IsoTropic Networks

iDirect

Satellite Router

Winegard

2-Way VSat Antenna Training Manual

This Document Contains Confidential and Proprietary Information

Contents

Goal: This iSite Guide is intended to help you quickly configure an iDirect Satellite Routers at remote sites and to give an overview of the tools the iSite software provides. This document applies to both modem and Evolution series Satellite Routers.

1 Required Equipment

You will need the following equipment and software to successfully commission the Satellite

Router in the field:

• A console cable with DB9 adapter. (Not required for Evolution X1 remote.)

• A crossover LAN cable

• A digital (or analog) voltmeter plus adaptor from voltmeter to IFL "F" connector

• A hand-held GPS unit or a map that shows your current geographic location coordinates

• A laptop (or PC) with:

• Window 7, Windows XP or Windows 2000, Service Pack 3

• A minimum of 512 MB RAM

• A minimum processor speed of 1 GHz

• A minimum of 50 MB of free disk space

• The correct options file provided to you by your Service Provider

• The correct remote software and board support packages from the IsoTropic Networks Web page: www.isosat.net

Note: disabling the firewall on your laptop is required to ensure complete functionality.

These instructions guide you through the process of installing the iSite software and remote images onto your laptop or PC. The software may be downloaded from the IsoTropic Networks Web Page www.isosat.net or it may be distributed to you on a CD.

The iSite software client is distributed in a ZIP file that also includes the remote modem software images.

After receiving the compressed file, idx3103.zip, follow these steps to install the files on your laptop:
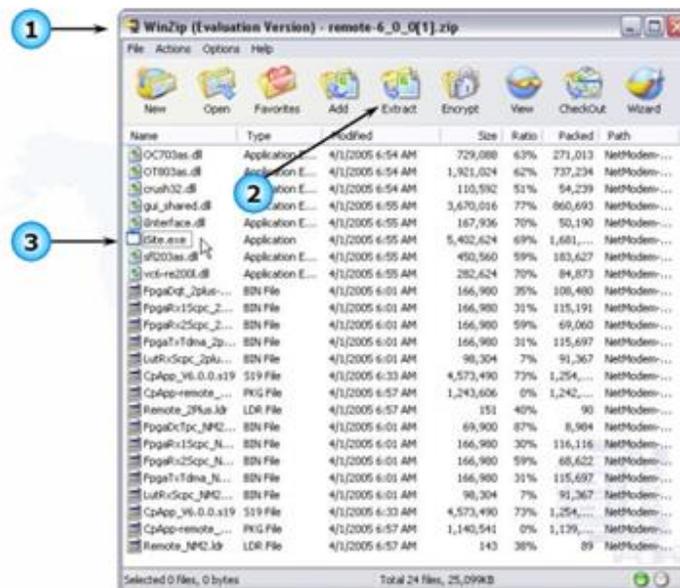
1. Copy the ZIP file to a directory where you can extract the compressed files. Be sure to store the files in a directory on your laptop that you can locate later.

2. Extract the files using a utility that understands the .zip format or right-click the ZIP file and select Extract All.

3. If desired, create a shortcut to iSite.exe on your desktop or Windows taskbar. iSite.exe is located in the iSite folder.

The following folders containing iSite.exe and the remote image files are created on your laptop when you extract the compressed files from the ZIP file:

Remote Software and iSite – {iDX software version number}

iSite/
Images/
  Remote_Evolution_e8series
  Remote_Evolution_X3_X5
  Remote_Evolution_X1
  Remote_modem
  Remote_eP100
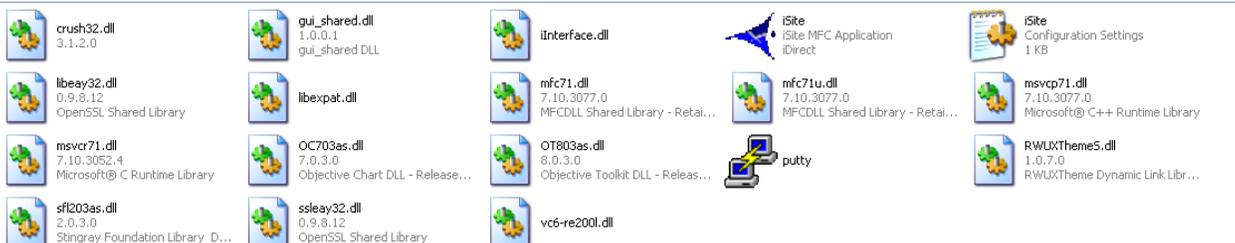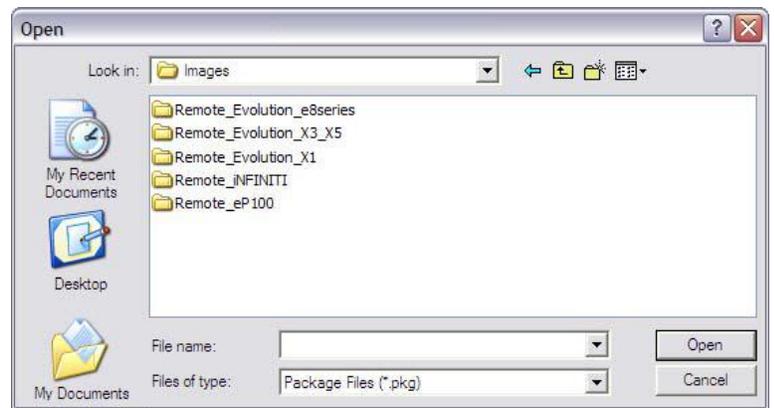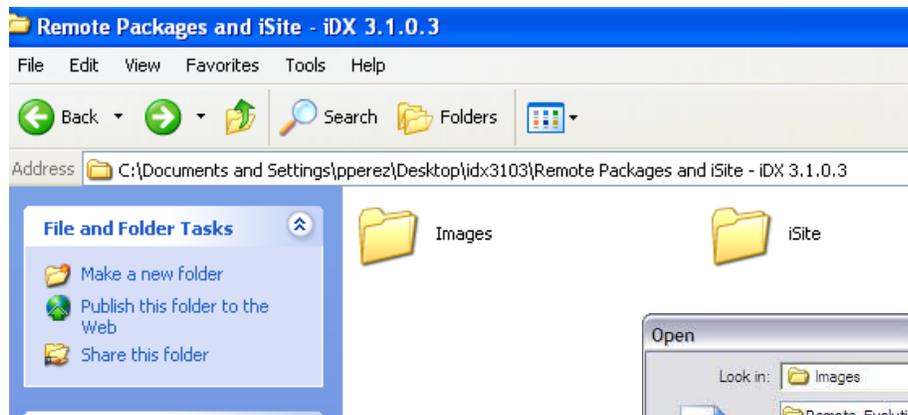
2.1 Connecting to your Modem

Connect the crossover cable from your computer to the modem and start iSite 3.1.0.3 if your modem was previously configured with DHCP active, you can configure your computer to 'obtain an IP address automatically'. If not, you will need to hard code an IP address in the computer on the same range as the current IP in the modem. The current modem address should be displayed in the left column of the iSite software. If necessary, hardcode an IP address within the same network range (modem IP address plus 1).

Using a Crossover cable:

To PC
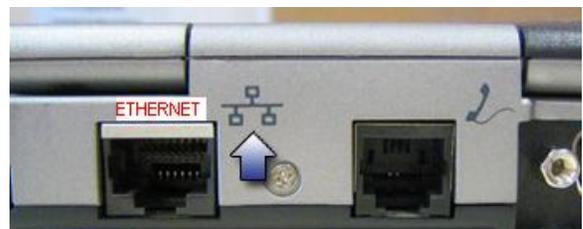
Using a straight thru cable: *Requires 2 straight thru cables*

To Winegard
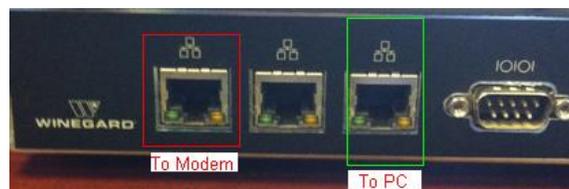
2.2 How to hardcode an IP Address

For Windows XP:

1. Open Network Connections

2. Right-click the network connection you want to configure, and then click Properties.

3. On the General tab (for a local area connection) or the Networking tab (all other connections), click the Internet Protocol (TCP/IP) component, and then click Properties.

4. Click Use the IP address provided by IsoTropic Networks, and do the following:
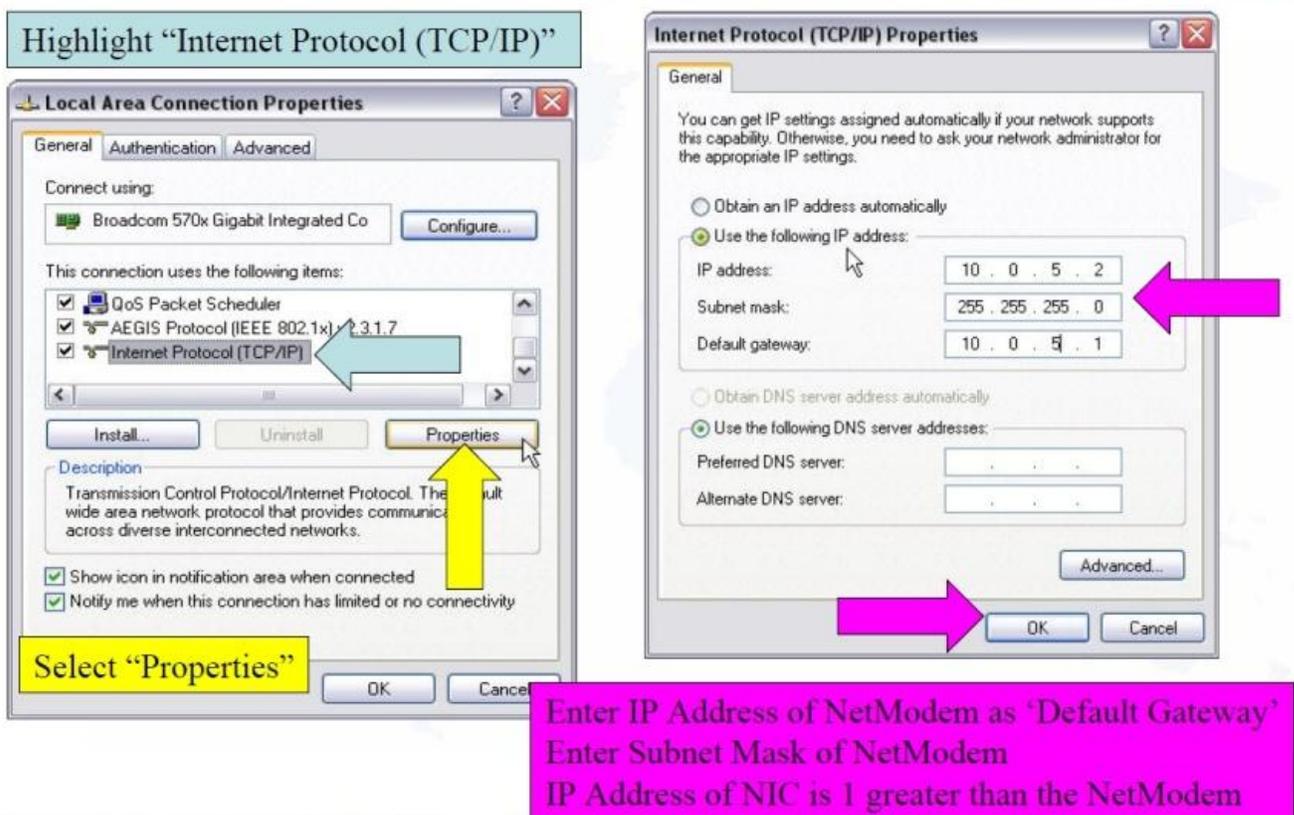
• Change from obtain IP address automatically to *Use the following IP address*, Please Change the Subnet mask, and Default gateway to what your iDirect Modem is configured for. Confirm the IP address, subnet mask, and default gateway addresses.

5. Click Obtain DNS server address automatically

6. Select ok and select ok again on the Local Area Connection Properties

For Windows 7:

1. Open Network Connections by clicking the Start button ⬤, and then clicking Control Panel. In the search box, type adapter, and then, under Network and Sharing Center, click View network connections.
2. Right-click the connection that you want to change, and then click Properties. 🛡 If you're prompted for an administrator password or confirmation, type the password or provide confirmation.
3. Click the Networking tab. Under This connection uses the following items, click either Internet Protocol Version 4 (TCP/IPv4)), and then click Properties.
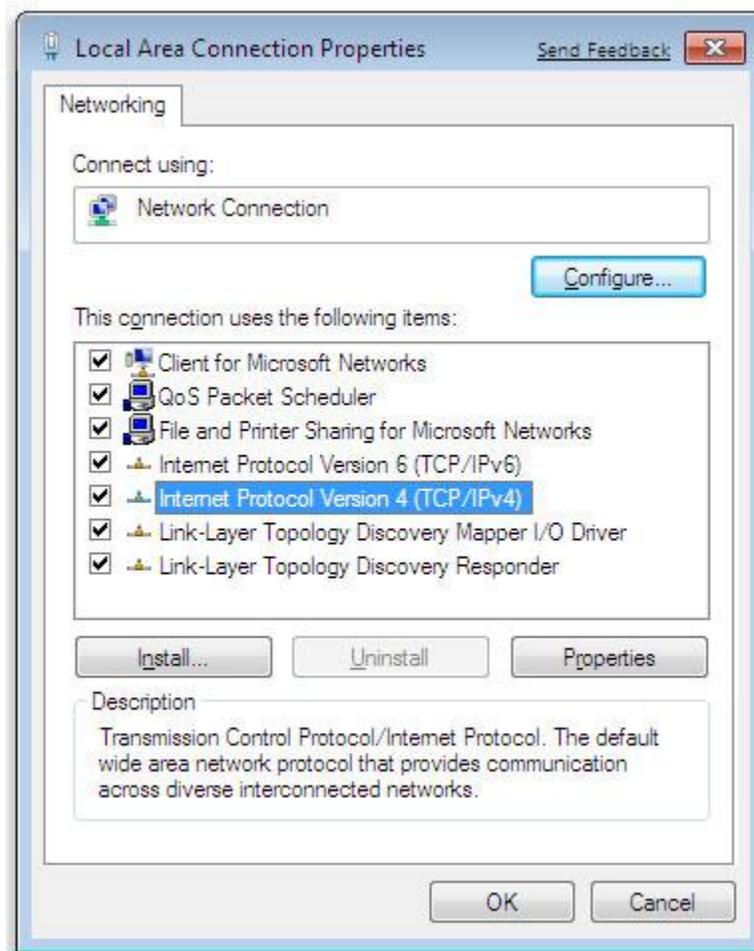
The Network Connection Properties dialog box

4. To specify IPv4 IP address settings, do one of the following:
   o To get IP settings automatically using DHCP, click Obtain an IP address automatically, and then click OK.
   o To specify an IP address, click Use the following IP address, and then, in the IP address, Subnet mask, and Default gateway boxes, type the IP address settings.
   o To get IP settings automatically using DHCP, click Obtain automatically, and then click OK.
   o To specify an IP address, click Use the following IP address, and then type the IP address settings.

The Internet Protocol Version 4 (TCP/IPv4) Properties dialog box

2.3 How to connect to your Satellite routers Console Port Using HyperTerminal

You can use any terminal emulator to connect to the Satellite Router console. This section uses HyperTerminal to illustrate how to connect to your Satellite Router.

Note: This chapter does not apply to Evolution X1 Satellite Routers.

Connecting to the Satellite Router's Console Port

1)   Connect the RJ-45 to DB-9 adapter (If laptop does not have a DB-9 input) to the COM1 port of your laptop.

2)   Plug the other end of the cable into the Console port of the iDirect Satellite Router.

3)   Power on your Satellite Router.

4)   In the Windows Start menu of your Laptop,

        Select All Programs

                -   Accessories
                -   Communications
                -   HyperTerminal

To open the Connection Description dialog box.

HyperTerminal Connection Description Dialog Box
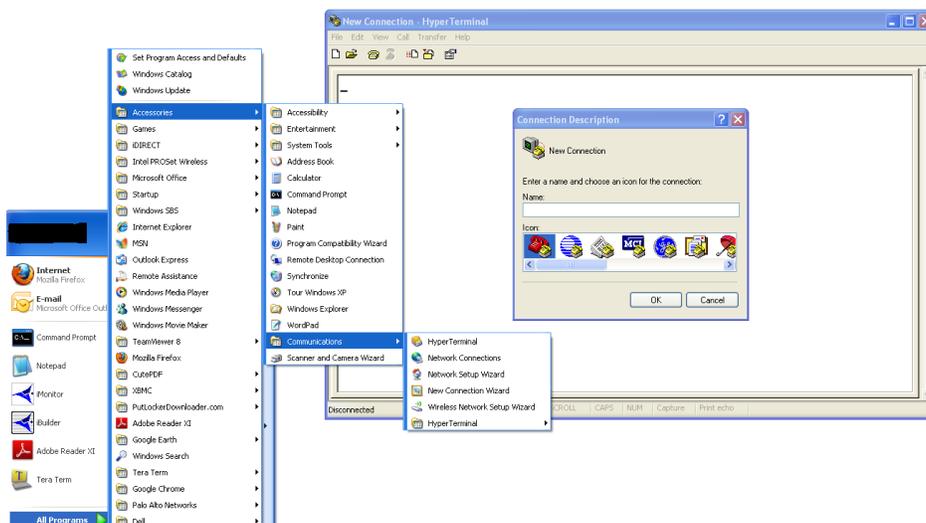
5)   In the Connection Description dialog box, type a Name for the connection, such as Satellite Router Console.

6)   Optionally, you can select an Icon other than the default icon for your connection.

7)   Click OK to display the Connect To dialog box.

8)   Select COM1 from the Connect using drop-down menu.

9)   Click OK in the Connect to dialog box to view the COM1 Properties dialog box.

10)   Use the drop-down menus to select the COM1 Properties. Select the same settings as shown in image below

• Bits per second: 9600

• Data bits: 8

• Parity: None

• Stop bits: 1

• Flow control: None
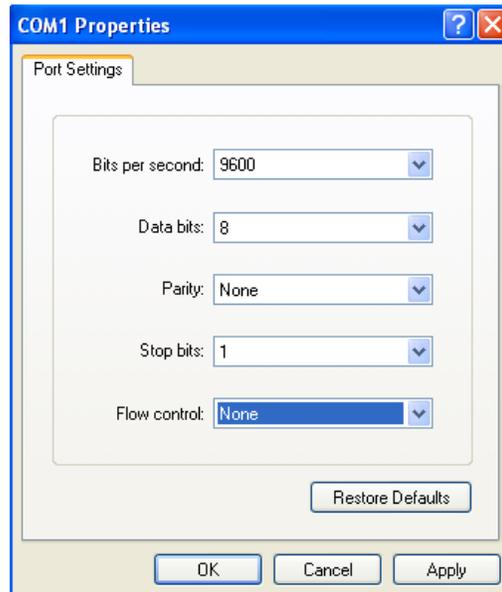
11)   Click OK to connect to the Satellite Router.

Note: *This is a mobile remote and you lose contact with it, the console port settings will change during the boot process to 4800 bps. All other settings will remain the same. To re-establish communication with the console port, you must change your serial port settings to match the new settings.*

12)   Press Enter a few times to generate a response from the Satellite Router. If you are successful, the console prompt will display. If you are unable to generate a response from the Satellite Router, re-examine your settings to be certain that they are correct.

13)   At the iDirect login prompt, enter *root* (Figure 4).

Figure 4. Logging On to root Account during a Console Session

14)   At the Password prompt, enter the default password, ***P@55w0rd!***

You are now logged on to the Linux software running on your Satellite Router.
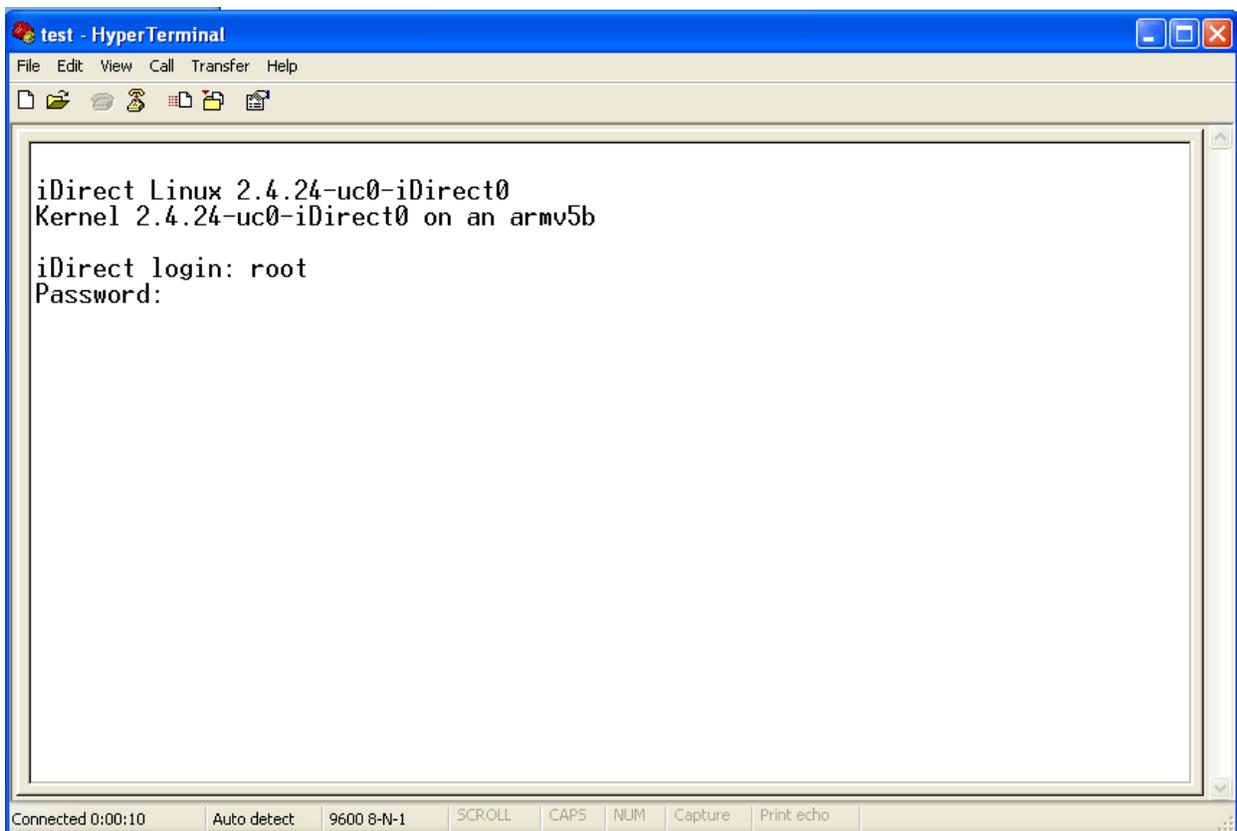
```
iDirect Linux 2.4.24-uc0-iDirect0
Kernel 2.4.24-uc0-iDirect0 on an armv5b

iDirect login: root
Password:
```

2.4 How to connect your Satellite routers Console Port Using TeraTerm on Win7

You can use any terminal emulator to connect to the Satellite Router console. This section uses TeraTerm l to illustrate how to connect to your Satellite Router. (This is due to Windows 7 not having HyperTerminal installed)

Connecting to the Satellite Router's Console Port

1)   Connect the RJ-45 to DB-9 adapter (If laptop does not have a DB-9 input) to the COM1 port of your laptop.

