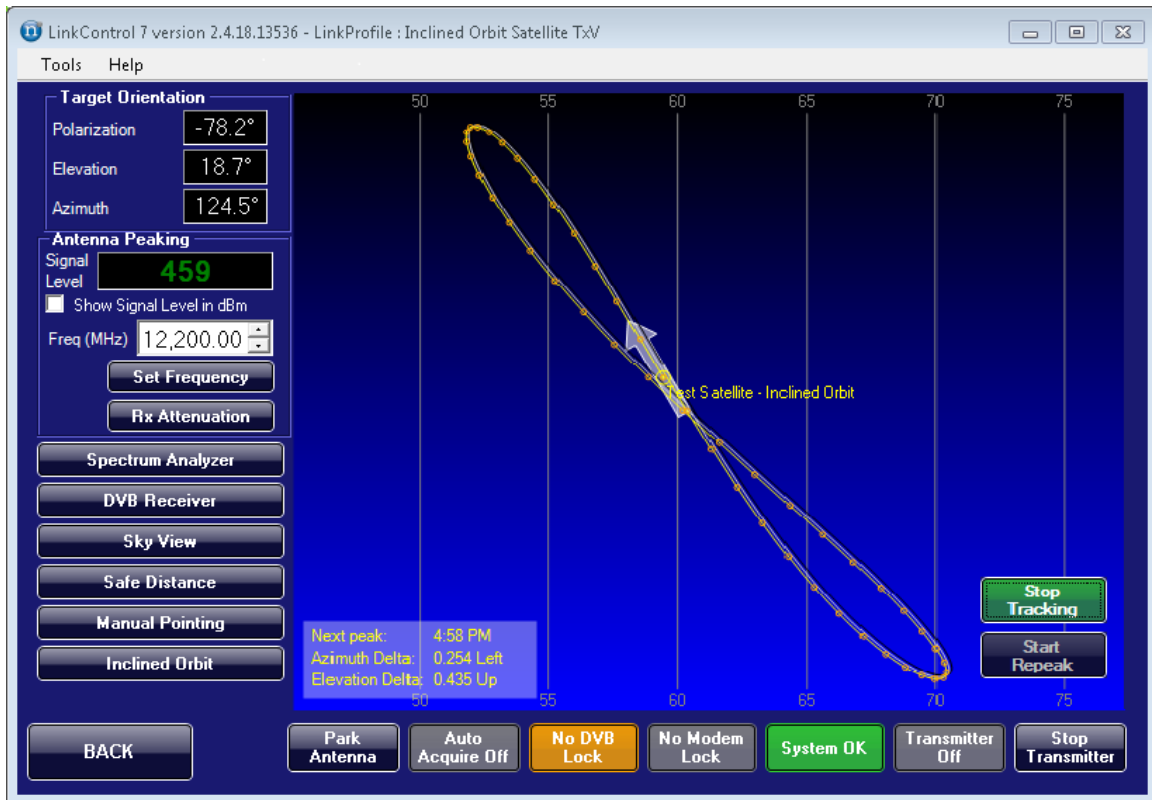


Figure 17: Inclined Orbit Tracking Details

Note: Target Azimuth reports geographical azimuth, not magnetic.

The projected motion arc for the satellite is shown, along with tracking details in the lower left corner of the arc display. The details indicate the next time at which the system will adjust its position along with the changes in azimuth and elevation that will be made at that time. Controls are also available for stopping and restarting inclined orbit tracking, and forcing the re-peaking process to be run immediately.

3. Satellite Acquisition Tools

This chapter will instruct you in the use of the advanced tools for satellite acquisition and link maintenance

3.1 Pointing Calculation

LinkControl provides a continually-updated calculation of your pointing solution based on your LinkProfile settings, your location, and the satellite almanac. Throughout many screens the present pointing solution is displayed in the top left corner. This is used for manual pointing operations.

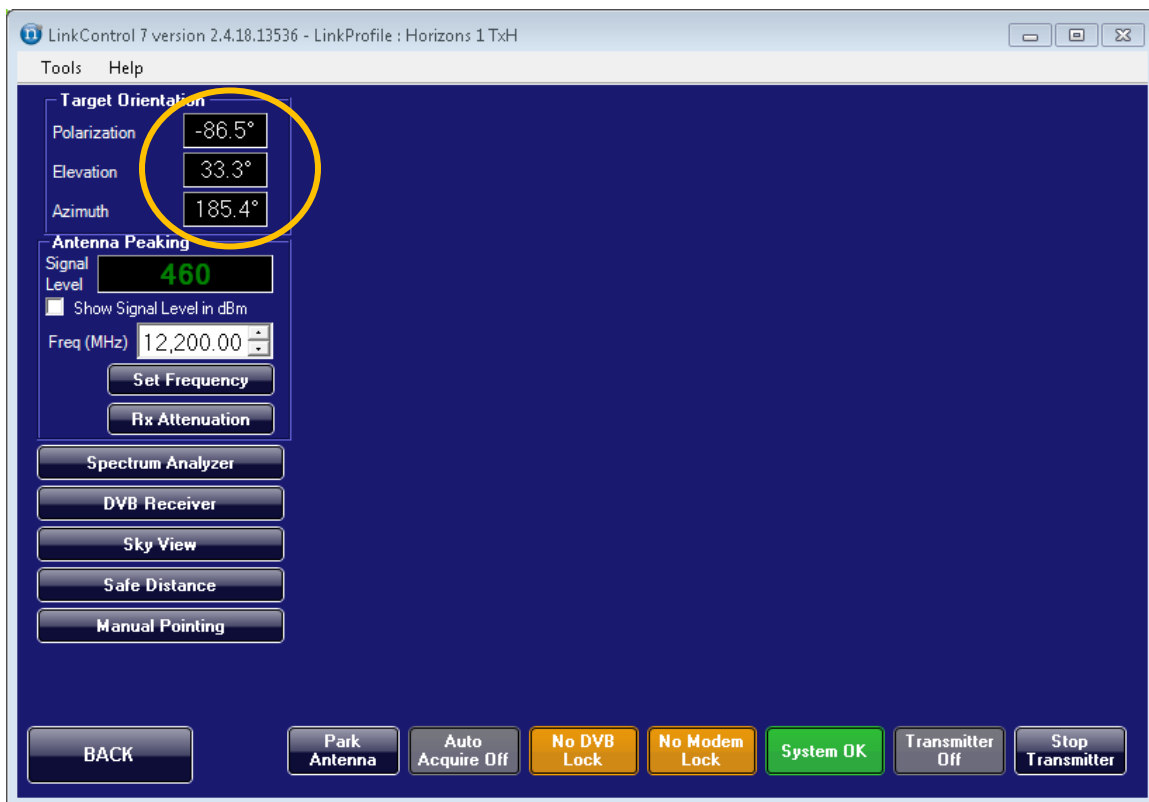


Figure 18: Pointing Calculation

Note: Target Azimuth reports geographical azimuth, not magnetic.

The Pointing tool, selected from the left-hand tool bar, allows the user to determine whether a target satellite can be found in a given location.



Figure 19: Pointing Tool

Location information can be provided manually using the controls at the top left or by clicking on a location on the map. The terminal location may also be obtained from either the GPS Hardware, the active LinkProfile, or from the City Almanac accessed through the **Select City** button. The current GPS data may be viewed using the **View GPS Data** button. One can select different satellites using the **Select Satellite** button.

The terminal's ground location and the orbital position of the target satellite are shown on the map; these indicators are updated automatically as changes are made. The pointing solution is displayed in the top right; on systems with positioning feedback, the current polarization, elevation, and azimuth orientations are also shown for comparison.

3.2 Spectrum Analyzer and Power Meter

The Spectrum Analyzer functions are accessed by clicking on the **Alignment** button in the left-hand tool bar and then clicking on the **Spectrum Analyzer** button. The target orientation indicators and Rx signal level indicator are available to all alignment tools.

The Receiver Spectrum Analyzer analyzes downlink signals being received by the antenna. The Receiver Spectrum Analyzer aids the operator to positively identify the correct satellite. This verification can be achieved by determining if known signals (i.e. satellite beacon frequencies) exist at the expected correct frequency and polarization.

The Signal Level display shows the present RSSI of the center frequency; this is typically used to peak the signal as one adjusts the terminal so that the highest value appears.



Figure 20: Spectrum Analyzer

Note: Beacon frequencies are not unique to each satellite. While a peaked beacon frequency ensures that you are pointing directly at a satellite, it does not guarantee that you are pointed at your *desired* satellite.

The Spectrum Analyzer displays frequency along the x-axis (horizontal) and signal amplitude along the y-axis (vertical).

The following controls are available for the Spectrum Analyzer:

- Center frequency
- Frequency span
- Decibels per division
- Reference level
- Sweep detail
- Signal averaging
- Marker functions (in the wave form window)
- Carrier and Beacon selection list

Manual Control

The center frequency, dB per division, and reference level can all be controlled manually. The user can either enter the desired values or use the scroll arrows to adjust the values by unit(s). The frequency span can also be specified manually by selecting the desired value from the **Freq span (MHz)** pull-down list.

Marker Functions

The marker functions allow the user to measure the amplitude and bandwidth of signals viewed in the spectrum analyzer.

To set a marker:

1. On the Spectrum Analyzer, move the pointer to the spot you wish to mark.
2. Left-click to set Marker 1 (blue arrow).
3. Right-click to set Marker 2 (orange arrow).

To change the Center Frequency:

- Type a new value in the **Center frequency (MHz)** field or use the field's up and down arrows to increase or decrease the value. The center frequency is also set when clicking on a carrier in the Carrier List shown below the spectrum analyzer graph.

Spectrum Analyzer Tips and Tricks

1. Use a broad carrier to peak your dish, since beacons may have insufficient power to register well.
2. The carrier list is trimmed to show only the signals that are available for your present frequency and polarization choice. Use the LinkProfile to move to different frequencies or polarizations.

Recording the Spectrum Analyzer

From the **Tools > Spectrum Analyzer** menu one can record the spectrum. Similarly, saved recordings can be played back. During recording or play back the Operation Mode will indicate if you are recording or playing versus being in a standard mode.

Note: Spectrum Analyzer recording and playback is not supported if the LinkControl client and server are run on different machines.

3.3 DVB Receiver

The DVB Receiver functionality is accessed by clicking on the **Alignment** button in the left-hand tool bar and then clicking on the **DVB Receiver** button. One can select an existing carrier from the list, or manually enter a frequency and symbol rate in the available text boxes.

While sweeping the sky, the panel will display the lock status and signal strength of the lock. This can be used to peak the dish by maximizing the signal strength.

The Signal Lock is echoed on the lower alarm bar, and thus you can set the carrier you are looking for and then move to a different tool while still hunting for the DVB Lock.



Figure 21: DVB Receiver Controls

Video Streaming

Additional controls will be available for terminals that contain a DVB Receiver capable of deciphering the incoming transport stream and separating it into individual programs.

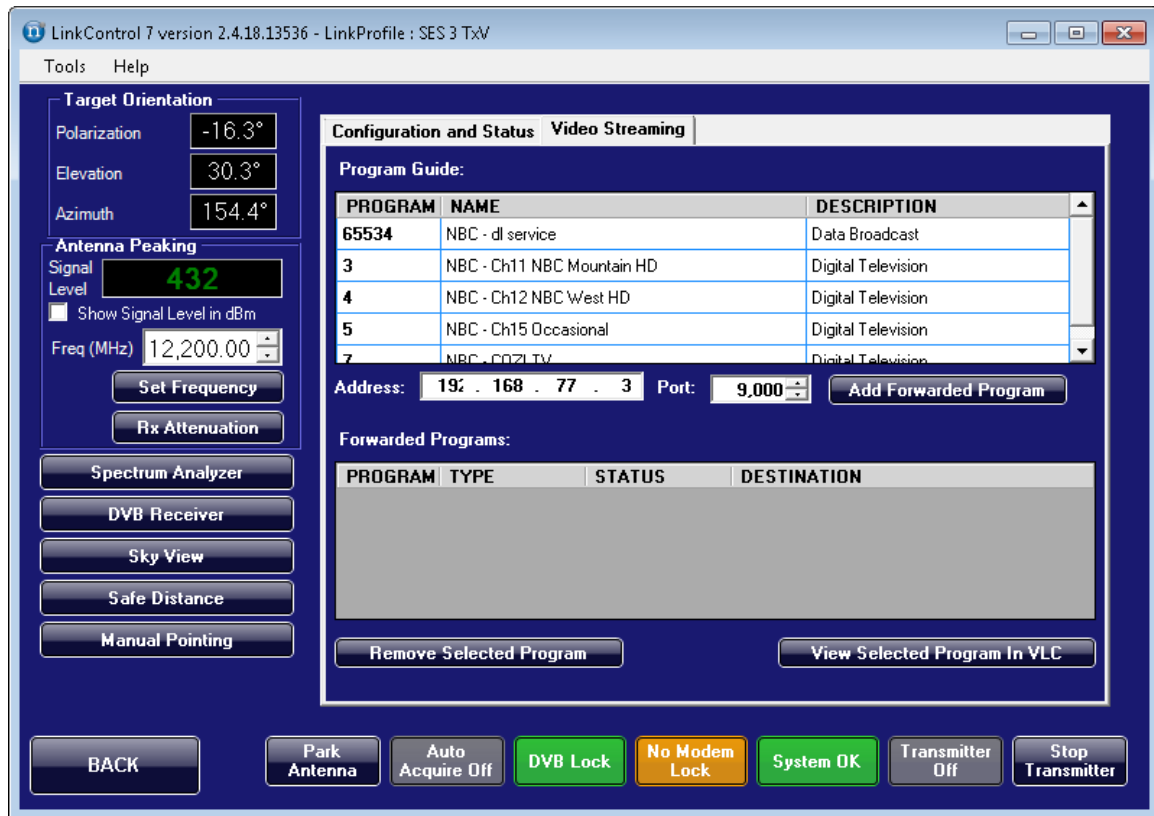


Figure 22: DVB Receiver Video Streaming Controls

Once a DVB Lock has been obtained (by ensuring that the terminal is properly pointed towards the target satellite and that the DVB Receiver's frequency and symbol rate have been set for the target carrier) the transport stream for that carrier will be automatically processed and the stream's Program List will be shown in the **Program Guide** table. Individual programs in the Program Guide table can then be forwarded to a specific IP Address and Port from which they can be streamed using third-party video players like VLC Media Player.

To forward a program, first select the program's entry in the Program Guide. Use the **Address** and **Port** controls to specify the IP Address and Port that the program will be forwarded to. The IP Address specified must match the IP Address of the computer on which the video streaming software has been installed; this may be the terminal itself (in which case the IP Address is typically 192.168.77.3) or any other computer connected to the same local network as the terminal. The Port value should be any unused port on the target computer. If multiple programs are to be forwarded to the same target computer, each program should be forwarded to a unique Port.

Once the Program has been selected in the Program Guide and the IP Address and Port have been specified, press the **Add Forwarded Program** button to initiate the program forwarding. The forwarded program will then show up in the **Forwarded Programs** table.

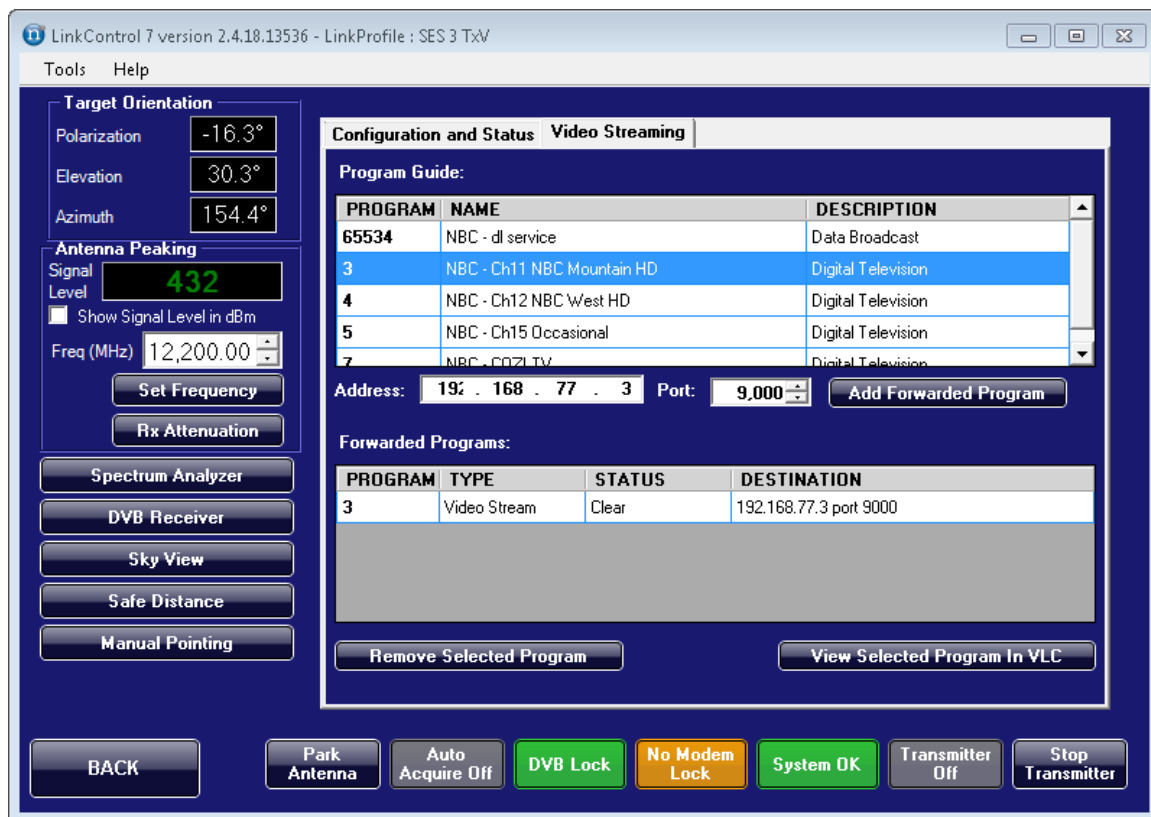


Figure 23: A Forwarded Program

To stop forwarding a program, select its entry in the Forwarded Programs table and then press the **Remove Forwarded Program** button. The program entry will automatically be removed from the table once it is no longer being forwarded.

