



# SATELLITE TV ANTENNA CONTROLLER

## RFM-1000/1100 TECHNICAL MANUAL





## **WARNING**

**Make *all* electrical and coax connections from the controller to the mount and LNB's BEFORE applying power to, or connecting the satellite receiver to the controller.**

Note: When the controller is turned OFF it will still pass voltage from the receiver to the LNB if the receiver is plugged in to 110 AC. Shorting of the coax at any time during installation may cause damage to either the Controller or the DiSEqC Switch. Failure to follow this procedure can result in voiding of warranty replacement, not to mention time spent trying to troubleshoot a system that does not perform.

90% of all problems are a result of CONNECTIVITY or CONFIGURATION.

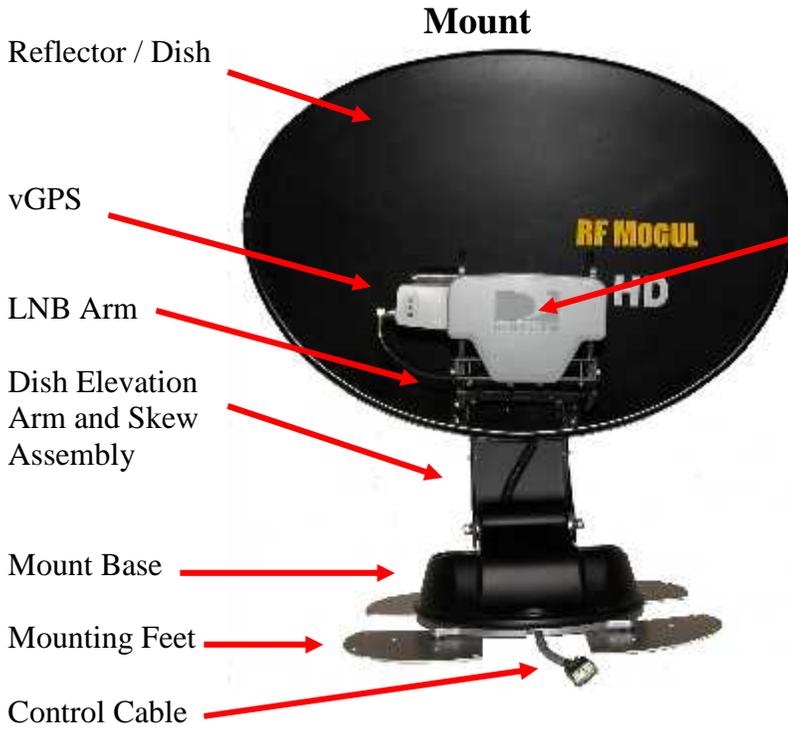
# **I**ndex

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# BILL OF MATERIALS

A system consists of several components.



Note: Your LNB may vary from that pictured depending upon your system configuration.

- Items included with the system and not shown.**
- 1 ea Roof top Connector Housing
  - 1 ea Clam Shell
  - 1 ea LNB Landing Plate
  - 15' Control Cable
  - 1 ea Connector, green, 12 pin
  - 1 ea Power Supply, 12 VDC 7 amp
  - 1 ea RFM-1000/1100 User Guide
  - 1 ea vGPS Installation Kit for DirecTV SWM and SHAW Direct systems.

**Controller Front view**



**Controller Rear view**



# Front view



POWER "ON" .....  
 SD Card Slot .....  
 LCD Display .....  
 TO FIND SATELLITES .....  
 TO STOW THE MOUNT .....

Front Buttons Function		
Buttons		Function
POWER	* * * R F M O G U L * * *	Turn Power ON
	* * * W I W O R L D * * *	
SEARCH	S H A W D i r e c t H D S E A R C H . . .	Request to SEARCH
STOW	S T O W & P O W E R O F F P l e a s e W a i t	Request to STOW
SEARCH+STOW	S H A W D i r e c t H D P O W E R O F F	Turn Power OFF

Note: Pressing SEARCH / STOW at the same time will turn POWER OFF.



