DataStorm D3 User Guide

v.1

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Read Me

10/07/2005: Note that the DataStorm Administrator will NOT WORK with the current release of DataStorm D3 code [v3.7.8]

10/07/2005: Please refer to the D3 Changelog notes for more information on current known issues.

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Welcome to the DataStorm D3 Controller

The DataStorm D Series is once again refining mobile automatic pointing while setting the standard in configuration control and reliability. The DataStorm D3 controller is the 3rd generation of D series controller that adds to the legacy of pinpoint accurate automatic find-and-peak system control. A new standard DVB [Digital Video Broadcast] tuner makes possible the means to find any satellite, anywhere on planet earth. A new method of searching for the satellite called Sweep-and-Search not only drastically reduces the time-to-online, it truly utilizes the full potential of the DataStorm's capabilities. The DataStorm D3 is also 33% less deep enabling it to be placed into space critical situations while preserving functionality by placing the power switch on the front panel. The D3 will also be the first D series controller to run the new DataStorm XF series mount system. The new XF series utilizes a ground-up redesign on motor, gears, counting, and robustness. Come discover how MotoSAT is changing the way you’ll communicate.

Welcome to the new MotoSAT.

DataStorm D3 Specifications

Everything you need to know about the size, functionality, design, and system requirements of the DataStorm D3.

SYSTEM REQUIREMENTS
| Web Browser [i.e., Internet Explorer, Netscape, Firefox, Apple Safari, etc.] |
| Computer with a networking port [Ethernet, Wireless card, etc.]

DIMENSIONS OF D3
| Length: 7 Inches |
| Width: 11 inches |
| Height: 2 Inches |
| Weight: 2.5 lbs |

CABLING
| DVB Tuner [receive RG6 cable in from dish, modem RG6 out to modem] |
| RJ-45 Ethernet Port |
| Electrical Data Interface Cable [Control Cable]: 9 conductor 18AWG 30' |
| DataStorm F Series Mount Power: |
| F1: 12v 4amp |
| F2, F3: 15v 6.6amp |
| DataStorm XF Series Mount Power: 15v 8amp |

ENVIRONMENT
| Temperature: Operational from 32°F to 95°F |

INTERFACE
| Manual: Three-button, Power, Search, Stow |
| Virtual: Web interface commands; telnet commands also available |

SOFTWARE
| D3 Software: Embedded firmware |
| Maintenance: Via web interface upload |

MODEM COMPATIBILITY
| Direct Interface: DIRECWAY, iDiRECT |
| Non-Direct [Using true DVB]: Any Satellite modem |

RX In from Satellite |
RX Out to Modem |
Power Supply Cable |
Control Cable |
Ethernet Port |
Search |
Power |
Stow |
DataStorm D3 Hardware Definitions

These definitions are basic descriptions of the DataStorm D3’s hardware interfaces and functions.

| DataStorm D3 Front Panel Definitions |

| Power On/Off Button |
This button turns the D3 on and off. Also if the unit is powered on and somehow loses power, the D3 will remember the power state and when powered is restored, the D3 will automatically boot back up. In the future, this button will also provide the intelligent functionality to be able to know when it should or shouldn’t turn off. For example, if the dish is in transition of searching for the satellite and the power button gets bumped, the D3 will recognize this and not sever power. Look for this and other intuitive functions from MotoSAT in the future.

| Search |
This button is one way to tell the DataStorm dish to find satellite. When pushed the DataStorm will check it’s settings for the satellite it’s assigned to then raise and proceed.

Note: If an NVCLEAR has been performed or the searching routine is the first for the D3, the dish must perform a stow [the dish will raise elevation, skew both directions, then stow back down] before it will perform an actual search.

| Stow |
This button tells the DataStorm to return to travel position [stow] from wherever it’s currently located [excepted if it’s already stowed and the stow light is solid].

Note: The D3’s stow light is the best indicator of whether or not the D3 is actually stowed.

Note: Normal operation for finding the satellite will be indicated by the LNB, LAN, GPS, and Stow lights to all be lit and solid. Refer to the DataStorm D3 Light Definitions for more information on light functioning.
DataStorm D3 Hardware Definitions Cont.