If the VLC Media Player software has been installed on the terminal, LinkControl will automatically detect the installation and allow forwarded programs to be easily viewed on the terminal's display monitor. Select a forwarded program from the Forwarded Programs table, and then press the **View Selected Program In VLC** button. The VLC software will be launched automatically and will start playing the forwarded program audio and video streams.

The VLC Media Player software is not installed on Norsat terminals by default. A commercial license is required before the software can be used to stream forwarded programs, and must be purchased separately from the VideoLAN website.

More information concerning the VLC Media Player software can be found on the VideoLAN website: <http://www.videolan.org/vlc/index.html>

DVB Receiver Tips and Tricks

1. Many Satellite operators change their DVB Carriers fairly often. Update your almanac regularly to assist in finding satellites.
2. The carrier list is trimmed to show only the signals that are available for your present LNB frequency range and polarization choice. Use the LinkProfile to move to a different frequency range or polarization configuration.
3. Bigger carriers are easier to find.

3.4 Sky View and Clearance Calculation

Two handy tools provided in the **Alignment** tools are the **Safe Distance** view and the **Sky View** panel.

The Safe Distance view provides calculations so that you can estimate safe distances for individuals standing in front of the terminal and clearance for buildings or other objects that may potentially block the terminal's signal.

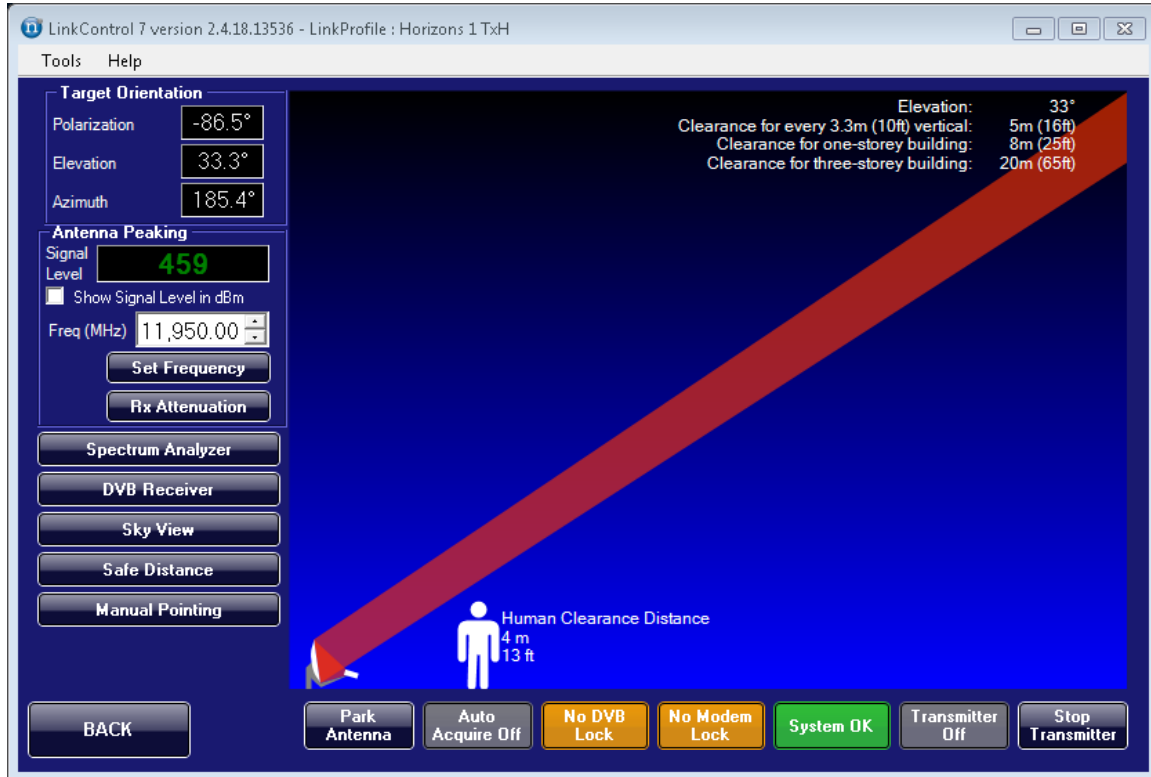


Figure 24: Safe Distance

The Sky View shows what the satellite arc looks like around the target satellite. This may help you understand if you are seeing signals but are not able to lock onto your expected carriers due to interference from adjacent satellites.



Figure 25: Sky View

3.5 Motor Control

GLOBETrekker™ and other motorized platforms have tools that allow a user to directly control and move the reflector. For safety reasons, the motors cannot be engaged while the transmitter is on.

Parking

On motorized platforms, there is a persistent **Park Antenna** button on the lower alarm bar. This will return the reflector to its preset parked position automatically. The **Park Antenna** button will turn green while the parking process is in progress, and will return to its standard appearance once the parking process has completed.



Figure 26: Park Antenna Button

Movement Controls

There are two ways to access the movement controls; the motor panel, or the pop-up interface.

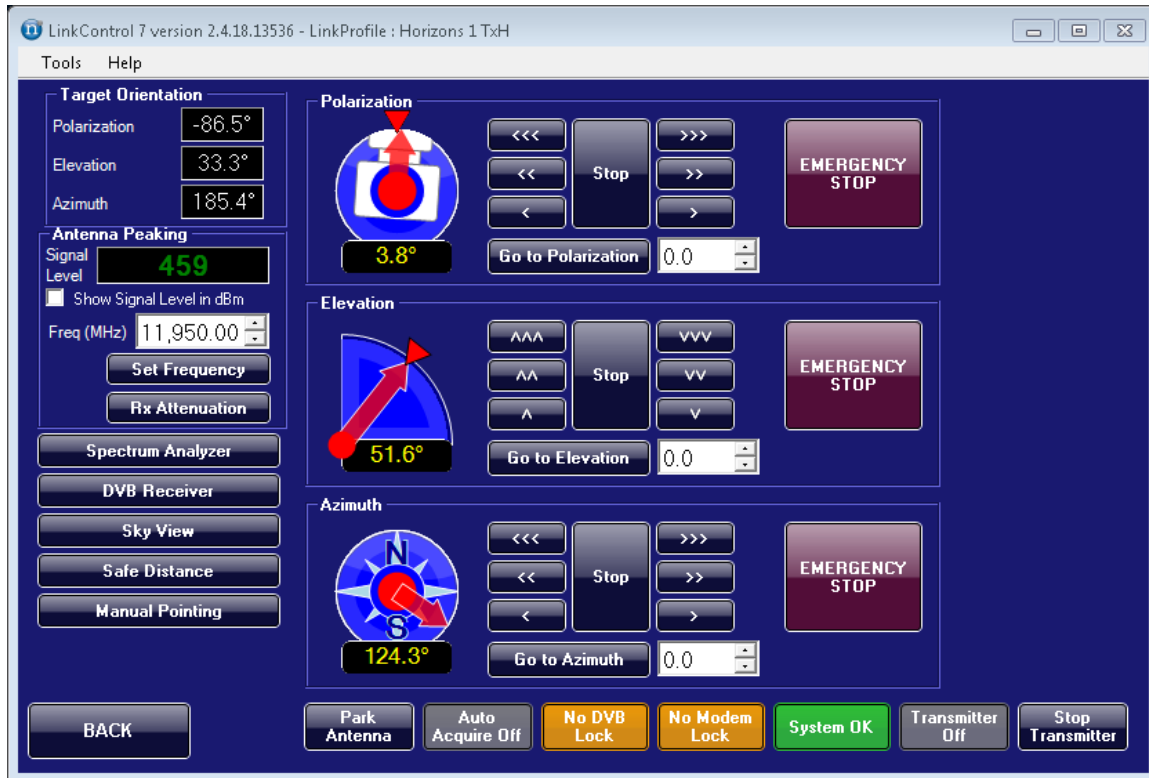


Figure 27: Motor Panel

Note: Azimuth reports geographical azimuth, not magnetic.

Movement can be initiated using the arrow keys (big arrows move to the appropriate axis's motion limit, medium arrows move a short distance, and small arrows move a very short distance) or you can simply type in the target location and use the **Go To Polarization**, **Go To Elevation**, or **Go To Azimuth** buttons to initiate movement to the desired orientation. The **Stop** buttons bring the appropriate motor to a graceful stop, while the **Emergency Stop** buttons immediately and abruptly halt the appropriate motor.

The pop-up interface is used when manually peaking or when tuning the system with smaller movements. You can request the pop-up from **Tools > Motor Control Tools > Manual Pointing**.



Figure 28: Motor Pop-Up Interface

The controls on the pop-up interface are the same as those found in the standard interface (without the Go To Polarization, Go To Elevation, and Go To Azimuth buttons).

Disable Motors

In the event of a critical failure, the motors can be disengaged so that you can operate the various movements by hand. The **Tools > Motor Control Tools > Disable Motors** menu item is a toggle, so you can re-enable the motors after you have moved the unit.

3.6 Transmission Control

Transmission control is available from the main tool bar and allows the user to control the main transmission units. This includes muting and power level monitoring of the BUC and frequency and power control of the modem.

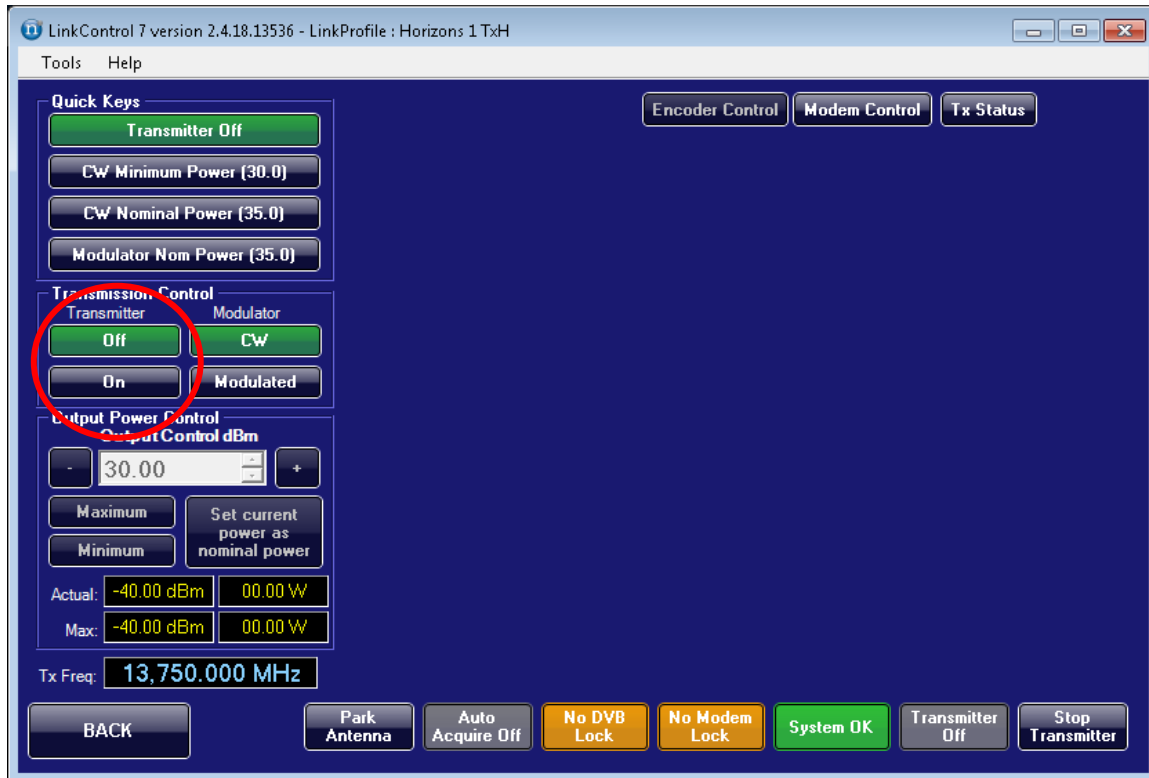


Figure 29: Transmission Control

The BUC mute status is controlled by the transmitter status. When the Transmitter is on, the system is hot, and the alarm panel will indicate that the Transmitter is on.

On hub-controlled modems, the power output is controlled by the network, and thus power data is only informative. Otherwise the power output can be actively controlled in this view. LinkControl uses a closed loop power control and will actively maintain the power in the face of temperature and use cases.

Go to [Modems and Encoders](#) on page 49 to learn about the specific details of your exact modem.

4. Modems and Encoders

This chapter explains how to configure settings for specific types of Modems, Hub-Controlled Modems, and Encoder/Modulators.

4.1 Radyne DMD-1050 SCPC Modem

Modem Interfaces

The Radyne DMD-1050 modem is an SCPC modem with the following features:

RF Interfaces	
Tx Out	950-2050 MHz
Rx In	950-2050 MHz
Modem Type	Radyne DMD-1050
Data Interface	10/100 Base-T Ethernet DB-25 High Speed Serial Interface
Network Topology	SCPC
Modulation	BPSK, QPSK, OQPSK
Data Rates	2.4kbps-10Mbps (20Mbps optional)
Error Control	Viterbi FEC Rates $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, Intelsat Reed-Solomon Outer Codec (optional), Turbo Product Codes

To Start a Network session with your Operator

1. On the **Transmit** tab, click **Modem Control**.
2. Call the Network/Satellite Operator:
 - a. Identify yourself and your location (leave your phone number)
 - b. Indicate that you have scheduled satellite time (leave time, freq.)
 - c. Indicate the purpose of the transmission (example: data transfer)
 - d. Indicate that you are ready to start transmitting on satellite, transponder and frequency slot allocation (example: NSS7, Transponder K18, Slot C)
3. The satellite operator may verify some parameters and ask some questions. Parameters/questions may include:
 - Are you aligned and peaked on the satellite?
 - Modem settings.
 - Confirm Uplink frequency and polarization.

4. When directed by the hub/satellite operator to start transmitting at low power, unmodulated carrier (also known as a CW or continuous wave), click **CW Minimum Power**. The transmitter will now be “on” and the **CW Minimum Power** button will turn green.
5. Wait for further instructions while the operator checks the cross polarization and frequency of the carrier. The operator may instruct you to adjust the transmit power, frequency, polarization, and / or antenna pointing.



Figure 30: Transmit Control showing Modem Control

6. When directed, slowly increase power to operating level and stop.
7. Wait for further instructions while carrier specifications are checked.
8. When directed, modulate the signal and verify the remote end is locked onto the signal.
9. Wait for further instructions while your carrier and bandwidth are checked
10. The satellite operator will verify your phone number and the end time for your uplink. The controller will remind you to call again just before the end of the uplink (Goodnight call).

Verify Modem Settings

In addition to the satellite and frequency settings, you must also ensure that the modem settings match the settings expected by the satellite hub.

You must verify the following settings:

1. Transmit and Receive Data Rates
2. Error Correction Settings
3. Framing Settings
4. Modulation Scheme
5. Terrestrial Interface Type
6. Interleaving
7. Scrambling

Set Modem Parameters

To set Transmit (Tx) and Receive (Rx) parameters for the modem, click the **Edit Modem Settings** button to bring up the Current Radyne Modem Settings window. These settings can also be accessed from the **Radyne Modem** tab when editing a LinkProfile.

1. Enter new **Transmit** and **Receive** frequencies.
2. Select the extra encoding features that your network hub has provided by setting the appropriate fields to the specified values.
3. Click **Apply**, or save the LinkProfile.

Current Radyne Modem Settings

Transmit		Receive	
Tx Frequency (MHz)*:	13,750.000000	Rx Frequency (MHz)*:	11,700.000000
Tx L-Band Freq (MHz) *:	950.000000	Rx L-Band Freq (MHz) *:	950.000000
Network Spec:	Closed Net	Network Spec:	Closed Net
Spectral Mask:	INTELSAT 0.35	Spectral Mask:	INTELSAT 0.35
Modulation *:	QPSK	Demodulation:	QPSK
Data Rate (bps)*:	2048000	Data Rate (bps)*:	2048000
Inner FEC *:	TPC 3/4	Inner FEC *:	TPC 3/4
Differential Encoding:	Disable	Differential Decoding:	Disable
Scrambler Type:	TPC	Descrambler Type:	TPC
Satellite Framing *:	No Framing	Satellite Framing *:	No Framing
Data Polarity:	None	Data Polarity:	None
Reed Solomon:	Disable	Reed Solomon:	Disable
N Value:	219	N Value:	219
K Value:	201	K Value:	201
Interleaver Depth:	8	Interleaver Depth:	8
Terr. Clock Source:	SCTE	Active Buffer Clock:	RxSat
Clock Polarity:	Normal	Sweep Range (kHz):	25
SCT Source:	Internal	Loopback:	None
Terr. Interface Type:	Ethernet		

Apply Close

Figure 31: Radyne Modem Settings

4.2 Comtech CDM-570L L-Band Satellite Modem

Modem Interfaces

The Comtech CDM-570L modem is an SCPC modem with the following features:

RF Interfaces	
Tx Out	950-2000 MHz
Rx In	950-2000 MHz
Modem Type	Comtech CDM-570L
Data Interface	10/100 Base-T Ethernet DB-25 High Speed Serial Interface
Network Topology	SCPC
Modulation	BPSK, QPSK, OQPSK, 8-PSK, 8-QAM, 16-QAM
Data Rates	2.4 kbps – 9.98 Mbps
Error Control	Viterbi FEC Rates $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, Intelsat Reed-Solomon Outer Codec, Trellis Coded Modulation, Turbo Product Coding

To Start a Network session with your Operator

1. On the **Transmit** tab, click **Modem Control**.
2. Call the Network/Satellite Operator:
 - a. Identify yourself and your location (leave your phone number)
 - b. Indicate that you have scheduled satellite time (leave time, freq.)
 - c. Indicate the purpose of the transmission (example: data transfer)
 - d. Indicate that you are ready to start transmitting on satellite, transponder and frequency slot allocation (example: NSS7, Transponder K18, Slot C)
3. The satellite operator may verify some parameters and ask some questions. Parameters/questions may include:
 - Are you aligned and peaked on the satellite?
 - Modem settings.
 - Confirm Uplink frequency and polarization.
4. When directed by the hub/satellite operator to start transmitting at low power, unmodulated carrier (also known as a CW or continuous wave), click **CW Minimum**. The transmitter will now be “on” and **Modulator CW** turns green.
5. Wait for further instructions while the operator checks the cross polarization and frequency of the carrier. The operator may instruct you to adjust the transmit power, frequency, polarization, and / or antenna pointing.