## AVAILABLE CONFIGURATIONS

### TV Networks

- DirectTV SWM** = 99, 101, 103 Satellites
- Dish Network** = 110, 119, 129 Satellites
- Bell Express** = 82, 91 Satellites (For Canadian Use Only)
- SHAW Direct** = 107.3, 111.1 Satellites (For Canadian Use Only)

## CONDITIONS

- Stowed** Power shuts down automatically after stowing. If dish is stowed and power is turned ON, the display will continue to show Stowed for two minutes if no other command is selected then the power will shut down automatically.
- Searching** Will display as the dish is in the searching routine and not peaking.
- Peaking** Will display if the dish is peaking a signal.
- Locked** Will display when the dish has completed searching and is Locked onto the correct satellite (s) (TV Services). Two 1/2 minutes after locking onto satellite(s) the power will shut OFF.
- Stowing** Will display when dish STOW command has been selected and the dish is moving to the Stowed position. When STOWED the Power will shut OFF automatically.

# Rear view



To Satellite Receiver.....

To Antenna.....

Configuration "Dip" Switch.....

Factory Maintenance Port.....

Control Cable to Roof Mount Connections.....

Ignition STOW option and 12 VDC.....

Alternate Power IN (12 VDC).....

## CONNECTIONS

### TO SATELLITE RECEIVER

This is a pass through and a coax connection to your satellite receiver (Satellite IN)

### TO ANTENNA:

Coax connection from the Antenna's LNB to the base of the mount (see configuration to determine which coax at the base of the mount goes to the controller).

### CONFIGURATION 6 PIN DIP SWITCH:

Used for programming or configuration of the controller (See Configuration)

### FACTORY MAINTENANCE PORT

Used for factory diagnostic purposes

### CONTROL CABLE CONNECTION:

Termination of the 12 wires of the control cable to the controller takes place here.

### OPTIONAL IGNITION STOW and POWER:

Connection for optional Ignition STOW and Optional 12 VDC power

### ALTERNATE POWER:

Input for 12 VDC from a 12VDC 7 amp. power supply.

# C onfiguration



**Configurable Dip Switch**

On the back of the controller are 6 Dip Switches which are used to program or configure the controller to which of the services and or satellites to locate. The position of these switches will only be read at POWER ON. To program or configure your controller to your specific needs the dip switches will be required to be placed into one of the following positions while power is OFF.

Dip Switch Functions	
CONFIGURATION	SPECIAL FUNCTIONS
Dip Switches	Mode
Up	Down
	DirceTV HD
	Dish Network HD
	BELL TV
	SHAW Direct HD
	DISEqC Switch Test
	Cycle Test
	Manual Mode ELEVATION
	Manual Mode AZIMUTH
	Manual Mode SKEW
	Manual Mode SHOW

Canadian Use →  
 Canadian Use →  
 Switch Test →

El 45 degrees up, Skew 45 degrees, return to Skew 0 degree, AZ 360 degree turn to clockwise limit, return to stow position and stow. Continuous movement of the mount until power OFF.

El 45 degrees up, Skew 15 degrees, simulate satellite peak, clockwise in AZ to 45 degrees, return to Skew 0 degree and stow. Continuous movement of the mount until power OFF.

# **S**PECIAL FUNCTION Dip Switch Settings

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The Dip Switches may be configured to operate the mount in a special way depending upon their settings. The position of these switches will only be checked at POWER ON. After the settings have been changed the controller will follow the commands given by the changed settings. The "Special Functions" will perform the following actions:

**To EXIT any of the following functions press SEARCH and STOW at the same time then release. This will power OFF the controller and allow you to change the dip switch settings.**

## **SHOW Mode**

When the switches are in this position and the SEARCH button is pressed, the mount will

- Raise in Elevation,
- Skew a predetermined amount,
- Rotate 45% in Azimuth,
- Simulate peaking on a satellite,
- Pause and then return to the stowed position and will continuously repeat this procedure until the dish is stowed. It is designed to show the mount in all its movements for display purposes.

