



J1



Mobile Satellite Antenna Controller

User and Installation Manual

Firmware Version 1.0.0

Mar 1, 2010

The DataStorm J1 Satellite Antenna Controller



Features

- Stand Alone Satellite Antenna Controller
- Front Panel Search, Stow, and Power Commands
- No Software Required on PC
- DVB-S2 Satellite Identification (NID)
- HTML Graphical User Interface
- SD Card Firmware Upgrades
- SD Card Configuration Imports
- Web Direct Sat Table Imports
- LED Status Indicators
- Simplified Multiple Sat Select Screen
- Telnet Commands for Diagnostics
- Import and Export Configuration Files
- Import and Export Satellite Tables
- Simple Electrical Connections

The DataStorm J1 Satellite Antenna Controller

is one of the most advanced Satellite Antenna Controllers available. Simple User operation combined with many advanced configurable features will allow the flexibility needed for almost any application anywhere.

Operate from the Front Panel or through a PC using an Internet Browser such as Internet Explorer, Firefox, Sapphire, Chrome or many other Browsers.

No external software external is required.

A true stand alone Satellite Antenna Controller now with SD Card Interface.

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Getting Started!

If this is a new system install or just upgrading to the new J1 Controller it is important to follow the guidelines below to insure the system functions properly.

Connection and Configuration!

Nearly all technical support calls on new installations are due to bad or improper wiring, or incorrect configurations. Please be sure to review these two items before contacting technical support for assistance.

The J1 must be configured properly before it can be used in normal operation.

Before proceeding insure that all wiring to the J1 Controller is correct. This would include any connections to the DataStorm Mount. See J1 System Wiring.

Using the SD Card for Setup

The J1 Satellite Antenna Controller includes a Front Panel SD Card Slot. This feature will allow the user to upgrade firmware, import configuration files, and import Sat Tables without being connected to a PC or Network. See *SD Card Functions* for setup and use.

Quick Setup

Once the System is installed and wired the next step is to prepare the J1 Controller for the users specific requirements.

Below is a quick list to follow to insure proper operation. Please follow the steps below in the order as shown.

- **Step 1 Set up a Network Connection between the J1 and the PC**

Using the SD Card, *LoadOnce* Folder, place a modified configuration file in the *LoadOnce* folder.

Name the file "IPConfig.txt" and place the IP information needed to work in the existing Network (Router)

LocalAddr = 192.168.1.250	/new controller IP address
SubnetMask = 255.255.255.0	/if different

ModemIp = 192.168.0.1 /modem IP address
GateAddr = 192.168.1.1 /router IP address

Place into J1 SD Card Slot, turn on power. When controller restarts IP Info is changed.

See *Network Settings* page 19.

- **Step 2 Upgrade Firmware** (If necessary)

Using the SD Card, *LoadOnce* Folder, place a new *J1firmware.hex* file in the *LoadOnce* folder.

Place into J1 SD Card Slot, turn on power. Wait for status indicators to scroll from left to right. When controller restarts the new firmware is updated.

See *Upgrade Firmware* page 54.

- **Step 3 Modify Configuration Functions**

Open the HTML Browser and choose the Configuration Functions pages;

Search Settings (all) - Satellite System, Satellite Longitude, and RX Polarity

Search Settings (HNS) - TX Polarity, Modem IF Frequency, Symbol Rate

LNB Settings – As necessary

See *Configuration Functions* page 19.

Note: See *Import/Export Files* to save configuration page 52.

- **Step 4 Calibrate Dish**

See *Calibrate Dish* page 50.

- **Step 5 Ready for Normal Operation (Find Satellite)**

Open the HTML Browser and click on the *Search* command.

See *Find a Satellite* page 11.

- **Step 6 Import a current Sat Table**

Once the Dish Mount is locked to the correct satellite and the Modem has come into the network you should update the *Sat Table*.

Import Web Sat Table allows the user to directly import the latest Satellite Table File from the MotoSAT Web Site. In Network Settings (Web Sat Table URL) is a default web address of <http://www.motosat.com/sattables/world.csv>. This address can be changed if future sites are available. For this import to work the user must be connected to an active modem (Network) and locked onto the Satellite.

See *Import/Export Files* page 52.

- **Step 7 Save Configurations and Sat Tables**

Once the J1 Controller and Dish Mount have been set up properly the **Current Sat Table** and **Config Files** should be exported.

See *Import/Export Files* page 52.

After exporting these files to the PC, remove the SD Card from the J1 Card Slot and connect the SD Card to your PC. Save the Config file and Sat Table to the J1 Files Folder on the SD Card for backup. Place SD Card back into J1 Controller.

The **J1 Files** Folder is used to store different Firmware versions, and different Dish Mount configuration files samples. This is just a working folder on the SD Card. The J1 Controller can not read or write any files to this folder.

J1 Normal Operation

IMPORTANT! Before the J1 is ready for normal use the system must be wired and configured correctly. Go to **Setup and Configuration** for setup.

The J1 Controller can be operated through either **Front Panel Controls** or via the **HTML Interface** built into the Controller.

Front Panel Operation

Model J1



The **Front Panel** has three Buttons.

The **Power Button** is used to turn the J1 Controller On and Off. When Powered on the Green LED to the Left of the Power Button will illuminate. AC Power Rocker Switch must be in On “Illuminated” position.

On Power up the controller will take about 15 seconds to initialize. The Power, LNB, and LAN LED’s should be illuminated when controller is ready for use.

Under normal conditions the Stow LED should also be illuminated when first powered on.

The **Search Button** will cause the Antenna to rise from the stowed position and search for the **Satellite 1 (Sat 1)**. See Building, Importing and Exporting a Config File.

The LNB and GPS lights should be illuminated before the Antenna will start a Search (move).

Wait for the LNB Light to illuminate before pressing the Select Button. Once selected the BUSY and READY lights will start to flash.

The dish will begin a search if the GPS Light is on. (GPS Locked)

If the GPS Light is blinking then the Antenna will not move until the GPS Light goes solid. A blinking GPS means that a valid GPS location has not been determined. Typically GPS should acquire lock in less than 120 seconds.

The Stow Button when pressed will move the Antenna to the Travel Position. When the Antenna is moving to the Stowed position the Busy and Stow Light will flash. When the Antenna is stowed the Stow Light will be on Solid.

The Front Panel has seven (7) lights.

Power Light (Green) is illuminated when ever the J1 is powered on. The Main AC power Light should also be illuminated.

LNB Light (Blue) will illuminate when a Modem is connected to the J1 and power is applied to the Modem. If the J1 is configured to Generic Mode then the J1 will supply LNB power.

LAN Light (Blue) is illuminated when a network connection is detected.

GPS Light (Blue) will illuminate when GPS has received a valid Latitude and Longitude location. When GPS is not locked LED will Blink.

If there is no GPS (Sensor Board) installed on the Antenna Mount then the GPS light will be off.

READY Light (Blue) will illuminate when the Target Satellite is locked and peaked.

The Ready Light will flash when the Antenna is searching for a Satellite.

BUSY Light (Red) illuminates under many conditions.

On Power Up the Busy light will flash for approximately 15 seconds while the J1 Controller is initializing the system configuration.

During Search and Stow the Busy light will flash.

STOW Light (Red) is on Solid when the Antenna is Stowed (travel position). When the Antenna is moving to the stow position the Stow Light will flash.

HTML (Web Browser) Operation

IMPORTANT! The LAN Light must be on before the web browser can open.

To use the **HTML Interface** you must access the J1 by using a standard Web Browser such as Internet Explorer, Netscape, or Mozilla. Open the Browser as you normally would then type into the address bar the IP Address of the J1 Controller. The default IP address of the J1 is set to **192.168.1.250**. This address can be changed in the Network Settings Screen.

The System Status screen should open if the browser and J1 IP address are configured correctly. See Setup and Configuration if the page below does not open.

System Status Screen

Antenna Stowed

The screenshot shows a web browser window displaying the MotoSAT J1 system status page. The browser's address bar shows the URL `http://192.168.1.250/`. The page features a navigation menu on the left with sections for Standard Functions, Configuration Functions, and Advanced Functions. The main content area displays system status indicators for LNB, LAN, GPS, READY, BUSY, and STOW. Key metrics include Signal Quality (29) and Signal Strength (522). The TX Status indicates the transmitter is unavailable due to receive signal problems, and the RX Status indicates the receiver is not locked to a signal. The System Status shows that the stow dish operation is completed. Below these indicators are buttons for Search, Stow, and Stop, along with a dropdown menu for satellite selection (currently set to Default (Horizons 1 127W V)). A table at the bottom provides detailed sensor and satellite data.

SENSORS		SATELLITE	
Dish Elevation	0	Target Elevation	112.9304
Dish Azimuth	0.05022322	Target RX Skew	-73.23281
Dish RX Skew	-58.2487	Satellite Longitude	127W V
GPS Longitude	111.9643W	Sat Elevation	40.43038
GPS Latitude	40.72922N	Sat True Azimuth	202.3761
Motor Current	0.05156	Sat Polarization	16.7672

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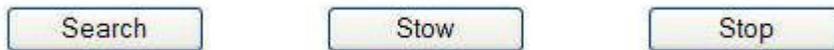
Find a Satellite (Search)

Before the System will begin a search the LNB and LAN status indicators must be illuminated.

The GPS indicator will illuminate when valid GPS is acquired.



Clicking on the Search button will cause the Antenna to begin a search for the *Default Satellite*. (Also referred to as the Target Satellite.)



A Drop Down Box below the Search Button allows the user to select any Satellite Configured in the Sat Table. Highlight the desired Satellite and click the Search button.

Satellite Selector Screen

Antenna Stowed



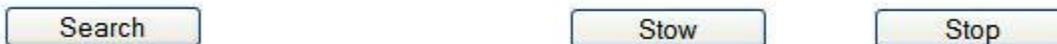
Signal Quality 29

Signal Strength 522

TX Status Transmitter unavailable due to receive signal problems. (TxCode 6)

RX Status Receiver not locked to a signal. Receive cable fault suspected. (RxCode 6)

System Status Stow dish operation completed.



Default (Horizons 1 127W V)



Dish Elevation	0	°	Target Elevation	112.9305	°
Dish Azimuth	0.05022322	°	Target RX Skew	-73.23277	°
Dish RX Skew	-58.2487	°	Satellite Longitude	127W V	°
GPS Longitude	111.9644W	°	Sat Elevation	40.4305	°
GPS Latitude	40.72911N	°	Sat True Azimuth	202.3761	°
Motor Current	0.05156	A	Sat Polarization	16.76724	°

Satellite Selector Screen



Drop Down Table

The arrow above is showing the current default satellite in the Drop Down box.

The *Default Satellite* is created in *Search Settings*. (Satellite Longitude)

By clicking on the Down Arrow in the Drop Down box, a list of all available satellites will appear in the *Sat Table* window.

The size and order of these satellites can be configured *Search Settings*. See Search settings.

After highlighting the desired satellite in the Sat Table window, clicking the Search button will begin the search for the selected satellite.

The Sensors and Satellite Status located on the lower part of the screen will display the Antenna Mount position and the current Satellite information while the Search is in progress.

System Status Screen

Searching Sky

SENSORS		SATELLITE	
Dish Elevation	0	◦ Target Elevation	112.9306 ◦
Dish Azimuth	0.05022322	◦ Target RX Skew	-73.23272 ◦
Dish RX Skew	-58.2487	◦ Satellite Longitude	127W V ◦
GPS Longitude	111.9643W	◦ Sat Elevation	40.43056 ◦
GPS Latitude	40.72903N	◦ Sat True Azimuth	202.3762 ◦
Motor Current	0.07734001	A Sat Polarization	16.7673 ◦

Under normal search conditions the J1 Controller will search for a Reference Satellite(s) that is near the true southern part of the sky based upon the current GPS Longitude.

The J1 may find and peak several satellites before identifying a valid satellite. Once a *Reference Satellite* is identified the J1 will calculate and move directly to the Selected *Target Satellite*.

The J1 will peak the satellite for maximum Signal Quality at that location. After the peak is completed the J1 will reconfirm the Target Satellite Identification.

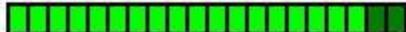
NOTE: There are conditions where the Antenna can move into an adjacent Satellite with a stronger signal level. If this happens the J1 Controller should ID that Satellite and then move to the Target Satellite as described above.

NOTE: There are two types of Searches available in **Search Settings**. The default search is referred to as a Longitude Search. The alternative Search is referred to as Target Search. We recommend the default setting. See Setup and Configuration for details.

Search Operation completed the system is ready for use.

System Status Screen

Search Complete

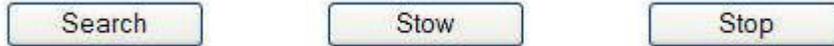
LNB	LAN	GPS	READY	BUSY	STOW
Signal Quality  91					
Signal Strength  579					
TX Status Transmitter ready. (TxCode 8)					
RX Status Receiver operational. (RxCode 5)					
System Status Search Time: 4 minutes 29 seconds.					
<input type="button" value="Search"/>		<input type="button" value="Stow"/>		<input type="button" value="Stop"/>	
Default (Horizons 1 127W V) <input type="button" value="v"/>					

SENSORS		SATELLITE	
Dish Elevation	113.3789	◦ Target Elevation	112.9305 ◦
Dish Azimuth	109.788	◦ Target RX Skew	-73.23287 ◦
Dish RX Skew	-73.07249	◦ Satellite Longitude	127W V ◦
GPS Longitude	111.9645W	◦ Sat Elevation	40.43052 ◦
GPS Latitude	40.72911N	◦ Sat True Azimuth	202.376 ◦
Motor Current	0.07734001	A Sat Polarization	16.76714 ◦

Stow the Dish (Stow)

Stowing the Dish puts the antenna back into a travel position where the Antenna is in a Face Down position on the roof of the vehicle pointing toward the rear of the vehicle.

Clicking on the Stow button will cause the Antenna to begin the Stow routine.



The System will begin to stow and the J1 Front Panel will show Stow and Busy Lights flashing. The HTML Status Screen will show **Stowing Dish**.

The typical stow routine will cause the antenna to first move elevation to a full back position, then rotate Skew to a correct stow position, then rotate Azimuth fully counterclockwise, and finish stowing Elevation to a full down position.

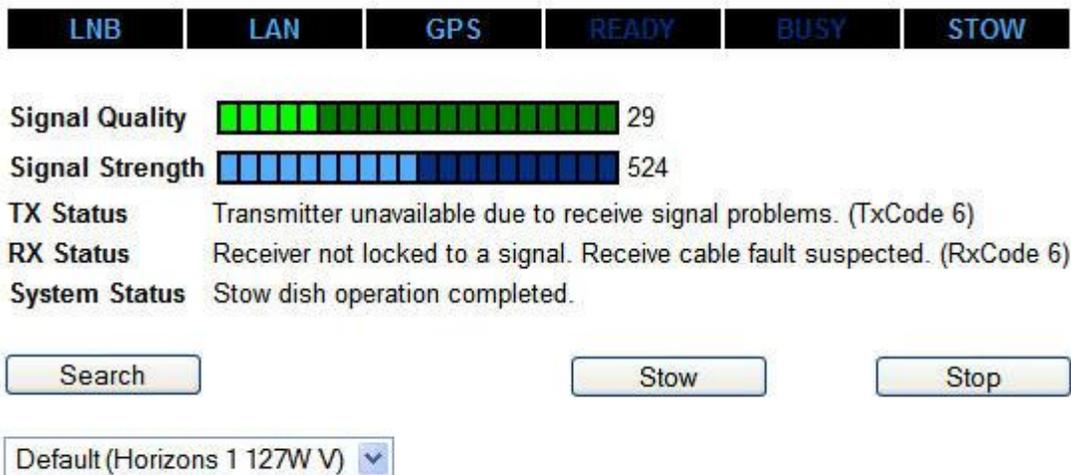
When using the **Generic** mode type in **Search Settings, Satellite System** the antenna elevation is moved up above the Satellite Belt first to prevent any undesired transmissions from hitting any other satellites during stow.

