

## Installing a MotoSat MD500 for Dish Network on a 2005 24RB Born Free

**2005 24RB**  
**July 2006**

I have Dish network using satellites 110 and 119 and had decided on using the MotoSat MD500 rather than the dome antennas on the market. Dome antennas usually only have one LNB rather than the two needed for Dish network. I didn't want to wait while the controller/receiver hunted between satellites, I also needed a skewable dish and I wanted the lowest profile I could get when stowed (10.5" High).

[http://www.motosat.com/products/tv\\_md500/](http://www.motosat.com/products/tv_md500/)

Another consideration was the dealers I had contacted to install this all wanted to charge me about \$400.00 and they wanted to do it their way and drill through the roof directly down to the entertainment center rather than run the wiring thru the refrigerator vent, so I decided to do it myself. The other problem was no dealers near me (Sequim, Wa.) I was able to purchase my unit from: <http://rvprotectionproducts.com/>, near Everett, WA.

If I hadn't had Dish at home, I would have purchased DirecTV as they only use one satellite and it keeps the price lower.

Before starting this project I contacted Kim Olson at BF to find out how what the thickness of the plywood in the roof was and this is what he E-mailed me:

The roof has  $\frac{3}{4}$  plywood plus the thickness of the fiberglass and gelcoat. We normally install the satellites at the highest horizontal roof section, right behind the clearance lights but I have seen a few mounted behind the roof air that were done after market. If you install it behind the roof air be careful as there are metal raceways that run thru the roof from side to side, they are 2 inches wide and I do not have a schematic of where they are at as each coach is not the same as the next, all I can tell you is if you hit metal with a screw on the roof don't push thru the raceway or you may run a screw into an AC or DC wire in the raceway.

KIM OLSON

I took his advice and checked the roof with a large magnet, after I located the raceway I made sure I did not use any screws in that location.

I mounted the MotoSat stainless steel base plate with (20) #12 x  $\frac{3}{4}$ " pan head stainless steel screws and sealed the screws and holes with Dicor Sealant: <http://www.dicor.com/> specified for fiberglass and rubber roofs. Trying to minimize holes in the roof I used a scrap piece of aluminum stock connected to the base plate and secured a piece of  $\frac{3}{4}$ " vinyl flex (electrical section, Home Depot) for mechanical and UV protection for the wiring. The wiring is supposed to be UV resistant but why take chances. I used black UV resistant cable ties on the roof and wrapped the exposed wiring (RG6 and 9 conductor controller wire) with weather and UV resistant T88 (3M) vinyl tape where it was exposed. I also used dielectric grease on all connectors. (See picture below on page 4) I purchased a tube of Permatex (3 oz) from a local auto parts store for about \$4.00.

My neighbor designed and built me a cabinet for the Nomad controller and my Dish 625 DVR Receiver. I was able to purchase the custom sized cabinet doors from Kim at Born Free, this saved a lot of time in building the cabinet. I added a power strip with a switch as an afterthought inside cabinet to totally power down the Dish receiver.

The dish works great, it usually locks onto the satellites in about 1 minute.



**This is a picture of the MotoSat dish on the roof.**



**This shows how I attached the ¾" Flex to the air conditioner and attached to the Refrigerator vent.**



**This is how the connectors are attached inside the small white box on base plate, note use of dielectric grease on connectors.**