2)   Plug the other end of the cable into the Console port of the iDirect Satellite Router.

3)   Power on your Satellite Router.

4)   In the Windows Start menu of your Laptop, (TeraTerm will be on the flash drive given by IsoTropic Networks in Training)

Select All Programs

Locate TeraTerm

To open the Connection Description dialog box.

TeraTerm Connection Description
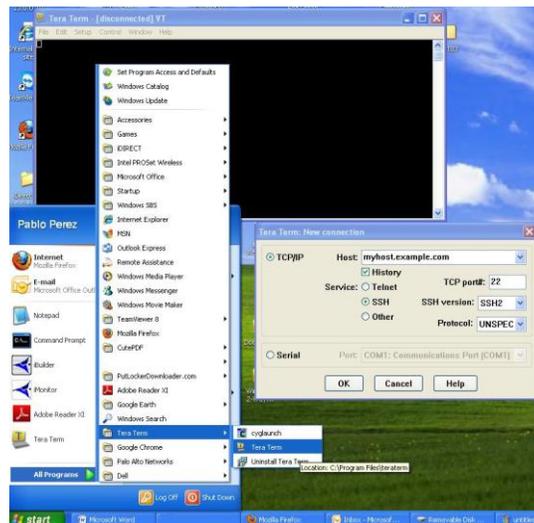
5)   In the Connection Description box, Select Serial

6)   Optionally, you can select the specific port (If using a USB to Serial Cable, select USB to Serial)

7)   Click OK
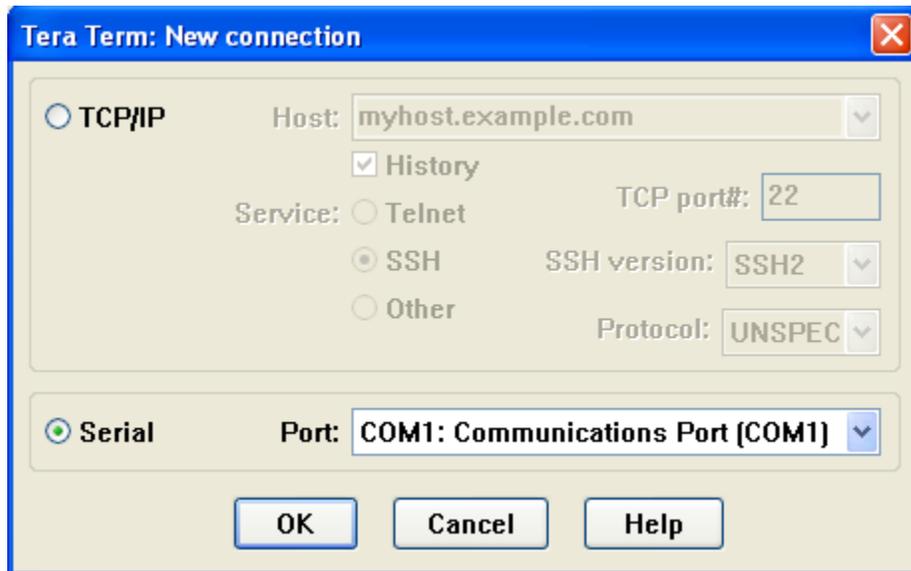
8)   On Black screen select Setup scroll down to serial port and select
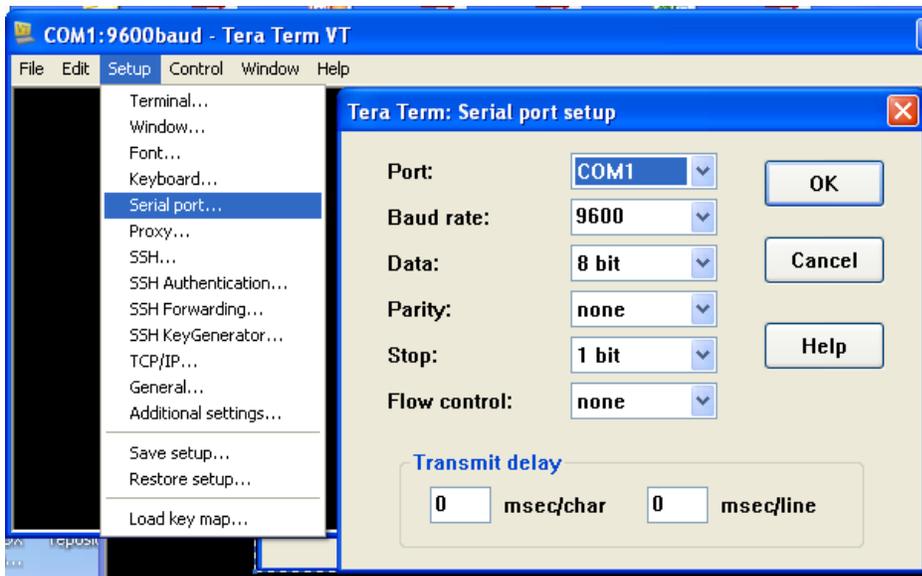
9)   Select ok once completed

• Bits per second: 9600 before full boot/ 4800 once fully booted

• Data bits: 8

• Parity: None

• Stop bits: 1

• Flow control: None

Note: *This is a mobile remote and you lose contact with it, the console port settings will change during the boot process to 4800 bps. All other settings will remain the same. To re-establish communication with the console port, you must change your serial port settings to match the new settings.*

You are now logged on to the Linux software running on your Satellite Router. Perform the steps in the next section to telnet to the iDirect Application.

3 Downloading Packages and loading option file using iSite

Perform the steps in this section to download the image packages containing software and firmware for the current release from your laptop to the Satellite Router.

1. Connect the LAN port of the laptop to the LAN A port of the Satellite Router using a LAN cable.

2. Launch iSite. iSite automatically discovers the Satellite Router in the iSite Tree View, if the firewall is disabled. See Figure below
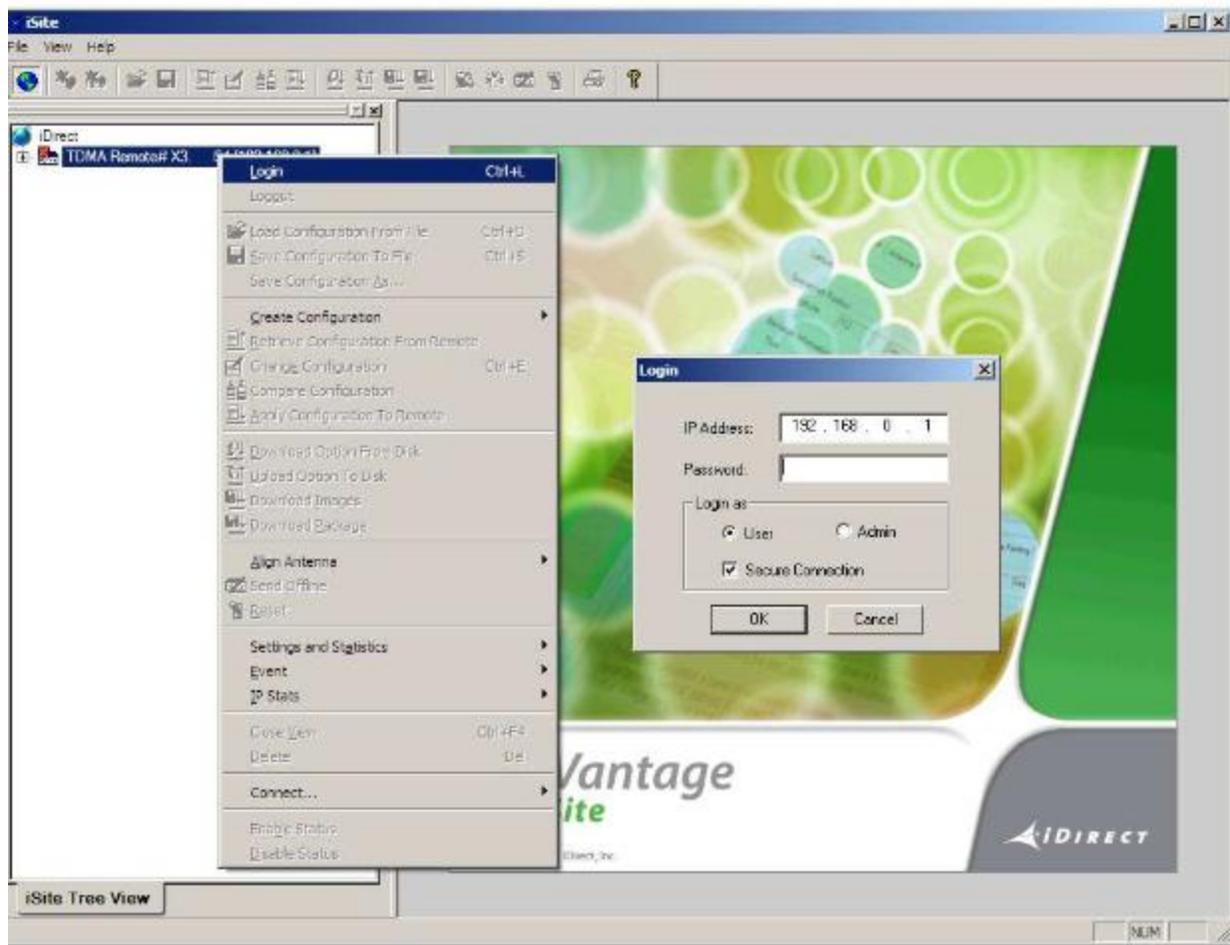
iSite Welcome screen

Note: If iSite does not automatically discover the Satellite Router, right-click the iDirect globe in the iSite tree and select New from the menu to add an unknown element to the tree. Then right-click the new element and log on using the IP address of the router.

3. Right-click the Satellite Router in the iSite Tree View and select Login.
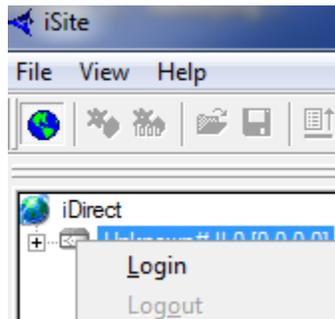
The Login dialog box opens pre-configured with your Satellite Router's IP Address. I
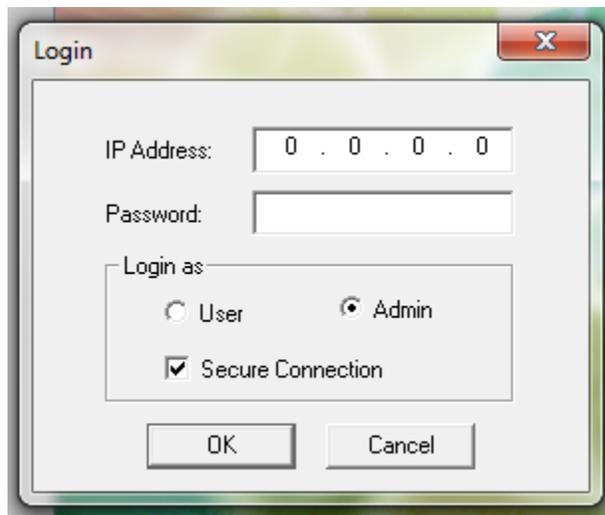
iSite Login Dialog Box

4. Type the default Password, P@55w0rd! (Please note the Password is the same on all rigs this is due to the communications from the Winegard unit and the modem.)

5. In the Login as section of the dialog box:

a. Select Admin.

b. Select or clear the Secure Connection check box

If a pre-7.1 version of the iDirect application is currently installed on the Satellite Router, clear the Secure Connection check box. If later images have already been installed, select Secure Connection.

5. Click OK to log on to the Satellite Router.
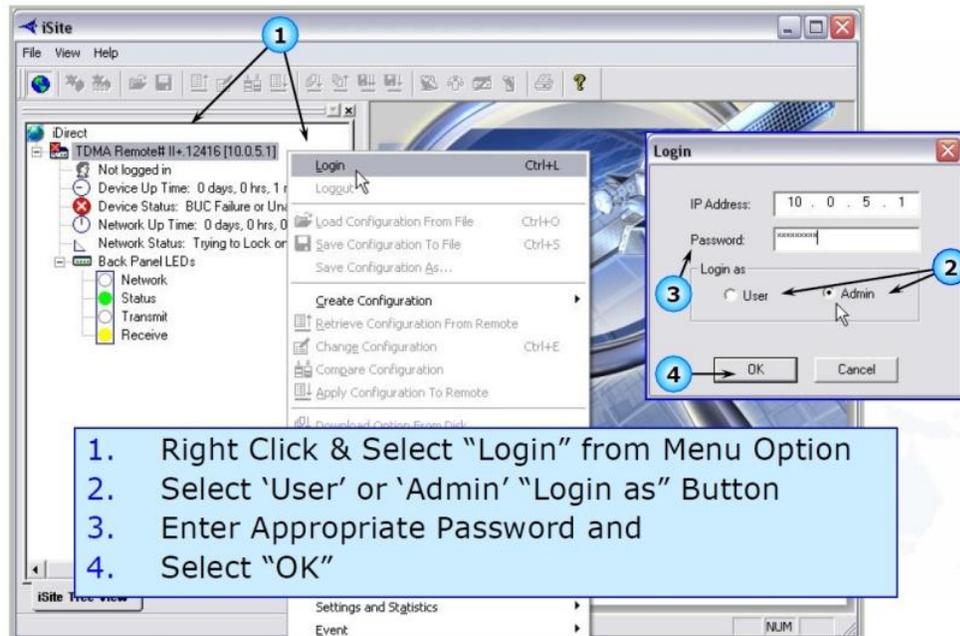
6. In iSite, choose [Configure] from the main menu bar, then [Download Package].
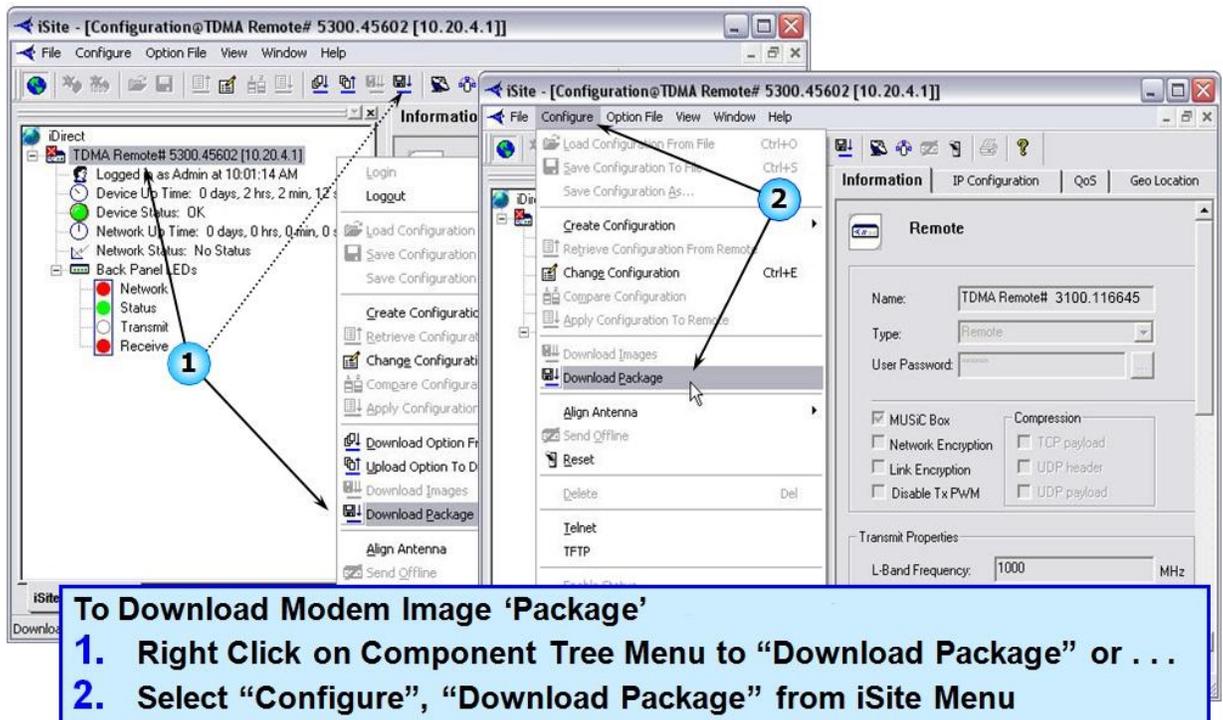
7. Now, click on the [Folder] button to the right of the PACKAGE field. Browse to the Images/remote_iNFINITY (Please Note if using evolution select directory Images > Remote_Evolution_XX (Where XX = modem model,, ex. "Remote_Evoltion_X3_X5")
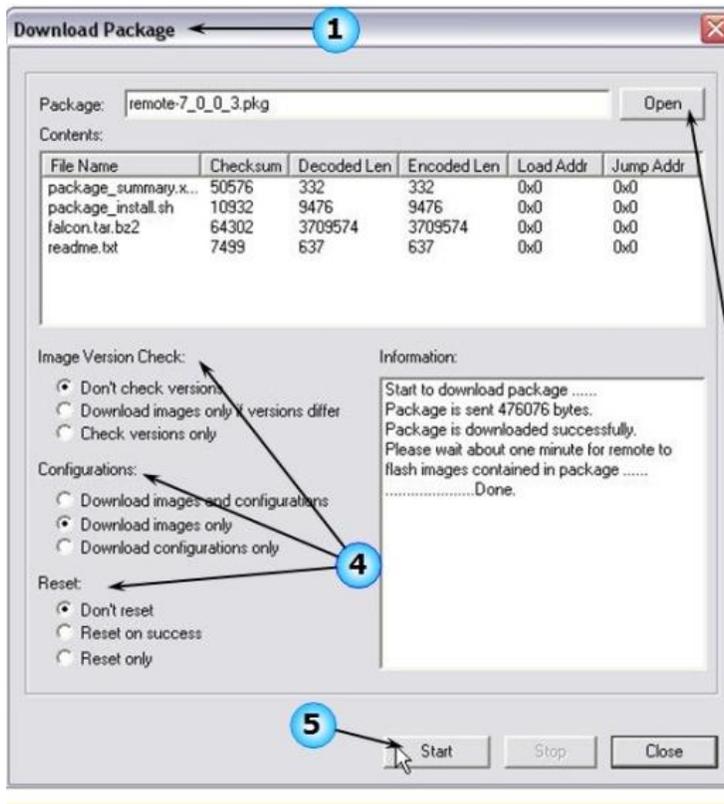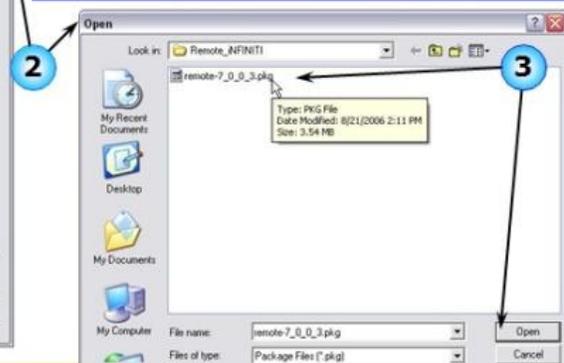
8. Choose the file entitled 'linux_2.4_bsp-3.1.0.3.pkg' and click on OPEN

9. Next, click on START at the bottom of the window. The BSP Update Package will load.

10. Once complete, wait for the information window to respond 'DONE'

11. Again, click on the [Folder] button to the right of the PACKAGE field. For 3100 modems Browse to the Images/remote_iNFINITY directory or Images >
For X5 Evolution Modems select Remote_Evolution_XX (Where XX = modem model, ex. "Remote_Evoltion_X3_X5")

12. Choose the file entitled 'remote_3XXX-3.1.0.3.pkg' for 3100 series modem or evo_X5_rmt-13.0.0.3.pkg' for X5 evolution modem and click on OPEN

13. Next, click on START at the bottom of the window. The 3.1.0.3 Image Package will load.

14. Once complete, wait for the information window to respond 'DONE'

15. Click on [Close] (Not Reset).

16. Back to the Main Menu – click on Option File, then Download From Disk. Browse to the Option File attached to this e-mail and load it (make sure the serial number of the options file matches the serial number of the modem) – then reset the modem.

1. **Right Click on Remote; Select "Download Option From Disk" from Component Tree Menu**
2. **Alternatively Select "Option File" from iSite Menu; Select Download From Disk**
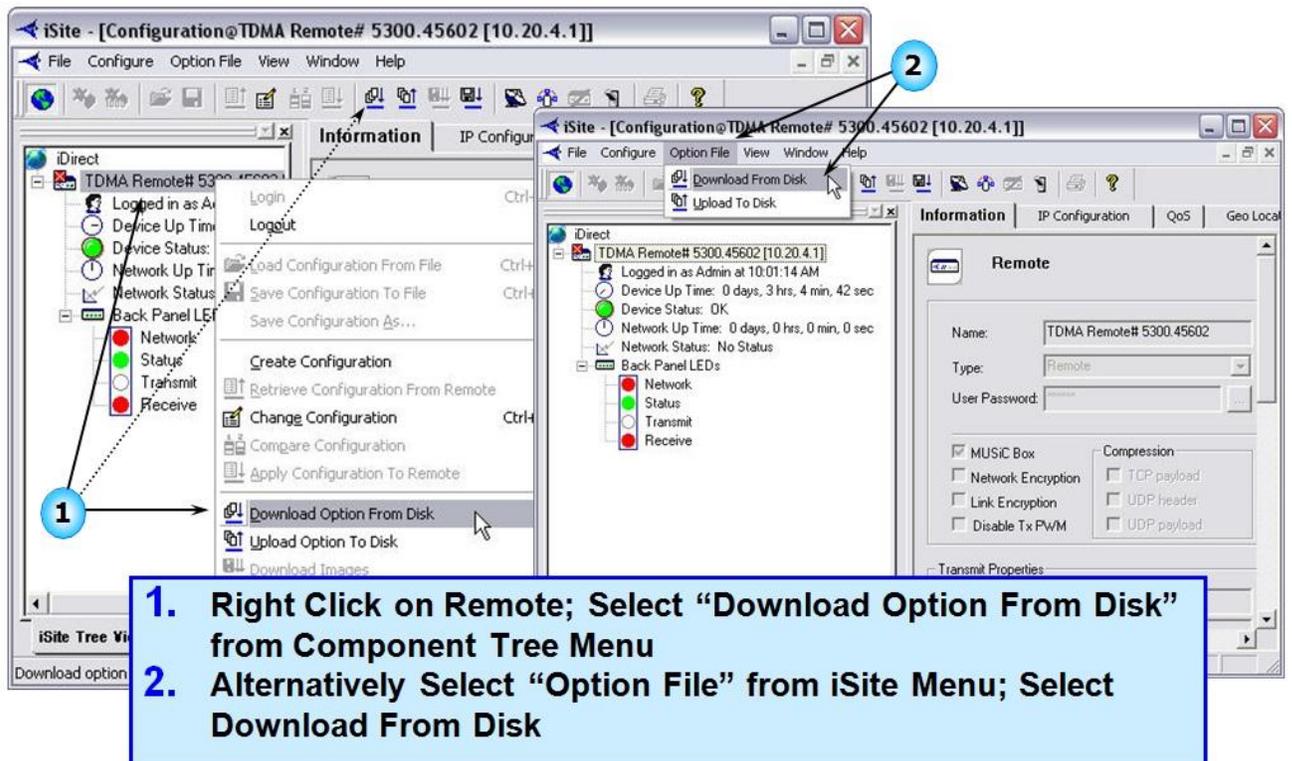
17. Once the modem has finished the start-up procedure, the modem is ready to commission into the Satellite Network.