When using specific modems such as **iDirect and Hughes (HNS)** the J1 Controller has the ability to disable the Transmit function of the Modem. When these modems are selected in **Search Settings, Satellite System** the Antenna will not need to move elevation up before stowing the antenna.

The HTML Screen will show **Stow Dish Operation Completed**.

System Status Screen

Stow Operation Complete



The screenshot shows a status screen with a top navigation bar containing six buttons: LNB, LAN, GPS, READY, BUSY, and STOW. Below this, there are two progress bars: 'Signal Quality' with a green bar at 29 and 'Signal Strength' with a blue bar at 524. The status text indicates: 'TX Status: Transmitter unavailable due to receive signal problems. (TxCode 6)', 'RX Status: Receiver not locked to a signal. Receive cable fault suspected. (RxCode 6)', and 'System Status: Stow dish operation completed.' At the bottom, there are three buttons: Search, Stow, and Stop, and a dropdown menu showing 'Default (Horizons 1 127W V)'.

Standard Functions

Standard Functions

- [System Status](#)
- [Modem Status](#)
- [About](#)

- System Status Page
- Modem Status Page
- About Page

System Status Page

The System Status Page is the first screen (main index page) the J1 controller will open when using HTML. From this page all other functions can be accessed.

System Status Page

The screenshot shows the MotoSAT J1 web interface. At the top, there's a navigation bar with 'File', 'Edit', 'View', 'Go', 'Bookmarks', 'Tools', and 'Help'. The address bar shows 'http://192.168.1.250/'. The main header features the MotoSAT logo and a satellite image with 'J1' in large red letters.

Standard Functions

- [System Status](#)
- [Modem Status](#)
- [About](#)

Configuration Functions

- [Network Settings](#)
- [Search Settings](#)
- [LNB Settings](#)
- [Mount Settings](#)

Advanced Functions

- [Manual Motor Control](#)
- [Calibrate Dish](#)
- [Import/Export Files](#)
- [Upgrade Firmware](#)

Status Indicators: LNB, LAN, GPS, READY, BUSY, STOW

Signal Quality: 0 (represented by a green bar chart)

Signal Strength: 487 (represented by a blue bar chart)

TX Status: Transmitter unavailable due to receive signal problems.

RX Status: The receiver is not locked to a signal.

System Status: Autoload configuration operation completed.

Buttons: Search, Stow, Stop

Dropdown: Default (AMC 4 101W V)

SENSORS		SATELLITE	
Dish Elevation	0	Target Elevation	114.0726 °
Dish Azimuth	0	Target RX Skew	77.54365 °
Dish RX Skew	-57.8999	Satellite Longitude	101W V °
GPS Longitude	111.9643W	Sat Elevation	41.57256 °
GPS Latitude	40.72934N	Sat True Azimuth	163.463 °
Motor Current	0.05156 A	Sat Polarization	-12.45636 °

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Done

The main frame of the System Status page (white) includes the Search, Stow and Stop Commands along with status indicators. In the lower area of the Status page mount and satellite position information is displayed.

Sensors

Dish Elevation displays the current position of the Antenna in respect to Stowed (travel position). Stow is approximately 0 degrees. *Elevation Origin* under *Mount Settings* will affect this value.

Dish Azimuth displays the current position of the Antenna in the horizontal travel plane (0 to 375 degrees of rotational travel) relative to the stowed position.

Dish RX Skew displays the current position of the Antenna Skew. Depending on Mount Type the Antenna or Feed Horn Assembly will rotate (roll) in a CW/CCW direction up to +/- 103 degrees. Skew stow position is different for different mount types.

GPS Longitude and Latitude is read from the GPS module located on the Antenna Mount or when Manual Location is “*Enabled*” in *Search Settings*.

Motor Current displays the power consumption of the motors on the Antenna Mount when the Antenna is moving.

Satellite

Target Elevation displays the calculated amount of Elevation travel the antenna mount will have to raise from the Stowed position to locate the selected satellite.

Target RX Skew displays the calculated Skew Angle for the selected satellite.

Satellite Longitude displays the true Longitudal location of the Target Satellite above the Equator.

Sat Elevation displays the true elevation look angle of the Target Satellite from the Earth horizon (level).

Sat True Azimuth displays the actual compass direction of the Target Satellite in reference to True North.

Sat Polarization displays the true Skew Angle for the Target Satellite.

Modem Status Page

The Modem Status Page currently is available only for the Hughes (HNS) Modems. This link offers a direct connection to the HNS Status page as shown below.

Modem Status Page

The screenshot shows a web browser window displaying the MotoSAT Modem Status Page. The browser's address bar shows the URL <http://192.168.1.250/>. The page header features the MotoSAT logo and a satellite image with the text "MOBILE SATELLITE SYSTEMS" and a large red "J1" in the top right corner. The main content area is divided into several sections:

- Standard Functions:** A blue sidebar on the left contains links for [System Status](#), [Modem Status](#) (highlighted), and [About](#).
- Configuration Functions:** A blue sidebar on the left contains links for [Network Settings](#), [Search Settings](#), [LNB Settings](#), and [Mount Settings](#).
- Advanced Functions:** A blue sidebar on the left contains links for [Manual Motor Control](#), [Calibrate Dish](#), [Import/Export Files](#), and [Upgrade Firmware](#).
- System Status:** A central area displays "HughesNet" and three status indicators: "System Status" (green circle with "OK" below it), "Reception Info" (blue circle), and "Transmission Info" (blue circle).
- HN7000S System Control Center:** A section titled "Your built-in diagnostic system for view statistics, getting help, and configurin" (partially cut off) contains sub-sections for "SYSTEM STATUS" and "DIAGNOSTIC UTILITIES".
- HELP:** A sidebar on the right contains links for [Getting Sta](#), [Browsing C](#), [View Help](#), [Contact Inf](#), and [Restart HN](#).
- myHughes:** A sidebar on the right contains the text "Click on th myHughes" and a dropdown arrow.

The footer of the page reads "Copyright © 2001- 2010 MotoSAT. All rights reserved." and the browser status bar at the bottom shows "Done".

About Page

The About Page offers general information about MotoSAT and the J1 Controller.

As shown below you will find MotoSAT information such as Phone Numbers, Fax Numbers, Email Accounts, and our Web Address.

You will also find J1 Controller information like Firmware Version, Modem Type, Router/Gateway IP Address and Modem or internal ESN (serial) numbers.

Occasionally check the MotoSAT Website for newer Firmware Versions.

About Page

File Edit View Go Bookmarks Tools Help

http://192.168.1.250/

DataStorm 192.168.1... Speedtest.net - The ...

MotoSAT
MOBILE SATELLITE SYSTEMS

J1

Standard Functions

- [System Status](#)
- [Modem Status](#)
- [About](#)

Configuration Functions

- [Network Settings](#)
- [Search Settings](#)
- [LNB Settings](#)
- [Mount Settings](#)

Advanced Functions

- [Manual Motor Control](#)
- [Calibrate Dish](#)
- [Import/Export Files](#)
- [Upgrade Firmware](#)

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TECHNICAL SUPPORT

Phone 800-247-7486
Fax 801-972-5407
Email support@motosat.com
Web www.motosat.com

SYSTEM

Version 1.0.0
Type Generic
Gateway 192.168.1.1
ESN 1262635290

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Done

Configuration Functions

Configuration Functions

- ◆ [Network Settings](#)
- ◆ [Search Settings](#)
- ◆ [LNB Settings](#)
- ◆ [Mount Settings](#)

- Network Settings Page
- Search Settings Page
- LNB Settings Page
- Mount Settings Page

The J1 Controller is compatible with seven MotoSAT Antenna Mounts. These are F1, F2, F3, XF2, XF3, G74, and G75. Along with the type of mount, adjustments for Satellite Location, LNB Frequencies, Polarity and many other options need to be set for the J1 to function properly based on user application. The following pages below describe how this is done.

Network Settings Page

The Network Settings Page allows the user to configure the LAN (Local Area Network) so the J1 Controller, Satellite Modem, and the Router/Switch can all communicate with each other.

Each Setting is described in detail below.

Network Settings Page

Page 1 of 1

NETWORK CONFIGURATION SETTINGS		
Local Address	<input type="text" value="192.168.1.250"/>	<input type="button" value="Update Settings"/>
Subnet Mask	<input type="text" value="255.255.255.0"/>	
Modem Gateway	<input type="text" value="192.168.0.1"/>	
Router Gateway	<input type="text" value="192.168.1.1"/>	
DNS Address	<input type="text" value="198.6.1.194"/>	
Modem Username	<input type="text" value="admin"/>	
Modem Password	<input type="password" value="*****"/>	
Web Sat Table URL	<input type="text" value="http://www.motosat.com/sattables/world.csv"/>	
Startup Delay	<input type="text" value="4"/>	seconds
System Name	<input type="text" value="MotoSAT"/>	

Config Name (Default)

Local Address (192.168.1.250) **Setting required**

The Local Address is the internal Ethernet Address of the J1 Controller. This address is set at 192.168.1.250 from the factory but can be changed based on the customer network requirements.

Subnet Mask (255.255.255.0) **Setting required**

Default to 255.255.255.0, see your IT manager if changes to this value are necessary.

Modem Gateway (192.168.1.1) **Setting required**

This value is set to the modem address. See Modem manual for more information.

Router Gateway (192.168.1.1) **Setting required**

This value is set to the Router address. If a LAN switch is used then setting this to the modem address is typical. See Router or Modem manuals for more information.

DNS Address (192.168.1.1) **Setting required**

This value is set to the modem address. See manuals or white papers for more information.

Modem Username (admin)

If required. Currently the iDirect Modem is the only Modem that requires a Modem Username to access their Telnet to read SNR (Signal Quality) and feed it GPS for mobile use. The default Username is admin but the ISP or VAR can change this. A -25 message will appear on the main status page if this name is not correct.

Modem Password (******) (P@55w0rd!)

If required. Currently the iDirect Modem is the only Modem that requires a Modem Username and Password to access their Telnet to read SNR (Signal Quality) and feed it GPS for mobile use. The default Password is set internally but will display ***** on this screen. Contact the ISP or VAR if this requires changing. A -25 message will appear on the main status page if this password is not correct.

Web Sat Table URL **(<http://www.motosat.com/sattables/world.csv>)**

The J1 Satellite Antenna Controller is capable of downloading and upgrading the internal current Satellite Table directly from a website.

<http://www.motosat.com/sattables/world.csv> is the MotoSAT default address to receive current Sat Table updates. If there are other sites that offer compatible Sat Tables you can enter that address in this location.

In addition to world.csv which is the current worldwide Satellite Table in time MotoSAT may offer other CSV (comma separated value files) for specific locations in the world.

Startup Delay **(4)**

Startup Delay sets a time delay from J1 Power On to active LAN connection. This time period is displayed in seconds (0 to 999). This time delay is used to allow the Router and or Modem time to configure properly and communicate after AC power has been applied to these devices. The J1 will attempt to communicate with the modem after the delay time has expired.

Example; a LinkSys Router typically requires 20 seconds before it sets DHCP and accesses the WAN port. So setting the Startup Delay to 30 seconds should resolve this for the J1 to see the modem.

System Name **(MotoSAT)**

Allows users to name and manage several vehicles by identifying the J1 Controller through remote access.

Search Settings Page

The Search Settings Page allows the user to configure the J1 Satellite Antenna Controller with specific information pertaining to the modem, satellite, and polarization necessary to find, peak and track the correct satellite(s).

Each Setting is described in detail below.

Search Settings Page

Page 1 of 2

SEARCH CONFIGURATION SETTINGS

Satellite System	HughesNet ▾	<input type="button" value="Update Settings"/>
Satellite Longitude	127W °	
Modem LNB	LNB A ▾	
RX Polarity	Vertical ▾	
TX Polarity	Horizontal ▾	
Modem IF Frequency	1070.0 MHz	
Modem Symbol Rate	30 Msps	
Search Frequency	1250 MHz	
Search LNB	LNB A ▾	
Target LNB	LNB A ▾	
Peak Step	0.33 °	
Signal Trigger	5	
Trigger Filter	2	

Config Name (Default)

Satellite System (Generic) **Setting required**



When no modem is connected or does not require any external input then Generic is recommended.

Satellite System sets Modem or ISP type. Setting this value for the proper modem type will allow the J1 to integrate at different levels with specific modems.

Currently the J1 shares data with the Hughes Net and iDirect Modems allowing the J1 to confirm correct Satellite Identification, Signal Quality level, set TX ranging values, etc.

Other Modems currently displayed in the Satellite System drop down box function as Generic mode.

Important Note: It is extremely important that when using Hughes Net mode that many of the following configurations are set correctly. Just being close will not work.

Satellite Longitude (101W) **Setting required**

Satellite Longitude is a numerical value followed by an E or W. This will set the Default Satellite (Target Satellite) Location. i.e. **101W**

The Bandwidth Provider (VAR) will supply the Satellite Longitude required for the modem to lock to the correct RF carrier.

When inputting a Satellite Longitude in the **western** hemisphere you **should** place a **W** after the numerical longitude value.

When inputting a Satellite Longitude in the **eastern** hemisphere you **must** place an **E** after the numerical longitude value.

If you do not place a W or E after the numerical value the hemisphere will default to West (**W**).

Modem LNB (LNB A)

The J1 Controller has the ability to search using one LNB and then switch to a second LNB for proper Modem operation. We recommend using LNB A settings as the Modem LNB when possible.

See LNB Settings Page for additional information for LNB setup and use.

RX Polarity (Vertical) Setting required

This is a critical setting. The Bandwidth Provider (VAR) will supply the RX polarization required for the modem to lock to the correct RF carrier.

This will be either H (horizontal) or V (vertical) polarized. This must be correct for the Modem to operate properly.

TX Polarity (Horizontal) Hughes required

Hughes critical setting! The Bandwidth Provider (VAR) will supply the TX polarization required for the modem to transmit the RF signal in the correct field.

This will be either H (horizontal) or V (vertical) polarized. This must be correct for the Modem to operate properly and to not cause RF interference with other users of the Satellite.

Note: When using the DataStorm F1 or G74 Mount TX Polarization must be set to Horizontal Only!

Note: When using F2, F3, XF2, and XF3 mounts the TX Polarization must be set to the opposite field of the RX Polarization.

Note: The G75 Mount requires the user to physically set the LNB and BUC polarization at the Feed Assembly on the mount. These fields can not be adjusted by the J1 Controller but the RX and TX settings must be set the same as the physical settings on the mount for the modem to operate properly.

Modem IF Frequency (0) Hughes required

Hughes critical setting! When the *Satellite System* type is set to *HughesNet* (Hughes) you must enter the *Receive Frequency* (950-2150 MHz) supplied by your Bandwidth Provider in this position.

When not used in Hughes mode this value should normally be set to 0.

Under conditions where a Satellite you are wanting to find (Target Satellite) is sitting between two stronger satellites (adjacent satellites) it

might be necessary to input an IF frequency that will help you peak on the Target Satellite without the signals from the adjacent satellites causing the Dish to pull off and peak onto an adjacent satellite. In this situation a value other than **0** can be used. See *Building a Sat Table* for additional information.

Modem Symbol Rate (30) Hughes required

Hughes critical setting! The Bandwidth Provider (VAR) will supply the Symbol Rate required for the modem to lock to the correct RF carrier

The symbol rate is entered in Msps (Mega Symbols per Second).