These definitions are basic descriptions of the DataStorm D3’s hardware interfaces and functions.

| DataStorm D3 Back Panel Definitions |

- **Power Supply Cable**
  The power source for DataStorm systems. Only use approved MotoSAT power supplies.
  - DataStorm F Series
    | DataStorm F1 Mount = 12v 4amp power supply
    | DataStorm F2 Mount = 15v 6.6amp power supply
    | DataStorm F3 Mount = 15v 6.6amp power supply
  - DataStorm XF Series
    | DataStorm XF Mount = 15v 8amp power supply

- **Control Cable**
  The communication lifeline mount and the D3 controller. This 9-wire colored coded pinout controls such things as GPS communication, power to the dish, and more.

- **Ethernet Port**
  The communication center of the D3. This standard network connection enables the D3 to be placed in a computer network. Wired or wireless devices can access and control the D3 through this port.

- **RX Out to Modem**
  Enables the D3 to control the signal strength via its DVB. It then can relinquish control to the modem when the correct satellite is found via this coaxial port.

- **RX In from Satellite**
  Where the coaxial connection comes from the dish into the D3. This port is part of the DVB tuner that the D3 uses to find satellites. It will then relinquish control to the modem when the correct satellite is found.
DataStorm D2 Light Definitions

The following are light definitions of the D3’s front panel lights. These are general operational definitions.

| DataStorm D3 Light Definitions |

- **LNB**: The LNB light is only active when attached to a modem. The system will not let you 'Search' [find satellite] without the LNB active. [Solid]

- **LAN**: The LAN light is active when a LAN connection is detected. [Solid]

- **GPS**: The GPS light is active when a GPS signal is received from the dish. [This light becomes active usually within 1-3 min. after turning on the D3] [Solid]

- **READY**: The READY light is active during:
  - A search routine [blinking]
  - When the system has cross-poled and is online [Solid]

- **BUSY**: The BUSY light is technically the light that denotes any kind of activity or communications with the D2. Its functions are listed below:
  - During a Upper Control Board update [Blinking]
  - During a Search routine [Blinking]
  - During a Stow routine [Blinking]
  - This light should NEVER be solid
  - No changes can be made to the D3 when this is blinking.

- **STOW**: The STOW light is active during:
  - A stow routine [blinking]
  - When the system has completely stowed [Solid]

- **ETHERNET**: The Ethernet lights show power and connectivity.
  - Green shows power
  - Yellow will blink and show communication
DataStorm D3 Software Interface

The DataStorm D3’s software interface is the heart of the D3 system. All configurations, in-depth sensor information, network addressing and auxiliary movement operation, etc. can be found in the DataStorm D3 software interface. The DataStorm D3 software is broken up into two categories:

<table>
<thead>
<tr>
<th>Standard Functions</th>
<th>Advanced Functions</th>
</tr>
</thead>
</table>

### Standard Functions

- **System Status**: Links to the system status page
- **Configuration**: Links to the D3’s configuration page
- **Product Registration**: Links to DataStorm product registration online
- **About**: Shows information about the D3
- **Modern Status**: Shows the interface for the modem [if available] based on your configuration’s modem gateway

### Advanced Functions

- **Manual Motor Control**: Links to controls for moving the dish manually
- **Calibrate Tilt Sensors**: Step-by-Step process for tilt calibration [only on legacy-style upper control boards]
- **Calibrate Dish**: Step-by-Step process for dish calibration
- **Upgrade Firmware**: Launches an update tool to upgrade your D3’s software

DataStorm D3 System Status Page

The DataStorm D3 system status page is the default information display center. Here the options to find satellite and stow the dish are located. System Status messages are also displayed here. Below are general explanations of the information displayed on this page.
DataStorm D3 System Status Page Cont.

The system status page will be broken up into 3 sections: main, sensors, and satellite.

| DataStorm D3 System Status Page: Main |

1-6 Light Status Buttons
These buttons coincide with the lights on the D3 front panel.

2-Signal Quality Bar
Signal quality is attained via the modem. This bar displays that quality value.

3-Signal Strength
Signal strength is a function of the D3. This bar displays that strength value.

4-TX Status
TX status of the transmitter operation on the dish. Normal operation indicates the transmitter is unavailable until satellite is found.

