



Hardware Installation Guide





A GUIDE FOR THE PHYSICAL INSTALLATION OF THE DATASTORM MOUNT



This guide is provided as a help and not a total solution for every installation. Common sense and concern for customers equipment will make for a good installation.





IMPORTANT INFORMATION

PLEASE READ

	DANGER
	The Federal Communications Commission requires professional installation of the Satellite Return antenna assembly.

	CAUTION
	<ul style="list-style-type: none">• This device emits radio frequency energy when in the transmit mode.• To avoid injury, do not place head or other body parts between feed horn and satellite antenna dish when system is operational.• Unplug indoor power connection before performing maintenance or adding upgrades to any antenna components.

	CAUTION
	The Satellite Return antenna assembly must be installed in a location or manner not readily accessible to children and at least 6 feet above ground level.

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**MotoSAT DataStorm Mobile Two-Way Internet
User's Manual Addendum
Regulatory Information**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Lower Control Unit (LCU-1) and Upper Control Unit (UCU-1) components of the DataStorm (together “the equipment”), and the associated connections, have been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not approved by MotoSAT [Mobile Technology, Inc.] for compliance could void the user's authority to operate the equipment.

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INSTALLATION GUIDE

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FIRST STEP

The first step of installation is to get a special Billing ID. The Billing ID is used when you load the DIRECWAY software to the computer for the first time. These billing ID's are unique for the TFES (Transportable Fixed Earth Station) DataStorm system. Billing ID's are provided by Hughes to bandwidth resellers.

Please contact your Bandwidth Provider for your billing ID. If you do not know who your bandwidth provider is, please contact your dealer.

OBTAINING A BILLING ID

Make sure the customer knows which Internet Package they would like, and whether or not they desire to have the Satellite TV option. Questions like "Do they require a Static IP address?"... Or "Do they plan to have more than one computer using the Internet Connection?" ...need to be known prior to getting the Billing ID.

Please get a Billing ID as soon as possible... *Prior to Installation.* Doing this could shorten the Installation time by hours. (Not Joking)

MINIMUM REQUIREMENTS

ROOF SPACE MINIMUM REQUIREMENTS

The DataStorm requires a 56" x 40" area in the center top of the vehicle to mount. Visually check to make certain that the dish arm does not hit any other mounted antenna or other device such as an Air Conditioner as it rotates on its axis.



COMPUTER MINIMUM REQUIREMENTS

- Pentium III 500 MHz or Celeron at 800 MHz.
- 128 Megs RAM.
- 120 Megs hard drive space.
- CD-ROM Drive.
- Windows 2000 Professional, XP Home or Professional

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- Available USB Port.
- Available Serial Port.
- A working Dial-up Modem (for one time connection to activate dish)
- System Disk for Windows (if some required programs were not installed originally on your windows system).
- 800 x 600 monitor display

RECOMMENDED TOOLS



Power Screwdriver - A Short head driver is good for tight situations.



Stud Finder Tape Measure Volt Meter Fish Tape



Hole Drill Wire Strippers TC-360 DLS Electronics
(Different sizes) Coax Cable Crimping tool



Coax Cable Stripper Long Drill Bit for
Pilot Holes



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7/16 Screw Driver Mini Screwdriver
Open Ended Wrench Philips #2 Flat Blade

RECOMMENDED HARDWARE

*USE THE PROPER SCREWS FOR THE TYPE OF ROOF YOU HAVE.
Stainless Steel Hardware is ALWAYS recommended.*



Fiberglass
Roof



Metal
Roof Only



Wood or Composite
Roof



Screw size recommended (depending on roof structure) #14X1"

FIBERGLASS ROOFS – Must pre-drill. Self-tapping screws will chew up and damage the roof. Use non-self tapping screws.

METAL ROOF – Metal roofs may use self-tapping screws.

WOOD OR COMPOSITE – Sheet Metal Type, *non-self*tapping screws.

OTHER RECOMMENDED HARDWARE



Cable Clamps

Zip Tie Straps



Dicor Sealant



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Dielectric Grease

COMMON SENSE

We strongly recommend that DICOR roof sealant be used with any job where holes need to be sealed on a vehicle. Dicor has proven to be superior to other silicon sealants.