Example; 30,000,000 symbols per second is entered as 30 Msps.

Search Frequency (1250)

The Search Frequency is the initial frequency set in the J1 Controller Tuner to find most Satellite Signals in the sky.

Depending on the general center frequencies of most of the Satellites in the viewable orbit above your GPS Longitudal position this value can be changed.

In North America most Ku Band Satellites have a many transponders that are near 1250 MHz IF. So using 1250 MHz is recommended.

Check Satellite Charts for the particular region in the world you plan to operate and make changes as needed.

Search LNB (LNB A)

The J1 Controller has the ability to search using one LNB and then switch to a second LNB for proper Modem operation. Under normal conditions the Modem LNB, Search LNB, and Target LNB will be set to LNB A.

If the Satellite you are wanting to find is not in the same RF Frequency band as most of the Satellites in the satellite arc (belt) above, then using one LNB to search and then switching to another LNB for the Modem to lock is possible with this setting. A Dual Band LNB is required for this configuration.

See LNB Settings Page for additional information for LNB setup and use.

Target LNB (LNB A)

Future use only.

Peak Step (0.33)

Peak Step is the amount of distance in degrees the Antenna Mount will move to test the signal level/quality during the peaking routines.

The larger the distance between peak steps could speed up the finished Peak times but might reduce the accuracy of the peak.

The smaller the peak steps may improve the final signal peak but could slow down final peak times.

Under most conditions 0.33 degrees is a good balance.

Signal Trigger (5)

Signal Trigger is a numerical value that represents a change of Signal Strength Level during a small period of time. When this value is triggered the J1 will stop the antenna movement and begin a Signal Identification Peak.

The Signal Trigger Value is set to Default 5. It can be adjusted from 1 to 40. The lower this value can be set the wider view of the sky for a quicker search. If this value is set too low the J1 will begin to stop on false targets such as trees, lights, and buildings. The higher this value is set the narrower the sky view search angle.

Setting range is 1 to 50.

Trigger Filter (2)

Trigger Filter is the number of consecutive times the Signal Trigger must see a positive change value before the Antenna Mount will stop to initiate the peaking routines.

Setting range is 1 to 10.

Azimuth Search Window	<input type="text" value="21"/>	°	
Elevation Search Window	<input type="text" value="10"/>	°	
Minimum Search Angle	<input type="text" value="17"/>	°	<input type="button" value="Update Settings"/>
Isolation Optimization	<input type="text" value="Low"/>	▼	
Target Search	<input type="text" value="Disabled"/>	▼	
Dual Verification	<input type="text" value="Disabled"/>	▼	
Motion Stow	<input type="text" value="Disabled"/>	▼	
Inclined Orbit	<input type="text" value="Disabled"/>	▼	
Inclined Orbit Angle	<input type="text" value="0"/>	°	
Manual Location	<input type="text" value="Disabled"/>	▼	
Latitude	<input type="text" value="40.72914N"/>	°	
Longitude	<input type="text" value="111.9644W"/>	°	
Satellite Selection Sorting Order	<input type="text" value="Name"/>	▼	
Satellite Selection Longitude	<input type="text" value="95W"/>	°	
Satellite Selection Window	<input type="text" value="70"/>	°	

Config Name (Default)

Azimuth Search Window (21)

The *Azimuth Search Window* sets the Satellite ID Table size with respect to the Reference (initial) Satellite Longitude and the Target Satellite Longitude.

In addition to setting the Sat Table ID size it also sets the maximum search window in degrees the Azimuth will move in either direction from the calculated Target Satellite Location.

On initial Search the J1 will choose a Satellite Longitude equal to the GPS Longitude (Reference Satellite). This causes the J1 to search for Satellites near the top (apogee) of the Satellite Arc.

Setting the Search window narrower will reduce the total number of Satellites that the Sat Table will ID. This reduces the ID time because the J1 Controller will not have to test as many Satellite DVB Carriers. If the Satellite Table is built efficiently this can reduce the Search Times.

If the Search Window value is set to a larger number this will allow more Satellites to be identified during the search but will require more ID Time on every unknown Satellite the system stops on.

Elevation Search Window (10)

The *Elevation Search Window* is the vertical search area of the Mount after a Reference Satellite has been located. The J1 will determine the calculated relative location of the Target Satellite from the Reference Satellite Location. The J1 will begin a search for the Target Satellite in the middle of the *Elevation Search Window* and continue to move the Dish Elevation higher and lower from this location at the end of every Azimuth pass until the total value set in this window has been searched. i.e. a value of 10 in this window will allow the elevation to search 5 degrees above and below the calculated Target location.

The Default value for *Elevation Search Window* is 10. This value can be narrowed if the vehicle is always very level, but not recommended. If the Mount/Dish is placed on a Skid or Pallet and the ground is not level increasing this value may be necessary.

Minimum Search Angle (17)

This is the lowest Satellite Look Angle allowed by the J1 Controller when in search mode. From the factory the J1 is set with an angle of 17 degrees.

Once the Dish is mounted on a roof or platform this value can be changed as necessary as long as full Azimuth Rotation will not cause the LNB to hit objects in this rotation. Normally 17 degrees will work for most of the US and Southern Canada.

Isolation Optimization (Low)

Isolation Optimization is used to set Cross Polarization (Cross Pol) of the antenna Transmitter to an acceptable Isolation level.

Low

When set to **Low** the skew (polarization) is calculated from the current GPS readings and the Feed Assembly will rotate the calculated value. There are no additional adjustments in the **Low** mode.

Medium

When set to **Medium**, Skew is initially set using the **Low** mode routine. Once the mount is near the correct elevation the J1 will then test the tilt sensors attached to the mount by rotating the Azimuth 180 degrees to determine the levelness of the mount. Any offset in level will be added or subtracted to the GPS calculated value and the Feed Assembly will be corrected as required.

High

When set to **High** mode the J1 will first perform the **Medium** routines. Once locked onto the Target Satellite the J1 controller will initialize a signal feedback routine using either the internal DVB Tuner in the J1 or if using a Hughes modem will initiate an ACP with the Hughes NMC Cross Pol server.

Note: TX Offset when used will influence the final Skew location. See TX Offset for additional information.

Target Search (Disabled)

When **Target Search** is *Disabled* the J1 Satellite Antenna Controller will begin an initial search for any/all satellites in the true southern part of the sky (*Longitude Search*). During this search the polarization is set to H or V Field with no skew offset added. Elevation is adjusted to pass through the highest satellites in the arc. Once a satellite in the Southern part of the sky has been identified the J1 will correct the Skew for the *Target Satellite* and move directly to the calculated position. In most cases, this search in areas of the world where many satellite can be identified is most efficient.

When **Target Search** is *Enabled* the J1 Satellite Antenna Controller will calculate the proper Elevation and Skew and begin a direct azimuth search for the selected satellite (Target). Use this type of search when there are fewer identifiable satellites in the arc.

Dual Verification (Disabled)

Dual Verification is used in areas where high RF Reflectivity could cause the J1 to stop and peak on a reflected RF signals. This is normally in an area with multi-story steel or glass buildings. When *Enabled* the J1 must verify two satellites in the proper orbital locations before completing the Search Operation.

Note: With Dual Verification Enabled it is recommended to Enable Target Search also.

Motion Stow (Disabled)

Motion Stow is initiated when the Tilt (accelerometer) Sensors detect motion other than mild rocking caused by wind. The J1 Controller **must** be **powered on** for Motion Stow to work.

Note: Some vehicles may disable the AC power when the ignition has been turned on. If the DC Power Supply that runs the J1 is on this AC Power circuit then Motion Stow will not work.

Inclined Orbit (Disabled)

Inclined Orbit is used when the Target Satellite is constantly moving in a Vertical Elevation pattern from the determined Clark Orbital slot. To track this kind of Satellite this configuration must be *Enabled*.

This mode could also be used in areas where a mount is placed on an unstable surface such as snow or mud and minimal mount adjustments may be required.

This routine CAN NOT be used for a vehicle or platform in motion.

Inclined Orbit Angle (0)

The ***Inclined Orbit Angle*** is set when the Vertical Change of an Inclined Orbit Satellite is known.

Inclined Orbit Satellites usually change less than +/- 6 degrees in a vertical direction. There is a small amount of Azimuth deviation on an Inclined Orbit Satellite which is also tracked when *Inclined Orbit* is Enabled.

Manual Location (Disabled)

When ***Manual Location*** is ***Disabled*** the J1 reads the current location values (Latitude and Longitude) from the GPS module installed on the Mount/UCB.

When **Manual Location** is **Enabled** the J1 will use the values currently stored in Latitude and Longitude.

Note: If valid GPS is ever acquired before a *Search* command is issued then even if Manual Location is *Enabled* the values in the Latitude and Longitude fields will be updated to the current GPS position.

Note: If a *Search* command has been initiated and it has been 3 minutes with GPS not acquiring valid latitude and longitude, the J1 will use the existing values displayed in *Latitude* and *Longitude* and begin a satellite search. These values may be from a previous location and not valid for Skew and Ranging information in some modems.

Latitude

Latitude values can be entered manually if GPS is not able to enter valid data to this field. Even if *Manual Location* has been *Enabled* once GPS acquires valid Latitude data it will overwrite the current value in this field.

Longitude

Longitude values can be entered manually if GPS is not able to deliver valid data to this field. Even if *Manual Location* has been *Enabled* once GPS acquires valid Longitude data it will overwrite the current value in this field.

Satellite Selection Sorting Order (Name)

Allows two options for the sorting order of the Satellite Selection Drop Down box on the *System Status* Page. (Below the *Search* button)

Name sorts the Satellites in the Satellite Selection Drop Down box into an Alphabetical order.

AMC, Anik, Galaxy ...

Longitude sorts the satellites in the Satellite Selection Drop Down box into a Longitudinal order from West to East.

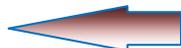
129W, 127W, 125W, 123W ...

Search

Stow

Stop

Default (AMC 4 101W V) ▼



Satellite Selection Drop Down box

Note: The first selection shown in the Satellite Selection Drop Down box is the Default Satellite. This Satellite is configured in *Search Settings Satellite Longitude*.

Satellite Selection Longitude (95W)

Satellite Selection Longitude (SSL) should be set to the approximate center of the (Mobile) region the Dish Mount is going to be used. The default value (95W) is for North America.

Africa 22E, Asia 120E, Australia 135E, China 105E, Europe 15E, Middle East 45E, Siberia 75E, Russia (West) 45E, South America 60W, SE Asia 90E

Note: You can add satellites to the East or West in the Satellite Table Drop Down box by moving this value higher or lower.

Satellite Selection Window (70)

The Satellite Selection Window (SSW) (in degrees) selects the total number of Satellites that will be displayed in the Satellite Selection Drop Down box on the *System Status* Page. The Window is centered on the Satellite Selection Longitude.

Note: Only Satellites in this window (SSW) can be selected or used for identification. The window must large enough to include the Satellite Longitude of any Satellite that is entered into *Search Settings Satellite Longitude*.

Note: You can add or reduce the number of satellites in the Satellite Table Drop Down box by changing this value.

LNB Settings Page

The J1 Satellite Antenna Controller has the ability to use two LNB's to Find, Peak and Lock to a Target Satellite. Using two LNB's or a Dual LNB that can see more than one Satellite Band offers the user the ability to Search on one satellite band and then switch to the other band for the modem to function properly.

A typical Dual Band LNB will have two Local Oscillators which gives the LNB the ability to see the High or Low Band Ku signals. The oscillator is switched by using a 22 KHz tone or 13/18Volts. Check the LNB specs for additional information.

In **Search Settings** you can choose which LNB to use for searching and which LNB is needed for the Modem. Sometimes one satellite band has many satellites to use as a Reference Satellite while the satellite you need to find for the modem is not common and would be difficult to find if it was the only satellite to search for.

The LNB Settings Page allows the user to configure the J1 Satellite Antenna Controller with specific information pertaining to a single or dual LNB setup.

Each Setting is described in detail below.

LNB Settings Page

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LNB CONFIGURATION SETTINGS

LNB A LO Frequency	<input type="text" value="10750"/>	MHz	<input type="button" value="Update Settings"/>
LNB A Power	<input type="text" value="18"/>		
LNB A 22KHz Tone	<input type="text" value="Disabled"/>		
LNB B LO Frequency	<input type="text" value="10750"/>	MHz	
LNB B Power	<input type="text" value="18"/>		
LNB B 22KHz Tone	<input type="text" value="Disabled"/>		

Config Name (Default)

LNB A Configuration

The J1 Satellite Antenna Controller is capable of using and managing two LNB's. In most conditions only one LNB is required.

Use LNB A as the primary LNB (modem LNB) when either one or two LNB's are used.

LNB A LO Frequency (10750) **Setting required**

LO Frequency (Local Oscillator) is used in the LNB to mix with the incoming RF signal to produce an IF Frequency in the 950 to 2150 MHz range. The LNB manufacturer will normally mark the LO Frequency on the side of the device.

To determine if an LNB will work with the J1 Controller and the Data Modem add or subtract the Satellite RF Band from the LO. The resultant frequencies should be in the 950-2150 MHz range. Check with the Modem supplier to see what IF Frequency is needed for your specific application.

Example; 11,700 MHz – 10750 MHz = 950 MHz
 12,200 MHz – 10750 MHz = 1450MHz

The Default LO Frequency is 10750 MHz, for Ku Band the LO Frequency is usually set between 9750 to 11300 MHz.

It is extremely important this value is set correctly for proper J1 operation.

LNB A Power (18) **Setting required**

LNB power is the actual DC Voltage supplied through the coax cable. This voltage is usually in the range 12 to 24 VDC (DC volts).

Some LNB's will use two different input voltages (13/18) to select either LO Frequency or to change the RF Polarity (H/V).



The J1 Controller lets you choose the type of power to control the LNB.

If the LNB can see both polarities and the polarity is changed by voltage it is important to note that depending on the physical assembly of the LNB to the Feed Assembly that 13 Volts could be either H (horizontal) or

V (vertical) polarized. Select the correct voltage scheme to fit the application.

LNB A 22 KHz Tone (Disabled)

When applicable the *22 KHz Tone* is used to switch the LO Oscillator Frequency from one frequency to another. This allows the system to see multiple satellite bands at the same Longitude location.

A Dual Band LNB or Co-Pol Feed Assembly with 2 LNB's and a 22 KHz switch is required.

This function can be used in special search mode applications.

LNB B Configuration

When the system requires a second LNB for either finding secondary (Reference) satellites or for peaking on the Target Satellite LNB B should be used.

Use LNB A as the primary LNB (modem LNB) when either one or two LNB's are used.

Configure LNB B as necessary for proper operation.

LNB B LO Frequency (10750)

See LNB A LO Frequency for details and information. Modify as necessary for the second LNB.

LNB B Power (18)

See LNB A Power for details and information. Modify as necessary for the second LNB.

LNB B 22 KHz Tone (Disabled)

See LNB A 22 KHz Tone for details and information. Modify as necessary for the second LNB.

Mount Settings Page

The Mount Settings Page allows the user to make adjustments the Mount Stowed Position, Skew Offsets, and even basic motor operation parameters.

WARNING! Making adjustments to any mount configuration settings can cause the system to not function properly. Any adjustments to these setting should be performed under the supervision of a certified MotoSAT installer or through MotoSAT Technical Support. Technical Support 1-800-247-7486

If you have made adjustments to any of the settings below and the dish no longer performs a complete Calibrate Dish (Test Dish) you should perform an NVClear and run another Calibrate Dish before contacting MotoSAT Technical Support.