18. Log back into iSite and use it to peak the antenna. Choose CONFIGURE / ALIGN ANTENNA / ANTENNA POINTING.

19. The RX light should turn green once the satellite is found.
(Please note if firmware and option files are properly loaded the modem lights will be a Solid Amber on the RX and Net)

This section explains how to point the antenna using Pulse Width Modulation and the NMS iSite client.

Preparing the Satellite Router, BUC and LNB for Pointing:

1. If your Satellite Router is powered on, power it off at this time.

2. Ensure that the Receive IFL cable is connected from the LNB to the Satellite Router.

3. Disconnect the Transmit IFL cable

4. Power on your Satellite Router.

Download version 3.1.0.3 from our web site at " http://www.isosat.net/idx3103.zip ". Unzip this file into a separate folder on your desktop.

1. Download "remote-<version>.zip" File from TAC Web Page
2. Unzip/Extract File (example: remote-5_0_2.zip) to Laptop/PC
3. Create iSite Shortcut or Double Click on iSite.exe to Launch

Connect the crossover cable from your computer to the modem LAN A port (unless you are already connected to the modem via a switch or router) and start iSite 3.1.0.3. If your modem was previously configured with DHCP active, you can configure your computer to 'obtain an IP address automatically'. The current modem address should be displayed in the left column of the iSite software. If necessary, hardcode an IP (*Please reference page 8*) address within the same network range (*modem IP address plus 1*).

Right click the modem icon on the left and select "login" to log into the modem with the following UserID and Password:

UserID =   *Admin*

Password =   *P@55w0rd! (that is a zero)*
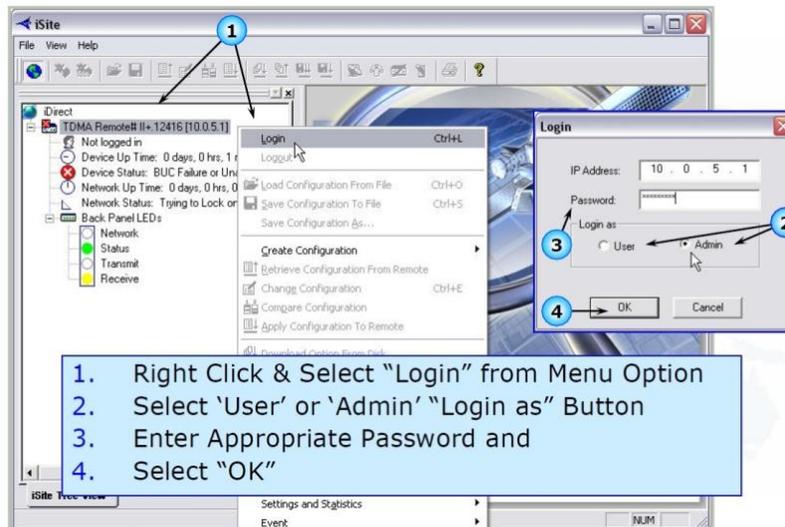
Upper and lower case are critical.

1. In iSite, choose [Configure] from the main menu bar, [Align Antenna], then click [Antenna Pointing].
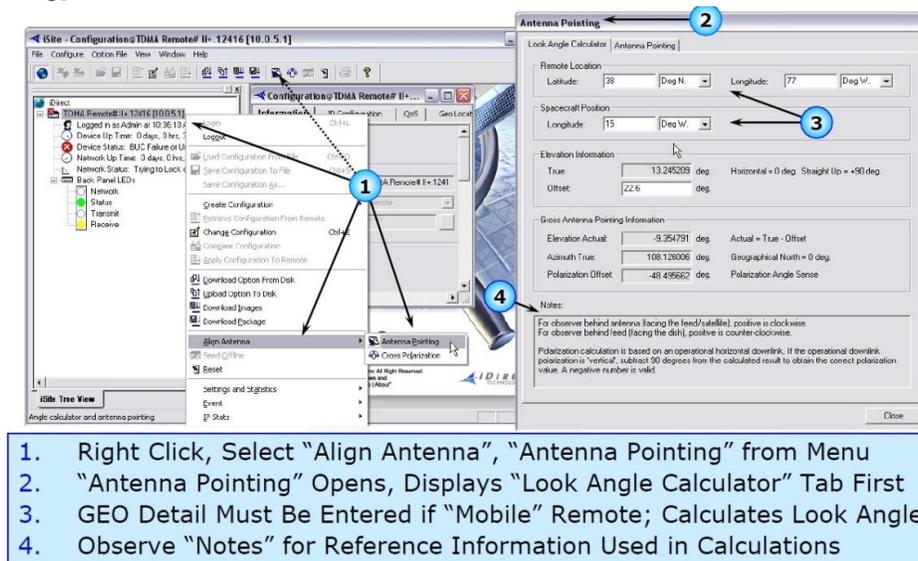
2. Now, click on the [Antenna Pointing] tab to the right of the Look Angle Calculator tab. You should see a black box (as below).

Note: Remember to ALWAYS Power down NetModem II+ when Connecting and/or Disconnecting IFL Cables

1. Select "Antenna Pointing" Tab
2. Select "Start" to Initiate Process
3. Observe Warning; Remove Cable from BUC
4. Observe Antenna Pointing DC Voltage — Red = Off/No Satellite
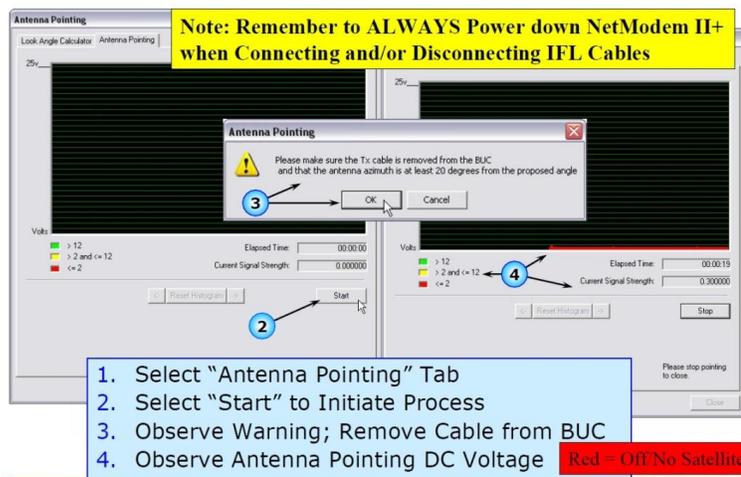
Click start and make sure your TX cable is disconnected before clicking yes to the warning, please ignore the 20degrees from proposed angle information.

3. After 10 seconds you should start to see a bar graph and hear a noise, this indicates current signal strength. A low signal will be between 0.03 and 12. A signal above 12 generally signifies that you have found the correct satellite, peaking the antenna should bring the values above 16.

Yellow = Satellite Energy

Green = On Satellite

1. Observe Graph, "Current Signal Strength" or Voltmeter
2. Adjust Antenna in Azimuth/Elevation to Maximize Signal
3. Graphically, Peak Signal Until 'Green' is Displayed (=>12 vdc), or >12 vdc Present on Voltmeter.
4. Anything < 12 vdc Indicates Satellite Energy Sensed, However iDirect Network Outbound SCPC Carrier Not Detected
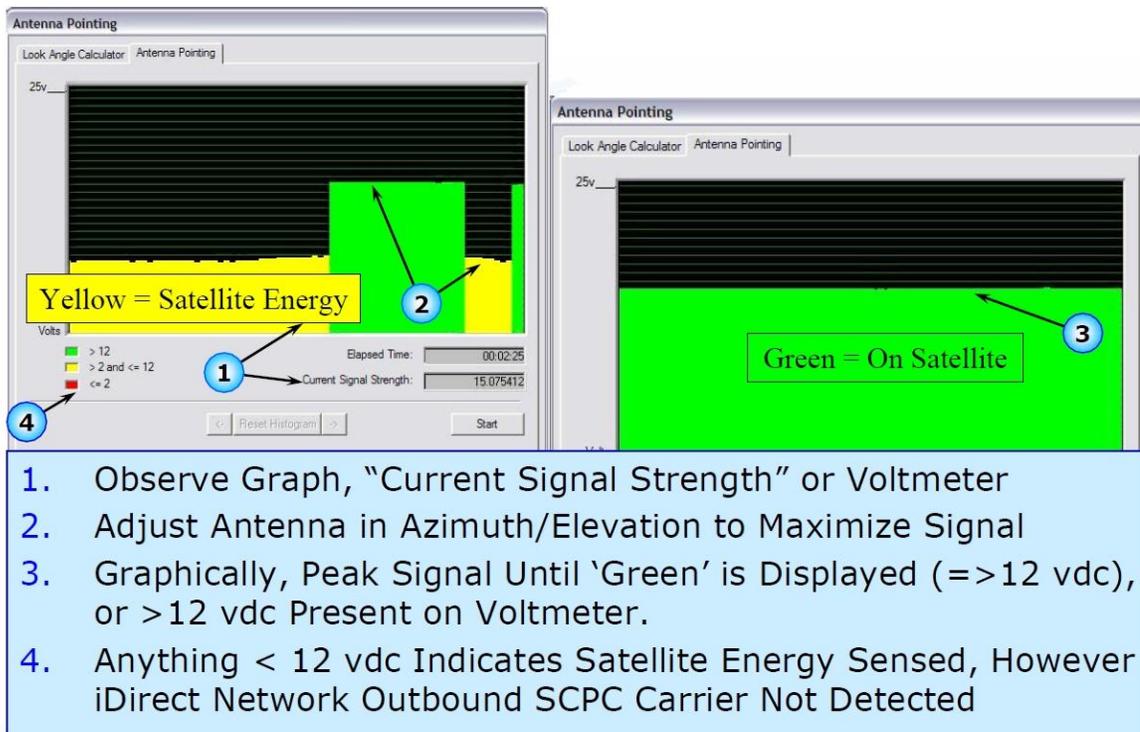
4. Once you have found the strongest signal possible, power cycle (reset) the modem. Unplug the power, then let the modem boot and check for a green RX light.

Goal: To introduce Telnet commands to retrieve information from or command your iDirect Satellite Routers at remote sites and to give an overview of the support tool in the instance iSite is not working properly or used as an alternative:

1.1 Required Equipment

You will need the following equipment and software to successfully commission the Satellite

Router in the field:

• A crossover LAN cable

• A telnet software client

• A laptop (or PC) with:
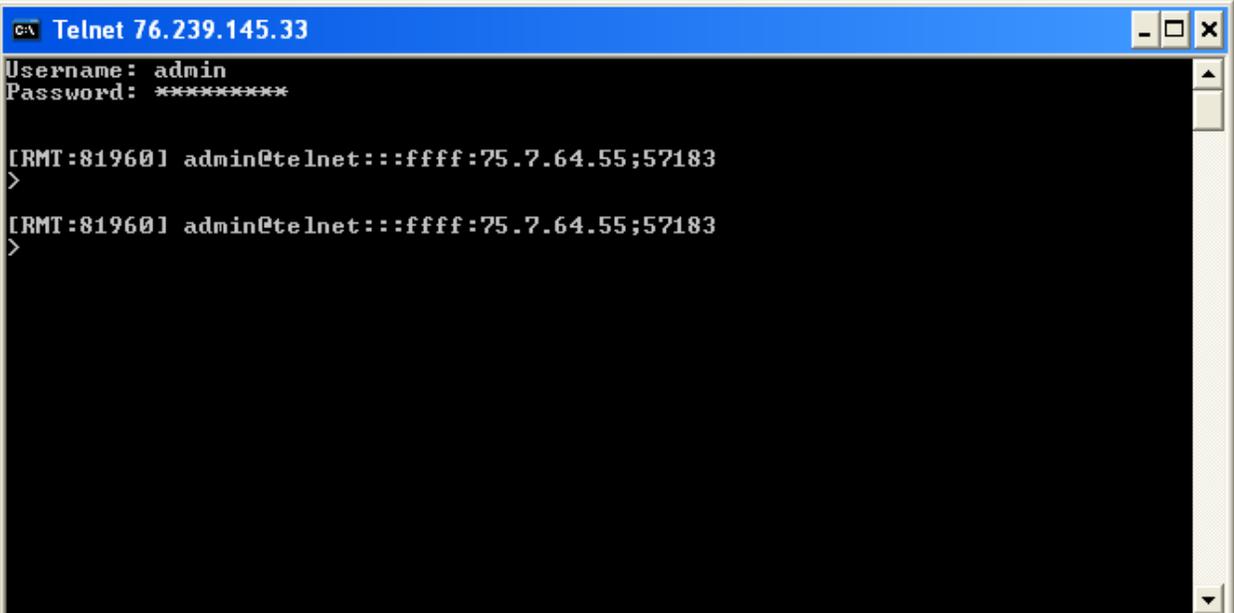
• Window 7, Windows XP or Windows 2000, Service Pack 3

2 How to enable Telnet in Windows 7

(Please note a standard Windows 7 PC does not have the telnet feature enabled compared to Windows XP)

1. Open the control panel, or you can go to Run and type control.

2. Click the "Programs and Features".

3. After that the window will shows the program lists, click on the left side "Turn Windows features on or off". You also can go to this step directly by typing *appwiz.cpl* on Run or type it on search box (start menu).

4. A new window "Windows Features" will pop out. Find and check the "Telnet Client" option.
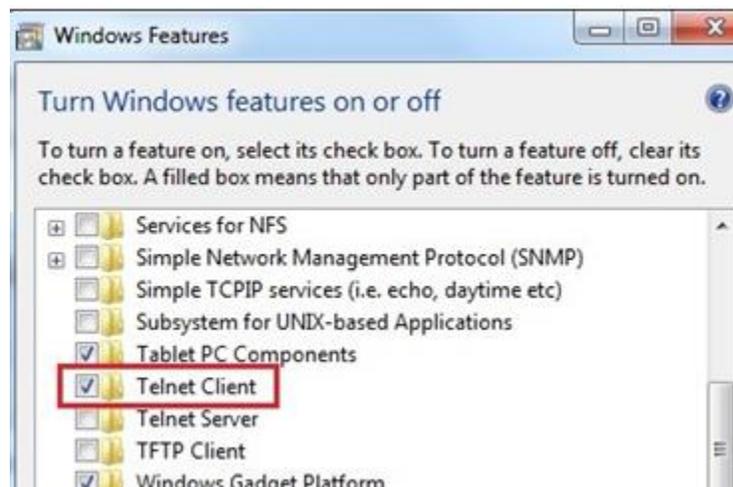
3 How to telnet into the iDirect Modem

1. Click Start.

2. Click Run.

3. Type cmd or command and press enter.
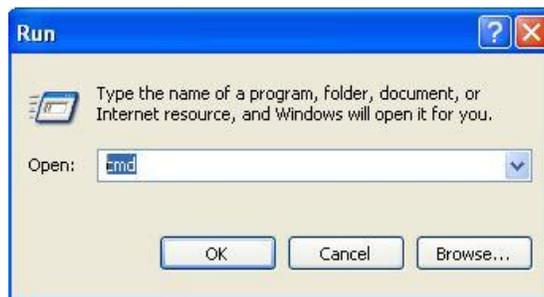
4. Below is the Command prompt screen. Please enter the following command: **telnet {space} the IP address of the modem.** (locate the IP address of your modem by typing in the command: *ipconfig* this will give the IP address of your computer) The gateway IP address will be the modems IP address.

Telnet Command Example: *telnet 192.168.0.2*
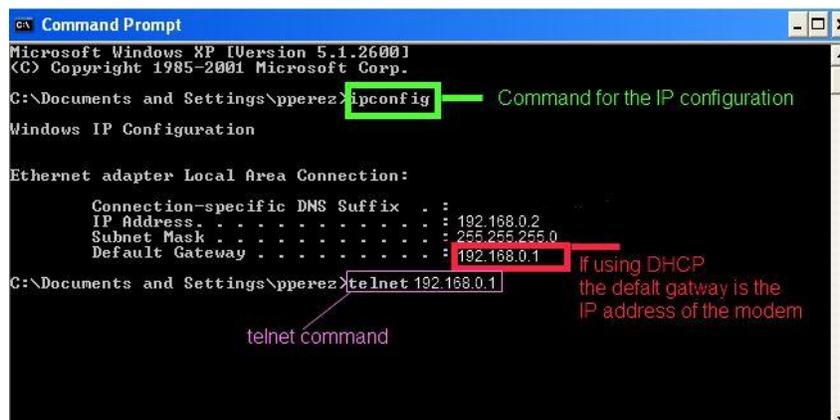
5. Below is the screen you will see when starting a telnet session. You will need to use the same passwords as iSite (Please note if the password is working for the telnet session they will be working for the iSite program and vice versa)

IsoTropic Networks Standard Passwords:

Username: *admin or user*

Admin: PW = *P@55w0rd!*

User: PW = *iDirect*
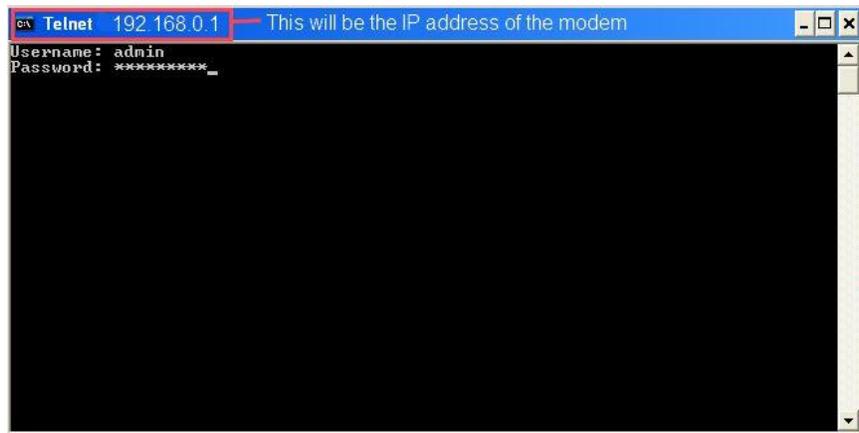
Upon a successful login you can begin to enter specific commands as instructed by the NOC. Below are some key commands to keep a note of.

Commands:

DID	Shows modem identification number
rmtstat	Toggle printing Remote Status messages
rmtlock status	Checks to see if the modem is locked
rx snr	shows the Receive signal to noise to ratio
rx pointing enable	to enable pointing your antenna thru a telnet
rx pointing on	step two to point the antenna
rx freq	shows the Receive frequency

4 Reference list of Telnet commands

DID	Show modem identification number
ENTER_ERROR_STATE	Enter Error state
TERMINATE	Kill process
acq	ACQ/UCP control
antenna	
arp	ARP control
beam	
beamselector	
ber	
btp	Tx Debug
classifier	Classifier command
clear	Clear screen
console	Console control
cpu	Show CPU utilization percentage
date	Get the downstream time information
delay	Usage: delay <msecs to sleep>
dfoe	Dynamic Features and Options exchange
dfoerxonly	Rx-Only Dynamic Features and Options exchange
dgm_pkg_rx	Datagram Package Download Receiver control
dhcp	DHCP server command
dma	DMA Stats
dns	DNS control
dumpb	Dumps bursts received on TDMA RX2 of the remote
eepromsn	Show modem serial number as written in eeprom
eloop	Display Event loop status
enc	Remote encryption control
encs	Remote encryption-session control
eth	Show the output of ifconfig command
extras	Extras option file manipulation
fake_acq	Fake ACQ control
fll	FLL/DAC sampling
fpga	
gecho	Global echo
gpspollinterval	seconds
gpsvalidationstatus	Status of GPS Validation
gre	gre protocol
hdlc	HDLC Stats
heap	Memory Usage
hookstatus	Protocol Hookup status
hub_fsd	Hub FSD
icmp	ICMP protocol inpection layer console command
igmp	Multicast control
inroute_list	Inroute List
ip	Router control
ipv4	IPv4 protocol acceleration control layer
keyroll_mgr	Keyroll manager command

ktun	Kernel Tunnel Command
l2tp_compress	L2TP Payload compress
laninfo	View IP address/netmask
latlong	LAT LONG
license	Get License
licensestat	Remote license status information
ll	Link Layer control
mac	MAC control
map	debug/show/delete
mapclient	
maphandler	
mcqos	Multicast QoS
mem	Resource information
mesh	Forces the remote out of mesh
mesh_marker	mesh_marker layer command
mesh_ucp	Display Mesh UCP information
meshdebug	Mesh Debug
mux	MUX Table Dump
nat	NAT Control
netstat	Show the output of a netstat command
nms_echo	NMS event echo
nmsr	Debug NMS Reporting object (event message sender)
offline	Offline
online	Online
oob	OOB control
oobc	OOBC layer stats and params
options	Options file manipulation
ota	OTA stats
packages	Show list of installed software packages and their versions
params	View/Edit global params
pasoc	command for the packet socket layer
passwd	Change password
pcmd	Periodic Console Command
peek	raw memory read - can be dangerous
phy	read PHY status register
ping	Ping Utility
pm	Pad upper Mux stats
poke	raw memory write - can be dangerous
port	
powermgmt	Power Management
profiling	Profiling Utils
ps	Show the output of the ps command
pull_engine	PullDown Engine Control
qos	QoS control
remotestate	Displays the current remote state
reset	Reset machine or restart service
rmtarp	Mesh ARP table
rmtlock	Locks the remote to work in a specific network
rmtstat	Toggle printing Remote Status messages

rx
rxdiag
satmac   satmac layer stats
service   Service start/stop command
sn   Show modem serial number
spoof   Spoof Command
stats   View/Edit global stats
status   Display FIPS status
sys_time   Sys Time Tick
systray   Systray status sender command
tick   Get Time Tick
timer   Timer control
tlev   Trace control
tls   tls control
tls_mnc   TLS MnC server command
transec   TRANSEC related FPGA registers stats
transec_layer   transec layer command
tx
txstate   Displays the current Transmit state
udp   UDP Command
udp_compress   UDP Payload compress
uptime   System and application uptime
version   Build information
versions_report   Full operating environment report
vlan   VLAN control
x509   Manage X509 Certificates and RSA keys
xoff   disallow messages from other processes
xon   allow messages from other processes
zeroize   zeroize FIPS components

Check the Management IP: **options show SAT0_1**
The options show SAT0_1 command will show the management IP on the modem. Verify the Management IP on the modem matches the Management IP of the site in iBuilder.