Close up view of 3/4" vinyl flex connected to reefer vent

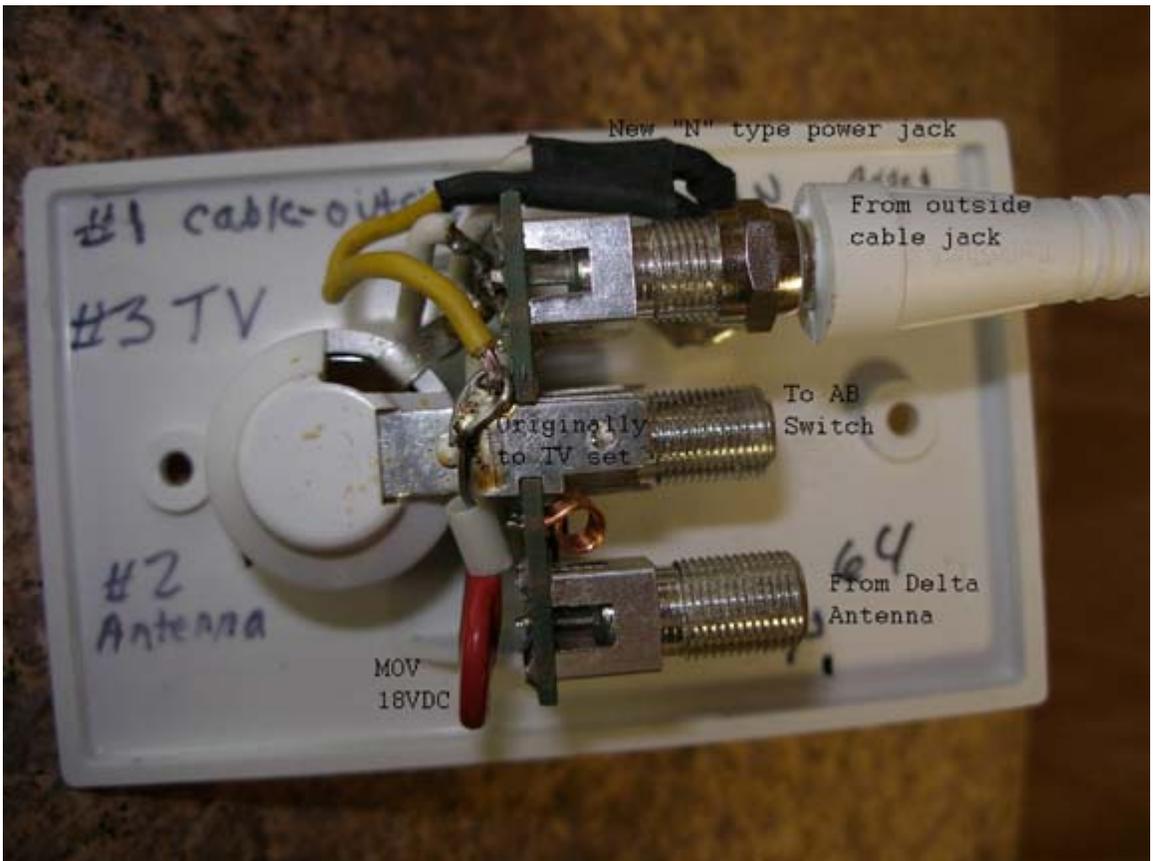
On the inside of the coach I installed a plate for the coax, modified the 12VDC outlet and added a power connector (4A rating) for the Nomad 2 controller, the controller comes with a 110VAC to 12VDC/4A converter but I wanted the option of using my batteries if I so desired, I also added a MOV for some nominal surge suppression on the 12V Winegard power Amp and outlet.



View of area where controller and sat dish receiver plugs into, this is the area where a small TV would normally be if we didn't have the entertainment center.



This is a close up of modified Winegard Amp cover



This is how it was wired, view from backside.



This is a picture of hole I drilled for wiring, this was used for some BF wiring and was convenient for placing my wiring. I also had some wiring here for a new Tank Monitor project I did but that's another project. The hole is actually behind the reefer.



I installed an ABC switch at this location, this is AFTER my satellite receiver on the UHF/VHF side, I wanted to use the RG6 coax going forward to the entertainment center and not have to worry about trying to fish wire across the roof area, I didn't want any exposed wiring.

My wife didn't want to see this in the living area, hence that's why it's here, also will probably leave it on the sat dish rather than on the Delta (rabbit ears), but I wanted the option of using the Delta or the outside cable connection.

(This is just above the area where the Nomad 2 controller and Dish receiver are located)  
All new and existing wiring is behind this panel.



This is where the Nomad 2 Controller and my Dish 625 DVR receiver will sit, I'm in the process of building a nice cabinet and door around it. My neighbor is doing most of the wood working in his shop.



Fitting the new cabinet and shelf.



Bengt, my neighbor, installing the doors on new cabinet.