## **MANUAL Movement AZimuth**

When the switch is in this position and the power is turned ON, press the SEARCH button and the mount will respond by moving clockwise. Press the STOW button and the mount will respond by moving counterclockwise in azimuth

## **MANUAL Movement ELevation**

When the switch is in this position and the power is turned ON, press the SEARCH button and the mount will respond by moving UP. Press the STOW button and the mount will respond by moving DOWN in elevation.

## **MANUAL Movement SKew**

When the switches are in this position and the power is turned ON, press the SEARCH button and the antenna will respond by rotating clockwise. Press the STOW button and the antenna will respond by rotating counterclockwise in skew.

**Note:** It is the responsibility of the person changing the settings to return them to the proper configuration following any Special Setting change. Only change the dip switch configuration when the power is OFF. If your system does not seem to operate properly, turn the power off (see procedure above) and check the position of the Dip Switches.

# MANUAL MOVEMENT

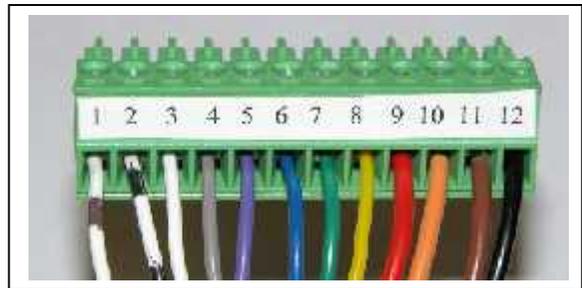
The Manual Movement mode will "manually" move the mount when the dip switches are put in a specific mode and powered ON. It will allow you to move the mount in all directions in Elevation, Azimuth and Skew.

**CAUTION:** The mount will move at your command. Know where your dish is before you start to move it. You do not want it to scrape across your roof. Make sure of your clearances before you move.

SPECIAL FUNCTIONS	
Dip Switch	Mode
 : Up      : Dn	
 1 2 3 4 5 6	Manual Mode <b>ELEVATION</b>
 1 2 3 4 5 6	Manual Mode <b>AZIMUTH</b>
 1 2 3 4 5 6	Manual Mode <b>SKEW</b>
 1 2 3 4 5 6	Manual Mode <b>SHOW</b>

- SEARCH button - Raises  
STOW button - Lowers
  
- SEARCH button - Clockwise  
DOWN button - Counter-Clockwise
  
- SEARCH button - Clockwise  
DOWN button - Counter-Clockwise
  
- Turning Power ON will start the automatic SHOW movement

# WIRING DIAGRAM



**GREY CONTROL CABLE**  
(Green Connector)

Pin	Color	How Used	Where Used
P1 =	Violet	Limit Sensor	EL Up
P2 =	Dk Blue	Limit Sensor	AZ
P3 =	Green	Limit Sensor	EL Down
P4 =	Gray	Encoder	SK
P5 =	Yellow	Encoder	AZ
P6 =	Brown	Encoder	EL
P7 =	Black	Ground	GND
P8 =	Red	VCC	
P9 =	White	Power	AZ-B
P10 =	Pink	Power	AZ-A
P11 =	Lt Blue/Tan*	Power	EL-B
P12 =	Orange	Power	EL-A

\*Tan will substitute for Lt Blue when Lt Blue is not present. This will be on cables longer than 15'.