Check the Model of the modem: **DID**
The DID command will show the actual hardware model of the modem and its DID.**If the Model and DID do not match the iBuilder Modem-Model and DID, the site will be accepted by the network.**

Check the Software Version: **Version**
Verify it's the current NMS version in use at the teleport.

Pure Carrier via Telnet Session

1) Telnet into the modem
   a. Make sure a cross-over cable is connected from the modem's LAN A port to the Ethernet port on the computer
   b. Click on "Start"
   c. Click on "Run"
   d. Type: cmd
   e. Type: telnet ip address of modem
   f. Login
      i. User ID: admin
      ii. Password: P@55w0rd!
2) Make sure the **RX cable is disconnected**
3) Enter the following commands
   a. Type: tx freq L-Band Frequency (Given by IsoTropic NOC)
   b. [Enter]
   c. Type: tx power power level
   d. [Enter]
   e. Type: tx cw on
   f. [Enter]

Goal: Recovering an modem device, which entails executing procedures presented in this document, is intended to restore full functionality to the malfunctioning modem device. These procedures resolve issues caused by corruption in the software, incorrect or forgotten passwords, mismatched Options files, and incorrectly configured interface properties. In the case of a malfunction, these procedures also help rule out these causes before proceeding with a Return Merchandise Authorization (RMA) request.

Procedures:

• *Procedure 1. Loading Linux from Redboot*
• *Procedure 2. Establishing IP Connectivity*
• *Procedure 3. Reloading Image Software Package*
• *Procedure 4. Reloading Options File*

Before Attempting to Recover
The following two steps must be completed on the connecting PC before beginning to recover an modem Remote

Before recovering an modem Remote:

1. Create or obtain a good Options file for the modem, using a matching version of the iSite or iBuilder application

Note: The Options file, at a minimum, must match the Model Type, Serial Number, Software Version, and Derived ID of the modem device being recovered.

2. Obtain the iDX Software Image package. The iDX release version must match that of the network. The software package(s) should be obtained from the Network Operator, and placed into one folder on the connecting PC.

You must also have the following equipment:
• a rollover console cable or DB-9 to RJ-45 adapter
• a Cross-over Ethernet cable
• a terminal emulator (i.e. TeraTerm or HyperTerminal)
• the iSite software
The following are optional applications which can be used for some procedures:
• PuTTY (or any Secure Shell client)
• WinSCP (or any Secure Copy client)

Procedure 1. Loading Linux from Redboot
(If Login appears and login information correct you may skip procedure 1)
To load Linux from Redboot:
1. Connect the PC to the modems console port using TeraTerm or HyperTerminal

2. Power cycle the modem.
The message DRAM Test Successful displays on the console.

3. Immediately press the spacebar 4 to 5 times, in order to interrupt the boot load sequence and enter
RedBoot.
The Redboot> prompt displays.

4. Enter the following commands to load the Linux kernel:
fis load Linux
exec -c "root=/dev/mtdblock2 console=ttyS1,9600 single"
The /# prompt is displayed, indicating a login without password:
To change the root password:

5. Enter the following command:
passwd

6. Type a new password (P@55w0rd! is the default) and press Enter.

7. When prompted, enter the new password again to confirm.

Procedure 2. Establishing IP Connectivity

This procedure describes how to use the console to establish IP and Secure Shell connectivity
to the modem.

Note: This procedure presupposes that *Procedure 2* has been completed, and therefore console
connectivity has been established, Linux has been loaded and logged into, and the
idirect_falcon services are not running. To determine modem unit IP Address and Subnet Mask:

1. At the /# Linux prompt, enter the following command to view the interface configurations:
ifconfig
The interface configurations are displayed.

2. Annotate what is displayed as the first interface (ixp0 or ixp1); this information is needed in
the following steps to configure the IP address and cabling.
What follows after the inet addr and Mask fields under the first listed interface is the modem
unit's IP address and subnet mask.

3. If a valid/correct IP address and subnet mask were displayed in Step 1, skip to Step 4. If a valid IP address and subnet mask is not present, configure it by entering the command:
ifconfig *<interface>* *<ip address>* netmask 255.255.255.0

where:
interface = ixp0 or ixp1 (as noted in Step 2)
ip address = desired address (192.168.0.1, for example)
Note: Changing the IP address using this method is temporary; it will be overwritten by the IP address configured in the Options file when the file is read, which occurs during reboot at the end of this document.

4. Enter the following command again, to confirm the interface configurations:
ifconfig
Note: Anotate what is now displayed as the IP address (inet addr) of the first interface; this information is needed in later procedure steps. The Command

5. Turn on the SSH daemon by entering the following console commands:
service idirect_falcon stop
service sshd start

6. Using a crossover cable, connect the PC's Ethernet interface to the modem unit's LAN A port.

7. Using the Windows Internet Protocol (TCP/IP) Properties dialog box, configure the PC's Default gateway to match the modem's IP address, and the PC's IP address to be in the same subnet. For example, if the modem's IP address and Subnet mask (noted in Step 4) are 192.168.0.1 and 255.255.255.0, a correct configuration for the PC would appear as shown in the following screen image:
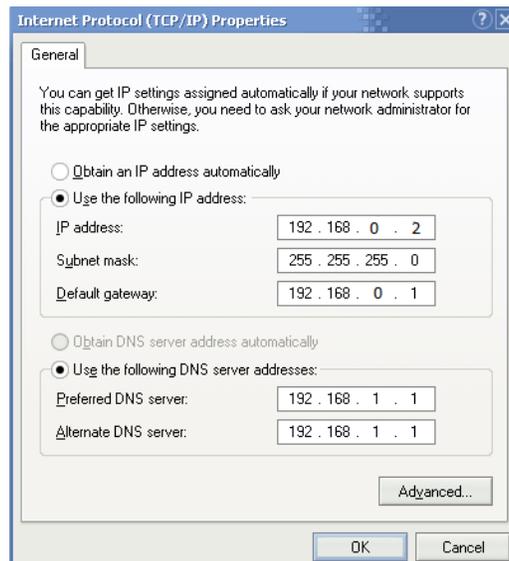
Note: Annotate the IP address configured for the PC in case this information is needed later in the procedure.

8. From the Windows Command Prompt, verify IP connectivity by successfully pinging the modem unit's
IP address:
ping <ip address>
where:
ip address = modem unit's IP address (as noted in Step 4)

Procedure 3. Reloading Image Software Package
The following procedure uses the console and iSite's TFTP Server application to reload the modem unit's Image Software Package.

Note: This procedure presupposes Procedure 2 has been completed, with console connectivity established, Linux has been loaded and logged into, the idirect_falcon services are not running, and IP connectivity has been established.

To reload the Image Software Package using TFTP:

1. Enter the following commands from the console to increase the swap-space in the /tmp directory:
df
mount -t tmpfs -o remount,size=25M /tmp
df
cd /opt/idirect/falcon/fpga_images
rm –fr *
cd /root

2. To use the TFTP Server included with iSite:
a. Close any open sessions of iSite
b. Launch a new session of the iSite application
c. Select File—>TFTP
The TFTP Settings dialog box displays.
d. Browse and select the folder on the PC containing the modem package file(s) and click OK when complete.
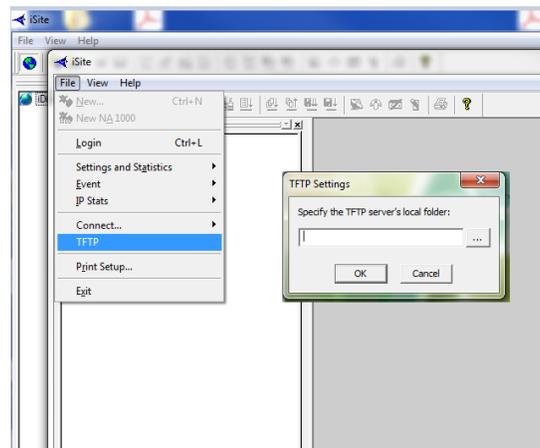
To install the BSP Update package:

5. To start the installation of the BSP package file, enter the following command at the Linux prompt:
tftp_package.sh *<ip address>* linux_2.4_bsp-13.0.0.3.pkg

where:

ip address = address of TFTP server (PC)
For example, if the IP address of the PC is 192.168.0.2 and loading iDX 3.1.0.3, the command is:
tftp_package.sh 192.168.0.2 linux_2.4_bsp-13.0.0.3.pkg

Note: If a TFTP: timeout error message displays, close iSite, ensure any other running iSite applications are closed, and return to Step 1.

To install the Software Image package:

6. Enter the following command at the Linux prompt:
If the modem is a 3000 series, enter the following command:
tftp_package.sh *<ip address>* remote_3XXX-13.0.0.3

If the modem is a X5 series, enter the following command:
tftp_package.sh *<ip address>* evo_X5_rmt-13.0.0.3.pkg

where:

ip address = address of TFTP server (PC)
device = hub | remote (type of modem package)

For example, if the IP address of the PC is 192.168.0.2 and iDX 3.1.0.3 is being loading, the command is as follows: tftp_package.sh 192.168.0.2 remote-3XXX-13.0.0.3.pkg

Note: If a TFTP: timeout error message displays, close iSite, ensure any other running iSite applications are closed, and return to Step 1.

To verify the successful installation the Software Image package:

7. Enter the following command at the Linux prompt:
/usr/sbin/falcon –version

If the correct iDX version is displayed, proceed to *Procedure 4. Reloading Options File.*

Procedure 4. Reloading Options File

The following procedure uses the console to reload the Options file locally. This procedure copies the text of the Options file to the clipboard on the PC, and then pastes it into an Options file on the modem unit console. In certain circumstances, the Options file can instead be reloaded remotely using WinSCP. For more information, see alternative *Procedure*

Note: This procedure presupposes *Procedure 4* has been completed, console connectivity has been established, Linux has been loaded and logged into, the idirect_falcon services are not running, and the modem is using a valid, uncorrupted software image (Please Note we recommend using TeraTerm for this procedure)

To reload the Options file:

1. Open the good Options file in a text editor (i.e. Notepad) and copy all of the text to the Windows clipboard.

2. On the console, move to the Options file directory by entering the following command:
cd /etc/idirect/falcon

3. Rename the current Options file by entering the following command:
mv falcon.opt falcon.opt.old
Note: A no such file or directory error displays if there is no existing Options file.

4. Enter the following command to create, and enter text into, a new Options file:
cat > falcon.opt

5. Move the mouse cursor to the location of the console cursor, and right-click to paste the text previously copied (in Step 1) into the console session.

6. Press Enter once, and then press Ctrl-D to exit.

7. Examine the contents at the end of the falcon.opt file, ensuring no extra characters were inserted, by entering the following command:
cat falcon.opt

8. Reboot the modem unit, by entering the reboot console command:
reboot

Note: After the iNFINTI unit has completed its reboot cycle, the iDX version and Options file can be verified by entering the following commands at the Linux prompt:

/usr/sbin/falcon --version
cat /etc/idirect/falcon/falcon.opt

Cheat Sheet Commands:

service idirect_falcon stop

service sshd start

mount -t tmpfs -o remount,size=16M /tmp

tftp_package.sh 172.17.69.194 evo_X5_rmt-13.0.0.3.pkg

tftp_package.sh 172.17.69.194 linux_2.4_bsp-13.0.0.3.pkg

tftp_package.sh 172.17.69.194 remote_3XXX-13.0.0.3.pkg

cd /etc/idirect/falcon

mv falcon.opt falcon.opt.old

cat > falcon.opt

/usr/sbin/falcon --version

cat /etc/idirect/falcon/falcon.opt

2.1 Modem Recovery- loading Option File (Falcon File) using WINSCP

This procedure is an alternative to Procedure 4, which can be used to load an Options file remotely. This procedure uses a Secure Shell session and WinSCP to reload the modem unit's Options file, and requires that WinSCP be installed on the PC.

Note: WinSCP is an open source SFTP client for Windows that offers secure file transfer between a local and remote computer. It may be downloaded by accessing http://winscp.net/eng/index.php.

Note: This is a remote alternative to Procedure 4, and may not be successful unless

Procedures 1-4 have been completed locally. This procedure requires that LANside

IP connectivity has been established on the modem unit, Linux has been loaded and logged into, the Secure Shell daemon is running, and a valid and uncorrupted software image is operating.

To establish a Secure Shell session:

1. Launch the Secure Shell client (i.e. PuTTY) on the PC, and using the modem unit's IP address (noted

in Step 4 of Procedure 3), establish an SSH session with the modem.

2. Login to the SSH session with the modem using the root user login.

To load an Options file using WinSCP:

3. Rename the good Options file on the local PC to falcon.opt.

4. In Windows, launch the WinSCP application, and login to a session using the default WinSCP session parameters, the configured modem IP address (noted in Step 4 of Procedure 3), and the root user login
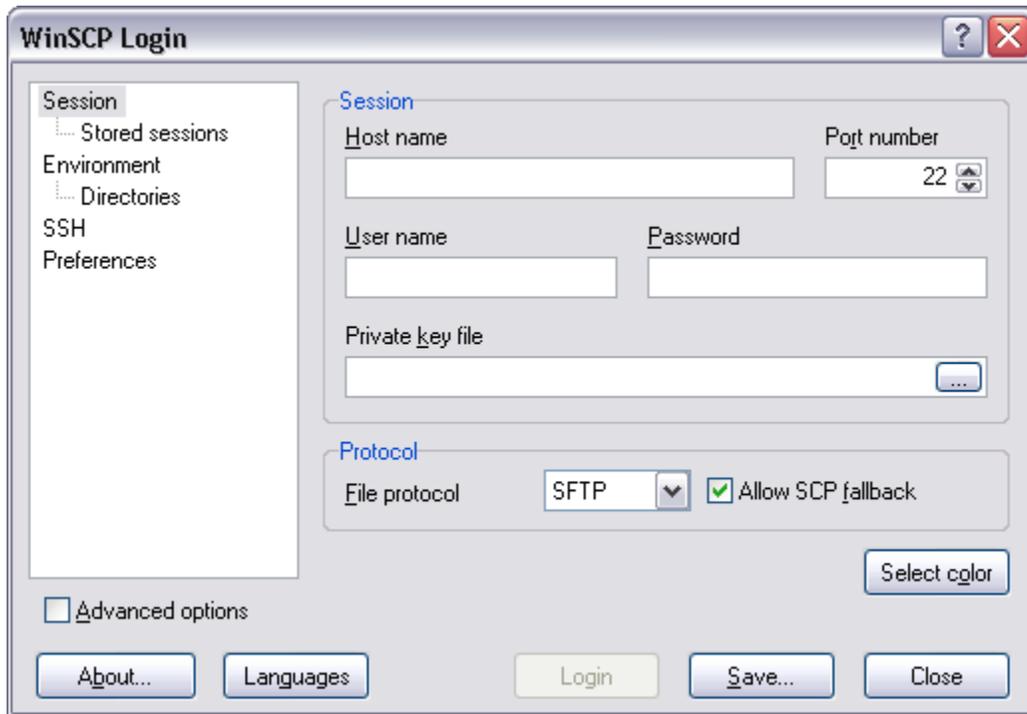
5. using the WinSCP session, navigate to the /etc/idirect/falcon/ directory on the modem. If there is an existing file there, named falcon.opt (precisely), left-click the file and rename it falcon.opt.old.

6. Using the WinSCP session, drag-and-drop to secure copy the falcon.opt Options file (renamed in Step 3) to the following location on the modem unit:
/etc/idirect/falcon/

7. Using the WinSCP session, navigate to the /etc/idirect/falcon/ directory on the modem, and ensure the Options file copied in the previous step is still named **falcon.opt** and not **falcon.opt.opt**. If not, change the file name to **falcon.opt**.

8. Enter the **reboot** command at the modem unit console:
reboot

Module 4 Winegard 2-Way Satellite Internet System

Goal: The purpose of this document is to provide the end user with a complete understanding of the Winegard 2-way antenna system.

Overview:

Theory of operation

Intial Set up

Debug/Motor Movements

Troubleshooting

Software Updates

You will need the following equipment and software to successfully service and maintence in the field:

• A console cable with DB9 adapter. (Not required for Evolution X1 remote.)

• USB keyboard

• A telnet session enabled in windows 7

• A laptop (or PC) with: Window 7, Windows XP or Windows 2000, Service Pack 3

• USB flash drive

The Winegard 2-Way satellite system has been modularly designed. The system can utilize several different antenna sizes as well as different satellite modems. The basic antenna pointing mechanism is the same for all platforms. The 2 major differences between platforms are antenna size and skew methodology. Some systems are designed to skew the entire antenna and some are designed to skew the feed horn assembly.

The antenna system requires an internet modem and suitable 110/220 volt AC power source to operate. The modem is connected to the Indoor Control Unit (IDU) through a CAT5 telnet cable and to the antenna system through 2 RG6 (or equivalent) coaxial cables. These cables are terminated with environmentally sealed F connectors. The modem supplies the DC voltage necessary for the LNB. The IDU supplies 48 volts DC to the antenna system through an RG6 (or equivalent) cable. Communications between the IDU and the antennas Outdoor Control Unit (ODU) are carried over the antenna's power cable utilizing Bluetooth Protocol. This cable is terminated with BNC connectors.

The modular design was used to make assembly and repair as efficient as possible (see the Functional Block Diagram).

The system was designed to utilize an onboard GPS receiver to determine pointing elevation and correct skew angle. The pointing angle is also compensated by pitch and roll detectors. It also uses on onboard compass to automatically determine the correct pointing direction. An antenna heading can also be entered into the systems which will by-pass the compass (fixed heading mode). This should be used when compass calibration is impractical.

The antenna uses an onboard DVB receiver to find the correct satellite. The system then fine tunes the pointing position. The preferred method for fine tuning is to use information from the modem and adjust the azimuth, elevation, and skew for optimal signal integrity. If the system is set to generic mode the antenna's fine tuning is completed using the onboard DVB receiver. This second method requires no modem communication and is not recommended.

There is several safety features built into the antenna system. These features automatically stow the antenna if certain criteria are met. These include loss of receive signal lock, detected motion (pitch, roll, velocity) as well as turning the power off to the system by pressing the power button on the IDU.

1.1 Functional Block Diagram
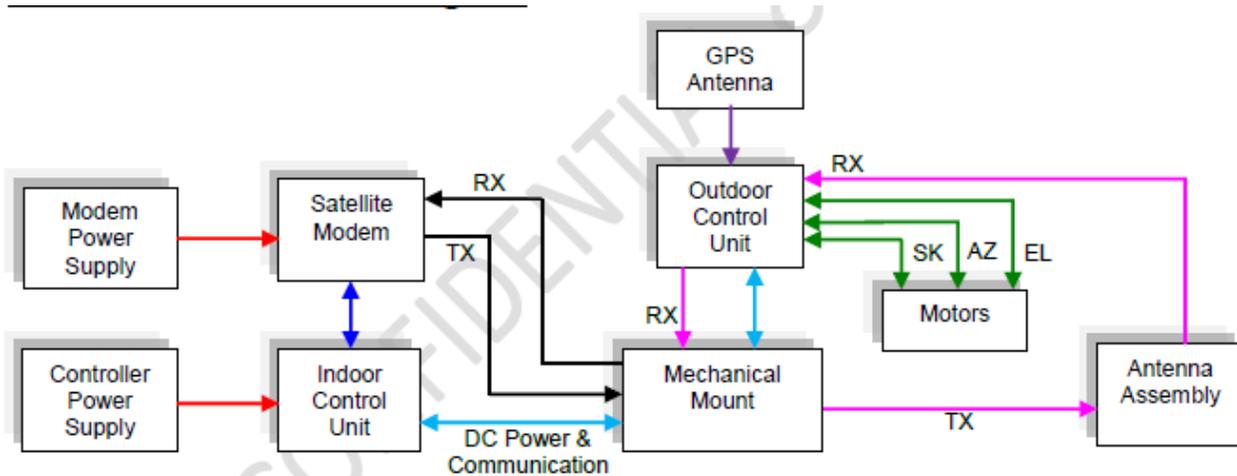
Legend

▬ Ethernet		▬ GPS	
▬ DC Wiring Harness		▬ Control	
▬ RF Wiring Harness		▬ Modem Rx Tx	
▬ Power			

Antenna Assembly –
Contains the RX LNB, TX BUC and the Antenna Dish

Motors –
The motor block contains the Azimuth motor, Skew motor, and the Elevation actuator.

Outdoor Control Unit (ODU) –
The ODU contains a DVB/DSS receiver and controls all motor movements.