Dielectric Grease is needed to create a water tight barrier for electronic connections. Please make sure that the grease you are using is dielectric, which means it does not conduct electricity.

COAX CABLE (also know as RGG)

The DataStorm is shipped with 30' of coax cable to wire your system. If you choose to purchase additional coax cable, it MUST be of a high quality and swept-tested.

COAX CABLE CONNECTORS

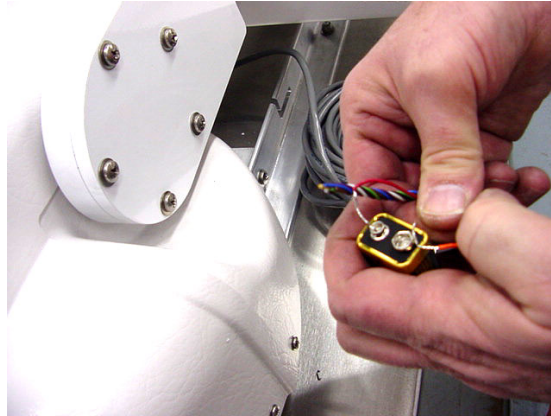
MotoSAT insists that you use coax connectors that **do not have a rubber washer** for weatherproofing. We recommend using very high-grade connectors and sealing them with Dielectric grease upon installation. These connectors are exposed to severe weather and should be treated as vital connections.

STEP 1. UNPACKING THE DISH FROM THE SHIPPING CRATE

Remove the screws that hold the DataStorm to the shipping crate and remove the DataStorm Dish.

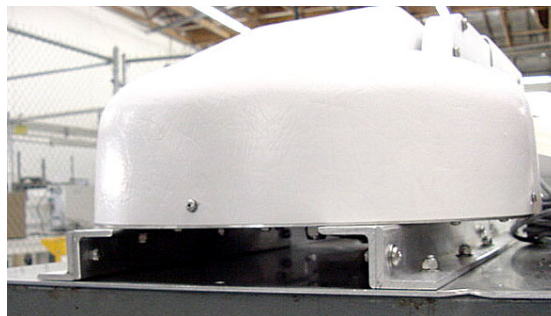
RAISING THE DISH MANUALLY - To raise the dish after unpacking it from the shipping crate, find the Control Cable that is connected to the mount. You'll notice two wire leads (Red & Orange) sticking out from the Control Cable. To raise the dish, connect the Red lead to a positive 12-volt or 9 volt lead, and the Orange lead to negative. (Use of a Power Screwdriver battery is also recommended). Reverse the leads to lower the dish.

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WARNING – WHEN RAISING THE DISH MANUALLY, THE CONTROL CABLE **MUST NOT BE CONNECTED TO THE MAIN CONTROLLER!** If the control cable is connected to the Main Controller when you manually move the dish, you will damage the internal circuitry. If the Control Cable is already connected to the Main Controller and you want to raise or lower the dish manually, **DISCONNECT the Control Cable from the Main Controller FIRST.**

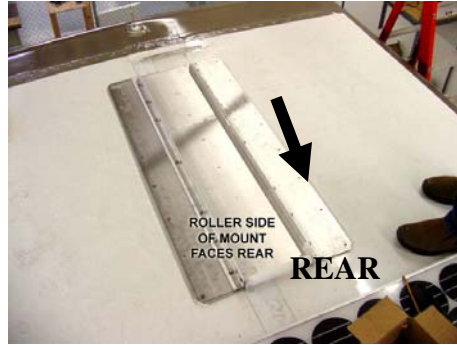
STEP 2. REMOVING MOUNTING PLATE FROM THE DISH (OPTIONAL, you do not have to remove the mount from the mounting plate for installation. It may be helpful in some situations.)



Four screws attach the Dish Mount to the Dish Mounting Plate. Locate and remove the four screws and lift the Mount off the mounting plate.

