Norsat International Inc.

SOFTWARE MANUAL

LINKCONTROL 8

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PREFACE

Purpose and Scope of the User Guide

The user guide explains the system specifics of the Norsat LINKCONTROL 8 SOFTWARE SUITE for use with Norsat satellite terminals.

This user guide is specifically written for the LINKCONTROL 8 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 8 SOFTWARE SUITE

1. LinkControl 8 Basics

LinkControl 8 is a Suite of Software that assists users in using their Norsat Satellite Equipment in all environments

1.1 Overview

Norsat's LinkControl 8 software offers an intuitive and powerful set of tools designed for satellite communications professionals and amateurs. Delivering a robust package of acquisition and monitor + control interfaces, LinkControl 8 empowers new users to run complex VSAT systems and enables professionals to work more efficiently in the field. LinkControl 8 seamlessly integrates the various hardware and procedures into user-friendly steps. LinkControl 8 features include:

- Save commonly-used settings using pre-configurable LinkProfiles
- Save satellite data used for acquisition in a Satellite Almanac
- Automatic satellite acquisition using selected settings
- Manual control over antenna orientation
- Compatibility with OpenAMIP

Norsat's LinkControl 8 Software runs on a Host Computer (typically a laptop) running Microsoft Windows® 7 or Microsoft Windows® 10 connected to the terminal via an Ethernet connection. The Host Computer may be connected to the antenna directly or may connect through a Local Area Network.

1.2 Minimum Recommended Software Requirements

Refer to the table below for the minimum recommended software requirements.

PARAMETER	REQUIREMENT
Operating System	Windows 7 or Windows 10, with .NET 2.0 or above installed
Hard Drive	2 GB or more of available free space
Processor	i3 or equivalent (dual-core, 2.93 GHz)
RAM	2 GB DDR3
Resolution	1280 x 768 display resolution

1.3 Installing LinkControl 8

LinkControl 8 is typically provided to customers in one of two ways: distributed electronically as a compressed ZIP archive, or distributed on a USB stick.

The following instructions explain how to install LinkControl 8 from a Compressed ZIP Archive:

1) Use the Windows File Explorer to navigate to the root of the C: Drive on the Host Computer.
2) Create a new subfolder called **LinkControl8**.
3) Copy the provided ZIP Archive to the C:\LinkControl8 folder.
4) Extract the contents of the ZIP Archive to the C:\LinkControl8 folder.
5) Make a shortcut to LinkControl.exe.
6) Rename the shortcut “Norsat LinkControl 8”.
7) Move the shortcut to the Desktop folder on the Host Computer.

LinkControl 8 can now be launched using the shortcut on the Desktop.

The following instructions explain how to install LinkControl 8 from a USB Stick:

1) Insert the USB Stick into a USB port on the Host Computer.
2) Use the Windows File Explorer to navigate to the root of the C: Drive on the Host Computer.
3) Create a new subfolder called **LinkControl8**.
4) Copy the LinkControl 8 files from the USB Stick to the C:\LinkControl8 folder.
5) Make a shortcut to LinkControl.exe.
6) Rename the shortcut “Norsat LinkControl 8”.
7) Move the shortcut to the Desktop folder on the Host Computer.

LinkControl 8 can now be launched using the shortcut on the Desktop.

Once the LinkControl 8 files have been copied to the C:\LinkControl 8 folder, you should see the following files in the folder:

- **LinkControl8**
  - **LocalData**
    - DeviceSettingsData.xml
    - GroundLocations.xml
    - LinkControlSettingsData.xml
    - LinkProfileData.xml
    - MagneticDeclinationIGRF2000.xml
    - SatelliteData.xml
    - SettingsData.xml
  - **Logs**
  - GlassButtonMono.dll
  - GraphicsDLL.dll
  - IPAddressControlLib.dll
  - LinkControl Changelog.txt
  - LinkControl.exe

1.4 Launching LinkControl 8

On Norsat-supplied systems LinkControl 8 is configured to automatically start up when the Host Computer boots up, however this may not be the case for systems where LinkControl 8 has been installed by the end user. LinkControl 8 is a standard desktop 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 8 software is run. This EULA must be accepted in order to use the LinkControl 8 software. If the EULA is not accepted, LinkControl 8 will automatically exit and the EULA will be displayed again the next time the LinkControl 8 software is run. Once the EULA has been accepted it will no longer be shown when LinkControl 8 starts unless a new version of the software is installed on the Host Computer. It can be accessed at any time from the **Help > View EULA** entry in LinkControl 8's main menu.

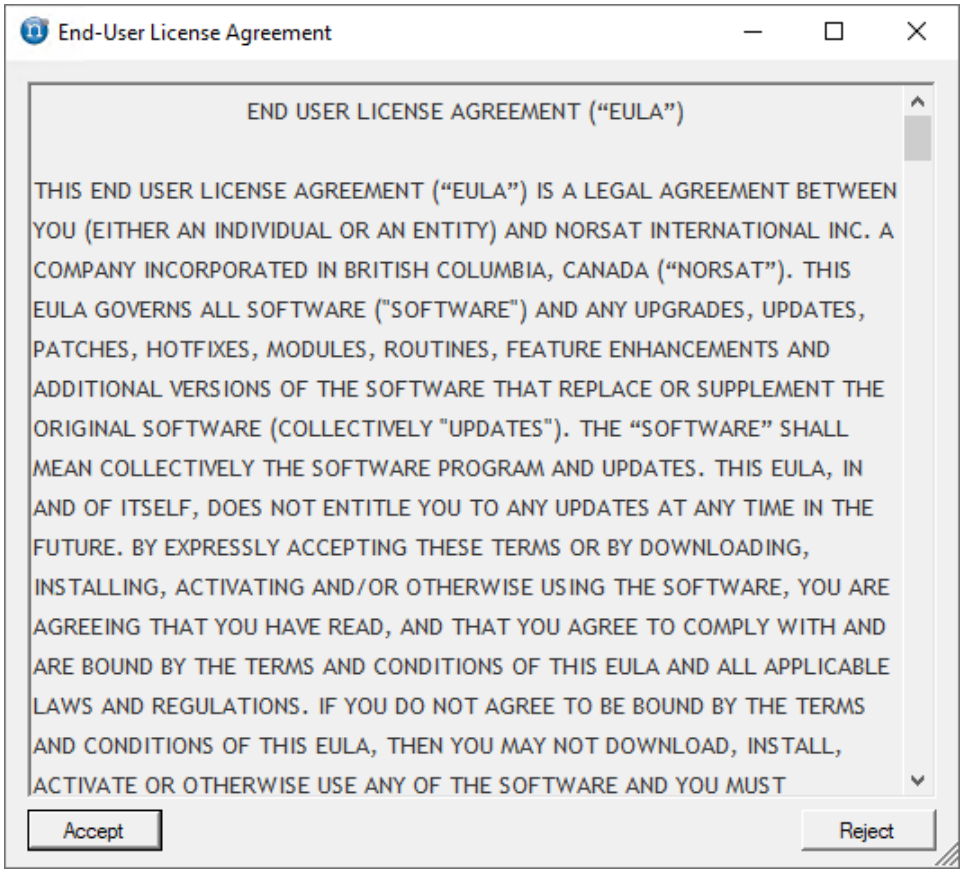


Figure 1: LinkContro 8 End-User License Agreement (EULA)

At start-up LinkControl 8 connects to the specified antenna and receives various diagnostic information from it. Please wait until the overall status indicator registers “System OK”.

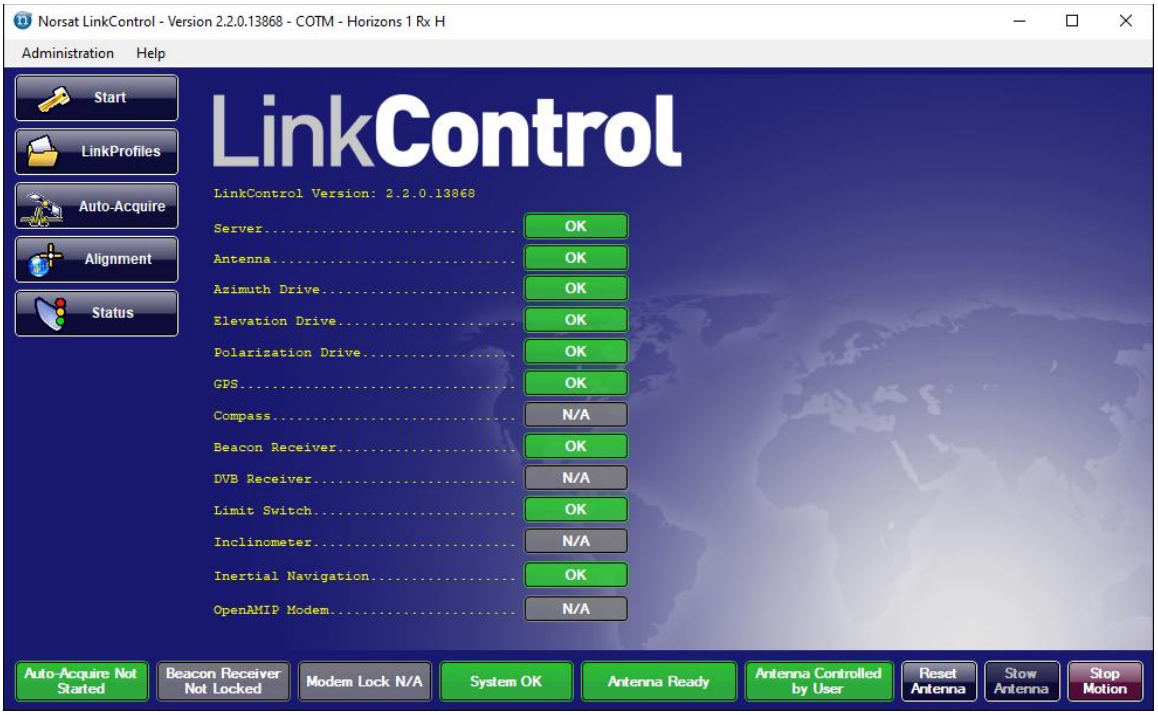


Figure 2: LinkControl 8 Start-Up Screen

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 Satellite Almanac

LinkControl 8 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 as specified in LinkProfiles.

1.5.1 Accessing the Satellite Almanac

To access the Satellite Almanac, click **Administration** in the main menu, and then select **Satellite Almanac** from the resulting pull-down menu:

Figure 3: Accessing the Satellite Almanac

This will bring up the Satellite Almanac window:

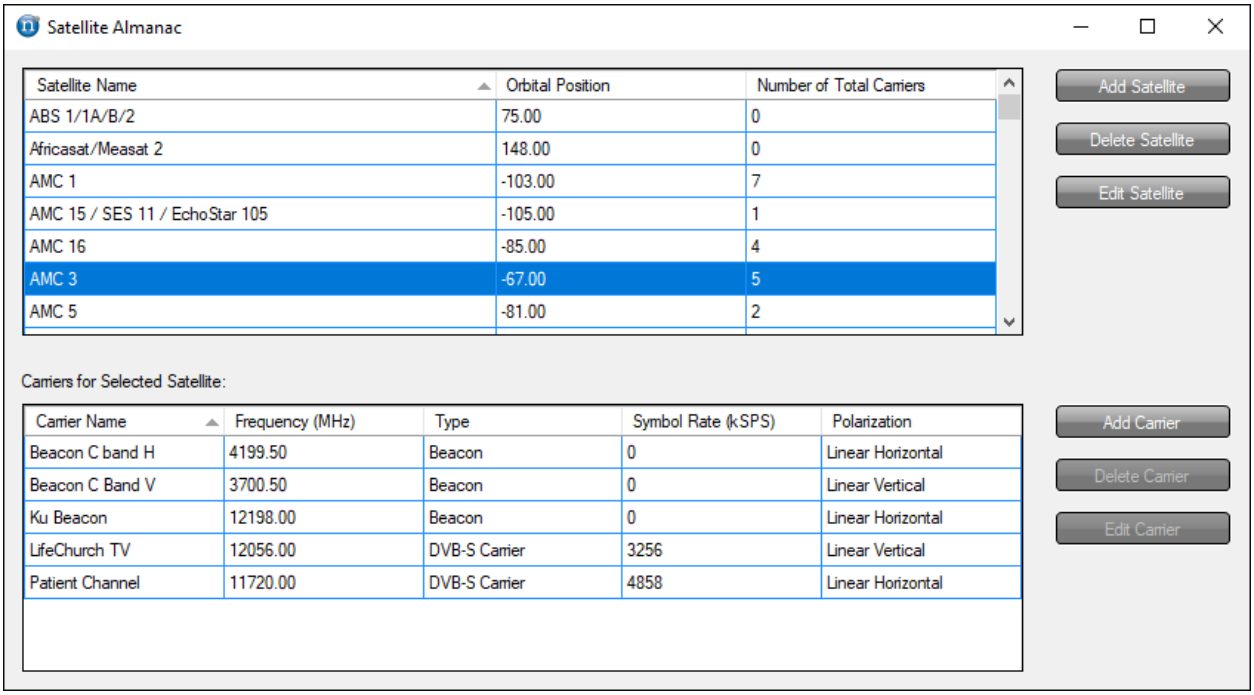


Figure 4: The Satellite Almanac Window

The Satellite Almanac provides a Satellite List at the top of the interface. Clicking on a satellite in the Satellite List will populate the Carriers for Selected Satellite List with the beacons and carriers associated with that satellite.