1.2 Wiring diagram
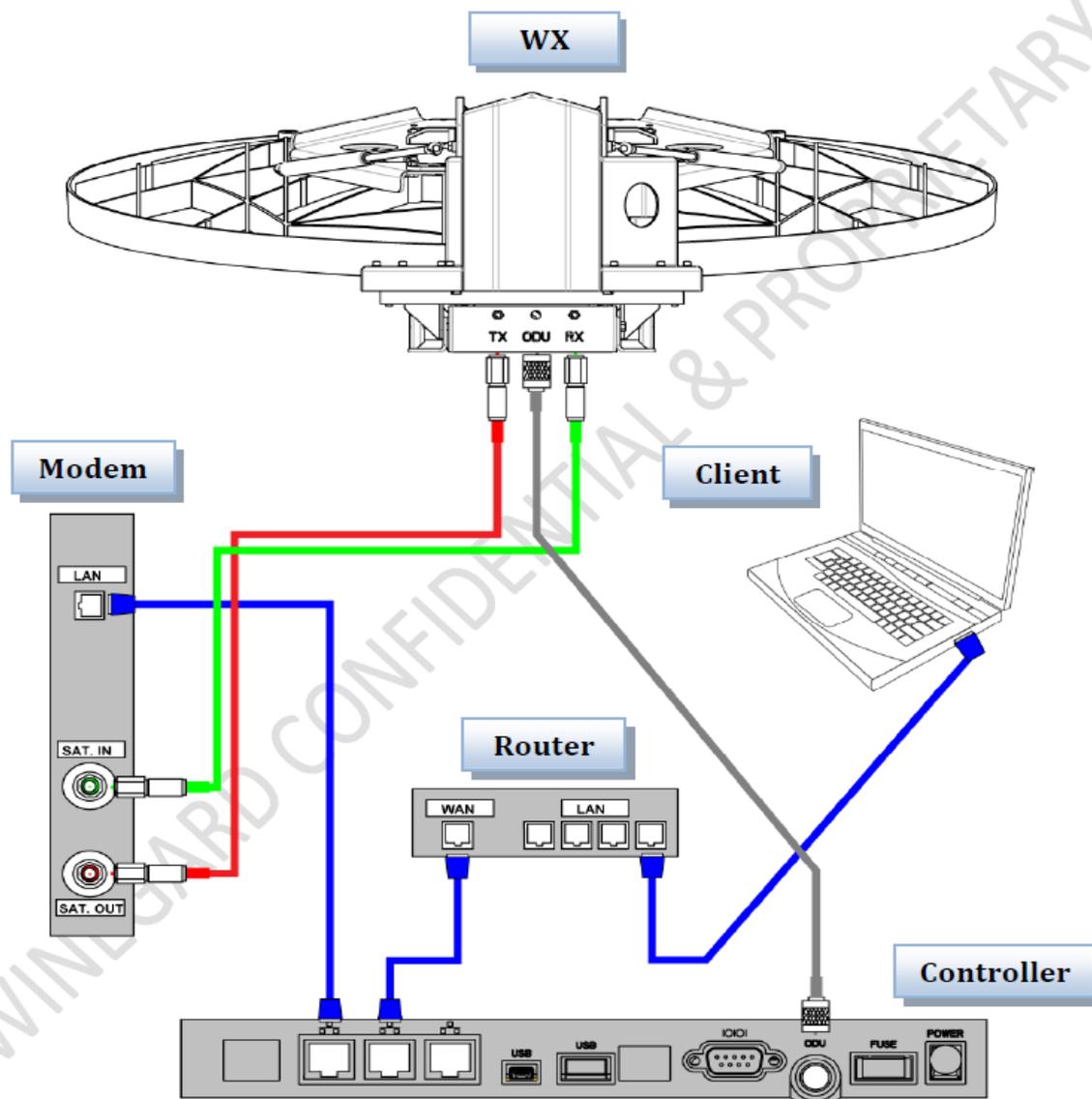
IDU- In-Door Unit

The Winegard 2-Way in door electronics, IDU refers to the 2-way controller. The term IDU does not include the modem .Interchangeable words in the industry:

IDU, Controller, ACU

ODU - Out-Door Unit

The Winegard Outdoor Electronics, or ODU, refers to the electronics manufactured by Winegard which reside on the Antenna itself. It does not extend to include RF electronics such as the BUC and LNB.

Interchangeable words in the industry:

ODU, Upper Board, Antenna Electronics

Antenna- Winegard 2-Way Antenna

Includes all physical components of the system except the IDU. Motors, hardware links, ODU, Reflector and RF Electronics are all components of the antenna.

Interchangeable words in the industry:

Antenna

Mount

System- Winegard 2-Way System

Includes all components supplied by Winegard. Motors, hardware links, ODU, Reflector, RF Electronics and IDU are all components of the System.

Interchangeable words in the industry:

System

Component Description
The Winegard antenna houses the following components:

1. Reflector -
WX1200B antennas have an ASC signal reflector and WX1200 antennas have a Prodelin reflector.

2. Elevation Actuator -
Attached to the Reflector back plate and Main Drive Mechanism

3. Main Drive Mechanism -
Houses the AZ motor, AZ ring gear, ODU, wiring etc.

4. Installation Rails -
Used to secure the antenna to the vehicle or mobile structure. Hole patterns for installation are available on the dimension.pdf documents at the end of this manual.

5. Feed Arms -
Houses the Universal BUC mounting plate which can be used to mount BUCs up to 15lbs and 12.00" L x 7.75" W x 5.5" H.

6. Skew Assembly -
Houses the Skew drive motor, Feed assembly, LNB and Flex Wave Guide

1.5.1 Main Cover

In order to replace the azimuth motor, elevation actuator, magnetic sensor, or the Outdoor Control Unit (ODU) it is necessary to remove the main cover.

The main cover is held on by 8, ¼ - 20 X ¾ button head hex screws (3/16 Allen Wrench)
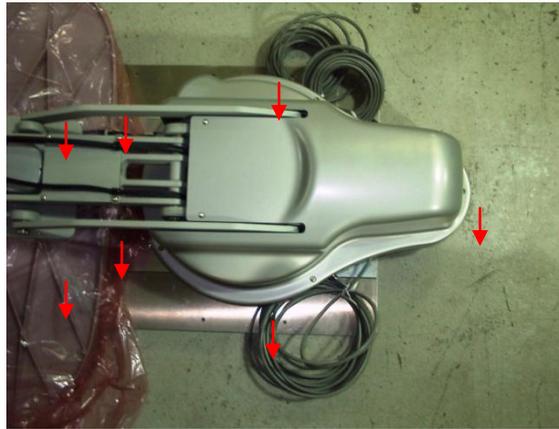
1.5.2 Azimuth Motor

Remove the final 2 motor screws and carefully lift out the motor.
The system must be calibrated (homed) before returning to normal operation.

WX Series
5/32 Allen Wrench
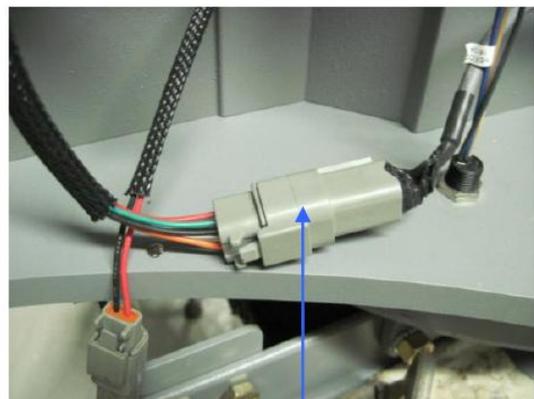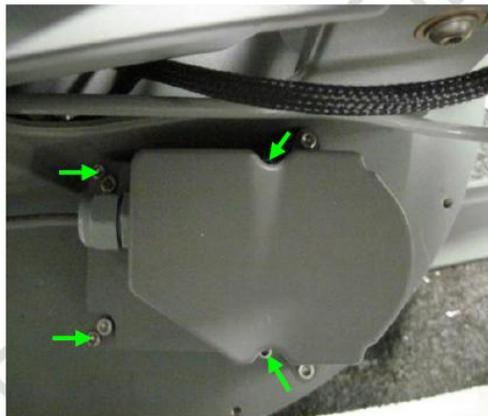
Azimuth motor connector

1.5.3 Azimuth Magnetic Sensor

The magnetic sensor is the only positional sensor in the Winegard 2-Way Antenna system. It is located under the main cover next to the azimuth motor.

The sensor is used to calibrate the azimuth position as well as verify azimuth position before stowing. The sensor will need to be calibrated before returning the system to normal operation.

The sensor is threaded into the base of the antenna mount and is held in place by 2 nuts which lock the sensor in place. In order to remove the sensor, disconnect the sensor's connector. Loosen both lock nuts starting with the top nut. Unscrew the sensor from the azimuth base plate.

Rotate the azimuth base until the sensors magnet can be seen from through the mounting hole. This position should be very close to the azimuth stowing position. Carefully screw the sensor into the mounting hole until the sensor contacts the magnet. Unscrew the sensor 1 to 1 ½ turns. Lock the sensor in place by tightening the lock nuts in place starting with the bottom nut first. Make sure the sensor does not turn when tightening the lock nuts.

1.5.4 Skew Motor

The skew motor can be located in 2 different locations depending on which type of model is being serviced.

The system must be calibrated (homed) before returning to normal operation.
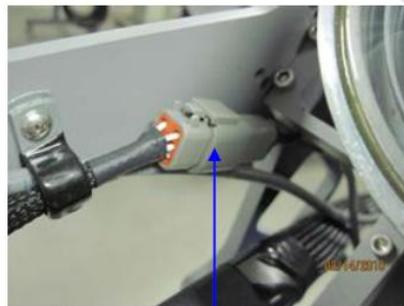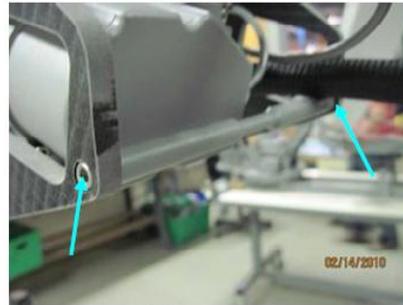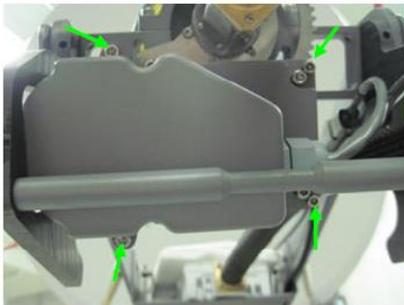
The skew motor for these models is located next to the LNB/BUC assembly. This causes only the feed horn, OMT, BUC and LNB to rotate. Disconnect the skew motor connecter and remove the 4 skew motor screws.
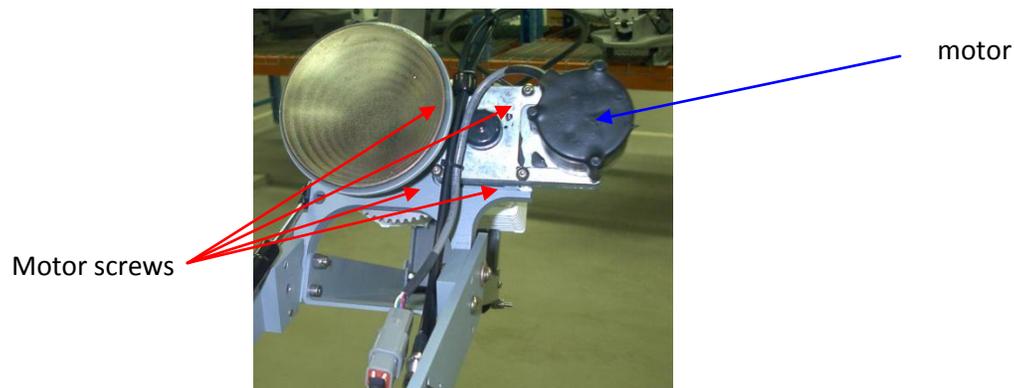
1.5.5 Outdoor Control Unit (ODU)

The Outdoor Control Unit is located under the main cover. It is held in place by 4 hex screws. It is easiest to replace the ODU if the system is in the stowed position.

The following parameters need to be checked and/or calibrated if the ODU is replaced: Azimuth home position, skew home position, elevation home position and the Pitch/Roll sensor.

Make sure the power is turned off to the system.

There are 5 connectors that need to be dissembled. Mark the position of the 2 RF connectors (F connectors) before removing them so they can be reassembled into the same position. Disconnect the 2 F connectors and then remove the BNC cable connector. Remove the GPS antenna connector. Unscrew the 4 ODU mounting screws located in the corners of the ODU. Carefully raise the ODU and remove the 28 pin AMP connector by unscrewing the outer ring. This connector is located on the bottom of the ODU.

ODU mounting screws

GPS antenna connector

RX IN (from LNB)

RX OUT (from modem)

BNC connector (power and communications)

28 pin AMP connector
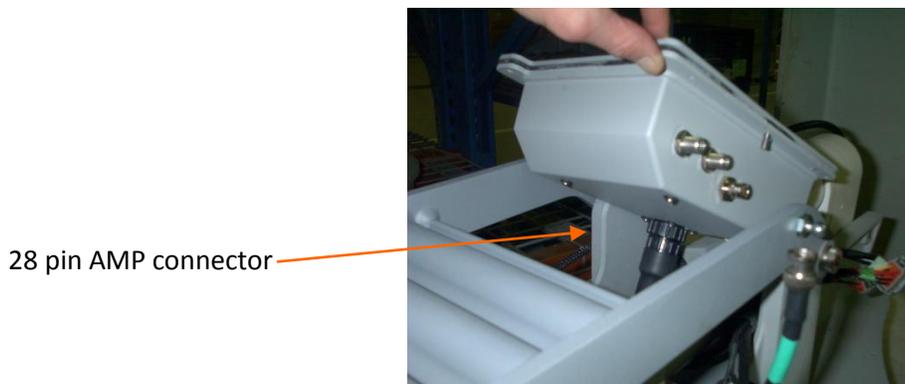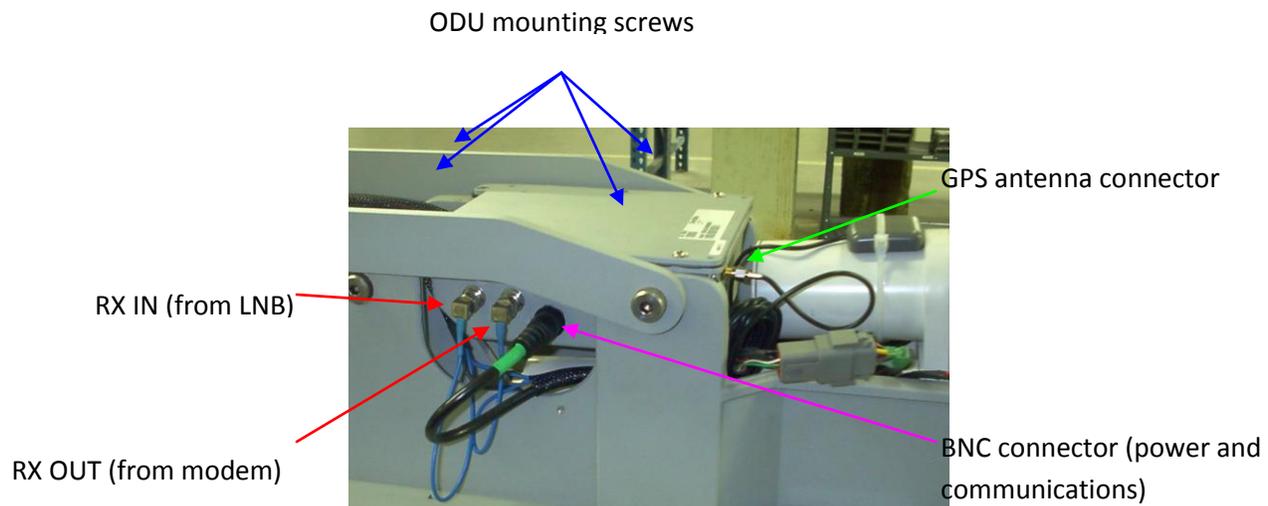
1.5.6 Elevation Actuator

In order to replace the elevation actuator the satellite dish assembly may need to be raised and lowered manually. The dish assembly is very heavy and it is recommended that 2 people are used to complete this procedure. (1 Inch Socket used to remove bottom pin)

The elevation actuator is located under the main cover. It is necessary to raise the dish in order to remove the elevation actuator. If it is not possible to raise the dish the ODU will have to be removed first.

Disconnect the actuator power connector. Remove the GPS antenna from the top of the actuator. Raise the dish until the front actuator pin can be removed. The dish should be raised high enough so the lift link can be blocked. With the block in place lower the dish until the actuator stops moving. This will prevent the dish from lowering and help with the installation. Once the lift link is blocked remove the e-clips (or retaining screw) and remove the front actuator pin. Remove the e-clips from the rear actuator pin. Remove the rear actuator pin and carefully slide the actuator out towards the back. Reverse the procedure for installation. The system must be calibrated (homed) before returning to normal operation.

WX Series
3/16 Allen Wrench
1/8 Allen Wrench
Disconnect
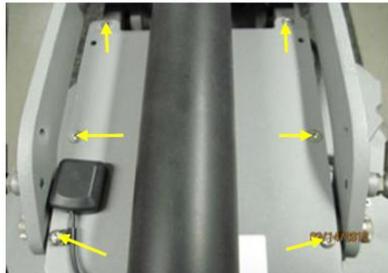
1.5.7 Tools Required

Allen Wrenches
- 3/16
- 5/32
- 1/8

Sockets
- 1 inch

Lager adjustable Wrench
Magnetic Compass
Inclinometer
Digital inclinometer
Volt meter
12 volt DC battery

The installation setup allows you to properly configure Winegard controller to point to the satellite your iDirect modem is configured for. Below is the Procedure.

1 .From the Main Menu on the Winegard Controller select the authorized installer menu on the controller.
    a.   Click on the Triangle with the exclamation point
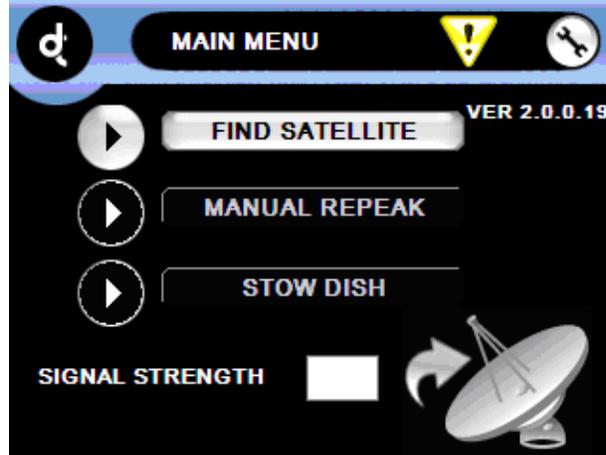
    b.   Click on Authorized Installer Menu
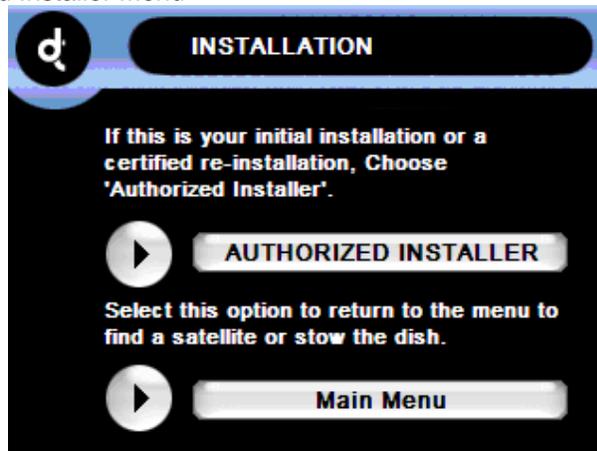
    c.   The Password is: **1234**

d. This will take you through a series of questions below
- Do you need to perform emergency motor movements? No
- Would you like to calibrate motor? No
- Would you like to perform a Compass Calibration? No

e. Search Mode: **Normal Search Mode (default)**

f. Modem Selection: **iDirect**
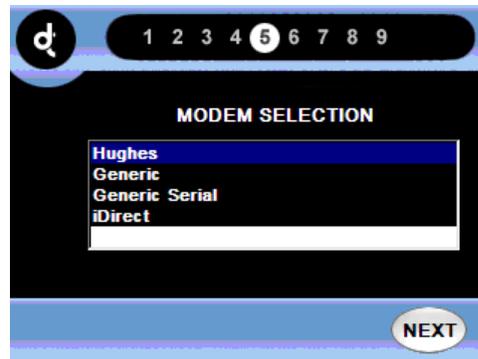
2. DVB or Modem search: Select **Modem** search
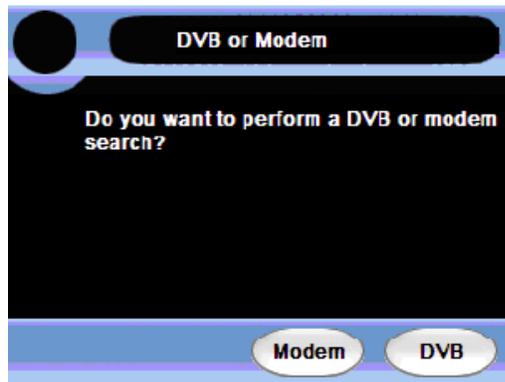
3. For Locating Satellite, verify all information with IsoTropic :

g. Orbital Location: **89W**

h. RX polarity: **Rx=V**
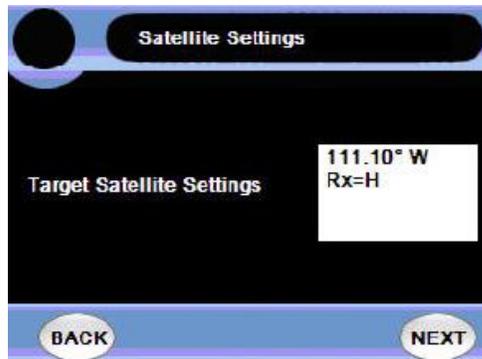
4. Would you like to change the default search window settings? *No*
5. Would you like to turn on auto peak? *No*
6. When it asks if you want to set a skew offset, select *NO*
7. For Target Satellite Orbital Location, select *proper Satellite latitude*
8. For the RX, enter *proper polarization*
9. It will ask if these settings are correct, select *YES*
This will take you back to the main menu

Please Verify the Heading. You can do this by looking on the lower right hand corner of the main menu. If the system is set up for Compass Heading the system should automatically be updated. If using a fixed heading, please confirm the direction of where the top (front) of the antenna is pointed in the stowed position.
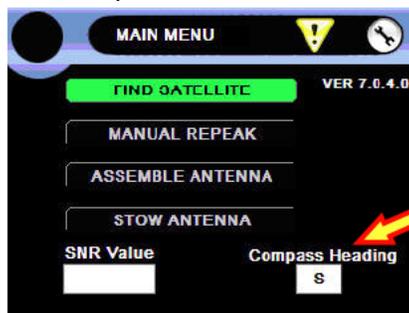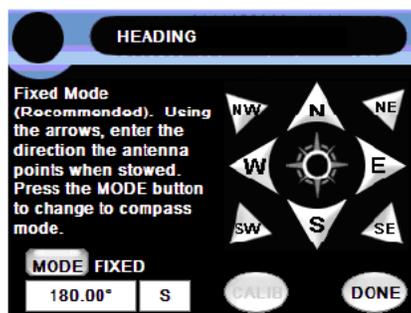
i. Click *Find Satellite*
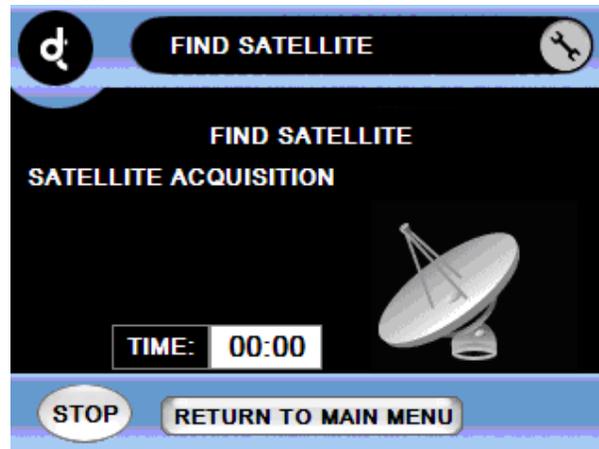
3 Debug Mode

The debug prompt allows interaction with the controller using a command line type interface. In the debug prompt you can perform any function you would using the GUI but in a command line interface.