5-RX Status
RX status of the modem. Normal operation indicates the receiver is not locked until satellite is found.

6-System Status
System status displays the current status of the D3. Any state the D3 is in will be displayed here as well as error messages.

7-Search Button
The search button is used to raise the dish and find satellite during satellite based commissioning or connecting to the Internet.

8-Stow Button
The Stow button is used for returning the dish to the travel position when it is in a position other than stowed.

9-Stop Button
This button stops all current running motor functions of the dish.
| Standard Functions |

DataStorm D3 System Status Page Cont.

| DataStorm D3 System Status Page: 📊 |

| 1-Dish Elevation |
| Displays the actual dish elevation [up/down] in degrees. |

| 2-Dish Azimuth |
| Displays the actual dish azimuth [left/right rotation] in degrees. |

| 3-Dish Skew |
| Displays the actual dish skew [dish face rotation] in degrees. |

| 4-GPS Longitude |
| Displays the GPS longitude from the GPS antenna on the dish. If this value is shown and the GPS status light on the D3 is not lit, The D3 is using the last known GPS value. |

| 5-GPS Latitude |
| Displays the GPS latitude from the GPS antenna on the dish. If this value is shown and the GPS status light on the D3 is not lit, The D3 is using the last known GPS value. |

| 6-Elevation Tilt |
| The actual tilt of the DataStorm mount up and down. |

| 7-Skew Tilt |
| The actual tilt of the DataStorm mount from side to side. |

| 8-Motor Current [in AMPs] |
| Indicates the motor draw in amps when a motor is in use. |

| SENSORS |
| 1-Dish Elevation | 108.0416° |
| 2-Dish Azimuth | 63.00784° |
| 3-Dish Skew | -23.86091° |
| 4-GPS Longitude | 111.4957W |
| 5-GPS Latitude | 40.74482N |
| 6-Elevation Tilt | 0.7238604° |
| 7-Skew Tilt | -0.6525306° |
| 8-Motor Current | 0 A |
**DataStorm D3 System Status Page Cont.**

**Standard Functions**

| DataStorm D3 System Status Page: **Satellite** |

<table>
<thead>
<tr>
<th>1-Target Elevation</th>
<th>Displays the predicted dish elevation in degrees of the chosen satellite based on GPS and compass.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Target Skew</td>
<td>Displays the predicted dish skew in degrees of the chosen satellite based on GPS and compass.</td>
</tr>
<tr>
<td>3-Satellite Longitude</td>
<td>Displays the orbital slot of the satellite to be found.</td>
</tr>
<tr>
<td>4-Sat Elevation</td>
<td>Displays the actual elevation of the Satellite you are pointing to based on your current Latitude and Longitude received via GPS.</td>
</tr>
<tr>
<td>5-Sat True Azimuth</td>
<td>Displays the actual true azimuth of the Satellite you are pointing to based on your current Latitude and Longitude received via GPS.</td>
</tr>
<tr>
<td>6-Sat Magnetic Azimuth</td>
<td>Displays the actual magnetic azimuth of the Satellite you are pointing to based on your current Latitude and Longitude received via GPS.</td>
</tr>
<tr>
<td>7-Sat Polarization</td>
<td>Displays the actual polarization [skew] of the Satellite you are pointing to based on your current Latitude and Longitude received via GPS.</td>
</tr>
</tbody>
</table>
DataStorm D3 Configuration Page

The DataStorm D3’s configuration page is where changes can be made for finding the satellite, setting up the D3 on a network, and setting other configurations. Below are general explanations of the information displayed on this page.

Standard Functions

DataStorm D3 Configuration Pages Cont.

The D3’s configuration page will be broken up into: Main 1, Main 2, Main 3

DataStorm D3 Configuration Page: Main 3
DataStorm D3 Configuration Pages Cont.

DataStorm D3 Configuration Page: Main1

1-Local Address
The IP address of the D3.
[Default is: 192.168.0.250]

2-Subnet Mask
The subnet mask of the D3.

3-Modem Gateway
The IP address of the Modem.

4-Router Gateway
LAN IP address of the router. If the D3 is placed behind a router in the network.

5-DNS Address
The IP address of the modem.