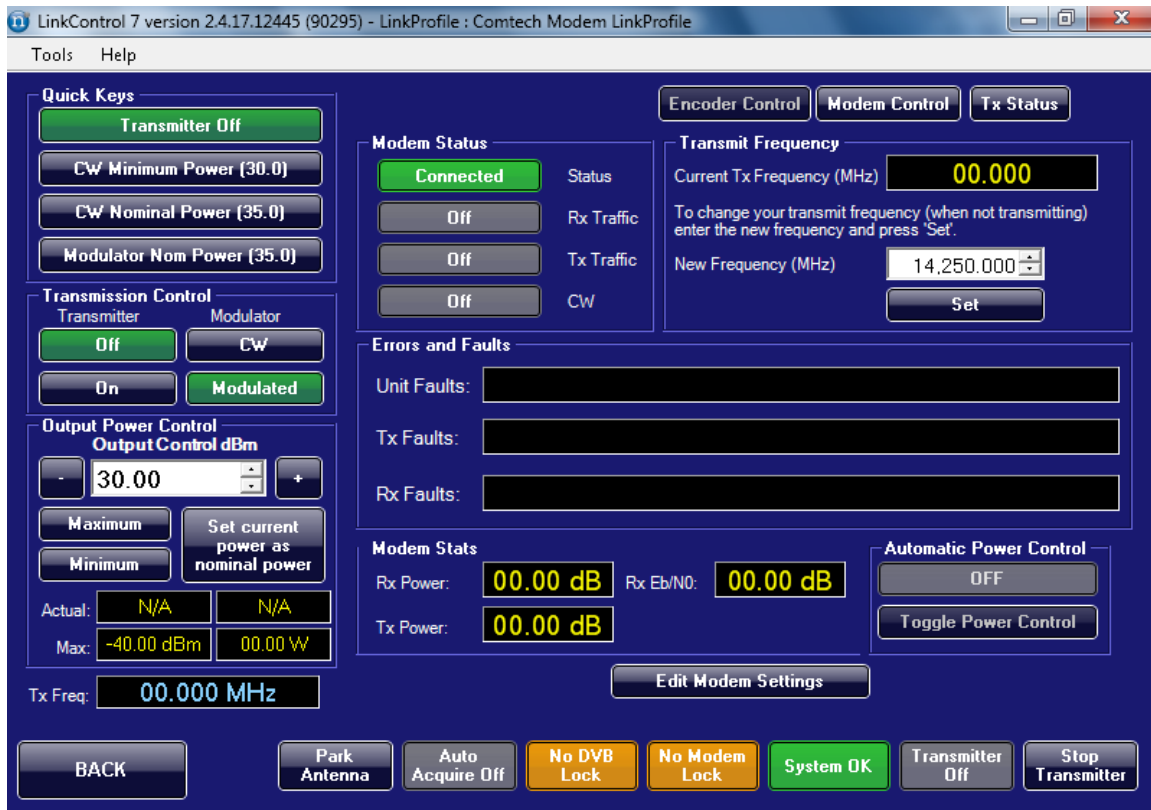


Figure 32: Transmit Control showing Modem Control

6. When directed, slowly increase power to operating level and stop.
7. Wait for further instructions while carrier specifications are checked.
8. When directed, modulate the signal and verify the remote end is locked onto the signal.
9. Wait for further instructions while your carrier and bandwidth is checked
10. The satellite operator will verify your phone number and the end time for your uplink. The controller will remind you to call again just before the end of the uplink (Goodnight call).

Verify Modem Settings

In addition to the satellite and frequency settings, you must also ensure that the modem settings match the settings expected by the satellite hub.

You must verify the following settings:

1. Transmit and Receive Data Rates
2. Error Correction Settings
3. Framing Settings
4. Modulation Scheme
5. Terrestrial Interface Type
6. Interleaving
7. Scrambling

Set Modem Parameters

To set Transmit (Tx) and Receive (Rx) parameters for the modem, click the **Edit Modem Settings** button to bring up the Current Comtech CDM-570L Modem Settings window. These settings can also be accessed from the **Comtech CDM-570L Modem** tab when editing a LinkProfile.

1. Enter new **Transmit** and **Receive** frequencies.
2. Select the extra encoding features that your network hub has provided by setting the appropriate fields to the specified values.
3. Click **Apply**, or save the LinkProfile.

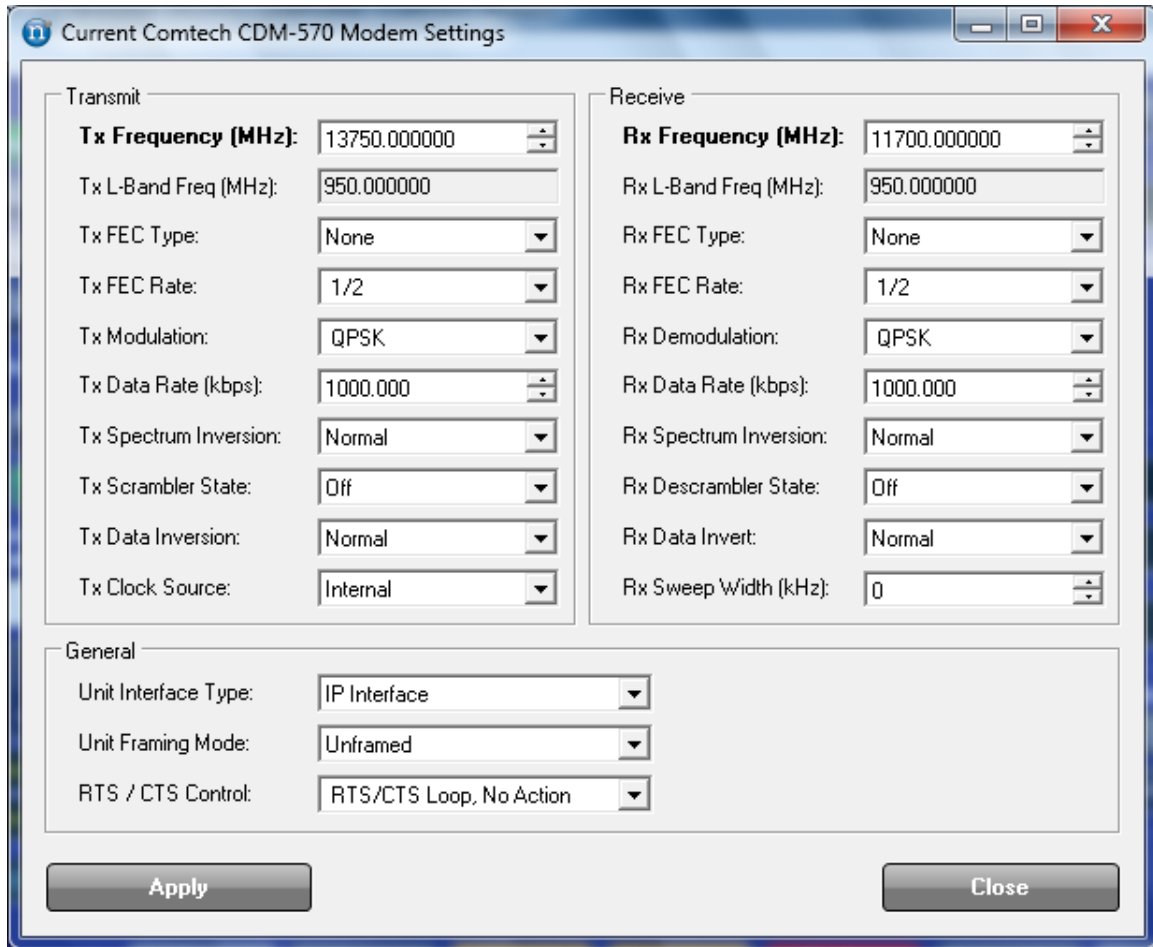


Figure 33: Comtech CDM-570L Modem Settings

4.3 iDirect e8350 Hub-Controlled Modem

Modem Interfaces

The iDirect e8350 modem is a TDMA hub-controlled modem with the following features:

RF Interfaces	
Tx Out	950-2000 MHz
Rx In	950-2000 MHz
Modem Type	iDirect Evolution e8350
Data Interface	10/100 Base-T Ethernet
Network Topology	TDMA
Modulation	BPSK, QPSK, 16APSK
Data Rates	Up to 11.1Mbps (TDMA, Time Division Multiple Access)

Data Interfaces & Modem Implementation

Data connectivity to the modem is provided through the external Ethernet jack located on the Norsat Satellite Terminal

LAN A of the modem is connected to the internal Ethernet switch of the Norsat Satellite Terminal. Users can access LAN A using the “M&C Ethernet” RJ-45 Jack located on the Front Panel (which is also connected to the internal Ethernet switch).

GPS coordinates are provided to the modem through the Console Port by LinkControl; there is no NMEA data provided directly to the Modem.

Call Network Operator to Access Satellite – iDirect Hub-Controlled Modem

Provided the dish is pointed, an options file has been loaded, and the modem has an Rx OK, only the following procedure is necessary:

1. On the **Transmit** tab, click **Modem Control**.
2. Click the **Transmitter On** button. The hub will control the power and modem settings automatically.
3. Contact the satellite operator who will verify your phone number and the end time for your uplink. The controller will remind you to call again just before the end of the uplink (Goodnight call).

If the previous steps do not work it is likely the modem has an incorrect options file. You may need to contact the hub operator and download a new options file.

1. Call the Network Hub/Satellite Operator:
 - a. Identify yourself and your location (leave your phone number)
 - b. Indicate that you have scheduled satellite time (leave time, freq.)
 - c. Indicate the purpose of the transmission (example: data transfer)
 - d. Indicate that you are ready to start transmitting on satellite, transponder and frequency slot allocation (example: NSS7, Transponder K18, Slot C)
2. The satellite operator may verify some parameters and ask some questions. Parameters/ questions may include:
 - Are you aligned and peaked on the satellite?
 - Modem settings.
 - Confirm Uplink frequency and polarization.
3. Once you receive a new options file, upload it to the modem by following the instructions in the “Set Modem Parameters” section below.
4. When directed by the hub/satellite operator to start transmitting, click the **Transmitter On** button. The hub will control the power and other modem settings automatically.
5. Contact the satellite operator who will verify your phone number and the end time for your uplink. The controller will remind you to call again just before the end of the uplink (Goodnight call).

Verify Modem Settings

The iDirect hub-controlled modem configuration is controlled by the option file interface and directly by the hub. You can verify the following settings on the transmit screen.

1. Transmit Frequency
2. Receive Frequency



Figure 34: Transmit Control showing iDirect E8350 Hub-Controlled Modem Control

Set Modem Parameters

To set Transmit (Tx) and Receive (Rx) parameters for the iDirect hub-controlled modem, upload an options file using the interface on the transmit page by clicking “Advanced Modem Settings”. Once on the Advanced iDirect Settings screen, browse for your options file and click “Upload and Reset”.

Note: Uploading an options file can take from 3 to 10 minutes.

Additionally, some versions of LinkControl cannot upload options files if the modem is running firmware version 16.0.3.5 or higher. LinkControl will automatically detect whether it is possible to upload options files to the modem and will enable or disable the Options File Settings controls appropriately.

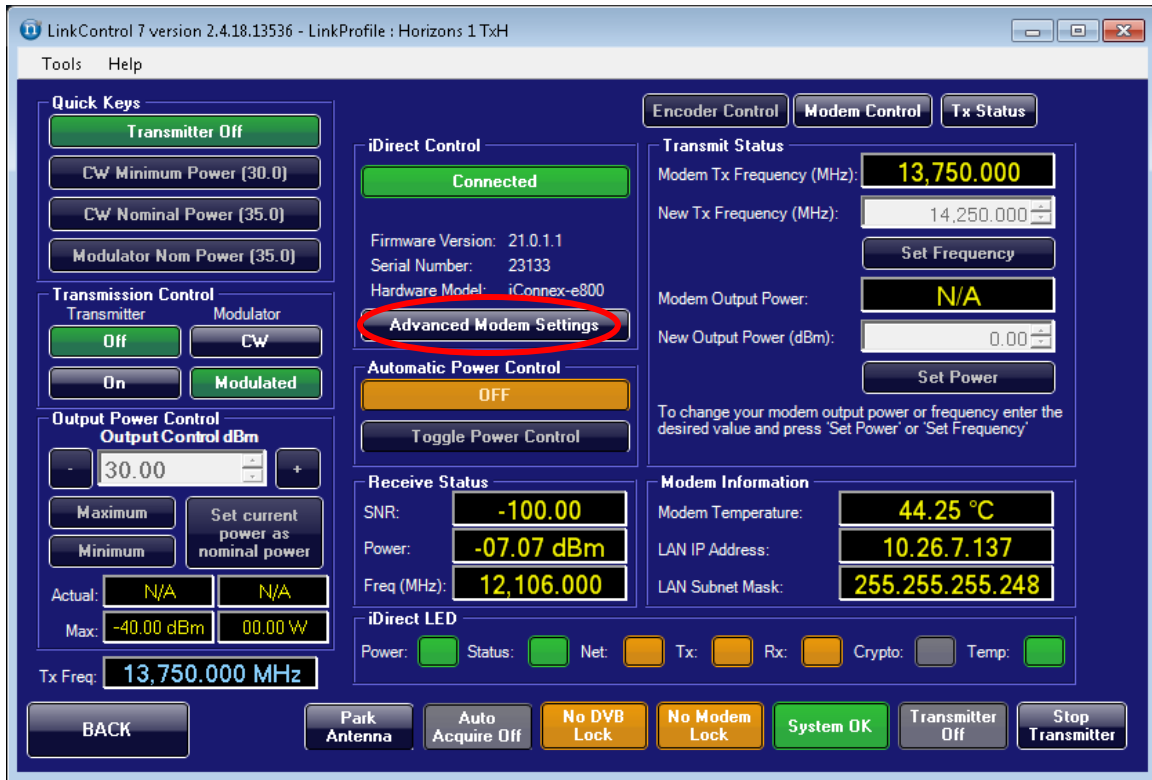


Figure 35: Advanced Modem Settings Button

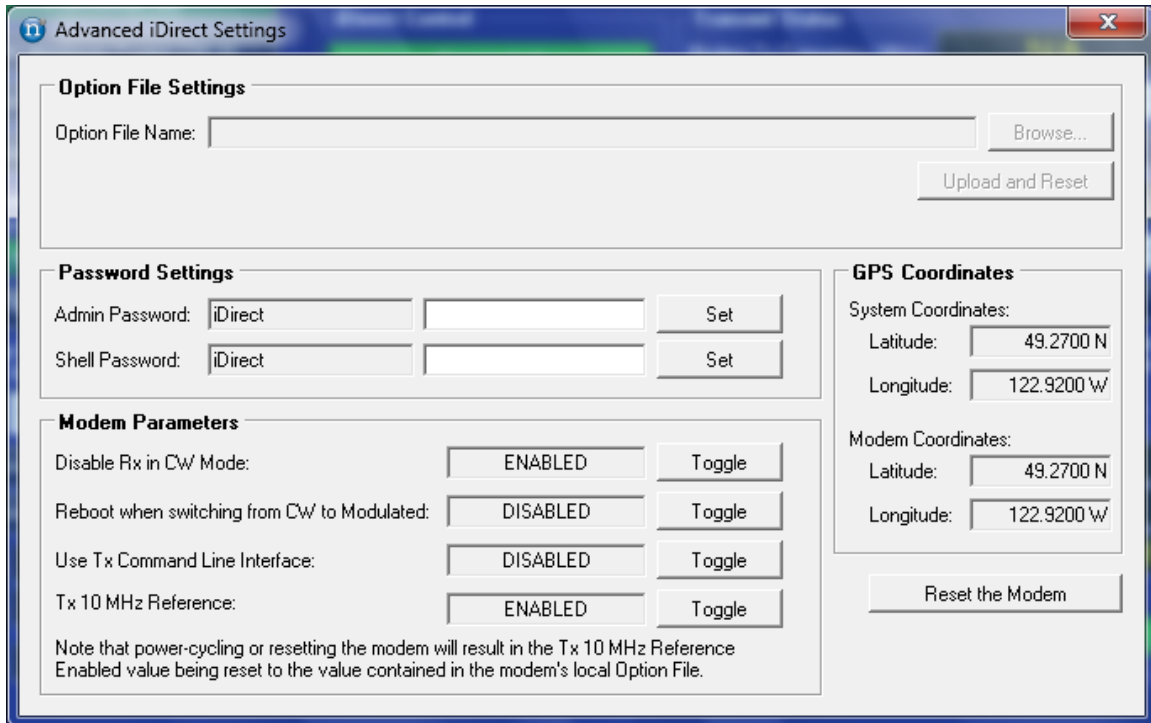


Figure 36: iDirect E8350 Advanced Modem Settings

The Advanced iDirect Settings screen also provides the following setting features:

- Change the passwords used by LinkControl to log in to the modem
- Disable the RX interface in CW Mode
- Configure whether the modem is rebooted when switching from CW to Modulated
- Toggle whether to use the TX Command Line Interface
- Enable or disable the modem's Tx 10 MHz reference signal
- Reset the modem button.