Tap the icon in the upper left hand corner of the screen and then tap the screen somewhere in the lower right hand quadrant of the screen. Do this repeatedly until the screen turns white. The tool bar should display the following options: File, View, Help, Install, and User. This is the debug screen. The screen should also display the "trk>" prompt.

Touch here

0

Then here
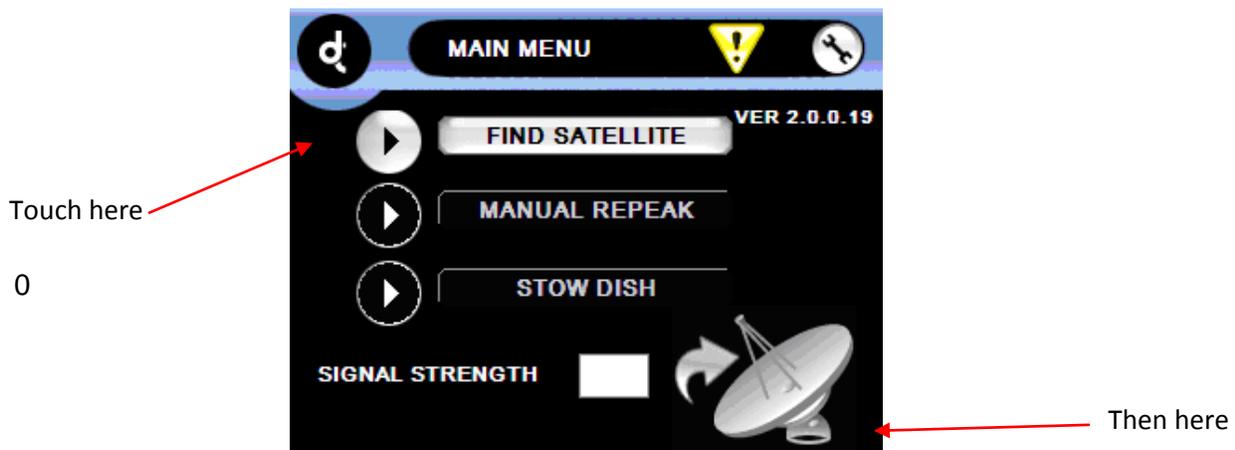
1. Tap three times on the upper left hand corner of the screen.   **Version 8+**

Tap Here
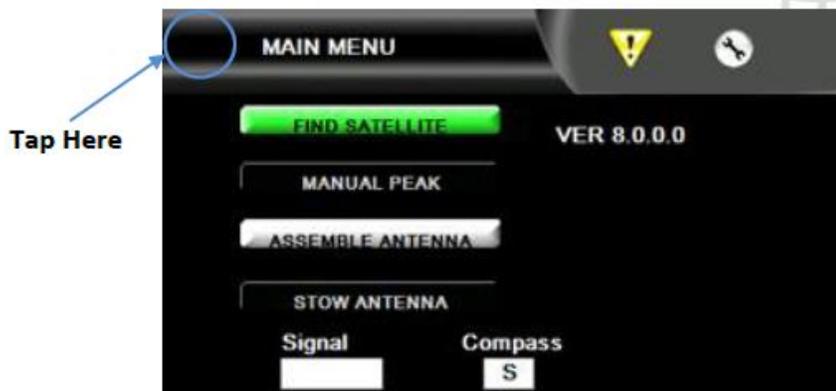
2. Do this repeatedly until the screen turns white as seen below.
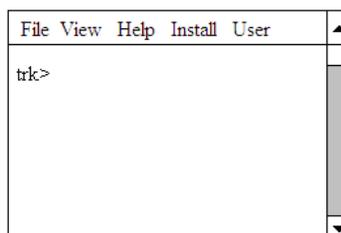
3.1 Debug- Using a terminal emulator program or telnet in debug mode

Null modem

A null modem cable can be connected between the IDU and a computer's serial port. The IDU can then be controlled in debug mode using a terminal emulator program. This replaces the need for a USB keyboard.

The baud rate should be set to 576000, and the rest of the settings are 8 data bits, No parity, 1 stop bit and no flow control.
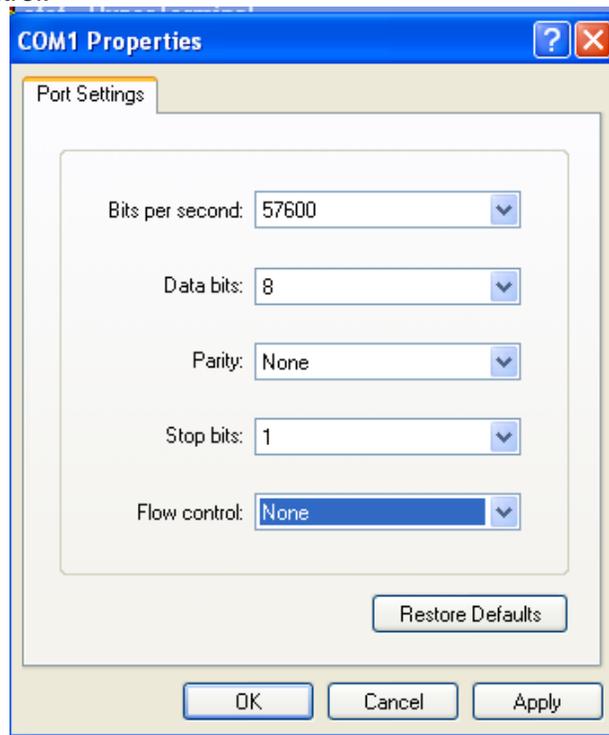
This a good way to also capture the errors in troubleshooting

Enter debug mode as described earlier after the derail cable is connected. Commands are entered exactly as described in other parts of this document.

Telnet-

Please enter the following command: **telnet {space} the ip address of the IDU <space> 5566.** (you can locate the IP address of your IDU by typing in the command: *ipconfig* this will give the ip address of your computer and the gateway IP address will be your modems IP address and then +1 for IDU IP Address or select the wrench icon in the main menu and scroll to Network setup

Telnet Command Example: *telnet 192.168.0.1 5566*

It is sometime necessary to move the system during troubleshooting. The proper precautions must be taken when moving the system through the debug interface.

Caution: There are several safety features which are disabled during some commands such as the motor stall timer and azimuth-skew lock out. Make sure the system can move in all axis and unintended movements will not damage the antenna or surrounding structures. Make sure the antenna is raised to a safe elevation before moving the azimuth or skew motors. The MOTOR commands require a minimum elevation before the other axis can be rotated. This is not the case for velocity commands (DC). Stay clear of the system during all system movements. *Typing "s" and pressing enter at any time from the debug menus MOTOR>, DC>, and HOME> will stop all motors.*

There are three major types of motor commands.

Angular Movement

Positional Movement

Velocity Movements

There are three major types of calibrations.

Skew Home Position Calibration

Azimuth Home Position Calibration

Pitch and Roll Calibration (Would Require a Digital Inclinometer)

Important Note: Each Motor is identified by a number. Typing "s" and pressing enter at any time from the debug menus MOTOR>, DC>, and HOME> will stop all motors.

Azimuth = 0
Elevation = 1
Skew=2

3.2.1Angular Movement

The first type of movement is an angular movement command that is done from the "MOTOR>" menu. Movements are given using angular commands. Below is a screen shot from the debug menu. The motor command was issued from the "TRK" prompt and the "a" command (angle) displays the current motor angles.

Important Note: Typing "s" and pressing enter at any time stops all motors.

MOTOR>s
 AZ stopped.
 EL stopped.
 SK stopped.
MOTOR>
TRK>motor
MOTOR>a
 AZ = 355.93° wrap = -4.07°
 EL = 29.52°
 SK = 325.64°
MOTOR>

Each motor is identified by a number. The azimuth is motor 0, the elevation is motor 1, and the skew is motor 2. The format for a motor movement command is "a [motor#] [angle].

Use the command "a 1 35" to raise the actuator to 35 degrees.

MOTOR>a 1 35
 Angle = 30.00°
MOTOR>a
 AZ = 359.97° wrap = -0.03°
 EL = 34.91°
 SK =   0.04°
MOTOR>

Use the command "a 0 315" to rotate the azimuth counter clockwise from zero 45 degrees.

MOTOR>a 0 315
 Angle = 315.00°
MOTOR>a
 AZ = 314.96° wrap = -45.04°
 EL = 29.91°
 SK =   0.04°
MOTOR>

Use the command "a 0 45" to rotate the azimuth clockwise from zero 45 degrees.

MOTOR>a 0 45
 Angle = 45.00°
MOTOR>a
 AZ = 44.99° wrap = 44.99°
 EL = 29.91°
 SK =   0.04°
MOTOR>the skew motor operates in the same manor.

The second type of movement command is called positional movement. The position is based on the number of individual steps per revolution (motor pulse counts). This position is reset when the system performs a motor calibration (homing routine) this command is entered from the "DC>" prompt in the debug mode. The format is similar to the motor movement command described above. If a "p" is entered the system will respond with the current motor position.

DC>p
 AZ = 15193
 EL = 2636
 SK = 8949
DC>
Each motor is identified by a number. The azimuth is motor 0, the elevation is motor 1, and the skew is motor 2. The format for a positional movement command is "p [motor#] [position].

The number of possible positions (steps per revolution) is different for each axis. It also differs for each type of mount. The azimuth is the same for all systems and the number of steps per revolution is 17363. In this case 17363 is the same as 0.

Important Note: Typing "s" and pressing enter at any time stops all motors.

DC>s
 AZ stopped.
 EL stopped.
 SK stopped.
DC>
Caution: The system will move in azimuth and skew regardless of what the elevation is. Make sure the system is at a safe elevation before attempting to move the azimuth or skew motors. Stay clear of the entire system during movement commands.

Caution: The elevation will raise and lower its full range regardless of the azimuth and skew position. This means it is possible to lower the antenna on either side of the LNB landing ramp possibly causing damage to the antenna mount or surrounding equipment.

Use the command "p 0 100" to move the azimuth motor to position 100.

DC>p 0 100
DC>p
 AZ =   98
 EL = 2636
 SK = 8949
DC>

.

Each motor is identified by a number. The azimuth is motor 0, the elevation is motor 1, and the skew is motor 2. The format for a velocity movement command is "v [motor#] [velocity]. The velocity is any number between -255 and 255. Negative numbers move the motors in on direction and positive numbers move the motor in the opposite direction.

Important Note: Typing "s" and pressing enter at any time stops all motors.

DC>s
 AZ stopped.
 EL stopped.
 SK stopped.
DC>
Caution: The system will move in azimuth and skew regardless of what the elevation is. Make sure the system is at a safe elevation before attempting to move the azimuth or skew motors. Stay clear of the entire system during movement commands.

Caution: The elevation will raise and lower its full range regardless of the azimuth and skew position. This means it is possible to lower the antenna on either side of the LNB landing ramp possibly causing damage to the antenna mount or surrounding equipment.

Caution: Once the motor has been given a velocity command it will continue to rotate until it hits a hard stop or the stop "s" command is given.

To start the azimuth rotating counter clockwise use "v 0 200". The system will continue rotating until the "s" (stop) command is given.

```
DC>p
AZ = 17362
EL =  2636
SK =  8949
DC>v 0 200
DC>s
AZ stopped.
EL stopped.
SK stopped.
DC>p
AZ =   840
EL = 2636
SK = 8949
DC>
```

Notice the change in position.

The system can be homed from the debug menu. Type "home" from any capitalized debug prompt and press enter. This should display the "HOME>" prompt.

The system (or individual axis) will need to homed if an "invalid position" indicator shows up in either the angle or position commands.

DC>home
HOME>
The system can go through a full, 3-axis calibration by typing "h" and pressing enter. The elevation will raise (or lower) to a predetermined elevation. The skew will then rotate all of the way in one direction until it encounters a hard stop and then return to zero degrees. The azimuth will rotate clockwise until it encounters the magnetic position sensor or hits the hard stop. If it hits the hard stop it will rotate counter clockwise until it senses the magnetic sensor. The azimuth will then return to zero degrees. The elevation actuator will then lower the dish until it hits the hard stop. The elevation actuator may clutch several times. This is normal and does not cause any damage.

Each axis can be calibrated (homed) individually. In order to calibrate the skew and azimuth motors the system must be at or above a minimum elevation angle (10 degrees). In order to home the elevation motor the azimuth and skew must be at zero degrees.

Each motor is identified by a number. The azimuth is motor 0, the elevation is motor 1, and the skew is motor 2. The format for a specific motor calibration command is "h [motor#].

The following command homes the azimuth. Wait for the system to complete moving before attempting to issue another command.

HOME>h 0
HOME>

Important Note: Typing "s" and pressing enter at any time stops all motors. The calibration may not be complete.

3.2.5 Calibration Procedure

There are several different systems that require calibration. The first group of calibration procedures are factory set calibrations and will only be required if the Outdoor Unit (ODU) or the azimuth position sensor is replaced. These include calibration of the azimuth home position, calibration of the skew position, or calibration of the Vehicle Attitude Board (pitch and roll).

The second calibration procedure involves systems that may require periodic calibration. This includes setting the antenna system's home position and calibration of the on-board compass. Both of these procedures can be accomplished using either the USB keyboard or the Indoor Unit (IDU) in normal operation.

3.2.6 Calibration of the Skew Home Position (zero degree skew)

This procedure should be performed if the antenna does not return to the zero degree skew position during motor calibration. This procedure requires a USB keyboard (or alternate method). The system must be in debug mode as described earlier in this document.

It is very important that the antenna elevation is high enough that antenna can skew freely. When the skew motor is calibrated it will rotate the skew all of the way in one direction and then return the skew to zero degrees. If the system does not return to zero degrees it will be necessary to adjust the maximum skew angle in the ODU memory.

1. The IDU screen should display "trk>".
2. Hold down the control key (ctrl), press "t", release both keys and then press enter.
    a. The IDU screen should change to the capital "TRK>" prompt.
3. At the "TRK>" prompt type "home" and press enter.
    a. The IDU screen should now display the 'HOME>" prompt.
4. At the "HOME>" prompt type "h 2" and press enter.
    a. The command will calibrate the skew motor.
    b. If the skew does not return to the zero degree position than the maximum skew angle will need to be changed.
    c. If the skew returns to the zero degree skew position no adjustment is necessary.
5. If adjustment is needed estimate how far off the skew is from zero degrees and continue.
6. Type "NVS" from any capitalized screen prompt (ie: TRK>, HOME>, etc).
    a. The IDU screen should now display the "NVS>" prompt.
7. At the "NVS>" prompt type "e 70" and press enter.
    a. The value displayed is the current maximum value for the skew.
    b. CAUTION : The system is now ready to enter the new value. If the value doesn't need changed press enter. Do not save the new values.


```
File  View  Help  Install  User       ▲

NVS>e 70

    70)  Skew Max Angle        4
7.50 .▯
```
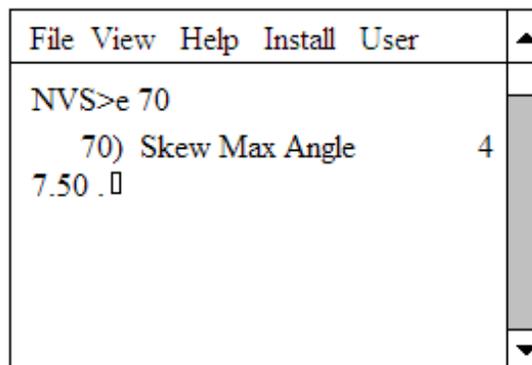
c. The picture above depicts a typical value for a DT740 (47.5 degrees).
d. This value may be different depending on model and skew configuration.
e. If the system rotated past the zero degree skew position during skew motor calibration than this value is too large.

       f.   If the system did not reach the zero degree position during skew motor calibration than this value is too small.

8. Type the new value into the IDU and press enter.
   a. Start with small value changes.
   b. To increase the Skew Max Angle 1 degree type "48.5" and press enter.
9. Press enter again and the system will display the "NVS>" prompt.
10. From the "NVS>" prompt type "s" and press enter.
    a. This saves the new value into memory.
11. The system needs to be power cycled in order for the new values to take effect.
    a. Once the system has been power cycled start back at step 1 and calibrate the skew motor.

3.2.7 Calibration of the Azimuth Home Position

This procedure should be performed if the LNB arm does not line up properly in the stow position bracket. This procedure requires a USB keyboard (or alternate method). The system must be in debug mode as described earlier in this document.

It is very important that the antenna elevation is high enough that the LNB arm will clear all obstacles.

1. The IDU screen should display "trk>".
2. Hold down the control key (ctrl), press "t", release both keys and then press enter.
    a. The IDU screen should change to the capital "TRK>" prompt.
3. Type "dc" and press enter.
    a. The IDU prompt should change to "DC>"
4. Type "p 1 1500" and press enter.
    a. The LNB arm should lift off of the stow tray.
    b. Verify that the LNB arm will not hit any obstacles when the azimuth motor is engaged.
    c. If the LNB arm must be raised farther type "p 1 1600" Keep increasing the position value until the LNB arm is at a safe elevation.
5. Center the azimuth.
    a. Visually inspect the front of the antenna assembly to see if the unit is aligned in the middle of the stow tray.
    b. If the unit is aligned skip to step 6.
    c. At the "DC>" prompt type "p 0 -500" and press enter. This will rotate the azimuth motor clockwise past the magnetic sensor.
    d. Qt the "DC>" prompt enter the command "p 0 +100" and press enter. This will rotate the azimuth counterclockwise back towards the center of the tray.
    e. Continue to rotate the azimuth towards the center. It may be necessary to decrease the amount of travel by entering values less than 100 in order to stop at exactly the center position.
    f. The system must be brought to the center position from this direction. If the system overshoots the center position it will be necessary to start back at step c.
6. Calibrate the center (0) position.
    a. From the "DC>" prompt type "calib" and press enter.
    b. Then type "y" when asked if the azimuth is at 0.
    c. The azimuth should move in both directions. It may not return to the centered position.
7. From the "DC>" menu type "home" and press enter.
    a. The IDU screen should change to the "HOME>" prompt.
8. At the "HOME>" prompt type "h" and press enter.
    a. The system should go through a motor calibration.
    b. Verify that when the system stows it is centered on the stow tray.
    c. If the system is not centered it will be necessary to return to step 3 and repeat this procedure.

3.3 Debug Commands

Below is a list of common debug commands used in in the debug interface which may become necessary when troubleshooting, there are several commands and procedures that may enhance operation and troubleshooting. Pressing ctrl-t and ctrl-i switches between the capitalize debug prompts. The capital prompts come directly from the ODU and the lower case prompts come directly from the IDU.

trk =   trk Menu
upd =   upd Menu
ant =   ant Menu
acu =   acu Menu
dc =   dc Menu
bt =   bt Menu
slk =   slk Menu
mdm =   mdm Menu
cfg =   cfg Menu
dump =   Dump Trace Buffer
hh =   HTest

trk> trk menu

v =   version
i =   info
dbg =   dbg port
m =   mode
u =   update [-ds980]
test =   test
stats =   stats
sync =   sync time
baud =   baud
ticks =   ticks
pl =   Pkt Log
clear =   Pkt Log Clear
pe =   Pkt Log Enable
pd =   Pkt Log Disable
gt =   GPS test
ps =   power switch
et =   Set EL table "filename.txt"
et? =   Get EL table
ec =   Set EL calib [ustep]
ec? =   Get EL calib
led =   Set LED latch state [r(red)|g(green)]
rs =   Remote switch
?? =   Common commands

Ctrl +t =   TRK

upd> upd menu

cpld   =   Update Tracker CPLD

 dbg   =   Set Tracker Debug Port

 con   =   Set Tracker Console Port

 id   =   Set Subsystem ID

 id?   =   Get Subsystem ID

 ??   =   Common commands

ant> ant menu

search =   search

 sw   =   search wait

 search2 =   search azel

 freq   =   freq [freq] [rate] [nid]

 i**dsat**   =   ID Satellite

 v   =   velocity

 vt   =   velocity test

 a   =   angle

 ar   =   angle relative

 wa   =   wrap angle

 att   =   pitch, roll, yaw

 sa   =   set angle

 st   =   st

 pv   =   peak vertically

 pa   =   pointing angle

 scalc   =   Search Calcs

 hits   =   search hit count

 sat   =   show sat [index]

 go   =   go to sat [index]

 calaz   =   calib az sensor

 tiltmount =   tilt mount calib

 s   =   stop

 h   =   home [motor]

 gps   =   gps

 t   =   command status

 stow   =   stow

 hh =   H Test

 ad   =   Angle Delay

 slkt   =   Slk Test

 slkt2   =   Slk Test2

 slkt3 =   Slk Test3

invalidate =   Invalidate [angle]
gotovel   =   goto velocity [vel]
copy   =   copy [memcard file]
av   =   angle velocity
stoptest   =   stop test
ctest   =   corrupt test
??   =   Common commands

TRK> TRK menu

PA   =   Point Angle Menu
Search =   Search Menu
adc   =   A/D Menu
att   =   Attitude Menu
bt =   Bluetooth Menu
compass =   Compass Menu
d?   =   Default commands help
dc =   DC Motor Menu
dip =   Dip Switch Menu
dump   =   Dump Trace Buffer
dvb =   DVB Menu
echo =   Echo
elev =   Elevation Table
f   =   Flash Menu
goto =   Goto Menu
gpio =   GPIO Menu
gps =   Gps Menu
home =   Home Menu
i2c =   I2C Menu
id   =   ID
motor =   Motor Menu
nvs =   NVS Menu
os   =   OS Menu
pwm   =   PWM Menu
regs =   Dump registers
rtc =   RTC Menu
scan =   Scan Menu
ser =   Serial Menu
signal =   Signal Strength Menu
slk   =   Slk Menu
spi =   SPI Menu
stow =   Stow Menu
tilt =   Tilt Menu
timer =   Timer Menu

wd   =   Watchdog Menu

acu> acu menu

reboot =   reboot IDU
h   =   home [motor]
stow   =   stow
calaz =   calib az sensor
v   =   velocity [motor] [speed]
a   =   angle [motor] [angle]
ar   =   angle relative [motor] [angle]
s   =   stop current command
sa   =   set angle [motor] [angle]
inv   =   invalidate [angle]
acc   =   auto heading calib
tiltmount =   tilt mount calib [pitch] [roll]
att   =   pitch, roll, yaw
gps   =   read gps
peak   =   peak [r(run)|s(stop)]
search =   search [r(run)|s(stop)]
angsig =   angle/signal [j|k|l|u|i|o|s]
t   =   odu command status
opstat =   operational status
exit   =   exit console
utrk   =   update trk [-spa1200]
udcmb =   update dcmb
update =   update all ODU software
login =   modem login
logout =   modem logout
sig   =   signal strength
lock   =   rx lock status
txen =   tx enable
txdis   =   tx disable
reset   =   reset modem
settings =   modem settings
health =   modem health check
latlong =   modem save latlong
ip =   ip [net|ip|mask|gateway|dns1|dns2] [value]
modemip =   modemip [ip]
inq   =   Bluetooth inquiry
i =   Bluetooth init
info   =   get config info
ver   =   version [DT740|Launcher|trk_app|bootld5k|dcmb] [value]
save   =   save config changes

config = restore config [repair|delete]

modem = set modem type [index]

modempass = modem password [password]

searchmode = search mode [D(DVB)|R(DVB Ref)|M(Modem)]

searchwindow = [w] [h] [spacing] [speed] [vspeed]

target = target [long|freq|sr|rx|tx] [value]

ref = ref [long|freq|sr|rx|tx] [value]

headingmode = heading mode [index]

heading = fixed heading [angle]

lat = lat [latitude]

long = long [longitude]

skcalib = skew isolation calib [value]