6-Satellite System
Choose which satellite platform you are using; i.e. Generic, DiRECWAY, iDirect, etc.

7-Satellite Longitude
This value indicates the satellite you are searching for in degrees.

8-Frequency
The assigned transponder frequency on your assigned satellite.

9-RX Polarization
Based on your assigned transponder it can be vertical or horizontal.

10-TX Polarization
Based on your assigned transponder it can be vertical or horizontal.

11-Symbol Rate
Usually can be left at default but refer to your satellite platforms documentation.

12-LO Frequency
Spec from the mount’s LNB; default is 10750 and should be changed by calling tech support.

13-Signal Amplifier
Default is enabled. Should only be changed by calling tech support.

Update Settings
To have the D3 accept any changes you must click the ‘Update Settings’ button to store the new configuration.
### Standard Functions

#### DataStorm D3 Configuration Pages Cont.

| 14 - Signal Quality Threshold | Sets the minimum signal quality needed to peak on a satellite. |
| 15 - Signal Strength Threshold | Sets the minimum signal strength needed to peak on a satellite. Set Signal Strength Threshold to a value as low as possible that does not constantly start and stop azimuth movement. To set this value, run a test dish and take note of the lowest signal strength reading seen and set your threshold for 30 points above that reading. This value is 440 - 480 Typical. |
| 16 - Isolation Optimization | Has 3 settings: |
| | - Partial [default] Indicates that the D3 will perform a cross-pol |
| | - Full Indicates that the D3 will not only perform a cross-pol but ensure it’s optimization. |
| | - None [test purposes only] Indicates the D3 will not perform a cross-pol and just connect. |
| 17 - Azimuth Search Window | Width in degrees of the actual search pattern window the DataStorm will search in for the satellite. [left and right on a horizontal plane] |
| 18 - Elevation Search Window | Height in degrees of the actual search pattern window the DataStorm will search in for the satellite. [up and down on a horizontal plane] |
| 19 - Motion Stow | If signal quality is lost for 30 seconds or more, the dish will automatically stow if enabled. |
| 20 - Manual Location [GPS] | If enabled the manual GPS coordinates can be placed here overriding the automatic functioning of the DataStorm GPS module. |
| 21 - Latitude | |
| 22 - Longitude | |
| 23 - Azimuth Origin | |
| 24 - Elevation Origin | |
| 25 - Show Origin | |
| 26 - Minimum Search Angle | |

To have the D3 accept any changes you must click the ‘Update Settings’ button to store the new configuration.
Standard Functions

DataStorm D3 Configuration Pages Cont.

| DataStorm D3 Configuration Page: Main 2 |

<table>
<thead>
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<table>
<thead>
<tr>
<th>14</th>
<th>Signal Quality Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Signal Strength Threshold</td>
</tr>
<tr>
<td>16</td>
<td>Isolation Optimization</td>
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<tr>
<td>17</td>
<td>Azimuth Search Window</td>
</tr>
<tr>
<td>18</td>
<td>Elevation Search Window</td>
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<tr>
<td>19</td>
<td>Motion Stow</td>
</tr>
<tr>
<td>20</td>
<td>Manual Location</td>
</tr>
<tr>
<td>21</td>
<td>Latitude</td>
</tr>
<tr>
<td>22</td>
<td>Longitude</td>
</tr>
<tr>
<td>23</td>
<td>Azimuth Origin</td>
</tr>
<tr>
<td>24</td>
<td>Elevation Origin</td>
</tr>
<tr>
<td>25</td>
<td>Skew Origin</td>
</tr>
<tr>
<td>26</td>
<td>Minimum Search Angle</td>
</tr>
</tbody>
</table>

**Update Settings**
To have the D3 accept any changes you must click the ‘Update Settings’ button to store the new configuration.

**24-Elevation Origin**
The start mark in degrees for elevation rotation. After a successful peak of a satellite this value is automatically optimized.

**25-Stow Origin**
The start mark in degrees for skew rotation. After a successful peak of a satellite this value is automatically optimized.

**26-Minimum Search Angle**
Sets the minimum elevation search angle for finding satellite. Used in locations where a low look angle via elevation is needed. Also can be used for rotational height protection.
Standard Functions

Update Settings
To have the D3 accept any changes you must click the ‘Update Settings’ button to store the new configuration.