1.5.2 Adding a New Satellite

1. Open the **Satellite Almanac** using the procedure described in section 1.5.1.

2. Click on the **Add Satellite** button found to the right of the Satellite List. This will bring up the Add/Edit Satellite window:

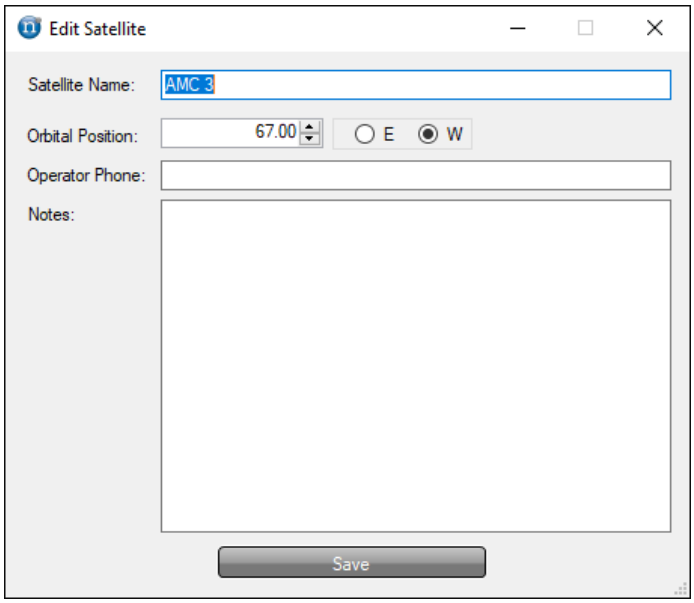


Figure 5: The Add/Edit Satellite Window

3. Enter a unique name for the satellite in the **Satellite Name** box.

4. Enter the orbital position of the satellite using the **Orbital Position** controls. The satellite's orbital position must be unique.

5. Optionally enter the **Operator Phone** number and any additional **Notes** as needed.

6. Click on the **Save** button to add the new Satellite to the Satellite Almanac.

1.5.3 Editing an Existing Satellite

1. Open the Satellite Almanac using the procedure described in section 1.5.1.

2. Select the satellite in the Satellite List that you wish to edit.

3. Click on the **Edit Satellite** button found to the right of the Satellite List. This will bring up the Add/Edit Satellite window.

4. Edit the satellite information as needed, following the steps described in section 1.5.2.

5. In the Add/Edit Satellite window, click on the **Save** button to update the information for the satellite in the Satellite Almanac.

1.5.4 Removing an Existing Satellite

1. Open the Satellite Almanac using the procedure described in section 1.5.1.

2. Select the satellite in the Satellite List that you wish to delete.

3. Click on the **Delete Satellite** button found to the right of the Satellite List.

4. Confirm the deletion if prompted to do so.

   Note: Deleting a satellite will delete all beacons and carriers associated with the satellite.

1.5.5 Adding a New Satellite Beacon or Carrier

1. Open the Satellite Almanac using the procedure described in section 1.5.1.

2. Select the satellite in the Satellite List that you wish to add the beacon or carrier to.

3. Click on the **Add Carrier** button found to the right of the Carriers for Selected Satellite List. This will bring up the Add/Edit Satellite Carrier window:

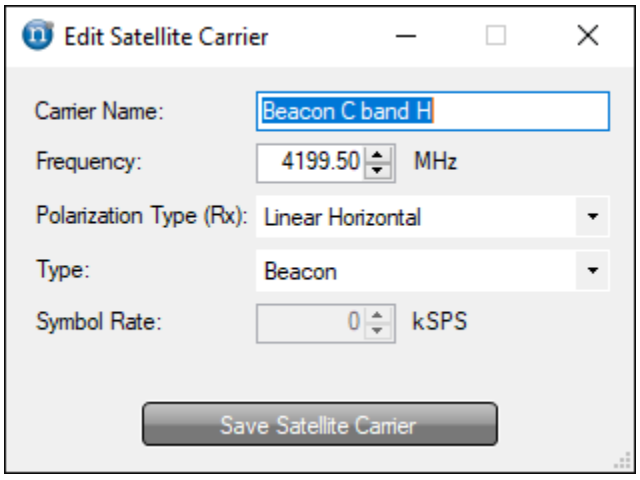


Figure 6: The Add/Edit Satellite Carrier Window

4. Enter a unique name for the carrier in the **Carrier Name** box.

5. Enter the frequency for the beacon or carrier using the **Frequency** controls.

6. Select the Rx polarization type using the **Polarization Type** pull-down menu.

7. Specify the type of carrier using the **Type** pull-down menu.

   Note: If the Type is set to *Beacon*, the symbol rate parameter will be automatically set to 0 and cannot be changed.

8. For DVB-S or DVB-S2 carriers, enter the symbol rate (in units of 1000 symbols per second) using the **Symbol Rate** controls.

9. Click on the **Save Satellite Carrier** button to add the beacon or carrier to the satellite.

   Note: Some antennas can only use Beacons when performing auto-acquire, so make sure you add beacons for any satellite you wish to use with auto-acquire for these antennas.

1.5.6 Editing an Existing Satellite Beacon or Carrier

1. Open the Satellite Almanac using the procedure described in section 1.5.1.

2. Select the satellite associated with the satellite carrier in the Satellite List.

3. Select the satellite carrier that you wish to edit in the in the Carriers for Selected Satellite List.

4. Click on the **Edit Carrier** button found to the right of the Carriers for Selected Satellite List. This will bring up the Add/Edit Satellite Carrier window.

5. Edit the beacon or carrier information as needed, following the steps described in section 1.5.5.

6. In the Add/Edit Satellite Carrier window, click on the **Save Satellite Carrier** button to update the information for that beacon or carrier in the Satellite Almanac..

1.5.7 Removing an Existing Satellite Carrier

1. Open the Satellite Almanac using the procedure described in section 1.5.1.

2. Select the satellite associated with the satellite carrier in the Satellite List.

3. Select the satellite carrier that you wish to edit in the in the Carriers for Selected Satellite List.

4. Click **Delete Carrier** on the right of the **List of Satellites Carriers.**

5. Confirm the deletion if prompted to do so.

1.5.8 Satellite Almanac Tips and Tricks

LinkControl 8 can support any number of entries in the Satellite Almanac, and each satellite can have as many beacons or carriers as necessary. We recommend that full advantage be taken of this. Some recommendations:

- Pick descriptive names that are easy to communicate via phone or voice radio links.
- Populate cross polarization elements in the event of changes in beacons and carriers on your main polarization.
- LinkControl 8 stores the information contained in the Satellite Almanac on the Host Computer's file system in an unencrypted format, so be aware that information for secure satellites can be retrieved.
- Beacon and carrier frequencies may be changed by the satellite operator, so update your Satellite Almanac regularly.

1.6 LinkProfiles

LinkProfiles are the heart of your system, as they guide the acquisition process with necessary satellite carrier information. They are essentially a collection of settings that allow users to switch between satellites or configurations quickly and easily.

1.6.1 Accessing LinkProfiles

To view the basic information for a LinkProfile, click on the **LinkProfiles** navigation button on the left side of the screen. This will bring up the LinkProfiles page, which shows a split screen with the LinkProfiles List on the left, and LinkProfile Details for the selected LinkProfile on the right. 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.

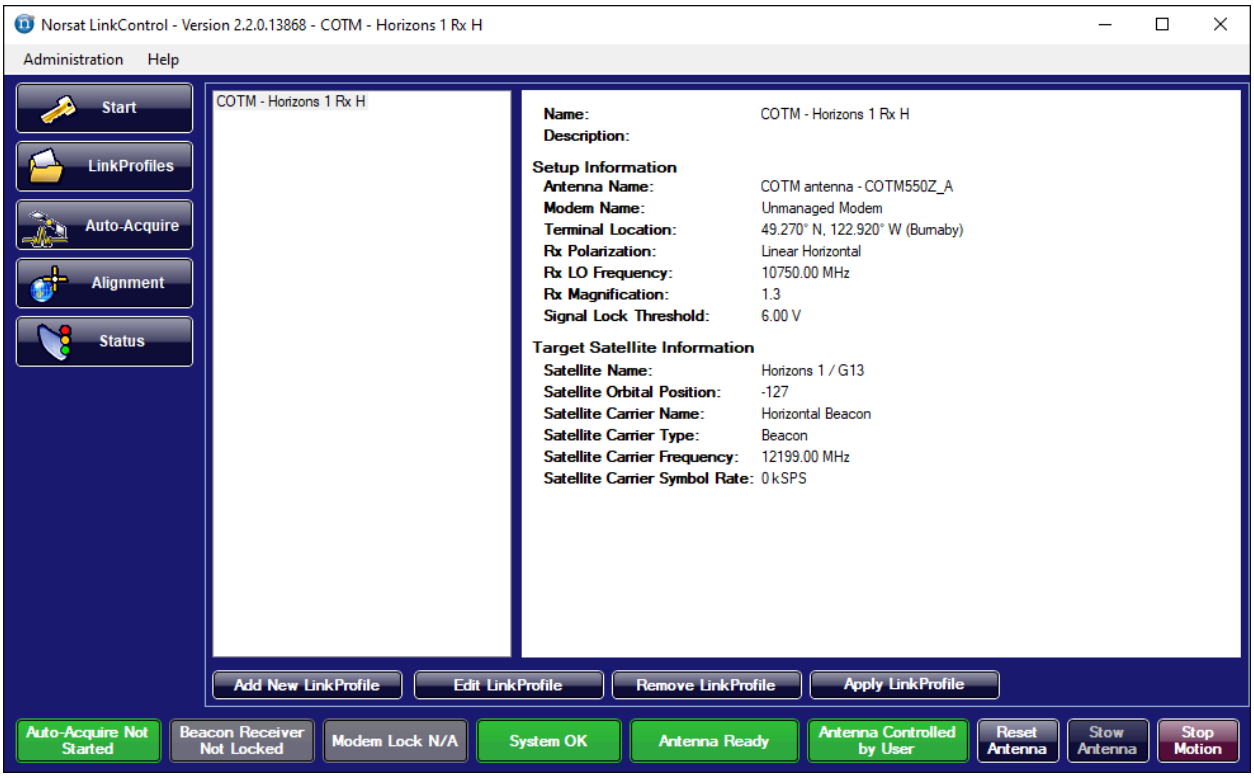


Figure 7: The LinkProfiles Page

Once you have selected a LinkProfile to use, click on the **Apply LinkProfile** button to apply the LinkProfile's settings to the system. It may take several seconds for all the settings to be applied to 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 in 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 would instead like to preserve all the existing LinkProfiles, then create a new LinkProfile. See Section 1.6.2 for Adding a New LinkProfile.
- If you do not plan to use one of the existing LinkProfiles again, then you may wish to edit an existing LinkProfile. See Section 1.6.3 for Editing an Existing LinkProfile.
- You may also copy and use an existing LinkProfile as a starting point for a new LinkProfile. See Section 1.6.4 for Making a New LinkProfile based on an Existing LinkProfile.

1.6.2 Adding a New LinkProfile

Perform the following steps to add a new LinkProfile to the system:

1. Navigate to the LinkProfiles page as described in section 1.6.1.

2. Click the **Add New LinkProfile** button. This will bring up a window like the one shown below:

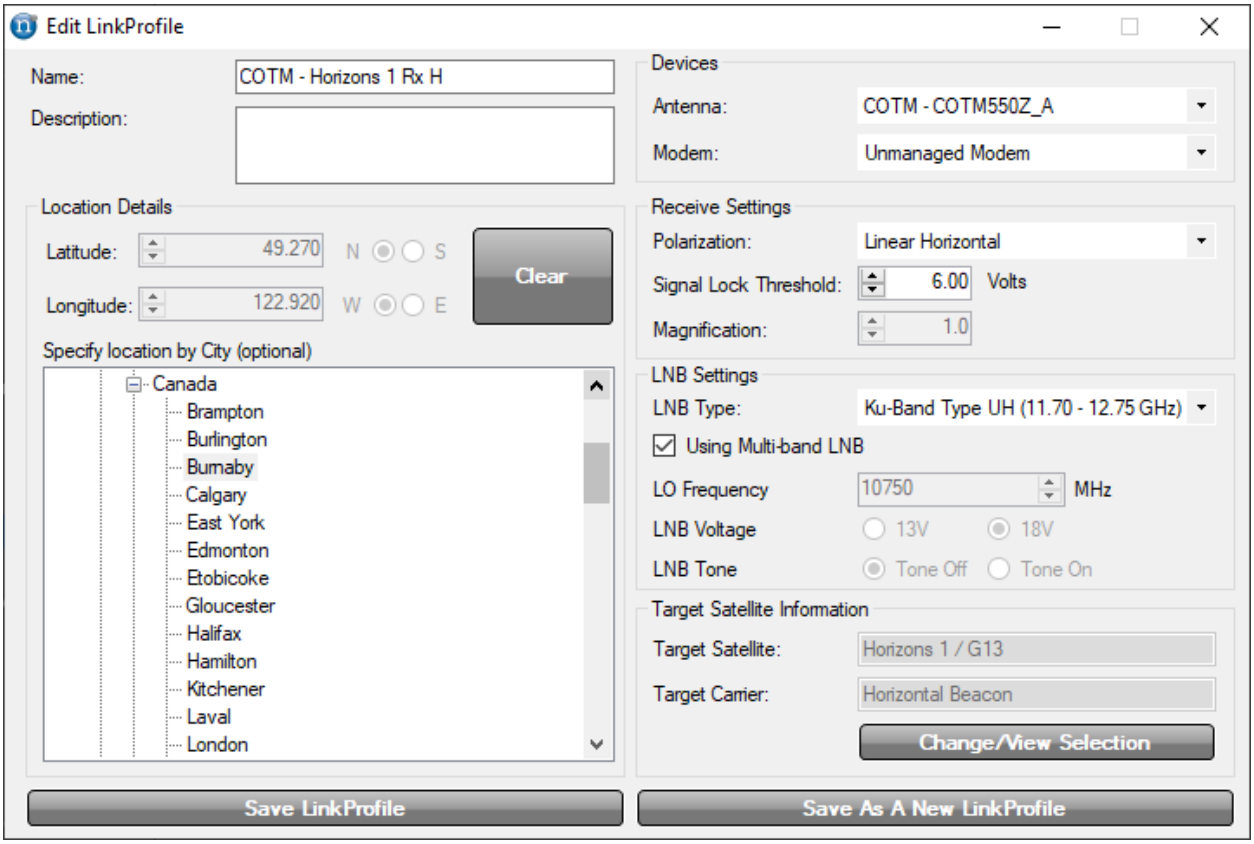


Figure 8: Add/Edit LinkProfile Window

3. Enter a unique name for the LinkProfile in the **Name** box.

4. Optionally enter a brief description for the LinkProfile in the **Description** box. The description will be shown in the LinkProfile Details for the LinkProfile on the LinkProfile page, and may help distinguish one LinkProfile from another.