?? = Common commands

dc> dc menu

v = ver

m = mode

u = update

test = test

stats = stats

i = system info

DC>DC menu DC Motor Debugger

b = Get Dc board sw & hw versions

bd <motor> <vel> <dur> <pause> = Back Drive Test

c motor <cmd> [hex] = DC Cmd Test

calib = Calibrate Hall

chk = Get Flash checksum

dcsteps = Dc Steps Per Rev

dt <motor> <end pos> = Drift Test

et = Elev Test

fstat = Get Flash Status

ht <msec> = Hang Test

inv motor = Invalidate Position

ls = Limit Switch

m [mode] = Get/Set Dcmb mode (a=App/b=Bootldr)

modetest = Bootload/App Mode Test

p [motor [[+/-]pos]] = Goto Position

pid = PID Test

pid2 <motor> <pos> = PID Test2

pid3 <motor> <vel> = PID Test3

r [hex addr] = Read sector

s [motor] = Stop Motor(s)

sp motor pos =   Set Position

spi <hex value> =   Spi Test

st =   Skew Test

t [motor] =   Command status

v [motor [steps/s]] =   Get/Set Velocity

w <hex addr>   =   Write sector

wp [motor [pos]] =   Wrap Position

bt> bt menu

cla =   Change Local Addr

ebm   =   Enter Bluetooth Mode

a   =   Local Addr

r   =   Remote Addr

n   =   Local Name

p   =   Properties

inq =   Inquiry

q   =   Inquiry Test

inqlist =   Inquiry List

spp   =   SPP

i   =   Init

rst   =   Reset

cfg   =   Configure

stats   =   Stats

link   =   Link

release =   Release

rssi   =   RSSI

fs   =   Factory Settings

sa   =   Set Remote Address

tm   =   Enter Test Mode

rftm   =   Enter RF Test Mode

slk>slk menu

s   =   snd

r   =   rcv

mdm>mdm menu

login =   Login

logout =   Logout

sig =   Signal Strength

lock =   Rx Lock Status

txen   =   Tx Enable

txdis = Tx Disable
reset = Reset Modem
settings = Modem Settings
health = Health Check
latlong = Save Latlong to Modem
ip = ip [net|ip|mask|gateway|dns1|dns2] [value]

cfg> cfg menu

info = Get Info
v = Version [DT740|Launcher|trk_app|bootld5k|dcmb] [value]
save = Save Changes
installed = Installed [T|F]
ovr = Safety stow override [T|F]
softpower = Use Soft power [T|F]
autodim = Auto dim backlight
config = Restore Config [repair|delete]
sysid = System ID [system_id]
modem = Set modem type [index]
modempass = Modem password info
modemuser = Modem username info
nerapass = Nera modem password info
nerauser = Nera modem username info
comtechpass = ComTech modem password info
comtechuser = ComTech modem username info
snr = SNR Threshold
comtechsnr = Comtech SNR Threshold
toowaysnr = Viasat Tooway SNR Threshold
xpolhns = Cross pol HNS [T|F]
comm = Commissioned [T|F]
modemip = Modem IP for comm
headingmode = Heading Mode [index]
heading = Fixed heading [angle]
headinglockout = Heading lockout [T|F]
lat = lat [latitude]
long = long [longitude]
gpsmodem = Send GPS to Modem [T|F]
gpstimeout = GPS Timeout [time ms]
gpsvel = GPS Velocity [velocity(0|>=300)]
igpsvel = IDirect GPS Velocity [velocity(0|>=300)]
searchmode = Search Mode [D|R|M]
searchwindow = [<w> <h> <spacing> <speed> [vspeed]
target = [long] [freq] [sr] [rx] [tx]
ref = [long] [freq] [sr] [rx] [tx]

autosearch =	Search at startup [T|F]
calc	=	Calculated position
true	=	True position
compass =	Compass [angle]
ss	=	Signal Strength
times	=	[acquire] [xpol] [stow]
peaked	=	Peaked [T|F]
beam	=	Beam [1|2|3|4]
peakset	=	Peak settings [recur|az|azmax|el|elmax|sk|skmax|samples|testsample
s =	|stability|snr|att|attdelta|minsnr] [value]
backlash	=	Backlash [angle]
inc	=	Inclined Track [T|F]
increc	=	Inclined Record Track [T|F]
increcint =	Inclined Record Interval [ms]
incrun	=	Inclined Run Program Track [T|F]
incint	=	Inclined Check Interval [ms]
def1	=	Deflection 1 [angle] (< def2)
def2	=	Deflection 2 [angle] (> def1)
def3	=	Deflection 3 [angle] (< def4)
def4	=	Deflection 4 [angle] (> def3)
torturecount =	Torture test cycle count
auto	=	Auto update [T|F]
test	=	Test update [T|F]
updserver =	Update server info [server|backup|path|pathtest|user|pass] [value]
updinterval =	Auto update interval
upd	=	Updated [T|F]

4 Troubleshooting

Troubleshooting may arise on the field due incorrect settings or malfunctioning hardware this process describes the common error and troubleshooting procedures

ERROR MESSAGE	Symptom	Corrective Action
Attitude board warning **VAB Not Found**	Attitude board warning screen appears with VAB not found or Tilt Sensor Not found message.	Power cycle IDU – Press **power button** to turn off IDU, wait a few seconds. Press **power button** again to turn IDU back on. If warning doesn't go away tap **OK.** IDU assumes ODU level & resumes search. Heading may need to be manually entered.
WARNING **GPS not acquired**	Warning screen appears with: GPS not acquired Retry GPS acquisitions?	Usually due to blockage of the GPS antenna signal. Wait several minutes. Tap **YES**; the IDU will retry GPS acquisition. If the problem is not resolved, tap **NO**. Screen goes to next screen.
WARNING **Homing Sequence Needed**	Warning screen appears with: Dish Raises but will not Skew or move Azimuth	Try performing a motor calibration first Verify motor positioning is working through the DC>debug commands
SETUP	Setup screen appears with: Modem has a communication issue, or is not connected.	Check all connections. Restart IDU & Modem. If the problem is not resolved, contact service provider.
MODEM ERROR	Modem error screen appears.	Follow screen directions. If the fault cannot be cleared record the error messages and contact Tech Support.
ODU COMMUNICATION FAILURE	ODU communication failure screen appears.	Check communication cable with BNC/TNC connectors.
STOW ERROR	Stow error screen appears.	Tap **HOME** to stow antenna. If the error continues contact Tech Support.

4.1 Troubleshooting- Antenna Movements

In the case that you may find the antenna is not moving or the Error of Homing Sequence Needed appears. You must first determine which motor if any is not functioning properly.

1. Login into the Authorized installer-This will be located on the main menu when you select the Yellow Triangle with the Exclamation point inside.
2. Select Authorized installer (Pass code is 1234)
3. We asked to if you would like to move the antenna Select Yes

MAIN MENU ⚠️ 🔧 FIND SATELLITE VER 7.0.4 MANUAL REPEAK ASSEMBLE ANTENNA STOW ANTENNA SNR Value Compass Heading S	⚠️ **Installation Menu** Tap the yellow triangular icon in the top right corner of the screen next to the wrench icon. This will allow the user to access the installation menu.
Enter Passcode 1234 1 2 3 4 5 6 7 8 DEL . 0 9 NEXT	**Passcode** The authorized installer will be asked to enter the passcode. The passcode is **1234.** When finished entering in the passcode tap **NEXT.**
Setup Do you want to move the antenna to finish assembly and wiring? YES NO	**Setup** the antenna needs to be moved to finish assembly and wiring tap **YES.**
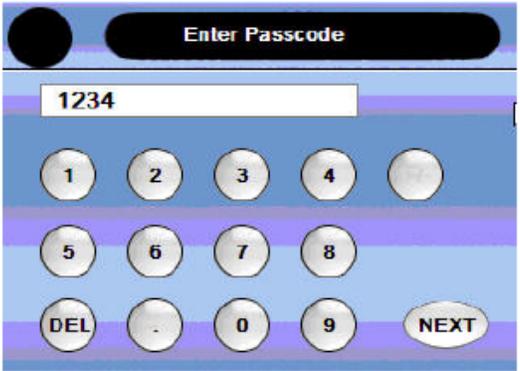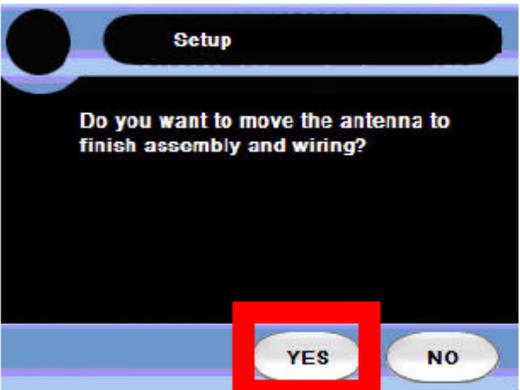
4.1.1 Movement Menu

Troubleshooting- Antenna Movements- Once you have selected Yes, the new screen will pop up and allow you to move the antenna. **May be used with iSite for manual antenna pointing**
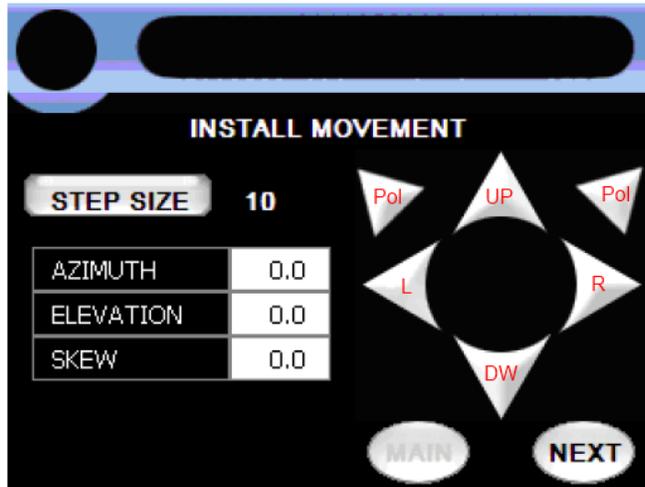
Install Movement

If *yes* was chosen at *setup* menu the antenna is ready for movement. Tap the arrow keys in the direction the antenna needs to move. When done press **NEXT.**

The user will then be asked to stow the antenna. Press **OK**.

The user will then return to the **Main Menu.**

Version 8+
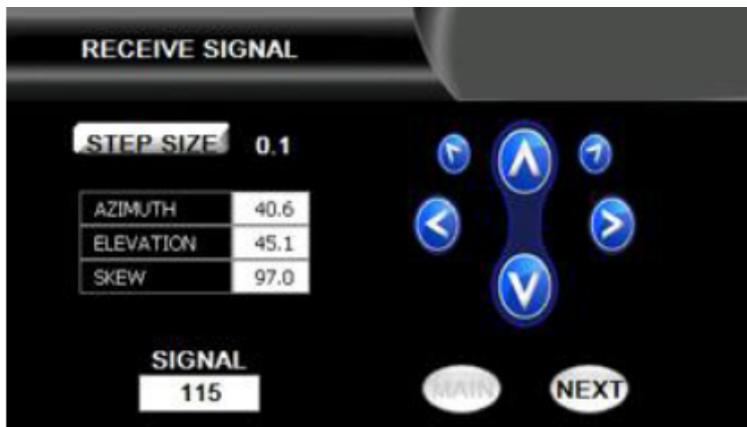
The RECEIVE SIGNAL screen allows for manual jogging of the antenna for assembly, wiring and even pointing purposes used in testing. However; if in Generic mode, please note that after movements are accomplished in this screen the only choice available is to tap on the "NEXT" button which will then require that the system is stowed.
If the system is already configured on any mode except Generic the "MAIN" button will be available to leave the manual movement screen back to the main menu without changes to you jogging movements.
The step rates available here are .1, .5, 1, 5, 10, 25 and 45 degrees per button selection. Signal Strength is also displayed here for pointing purposes.

4.1.1 Troubleshooting- Antenna Movements CONT.

*IF any motors are NOT moving please Contact IsoTropic Networks and Reference Page **64** (Using Debug Menu MOTOR MOVEMENTS) a USB Keyboard will be required for the Procedure:*

IF the unit is able move properly in all directions select **NEXT** on the screen and the system will ask you to stow the antenna select **OK** and this will take you back to the main Menu. IF the system fails to do so the **Error Homing Sequence needed** will appear. Select **OK**. This will calibrate the motors. Once back in the main menu it is best to do a motor calibration. In order to perform this Calibration you must go back to the Authorized installer menu. Select NEXT until the Calibration Screen appears. The System will ask {motor calibration is not required. Would you like to Calibrate anyway?} Select **YES** and then Select **GO** this will begin the motor Calibration
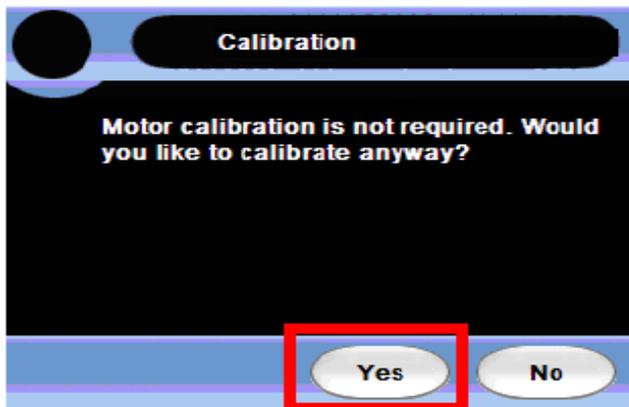
Calibration

If motor calibration is needed tap **YES**.

To skip motor calibration and continue to Calibrate Compass screen tap **NO**.
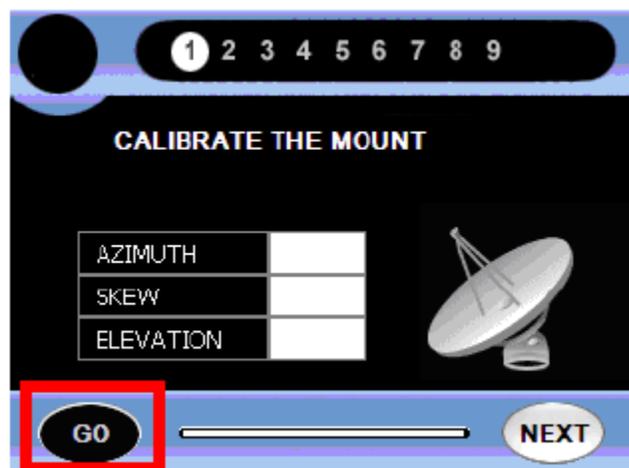
Calibrate The Mount

To calibrate mount tap **GO**.

If at any time the user wants to stop the calibration simply tap **STOP**.

Tap **NEXT** when done.
The user will advance to the Fixed Heading screen. If compass heading is selected the user will have the option to calibrate the compass.

IF the Controller is giving an error that there is no communication to the modem.

1. Please power Cycle the controller and the iDirect Modem.

2. While the hardware is powered down please be sure to inspect the Ethernet CAT 5 Cable from the Winegard Controller 3 port switch to the iDirect modem's LAN port and making sure it is making a proper connection. At this time please remove any other devices plugged into the Winegard 3 port switch

3. If all is secure power on the iDirect Unit first and let the modem boot up. Once the modem is fully booted. power on the Winegard Controller and allow it to fully boot. (This May Clear the Error).

4. If the Error does not clear Proceed with the following Procedures. *(Please Note the following procedures will be in the Debug Menu or in the Windows CE Menu) A USB keyboard may be required.*

How to Delete a Configuration File

1. Turn the system on by pressing the button on the IDU.
    a. A progress bar will scroll across the bottom of the screen.
    b. The screen will flash white and then change color.
2. Start tapping the screen when the screen flashes white and continue tapping the screen when it changes color.
3. The Windows operating screen should be displayed.
4. In the lower right hand of the IDU screen is the keypad icon.
    a. Touching this icon brings up the keypad.
    b. Leave the keypad on the screen during the following commands.
5. Open the My Device folder (double tap).
6. Open the OnBoard Flash folder (double tap).
7. Inside the onboard flash is a file named "config" we want to delete this file. To delete the file Simply tap and hold on the file and select delete when it appears, or you can tap once and Navigate to edit near the top of the screen where you can also select delete
8. Once the file is deleted successfully power down the controller and start it back up. When the modem starts up it will ask you to perform the initial configuration, please call the

Isotropic NOC for guidance on setting the controller correctly for your satellite (Please reference page BLANK (Setup & Installation Menu)

Connecting the Planet

ISOTROPIC
NETWORKS, INC.

How to Configure a Winegard unit for DHCP or Static IP addressing

To configure a Winegard controller unit with a Static IP address or to change the controller back to DHCP you must follow these steps:

1. Power the modem on and make sure to tap the screen while it is starting up to get to the OS (Windows CE) .

2. Open Control Panel -> Network Connections

Enter Network settings and click OK

3. Open Control Panel -> Display

Adjust the backlight and click OK (this saves the registry settings)

How to Change the default Password for iDirect with a winegard unit.

This procedure can be done when the Admin password of the iDirect modem has been changed from the default password. The passwords in the iDirect modem and in the Winegard unit must match. Below is the procedure.

Changing the iDirect Default Password

The iDirect password can be changed in the option file.

1. Enter the debug menus as described above.

2. At the "trk>" prompt type "cfg" and press enter.

a. This will change the prompt to "cfg>".

3. Type "modempass <new password>" and press enter. This is case sensitive.

a. A message will be returned that states "Password = <new password>".

4. Type "save" and press enter. This saves the change to the configuration file. The system will now use the new password to access the iDirect modem.

5. Cycle power on the IDU.

IF all procedures are completed this will properly set up the connection between the iDirect Modem and the Winegard Controller

Communications between the IDU and ODU are established using Bluetooth Protocol over the 48 volt DC power cable.

IF the controller is giving an error that there is no connection to the ODU, check the BNC/TNC cable running from the controller to the ODU. Make sure there are no hard bends or kinks in the cable. Also, remove and check the connectors for any corrosion before reseating them. If the controller is still displaying an ODU error, you will need to run Bluetooth commands in the debug menu.

Bluetooth (BT) Commands

If the IDU and ODU will not communicate it is possible that the Bluetooth protocol has not been properly established.

The Bluetooth initialization is completed from the lower case debug prompt. Type "bt" and press return from any lower case debug prompt.

Two commands are necessary in order to set up the BT command structure these are the inquiry command "inq" and initialization command "i". The initialization command must be given after a BT connection has been established. Below is an example of running the "inq" and "i" commands:

```
bt>inq    ←
Releasing Link ... Success
Inquiry (5 Seconds) ... 0 Devices Found
bt>inq    ←
Inquiry (5 Seconds) ... 1 Devices Found
* 0800172C0D32 WCS (000000) 3111
* Remote Name 0800172C0D32 ... WCS Tracker
* Saving Remote Addr 0800172C0D32 ... Success
bt>i
* Release Link: BT No Connection
* Req Establish: Success
* Link Indicator
* Success
bt>
```

Note: The "inq" command was given twice because it failed to establish the proper connection the first time. Having to do this 2 or 3 times is not unusual.

If the controller is still reporting an ODU error, you will need to check the system identification, and then perform a manual software update on the ODU.

4.3.1 Checking System Identification

There are serial numbers assigned to all systems. This should be located on one of the lift link arms. All serial numbers start with DT740. In addition to the serial number there is a system id stored in the Outdoor Control Unit. This id is important for troubleshooting as well as manually loading software. It is very important to know exactly what antenna system you are updating. The current models include DT740, DS980, DS980P2, DT960, DT960P2, DT1200A and DT1200AP2. The ODU will be updated using one of these models.

Verify that the USB keyboard is connected and functioning properly. Press the enter key a couple of times and verify that the screen displays several "trk>" prompts.

1. The IDU screen must be displaying the "trk>" prompt.
2. Type "i" and press return.
    a. The following should be displayed on the IDU screen indicating that the system id is a DT960P2.

trk>i

Mode: App

App Ver: 1.03.24

Boot Ver: 1.06.07

System ID: WX1200

Board: 0.10

CPU: 0X6

trk>

The item that you will need is System ID, which will be used during the manual software update.

1. Plug a USB keyboard into the controller and then reset the controller
2. Once the controller has booted, enter the debug menu. The IDU screen must be displaying the "trk>" prompt.
3. Type "u -(model)" and press enter.
   b. If the system is a WX1200 the command would be **u –wx1200**
   c. The IDU screen may display the error message "Bluetooth Error". Do not touch the OK button. The system is updating and should be untouched for 10 minutes.
   d. After 10 minutes press the OK button.
4. Re-enter the debug screen by pressing the icon in the upper left hand part of the screen. If the system does not enter the debug menus complete the procedure described above.
5. The IDU should be displaying the "trk>" prompt.
6. Type "dc" and press return. The IDU should now be displaying the "dc>" prompt.
7. Type "u" and press return. The IDU will now update the motor control board in the ODU.
8. Wait for this to complete.
9. Power cycle the system.
10. Navigate to the Version screen on the IDU by pressing the wrench in the upper right hand corner of the main menu screen. Refer to the Owners' Manual for specific instructions.
11. The system should be power cycled before continuing.