Note: An NVClear will also clear other configuration settings that may need to be reconfigured. Do not re-import a configuration file to resolve the above issue.

Each Setting is described in detail below.



MOUNT CONFIGURATION SETTINGS

Azimuth Origin	<input type="text" value="2.460938"/>	°	
Elevation Origin	<input type="text" value="0"/>	°	
Skew Origin	<input type="text" value="103.2432"/>	°	
Skew Offset	<input type="text" value="0"/>	°	
Skew TX Offset	<input type="text" value="0"/>	°	
Skew Stow Position	<input type="text" value="45"/>	°	
Update Settings			
Azimuth Torque Run	<input type="text" value="0.45"/>		
Azimuth Torque Limit	<input type="text" value="0.75"/>		
Azimuth PWM Low	<input type="text" value="30"/>		
Azimuth PWM High	<input type="text" value="450"/>		
Azimuth Current Limit	<input type="text" value="1.25"/>		A
Azimuth Stall Timeout	<input type="text" value="1500"/>		ms
Azimuth Count Limit	<input type="text" value="7264"/>		
Azimuth Count Resolution	19.91111		counts / °

Note: We recommend whenever possible to make mechanical adjustments to the Dish Mount before making configuration changes to the J1 Controller. When changes are made to the J1 Controller for Dish Mount adjustments the customer will be responsible for insuring the J1 Controller if replaced or NV Cleared has re-installed all configurations necessary for the Dish Mount to function properly.

Config Name (Default)

Azimuth Origin (0)

The **Azimuth Origin** primary function is to center the Dish Mount onto the Roof Mounting Plate when in the Stowed position.

The F1, F2, and F3 mounts move the Dish Azimuth to a physical current stall at the Azimuth down limit before allowing the Elevation to move down to the Stowed position. If the Azimuth current stall position is off by several degrees then it is possible for the RF Assembly arms to be off centered in the Roof Mounting Plate and actually rest on one of the rails extending the length of the plate. If this happens the dish will not stow fully down onto the roof. There are no mechanical adjustments to the mount and Mounting

plate to correct this. By making a small positive angle change to ***Azimuth Origin*** this mechanical tolerance can be corrected. Typically 1 or 2 degrees is sufficient. After making this setting, raise Elevation 75 degrees and stow the Dish to test Azimuth center. Repeat the process until the Azimuth Stow is centered properly.

The G74, and G75 mounts move the Dish Azimuth to a physical current stall at the Azimuth down limit before allowing the Elevation to move down to the Stowed position. If the Azimuth current stall position is off by several degrees then it is possible for the RF Assembly arms to be off centered in the Roof Mounting Plate and actually rest on one of the rails extending the length of the plate. If this happens the dish will not stow fully down onto the roof. There are mechanical adjustments that can be made to correct this Azimuth Offset. Loosen the 8 ¼-20 Cap Screws that secure the Dish Mount to the Roof Mounting Plate and rotate the Dish mount to center the Azimuth Stow position. Only use the Azimuth Origin Configuration adjustment as a short term solution until the mechanical solution can be accomplished.

The XF2 and XF3 mounts move the Dish Azimuth to a physical current stall at the Azimuth down position then move back in a positive (up) direction approximately 2.5 degrees to an electronic limit before allowing the Elevation to move down to the Stowed position. If the Azimuth current stall position is off by several degrees then it is possible for the RF Assembly arms to be off centered in the Roof Mounting Plate and actually rest on one of the rails extending the length of the plate. If this happens the dish will not stow fully down onto the roof. There are mechanical adjustments that can be made to correct this Azimuth Offset. Loosen the 8 ¼-20 Cap Screws that secure the Dish Mount to the Roof Mounting Plate and rotate the Dish mount to center the Azimuth Stow position. Only use the Azimuth Origin Configuration adjustment as a short term solution until the mechanical solution can be accomplished.

Elevation Origin (3) Recommended adjustment

The **Elevation Origin** sets the correct Search Elevation value for the type of Dish Mount when the Mount is placed on a level platform. When ***Elevation Origin*** is set properly, both *Dish Elevation* and *Target Elevation* values displayed on the *HTML Main Status Page* show the same approximate value when locked onto the Target Satellite.

Note: Make sure the Dish Mount is installed on a level platform or vehicle and the platform or vehicle is setting on a level surface before setting ***Elevation Origin***.

Depending on type of Dish Mount the J1 controller will set a default Elevation Origin value in configuration. This value can be changed and exported to a configuration file.

To adjust ***Elevation Origin*** the Dish Mount must be locked to a valid (Target) satellite.

- Read both the Dish Elevation and Target Elevation values on the HTML System Status page.
- Record the difference of these values.
- If *Dish Elevation* value is greater than *Target Elevation* then enter difference as a positive value in the ***Elevation Origin*** field.
- If *Dish Elevation* value is less than *Target Elevation* then enter difference as a negative value in the ***Elevation Origin*** field

After adjusting this value return to the main System Status Page to confirm the Dish Elevation and Target Elevation values are approximately the same. (+/- .25 degrees)

When the Dish Mount is Stowed the *Dish Elevation* on the main System Status Page will display the Elevation Origin Offset value with the +/- inverted.

Skew Origin (0) **Call MotoSAT**

After a Calibrate Dish (Test Dish) is performed the total mechanical Skew movement is recorded. Based on Skew ***counts per degree*** the mechanical stall limits are known and total Degrees are assigned. Skew Origin is ½ of the total degrees of Skew travel and is considered the lower stall limit.

Skew 0 (zero) is the center of this mechanical travel and is extremely important for proper polarization for Transmitter Isolation.

Only under direction of MotoSAT technical support should this value be modified.

This adjustment does not set the Stowed location of the LNB Feed Assembly. See *Skew Stow Position* in this section.

Skew Offset (0)

The J1 Controller use GPS Location to calculate the correct Horizontal and Vertical Skew Angles of a specific satellite base upon the Dish location on earth. However, some Satellites in the Clarke Orbit are Skewed off several degrees from what should be a true H/V based upon their Longitudal position.

Your ISP or NOC should provide you with a Skew Offset in this case which you can add as a positive or negative value in ***Skew Offset***. This will correct the initial search skew angle.

Skew TX Offset (0) Recommended adjustment

Tx (Transmitter) Offset allows the installer the ability to correct the mechanical errors of the RF Assembly so the Dish Mount when peaked on Satellite will be properly Cross polled for maximum Transmitter Isolation.

Note: For best performance using *Skew TX Offset*, *Isolation Optimization* in *Search Settings Page* should be set to medium.

Note: If *Isolation Optimization* is set to High, *Skew TX Offset* should be set to 0 (zero).

Make sure the Dish Mount is installed on a level platform or vehicle and the platform or vehicle is setting on a level surface before setting *Elevation Origin*.

To set *Skew TX Offset* the Dish Mount must be peaked on the Target Satellite. Record the *Target RX Skew* value on the main *System Status Page*.

Call the NOC/NMC (or your ISP provider) and request a Cross Pol Isolation Test. Inform them you are setting up a Mobile Antenna System and would like to find the Peak Isolation Value (not just a passing value).

Go to the *Manual Motor Control Page*. Primarily using the Skew buttons make adjustments to the Dish Mount in .5 or 1 degree steps under the direction of the NOC until a peaked Isolation value is obtained.

Note: If Azimuth or Elevation adjustments are required during this test please set motor steps to .33 degrees or less.

Return to the main *System Status Page* and record the Dish RX Skew value. Record the difference of the *Target RX Skew* and the *Dish RX Skew* including if it is a positive or negative difference.

Go to the *Mount Settings Page* and enter this value into *Skew TX Offset* and update Settings.

To confirm the proper adjustments, Stow the Dish Mount then Search for the Target Satellite. After the Target Satellite has completed peaking the Dish RX Skew should correct itself from the Target RX Skew by the amount set in *Skew TX Offset* (+/- .33 degrees).

Note: With *Isolation Optimization* set to medium there will be additional differences between *Target RX Skew* and *Dish RX Skew* depending on the Levelness of the vehicle.

Skew Stow Position (determined by Mount Type)

Limit
0°
45°
90°

This value is set by default depending on the Dish Mount type. Only make adjustments if directed by MotoSAT Technical Support (800-247-7486)

Skew Stow Position is usually set by default depending on the Dish Mount type.

Making adjustments to this setting without the direction of MotoSAT Technical Support could cause damage to the Dish Mount or the RF Assembly components (LNB, BUC, motors...)

This value displays the actual physical location of the Skew Assembly when the Dish Mount is Stowed.

Default Dish Mount Parameters

Azimuth Torque Run	<input type="text" value="0.45"/>	
Azimuth Torque Limit	<input type="text" value="0.75"/>	
Azimuth PWM Low	<input type="text" value="30"/>	
Azimuth PWM High	<input type="text" value="450"/>	
Azimuth Current Limit	<input type="text" value="1.25"/>	A
Azimuth Stall Timeout	<input type="text" value="1500"/>	ms
Azimuth Count Limit	<input type="text" value="7257"/>	
Azimuth Count Resolution	19.91111	counts / °

Azimuth, Elevation, and Skew Motor Parameters are similar in format but individual values will differ in the fields as shown to the left.

The J1 Satellite Antenna Controller will detect what type of Mount is installed. Every mount has different counts, motor start up torques, running speeds, and limits.

Listed below are the current defaults for each mount. These values may change as needed in new software versions.

Note: After performing an NVClear and restarting the J1 Controller you can type “showconfig” in a telnet session to see what the current default settings are for the Dish Mount connected to the J1 Satellite Antenna Controller.

The default values are listed below for each Dish Mount Type

Default Dish Mount Settings**Mount Types Listed**

Mount Type	F1	F2/3	G74	G75	XF2/3
AzTorqueRun	0.1	0.1	0.45	0.45	0.45
AzTorqueLimit	0.25	0.25	0.85	0.85	0.75
AzPwmLow	100	100	100	100	30
AzPwmLimit	456	400	256	256	450
AzCurrentLimit	0.85	0.85	2	2	1.25
AzCountResolution	12.74445	14.86601	14.09432	14.09432	19.91111
AzCountLimit (defined)	4715	5500	5225	5225	7265
AzCountLimit (actual)	4715	5500	5225	5225	7265
AzStallTimeout	1000	1000	3000	3000	1500
ElTorqueRun	0.2	0.45	0.8	0.8	0.65
ElTorqueLimit	0.4	0.6	1	1	1.99
ElPwmLow	100	100	140	140	100
ElPwmLimit	456	456	312	312	450
ElCurrentLimit	0.85	2	3	3	3
ElCountResolution	75.78567	64.6745	22.54483	22.54483	11.37778
ElCountLimit (defined)	10534	9248	3250	3250	1620
ElCountLimit (actual)	10534	9248	3250	3250	1620
ElStallTimeout	1000	1000	2000	2000	1500
SkTorqueRun	0.025	0.025	0.025	0.025	0.025
SkTorqueLimit	0.125	0.125	0.125	0.125	0.125
SkPwmLow	10	10	10	10	10
SkPwmLimit	80	80	80	80	80
SkCurrentLimit	0.75	0.75	0.75	0.75	0.75
SkCountResolution	8.34	5.734033	8.34	7.357466	5.734033
SkCountLimit (defined)	938	1180	938	813	1180
SkCountLimit (actual)	938	1180	938	813	1180
SkStallTimeout	1000	1000	1000	1000	1000

Every Dish Mount manufactured by MotoSAT is Quality Inspected and Tested to exceed minimum specification for operation and performance.

Every Dish Mount tested will vary in motor running currents because of variances in factory motor specifications, bearing tolerances, material tolerances, and even shipping jarring.

Over time all Dish Mounts will seat in and run near the same parameters. You can see the typical performance of the Dish Mount connected to the J1.

To see the performance of this Dish Mount;

- Open a telnet session
- Type “showdebug”
- Type “testdish”
- Data will show the performance of all 3 motors (Az, El, and Sk)

Defined Values are as follows;

[12:34:56] = Time Stamp (hh:mm:ss)
A = motor current (amps)
V = motor DC volts (volts)
W = motor power (watts)
T = input motor torque (in/lbs)
L =set torque run (in/lbs)
P =running PWM value (0 to 511)
A = AZ, E=EL, S=SK
123.45 =current position in degrees

Telnet Testdish

Showdebug

DATASTORM % showdebug

DATASTORM % testdish

[22:52:43] Motor is active.

[Time] A-current, V-volts, W-watts, T-torque run, L-torque set, P-PWM, A-Az

[22:52:43] A 0.59, V 4.411, W 2.615, T 0.08, L 0.45, P 30, A 155.89
[22:52:44] A 0.97, V 6.081, W 5.957, T 0.24, L 0.45, P 31, A 155.89
[22:52:44] A 1.00, V 5.246, W 5.274, T 0.25, L 0.45, P 32, A 155.89
[22:52:44] A 1.16, V 5.246, W 6.086, T 0.31, L 0.45, P 33, A 155.89
[22:52:44] A 1.18, V 5.604, W 6.645, T 0.32, L 0.45, P 34, A 155.89
[22:52:44] A 0.90, V 5.783, W 5.218, T 0.21, L 0.45, P 35, A 155.89
[22:52:55] A 1.28, V 10.01, W 12.91, T 0.37, L 0.45, P 106, A 224.94
[22:52:55] A 1.08, V 10.55, W 11.42, T 0.28, L 0.45, P 107, A 224.94
[22:52:55] A 0.61, V 10.43, W 6.455, T 0.09, L 0.45, P 108, A 224.94
[22:52:55] A 0.90, V 11.14, W 10.05, T 0.21, L 0.45, P 109, A 224.94
[22:52:55] A 1.03, V 11.26, W 11.61, T 0.26, L 0.45, P 110, A 224.94
[22:52:56] A 1.03, V 10.96, W 11.31, T 0.26, L 0.45, P 111, A 233.33
[22:52:56] A 1.00, V 11.32, W 11.38, T 0.25, L 0.45, P 112, A 233.33
[22:52:56] A 1.18, V 11.08, W 13.15, T 0.32, L 0.45, P 113, A 233.33
[22:52:56] A 1.03, V 11.32, W 11.68, T 0.26, L 0.45, P 114, A 233.33
[22:52:56] A 0.90, V 10.85, W 9.790, T 0.21, L 0.45, P 115, A 233.33

Azimuth Torque Run **Call MotoSAT**

Azimuth Torque Run (AzTorqueRun) sets the typical average running torque (L) of the azimuth motor under normal conditions. The lower this setting can be the less the wear and tear on the Dish Mount.

This setting determines the rate of acceleration of motor speed from the Azimuth PWM Low (AzPwmLow) setting. The J1 Controller will continue to step up the PWM value until input motor torque (T) matches AzTorqueRun (L). When this happens the PWM (P) will stop incrementing and continue to run at that value.

The manufacture has set these values in default to typically be half of the DC Motor rated output torque.

Making adjustments to this setting without the direction of MotoSAT Technical Support could cause the system to not function properly or even damage to the Dish Mount.

Azimuth Torque Limit **Call MotoSAT**

Azimuth Torque Limit (AzTorqueLimit) is the maximum input motor torque allowed during dish movement. If this value is exceeded the J1 Controller will reset the current PWM back to the PWM Low (AzPwmLow) setting and continue to move the Dish Mount.

If the Azimuth Torque Limit is still exceeded until the Stall Time Out (AzStallTimeout) is reached the Dish Mount will stop movement.

The manufacture has set these values in default to typically be the DC Motor rated output torque. It is not recommended to set this value higher than the motor ratings.

Making adjustments to this setting without the direction of MotoSAT Technical Support could cause the system to not function properly or even damage to the Dish Mount.