**BLACK CONTROL CABLE**  
(Green Connector)

Pin	Color	How Used	Where Used
1 =	<b>Brown</b> Stripe	Limit Sensor	EL Up
2 =	<b>Black</b> Stripe	Limit Sensor	AZ
3 =	White	Limit Sensor	EL Down
4 =	Gray	Encoder	SK
5 =	Purple	Encoder	AZ
6 =	Blue	Encoder	EL
7 =	Green	Ground	GND
8 =	Yellow	VCC	
9 =	<b>RED</b>	Power	AZ-B
10 =	<b>ORANGE</b>	Power	AZ-A/Skew
11 =	<b>BROWN</b>	Power	EL-B
12 =	<b>BLACK</b>	Power	EL-A/Skew

Raising the mount using a DC Voltage source direct to control cable

**GREY Control Cable**



**GREY CONTROL CABLE  
(Green Connector)**

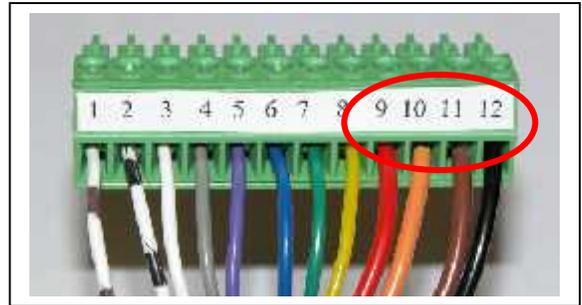
Pin	Color	How Used	Where Used
9 =	<b>WHITE</b>	Power	AZ-B
10 =	<b>PINK</b>	Power	AZ-A/Skew
11 =	<b>Lt BLUE</b> or Tan*	Power	EL-B
12 =	<b>ORANGE</b>	Power	EL-A/Skew

**TO RAISE THE MOUNT WITH A BATTERY**

- **ELEVATION Orange and Lt Blue (or tan)** will raise and lower the mount
- **AZIMUTH Pink and White** will rotate the dish in.
- **SKEW Orange and Pink** will tilt dish.

\*Tan will substitute for Lt Blue when Lt Blue is not present. This will be on grey control cables longer than 15'.

**BLACK Control Cable**



**BLACK CONTROL CABLE  
(Green Connector)**

Pin	Color	How Used	Where Used
9 =	<b>RED</b>	Power	AZ-B
10 =	<b>ORANGE</b>	Power	AZ-A/Skew
11 =	<b>BROWN</b> or Tan	Power	EL-B
12 =	<b>BLACK</b>	Power	EL-A/Skew

**TO RAISE THE MOUNT WITH A BATTERY**

- **ELEVATION Brown and Black** will raise and lower the mount
- **AZIMUTH Red and Orange** will rotate the dish in.
- **SKEW Orange and Black** will tilt dish.

**IGNITION STOW  
(OPTIONAL)**

- P1 = To Positive side of Battery 12VDC**
- P2 = To + 12 VDC side of car ignition when ON**
- P3 = To Ground of Battery**
- P4 = To Ground of Battery**

<b>2+</b>	<b>1+</b>
<b>4-</b>	<b>3-</b>

When wired in this manner and you turn your ignition key ON, your dish will automatically return to the STOWED position which is the travel position.



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**POWER ON** Pressing the POWER ON button will turn ON the power to the controller enabling it to perform the next function. Wait for this display to appear then select a function.

**SEARCH (UP)** Pressing the SEARCH button will instruct the mount to begin its searching routine and locate the satellites according to the settings of the dip switches.

**STOW: (DOWN)** Pressing the STOW button will instruct the mount to return to its stowed or travel position and turn power OFF automatically. Note: be sure 12 VDC is present.

**POWER OFF** Pressing the SEARCH *and* STOW buttons at the same time will manually turn the Power OFF.

**AFTER LOCKING ONTO THE PROPER SATELLITE:** The controller will remain ON for a short period of time and then automatically turn OFF.