In addition, the screen displays the current system GPS coordinates (as determined by the GPS hardware if a GPS lock has been obtained, or by the LinkProfile if no GPS lock has been obtained) and the most recent GPS coordinates that have been passed to the modem. The system's GPS coordinates will be periodically passed to the modem automatically by LinkControl when the modem is in Mobile Mode.

Note: As indicated by the Advanced iDirect Settings screen, the Tx 10 MHz reference signal will be enabled or disabled as determined by the appropriate setting in the modem's option file if the modem is reset or power-cycled.

4.4 Hughes HX200 Hub-Controlled Modem

Modem Interfaces

The HX200 is a hub-controlled modem operating with DVB and OFDMA technology.

RF Interfaces	
Tx Out	950-2000 MHz
Rx In	950-2000 MHz
Modem Type	Hughes HX-200
Data Interface	10/100 Base-T Ethernet
Network Topology	Star
DVB-S2 ACM Channel	DVB-S2 with Adaptive Coding and Modulation or DVB-S
DVB-S2 ACM Rate	1–45 Msps (in 0.5 Msps steps)
DVB-S2 ACM Modulation	QPSK, 8PSK, 16APSK (Adaptive Modulation)
DVB-S2 ACM Coding	BCH with LDPC 3/5, 1/2, 2/3, 3/4, 5/6, 8/9, 9/10 (Adaptive Coding)
FDMA/TDMA (IPoS) Channel Rate	256 to 6144 ksps (256 kbps to 9.8 Mbps)
FDMA/TDMA (IPoS) Channel Modulation	OQPSK
FDMA/TDMA (IPoS) Channel Coding Rate	1/2, 2/3, 4/5 with TurboCode (Adaptive Coding)
Bit Error Rate (Receive)	10^{-10} or better
Bit Error Rate (Transmit)	10^{-7} or better

Data Interfaces & Modem Implementation

Data connectivity to the modem is provided through the external Ethernet jack located on the Norsat Satellite Terminal.

LAN A of the modem is connected to the internal Ethernet switch of the Norsat Satellite Terminal. Users can access LAN A using the “M&C Ethernet” RJ-45 Jack located on the Front Panel (which is also connected to the internal Ethernet switch).

GPS coordinates are provided to the modem through the Console Port by LinkControl; there is no NMEA data provided directly to the Modem.

Status information is available in the Transmit window.



Figure 37: Transmit Control showing HX200 Control

During the creation of the LinkProfile, the Receive parameters should be populated. While the modem will lock using the commissioning values to achieve and report lock, the LinkProfile entry will allow easy use of the Spectrum Analyzer.



Figure 38: HX200 Settings

Modem Commissioning

The HX200 must be commissioned with a NOC in order to operate fully. When shipped the modem is partially commissioned but the commissioning process must be completed with the airtime vendor.

Norsat has provisioned a configuration file on the modem that includes specific features that will assist your NOC in commissioning the modem. Of course, a Hughes NOC operator may elect to use different data based on their expert knowledge of the local network.

- Receive Radio Parameters			
Receive LNB Type	Norsat1000XU_UL	LNB 22KHz Switch	Off <input type="checkbox"/> LNB 10 MHz On <input checked="" type="checkbox"/>
LO Freq (MHz)	9750	Sweeping Range (KHz)	0
Band Lower Edge (MHz)	10700	Band Upper Edge (MHz)	11700

- Transmit Radio Parameters			
<input type="radio"/> Saturated Radio <input checked="" type="radio"/> Linear Radio			
Enable Spreading?	<input type="checkbox"/>		
	Wavestream_40W_E		
Use External 10 MHz Signal?	<input type="checkbox"/>		
Transmitter 10 MHz Off?	<input type="checkbox"/>		
Minimum Attenuation (dB):	0.0		
Ranging Initial Attenuation (dB):	<input type="text"/> ?		
LO Frequency (MHz)	12800	Band Lower Edge (MHz)	13750
		Band Upper Edge (MHz)	14500
Radio Wattage (W)	40	Total Gain (dB)	70
		1 db G.C.P(dB)	46

Save Configuration **Cancel**

Figure 39: Commissioning Interface

4.5 HD/SD MPEG-4/MPEG-2 Encoder/Modulator

Encoder/Modulator Interfaces

The HD/SD MPEG-4/MPEG-2 Encoder/Modulator provides the following features:

RF Interfaces	
Tx Out	950-2000 MHz
Symbol rate	1 MS/s to 30 MS/s
Modulation Schemes and reference standards	DVB-S: QPSK, 8PSK, 16QAM DVB-S2: QPSK, 8PSK, 16APSK, 32APSK
Roll-off	20%, 25%, or 35%
Maximum bit rate	Up to 15 Mbps for MPEG-2, or 25 Mbps for MPEG-4

Audio Video Interfaces – MPEG-4	
Video Inputs	Digital SDI/HD-SDI with embedded or separate analog audio (Standard Definition only), or composite analog PAL/SECAM/NTSC
Video Encoding	ISO/IEC 14496-10 (H.264/AVC) Main Profile Level 3.0 and High Profile Level 4.0
Video Bit Rate	2 Mbps to 24 Mbps
Supported Resolutions	1920 x 1080 x 60i/50i/24p 1440 x 1080 x 60i/50i/24p 1280 x 720 x 60p/50p/24p 720 x 480 x 60i 720 x 576 x 50i
Audio Input format	Analog: Two channels (one pair) - mono, stereo, dual, joint stereo Digital SDI/HD-SDI with embedded audio or with analog audio input
Audio Sampling Frequency	32KHz, 44.1KHz, 48KHz
Audio Encoding Standard	ISO / IEC11172-3 (MPEG-1 audio) layer 2 - compliant
Audio Bit Rate	Up to 384 kbps

Audio Video Interfaces – MPEG-2	
Video Inputs	Digital SDI with embedded or separate analog audio, or composite analog PAL/SECAM/NTSC
Video Encoding	ISO / IEC 13818-2 MP@ML (MPEG-2 4:2:0)
Video Bit Rate	2 Mbps to 24 Mbps
Supported Resolutions	Full D1, 3/4 D1, 2/3 D1, 1/2 D1, SIF, QSIF

Picture Size:	Horizontal: up to 720 pixel in 32 pixel steps. Vertical: PAL - up to 576 pixel - NTSC - up to 480 pixel (in 32 pixel steps)
Audio Input format	Analog: Two channels (one pair) - mono, stereo, dual, joint stereo Digital SDI with embedded audio or with analog audio input
Audio Sampling Frequency	32KHz, 44.1KHz, 48KHz
Audio Encoding Standard	ISO / IEC11172-3 (MPEG-1 audio) layer 2 - compliant
Audio Bit Rate	Up to 384 kbps

Verify Encoder/Modulator Settings

In addition to the satellite and frequency settings, you must also ensure that the encoder/modulator settings match the settings expected by the satellite hub prior to calling your network/satellite operator.

You must verify the following settings:

1. Symbol Rate
2. FEC Rate
3. Modulation Scheme

Set Encoder/Modulator Parameters

To set Modulator, Multiplexer, Encoder, Audio, and Video parameters for the encoder/modulator, click the **Edit Encoder Modulator Settings** button to bring up the Current HD/SD Encoder/Modulator Settings window. These settings can also be accessed from the **HD/SD Encoder** tab when editing a LinkProfile.

1. Enter a new Tx Frequency, Symbol Rate, FEC Rate, and/or Modulation Scheme as necessary.
2. Ensure that the Multiplexer, Encoder, Audio, and Video parameters are set correctly.
3. Click **Apply**, or save the LinkProfile and then click the **Apply** button on the LinkProfile page to apply its settings to the system.

Note: The Encoder Bitrate is automatically set based on the audio, video, and modulator settings. This parameter cannot be set manually.

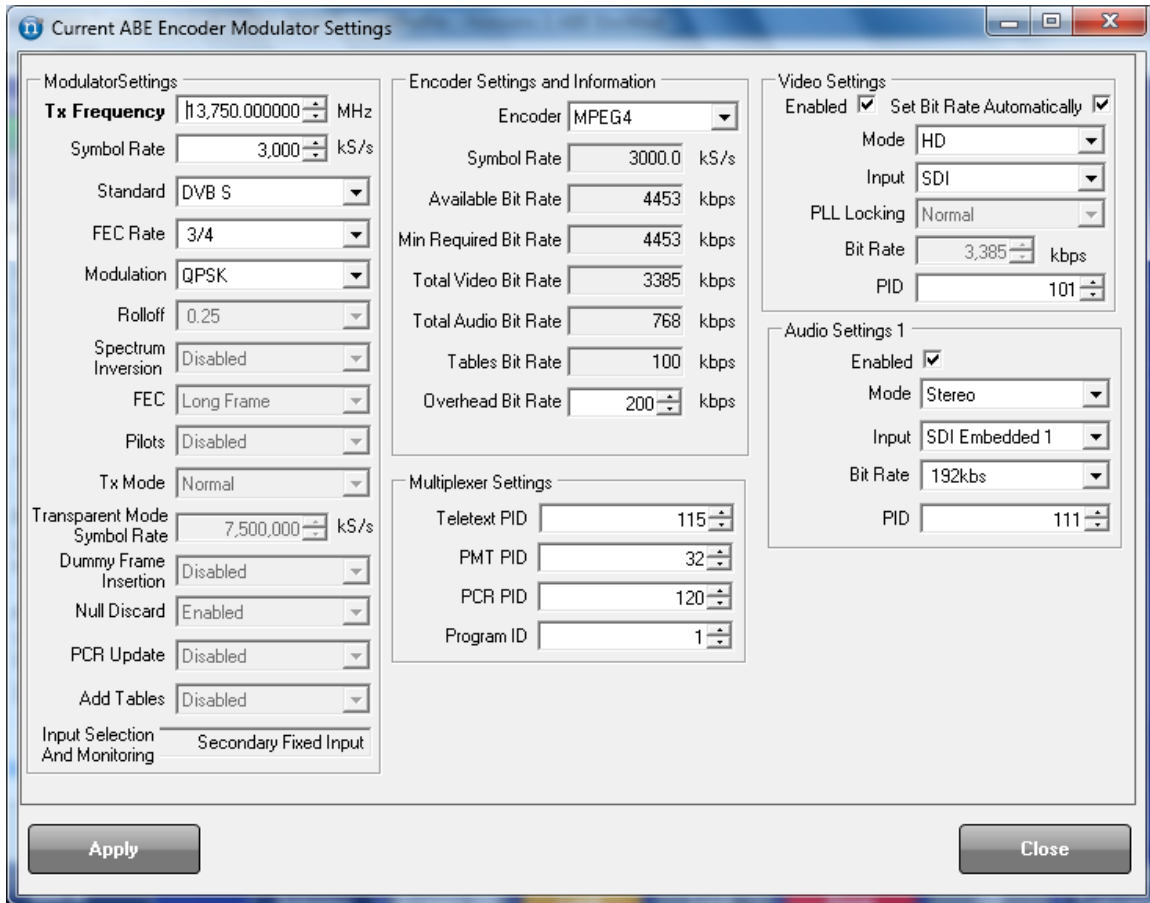


Figure 40: HD/SD MPEG-4/MPEG-2 Encoder/Modulator Settings

To Start a Network session with your Operator:

1. On the **Transmit** tab, click **Encoder Control**.
2. Call the Network/Satellite Operator:
 - a. Identify yourself and your location (leave your phone number)
 - b. Indicate that you have scheduled satellite time (leave time, freq.)
 - c. Indicate the purpose of the transmission (example: data transfer)
 - d. Indicate that you are ready to start transmitting on satellite, transponder and frequency slot allocation (example: NSS7, Transponder K18, Slot C)
3. The satellite operator may verify some parameters and ask some questions. Parameters/questions may include:
 - Are you aligned and peaked on the satellite?
 - Modulator settings.
 - Confirm Uplink frequency and polarization.

4. When directed by the hub/satellite operator to start transmitting at low power, unmodulated carrier (also known as a CW or continuous wave), click **CW Minimum**. The transmitter will now be “on” and **Modulator CW** turns green.
5. Wait for further instructions while the operator checks the cross polarization and frequency of the carrier. The operator may instruct you to adjust the transmit power, frequency, polarization, and / or antenna pointing.



Figure 41: Transmit Control showing Encoder/Modulator Control

6. When directed, slowly increase power to operating level and stop.
7. Wait for further instructions while carrier specifications are checked.
8. When directed, modulate the signal and verify the remote end is locked onto the signal.
9. Wait for further instructions while your carrier and bandwidth is checked
10. The satellite operator will verify your phone number and the end time for your uplink. The controller will remind you to call again just before the end of the uplink (Goodnight call).

4.6 Gilat SkyEdge II Pro Hub-Controlled Modem

Modem Interfaces

The SkyEdge II Pro is a hub-controlled modem operating with DVB-S2 ACM and ICM technology.

RF Interfaces	
Tx Out	950-1700 MHz
Rx In	950-1700 MHz
Modem Type	Gilat SkyEdge II Pro
Data Interface	10/100 Base-T Ethernet
DVB-S2 ACM Channel	DVB-S2 with Adaptive Coding and Modulation
DVB-S2 ACM Rate	256 Ksps – 45 Msps (in 1 Ksps steps)
DVB-S2 ACM Modulation	QPSK, 8PSK, 16APSK, 32ASPK
DVB-S2 ACM Coding	BCH with LDPC 1/4, 1/3, 2/5, 3/5, 1/2, 2/3, 3/4, 5/6, 8/9, 9/10
MF-TDMA Channel Rate	128 Ksps – 2.56 Msps
MF-TDMA Channel Modulation	QPSK, 8PSK
MF-TDMA Channel Coding Rate	1/2, 2/3, 3/4, 4/5, 6/7 with TurboCode

Data Interfaces & Modem Implementation

Data connectivity to the modem is provided through the external Ethernet jack located on the Norsat Satellite Terminal

LAN 1 of the modem is connected to the internal Ethernet switch of the Norsat Satellite Terminal. Users can access LAN 1 using the “M&C Ethernet” RJ-45 Jack located on the Front Panel (which is also connected to the internal Ethernet switch).

GPS coordinates are provided to the modem through the Console Port by LinkControl; there is no NMEA data provided directly to the Modem.

Status information is available in the Transmit window.