5. Optionally specify the GPS Coordinates for the location that the system will be operated from by either manually entering a **latitude** and **longitude** or selecting a city from the **Transmission City** list. These coordinates can be passed to the antenna in the event that a GPS Lock is not available.

   Note: If a city has been selected, the Latitude and Longitude fields will be disabled. If you would like to enter a latitude and longitude manually instead, click on the **Clear** button to ensure that no city is selected, and then enter the desired Latitude and Longitude.

6. Select the desired **Antenna** from the antenna list.

   Note: If there is only one antenna defined in the system, this parameter will already be set and cannot be changed.

7. Select the desired **Modem** from the modem list.

   Note: If no Modems have been defined in the LinkControl 8 Device Manager, the Modem selection will be set by default to “Unmanaged Modem” and cannot be changed.

   Note: If using an OpenAMIP modem, ensure that a valid satellite with the orbital position specified by the modem has been defined in the satellite almanac and that this satellite has at least one valid beacon or carrier defined.

8. Select the receive **Polarization** band from the pull-down list.

9. Choose a **Signal Lock Threshold** as a threshold for receive lock. The system will register a Beacon Lock if the signal strength goes above this value.

   Note: It is recommended to set this to 6.00 V by default.

10. Choose a **Magnification** level that will be used as a multiplier for the Signal Level.

    Note: COTM Antennas do not support setting a magnification level

11. Specify the appropriate **LNB Type** for the antenna from the pull-down list.

    Note: For multi-band LNBs, LinkControl 8 will automatically set the tone and voltage of the LNB to match the selected LNB type.

    For COTM antennas, custom LNB settings can be set as desired. Only Multi-band LNBs can have custom tone and voltage.

12. If the selected Modem is not an OpenAMIP-capable modem, then in the Target Satellite Information group box, press the **Change/View Selection** button to select a target satellite and beacon. This will bring up the **Select Carrier and Satellite** window:

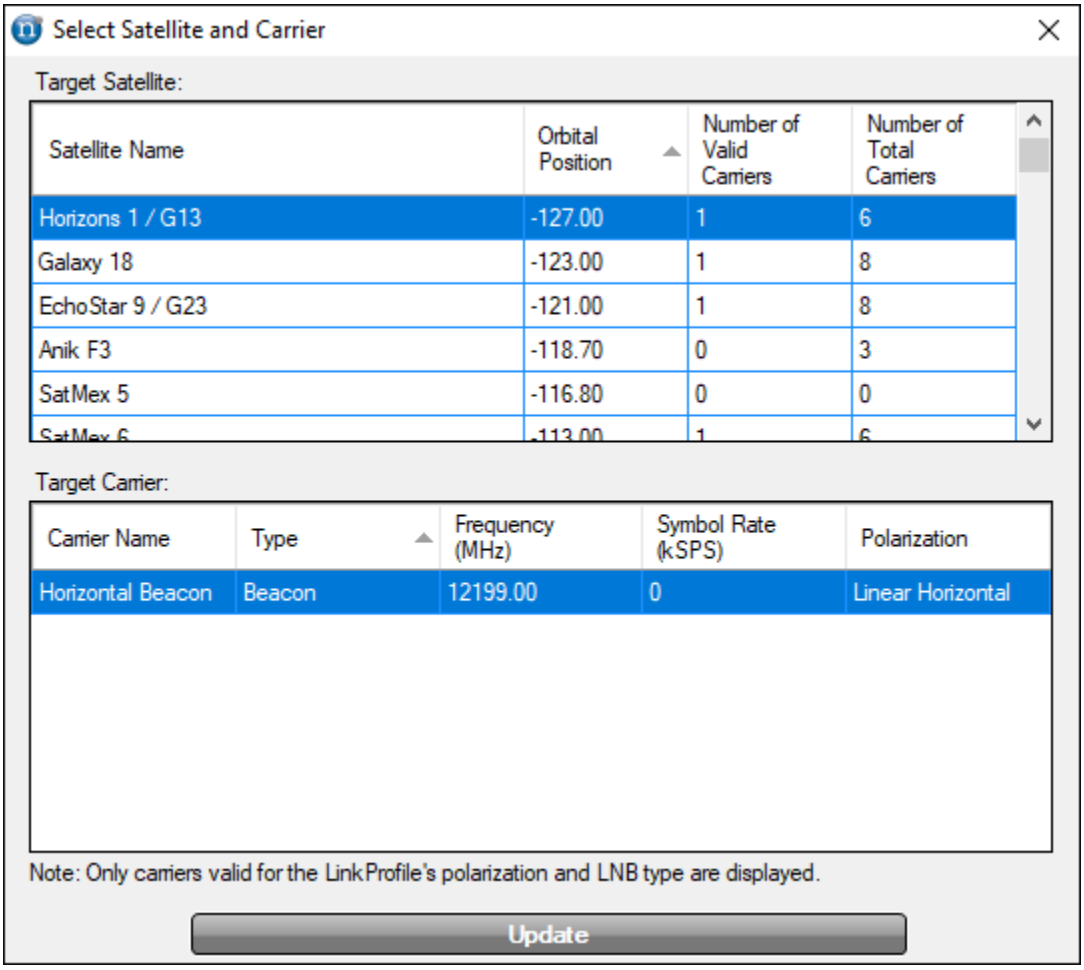


Figure 9: The Select Satellite and Carrier Window

13. From the **Select Satellite and Carrier** window, choose a target satellite and a target beacon or carrier. Then press the **Update** button to save the selections and close the Select Satellite and Carrier window.

Note: For COTM systems, only beacons can be selected. As such, only beacons will be shown in the list of carriers for each satellite.

14. Click on the **Save LinkProfile** button to save the LinkProfile.

15. Select the LinkProfile from the LinkProfile List and then click **Apply LinkProfile** to apply its settings to the system.

1.6.3 Editing an Existing LinkProfile

1. Navigate to the LinkProfiles page as described in section 1.6.1.
2. Select the LinkProfile to edit from the LinkProfile List.
3. Click on the **Edit LinkProfile** button.
4. Edit the LinkProfile as needed, following the steps described in section 1.6.2.
5. In the Edit LinkProfile window, click on the **Save LinkProfile** button to save the LinkProfile.

1.6.4 Making a New LinkProfile based on an Existing LinkProfile

1. Navigate to the LinkProfiles page as described in section 1.6.1.
2. Select the existing LinkProfile to serve as the base for the new LinkProfile from the LinkProfile List.
3. Click on the **Edit LinkProfile** button.
4. Give the LinkProfile a new, unique name.
5. Make any other desired changes to the LinkProfile.
6. Click on the **Save As A New LinkProfile** button to save the new LinkProfile.

1.6.5 Removing an Existing LinkProfile

1. Navigate to the LinkProfiles page as described in section 1.6.1.
2. Select the LinkProfile to be deleted from the LinkProfile List.
3. Click on the **Remove LinkProfile** button.
4. Confirm the deletion if prompted to do so.

1.6.6 LinkProfile Tips and Tricks

LinkControl 8 can support any number of LinkProfiles and we recommend that full advantage be taken of this. Some recommendations:

- Pick descriptive names that are easy to communicate via phone or voice radio links.
- Populate back-up satellites when available; you never know when a mountain will be in the way.

- If possible, test your LinkProfile in a depot environment.

1.7 System Monitoring

LinkControl 8 monitors and reports the state of the system as it runs. During operation, the health of various systems is monitored continually. The alarm entries at the bottom of the main user interface will keep you updated of major system occurrences. Additionally, a troubleshooter is provided to assist with resolving any issues.

In the event of an alarm, select **Help** in the LinkControl 8 Main Menu, and then **Troubleshooter** in the resulting pull-down menu to bring up the troubleshooting window. Alternatively click on the System Alarm indicator when it is in an Alarm or Warning state to bring up the troubleshooter window.

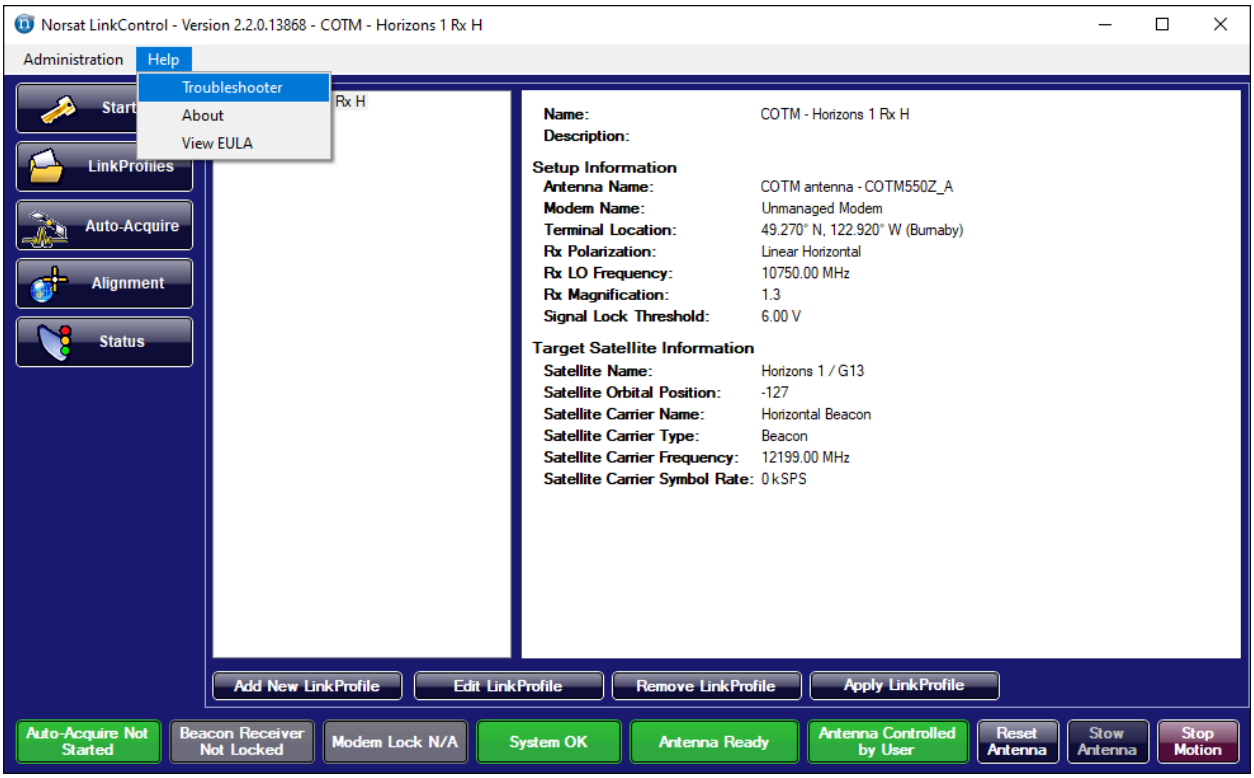


Figure 10: Accessing the Troubleshooter from the Main Menu

The troubleshooter will list each of the issues it has detected along with steps that can be taken to resolve the issue. Some issues may have multiple potential causes, so be sure to try all of the steps listed for each detected issue.

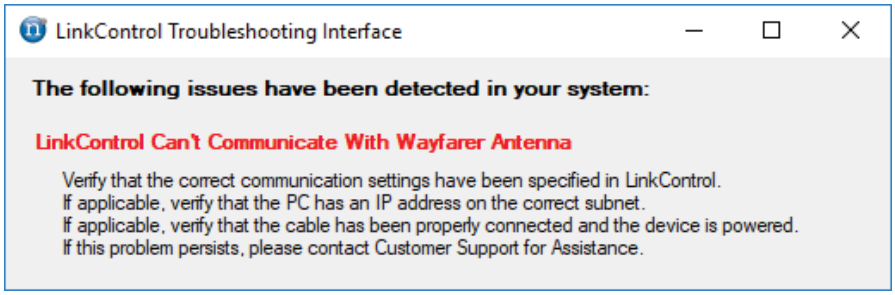


Figure 11: Sample Troubleshooter Window

To view a more detailed set of system status information, click on the **Status** navigation button on the left-hand side of the screen. The Status page displays information on the polarization, elevation and azimuth angles, the status of each of the limit switches, GPS readings, and compass readings.