Finished cabinet for Nomad 2 Controller and Dish 625 Receiver



Nomad 2 controller on top, Dish 625 DVR Receiver on bottom. Not shown in photo is a layer of 3/8" closed cell foam under components for shock absorption.



Here's what the MotoSat looks like from the ground in a stowed position.

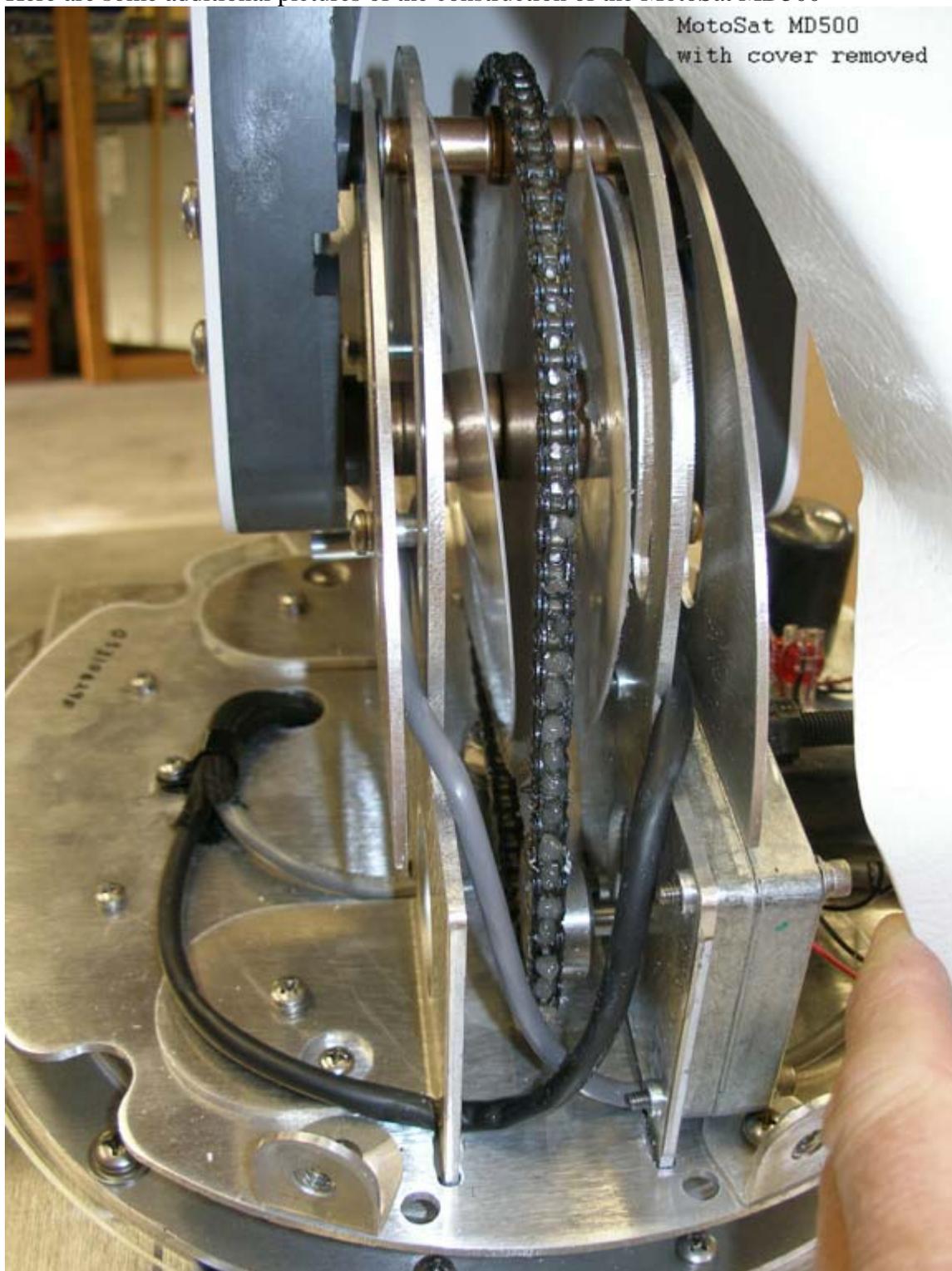


Here the MotoSat MD500 is deployed.