Azimuth PWM Low **Call MotoSAT**

The Azimuth PWM Low (AzPwmLow) sets the PWM (Pulse Width Modulated) voltage level in the J1 Controller motor driver circuits.

PWM Low, motor voltages performs two functions. One is to reduce the mechanical start-up stress on the Dish Mount. Second is to allow the Dish Mount to move at slower speeds for signal peaking. The lower this value can be set and still perform reliably the better overall performance of the mount.

If this value is set to low the J1 controller will not function properly and display different motor error messages.

If this value is set to high the primary issue could be poor peaking of the RF signal and a noticeable jerking motion of the dish mount.

Making adjustments to this setting without the direction of MotoSAT Technical Support could cause the system to not function properly.

Azimuth PWM High **Call MotoSAT**

The Azimuth PWM High (AzPwmLimit) sets the PWM (Pulse Width Modulated) maximum voltage level the J1 Controller motor driver circuits can output.

This PWM values is set in default to approach the maximum DC Voltage output of the J1 Controller.

Setting the PWM value lower will result in the antenna moving slower but will not reduce overall performance except for total Satellite Lock times.

Setting this PWM value higher will not improve performance of the system.

Making adjustments to this setting without the direction of MotoSAT Technical Support could cause the system to not function properly.

Azimuth Current Limit **Call MotoSAT**

The Azimuth Current Limit (AzCurrentLimit) sets the maximum allowed azimuth motor current for a specific time (AzStallTimeout) period before the dish will stop moving and display a stall message.

This value is different depending on the Dish Mount Type used. Current Limit is usually set at a value lower than the rated value of the DC motor.

In cases where a specific section (angle) of a Dish Mount exceeds the Current Limits the Current Limit value can be increased above the DC Motor ratings. But if the DC Motor ratings are exceeded more than 25% of the time the Dish Mount is moving then the mount should be repaired.

Making adjustments to this setting without the direction of MotoSAT Technical Support could cause the system to not function properly or even damage to the Dish Mount.

Azimuth Stall Timeout **Call MotoSAT**

The Azimuth Stall Timeout (AzStallTimeout) sets the maximum allowed time that Azimuth Torque Limit (AzTorqueLimit) and Azimuth Current Limit (AzCurrentLimit) can exceed their values before the J1 Controller stops the Dish Mount.

This time is displayed in milliseconds (ms) where 1000 ms = 1 second.

Over time if gears and chains loosen beyond typical specifications, increasing the Stall Timeout may prevent motor error messages. If this value needs to be increase by more than 200% of default value then the mount should be repaired.

Decreasing the Stall Timeout value is not recommended and will cause error messages.

Making adjustments to this setting without the direction of MotoSAT Technical Support could cause the system to not function properly.

Azimuth Count Limit **Call MotoSAT**

The Azimuth Count Limit (AzCountLimit) displays the actual measured total counts of travel from maximum limit to minimum (stowed) limit. This value should be approximately the default defined limits.

To see the defined limits open a telnet session and type “showmotors”

Telnet Showmotors

showmotors

```
DATASTORM % showmotors
DEFINED LIMITS
AZ: 7265 EL: 1620 SK: 1180
MEASURED LIMITS
AZ: 7248 EL: 1619 SK: 1176
...
DATASTORM %
```

As the Dish Mount ages and gears and chains loosen the defined values may need to be modified to keep the measured values in tolerance. This can only be accomplished though exporting, modifying (defined limits), and importing the configuration file. See ***Import/Export Files***.

Making adjustments to this setting without the direction of MotoSAT Technical Support could cause the system to not function properly.

Azimuth Count Resolution

Call MotoSAT

The Azimuth Count Resolution (AzCountResolution) displays the actual counts per degree of the Dish Mount.

All MotoSAT Dish Mounts use some type of position counters to determine the actual location of the mount relative to the Stowed position. Each mount and every motor (AZ, EL, SK) output different numbers of counts per degree.

To make this information usable the counts are converted to degrees as a standard frame of reference.

Even though a user could change the counts per degree value in telnet it is not recommended. These values will not change unless MotoSAT makes physical changes to the Dish Mount.

Making adjustments to this setting without the direction of MotoSAT Technical Support could cause the system to not function properly or even damage to the Dish Mount.

Elevation and Skew Settings

Call MotoSAT

Like Azimuth settings described above, the Elevation and Skew settings are configured similarly. Every Dish Mount has default settings for each of the fields shown below and it is recommended to not make any changes to these settings without instruction from MotoSAT Technical Support.

Making adjustments to this setting without the direction of MotoSAT Technical Support could cause the system to not function properly or even damage to the Dish Mount.

Dish Light (Enabled)

Enabled

Under normal use when the *Dish Light* is *Enabled* the DataStorm Dish will have a glowing Blue reflection off of the Dish surface when the dish is deployed. When the Dish is stowed this light will be off.

Disabled

If the user chooses to have this light off all the time simply disable this feature.

Elevation Torque Run	<input type="text" value="0.65"/>	
Elevation Torque Limit	<input type="text" value="1.99"/>	
Elevation PWM Low	<input type="text" value="100"/>	
Elevation PWM High	<input type="text" value="450"/>	
Elevation Current Limit	<input type="text" value="3"/>	A
Elevation Stall Timeout	<input type="text" value="1500"/>	ms
Elevation Count Limit	<input type="text" value="1627"/>	
Elevation Count Resolution	11.37778	counts / °

Skew Torque Run	<input type="text" value="0.025"/>	
Skew Torque Limit	<input type="text" value="0.125"/>	
Skew PWM Low	<input type="text" value="10"/>	
Skew PWM High	<input type="text" value="80"/>	
Skew Current Limit	<input type="text" value="0.75"/>	A
Skew Stall Timeout	<input type="text" value="1000"/>	ms
Skew Count Limit	<input type="text" value="1184"/>	
Skew Count Resolution	5.734033	counts / °

Dish Light

Advanced Functions

Advanced Functions

- [Manual Motor Control](#)
- [Calibrate Dish](#)
- [Import/Export Files](#)
- [Upgrade Firmware](#)

- Manual Motor Control
- Calibrate Dish
- Import/Export Files
- Upgrade Firmware

Manual Motor Control

MotoSAT™
MOBILE SATELLITE SYSTEMS

J1

Standard Functions

- [System Status](#)
- [Modem Status](#)
- [About](#)

Configuration Functions

- [Network Settings](#)
- [Search Settings](#)
- [LNB Settings](#)
- [Mount Settings](#)

Advanced Functions

- [Manual Motor Control](#)
- [Calibrate Dish](#)
- [Import/Export Files](#)
- [Upgrade Firmware](#)

MANUAL MOTOR CONTROL

Signal Quality 57
Signal Strength 613
System Status Search Time: 5 minutes 50 seconds.

Count	Angle
1324	Elevation 116.3672
2165	Azimuth 106.2723
630	Skew 7.324687

STOP

Manual Motor Control

Manual Motor Control is used typically during initial installation and for adjusting the initial Isolation test.

Changing the value in the box above will allow the Dish Mount to move by that amount. For peaking Azimuth and Elevation .33 degrees is typical. For adjusting Skew in Isolation Testing .5 degrees works better.

Holding a direction button down will not allow the Dish Mount to move continuously.

Calibrate Dish (Testdish)

A Calibrate or Test Dish is used to confirm the mechanical performance of the Dish Mount. This function should be performed after installation of either a new Dish Mount or Satellite Antenna Controller.

A Test Dish will confirm the Mount Setting Configuration parameters. If the Dish Mount completes the entire test without errors, the Dish will be in the stowed position and the HTML page will confirm the Test has passed.

If the Test Dish fails open a telnet session to repeat the test using telnet commands;

```
DATASTORM % showdebug
DATASTORM % testdish
```

Capture the entire Test and contact MotoSAT Technical Support for additional assistance.

Unless a count sensor has failed one of the motor parameters above in mount settings (*Default Dish Mount Parameters*) may be modified to allow a successful Test Dish.

If any parameters are changed we recommend you export and save the new Configuration File. If your Satellite Antenna Controller has been replaced these files can be imported into the new Controller.

We recommend that one person be outside the vehicle while the test is in process to assure that the antenna moves properly to all maximum and minimum limits as described above.

A proper Calibrate Dish will;

- Raise Elevation approximately 145 degrees to Max Stall
- Lower Elevation to 85 degrees dish angle
- Test Elevation Peak Speed and Currents
- Rotate Skew CCW to MAX Skew Limit (facing Dish)
- Rotate Skew Clockwise to MIN Skew Limit (facing Dish)
- Move Skew (LNB) to Configured Stow Position
- Rotate Azimuth Clockwise 375 degrees (360 +15)
- Rotate Azimuth CCW 180 Degrees, test Peak Speed and Currents
- Rotate Azimuth CCW to Stow Position
- Lower Elevation to Stowed Position
- End of test

Calibrate Dish Screen

In process

Performing dish calibration... please wait...

Elevation 1162

Azimuth 49

Skew 736

Current 0.20624



If at any time the Dish stops the Calibrate Dish has failed. The System Status Screen will display Error message. Contact Technical Support for assistance.

Calibrate Dish Screen

Completed

CALIBRATE DISH

Dish calibration is complete. Click finish to return.



If the Calibrate Dish completed properly the system is ready for Normal Operation.

Import/Export Files

MotoSAT™
MOBILE SATELLITE SYSTEMS

J1

Standard Functions

- ◆ [System Status](#)
- ◆ [Modem Status](#)
- ◆ [About](#)

Configuration Functions

- ◆ [Network Settings](#)
- ◆ [Search Settings](#)
- ◆ [LNB Settings](#)
- ◆ [Mount Settings](#)

Advanced Functions

- ◆ [Manual Motor Control](#)
- ◆ [Calibrate Dish](#)
- ◆ [Import/Export Files](#)
- ◆ [Upgrade Firmware](#)

IMPORT / EXPORT FILES

Configuration File:

Sat Table File:

Import/Export Files

The J1 Satellite Antenna Controller is capable of exporting and importing both Configuration and Satellite Table files.

This feature allows the installer a faster way to configure and complete a system installation. By importing a configuration with the same Dish Mount type and making small modifications to Network and Search settings the controller can be ready for a Testdish in minutes.

Configuration Files

Configuration Files contain the specific parameters of the J1 Controller which include IP Address, Modem, RF hardware, Satellite and Polarization, and Dish Mount settings.

To *Import Configuration File* click on the Browse command to the right of the dialog box. Select the location and file name of the corrected configuration file (filename.txt) making sure it has a .txt extension. Then click on the Import Configuration File command.

Note: If any Network IP settings are changed in the imported configuration file the J1 controller will automatically reset to restart the Ethernet connection to allow the IP settings to initiate.

Note: The J1 Satellite Antenna Controller includes an SD Card Slot on the Front Panel. For initial configuration setup it is recommended that a modified Config.txt file is placed on a SD Card (in “loadonce” folder) with the desired Local IP Address. This will allow the J1 to boot up properly on the Network with making hardware modifications. See *Using the SD Card* for additional information.

Selecting the *Export Configuration* command allows the user the ability to send a config.txt file to the PC. This file can be edited and re-imported by the user.

Note: The Configuration File is a simple text (.txt) document which contains every parameter that is also modifiable thru the HTML *Configuration Functions Page*. Whenever possible it is better to make changes to the HTML Configuration Functions Page. Always export the latest configurations for back up.

Note: You can not export the Configuration File to the SD Card in the J1 Controller, but it is a good practice to remove the SD Card from the J1 Controller and place it in an SD Card reader connected to the PC and save a copy of the Config File on the SD Card. Replace the SD Card back in the J1 Controller.

Sat Table Files

Sat Table Files are files which hold specific information about every satellite in this table. This information includes satellite longitudes, transponder frequencies, polarization, DVB symbol rates, FEC Codes, NID, and other miscellaneous data. The uniqueness of this data allows the J1 to ID Satellites.

To import a Satellite Table File click on the Browse command to the right of the dialog box. Select the location and file name of the Sat Table file (filename.csv) making sure it has a .csv extension. Then click on the Import Sat Table File command.

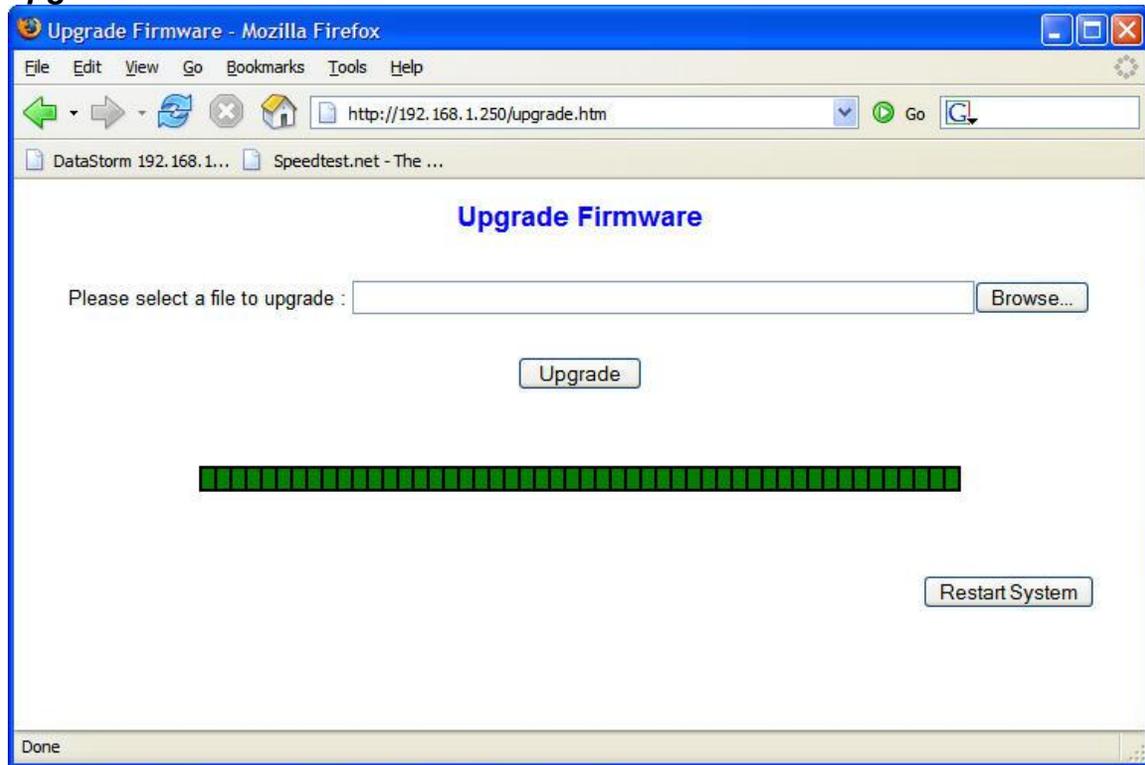
Import Web Sat Table allows the user to directly import the latest Satellite Table File from the MotoSAT Web Site. In Network Settings (Web Sat Table URL) is a default web address of <http://www.motosat.com/sattables/world.csv>. This address can be changed if future sites are available. For this import to work the user must be connected to an active modem (Network) and locked onto the Satellite.

Export Default Sat Table allows the user access to the original Satellite Table that is embedded in the firmware. Over time this Satellite Table will become less useful.

Export Current Sat Table allows the user access to the latest working Satellite Table in the J1 Controller. This is the active Satellite Table being used during and Satellite search. This would be the recommended Satellite Table to modify for importing.

Note: You can not export the Sat Table File to the SD Card in the J1 Controller.

Upgrade Firmware



Upgrading Firmware

The J1 Satellite Antenna Controller has a microcontroller that is software upgradeable in the field.