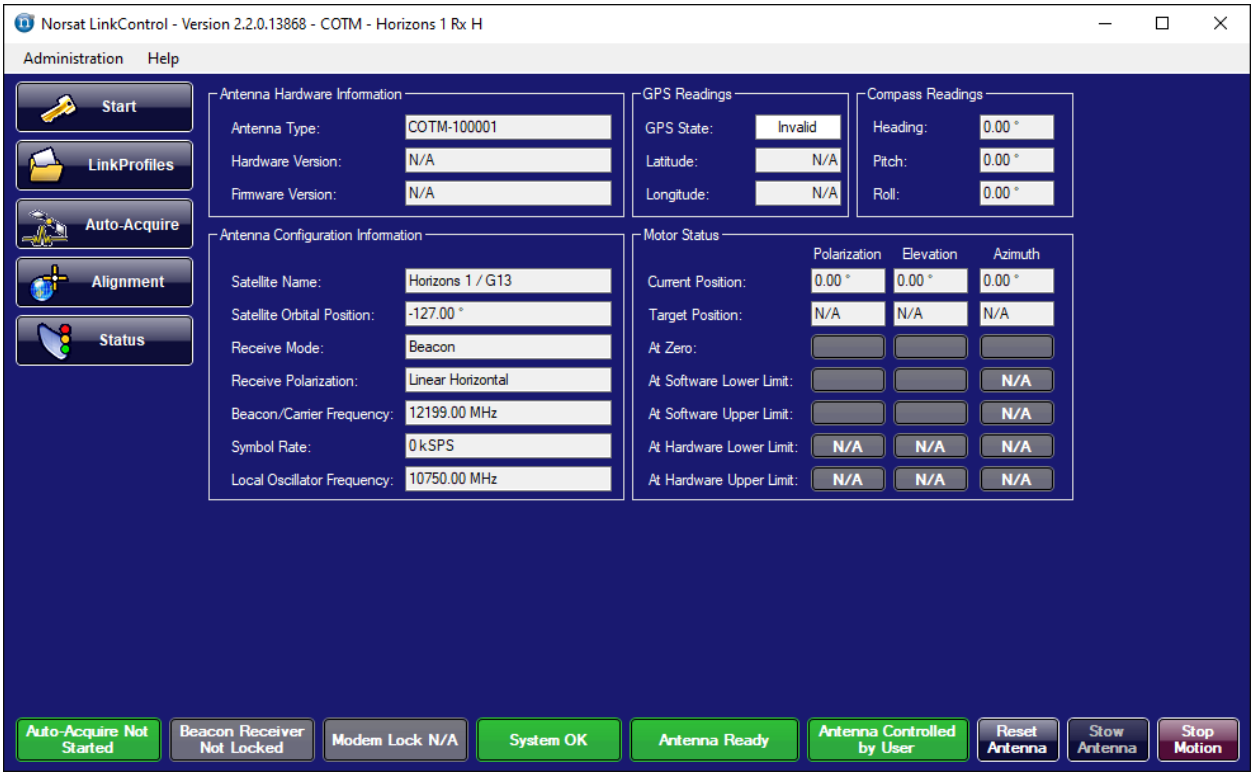


Figure 12: The Status Page

1.8 OpenAMIP Mode vs Non-OpenAMIP Mode

In normal system operation, the antenna is controlled by the user. The user may choose to move the antenna manually, or initiate Auto-Acquire to have the antenna automatically orient itself so that it is pointing at the target satellite. In OpenAMIP Mode, however, the antenna is controlled by the OpenAMIP-capable modem connected to the antenna, not by the user. This means that the user is prevented from initiating antenna motion to prevent interference with the modem's control.

If the user tries to reset or stow the antenna, they will be presented with a confirmation message, asking if they are sure they wish to proceed. If they proceed, LinkControl 8 will switch from OpenAMIP mode to non-OpenAMIP mode and then perform the specified action. If the user tries to stop the antenna from moving when it is in motion, the motion will stop without any confirmation and LinkControl 8 will switch from OpenAMIP mode to non-OpenAMIP mode.

The modem page may be used to switch between OpenAMIP mode and non-OpenAMIP mode. Additionally, applying a LinkProfile will switch to or from OpenAMIP Mode as appropriate.

1.9 Auto-Acquire

LinkControl 8 handles the antenna's Auto-Acquire functionality differently based on the mode it is operating in. The following sections describe the Auto-Acquire functionality for Non-OpenAMIP Mode and OpenAMIP Mode.

1.9.1 Auto-Acquire (Non-OpenAMIP Mode)

Note: Before using the Auto-acquisition function, 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.

Initiating Auto-Acquire

The following procedure explains how to use the LinkControl 8 software to automatically find a target satellite.

1. Ensure that the antenna is powered on and physically connected to the Host Computer.
2. Ensure that LinkControl 8 is running.
3. Wait for all indicators on the Start page to show up as "OK" or "N/A".

Figure 13: Start Page showing All Indicators at OK or N/A

4. Click the **LinkProfiles** navigation button on the left-hand side of the screen, and ensure that a valid LinkProfile has been applied. If this is not the case, apply a valid LinkProfile.

   Note: See sections 1.5 and 1.6 for instructions explaining how to make changes to the Satellite Almanac and how to configure LinkProfiles.

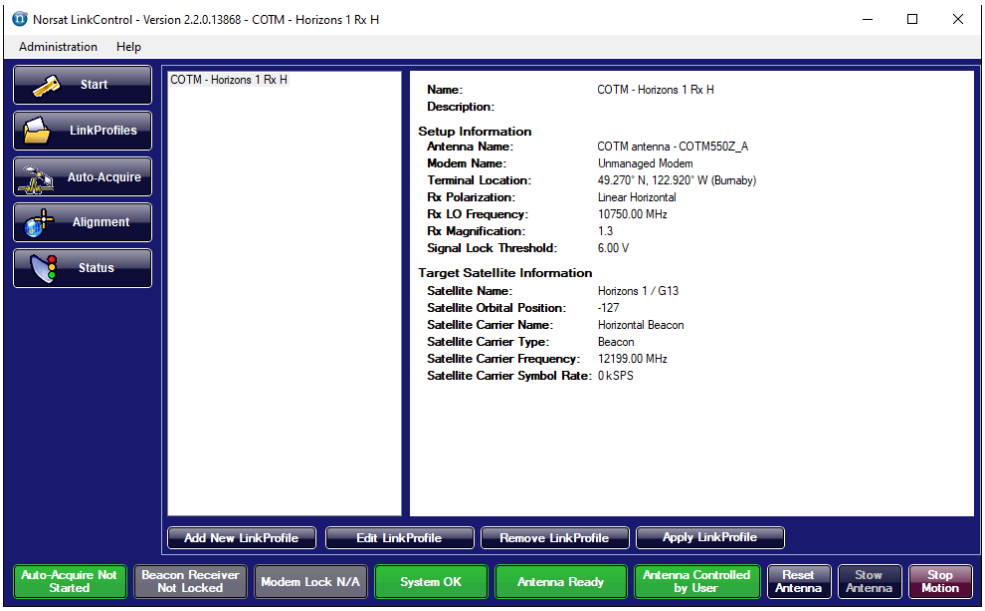


Figure 14: The LinkProfile Page

5. 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.

6. Click the Auto-Acquire navigation button on the left-hand side of the screen and verify that the details listed in the **Active LinkProfile Details** field are correct.

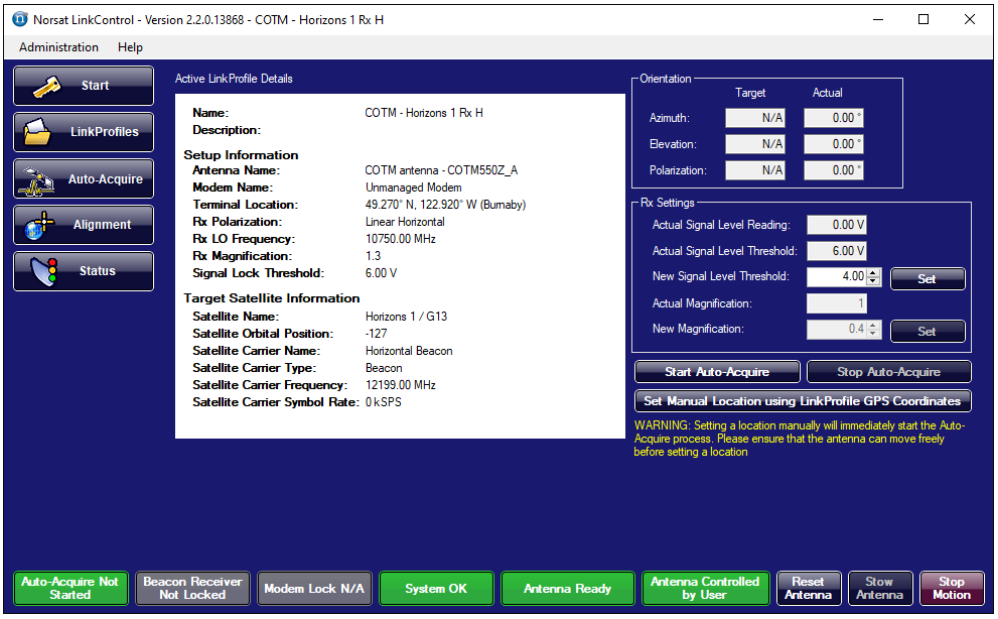


Figure 15: The Auto-Acquire Page

7. Click on the **Start Auto-Acquire** button and the antenna will start auto-acquisition using the pre-set signal level threshold from the LinkProfile.

   The Auto-Acquire indicator at the bottom of the screen will turn green once the Auto-Acquire process has started and will remain green if there has been a successful acquisition. It will turn red if the Auto-Acquire failed.

8. Monitor the **Actual Signal Level Reading** reported while the antenna is going through the Auto-Acquire process, and observe the difference of the signal level peaks during pointing. If the signal level is consistently too low relative to the Signal Level Threshold, or if the received signal seems to be saturating the Actual Signal Level Reading, then stop Auto-Acquire and modify your LinkProfile's Magnification and/or Signal Level Threshold to compensate for the signal being received.

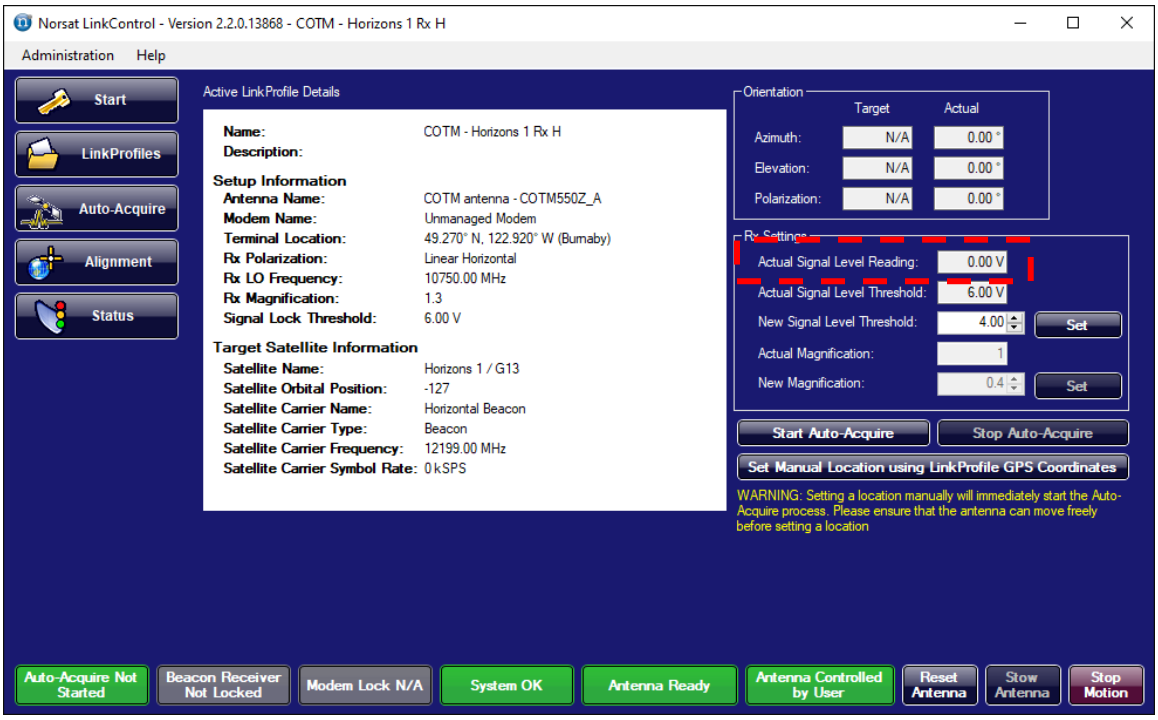


Figure 16: The Signal Level Reading

If you need to change your LinkProfile while Auto-Acquire is running, follow the steps outlined below:

1. Click **Stop Auto-Acquire**.

2. Click the **LinkProfiles** navigation button on the left-hand side of the screen.

3. Select a different LinkProfile from the LinkProfiles List and then click on **Apply LinkProfile**.

1.9.2 Auto-Acquire (OpenAMIP Mode)

Note: Before using Auto-Acquire while the system is in OpenAMIP Mode, ensure that a LinkProfile has been set up for use with the modem and that the Satellite Almanac contains an entry for the satellite that the modem will attempt to acquire on (along with at least one beacon or carrier for the satellite that corresponds with the desired Rx Polarization settings). OpenAMIP will supply only the orbital position of the target satellite, and LinkControl 8 uses the Satellite Almanac to get additional information about the target satellite and target beacon/carrier.

Initiating Auto-Acquire

At some point after communication has been established with the OpenAMIP modem (typically as soon as the modem has finished booting up and has sent the target satellite details to LinkControl 8), the modem will attempt to initiate Auto-Acquire for the antenna. Upon receiving the request to start Auto-Acquire, LinkControl 8 will prompt the user to either allow or deny the action. This allows a user to confirm that it is safe for the antenna to perform Auto-Acquire before the antenna starts moving. When presented with a prompt to take action, select **Proceed** to allow Auto-Acquire to start, or select **Abort** to prevent Auto-Acquire from starting.