The magnetic sensor is the only positional sensor in the Winegard 2-Way Antenna system. It is located under the main cover next to the azimuth motor. The sensor is used to calibrate the azimuth position as well as verify azimuth position before stowing. In the case the switch is not activated and an Limit switch error occurs, Proceed with the following instructions

1. Take the sensor out. Plug the sensor into the wiring harness.

2. On the winegard controller tap into the debug Menu and perform the following commands

> **trk>**
> hit {ctrl} t This will change to a capital TRK in TRK type motor
> **TRK>motor**
> in MOTOR type a
> This will give you the currently angles of Elevation, Azimuth and Skew
> **MOTOR>a**
> AZ =   0.06°
> EL = 34.72°
> SK =   0.16°
> in MOTOR Type dc
> **MOTOR>dc**
> in DC type ls
> **DC>ls**
> FRise = 117   FFall = 17334   RRise = 17281   RFall = 65
> Hit any key to abort.
> LS = 0 1 0 1

3. This will give a limit switch value Zero (0) states the switch is engaged a value of one (1) will indicate the switch is not engaged. To test the switch is working properly

> e.   Use an external magnet and see if the switch changes state when the magnet is placed in proximity to the sensor. It does matter what magnetic pole you use. The sensors are south pole activated. The Magnet will have to flip the magnet around in order to activate/deactivate the sensor.
> f.   If the switch is working this indicates the switch and harness are working properly proceeded to inspect the magnet and make sure it has not broken off.

4. Rotate the azimuth base until the sensors magnet can be seen from through the mounting hole. This position should be very close to the azimuth stowing position. Carefully screw the sensor into the mounting hole until the sensor contacts the magnet. Unscrew the sensor 1 to 1 ½ turns. Lock the sensor in place by tightening the lock nuts in place starting with the bottom nut first. Make sure the sensor does not turn when tightening the lock nuts.

Under normal circumstances the software can be automatically downloaded over the internet while the system is pointed and operational.

There may be circumstances which prohibit the automatic download of software. The following procedures describe methods which can be used to download software and program the antenna system manually.

The first procedure provides instructions on how to use a semi-automatic procedure utilizing a USB memory device. The following files must be located in the root directory of the USB memory device: bootdcmb.hex, dcmb.bin, DT740.exe, DT740.tmp, Launcher.exe, Launcher.tmp, trk_app.bin, update.xml. Do not install the USB memory device until step 3.

Copy the unzipped files onto the USB drive. Do not insert the drive into the controller.

1. Turn on the controller.
2. When the "Main Menu" screen is displayed, insert the USB drive into the port on the back of the controller.
3. Press the wrench button and navigate through the user status screens until the "Update" screen is displayed.
4. Press the "Update Now" button to begin an update. NOTE: If the dish is not deployed, this will automatically search for files on the USB drive instead of the online download area.
5. Cycle the power on the controller when the system returns to the Main Menu.

The second procedure describes how to load software manually from the IDU. This normally requires a USB keyboard and a USB memory device. This procedure should be used when the automatic procedures do not work and software corruption is suspected. The files can be transferred from a USB memory device into the folder "Onboard Flash" in the IDU. Once the files have been loaded into the IDU the Outdoor Unit (ODU) can be programmed. If a USB keyboard is not available additional steps must be taken in order to utilize the touch keyboard on the IDU screen.

There are 2 methods to copy the files. The first method is to place the files in the root of a USB memory device, insert the device into the IDU, and turn power on to the system. The application should ask you if you want to copy the files. If you select yes the files will automatically be copied from the USB memory device into the "Onboard Flash" folder in Windows CE. This will copy the DT740.exe application so the next time power is cycled the new version will be active. This also copies the trk_app.bin and DCMB.bin files. It does not program them into the ODU. This will have to be completed manually.

The second method that can be used to copy the files is to manually place the files into the "Onboard Flash" folder. This will cause the DT740.exe file to be executed next time the power is cycled. This will not program the ODU. This must be done manually via a USB keyboard.

Copy the files manually into the "Onboard Flash" folder.

1. Plug the USB memory device into the appropriate USB slot.
2. Turn the system on.
3. Watch the IDU screen. There is a progress bar that moves across the bottom of the screen. After the progress bar completes the screen will flash white briefly. Tap the screen several times as soon as the screen flashes. This should bring up the Windows CE operating system.
4. Open the file "My Device".
5. Open the file "Hard Drive". This should contain the file(s) that needs to be copied.
6. Highlight the file and select "edit" and "copy" from the pull down menu.
7. Press the back button in the tool bar.
8. Highlight and open the folder "Onboard Flash".
9. Select "edit" and "paste" from the tool bar. This will copy the file from the USB device to the Onboard Flash folder. The system may warn you that you are copying over an existing file.

Manually flashing the Outdoor Unit (ODU) using a USB keyboard, do not have a USB memory device and USB keyboard plugged into the IDU USB ports at the same time. One of the devices may not function.

The following procedure explains how to manually program DCMB.bin and trk_app.bin into the ODU. Verify that the correct files have been placed in the IDU's "Onboard Flash" folder. In order to complete this procedure the system must be placed in debug mode. Some of the IDU screens will not allow access to the debug menus. The Main Menu screen works the best for entering debug. Other screens will allow access to the debug menus it just takes longer and may involve several more screen taps including mixing in the a "GO" or "NEXT" button.

5.1 Manual Software Update

Procedure on how to update the ODU.

12. The IDU screen must be displaying the "trk>" prompt.
13. Type "u -(model)" and press enter.
   g. If the system is a DT740 the command would be u –dt740 (no quotes and a minus sign before the model).
   h. The IDU screen may display the error message "Bluetooth Error". Do not touch the OK button. The system is updating and should be untouched for 10 minutes.
   i. After 10 minutes press the OK button.
14. Re-enter the debug screen by pressing the icon in the upper left hand part of the screen. If the system does not enter the debug menus complete the procedure described above.
15. The IDU should be displaying the "trk>" prompt.
16. Type "dc" and press return. The IDU should now be displaying the "dc>" prompt.
17. Type "u" and press return. The IDU will now update the motor control board in the ODU.
18. Wait for this to complete.
19. Power cycle the system.
20. Navigate to the Version screen on the IDU by pressing the wrench in the upper right hand corner of the main menu screen. The system should be power cycled before continuing.

6 Winegard Preventative Maintenance

Although your antenna system requires minimal maintenance, we recommend that the following checkpoints are visually inspected at least quarterly.

Basic: Cleaning the antenna system is a personal preference for many but should not be overlooked. A light cleaning agent is recommended to maintain the appearance of the painted and the powder coated parts. Ensure that there is no debris that can get caught in the moving parts. Use a can of compressed air if necessary.

General Cleaning and Maintenance: Winegard Antenna Systems are designed as an outdoor use product. They may be subjected to varying conditions that could include:

• Snow
• Ice
• Dirt
• Grime
• Road spray
• Salt spray
• Extreme heat or cold

Inspect all critical pivot points, and be sure to remove any obstructions such as snow, ice, or dirt from the exterior and interior (if any) or the Motor Control, Sensor, and Coaxial Ports.
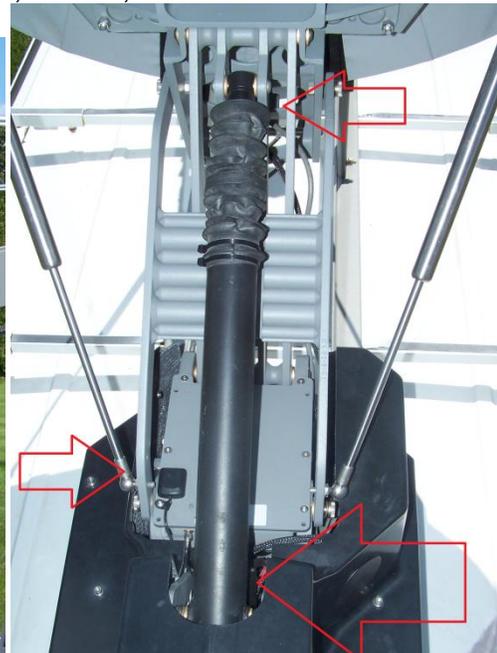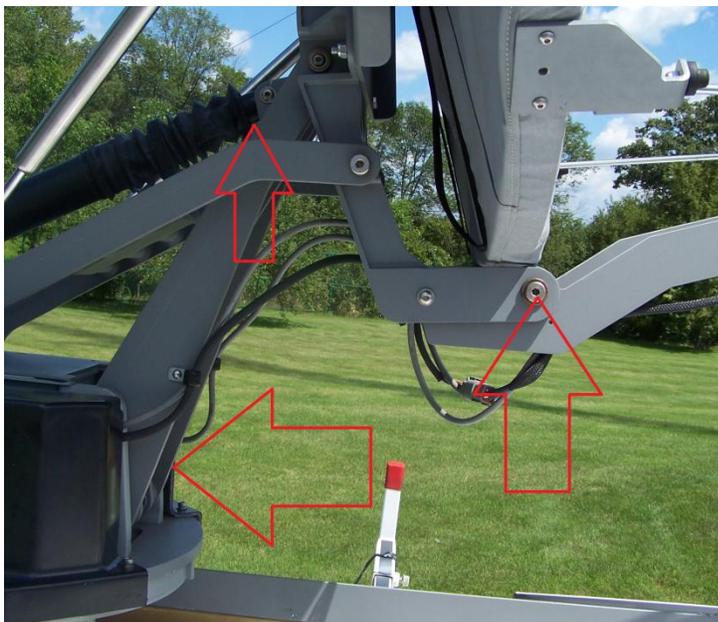
6.1 Feed assembly/Cabling

Please visually inspect the feed assembly, feed horn, cabling, and connectors for any physical damage. Inspect cabling for possible cuts, crimps, and/or any punctures that may disrupt connectivity. Ensure all connections are seated flush and tighten down any loose fasteners. Inspect Feed windows and be sure to clean the connectors, which should be replaced in the event of corrosion.
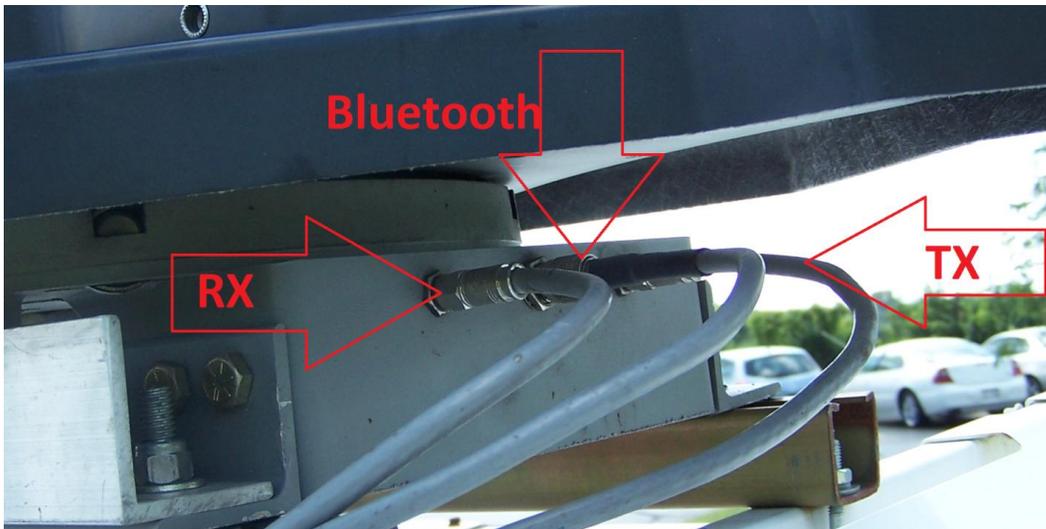
Inspect the cables. They should be taught and not frayed.

ODU mounting screws

GPS antenna connector

RX IN (from LNB)

RX OUT (from modem)

BNC connector (power and communications)

GPS Antenna

Kit: ODUE

FCC Compliant
14509

Serial:

Check Cable
and Connector
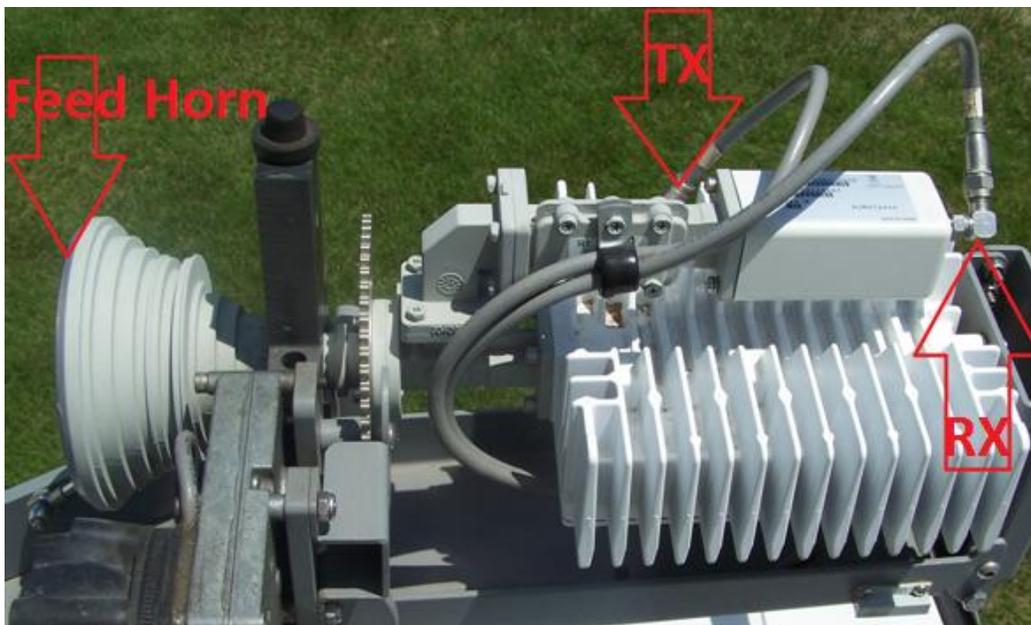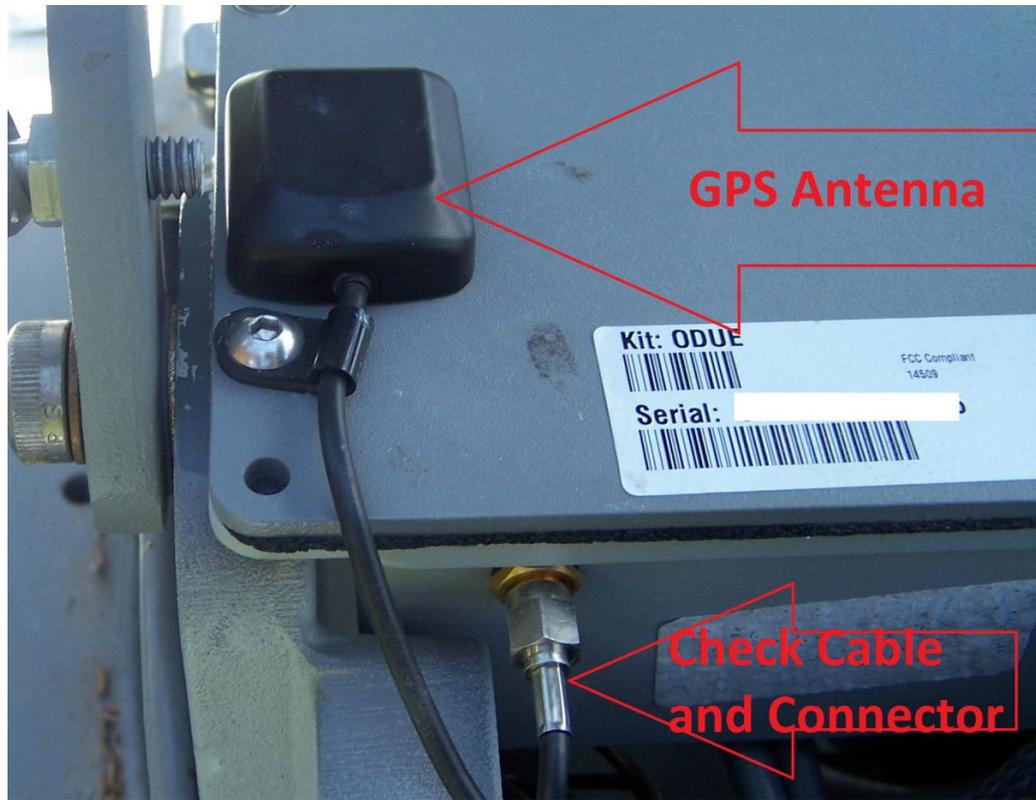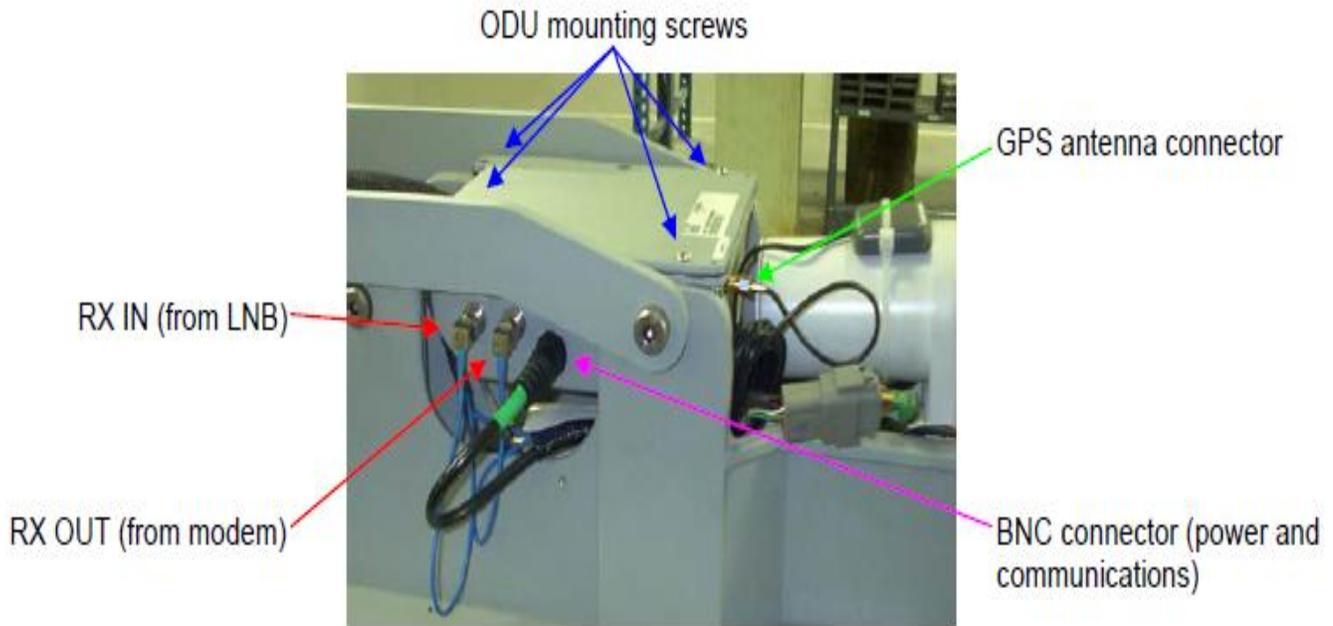
In the WX series antenna the azimuth will move on wheels underneath the antenna. These wheels allow for the azimuth motor to rotate smoothly. If for any reason the wheels are jammed this may cause a motor error/failure.

Apply (recommended) dry lube to each wheel

Apply (recommended) dry lube to each wheel

Piston Arms

If required, apply dry lube spray on the piston arms. Please ensure that the piston arms are properly connected to the mount and antenna.
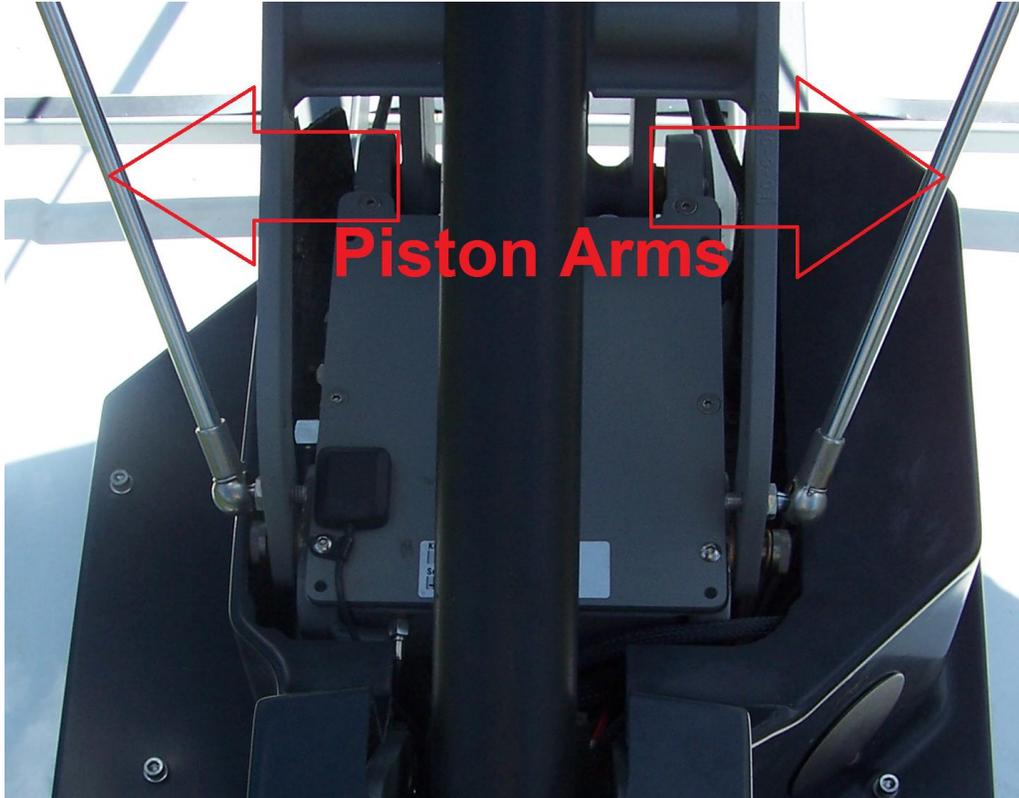
The following procedures are performed via Authorized Installer Menu. (Located *in motor movement sections on page 59 or 72)*

Azimuth: Manually "Jog" the antenna in azimuth from one limit to the other side and listen for any unusual noise such as grinding and that the corresponding limits are operational.

Elevation: Manually "Jog" the antenna in elevation from one limit to the other and listen for any unusual noise such as grinding and listen for any unusual noise such as grinding and that the corresponding limits are operational.

Polarization: Manually "Jog" the antenna in polarization from one limit to the other and listen for any unusual noise such as grinding and listen for any unusual noise such as grinding and that the corresponding limits are operational.

Minimal Operating Environments
Under normal operation conditions, it is recommended to maintain your Winegard Mobile Platform **every three (3) month**.

Harsh Operating Environments or Storage
It is recommended to perform maintenance to your Winegard Mobile Platform at least **every one (1) month** when subjected to snow and ice, dirt, grime, road spray, sand, salt spray, or extreme heat or cold. *Immediately perform maintenance after exposure to known chemicals, corrosives, contaminants, or before the system is prepared for storage.*

Preparation for Storage
Specifically before storage the system should be cleaned, thoroughly dried, and then lubricated as per maintenance procedures before storing.

The Winegard Mobile Platform should provide years of successful service in many environments if well maintained. The performance and reliability can be extended if reasonable care and precautions are taken.