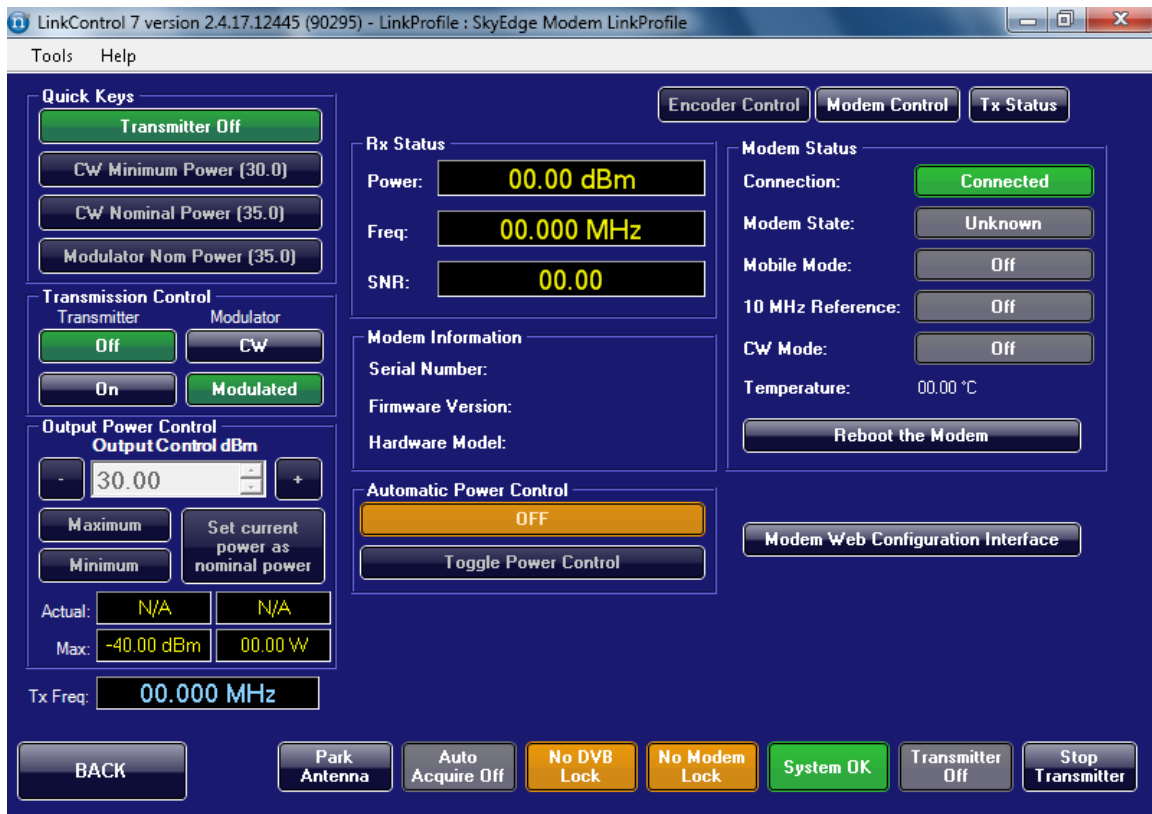
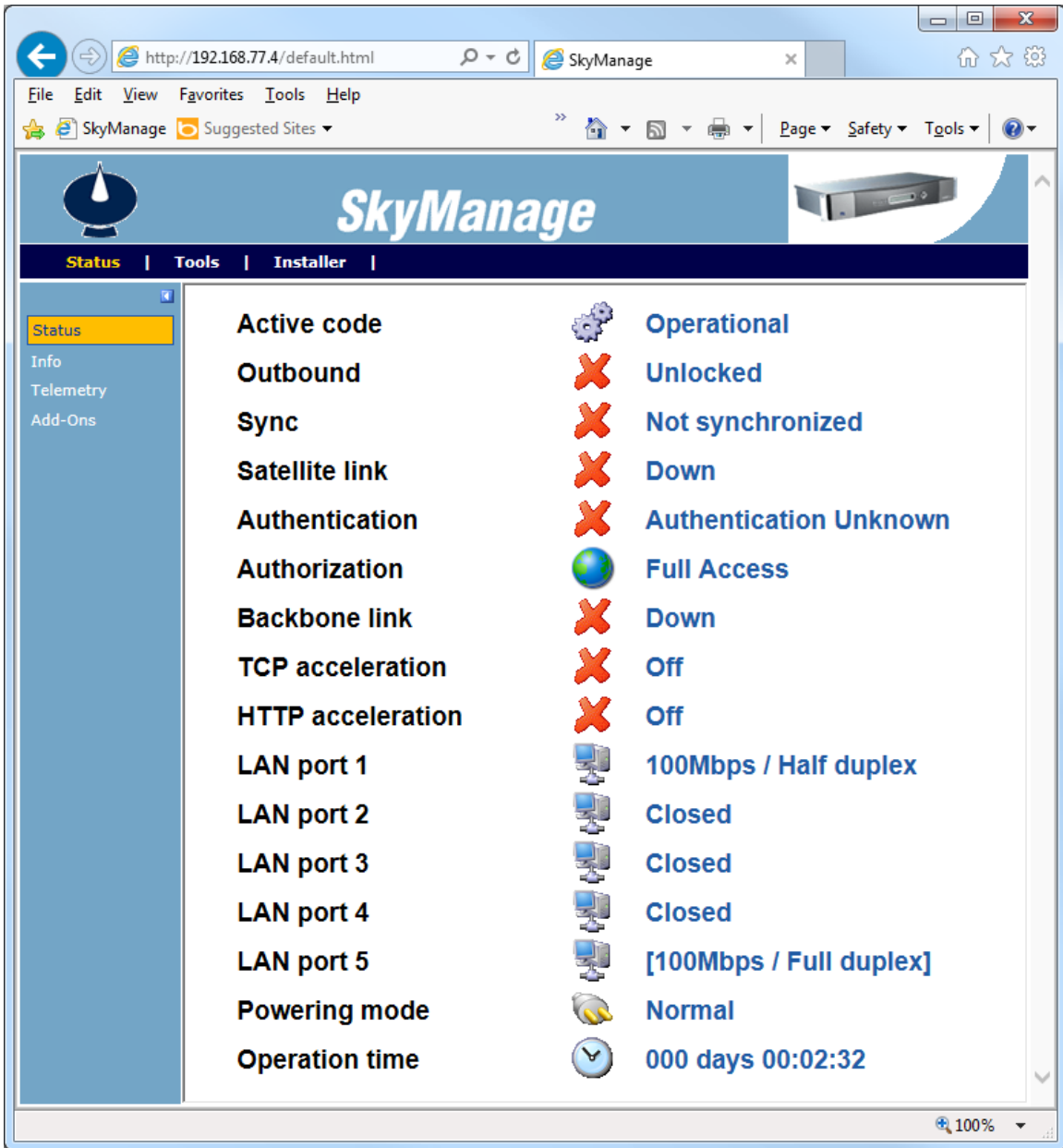


Figure 42: Transmit Control showing SkyEdge II Control

No control is provided through this interface aside from the ability to reboot the modem. Status information, including the Rx Output Power, Rx Frequency, and Rx Signal-to-Noise Ratio, is automatically updated continually. Modem control is provided exclusively through the modem's web configuration interface, which can be displayed by clicking on the **Modem Web Configuration Interface** button. Please consult the Gilat SE II VSAT Installation and Configuration Manual for web interface control details.

The modem's web configuration interface may also be accessed directly using a web browser. By default, the configuration interface can be reached at the following URL:

<http://192.168.77.4>



[Figure 43: SkyEdge II Pro Web Configuration Interface](#)

The web configuration interface can be used to change the IP Address that is used to access the web configuration interface. If this IP Address is changed, then the IP Address saved in LinkControl's configuration information for the modem must also be updated so that the **Modem Web Configuration Interface** button uses the correct IP Address.

4.7 Unmanaged Modem

While the preceding sections describe how to configure LinkControl for use with a managed modem (i.e. a modem directly controlled by LinkControl), it is also possible to configure LinkControl for use in systems where the modem is controlled using an external control interface (like separate control software or a web-based interface running on the modem itself). This section describes how to set up LinkProfiles for use with unmanaged modems.

There are three important settings to configure when setting up a LinkProfile for use with an unmanaged modem. First, the Tx Device and Rx Device must be set to Unmanaged Modem.

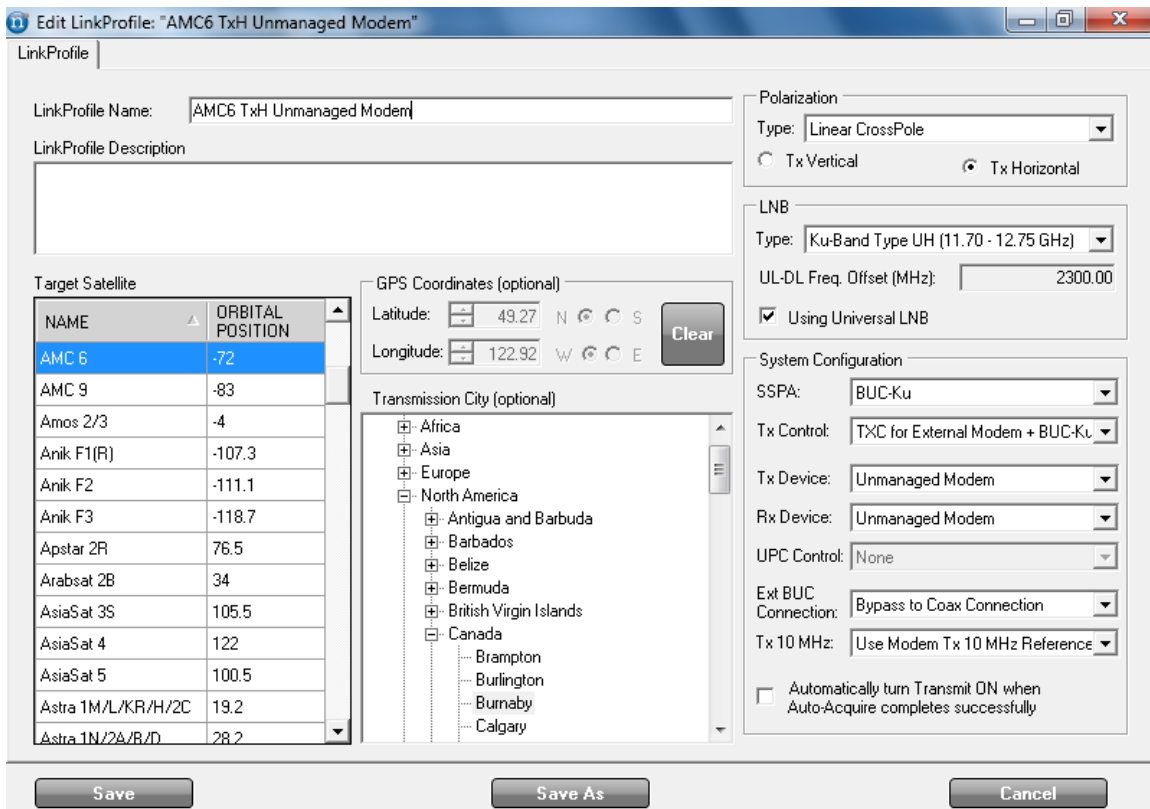


Figure 44: Setting the Tx Device and Rx Device to Unmanaged Modem

Second, the transmission control settings for the external modem may not be the same as for the internal modem. If your system has been configured with more than one Transmission Control settings package, ensure that the correct Tx Control is specified.

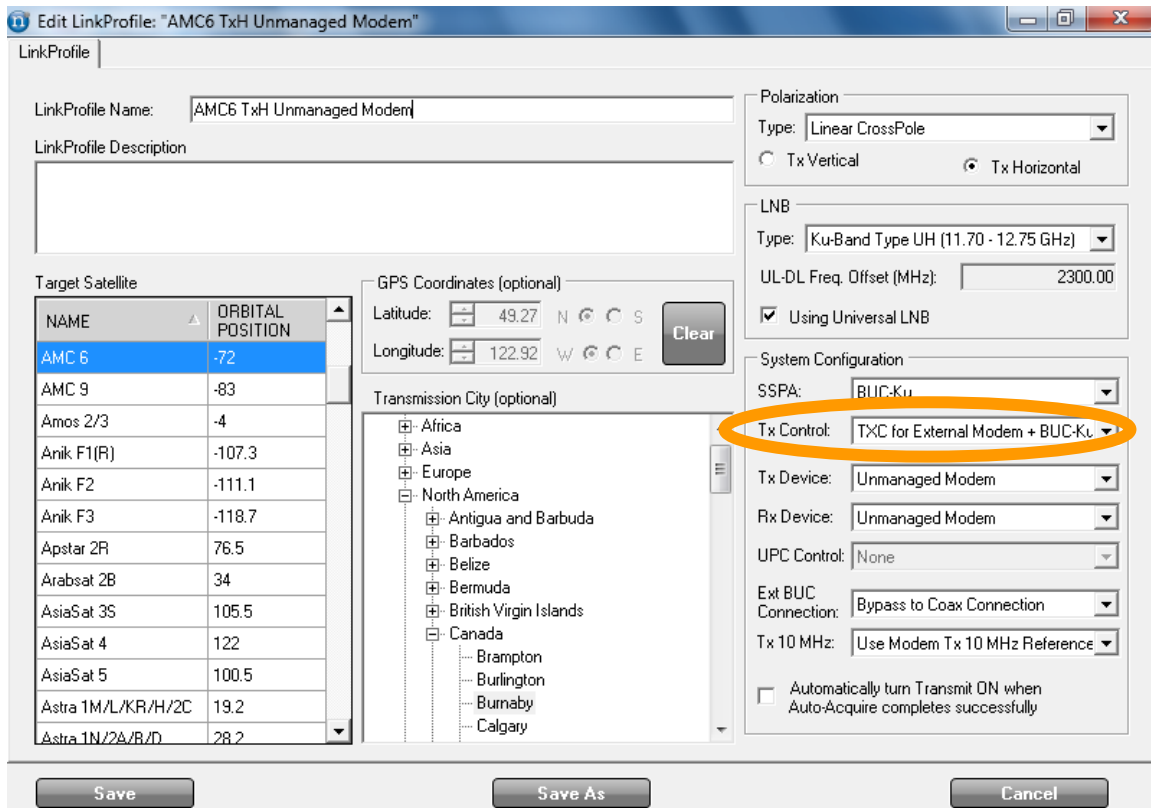


Figure 45: Setting the Tx Control

Lastly, you may need to specify the Tx 10 MHz Reference Signal Source. While the BUC requires a 10 MHz reference in order to transmit, not all systems require this to be specified; the Tx 10 MHz pull-down list will be disabled or not present for systems that do not require the Tx 10 MHz Reference Signal Source to be specified. For those systems that do require that it be specified, the possible values are as follows:

- Use Modem Tx 10 MHz Reference: Use this with an internal Managed Modem
- Use Internal 10 MHz Reference: Use this with an external Unmanaged Modem that does not supply a 10 MHz reference signal
- No 10 MHz Reference (Disabled): Use this with an external Unmanaged Modem that supplies a 10 MHz reference signal

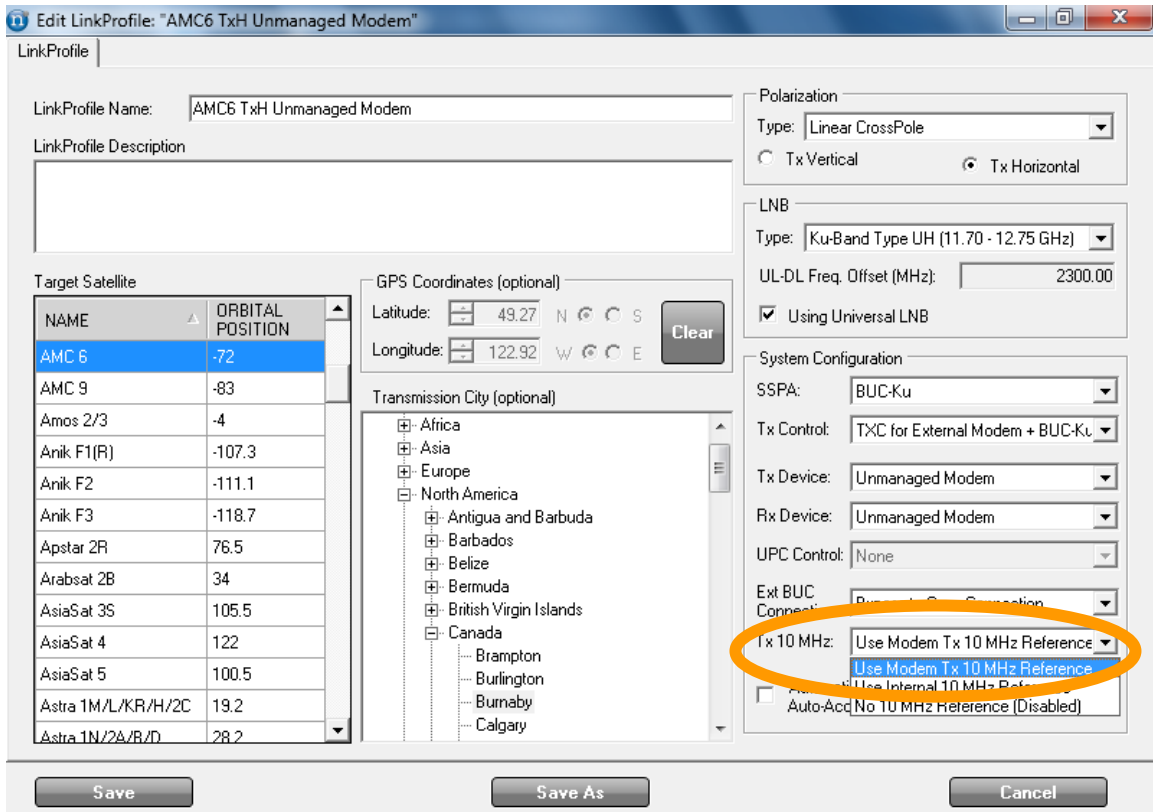


Figure 46: Setting the Tx 10 MHz Reference Signal Source

Note: Most BUCs require a 10 MHz reference signal to be provided to them in order to enable transmission. Don't forget to set the Tx 10 MHz Source in the LinkProfile!

The controls shown on the Transmit page are also different for unmanaged modems. Only controls for monitoring, muting, and unmuting the BUC/SSPA are available.

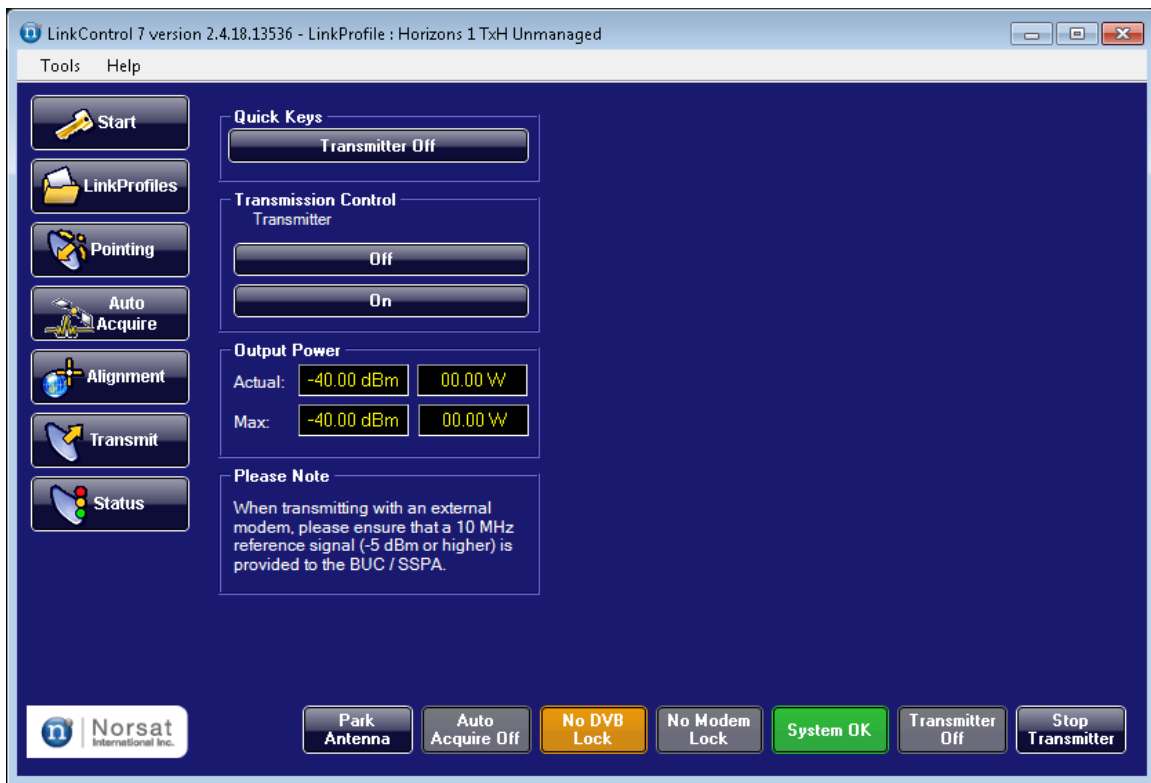


Figure 47: Transmit Page for Unmanaged Modems

5. Advanced Features

This chapter provides information and instructions concerning advanced tasks that are not usually part of basic operation.