STEP 3. FINDING A GOOD MOUNTING LOCATION

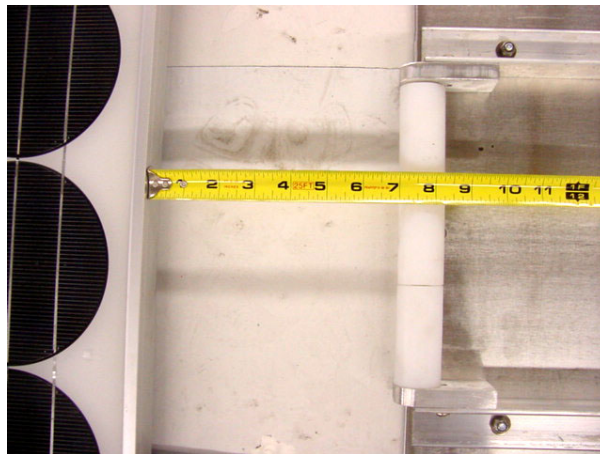
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WARNING - Make sure the roller side of mount faces **the REAR** of the vehicle.



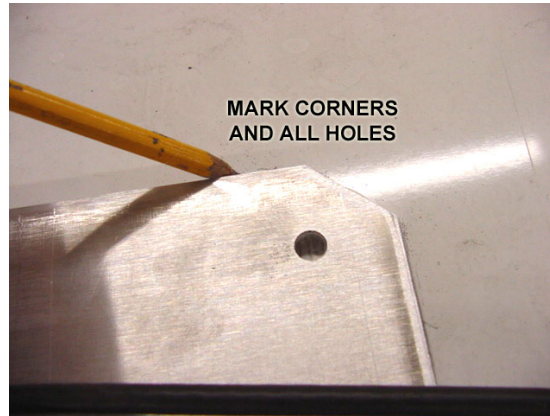
Place the Mounting plate in the center of the Roof. Use a Stud Finder to help you find cross beams that line up with some of the holes. Screwing into cross beams help secure the DataStorm to the roof and provide good stability.



Make certain that you have at least 7 inches between the roller bar and any item behind the bar.

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STEP 4. MARKING THE POSITION OF THE MOUNTING PLATE



You will need to mark the corners of the mounting plate as well as the holes you intend to drill through for later realignment. Notches are located in each end of the mounting plate to be used for relocating of the mounting plate after pre drilling the mounting holes. Mark and use for realignment.

STEP 5. PRE-SEALING THE ROOF



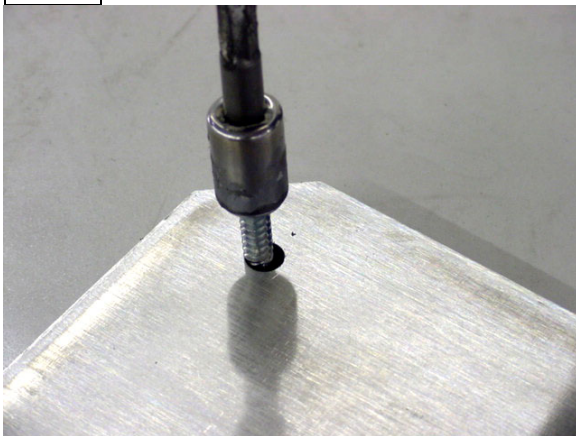
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Lift the Mounting Plate, and Pre-Fill all holes to be used.

Note: When **pre drilling**, drill and then fill the hole, **when using self-tapping screws**, use the technique shown above.





STEP 6. PLACE THE MOUNTING PLATE AND SCREW INTO PLACE



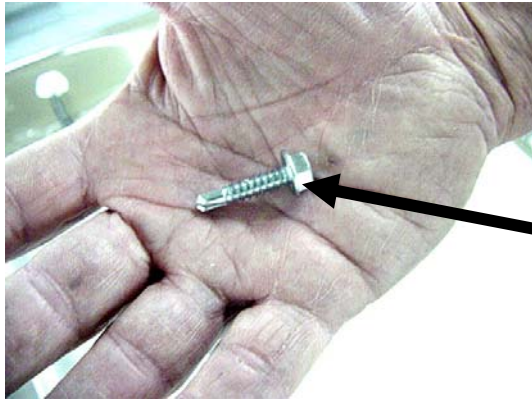
Note: The Mounting Plate comes with predrilled holes. When securing the mount to the roof, use as many of the holes as required for the job. Know your roof structure and capabilities.