Compare the current Firmware Version on the *About Page* with the latest Firmware available on the MotoSAT Website. If a newer version is available check the Firmware document to see if the upgrade is recommended.

There are several ways to complete a Firmware Upgrade.

HTML Upgrade Firmware

Under *Advanced Functions* select *Upgrade Firmware*. The Upgrade Firmware Page will open.

Click on the *Browse* button to the right side of the dialog box and select the location and name of the new firmware file (firmwareversion.hex).

Click on the *Upgrade* button in the center of the screen. The firmware will begin loading. **Do not interrupt this process.**

The green progress bar will show the approximate completion time. The upgrade takes about 10 minutes.

Upgrade Firmware

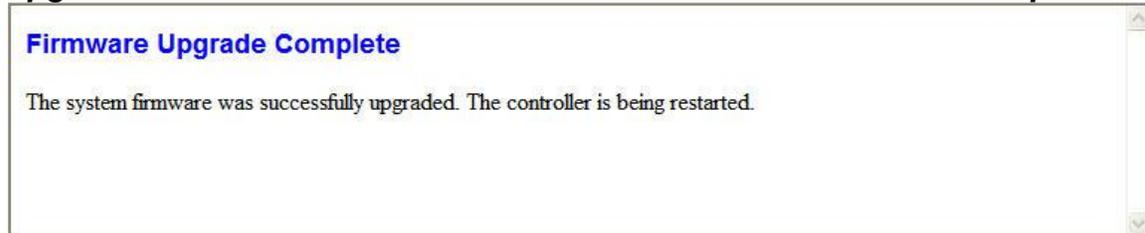
in process



When complete the Screen will display *Upgrade Firmware Complete* and the J1 Controller will restart in about 15 seconds.

Upgrade Firmware

Complete



In about 15 to 30 seconds the HTML main *Status Page* should open.

Upgrade Firmware thru J1 Front Panel

From the J1 Satellite Antenna Controller Front Panel there are several Ethernet IP options available to perform a *Firmware Upgrade*.

Firmware Upgrade with Configured IP Address

While holding down the *Search* button and then pressing the *Power* button and holding both for approximately one second, will cause the J1 Controller to power up in *Boot Mode* using the current configured *Local IP Address*. See *Network Settings, Local Address*.

Open your *Browser* to the current *Configured IP Address*. The *Upgrade Firmware Page* should open.

Follow steps in **HTML Upgrade Firmware** above to complete Firmware Upgrade.

Firmware Upgrade using IP Address 192.168.1.250

While holding down the **Search and Stow** buttons and then pressing the **Power** button and holding both for approximately one second, will cause the J1 Controller to power up in ***Boot Mode*** using a ***Local IP Address*** of ***192.168.1.250*** . This is the Default IP Address of the J1 Controller from MotoSAT.

Open your *Browser* to *IP Address*192.168.1.250. The *Upgrade Firmware* Page should open.

Follow steps in **HTML Upgrade Firmware** above to complete Firmware Upgrade.

Firmware Upgrade using IP Address 192.168.0.250

While holding down the **Stow** button and then pressing the **Power** button and holding both for approximately one second, will cause the J1 Controller to power up in ***Boot Mode*** using a ***Local IP Address*** of ***192.168.0.250*** . This is the Default IP Address of the J1 Controller from MotoSAT.

Open your *Browser* to *IP Address*192.168.0.250. The *Upgrade Firmware* Page should open.

Follow steps in **HTML Upgrade Firmware** above to complete Firmware Upgrade.

Upgrade Firmware thru SD Card

The J1 Satellite Antenna Controller can also have Firmware Upgraded through the SD Card Slot.

Name ▲	Size	Type	Date Modified
 Autoload		File Folder	2/24/2010 10:48 AM
 J1 Files		File Folder	2/24/2010 10:48 AM
 LoadOnce		File Folder	2/24/2010 10:49 AM
 Manuals		File Folder	2/24/2010 10:48 AM

Load the latest firmware to the SD Card into either the ***autoload*** or ***LoadOnce*** folder and place the SD Card into the J1 Controller Card Slot.

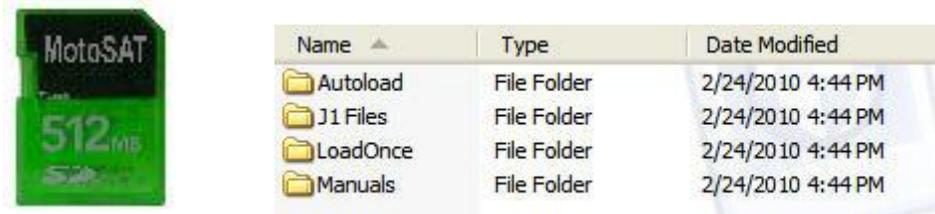
Hold down the **Search and Stow** buttons and then press the **Power** button and hold for approximately one second. The J1 will initiate a Firmware Upgrade and the Indicator lights will scroll from right to left. See ***Using the SD Card*** for additional information.

SD Card Functions

The SD Card Slot on the J1 Satellite Antenna Controller allows the installer and user a valuable tool for setup and programming.

For new installs, using this feature will allow the installer the ability to configure the J1 Controller much quicker.

The SD Card comes from MotoSAT with 4 Folders preloaded.



The **Autoload** Folder is intended to be used by an installer to load the same files multiple times into different systems with J1 Controllers. This folder will allow one *firmware.hex* file, one *sattable.csv* file, and one *config.txt* file. (Empty from factory)

The **J1 Files** Folder is used to store different Firmware versions, and different Dish Mount configuration files samples. This is just a working folder on the SD Card. The J1 Controller can not read or write any files to this folder.

The **LoadOnce** Folder is similar to the **Autoload** Folder with one major difference. After the **LoadOnce** Folder has updated the J1 Controller with a file, the J1 will delete that file from the **LoadOnce** Folder. So as the name implies “load once”. This feature allows the user to get new Firmware from the MotoSAT Website and place into the LoadOnce Folder, after it is has updated the J1 it will clear that file from the folder and not try to accidentally update again. (Empty form factory)

The **Manuals** Folder will hold any MotoSAT technical manual available for the J1 Satellite Antenna Controller. This is just a technical folder on the SD Card. The J1 Controller can not read or write any files to this folder.

J1 (System) Wiring

The J1 has Six (6) Connections on the back of the Controller.

J1 Rear Panel



Power > 3 Pin Terminal Block > 12 VDC to 15VDC Input up to 10 Amps.

Pin 1	Red	+ Volts DC (Positive)
Pin 2	Black	- Volts DC (Negative)
Pin 3	N/C	No Connection

Antenna > 9 Pin Terminal Block > connects the J1 Controller to the DataStorm Satellite Antenna usually mounted on the vehicle roof. This connector supplies Motor Power and Position Information.

Use supplied MotoSAT Antenna Control Cable and wire as shown to the DataStorm Satellite Antenna Circular Connector (9 or 14 Pin). Only use the supplied cable.

Pin 1	Black	AZ Motor - Output
Pin 2	Brown	AZ Motor + Output
Pin 3	Red	EI Motor + Output
Pin 4	Orange	EI Motor - Output
Pin 5	Yellow	Position Count Halt Input
Pin 6	Green	Ground
Pin 7	Blue	CAN + Communications
Pin 8	White	CAN - Communications
Pin 9	Purple	UCB Power (+12 to +15 Volts DC)

I/O RS232 > 3 Pin Terminal > RS232 Output Only! Outputs a continuous GPS data stream in NEMA format. Also outputs limited diagnostics.

Bits per second: 4800, Data Bits: 8, Parity: None, Stop Bits: 1, Flow Control: None

Use Cable 406-D9M-SER-T3P.

Example NEMA GPS Data Stream

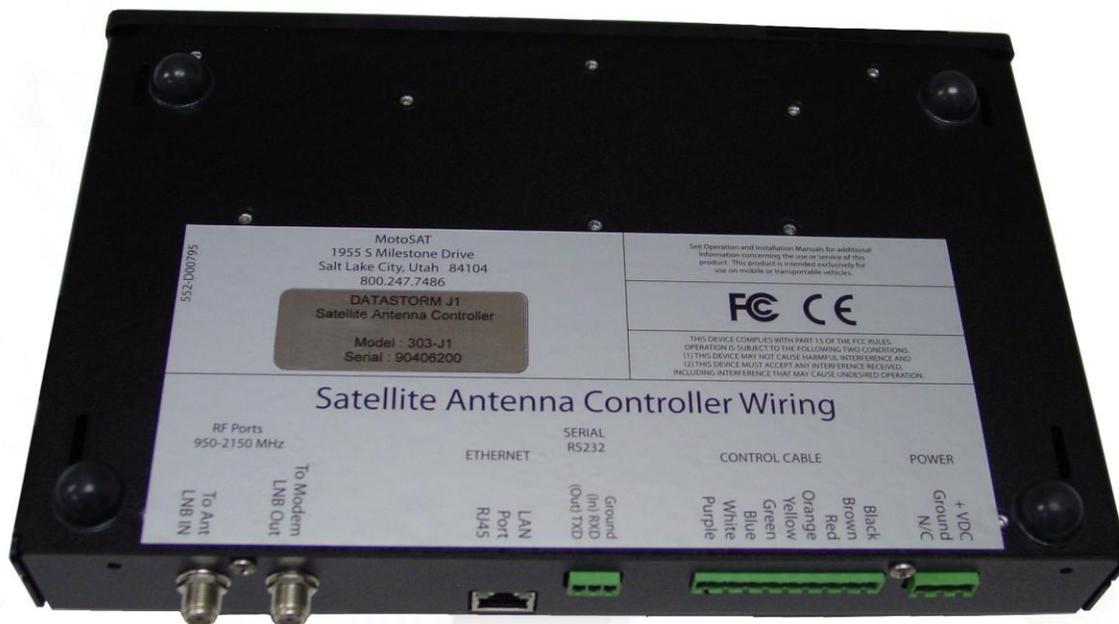
```
$GPGGA,152231,4043.0754,N,11157.0855,W,1,05,02.00,001289.1,M,-21.3,M,,*41
$GPGGA,152231,4043.0754,N,11157.0855,W,1,05,02.00,001289.1,M,-21.3,M,,*41
$GPGGA,152231,4043.0754,N,11157.0855,W,1,05,02.00,001289.1,M,-21.3,M,,*41
$GPGGA,152231,4043.0754,N,11157.0855,W,1,05,02.00,001289.1,M,-21.3,M,,*41
```

LAN > RJ45 > is the Network Interface to communicate to a Local Computer, Router, and Satellite Modem. This Port has configuration tools that make it extremely flexible for almost any user requirement. See J1 Configuration for additional information.

LNB RX Out > F Type > connects to the Satellite Modem/Router. When connected the J1 Controller can monitor the DC Voltage supplied to the LNB and allows the LNB located on the Satellite Antenna Mount to be shared by both the J1 Controller and the Satellite Modem at the same time with no external splitters or switches required.

LNB RX In > F Type > connects to the LNB located on the Satellite Antenna. This input receives L Band Signals 950-2050 MHz and supplies LNB DC Volts.

J1 Bottom View



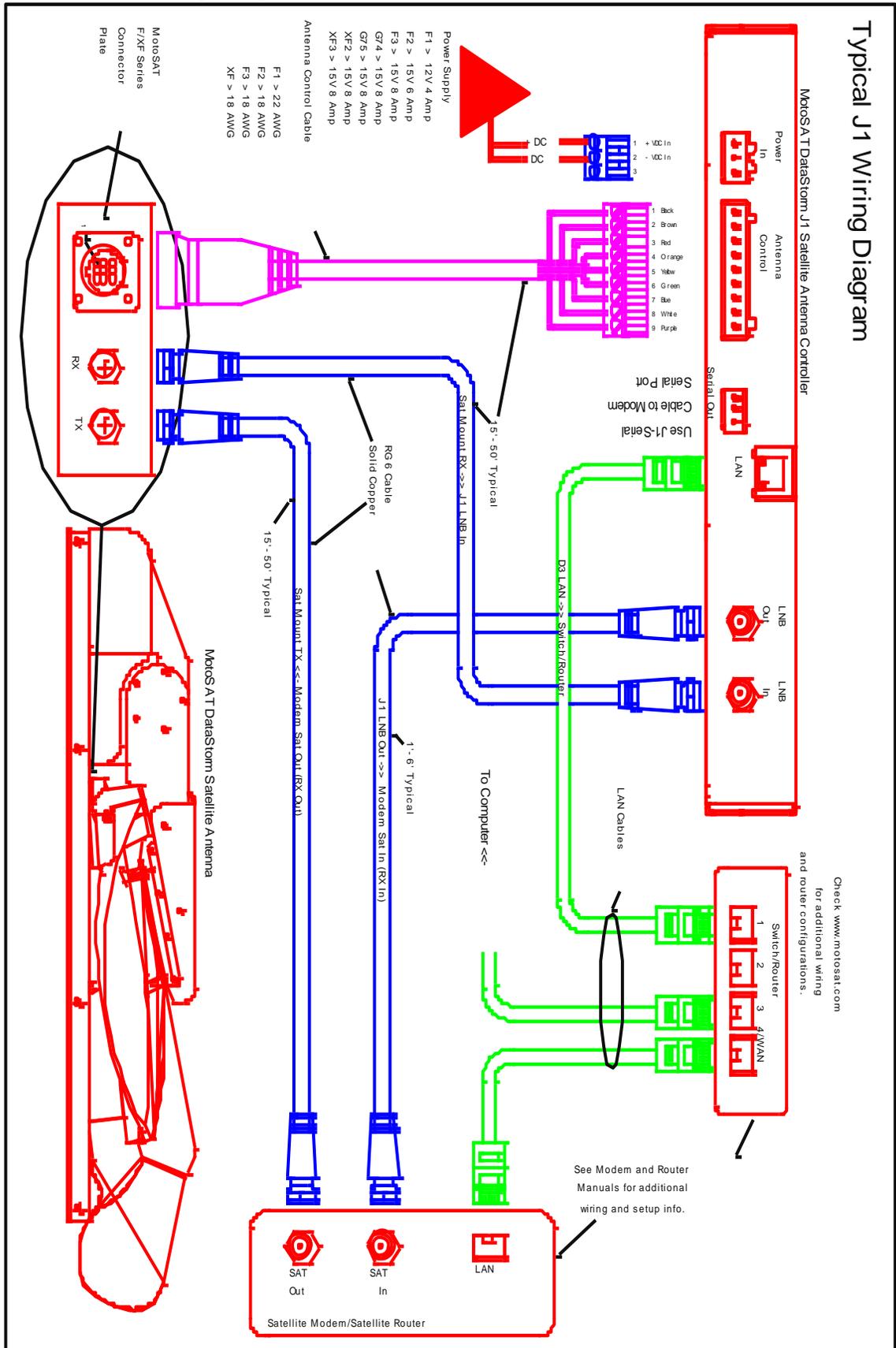
Located on the bottom side of the J1 Controller is the Product Label. This label should include the Product Model and Series number, Date of Manufacturer, FCC, CE, and UL certifications that apply, along with a simplified wiring connection detail.

On the following page is the *Typical J1 Wiring Diagram*. This is a generic wiring example of a MotoSAT DataStorm System.

For proper operation the Power Supply used with the J1 Controller must meet the power needs of the Dish Mount (see diagram below).

Always use the Control Cable supplied with the Dish Mount and follow wiring color codes.