5.1 Remote Desktop

Norsat terminals may be controlled remotely through the use of the Remote Desktop application included with Microsoft® Windows®. This application allows a remote computer's desktop to be visible in a local window so that the remote computer can be used as if it were a local computer.

Three pieces of information are required to connect to a remote computer through Remote Desktop: the remote computer's IP Address, the user name to log in with, and the password to log in with. All Norsat terminals are configured to use the same IP Address and login credentials by default.

The settings required to use Remote Desktop are:

IP Address: 192.168.77.3
User Name: Administrator
Password: norsat

To establish a Remote Desktop connection, begin by launching the Remote Desktop application from the Windows ® Start Menu. It is typically found in the Accessories group, sometimes in a Communication subgroup.

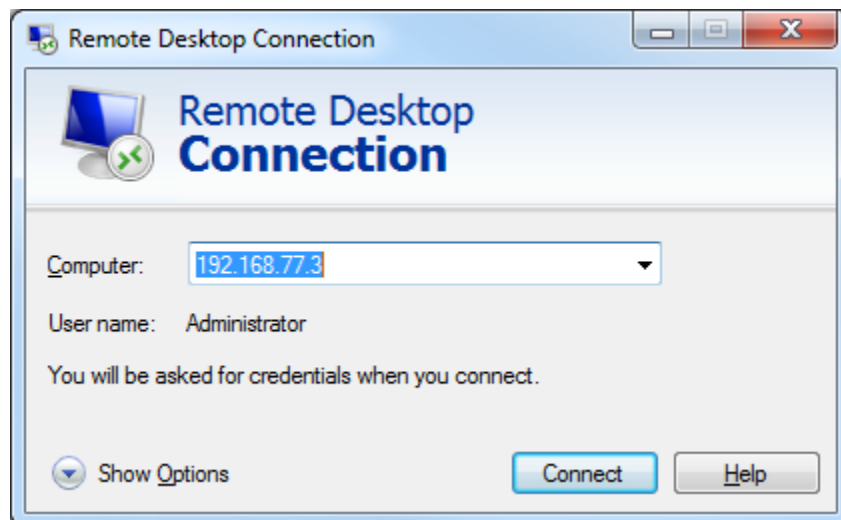


Figure 48: Remote Desktop Initial Screen

Click on the **Show Options** button to bring up the Remote Desktop configuration options.

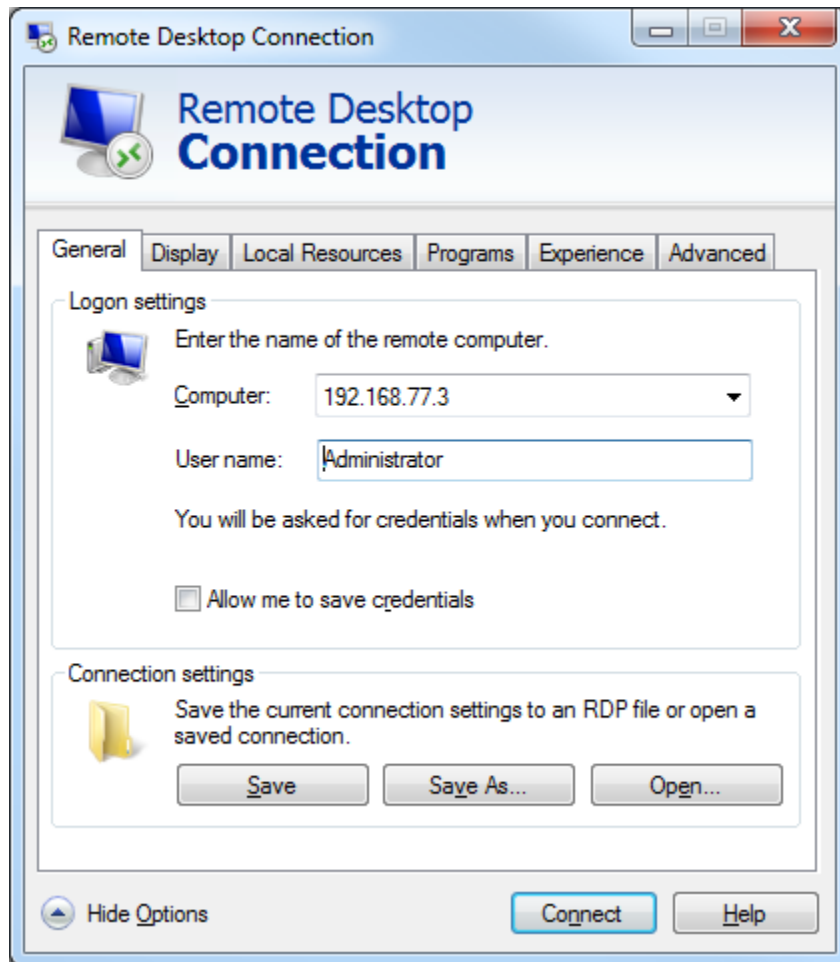


Figure 49: Remote Desktop Configuration Options

As shown in Figure 49 above, enter the remote computer's IP Address in the **Computer** field and the user name to log in with in the **User Name** field.

Click on the **Connect** button to initiate the connection.

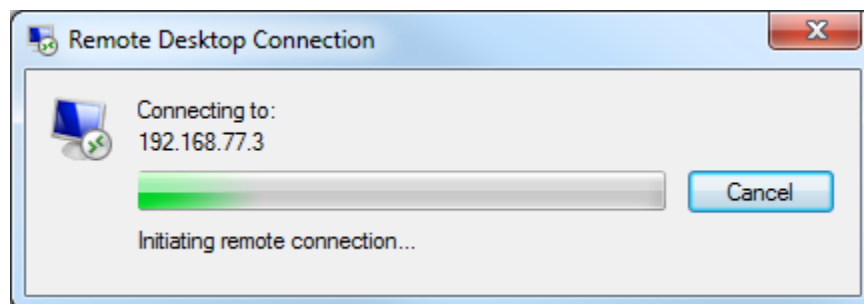


Figure 50: Remote Desktop Connection Initiation

Once the connection has been established, you will be prompted for a password:

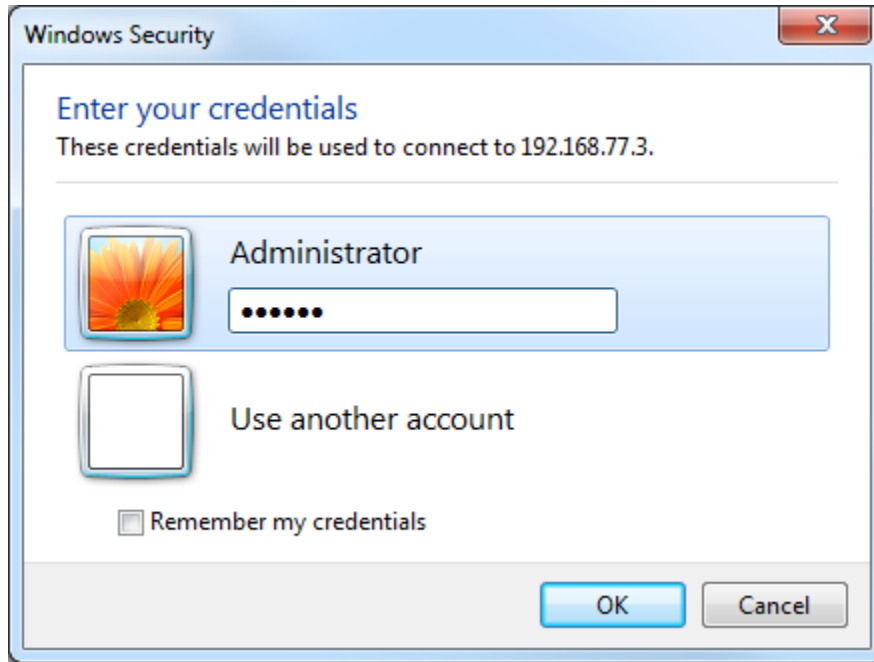


Figure 51: Remote Desktop Password Entry

Enter the password in the supplied field and then click on the **OK** button to complete the Remote Desktop login process.

Note that if the login process displays a screen indicating that the identity of the remote computer cannot be verified, press the **Yes** button to proceed with the Remote Desktop session.

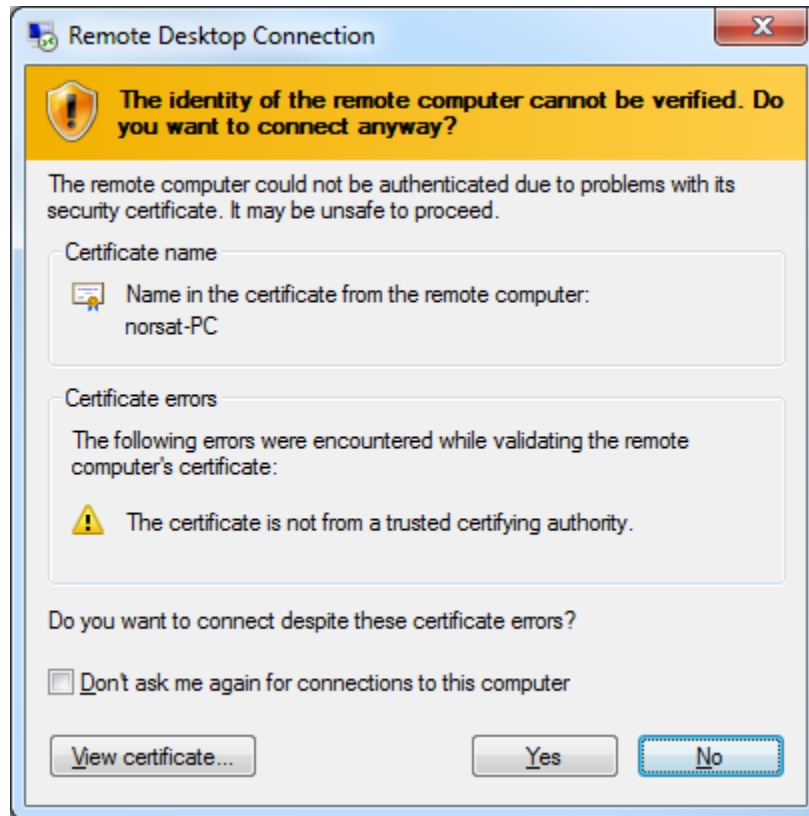


Figure 52: Remote Desktop Identity Verification Alert

The remote computer's desktop will be shown in a window on your local computer's desktop. To end the Remote Desktop session, simply close the Remote Desktop window.

5.2 Compass Calibration

Because the compass contained within the satellite terminal is sensitive to its environment, LinkControl provides the ability to recalibrate the compass. This allows the compass to compensate for any magnetic interference that might affect the accuracy of its readings.

Calibration Instructions for CMPS10 and CMPS11

To begin, first ensure that the satellite terminal has been parked using the **Park Antenna** button:



Figure 53: Park Antenna Button

Once the antenna has been parked, to access the compass calibration interface click **Tools > Administration > Compass > Compass Calibration** from the LinkControl Main Menu.

This will bring up the Compass Calibration Interface window. Click on the button labeled **Start Calibrating...** to begin the compass calibration process:

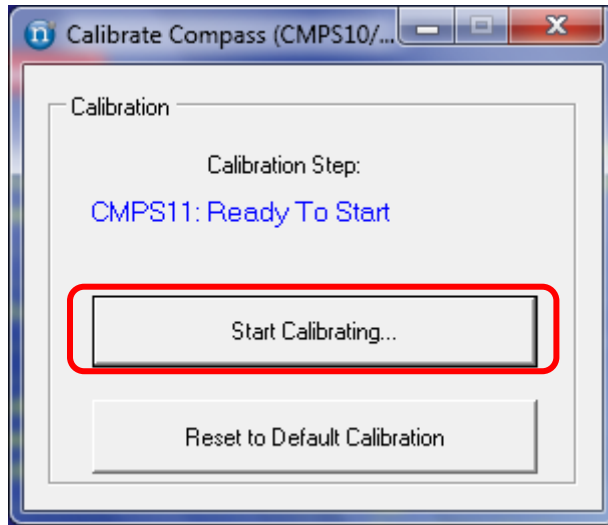


Figure 54: Starting the Compass 10/11 Calibration Process

As indicated by the on-screen instructions, the entire satellite terminal must be physically rotated at least 360 degrees in either direction in order for the compass to be properly calibrated. The terminal should be rotated slowly; it should take approximately 90 seconds to fully rotate the terminal. Click on the **Finished** button once the terminal has been rotated.

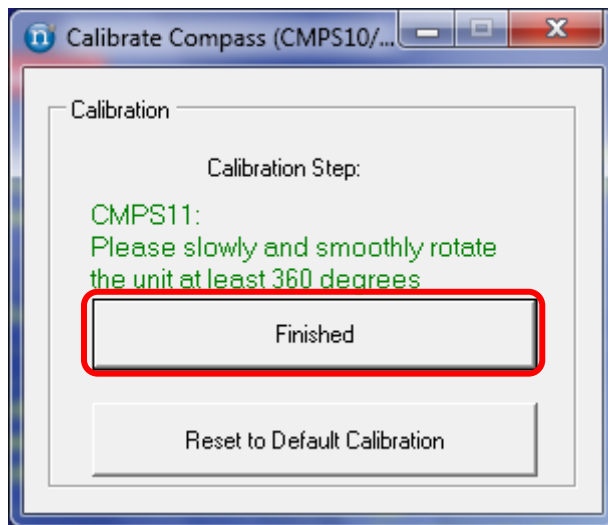


Figure 55: Finishing Compass 10/11 Calibration

The Compass Calibration Interface will then indicate that the calibration process has been completed:

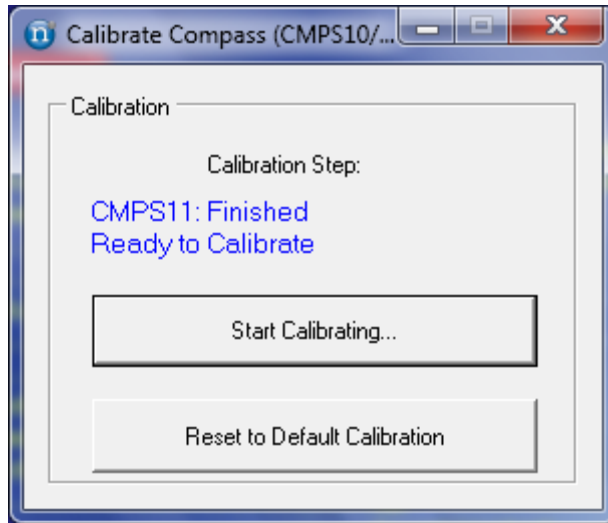


Figure 56: Indication that the Compass 10/11 Calibration Process has Finished

Once the calibration process has completed, power-cycle the satellite terminal to ensure that the new compass calibration is used.

Calibration Instructions for CMPS12

Note that headings are geographical and not magnetic.

Before starting the calibration process, examine your environment and ensure nothing is restricting the movement of the terminal and no unsecured items have been placed on it. Ensure there is ample clearance to rotate and tilt the terminal, being mindful of the boom-arm.

Use LinkControl to park the terminal by pressing the “Park Antenna” button. The “Park Antenna” button will turn gray when parking is complete.

Navigate to Tools -> Administration -> System Panel -> Compass Calibration to open the Calibrate CMPS12 form.

Calibrate CMPS12

Calibrate

Store Calibration

Delete Calibration

Initial Heading: 64.0 Reinitialize

Fixed Compass: True

Magnetometer Is Calibrated: No

Calibration Instructions:

Ensure nothing is restricting the movement of the terminal and no unsecured items have been placed on it. Ensure there is ample clearance to rotate and tilt the terminal.

Previous Step Next Step

Note: Refer to the LinkControl manual for additional details. Step 1 of 13

Figure 57 - Calibrate CMPS12 Form

Press the “Delete Calibration” button and press “Yes” to continue.

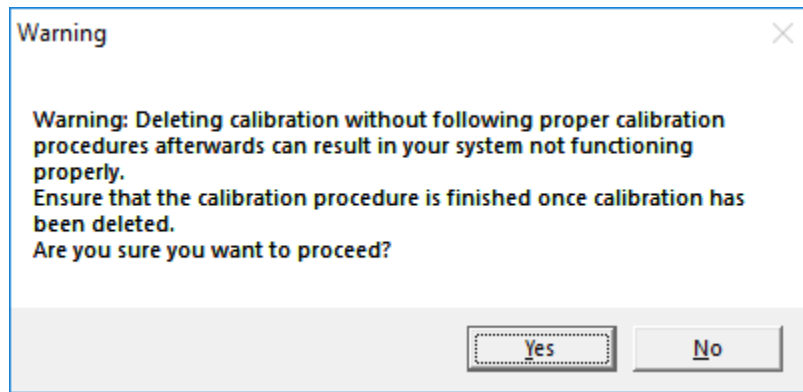


Figure 58 - Delete Calibration Warning Message

Wait for calibration to be deleted. The status label will say “Deleted Calibration” when complete.