Figure 17: The Prompt To Take Action

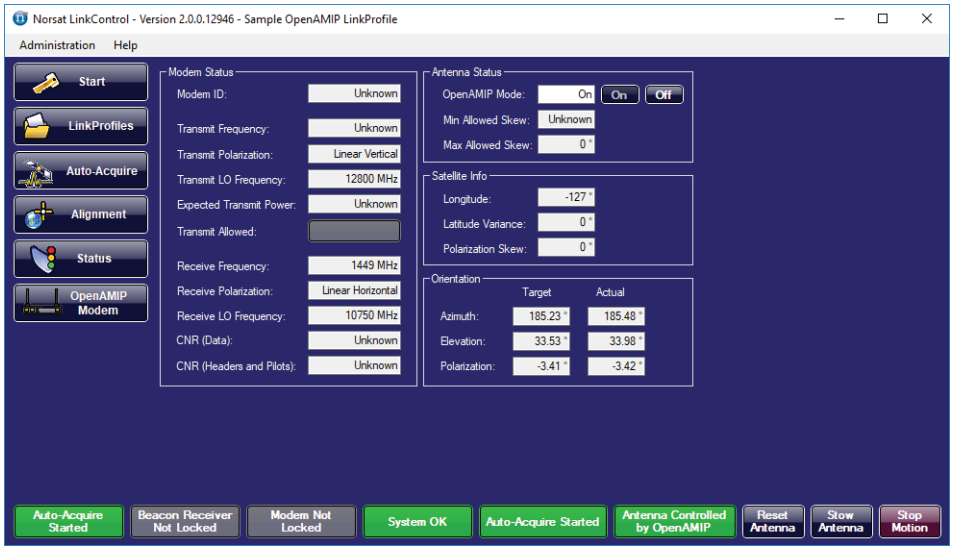
The prompt to take action is configured with a timeout; if no action from the user is detected after a pre-set amount of time (30 seconds by default, though this may change on a system-by-system

basis) then the Default Action (which is Abort by default for safety reasons) will be performed. The prompt to take action window will show both the Default Action and the time remaining (counting down to zero) before the Default Action is taken.
If the Proceed action is selected (either by pressing the Proceed button or if the timer expires and the Default Action is Proceed) then Auto-Acquire will be started automatically and will proceed as described in section 1.9.1. If the Abort action is selected (either by pressing the Abort button or if the timer expires and the Default Action is set to Abort) then Auto-Acquire will not be started and the system will be put in Non-OpenAMIP Mode. Additionally, if the antenna is manually stopped, reset, or stowed while Auto-Acquire is active, Auto-Acquire will be stopped and the system will be put in Non-OpenAMIP Mode. The system can be put back into OpenAMIP Mode using the OpenAMIP Modem page described in section 1.10.

Note: If the signal level reading remains 0.00 during Auto-Acquire, it is possible that the Auto-Acquire process is using an inactive beacon or carrier. Once the auto-acquire fails, LinkControl 8 will automatically initiate another attempt at Auto-Acquire using a different beacon or carrier on the same satellite.

1.10 OpenAMIP Modem Details

If you have an OpenAMIP-capable modem defined in your system configuration, and if that modem has been selected in the active LinkProfile, then LinkControl 8 will monitor various pieces of information about the modem on the OpenAMIP Modem page. To access this page, click on the **OpenAMIP Modem** navigation button on the left side of the screen. The page shows various modem parameters, information about the target satellite, and a comparison of the target orientation and the current orientation of the antenna.



The page can also be used to enable or disable OpenAMIP Mode for the system using the buttons in the Antenna Status section.

- If the system is in OpenAMIP Mode, the On button will be disabled and the Off button will be enabled; click the Off button to put the system in Non-OpenAMIP Mode to allow users to manually control the antenna.
- If the system is in Non-OpenAMIP Mode, the On button will be enabled and the Off button will be disabled; click the On button to put the system in OpenAMIP Mode to allow the modem to control the antenna.

  Note: Putting the system in OpenAMIP Mode may result in the modem automatically starting the Auto-Acquire process. Please refer to section 1.9.2 for additional details.

1.11 Tracking

For Comms On The Move antennas, satellite tracking automatically initiates upon a successful Auto-Acquire. The antenna action status will change from **Pointing** to **Tracking**.

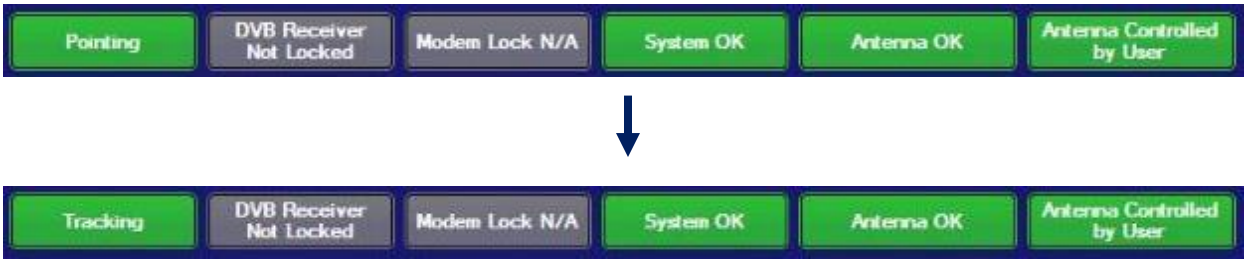


Figure 18: State Transition from Pointing to Tracking

Should the antenna lose satellite lock, the antenna will remain in tracking mode, but the antenna status will change from **Antenna OK** to **Losing Lock**.

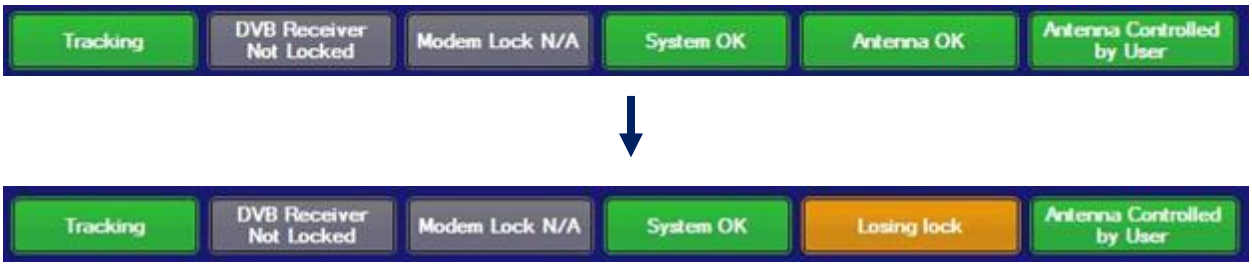


Figure 19: State Transition from Tracking to Losing Lock

1.12 Motor Control

Manual control of the antenna motors allows a satellite to be located manually instead of using the antenna's auto-acquire functionality. Full control is provided for the polarization, elevation, and azimuth motors.

1.12.1 Reset Antenna

The antenna must be reset every time the antenna is powered on before Auto-Acquire or movement using the manual motion controls can be initiated. The reset moves the antenna in a predetermined pattern that allows it to properly track its orientation. If Auto-Acquire is started without having performed a reset first, the antenna will automatically perform a reset and then initiate Auto-Acquire. A reset will not be performed automatically if the motors are moved manually without having reset the antenna first, so take care to perform a reset before moving the motors. To reset the antenna, press the **Reset Antenna** button located on the bottom-right of the screen.

Figure 20: Bottom Indicators and Controls showing the Reset Button Location

1.12.2 Stop Motion

While the antenna is in motion, all motors can be stopped from any page at any time by pressing the **Stop Motion** button in the bottom right of the screen. Unlike the other buttons in LinkControl 8's user interface, this button is colored red so that it is always easy to find.

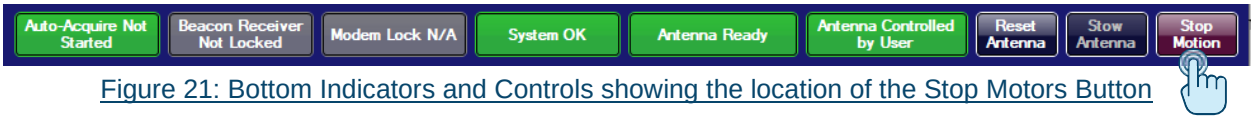


Figure 21: Bottom Indicators and Controls showing the location of the Stop Motors Button

1.12.3 Movement Controls

The antenna's polarization, elevation, and azimuth motors can all be moved manually. Click on the **Alignment** navigation button on the left side of the screen to bring up the Alignment page, which provides multiple controls that can be used to move each motor.

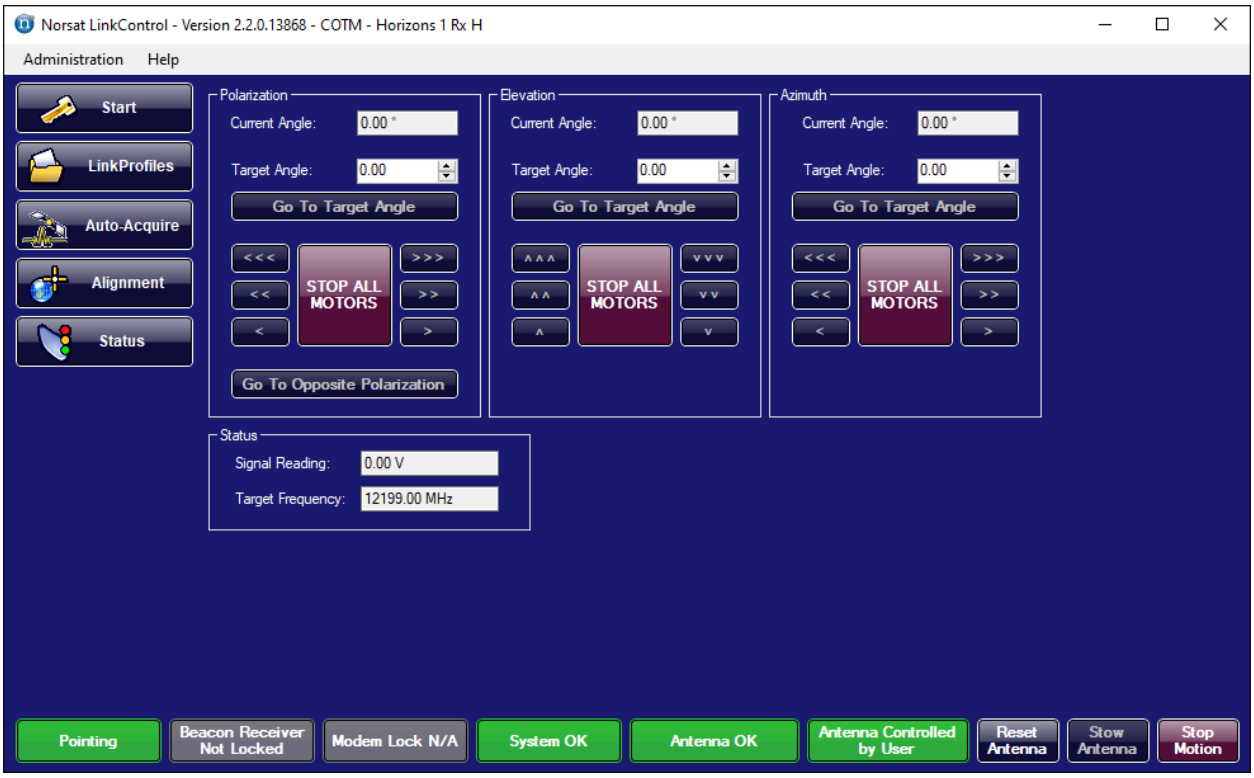


Figure 22: The Motor Controls on the Alignment Page

The controls for each motor are identical with one exception: the polarization motor controls feature one additional button that allow users to move to the opposite polarization. Pressing this button will move the polarization motor 90 degrees (clockwise or counterclockwise as appropriate based on the current position of the motor) to reach the opposite polarization.

Each set of controls shows the current orientation of the motor, and allows a Target Angle to be specified for the motor. Pressing the **Go To Target Angle** button will cause the appropriate motor to move to the specified target angle. Six arrow buttons and a Stop All Motors button are also provided for each motor. The Stop All Motors button will stop **all** of the motors, not just the motor that corresponds to the button that is pressed. All three Stop All Motors buttons thus have identical functionality, and also behave identically to the Stop Motors button described in section 1.12.2. The functionality of the arrow buttons is described in the table below:

MOTOR	BUTTON	FUNCTION
Polarization	<<<	Move to lower limit
	<<	Coarse nudge towards lower limit
	<	Fine nudge towards lower limit
	>	Fine nudge towards upper limit
	>>	Coarse nudge towards upper limit
	>>>	Move to upper limit
Elevation	^^^	Move to upper limit
	^^	Coarse nudge towards upper limit
	^	Fine nudge towards upper limit
	v	Fine nudge towards lower limit
	vv	Coarse nudge towards lower limit
	vvv	Move to lower limit
Azimuth	<<<	Move to lower limit
	<<	Coarse nudge towards lower limit
	<	Fine nudge towards lower limit
	>	Fine nudge towards upper limit
	>>	Coarse nudge towards upper limit
	>>>	Move to upper limit

Table 1: Arrow Button Actions

Note: By default, a coarse nudge moves 5.0 degrees, and a fine nudge moves 0.1 degrees.

Note: Because the COTM Azimuth motor is not limited, the azimuth motor will continue to turn until stopped if (<<<) or (>>>) is pressed.

2. Advanced Features

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

2.1 Host Computer Ethernet Adapter Configuration

The Host Computer needs to be able to communicate with the antenna and optionally an OpenAMIP Modem via Ethernet. This requires the Host Computer's networking setting to be configured in a way that facilitates this communication. To achieve this, the Host Computer and the antenna need to be on the same subnet; the easiest way to achieve this is to modify the IP Address of the Host Computer so that it is compatible with the IP Address of the antenna.

Note: You will need Administrator Privileges to be able to change the Host Computer's IP Address configuration.