Typical J1 Wiring Diagram



Specifications

Mechanical

Weight 2.0 Lbs (.9 Kg)
Dimensions 1.85 H X 11.0 W X 7.5 D Inches
47 H X 279 W X 190 D (millimeters)

Connectors

Power - 3 Pos, 5.08mm, Male Header Horizontal PCB (Green Euro Style)

Mates with;
On Shore Technology EDZ950/3
Terminal Block Plug Female 3 Pos 5.08mm

Control - 9 Pos, 5.08mm, Male Header Horizontal PCB (Green Euro Style)

Mates with;
On Shore Technology EDZ950/9
Terminal Block Plug Female 9 Pos 5.08mm

Serial - 3 Pos, 3.81mm, Male Header Horizontal PCB (Green Euro Style)

GPS Mates with;
On Shore Technology EDZ1550/3
Terminal Block Plug Female 3 Pos 3.81mm

LAN – RJ45 Ethernet Connection

Mates with;
Standard RJ45 Male Connector to Router
Crossover LAN when connected directly to PC

LNB In – F Connector, Female

Mates with;
F Connector, Male, Coax (to dish mount)

LNB Out – F Connector, Female

Mates with;
F Connector, Male, Coax (to modem)

SD Card – SD/MMC Card Slot (Front Panel)

Mates with;
Standard SD/MMC Memory Card (up to 4 GB)

Electrical

Power

Input	12VDC to 15VDC 4.8 to 8.6 Amps	(3 Pin Euro)
Motor	5 VDC to 15 VDC Az, El, Sk up to 8 Amps	(9 Pin Euro)
Dish Mount	12VDC to 15VDC 1 Amp Max.	(9 Pin Euro)
LNB	13VDC/18VDC 750 mA	

Power Consumption

Off	0 Amps	0 Watts	
Standby	.7 Amps	10 Watts	(On Satellite)
Dish Search	3 Amps	45 Watts	(Dish Moving)
Max Power	8.6 Amps	130 Watts	(Dish Stall) (Power Supply Rated)

Communications

CAN Bus	half duplex	(Dish Mount) (9 Pin Euro)
Serial Port	RS232 Output Only 4800 Baud 8N1, no flow Limited Diagnostic Port	(NEMA 0183) (3 Pin Euro)
LAN Port	10BaseT/100BaseT Auto negotiate (RJ45)	
DiSEqC	LNB Switching	(LNB RF In) (F Conn)
Halt/Count	Bi-directional	(Dish Mount) (9Pin Euro)
SD/MMC	SD/MMC Card Memory	(Front Panel)

RF Ports

LNB Input	950MHz to 2150MHz (L Band Input) 13VDC/18VDC/DiSEqC/22KHz (LNB Control)
LNB Output	950MHz to 2150MHz (L Band Pass Thru) (LNB DC Power Pass Thru)

Temperature

Operational	32F to 132F (0 C to 55 C)
Storage	-30F to 158F (-35 C to 70 C)

Diagnostics

Firmware Version 1.0.0

Controller Startup test

J1 Controller Status Indicators

Power up Test. This test will determine that the main power up sequence is operating properly.

No Modem Connected in Generic Mode.
Antenna in stowed position.

Use windows Desktop Clock as the timer.

Start Test

Turn on AC Power Switch on right side of controller.

- Switch will illuminate a Burnt Orange Color.

Wait for Windows clock to start at the 0 Second (12 O'clock position)

Start!

Seconds	Action
---------	--------

0	Press Power button on Left side of J1 Controller.
0	ON light illuminates.
0	LAN, GPS, Ready, Busy, and Stow lights illuminate
1	LAN, GPS, Ready, Busy, and Stow lights Off
2-5	LAN flashes Delay Time
13	LAN and Stow light illuminates
18	LNB light illuminates
55	GPS light On solid (Lock minimum time)
180	GPS light On solid (Lock maximum time)

- Busy LED may flicker occasionally
- If GPS Antenna does not have 360degree view of sky times may differ.
- Times from 12 to 180 seconds have a +/- 3 second tolerance.

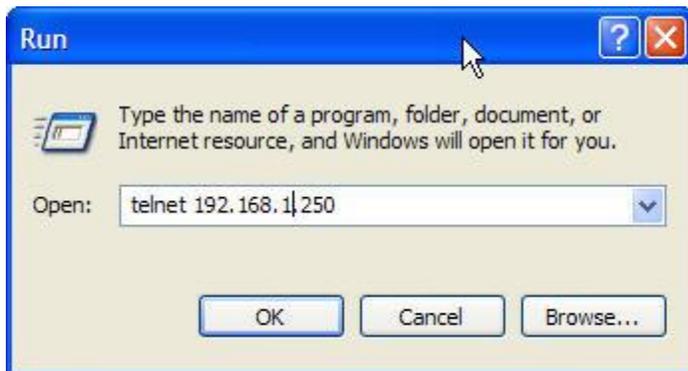
End Test.

Telnet Diagnostics

Telnet Communications

How to access Telnet Communications.

Click **Start, Run, and Local IP Address** of the J1 Controller.



A new DOS window will open with DATASTORM % prompt.

Type “help” after % symbol to see all of the available Telnet commands.

Telnet Screen

help

```
DATASTORM % help
Commands are:
13volts      18volts      ?            arp
bkgpeakrate  bpool        calcsat      calibrate
conf         date         demodish     devs
dg          echo         eeprom       exit
findsat     forcerange   getvalue     gps
gsn         hang         help         idirectgps
ifstat      igmp         kill         lanrequired
listmessages mem           mixrate      motion
moveaz      moveazang    moveel       moveelang
movesk      moveskang    netstat      ns
peakazel    peakisolation peakrate     ping
port        ps           reboot       restart
route       routes      sattable     scanfreqs
scansat     scansat2    searchfreq   sem
sensors     setdebounce setvalue     showconfig
showdebug   showmessages showmotors   showsr
sleep       snr          startpointing stopdish
stoppointing stowdish    switch       tcp
testdish    testhalt    testpeak     testpic
time        timerq      triggerfilter tunerregs
tunerreset  tunershowagc tunerstatus  uchupdate
udplisten
DATASTORM %
```

WARNING! Except for the Telnet Commands listed below making adjustments to any of the commands could cause the J1 Controller to not function properly.

It is recommended that you export your current Configuration and Sat Table files before making any changes to the commands listed above.

WARNING! Some adjustments to the commands listed above may cause damage to the antenna mount if not adjusted under the supervision of MotoSAT Technical Support. 1-800-247-7486

Proceed The following Telnet Commands are used for diagnostics.

Telnet Screen

gps

```
DATASTORM % gps 3
      version = 9
      # sats = 5
      max # sats = 5
      first sat time = 57 sec
      lock time = 83 sec
      temp = 42.8
1 of 3
      version = 9
      # sats = 5
      max # sats = 5
      first sat time = 57 sec
      lock time = 83 sec
      temp = 42.8
2 of 3
      version = 9
      # sats = 5
      max # sats = 5
      first sat time = 57 sec
      lock time = 83 sec
      temp = 42.8
3 of 3
DATASTORM % _
```

Telnet Screen

gsn

```
DATASTORM % gsn
checking: name = Horizons 1 127W U, freq = 11975, ifreq = 1225, timeou
t 0
SS ADC 587. Sharp 326. SNR 14.5
Entry 1, FEC 1
match!!
DATASTORM %
```

Telnet Screen

ping

```
DATASTORM % ping 192.168.0.1
56 octets from 192.168.0.1: icmp_seq 0
56 octets from 192.168.0.1: icmp_seq 1
56 octets from 192.168.0.1: icmp_seq 2
56 octets from 192.168.0.1: icmp_seq 3
56 octets from 192.168.0.1: icmp_seq 4
56 octets from 192.168.0.1: icmp_seq 5
56 octets from 192.168.0.1: icmp_seq 6
56 octets from 192.168.0.1: icmp_seq 7
56 octets from 192.168.0.1: icmp_seq 8
56 octets from 192.168.0.1: icmp_seq 9
received 10/10 packets (0 % loss)
DATASTORM % _
```

Telnet Screen

showmotors

```
DATASTORM % showmotors
DEFINED LIMITS
AZ: 7265 EL: 1620 SK: 1180
MEASURED LIMITS
AZ: 7264 EL: 1627 SK: 1184
ORIGIONS
AZ: 49 EL: 0 SK: 592
STOWS
AZ: 49 EL: 0 SK: 258
RESOLUTIONS
AZ: 19.91111 EL: 11.37778 SK: 5.734033
OFFSETS
AZ: 0 EL: 72.5 SK: 90
STATE OF MOTOR FLAGS
  RF Signal: LOW
  Over Current: LOW
  Motor Limit: LOW
  Motor Over Current Spike: LOW
  Motor Stall: LOW
  Motor Stopping: LOW
  Motor Aborted: LOW
UCBSTATE: 0000
FLAGS: 0000
MOTOR: 0
MaxCurrent: 7.1756e+16. Time Over Current 0.
Current Timeout: 0
  The dish is stowed: TRUE
  Motor Active: FALSE
  Count is Valid: TRUE
  AZ: Count: 50 Stow: 49 Tolerance 5 In Tolerance: TRUE
  EL: Count: 0 Stow: 0 Tolerance 3 In Tolerance: TRUE
  SK: Count: 258 Stow: 258 Tolerance 2 In Tolerance: TRUE
DATASTORM % _
```

Telnet Screen

sensors

DATASTORM % sensors

Mount Sensors:

[HARDWARE]

Tuner ID: 82

hardware version = 9

XF2 or XF3 mount.

LNB VReg C. 18 Volts. No 22 KHz. No Boost

[Sat Monitor]

The Sat Monitor is working properly.

Modem State 4.

[Lower Control Board Info]

Board Rev 2

ADC0 530

ADC + Gain 468

Volts In 15.80137

Modem Volts 0

LNB Volts 16.94473

LNB chip C

[NMEA Output Status]

The NMEA port is open but nothing has requested data.

Mount Limits EL: 1 1 1 AZ: 1 1 1

[GPS and COMPASS]

visible satelites = 6

longitude = -111.9642

latitude = 40.72921

altitude = 4237.861

velocity = 0

heading = 343.4

[A2D]

5 Volts = 5.000488

Voltage from LCB = 14.99556

UCB Voltage = 9.321289

Current = 0.1530044

AZ Current = 0

EL Current = 0.01967907

temp = 44.6

System Up Time = 741

[TILT]

skew = -0.3273733

elevation = -0.4812748

Skew Tilt Compensation = 0

Dish is stowed. Not monitoring tilt or rf

RF Low: 1024 RF High: 0

[SWITCHES]

heater = off

vs33 = on

1 of 1

DATASTORM %

Telnet Screen

testhalt

```
DATASTORM % testhalt
Halt line set to High.
Line HIGH.
Halt Line set to Low.
Line LOW.
Halt line set to High.
Line HIGH.
Halt Line set to Low.
Line LOW.
Halt line set to High.
Line HIGH.
Halt Line set to Low.
Line LOW.
```

Telnet Screen

switch

```
DATASTORM % switch
usage: switch [[AMP] [DUB] [LNB] [D5] [TUNERPWR] [TUNERRESET] [BOOST]
[UCB]] [[ON] [OFF]]
```

```
The current switches are:
AMP:      ON
DUB:      ON
LNB:      ON
D5 Latched: OFF
TUNERPWR: ON
TUNERRESET: OFF
UCB:      ON
DATASTORM % -
```

DataStorm J1 Message codes:

-1 Unknown error

Engineering and Development Message

Internal Message Only: This message should only display in when the MPU can not determine a specific message or issue. If this message appears during normal consumer operation.

- Capture Screen shot for Engineering Support
- Capture Config Files for Engineering Support
- Power cycle the controller and check connections at the mount and on the controller
- Perform Telnet **NVClear** Command and reload Config files.
- Perform Telnet **UCBupdate** command.
- Replace J1 Controller

Report this message and Captured data to Engineering.

-2 Invalid CAN command

Hardware Message

Issue: The J1 controller can not communicate with the UCB (Upper Control Board) or is receiving bad CAN data. Check the following hardware.

- Power cycle the J1 Controller. Leave off for 15 seconds minimum.
- Check wiring diagram to insure that the UCB and J1 Controller are properly wired.
- Perform Ohms test on Blue and White wire for 60 Ohms.
- Check the 9 Pin Green Cable Connector is seated properly to the J1 Controller and the both ends of the connector are pushed in evenly.
- Check the Green, Blue, White, and Purple wires on the 9 Pin Cable Connector is making secure electrical and mechanical contact.
- Check the 9 Pin or 14 Pin Circular connector to the Antenna Mount is seated properly and the Connector is locked in place.
- Measure purple wire for 12 to 15 VDC.
 - No Voltage, Replace J1 Controller
- Check UCB LED's, (located on Antenna Mount) for 1 second Heartbeat LED.
 - Nor Heartbeat, replace UCB
- Check UCB LED's, for CAN TX and RX LEDS flickering.
- Perform Telnet **UCBupdate** command.
- Perform Telnet **NVClear** Command and reload Config files
- Replace J1 Controller and UCB at same time.

-3 Bad parameter

Issue: Can bus error. (UCB to J1 communication error)

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Using the mounts wiring diagram perform an OHMS test and ensure the system is within tolerances.
5. Contact MotoSAT support for possible parts replacement.

-4 Not ready

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-5 Bad return value

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-6 Access denied

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-7 System error

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-8 Handshake error

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-9 Operation timeout

Issue: Can bus error. (UCB to J1 communication error)

Resolution:

12volt PS on 15 Volt System

1. Ensure the J1 power supply is supplying the correct voltage and amperage for the specific mount it is controlling.
2. Power cycle the controller and check connections at the mount and on the controller.
3. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
4. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
5. Using the mounts wiring diagram perform an OHMS test and ensure the system is within tolerances.
6. Contact MotoSAT support for possible parts replacement.

-10 "PC Serial timeout",

Not used obsolete.

-11 Mount A/D failure

Issue: UCU is not functioning properly

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
3. Contact MotoSAT support for possible replacement.

-12 Invalid pointer

Issue: N/A = This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.

3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-13 Compass failure

Future use only

.

-14 Mount SPI failure

Obsolete not used

-15 Mount not present

Issue: Control cable shorted or disconnected Upper control board shorted or disconnect. Internal wire harness shorted or disconnected.

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Check and reseat connections at the UCU..
3. Using the mounts wiring diagram perform an OHMS test and ensure the system is within tolerances.
4. Contact MotoSAT support for possible parts replacement.

-16 Tilt sensor failure

Issue:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-17 GPS failure

Issue: GPS chip is not sending data.

Temporary solution: Enable Manual location settings in configuration.

Resolutions:

1. Contact MotoSAT support for possible replacement.

-18 Shorted GPS Antenna

F1 mount Trimble Antenna

Issue: GPS antenna is not sending data to the GPS chipset.

Temporary solution: Enable Manual location settings in configuration.

Resolutions:

1. Contact MotoSAT support for possible replacement.

-19 Open GPS Antenna

F1 mount only BRICK UCB

Issue: GPS antenna is not sending data to the GPS chipset

Temporary solution: Enable Manual location settings in configuration.

Resolutions:

1. Contact MotoSAT support for possible replacement.

-20 No GPS battery

F1 Only BRICK UCB

Temporary solution: Enable Manual location settings in configuration.

Resolutions:

1. Contact MotoSAT support for possible replacement.

-21 Isolation test error

Hughes Only

Issue: there was a communications error with the Direcway modem during the isolation test.

Resolutions:

1. Power cycle the controller modems and router and check network connections.
2. Contact the Direcway bandwidth provider for possible modem or radio assembly replacement.
3. Contact 3rd party networking hardware provider for possible networking hardware replacement.
4. Contact MotoSAT support for possible parts replacement.

-22 No serial connection

Obsolete

-23 Dish not tested

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

Perform test dish

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-24 Bad version

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-25 Modem not responding

Issue: Usually only seen in iDirect mode when username or password is incorrect or the iDirect modem is not responding or not commissioned.