CAREFULLY move the mounting plate over holes and slowly drop it into place. Center the holes over each marking and press down slightly on plate. Once centered, attach the plate to the roof with short screws.

	WARNING
	<ul style="list-style-type: none">• Verify before you drill that there are no electrical wires in the wall near where you will be drilling.• You may be killed or seriously injured if you contact wiring while drilling.

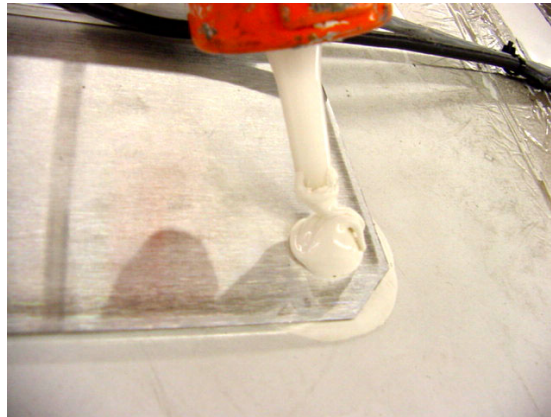
NOTE - In the illustrated installation, the roof is rubber on top of a wood foundation.

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NO!

YES!



Cover up each screw with Dicor to prevent moisture penetration.

STEP 7. ATTACHING DISH TO MOUNTING PLATE

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IMPORTANT

ALWAYS

1. Loosen the 4 bolts that attach the mount to the Stabilizing Rails and then loosen the nuts on each of the Stabilizing Rails.
2. Then, retighten the 4 bolts that attach the mount to the Stabilizing followed by retightening the nuts on the Stabilizing Rails (in that order).

FAILURE TO FOLLOW THIS PROCEEDURE CAN RESULT IN BINDING OF THE AZIMUTH ROTATION OF THE MOUNT.

Drop the Dish Mechanism to the mounting plate and insert the four bolts/nuts that secure the dish to the mounting plate.

STEP 8. RUNNING WIRES

WARNING – Make sure your wire run does not parallel any AC wires in the vehicle. Doing this may cause interference into the wiring, and the dish electronics could be affected.

The following cables are supplied:

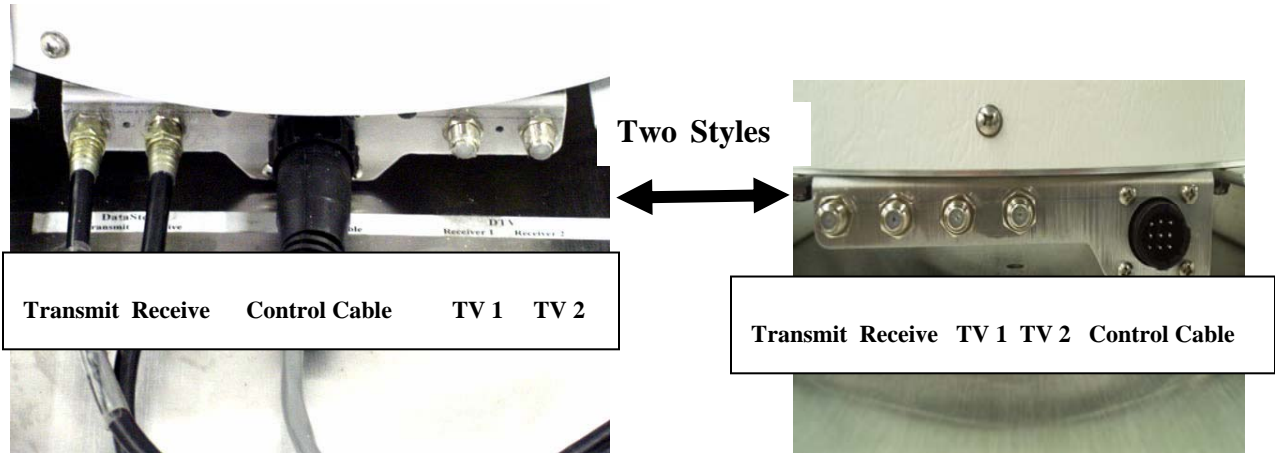
- 1 ea Control Cable
- 2 ea RGG coax cables with solid copper center conductor for the Receive and Transmit connections to the Main Controller (Commscope 5729 or equivalent)

RUN THE RGG COAX TRANSMIT, RECEIVE and CONTROL CABLE to a location inside the vehicle close to the customer's PC where the installation of the DIRECWAY Receive and Transmit modems and the Main Controller will take place.