All Norsat Wayfarer antennas use the same communication settings by default:

IP Address: 192.168.0.7

Subnet Mask: 255.255.255.0

Port: 8899

It is thus recommended to use 192.168.0.8 as the IP Address for the Host Computer.

To change a Host Computer's IP Address, start by going to the Windows Control Panel. Ensure that the items shown in the Control Panel are shown using Large Icons.

Note: Different versions of Microsoft Windows have slightly different ways of configuring IP Addresses. While the basic steps are essentially the same for all versions, some details may differ slightly. The instructions below explain how to change an IP Address for a Host Computer running Microsoft Windows 10.

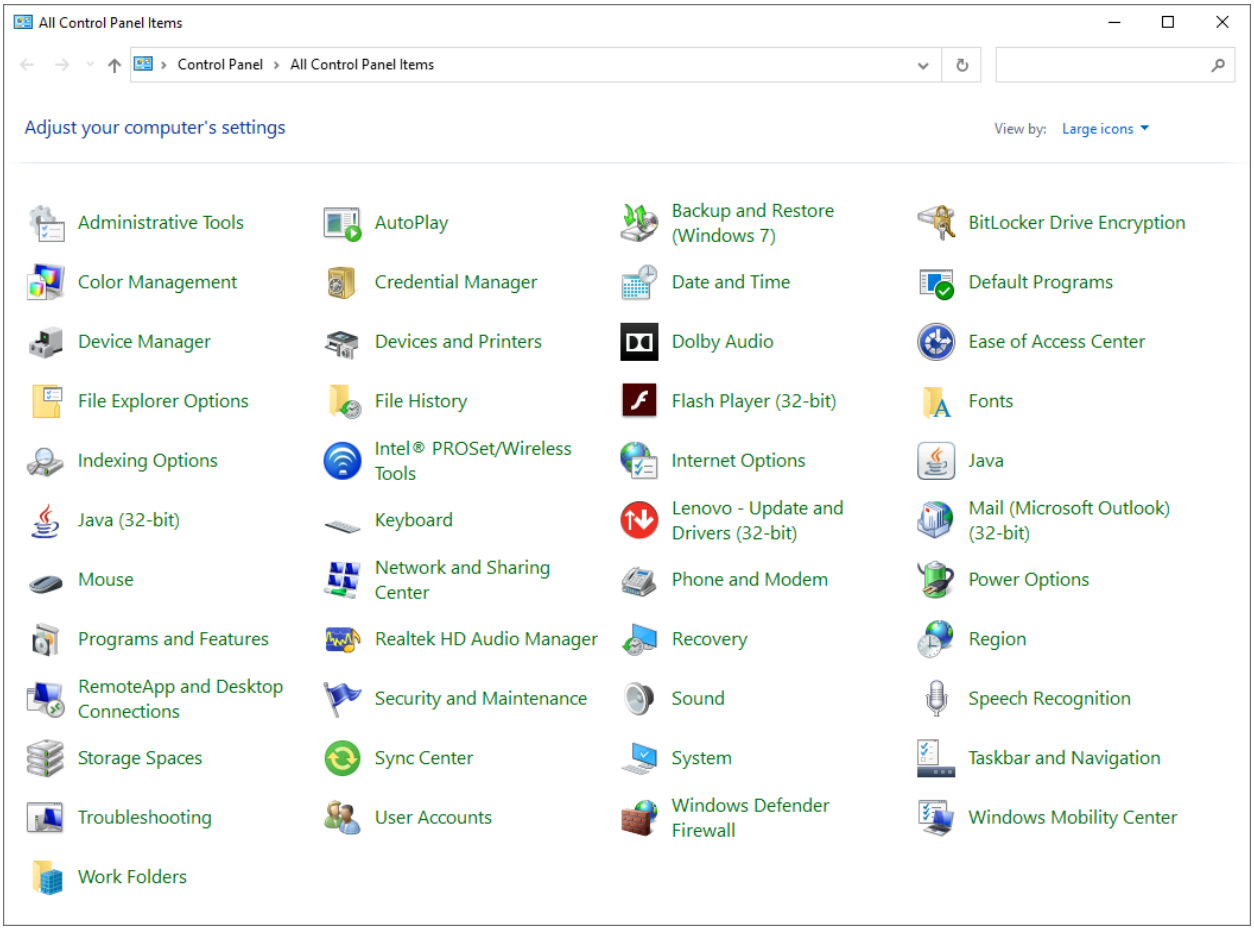


Figure 23: The Windows Control Panel showing Large Icons

Click on the **Network and Sharing Center** icon to bring up the Network and Sharing Center window.

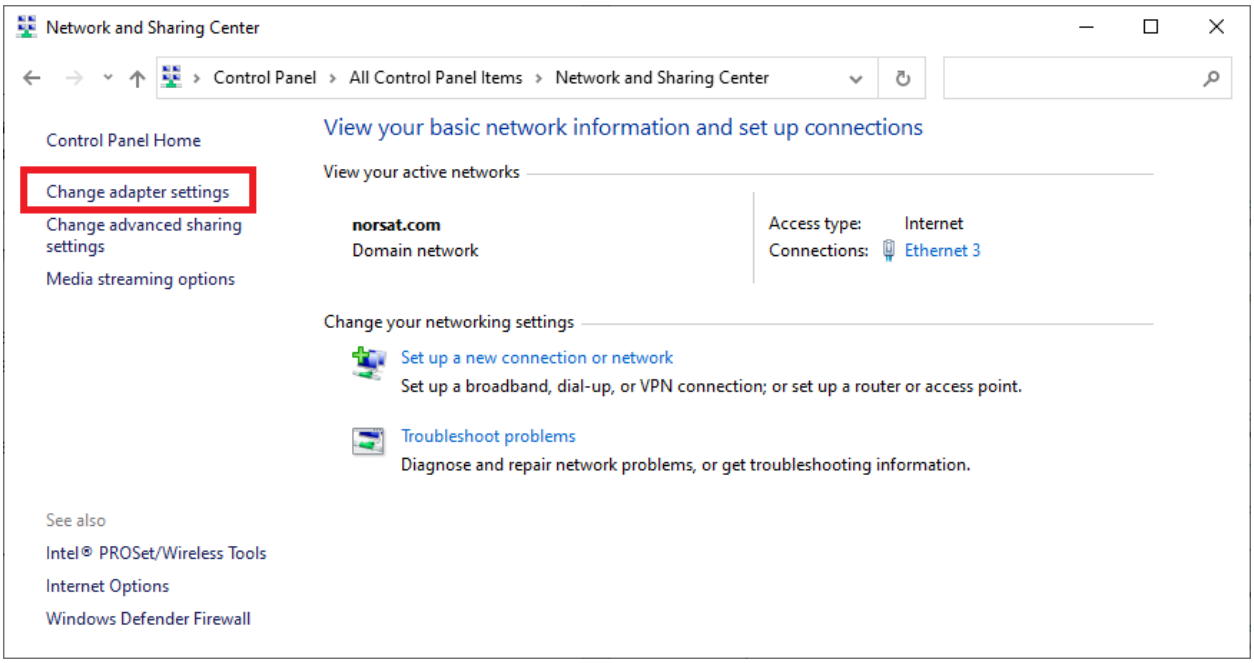


Figure 24: The Network and Sharing Center

Click on **Change Adapter Settings** on the left side of the window. This will bring up a list of Network Adapters for the Host Computer.

Right-click on the Ethernet Network Adapter used for the connection to the antenna and select **Properties** from the resulting pop-up menu.

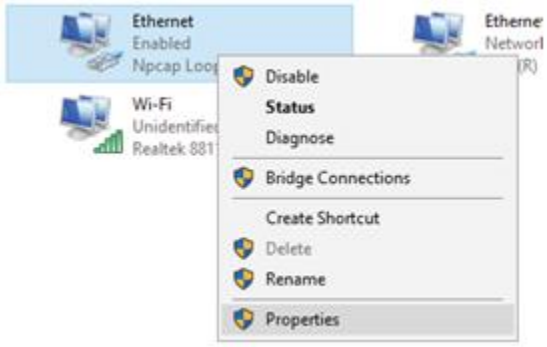


Figure 25: Accessing the Properties for a Network Adapter

This will bring up the Properties windows for the Network Adapter.

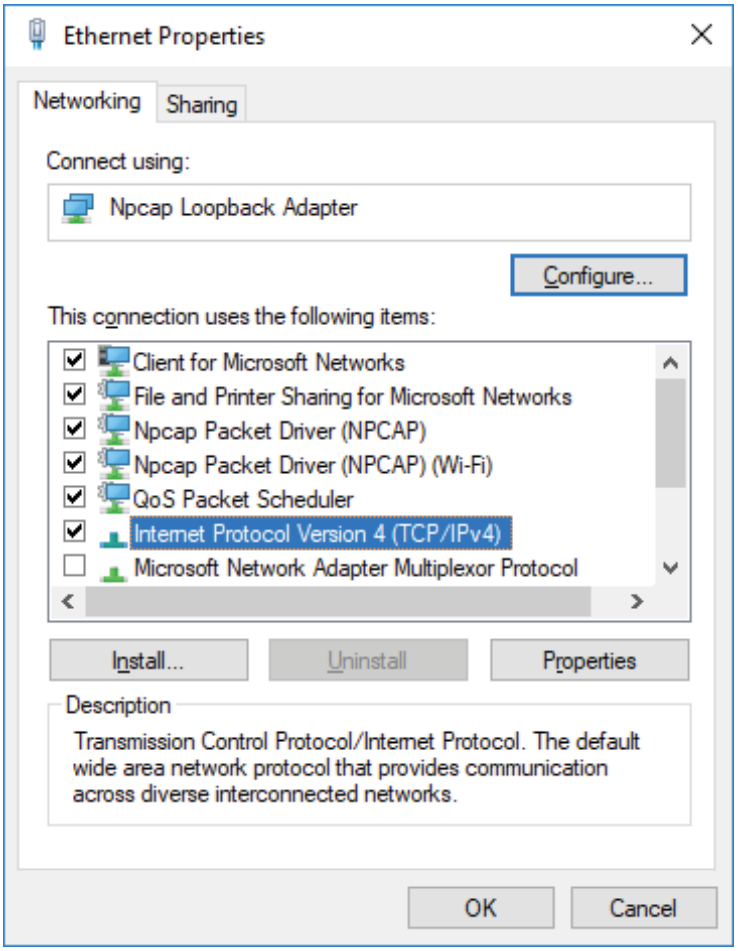


Figure 26: Network Adapter Properties

Ensure that **Internet Protocol Version 4 (TCP/IPv4)** is selected and then click on the **Properties** button to bring up the Internet Protocol Version 4 (TCP/IPv4) Properties window.

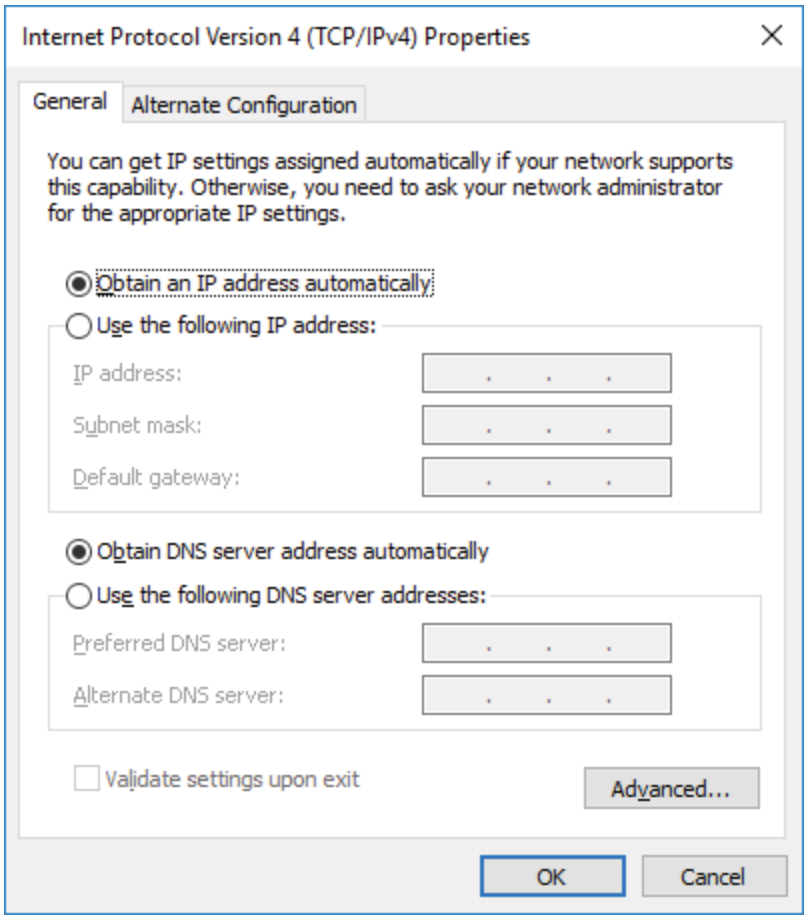


Figure 27: The Internet Protocol Version 4 (TCP/IPv4) Properties Window

Click on the **Use the following IP Address** radio button, and then enter a compatible IP Address in the **IP address** field, and enter 255.255.255.0 in the **Subnet mask** field.

If you are also using the Host Computer to communicate with an OpenAMIP-capable modem, then click on the **Advanced** button to bring up the Advanced TCP/IP Settings window.