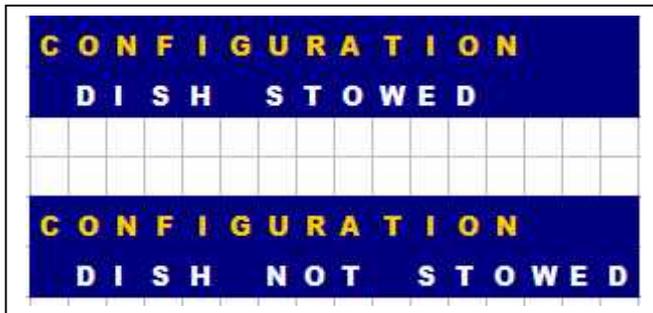
**AFTER STOWING:** The controller will automatically turn OFF.

# LCD DISPLAY

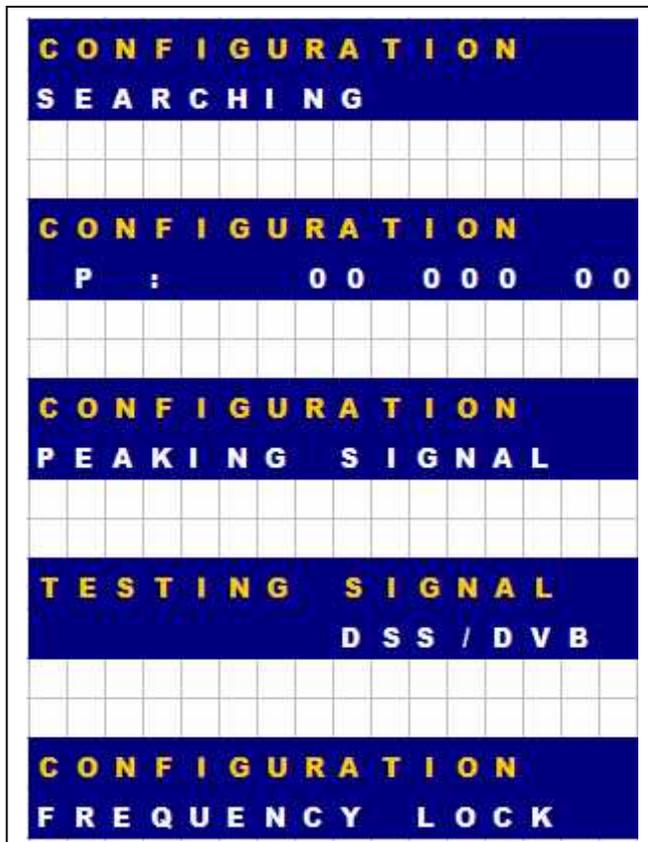
The LCD Display is designed to let you know the status of the mount and what it is doing at any given time.

- When POWER is first turned ON the display will show disposition of the dish on the roof.

("Configuration" is the Programming Service that has been selected by the positioning of the dip switches.)



- During the SEARCH process the display will show the various stages of acquisition.



Indicates that the dish is in its acquisition mode and is moving.

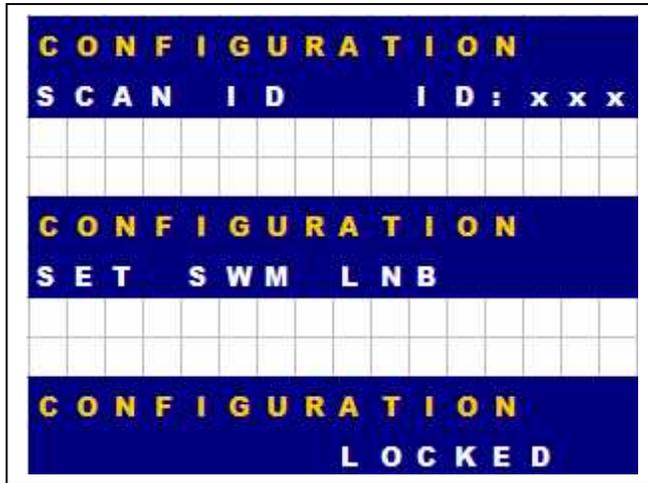


See below

Indicates that the dish has located a satellite and is Peaking for optimum strength.