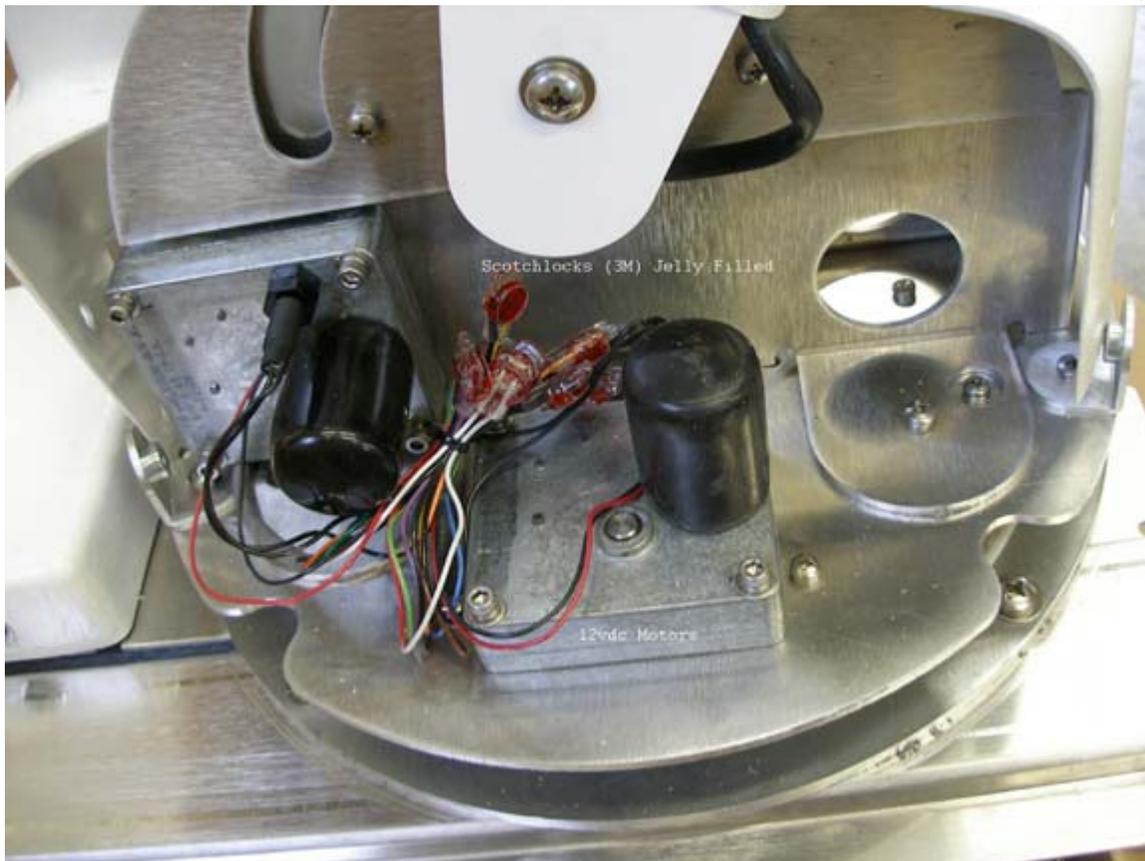


MotoSat MD500 stowed, it's only 10.5 inches high, will withstand 140MPH winds stowed and 60MPH deployed.

Here are some additional pictures of the construction of the MotoSat MD500

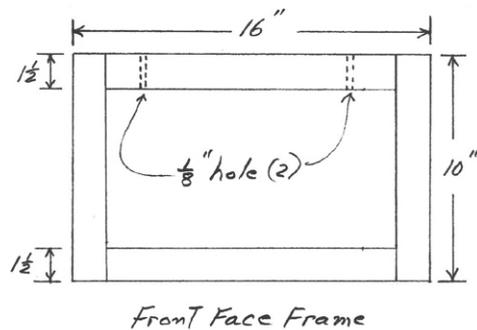
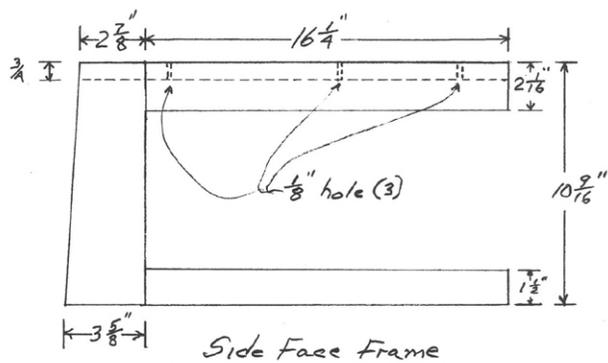


