



**Satellite TV**

# **FREEDOM SD2**

# **USER GUIDE**



**v.2 / MotoSAT**

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**901-FREEDOM Manual**

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## COMPONENT AND FUNCTIONAL DEFINITIONS

**Mount** – FREEDOM Dome and dish mechanics

**FREEDOM SD2** - Positioner, Controller or Control Box

**SD Card** – The memory card used to load programming code and configuration

**LNB** – The device under the dome that receives the satellite signal

**Control Cable** – The 9 conductor cable that connects the Mount to the FREEDOM SD2

**SD Card** – The data storage device which provides software and configuration updates

**Azimuth Motor** – The motor on the mount that controls azimuth movement

**Elevation Motor** – The motor on the mount that controls elevation movement

**Scotch Locks** – The devices used to splice electrical wires on the mount

**LED** – The lights on the front panel of the FREEDOM SD2 that indicate system status

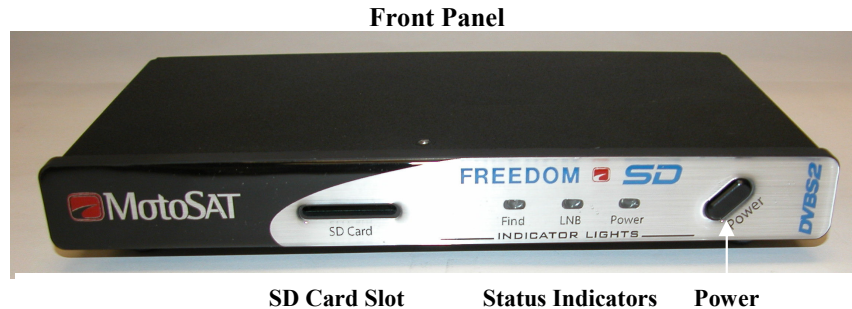
**Software** – Code which instructs the mount to locate and identify satellites

**Configuration File** – The code that tells the mount which satellites to identify

**Log Files** - Diagnostic files for monitoring the system as it goes through its various routines

**800-247-7486** – The number that you may call if you have any questions concerning your FREEDOM or its operation

# FRONT VIEW



The Front Panel consists of three buttons; STOW, SEARCH and POWER. It also has 4 LED indicators; Stow, Search, LNB and Power.

## BUTTONS

**POWER:** This button acts as the SEARCH button. When depressed it will activate the FREEDOM Controller

## SD CARD

**SD Card Slot:** This card slot receives a Multimedia Card (MMC) or a Secure Digital Card (SD). Push in to insert the card. Push in then pull out to remove the card. The SD Card does not have to be inserted for operation of the system. It is used for loading of software and capturing data.

## LED's

### **Find:**

This LED blinks when the FREEDOM SD2 is SEARCHING or when new software code is being loaded.

### **LNB:**

This LED is illuminated when the satellite receiver is plugged into an electrical outlet if the receiver is looped through the FREEDOM. Once the FREEDOM has locked onto the satellite, the LNB receives its power from the satellite receiver if the satellite receiver is linked to the mount through the FREEDOM SD22 (this link is an option.)

**Power:** This LED indicates to the user that the FREEDOM SD2 Controller is ON.

# REAR VIEW

Rear Panel



## CONNECTIONS

**Main Power:** This connector provides the +12 volt DC input power to the unit.

**Motor Control:** This connector sends power to the motors and receives position information from the dish

**Out to Receiver:** This connector is connected to the Satellite Receiver (see the label on the bottom of the Controller.)

**In from Dish:** This connector is connected to the Roof Mount (see label on the bottom of the Controller.)

# OPERATION

The following is a basic operation of the FREEDOM SD2 Controller and is meant to get the operator up and running in a short period of time.

## POWER UP

*Pressing the **POWER** button will activate the **SEARCH** routine.*

- If you are **currently ON** satellite then the system will re-peak. If programmed to go to another satellite the system will begin the move to the next satellite programmed.
- If you are **not currently ON** satellite then the system would begin the search for the programmed satellite.

## TEST DISH

This operation will test the Azimuth and Elevation functions of the mount. To implement this function you must create a new configuration file by adding 128 to the present configuration number. For example if your present Configuration is DirecTV satellite 101 you would add 1 to the configuration for that satellite. This is done in your NomadSD.dat file. For Example:

- DirecTV 101 is configuration  $002 + 128 = \mathbf{130}$  which is the TEST DISH for your configuration (see Programming Network Configuration in this manual.) This is generally used for diagnosis purposes when the dish cover is removed. It allows for visual confirmation of the Elevation and Azimuth motors running.
- Upon completion of the TEST DISH you must change your NomadSD.dat file back to its proper configuration for the network that you are subscribed to (subtract 128 from the previously altered Configuration number) or your system will perform a TEST DISH **each and every time** it is deployed.