The system is identifying the satellite by sampling the DSS and DVB carriers.

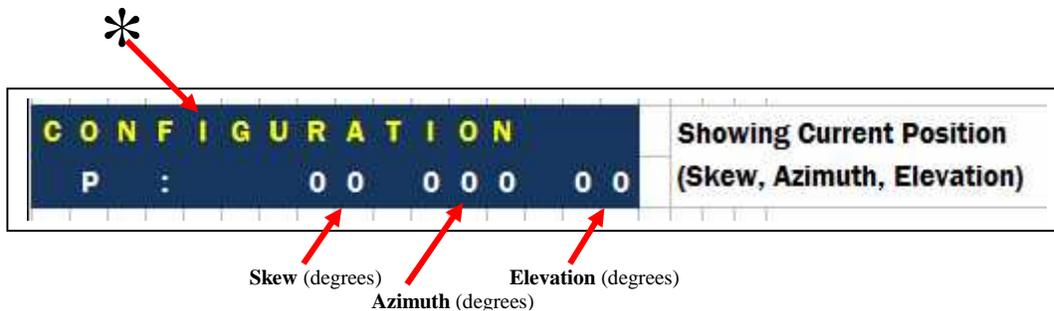
The system has identified the satellite and has locked the frequency..



The system is scanning the satellite ID and will display its identity (xxx).

The system is setting up the SWM acquisition

Acquisition and lock is complete. Your satellite receiver now has full control over the SWM or other style LNB's.



**Remember, the only thing you have to do to operate this system it to.....**

1. Turn **POWER ON**,
2. The status of the dish will appear, either "**STOWED**" or "**NOT STOWED**".
3. Press **SEARCH** or **STOW** depending on what you want the mount to do.
4. If **STOW** is pressed, the dish will return to its travel or stowed position.
5. If **SEARCH** is pressed, then wait for "**LOCK**" to appear. This signifies "locked on satellite".
6. After **acquisition** or **stow** the **POWER** will turn **OFF** automatically.

# **S**ervice messages

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Service messages will be displayed on the LCD screen should a condition occur that a person should be alerted to. If a condition should occur the following Service Messages will be displayed:

## **Service Message**

<b>AZ Count</b>	Is displayed if azimuth motor current can be detected in both directions but no counts are detected.
<b>AZ Motor</b>	Is displayed if no azimuth motor current is detected or maximum azimuth motor current is detected and there are no counts.
<b>AZ Limit</b>	Is displayed when total azimuth motor counts exceed maximum count value plus 20%.
<b>EL Count</b>	Is displayed if elevation motor current can be detected in both directions but no counts are detected.
<b>EL Motor</b>	Is displayed if no elevation motor current is detected or maximum elevation motor current is detected and there are no counts.
<b>EL Limit</b>	Is displayed when total elevation motor counts exceed maximum count value plus 20%.
<b>SK Count</b>	Is displayed if skew motor current can be detected in both directions but no counts are detected.
<b>SK Motor</b>	Is displayed if no skew motor current is detected or maximum skew motor current is detected and there are no counts.
<b>SK Limit</b>	Is displayed when total skew motor counts exceed maximum count value plus 10%.
<b>No Signal</b>	Is displayed when the Antenna Controller has searched the entire sky but no signals were detected to stop and peak.
<b>No Sat</b>	Is displayed when the Antenna Controller has searched the entire sky but no Satellites were found or identified.

# **F**irmware upgrade

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Should any firmware upgrades become available you may obtain them from your installing dealer or by contacting RF Mogul direct. To load software place the file on your Desktop and transfer the file to your SD Card and into the "root directory. Insert your SD Card into the controller and turn power ON. The software will automatically download to your controller. Remove the SD Card once the load function is complete.