If in iDirect modem with iDirect modem attached:

Resolution:

Or no LNB power from Modem to controller

Telnet sensors command to read modem voltage

1. Check network Cabling and network configurations on the J1 to ensure they match with the iDirect option files information.
2. Using the DATASTORM% telnet prompt use the setvalue commands to re set the modem username and password.

Or import name using Config file

4. Contact 3rd party networking and or modem hardware provider for possible networking hardware replacement.

If not in iDirect mode:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-26 Serial TX locked

Obsolete not used

-27 CAN TX locked

Obsolete not used

-28 Positioner Serial timeout

Obsolete not used

-29 Positioner CAN timeout

Issue: Can bus error. (UCB to J1 communication error)

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Using the mounts wiring diagram perform an OHMS test and ensure the system is within tolerances.
5. Contact MotoSAT support for possible parts replacement.

-30 Mount CAN timeout

Issue: Can bus error. (UCB to J1 communication error)

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Using the mounts wiring diagram perform an OHMS test and ensure the system is within tolerances.
5. Contact MotoSAT support for possible parts replacement.

-31 Isolation test not available

Hughes Modems only

Issue: there was a communications error with the Direcway modem during the isolation test.

Resolutions:

1. Check all coaxial connections and F connectors.
2. Power cycle the controller modems and router and check network connections.
3. Contact the Direcway bandwidth provider for possible modem or radio assembly replacement.
4. Contact 3rd party networking hardware provider for possible networking hardware replacement.
5. Contact MotoSAT support for possible parts replacement.

-32 Can't load ACP API

Hughes only communications issue with Hughes modem or HNS cross pol server.

Retest later.

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-33 "Bad license key",

Obsolete not used

-34 Motor overcurrent Azimuth

Issue: The Azimuth motor is drawing too much current. This can also happen if a counter is not working properly and the mount hits a limit when the software thinks it should not.

Motor has seen excessive currents. Man move motor 90 degrees both ways. Test counts. See that motor moves. Nothing blocking dish.... Hit limit when no counts.

Resolutions:

1. Check the controller's power supply and ensure it is supplying the correct voltage and amperage for the mount it is controlling

2. On a J1 Isolate the Motor that is causing the error by running a Test Dish and making note of the direction the dish is moving when the error occurs.
3. On a J1 ensure the controller has firmware version 3.9.0 or higher, perform a test dish from the DATASTORM% prompt to determine the motor that is causing the error.
4. Attempt to move that Motor using manual software motor controls.
5. If the Unit still will not move attempt to move that motor by directly applying power (9-18v) to the proper wires on the control cable.
6. Continue to troubleshoot below depending on the motor with the issue.
Azimuth and Skew Motors: It is possible to determine if the issue is on the UCU by swapping the location the motor is plugged into the UCU as the connectors are the same size and has the same wiring configuration. If the motor causing the error will work while plugged into its counter parts connection on the UCU then the issue is with the UCU (replace UCU). If it will not, the issue is with the Motor itself or its count sensor (replace motor).
Elevation Motor: 90% of these will be elevation motor failure 10% could be the UCU. Replace and test in that order.
7. Contact MotoSAT support for possible parts replacement.

-35 Motor count Azimuth

Issue: The azimuth counter is not counting.

Test man motor movement. Bad sensor, bad UCB, bad scotch lock, broken or shorted wire

Resolutions:

1. On a J1 ensure the controller has firmware version 3.9.0 or higher, perform a test dish from the DATASTORM% prompt to determine the motor that is causing the error.
2. Attempt to move that Motor using manual software motor controls.
3. If the Unit still will not move attempt to move that motor by directly applying power (9-18v) to the proper wires on the control cable.
4. Contact MotoSAT support for possible parts replacement.

-36 Bad motor count

Displays in Test Dish Only. Manually man move dish to confirm bad sensor.

Issue: After a dish calibration a count is out of tolerance.

Resolutions:

1. Check the controller's power supply and ensure it is supplying the correct voltage and amperage for the mount it is controlling.
2. On a J1 Isolate the Motor that is causing the error by running a Test Dish and making note of the direction the dish is moving when the error occurs.
3. On a J1 ensure the controller has firmware version 3.9.0 or higher, perform a test dish from the DATASTORM% prompt to determine the motor that is causing the error.
4. Attempt to move that Motor using manual software motor controls.
5. If the Unit still will not move attempt to move that motor by directly applying power (9-18v) to the proper wires on the control cable.
6. Continue to troubleshoot below depending on the motor with the issue.
Azimuth and Skew Motors: It is possible to determine if the issue is on the UCU by swapping the location the motor is plugged into the UCU as the connectors are the same size and has the same wiring configuration. If the motor causing the error will work while plugged into its counter parts connection on the UCU then the issue is with the UCU (replace UCU). If it will not, the issue is with the Motor itself or its count sensor (replace motor).

Elevation Motor: 90% of these will be elevation motor failure 10% could be the UCU. Replace and test in that order.

7. Contact MotoSAT support for possible parts replacement.

-37 Satellite not found

Check sat table, scansat, find other satellite, tree, building, skew motor not wired right G75 tri assembly is in other polarity

Issue: Satellite acquisition failed.

Resolutions:

1. Check all coaxial connections and F connectors.
2. Power cycle the controller modems and router and check network connections.
3. Perform a dish calibration.
4. Send the unit to search again.
5. Contact MotoSAT support for possible parts replacement.

-38 Gateway not found

Issue: The gateway specified in the network configuration is not able to be pinged from the controller.

Resolutions:

1. Power cycle the router, switches, and or modems.
2. Check network cabling and network configurations on the J1 to ensure they match the current routers or switches configuration.
3. Power cycle the Controller.
4. Contact 3rd party networking hardware provider for possible networking hardware replacement.
5. Contact MotoSAT support for possible parts replacement.

-39 Can't start isolation test

Hughes only, test later.. no Hughes server. Wait and retest

Issue: there was a communications error with the Direcway modem during the isolation test.

Resolutions:

1. Check all coaxial connections and F connectors.
2. Power cycle the controller modems and router and check network connections.
3. Contact the Direcway bandwidth provider for possible modem or radio assembly replacement.
4. Contact 3rd party networking hardware provider for possible networking hardware replacement.
5. Contact MotoSAT support for possible parts replacement.

-40 Isolation test failed

Hughes only, test later... Wait and retest try other satellite.

Issue: The Direcway modem failed the isolation test.

Resolutions:

1. Check all coaxial connections and F connectors.
2. Power cycle the controller modems and router and check network connections.
3. Change isolation optimization in the controllers' configuration to High or Medium as necessary.
4. Contact the Direcway bandwidth provider for possible modem or radio assembly replacement.
5. Contact 3rd party networking hardware provider for possible networking hardware replacement.
6. Contact MotoSAT support for possible parts replacement.

-41 Operation cancelled

User Message

Issue: No error. This message displays when the User hits the **Stop** command on the HTML Status Screen.

- Refresh HTML Screen
- Recycle Power to clear screen.
- Contact Technical Support.

-42 Out of memory

Engineering and Development Message

Internal Message Only: This message should only display in debug mode when compiling newer versions of software. If this message appears during normal consumer operation.

- Power cycle the controller and check connections at the mount and on the controller
- Perform Telnet **NVClear** Command and reload Config files.
- Perform Telnet **UCBupdate** command.
- Replace J1 Controller

-43 Not supported

Engineering and Development Message

Internal Message Only: This message should only display in debug mode when compiling newer versions of software. If this message appears during normal consumer operation.

- Power cycle the controller and check connections at the mount and on the controller
- Perform Telnet **NVClear** Command and reload Config files.
- Perform Telnet **UCBupdate** command.
- Replace J1 Controller

-44 Dish not stowed

Obsolete Message

Issue: This message should only display in earlier versions of J1 Software.

- Upgrade to latest version of Software.
- Perform Telnet **NVClear** Command and reload Config files.
- Perform Telnet **UCBupdate** command.

- Replace J1 Controller

-45 Modem LNB Volts not detected

Hardware Message

Issue: The J1 controller does not detect any LNB Voltage from the Modem. The Modem *RX In* or *LNB In* port should be connected to the J1 Controller *RX Out to Modem* Port.

- Check wiring diagram to insure that Modem and J1 Controller are properly wired.
- Test Modem LNB Voltage for DC Volts. Typically 13 to 24 Volts.
- Replace J1 Controller

-46 Controller RF Cables reversed

Hardware Message

Issue: The J1 controller detects the Modem LNB Voltage coming into the Controller *From Mount RX In* port. The Modem *RX In* or *LNB In* port should be connected to the J1 Controller *RX Out to Modem* Port.

- Check wiring diagram to insure that Modem and J1 Controller are properly wired.
- *From Mount RX In* cable must go to the RX port on the Antenna Mount.
- *RX Out to Modem* must be connected to the Modem *RX In* port.
- Recycle power to the J1 Controller.
- Replace J1 Controller

-47 DVB not detected

J1 Controller Only

Hardware Message

Issue: The J1 controller can not communicate with the internal DVB Tuner.

- Replace J1 Controller

-48 DiRECWAY modems not found

Or no LNB power from Modem to controller
Telnets sensors command to read modem voltage

Issue: In Hughes Net or Direcway mode but cant talk to the modem.

Resolutions:

1. Power cycle the controller.
2. Check network Cabling and network configurations on the J1 to ensure they match with the modems commissioning information.
3. Contact the DiRECWAY bandwidth provider for possible modem replacement.

4. Contact 3rd party networking hardware provider for possible networking hardware replacement. If not in iDirect mode:
5. Power cycle the controller and check connections at the mount and on the controller.
6. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
7. Contact MotoSAT support for possible parts replacement.

-49 Satellite not supported

Sat Table or Config issue

Issue: Wrong satellite longitude entered or the Satellite entered does not exist in the DVB table.
Resolutions:

1. Ensure the controllers configurations match that of the connected modem.
2. Contact MotoSAT support to ensure the satellite requested is in the DVB table.

-50 Motor limit

Issue: This is a standard system message when a motor reaches its limit while using manual motor controls. No error.

-51 Tuner AGC did not lock

Issue: DVB Tuner failure

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Contact MotoSAT support for possible parts replacement.

Replace controller

-52 AZ Motor Limit

Test dish, check man counts. Stow replaces controller.

Issue: The azimuth motor reached its limit prematurely.

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform stow dish operation.
3. Ensure the controller has firmware version 3.9.0 or higher and perform a test dish from the DATASTORM% prompt.
4. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller higher and perform a test dish from the DATASTORM% prompt.
5. Contact MotoSAT support for possible parts replacement.

-53 EI Motor Limit

Test dish, check man counts. Stow replaces controller.

Issue: The elevation motor reached its limit prematurely.

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform stow dish operation.
3. Ensure the controller has firmware version 3.9.0 or higher and perform a test dish from the DATASTORM% prompt.
4. Perform nvclear command from the J1boot% prompt in a telnet session, power cycle the unit and reconfigure the controller higher and perform a test dish from the DATASTORM% prompt..
5. Contact MotoSAT support for possible parts replacement.

-54 SK Motor Limit

Test dish, check man counts. Stow replaces controller.

Issue: The skew motor reached its limit prematurely.

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform stow dish operation.
3. Ensure the controller has firmware version 3.9.0 or higher and perform a test dish from the DATASTORM% prompt.
4. Perform nvclear command from the J1boot% prompt in a telnet session, power cycle the unit and reconfigure the controller higher and perform a test dish from the DATASTORM% prompt..
5. Contact MotoSAT support for possible parts replacement.

-55 Azimuth is not at the limit

XF Mount.. read sensors, test mount, replace controller

Issue: Azimuth limits sensor failure.

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform stow dish operation.
3. Ensure the controller has firmware version 3.9.0 or higher and perform a test dish from the DATASTORM% prompt.
4. Perform nvclear command from the J1boot% prompt in a telnet session, power cycle the unit and reconfigure the controller higher and perform a test dish from the DATASTORM% prompt..
5. Contact MotoSAT support for possible parts replacement.

-56 Elevation is not at the limit

XF Mount.. read sensors, test mount, replace controller

Issue: Elevation limits sensor failure.

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform stow dish operation.
3. Ensure the controller has firmware version 3.9.0 or higher and perform a test dish from the DATASTORM% prompt.
4. Perform nvclear command from the J1boot% prompt in a telnet session, power cycle the unit and reconfigure the controller higher and perform a test dish from the DATASTORM% prompt..
5. Contact MotoSAT support for possible parts replacement.

-57 SNR Not Available

Check sat table, Config, try other satellite, LNB cables, or controller

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-58 "Bad motor parameter",

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-59 Can communication problem

Issue: Can bus error. (UCB to J1 communication error)

Resolution:

1. Ensure the J1 power supply is supplying the correct voltage and amperage for the specific mount it is controlling.
2. Power cycle the controller and check connections at the mount and on the controller.
3. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
4. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
5. Using the mounts wiring diagram perform an OHMS test and ensure the system is within tolerances.
6. Contact MotoSAT support for possible parts replacement.

-60 Bad parameter LED

Replace Controller

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-61 Communications problems with Hughes

Obsolete... call MotoSAT if displayed.

-62 Bad parameter Exchange 1

Replace Controller

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-63 Bad parameter Exchange 2

Replace Controller

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-64 Bad parameter Bad Key

Replace Controller

Issue: This message should only be displayed in debug mode for use when compiling newer versions of software if this message appears during normal use:

Resolutions:

1. Power cycle the controller and check connections at the mount and on the controller.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Perform ucupdate command from the DATASTORM% prompt in a telnet session.
4. Contact MotoSAT support for possible parts replacement.

-65 Motor stalled elevation

Motor Count issue

Issue: elevation counter is not working properly

Resolutions:

1. Ensure the controller has firmware version 3.9.0 or higher and perform a test dish from the DATASTORM% prompt.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Contact MotoSAT support for possible parts replacement.

-66 Motor stalled skew

Motor count issue

Issue: skew counter is not working properly

1. Ensure the controller has firmware version 3.9.0 or higher and perform a test dish from the DATASTORM% prompt.
2. Perform nvclear command from the J1boot% prompt in a telnet session power cycle the unit and reconfigure the controller.
3. Contact MotoSAT support for possible parts replacement.

-67 Azimuth Motor Speed Failed

**Motor Speed testing in test dish, set mot speed and mot current retest
Mount, motors, controller**

--68 Elevation Motor Speed Failed

**Motor Speed testing in test dish, set mot speed and mot current retest
Mount, motors, controller**

-69 Halt Line Failure

-70 Motor Overcurrent Elevation

**Set motor currents in telnet or Config
Replace bad motor or mount, or controller**

-71 Motor Overcurrent Skew

**Set motor currents in telnet or Config
Replace bad motor or mount, or controller**

-72 Rotary Sensor Wait

XF mount only

The XF2 and XF3 Mounts use Quadrature Count Sensors for both Azimuth and Elevation positioning. These sensors operate properly when the outside temperature is above 32 degrees F. In extreme cold environments these sensors must warm up before the mount will begin to move.

These sensors have built in heating circuits that are monitored by the UCB (Upper Control Board). Typically under extreme cold conditions it may take more than 1 minute for these sensors to reach 32F. During this time a **-72 Rotary Sensor Wait message** will display.

Issue:

The **-72 Rotary Sensor Wait** message is displayed. Dish will not move with this display present.

Resolutions:

- If outside temperature is below 32F (0C) then wait for several minutes for display to clear.
- Replace Azimuth or Elevation Count Sensor.
- Replace UCB (Upper Control Board).

-73 Semaphore Locked

Replace Controller

-74 Locked Semaphore Released.