View of chain drive and stepping motors.



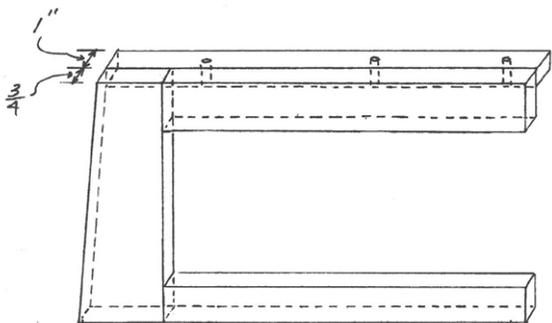
View of 12VDC sealed motors and gearing, connectors are 3M Scotchlocks (Jelly filled)

The following are drawings and dimensions for the cabinet work.

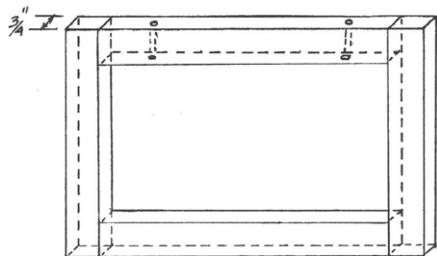


Assemble Face Frames using  $\frac{1}{4}$  dowel pins

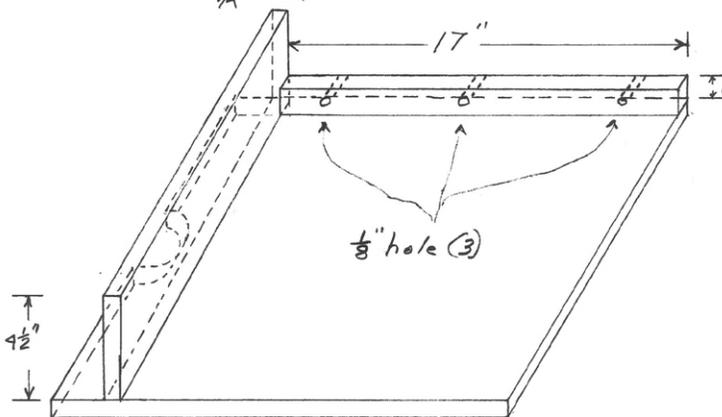
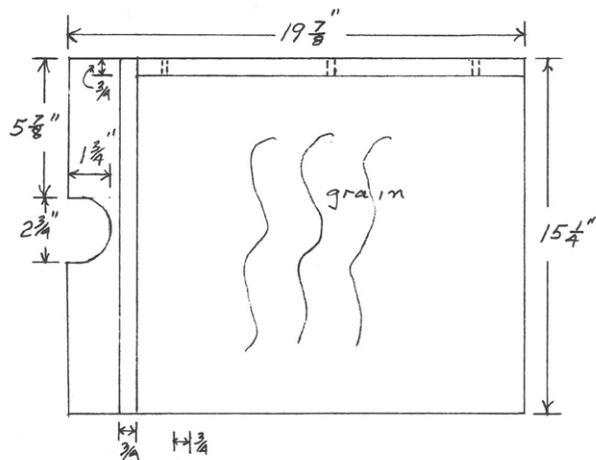
Scale = 1/4"