## FIND SATELLITE

To search for a satellite, press the POWER button once and the dish will begin to search for the desired satellite depending on the network configuration. The FIND led will blink indicating movement of the dish. Once the controller has locked on the appropriate satellite, the POWER and FIND led will go OUT and the FREEDOM Controller will turn OFF.

## MEMORY CARD

The memory card feature allows the user to do three things:

1. Upgrade the firmware application, i.e. (nsd\_xxxx.hex) from the **Root Directory**)
2. Change the network configuration, i.e. (NomadSD.dat) from the **Root Directory**.
3. Record the debug information into Log Files (**LOGFILES**).

The card is inserted by pushing in the card until it clicks into place. To remove the card, push the card in once again and the socket will eject the card. Then simply remove it the rest of the way. Any MMC or SD Card can be used as long as it is formatted to FAT32 file format.

## FIRMWARE UPGRADE

1. The FREEDOM SD2 Controller's firmware can be upgraded by simply copying the latest firmware upgrade *into* the Root Directory of the SD memory card using a computer capable of utilizing SD Memory Cards. Be sure to copy the file into the SD card "root directory" and not into a subdirectory or folder. You can find the latest firmware upgrade for the controller on our web site at: [www.motosat.com](http://www.motosat.com).
2. Power OFF the controller then insert the SD memory card into the card slot the front of the FREEDOM.
3. Power ON the FREEDOM. The FREEDOM SD2 Controller will detect the upgrade and automatically install the new upgrade code. New software upgrades will cause the LED's on the front panel to blink.

During the upgrade process the FIND led will blink in rapid succession indicating that programming is taking place. **DO NOT remove the SD memory card from the Controller until this process is complete.** If no upgrade is detected or the upgrade is an older version than what is already installed in the controller, an upgrade will not take place. **NOTE:** The controller will not permit installing previous numbered (older) upgrades. It will only recognize upgrades with a higher number than the last one stored.

**After a FIRMWARE UPGRADE has completed, the system MUST be powered OFF then powered ON to store new upgrade.**

## NETWORK CONFIGURATION

The program provider and satellite selections are configured using a configuration file (NomadSD.dat) that is placed in the root directory of the memory card (see Network Configuration.) This file is edited for the program provider. During initialization, the controller reads this file and makes changes to its configuration accordingly. Once this is done the Configuration File should be moved and stored in the “MotoSAT Configuration File” or appropriate folder and not in the root directory. If the Configuration File is left in the root directory and remains in the Controller then every time the system is turned on it will look at the Configuration File on the card and reconfigure from that file rather than the data that is stored in memory (which would execute much faster.) **This process is only needed to be done once per installation.**

## LOG FILES

Log Files are a diagnostic tool for monitoring the system as it goes through its various routines. The Log Files are created in the Log Files directory which is located in the root directory. If there is not a Log Files directory, the FREEDOM SD2 will create one automatically. The memory card must not be write-protected for Log Files to be created and stored. If it is write-protected the FREEDOM SD2 will ignore the disk. The latest log File is the one with the highest incremental number in the file name. To read a log file, simply open it using Word Pad or any other Text Editor. The Controller creates a new Log File upon every initialization and every time it locks on satellite.

## ERROR MESSAGES

The FREEDOM SD2 has some internal diagnostic capabilities that will not allow the unit to operate should a Critical Error occur. If a critical error occurs, the Stow and Search LED's will blink together at the same time in one second intervals. The number of repetitions will indicate the specific number code of the error. After a two (2) second pause the FREEDOM SD2 will blink out the error number again. The system can not function after experiencing a critical error. The unit will have to be powered OFF and powered back ON. The FREEDOM SD2 will also record a text message indicating the error into the Log File provided an SD card was inserted at the time of the error. If the card was not inserted at the time of the error simply turn off the power and insert the SD card and turn on the power to the FREEDOM SD2. The system will produce a log file onto the SD card which is the captured information that can be sent to the MotoSAT Technical Support Department to be analyzed.

The following page has a list of each error, its number code, and whether or not it is a critical error.