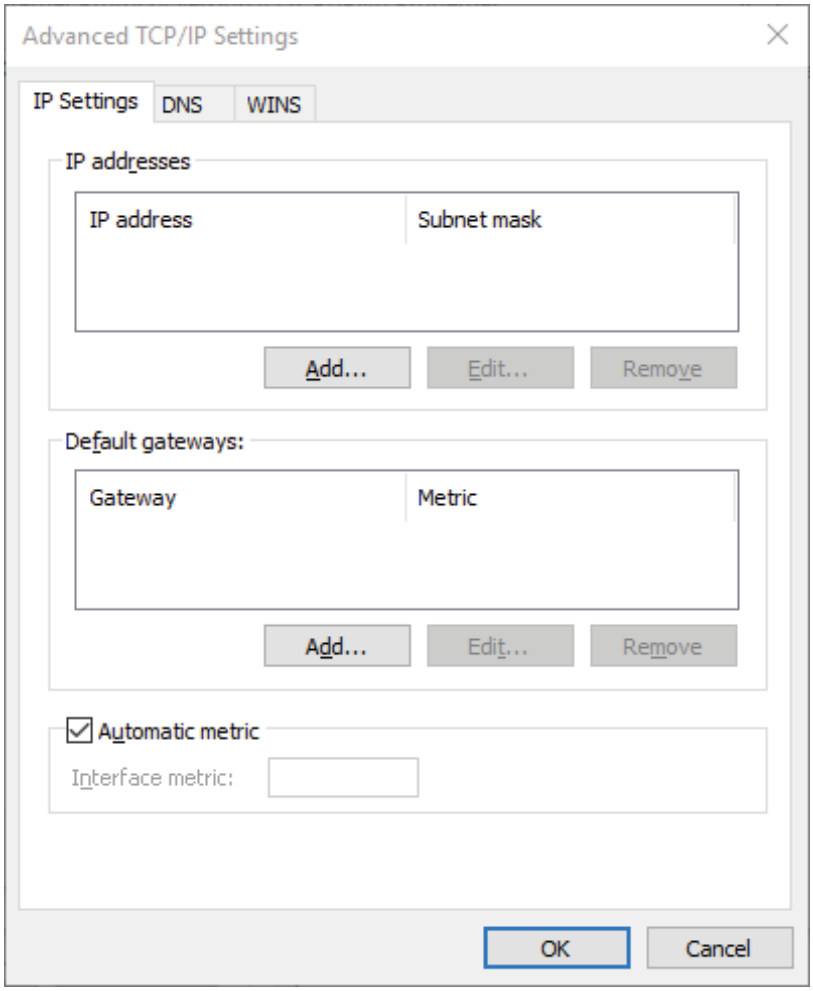


Figure 28: The Advanced TCP/IP Settings Window

Click on the **Add…** button in the *IP addresses* section to bring up a TCP/IP Address window that can be used to add a new IP Address to the adapter.

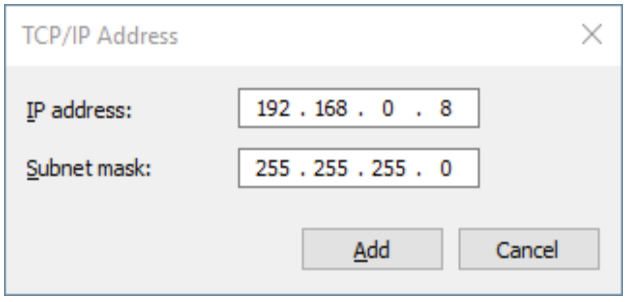


Figure 29: The TCP/IP Address Window used to Add a New IP Address

Enter an IP Address that is compatible with the modem's OpenAMIP IP Address in the **IP address** field, and then enter 255.255.255.0 in the **Subnet mask** field.

Click on the **Add** button to add the new IP Address to the adapter.

Click on the **OK** button in the Internet Protocol Version 4 (TCP/IPv4) Properties window, and then click on the **OK** button in the Network Adapter Properties window to save the IP Address(es).

Note: If you are using two separate connections to communicate with the antenna and the modem, then configure each of the Network Adapters with only a single IP Address.

2.2 LinkControl 8 Device Manager Configuration

In order to communicate with each of the components in the system, LinkControl 8 needs to know the communication settings for each component. This is done using the LinkControl 8 Device Manager.

WARNING: Incorrectly specifying a component's communications settings will prevent LinkControl 8 from communicating with that component properly, and will result in a loss of some or all system functionality until the proper communication settings are provided.

The LinkControl 8 Device Manager can be accessed through the program's main menu. Click on **Administration > Device Manager** to bring up the Device Manager window.

Figure 30: Accessing the LinkControl 8 Device Manager

The Device Manager shows a list of all the devices (antennas and modems) present in the system configuration. It is possible to have more components defined in the system configuration than are used at any one time. This allows a single Host Computer to be used with multiple antennas or modems.

2.2.1 Basic Configuration

To change a device's communication settings, start by clicking on the entry for the device to configure in the list of devices.

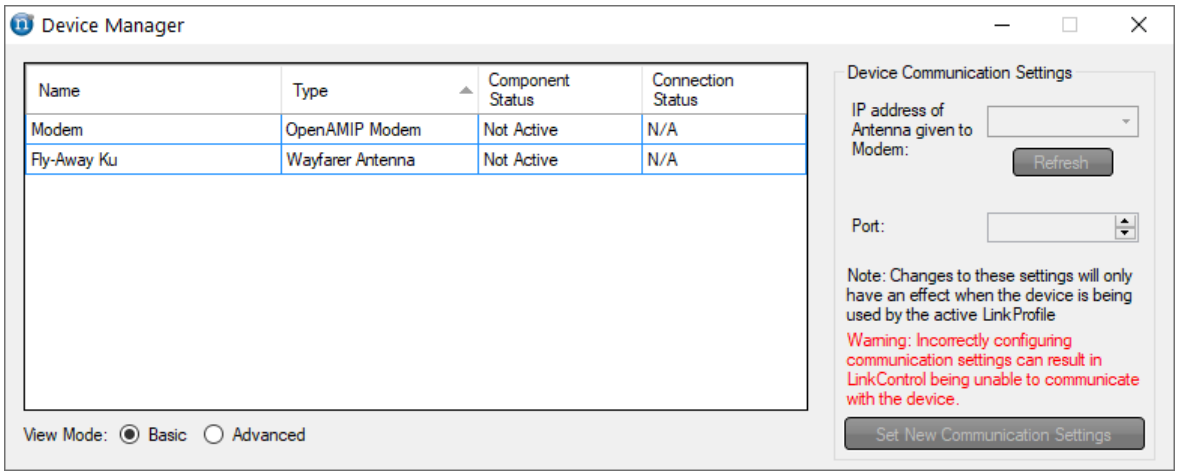


Figure 31: The Device Manager's List of Devices

Once a device has been selected, the communication settings for that device will be shown on the right side of the window. For antenna devices, use the controls to specify an IP Address and Port to use for TCP/IP communication. Click on the **Set New Communication Settings** button to save the IP Address and Port.

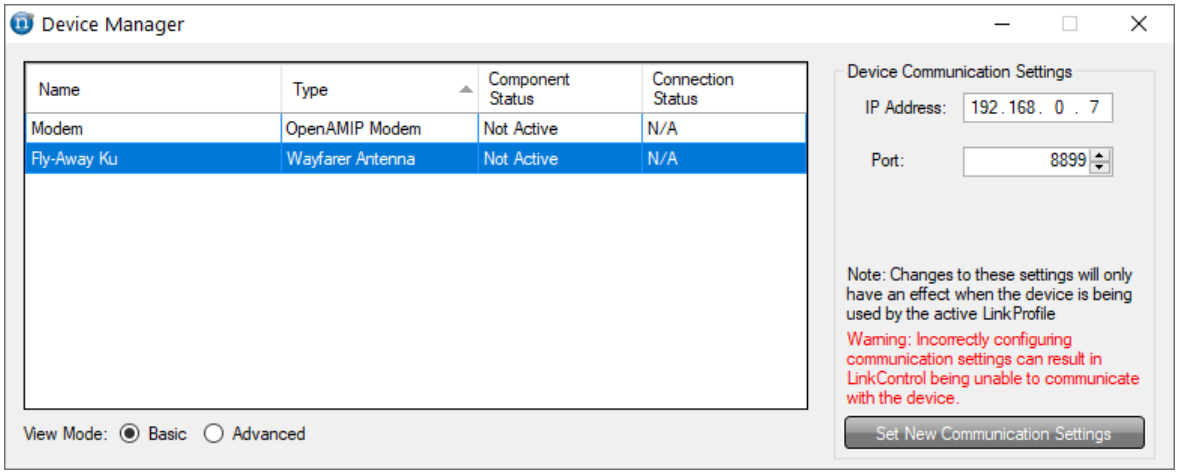


Figure 32: Communication Settings for an Antenna

To configure an OpenAMIP-capable modem, click on the modem to bring up its communication settings. Select the Host Computer IP Address that will be passed to the modem, and specify the

Port that will be used for communication. LinkControl 8 will listen on this port for an incoming connection from the OpenAMIP-capable modem. Click on the **Set New Communication Settings** button to save the IP Address and Port.

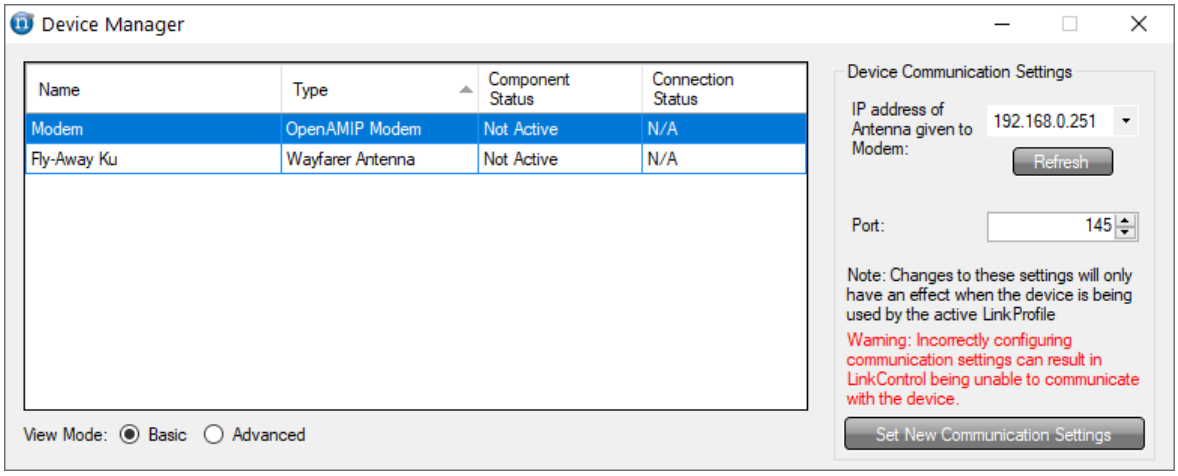


Figure 33: Communication Settings for an OpenAMIP-Capable Modem

2.2.2 Advanced Configuration

It may be necessary to ad or remove devices from the system configuration, or to edit the advanced settings for a device. The Device Manager provides this functionality, but only in its Advanced Mode.

WARNING: Deleting required devices from the system configuration will render the system non-functional. Incorrect advanced settings for a device may also result in a loss of some or all system functionality until the proper settings are restored.

By default, the Device Manager always starts in Basic Mode. To enable the Advanced Mode for the Device Manager, click on the **Advanced** radio button in the bottom-left corner of the Device Manager window. If prompted for a password, enter the following password:

norsat

The Device Manager will now be in Advanced Mode, with the Add Device, Edit Device, and Remove Device buttons visible.

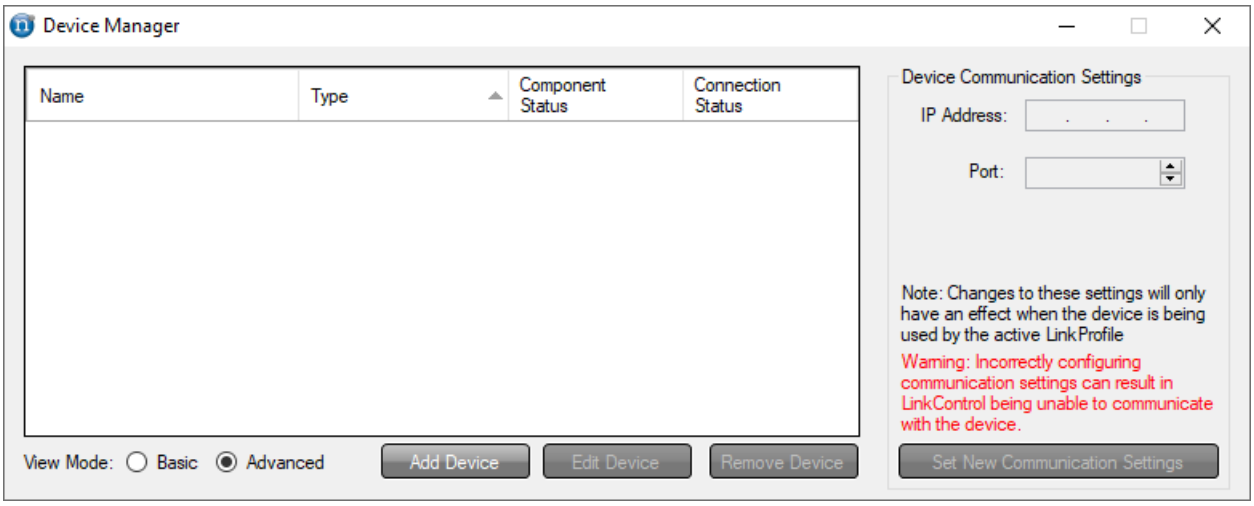


Figure 34: The Device Manager's Advanced Mode

2.2.2.1 Adding Devices

The following steps explain how to add a device to the system configuration:

1. Ensure that the Device Manager is in Advanced Mode.
2. Click on the **Add Device** button. This will start the Add Device Wizard.