Side Face Frame



Front Face Frame

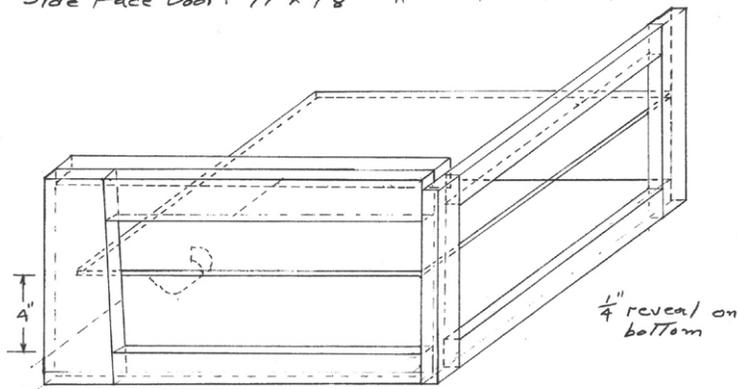


Base

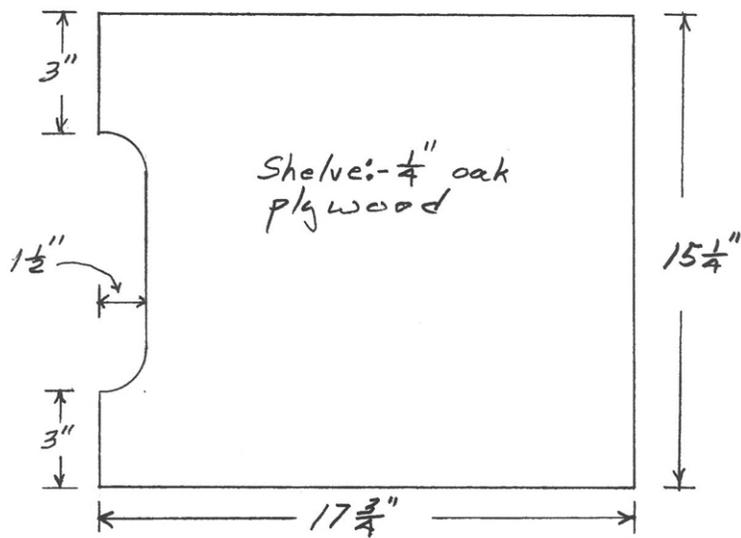
ATTACH Face Frame To  
Base using #20 biscuits

Front Face Door:  $14" \times 7\frac{3}{4}"$  from Born Free Motor Coach

Side Face Door:  $17 \times 7\frac{7}{8}$  " " " "



Cabinet Assembly



## MotoSat MD500 Technical Specs

### REFLECTOR TYPE

20" Effective area, elliptical offset

### MAXIMUM MOUNT ROTATION

Elevation:  $145^\circ$

Azimuth:  $375^\circ$

Skew (Polarization):  $\pm 55^\circ$   
Max look angle at:  $+75^\circ$

#### MOTOR

12VDC  
3-Motor Axis: Elevation, Azimuth and Skew  
Typical Motor Voltage: .7 Amps  
Surge Motor Voltage: 1.2 Amps  
RPM: 4.5

#### SPEED

Deploying Elevation:  $10^\circ$  per second  
Deploying Azimuth:  $12^\circ$  per second  
Peaking:  $12^\circ$  per second  
(Acquisition time is 2 to 4 minutes typical)

#### DIMENSIONS OF DISH

Length (Stowed): 35.25 Inches  
Width (Stowed): 21 Inches  
Height (Stowed): 10.5 Inches  
Weight: 35 lbs

#### CABLING

Receive Cables: 2 x RG6  
Electrical Data Interface Cable [Control Cable]: 9 conductor 22AWG 30'

#### ENVIRONMENT

Wind Deployed: 60 mph  
Wind Stowed: 140 mph  
Temperature: Operational from  $-20^\circ\text{F}$  to  $125^\circ\text{F}$

#### CONTROLLER

Nomad, Nomad 2 Universal DVB Controller  
DVB Tuner: Yes  
Software: Embedded  
RS232C port for software updates  
Controller Voltage: 12V DC 4 Amp, 500mAMP  
Receiver Compatibility: Any Dish Pro Dish Network, or Bell ExpressVu Receiver

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I have the original pictures at a higher resolution about 1.2MB to 1.5MB file sizes if anyone is interested.