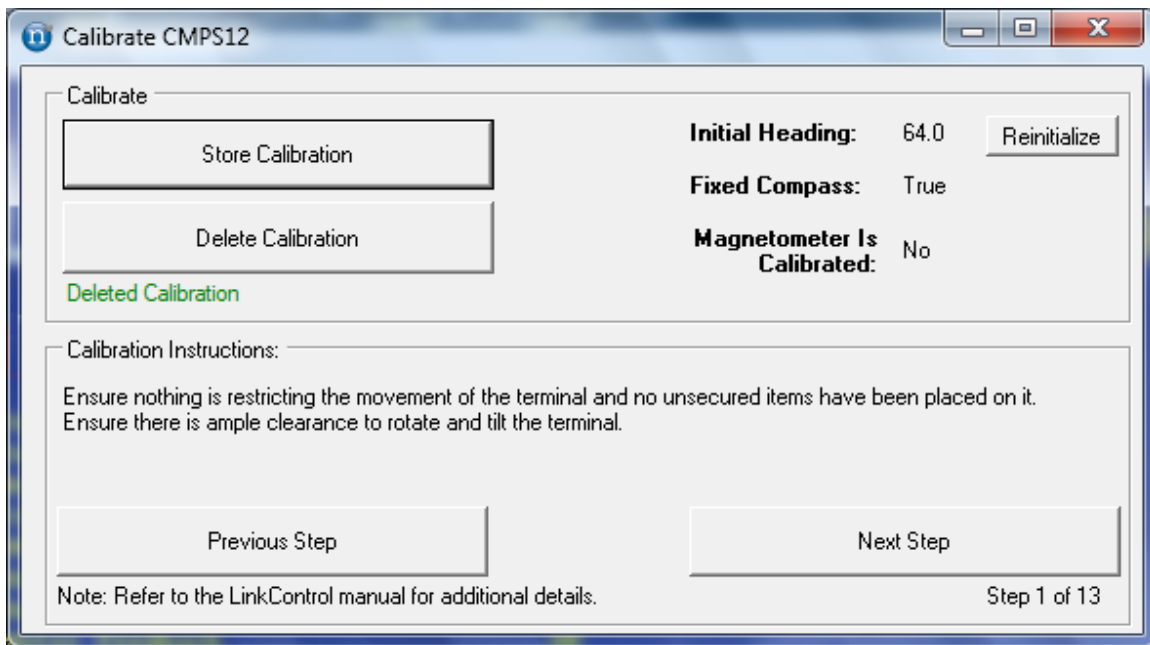


Figure 59 – Calibrate CMPS12 Form with Updated Label

Close LinkControl and power down the system.

If connected, disconnect the RF cable from the BUC.

Power on the system, open LinkControl and navigate back to the Calibrate Compass form.

Ensure nothing is restricting the movement of the terminal and no unsecured items have been placed on it.

Grab the front two legs of the terminal and slowly lift them up to 30 degrees and then place them back down.

Grab the right two legs of the terminal and slowly lift them up to 30 degrees and then place them back down.

Grab the back two legs of the terminal and slowly lift them up to 30 degrees and then place them back down. Pay special attention to the boom-arm and ensure it does not get hit against the ground.

Grab the left two legs of the terminal and slowly lift them up to 30 degrees and then place them back down.

For a second time, carefully pick-up the terminal, slowly rotate it 90 degrees and then repeat the tilt procedure.

For a third time, carefully pick-up the terminal, slowly rotate it 90 degrees and then repeat the tilt procedure.

For a fourth time, carefully pick-up the terminal, slowly rotate it 90 degrees and then repeat the tilt procedure.

If the magnetometer reports as not calibrated, repeat the rotate and tilt procedure until it reports as calibrated. Then, proceed to the next step.

Press the Store Calibration button and wait for the form to say, "Stored Calibration". To finish calibration, close LinkControl and power down the system for at least 5 seconds.

The new calibration will be used on the next boot-up.

6. Appendix

6.1 Windows 7 Migration Instructions

This section is meant to install a Windows 7 Embedded compatible version of LinkControl 7 on a Windows 7 Embedded system. In addition, any custom LinkControl configuration a customer might have had on the old Windows XP Embedded system will be imported to the updated system.

Warning: Ensure that the version of LinkControl being installed is 2.4.15 or higher. While there is no guarantee that this will be true for versions of LinkControl running on Windows XP Embedded systems, any version of LinkControl provided by Norsat for Windows 7 Embedded use will obey this criterion.

- 1) On the GlobeTrekker's Windows 7 Embedded computer, create the following folder structure if it does not already exist: C:\Program Files\Norsat International\LinkControl 7
- 2) Copy all LinkControl software files (provided by Norsat) to the LinkControl 7 directory indicated in the step above. Once done, the directory should be identical to the figure below:

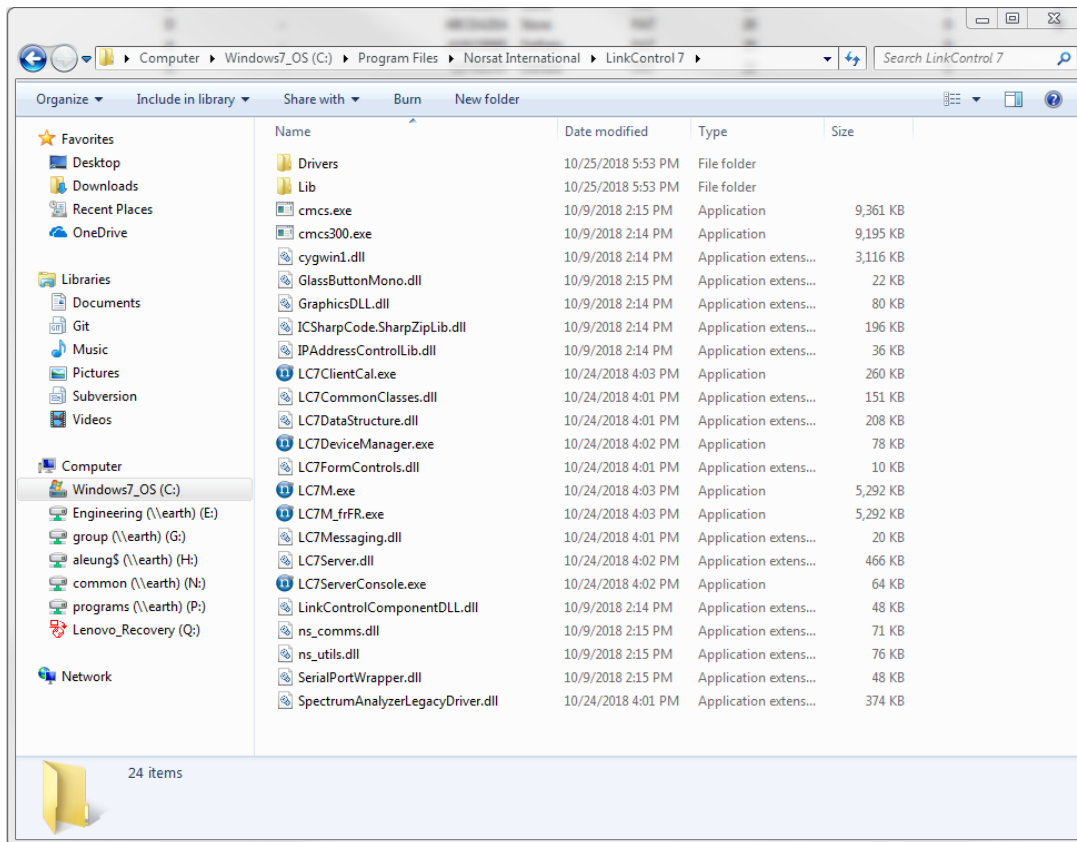


Figure 60: Example C:\Program Files\Norsat International\LinkControl 7 Folder

Warning: Versions of LinkControl running on Windows XP Embedded have an additional ClientData and ServerData folder that are contained at:

C:\Program Files\Norsat International\LinkControl 7

On Windows 7 Embedded, it is critical that these folders are NOT placed in this directory. See instructions below for alternative location.

- 3) Navigate to the C:\ProgramData folder and create the following folder structure if it does not already exist: C:\ProgramData\Norsat International\LinkControl 7

Note: The C:\ProgramData folder is typically hidden, so it will have to be accessed by typing the folder path directly into the Windows Explorer address bar, as shown below:

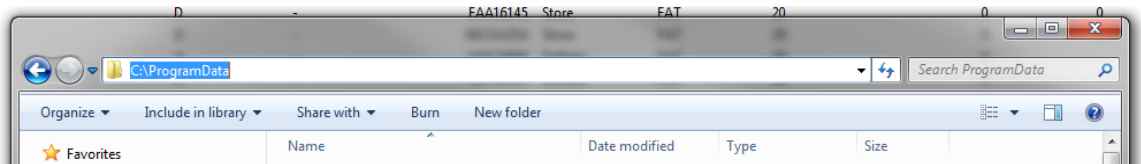


Figure 61: Entering the C:\ProgramData Path Into the Address Bar

- 4) From the original LinkControl 7, copy the ServerData and ClientData folders into the C:\ProgramData\Norsat International\LinkControl 7 folder created in the step above. Once done, the folder should look like this:

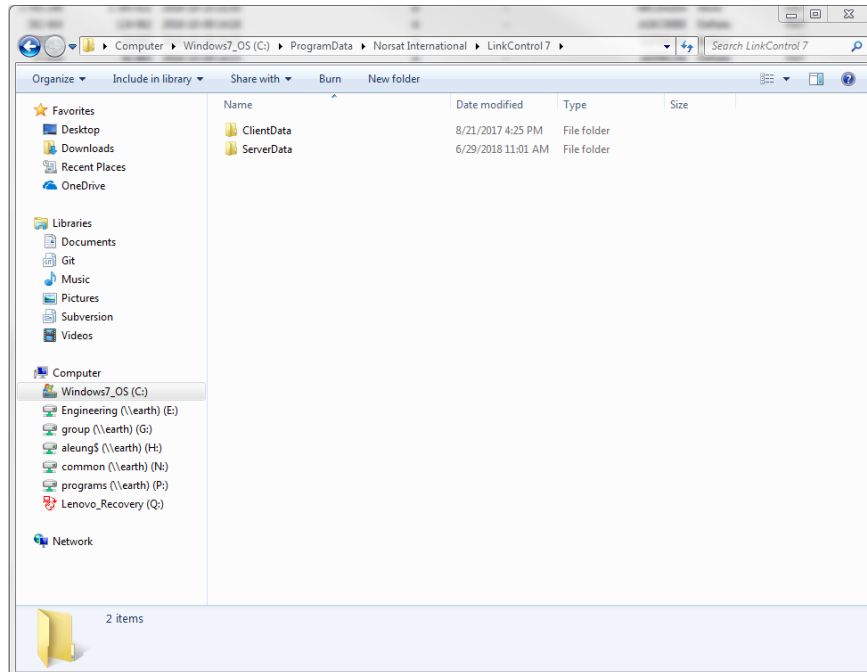


Figure 62: Example C:\ProgramData\Norsat International\LinkControl 7 Folder

- Go to C:\Program Files\Norsat International\LinkControl 7 and create a shortcut of the LC7M.exe file. The figure below shows one way of doing this:

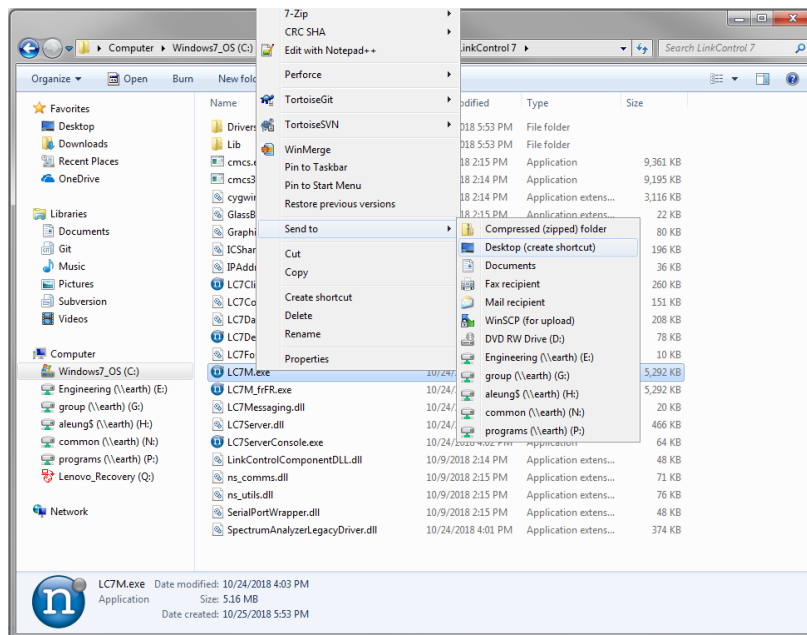


Figure 63: Creating a Shortcut to LC7M.exe

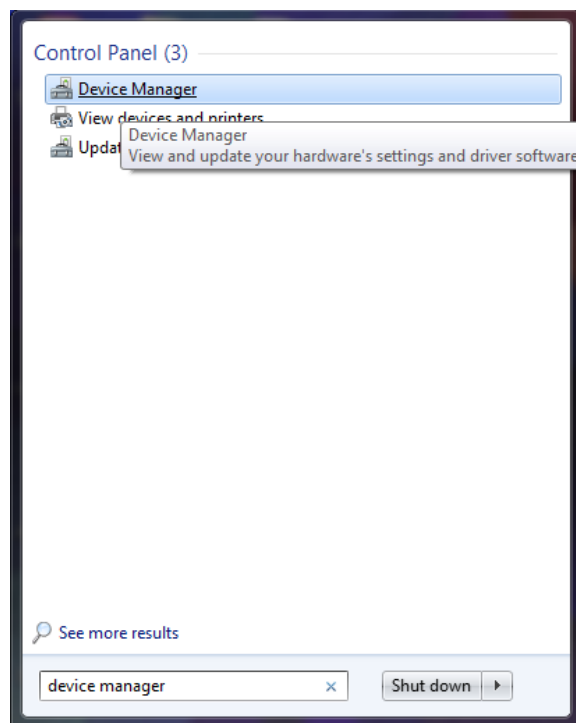
- 6) Click the start menu and navigate to the Startup folder
- 7) Right click on the Startup folder item and select Open. The Windows Explorer window leading to the Startup directory should open.
- 8) Move the LC7M.exe shortcut you created into the Startup folder.

LinkControl 7 is now installed and should run immediately on startup of the system.

If on starting LinkControl, the Spectrum Analyzer reports as disconnected, follow the below steps:

On LinkControl startup, if the Spectrum Analyzer is not connected, the COM port for the Spectrum Analyzer driver may be the issue.

- 1) Go to the start menu, and type in Device Manager. Select this option once it appears.



[Figure 64: Opening the Device Manager](#)

- 2) In the Device Manager, expand the Ports node and make note of the COM port for the Prolific USB-to-Serial Comm Port device.

In the figure below, the Prolific USB-to-Serial Comm Port device is on COM 3.