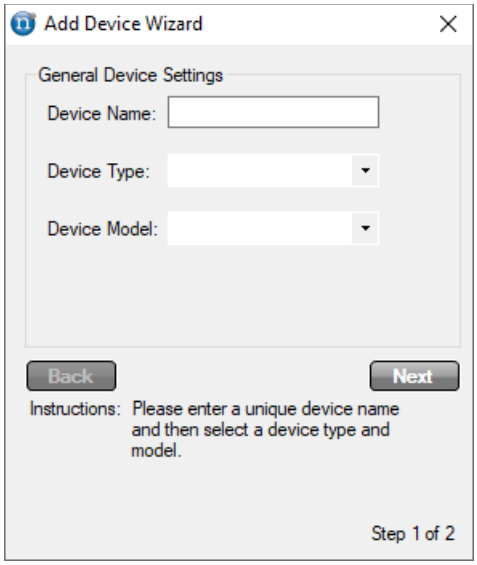


Figure 35: The First Page of the Add Device Wizard

3. Enter a unique device name for the device in the **Device Name** field. This name will be used when selecting a device in LinkProfiles, so ensure that the name is adequately descriptive.

   Specify the **Device Type** and **Device Model** using the pull-down menus. The device types and models currently supported by LC8 are as follows:

Device Type	Device Model
Wayfarer Antenna	WDA120KU
	WFA120KU
	WFA120KA
Comms on the Move Antenna	COTM550Z_A
OpenAMIP Modem	N/A

Table 2 - Supported device types

   Note that if a particular Device Type has only one available Device Model, the Device Model will be specified automatically and cannot be changed.

4. Click the **Next** button to bring up the second page of the Add Device Wizard. This page will allow the communication parameters for the device to be specified.

5. Most antennas and modems use TCP/IP communication via Ethernet. Use the controls on the page to enter the IP Address and Port to use for communication with the device. By default, all Norsat Wayfarer antennas will use an IP Address of **192.168.0.7**, and will use **8899** as the Port.

Figure 36: TCP/IP Communication Settings

6. If the device uses Serial communication instead of TCP/IP, click on the **Serial** radio button to switch to the serial communication configuration interface. Note that devices that support only TCP/IP communication will not display the IP and Serial radio buttons.

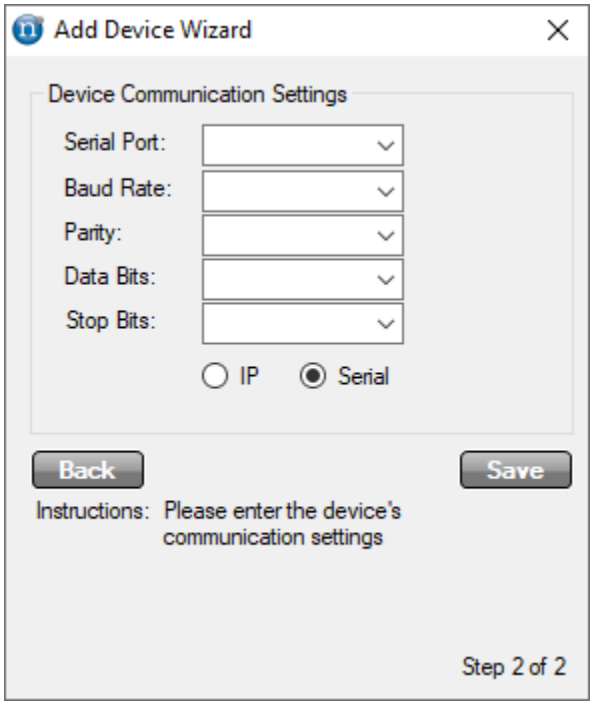


Figure 37: Serial Communication Settings

Use the pull-down menus to specify each parameter. For the Serial Port parameter, please specify the COM Port that the device was plugged into.

Factory default serial communication settings are as follows:

Setting	Default Value
Baud Rate	115200
Parity	None
Data Bits	8
Stop Bits	1

Table 3 – Default Serial Communication Settings

7. Click on the **Save** button to save the settings for a COTM Antenna. For other devices, there will be an additional page of settings to configure; click on the **Next** button instead to proceed to the settings for these devices.

8. Use the provided controls to specify the required parameters for the device. Sample configuration pages are shown below.

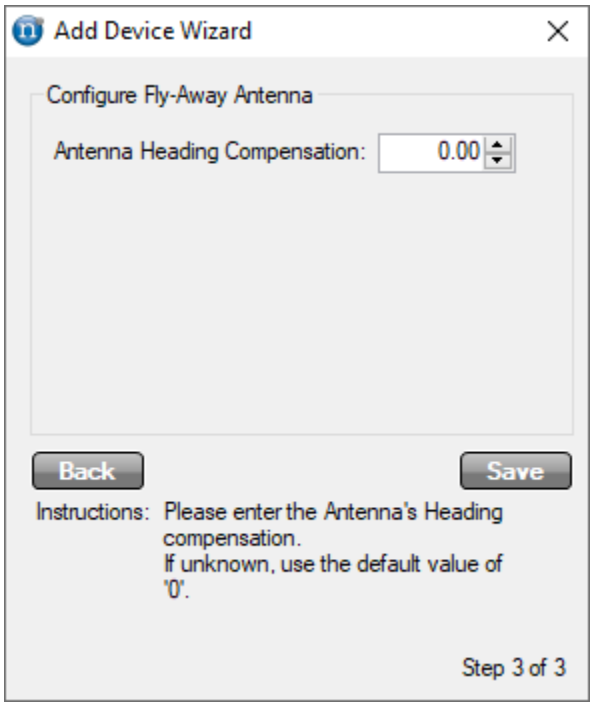


Figure 38: Final Configuration Page for WFA120KU Antenna

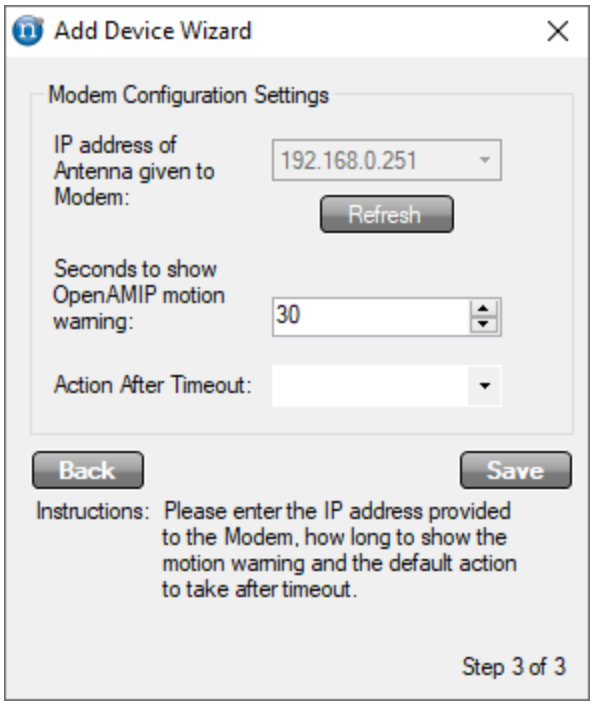


Figure 39: Final Configuration Page for OpenAMIP Modem

9. Once all of the settings have been specified for the device, click the **Save** button to add the device to the system configuration.

2.2.2.2 Editing Devices

The following steps explain how to edit the advanced settings for a device in the system configuration:

1. Ensure that the Device Manager is in Advanced Mode.

2. Select the device to be edited from the list of devices, and then click the **Edit Device** button. This will bring up the configuration interface for that device. The interface will have common configuration parameters along the top row of the window, and parameters that are specific to the device model below these common parameters.

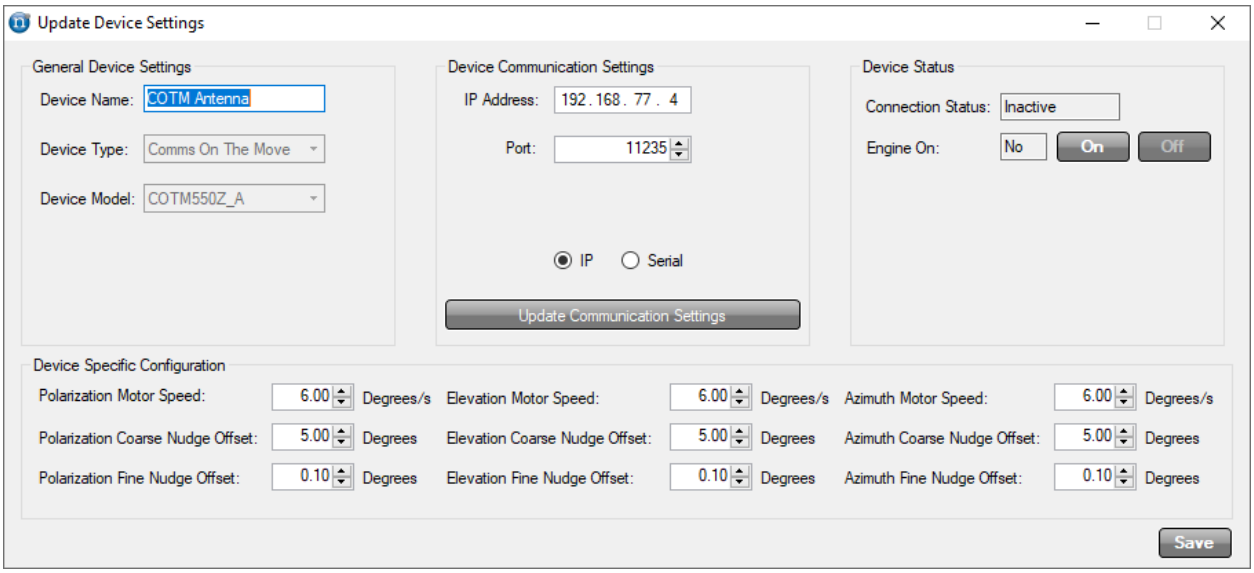


Figure 40: Configuration Interface for COTM Antenna

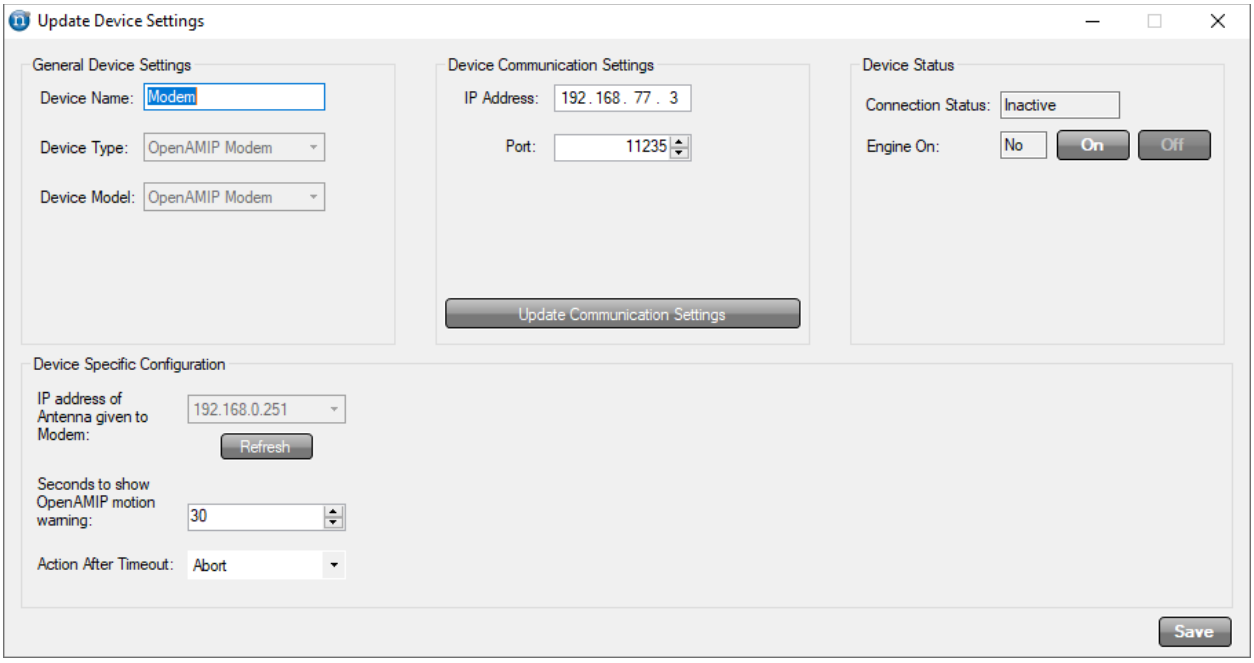


Figure 41: Configuration Interface for OpenAMIP Modem

3. In the General Device Settings box, the **Device Name** can be changed as desired. This name will be used when selecting a device in LinkProfiles, so ensure that the name is adequately descriptive.

4. In the Device Communication Settings box, the communication settings can be changed. To set the communication settings, specify the new IP address and port (or serial port settings) and press the **Update Communication Settings** button. Note that devices that support only TCP/IP communication will not display the IP and Serial radio buttons.

5. The Device Status box shows the communication status for the device. The driver engine can be turned off to pause communication with the device, or turned on to initiate or resume communication with the device. It is recommended that the engine be turned off prior to changing communication settings. All possible device communication states can be seen in the table below:

Engine On	Connection Status	Meaning
No	Inactive	Device is not attempting to connect
Yes	Connecting	Device is attempting to connect
	Connected	Device is communicating successfully
	Disconnected	Device failed to connect

Table 4 - Device Connection States

6. The Device Specific Configuration box provides the ability to configure parameters that are specific to the device's Device Model. Change these as required and then press the **Save** button to save the settings. Note that this will cause the connection to restart.

2.2.2.3 Deleting Devices

The following steps explain how to remove a device from the system configuration:

1. Ensure that the Device Manager is in Advanced Mode.
2. Select the device to be removed in the list of devices.
3. Click the **Remove Device** button to remove the device from the system configuration.

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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