27-Background Peak
If enabled, the dish will automatically repeak itself if signal quality drops 5 points.

28-Dish Light
Turns on or off the DataStorm blue light.

29-32-Future D3 Upgrade Settings
These settings will be used for future upgrades to the D3.
| Standard Functions |

DataStorm D3 About Page

1-**Version**
Displays the current build of D3 software.

2-**License**
Displays whether or not the D3 has been registered with MotoSAT. [This process can be done via the Product Registration link:](http://www.motosat.com/registration)

3-**Type**
Displays the current Type mode of the D3. Available types are: Generic, Direcway, and iDirect. [Aloha is not available at this time.]

4-**Gateway**
Displays the IP address of the Modem from the D3’s network configuration.

5-**ESN**
Displays the ESN number from the modem you are currently using. This is also a good indicator of whether or not the D2 is communicating with the modem.

| General Information |

The rest of the information on this page is contact and copyright information. Any questions regarding this can be sent to the email address shown.
**Advanced Functions**

**DataStorm D3 Manual Motor Controls**

1-Signal Quality Bar
Signal quality is attained via the modem. This bar displays quality value.

2-Signal Strength Bar
Signal strength is a function of the D3. This bar displays strength value.

3-System Status
Displays the current state of the D3.

4-Elevation Movement
Relates to the up and down motion of the DataStorm dish. Displays both motor counts and actual angle in degrees. The top arrow moves the dish up, the bottom arrow, down based on the number in #7.

5-Azimuth Movement
Relates to the left and right motion of the DataStorm dish. Displays both motor counts and actual angle in degrees. The left arrow moves the dish counter-clockwise, the right arrow, clockwise based on the number in #7.

6-Skew Movement
Relates to the left and right motion of the dish face [polarization]. Displays both motor counts and actual angle in degrees. The left arrow moves the dish closer to zero, the right arrow, increases based on the number in #7.

7-Stop
Stops any current motor movement.

8-Input Box
Place a value here to move the DataStorm.

9-Degrees or Counts
The DataStorm dish can move by motor counts [when a motor’s gear makes a revolution], or it can move in degrees.
DataStorm D3 Calibrations: Tilt

1-Starting the Tilt Calibration
Because this upper control board version rests between the arms, it needs an initial calibration to memorize its level point.

2-First Compass Reading
With the dish stowed, raise the DataStorm until its arm is level [parallel with the base plate]. When level, click next to take the reading. [Typical level position is up 3° from the stowed position.]

3-Tilt Calibration Finish
You have completed the tilt calibration. Please note the elevation tilt on the main system status page for tilt readings.

THE DISH MUST BE STOWED
ONLY USE THIS CALIBRATION IF YOU HAVE A LEGACY STYLE UPPER CONTROL BOARD WHICH IS ATTACHED BETWEEN THE DISH ARMS; THESE HAVE NOT BEEN SHIPPED IN NEW DATASTORM MOUNTS SINCE SEPTEMBER 2004 [F1 ONLY]
DataStorm D3 Calibrations: Dish

Advanced Functions

1-Starting the Dish Calibration
The dish calibration is done to test the motor functioning of the dish.

2-Dish Calibration
The entire dish calibration takes about 8-10 min. During this time you can monitor its progress by watching each of the axis’ move in motor counts or degrees.

3-Dish Calibration Finish
You have completed the dish calibration. Upon completion the dish will end up in a stowed position. If any errors were encountered please check the Error Code Definitions for more details in the DataStorm D2 Appendix.
This shows how to setup a basic DiRECWAY DW6000/DW7000 NAT Enabled Modem with the D3.

| DW6000 Wiring Setup NAT Modem |
Operations: DW6000/DW4020 NAT Modem Cont.

| DW4020 Wiring Setup NAT Modem |

Diagram showing the connections between various devices:
- Control Cable
- Receive Cable
- Transmit Cable
- Ethernet Cable
- Power Connection

Components:
- DataStorm D3
- Connection Plate at dish base
- Transmit Cable
- DW4020 Modem Set
- Control Cable
- Receive Cable
- Ethernet Cable
- Computer

Additional note:
- Wireless Access Point
  - Can be used for wireless access