# ERROR CODES

| Error Code | Error Description         | Critical Error = ! (Corrective action required) |
|------------|---------------------------|-------------------------------------------------|
| 0          | NO ERROR                  |                                                 |
| 1          | MOTOR, MOVING             |                                                 |
| 2          | INVALID MODE 1            |                                                 |
| 3          | INVALID MODE 2            |                                                 |
| 4          | MOTOR, TIMEOUT EL         | !                                               |
| 5          | MOTOR, TIMEOUT AZ         | !                                               |
| 6          | MOTOR, TIMEOUT SK         | !                                               |
| 7          | LIMIT ERROR, EL           | !                                               |
| 8          | LIMIT ERROR, AZ           | !                                               |
| 9          | LIMIT ERROR SK            | !                                               |
| 10         | TUNER FAILURE             | !                                               |
| 11         | AGC, NO LOCK              | !                                               |
| 12         | MAIN SAT FOUND ONLY       |                                                 |
| 13         | MAIN SAT NOT FOUND        |                                                 |
| 14         | UNUSED                    |                                                 |
| 15         | UNUSED                    |                                                 |
| 16         | NO SATELLITES FOUND       |                                                 |
| 17         | OVER TEMP                 |                                                 |
| 18         | DISH HEIGHT ERROR         | !                                               |
| 19         | COAX ERROR                | !                                               |
| 20         | UNUSED                    |                                                 |
| 21         | UNUSED                    |                                                 |
| 22         | UNUSED                    |                                                 |
| 23         | NO MAIN AFTER SKEW        |                                                 |
| 24         | CRITICAL INTERNAL FAILURE | !                                               |
| 25         | LNB POWER FAILURE         | !                                               |
| 26         | TUNER AMP ON, FAILURE     | !                                               |
| 27         | TUNER ID, FAILURE         | !                                               |
| 28         | MOTOR, FAILURE            | !                                               |
| 29         | COUNTER, FAILURE          | !                                               |
| 30         | MOUNT MISS-MATCH          | !                                               |

# PROGRAMMING

## NETWORK CONFIGURATION

**Note: This configuration process is limited to Microsoft PC's. Sorry, no Mac's.**

To use your computer to program your FREEDOM SD2 Card simply format the SD card to FAT32 and:

1. Select "START", "ALL PROGRAMS", "ACCESSORIES" and "Note Pad" on your computer.
2. Enter the Network Configuration number from the selection below starting at the first position of the file. **Just the Network Configuration number is all that you need.**
3. Name this file "NomadSD.dat" and save it onto your SD Card in the Root Directory. Once it is used, be sure to place it into the "MotoSAT Configuration File" or appropriate folder.

002 ← This sample configuration is set for 002 **DIRECTV NON SKEWABLE** 101

The information below is used for obtaining the Network Configuration Number for proper configuring of the NomadSD. The numbers in the first column determine the Network being used. Always include leading zeros.



### CONFIGURATION

### SATELLITES

|     |                                              |              |
|-----|----------------------------------------------|--------------|
| 000 | DISH NETWORK MODE, NON SKEWABLE,             | 119/110      |
| 002 | DIRECTV MODE, NON SKEWABLE,                  | 101          |
| 004 | BELL EXPRESSVU MODE, NON SKEWABLE            | 92/81        |
| 006 | DIRECTV ENHANCED MODE, NON SKEWABLE,         | 101/119      |
| 014 | DISH NETWORK <u>EAST MODE</u> , NON SKEWABLE | 119/110/61.5 |
| 016 | DISH NETWORK <u>WEST MODE</u> , NON SKEWABLE | 110/110/148  |
| 018 | DISH NETWORK MODE, NON SKEWABLE              | 119/110      |

## TO PERFORM A TEST DISH

To do a **TEST DISH** simply add **128** to any of the above i.e. 000 becomes 128, 003 becomes 131 and so on. **After you perform a TEST DISH return the configuration (NomadSD2.dat) back to the original configuration so that it will not perform a TEST DISH each time the power is turned on.**

**For additional information at this time contact  
MotoSAT Technical Support @ 800-247-7486**

**The MotoSAT Technician will ask you “What is your “Network Configuration?” Be prepared to tell him the code that you have in your Network Configuration File which will be found in your “MotoSAT Configuration File” folder on your SD Card. It will appear as a file labeled “NomadSD.dat”. Open this file and it will be the first 3 digits on the first line.**

Thank you for your assistance,

**Your Friends at MotoSAT**