## **When should you think about downloading new software?**

1. To take advantage of new innovative features offered by the latest revision of software.
2. If you have called your installer and he recommends it.
3. If you read the History of the new software and you determine that you could benefit from its features.

## **What style of SD Card do I need to use?**

You may use any size of SD Card and in any format. It is not restrictive.

## **MAC or PC?**

The software load will take either style of computer.

## **How to I tell that my software is loading?**

The LCD display will display

**SD CARD DETECTED  
LOADING SOFTWARE**

When finished it will display

**LOAD COMPLETE**

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## hecking Voltage at DiSEqC Switch

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If you are asked to check voltage at the DiSEqC Switch, this is the procedure to accomplish the task.

1. Turn the power to your controller OFF.
2. Disconnect the coax going to the receiver.
3. Place all dip switches on the back of your controller to the "DOWN" position.
4. From the back of the controller marked "Antenna" connect a coax to the base of the mount to the small coax that is "unmarked, black or white"
5. Disconnect the Yellow and Red coaxes from the LNB's. Note: these two (2) coaxes come directly from the DiSEqC switch.
6. Place your Multi-Meter on 20 Volts DC.
7. Turn ON the power to your controller.
8. Press SEARCH to start the switch check, wait approx 10 seconds before continuing.
9. The LED display will display "Testing SW1 or SW2" (SW1 is the LNB, SW2 is the vGPS) and will begin to alternately supplying and switching 13/18 DC Volts to one coax and then do the same on the other. Voltage will read around 12+ or 17+ volts.
10. Carefully check the voltage switching by placing one of your probes on the center conductor and the other on the outside of the connector on one coax and then check the other in the same manner. Care should be taken to not create a short during this process. Creating a short will give you a false reading and will cause you to think you have a DiSEqC switch problem.
11. If you should accidentally short the cable during this procedure you will need to restart your controller and do it again. It will not harm the controller or the switch, but be careful.
12. If you do not have voltage present on both the LNB and vGPS during this test then YOU HAVE A BAD DiSEqC SWITCH and it will need to be replace.

What can cause a DiSEqC failure?

1. A shorted cable going from the switch to the LNB or vGPS.
2. Input voltage *greater* than 21 Volts DC so **do not use a 29 Volt Power Inserter from DirecTV**. If you have a RFM-4100 SWM system a 21 Volt Power Inserter is required.
3. An open cable from the switch to the controller will not allow the switch to work properly.
4. Connecting coax while receiver is sending voltage to the LNB and causing a short.

## **RETURNING PARTS TO THE FACTORY**

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Parts returned to the factory must contain a Return Material Authorization (RMA) which will be provided by the RF Mogul Technical Support Department at the time of troubleshooting. This will ensure proper accountability of returned equipment or parts. Make sure that the following information is contained on your shipment.

**RF Mogul**

Attn: Product Evaluation Department

**RMA #** \_\_\_\_\_

3604 South Via Terra

South Salt Lake City, UT 84115

You must include your Return Address and Telephone Number failure to do so may result in you being billed for a non-returned part.

**We appreciate your business. If you need to contact us please see the information below.**

**RF Mogul**

**3604 Via Terra**

**South Salt Lake City, UT 84115**

**Tele 801-895-3308**

**Fax 801-478-5850**

**www.rfmogul.com**

**sales@rfmogul.com**

**support@rfmogul.com**

**Thank you for purchasing a RF Mogul System.**

# **P**RODUCT SUPPORT

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**For product support please contact the following**

## **UNITED STATES**

- Your Installing Dealer is your first line of defense. If resolution cannot be made it may be passed onto the manufacture.

## **CANADA**

Your installing Dealer or Distributor

Your issue may be passed onto the manufacture for assistance.

## **MEXICO**

Your installing Dealer or Distributor

Your issue may be passed onto the manufacture for assistance.

## **THE MANUFACTURE**

RF Mogul  
3604 South Via Terra  
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