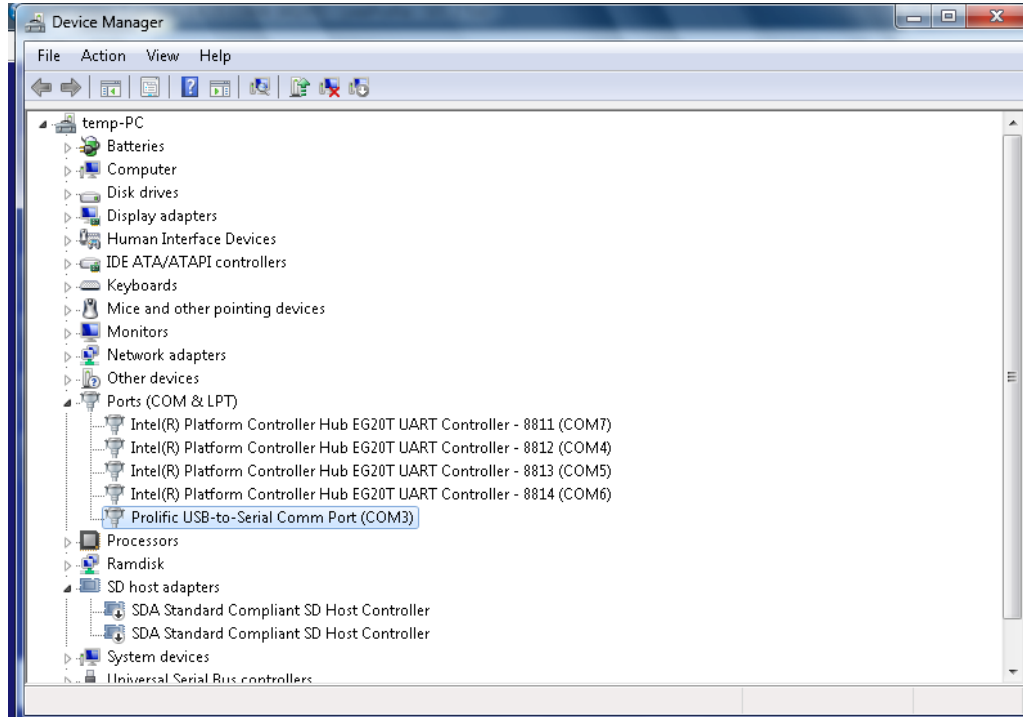


Figure 65: Getting the COM Port of the Spectrum Analyzer Adapter

- 3) Start LinkControl and wait until the program has fully loaded. The program will be fully loaded when you observe the screen below:

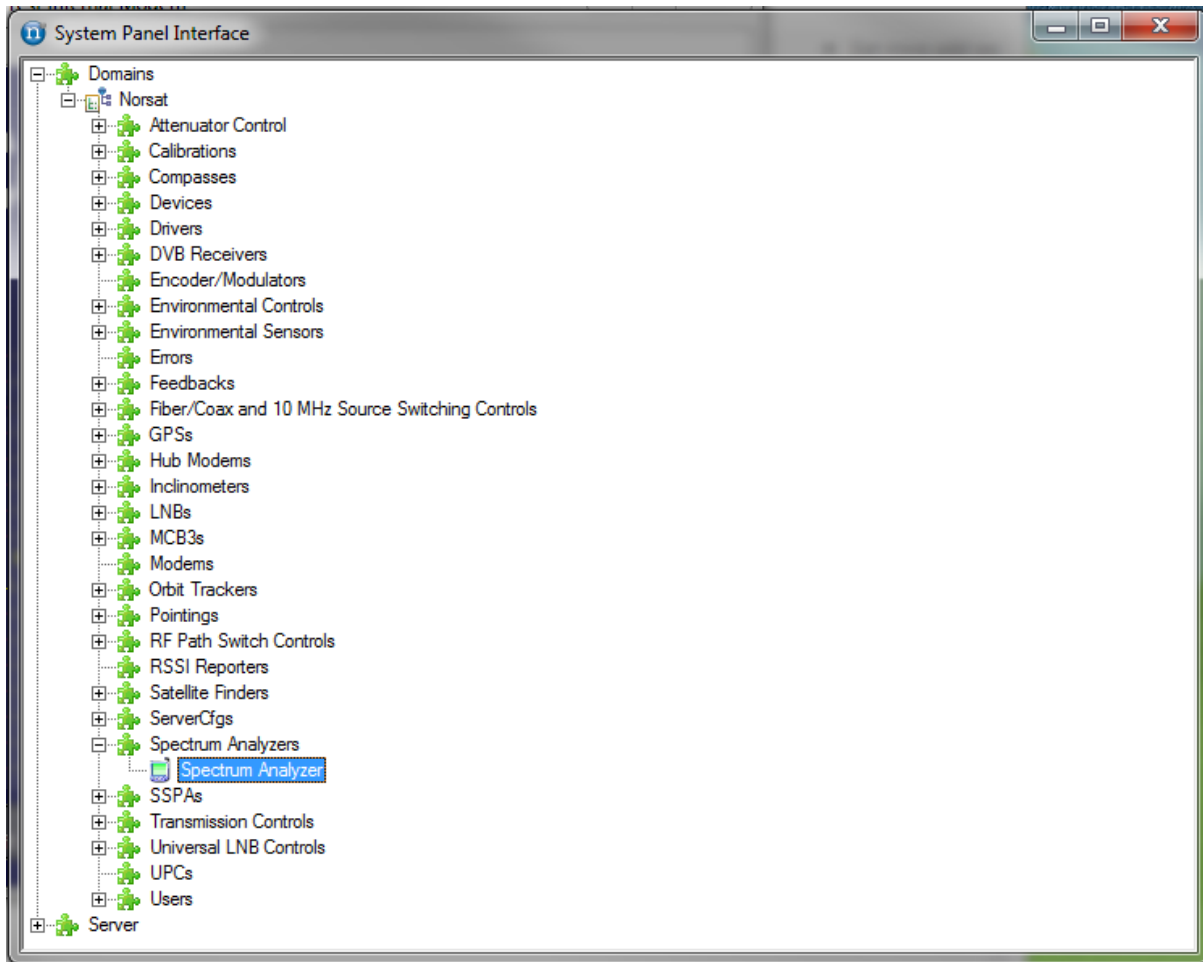


Figure 66: LinkControl Fully Loaded

- 4) Go to **Tools > Administration** and select the **System Panel** option.
- 5) In the password prompt that appears, enter the password provided by Norsat to open the System Panel.
- 6) In the System Panel Interface window that appears, navigate to the following node and expand it:

Domains > Norsat > Spectrum Analyzers

Double click the contained object underneath this node to open the LC7 Spectrum Analyzer Configuration Interface. In the figure below, the item is named Spectrum Analyzer, but the item's name on your system may differ:



[Figure 67: Expanding the Spectrum Analyzers Node](#)

- 7) In the LC7 Spectrum Analyzer Configuration Interface, if the Engine field displays **On**, but the Connected field displays **NO**, as shown in the figure below, then click the refresh button to the right of the engine field and wait until the Engine field shows **Off**. Otherwise skip to the next step.

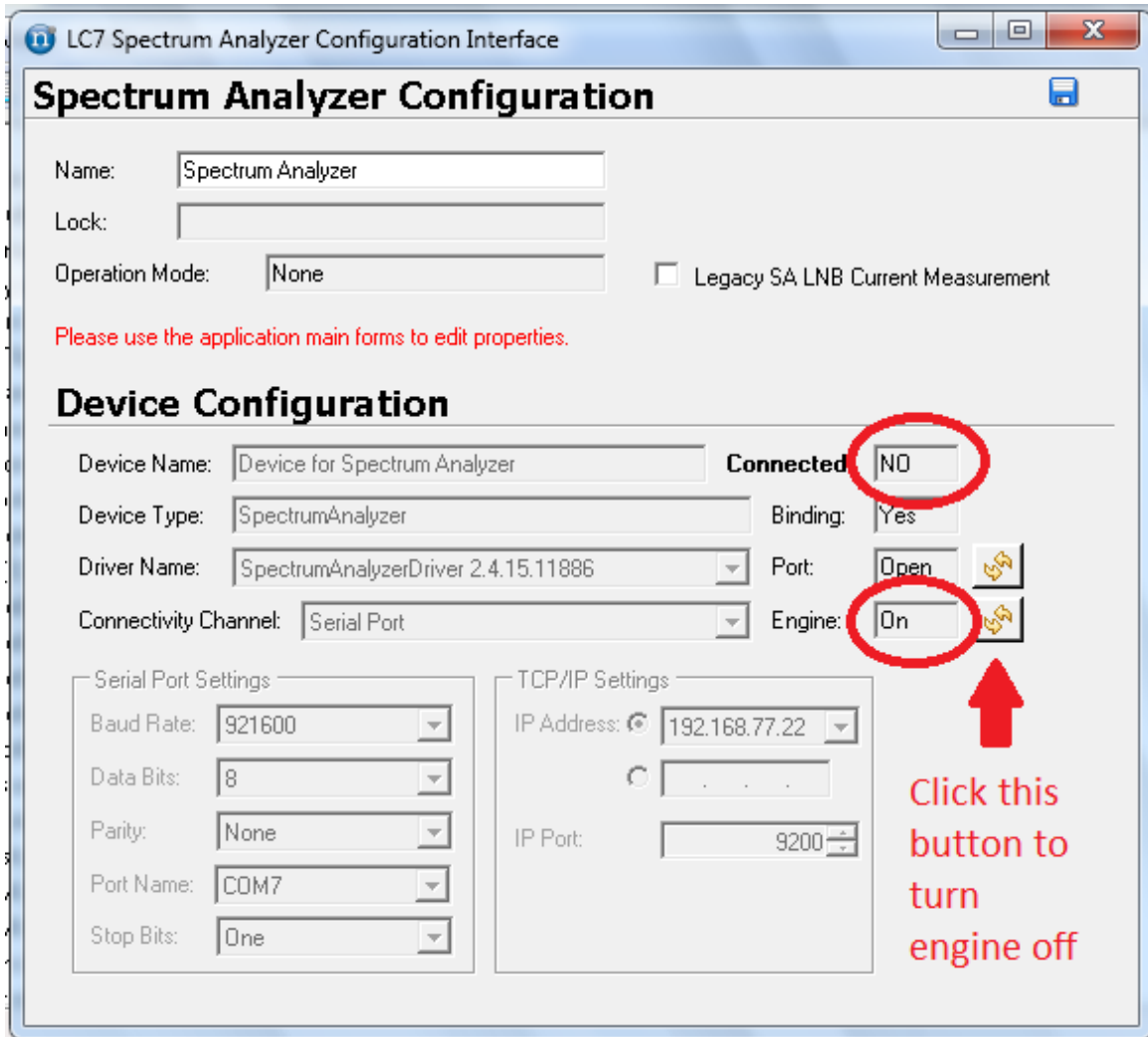


Figure 68: Spectrum Analyzer Configuration Interface

- 8) If your screen matches, toggle the Engine Off with the indicated button to Gain Access to the Port Name Dropdown.
- 9) In the LC7 Spectrum Analyzer Configuration Interface window, go to the Port Name dropdown, and select the COM port you noted in step 0 above. In the example below, the COM port noted was COM3:

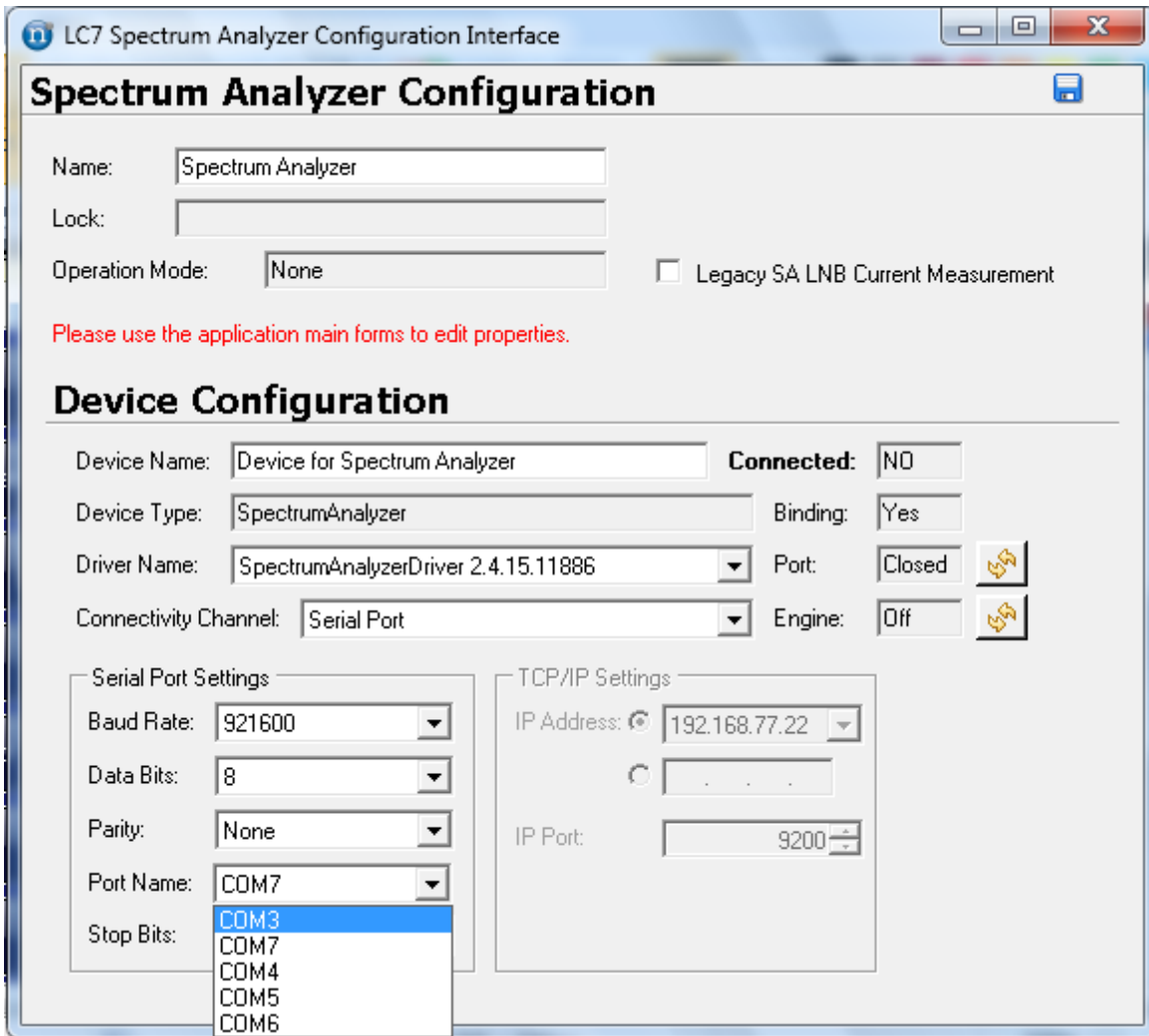


Figure 69: Setting Device Configuration Serial Port Name

- 10) Click the save icon in the top right corner of this window and press OK in the confirmation dialog that appears.
- 11) Click the refresh button beside the Engine field and wait for the text to change to **On**
- 12) Click the refresh button beside the Port field and wait for the text to change to **Open**
- 13) Check that the text box to the right of the Connected label now displays **Yes**. The LC7 Spectrum Analyzer Configuration Interface window should now appear as follows (the Name, Driver Name, Baud Rate, and Port Name fields may differ for your system):

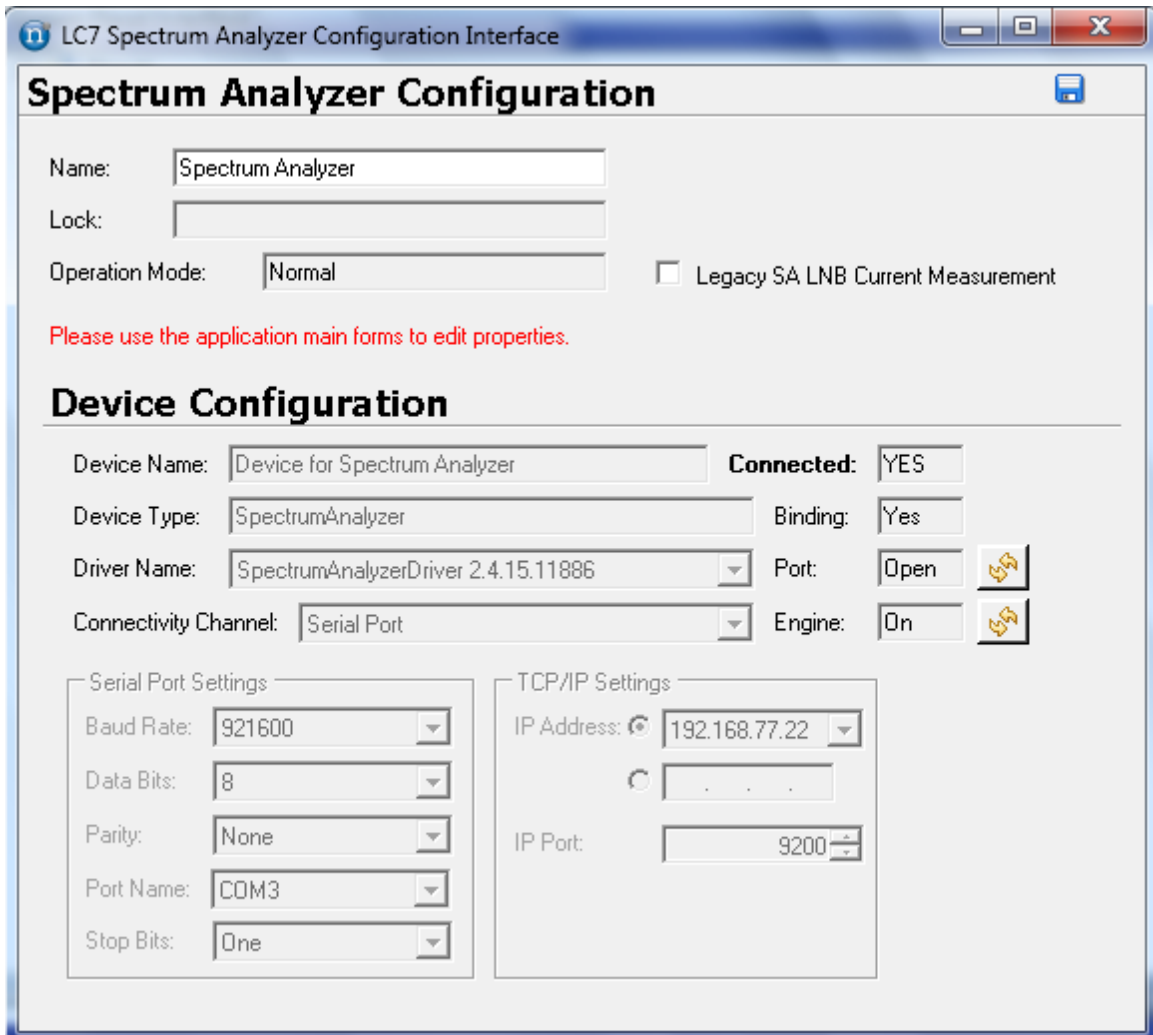


Figure 70: Expected State of the Configuration Interface

- 14) Close the LC7 Spectrum Analyzer Configuration Interface window and the System Panel Interface window

After the steps above, the Spectrum Analyzer should show a status of OK on the Start Page, as shown in the below figure.



Figure 71: Spectrum Analyzer OK Status



Norsat
International Inc.

ABOUT NORSAT

Norsat International Inc., founded in 1977, is a leading provider of innovative communication solutions that enable the transmission of data, audio, and video for remote and challenging applications. Norsat's products and services include customizable satellite components, portable satellite terminals, maritime solutions and satellite networks. The company's products and services are used extensively by telecommunications services providers, emergency services and homeland security agencies, military organizations, health care providers and Fortune 1000 companies.

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