NOTE - The modems will need to be fairly close to the computer. **Maximum run length of the USB cable is 10'.**

FRONT OF DISH MOUNT WHERE CABLES CONNECT TO THE MOUNT

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PREPARING WIRES – Take care in connecting coax connectors to the coax cable. Many errors are the direct result of improper Coax Cable connections.

Cables to run....

- Transmit Modem (ITU) - 1 RGGU
- Receive Modem (IRU) - 1 RGGU
- Control Cable - 1 DataStorm
- Satellite TV - Optional - up to 2 RGGU

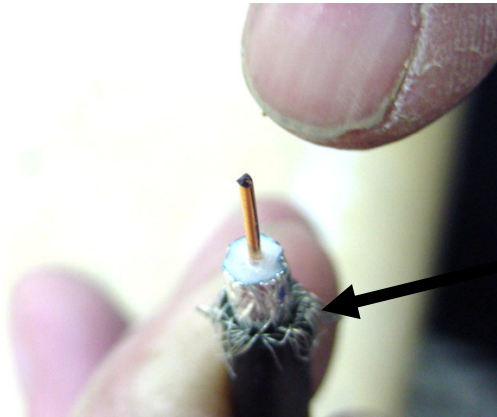
Coax Connector Installation Instructions



Use a cutting tool to cut the end of a coax cable. This tool can be purchased at any Radio Shack store.

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NOTE - FOLD THE STRANDS BACK OVER THE PLASTIC COVER.



Di-electric jell is to be placed at this location to seal the connector.

It is important that you fold over the wire strands of the coax cable over the outside plastic covering so that proper grounding is made to the connector you will be attaching... Not doing this will result in systems going bad while on the road.

Also...make certain that no metal wire strands are shorting the center wire of the coax cable.



Attach Coax Connector to end of Coax Cable



Use a crimping tool to secure the connector to the cable.



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Finished Coax Connector



Put dielectric Grease into the ends of each connector that is exposed to outside elements. The dielectric grease will make sure you maintain a waterproof seal.



Mark the Transmit cable at both ends.

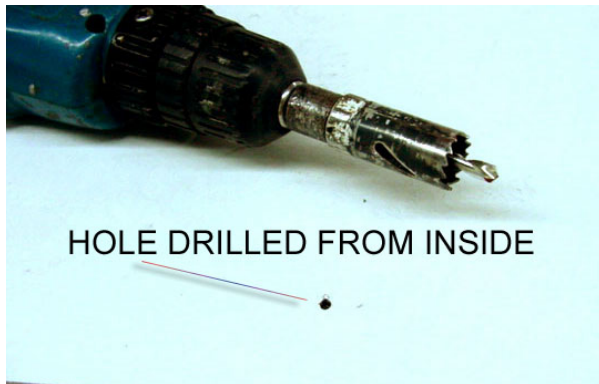
	WARNING
	<ul style="list-style-type: none">• Verify before you drill that there are no electrical wires in the wall near where you will be drilling.• You may be killed or seriously injured if you contact wiring while drilling.



From inside the vehicle, locate cable entry, and drill a hole with a **long** narrow drill bit through to the roof. This will give a pilot hole when you drill from the top of the roof down.

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WARNING – Make sure your wire run **does not** parallel any AC wires in the vehicle. Doing this may cause interference into the wiring, causing the dish electronic to malfunction.

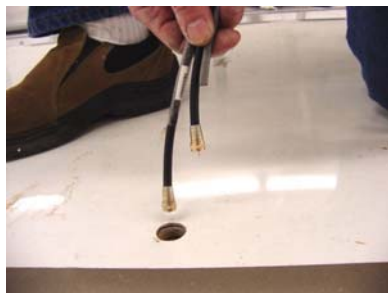


Note: Never drill straight through from skin to skin (outside through to inside). Stop after penetrating one skin to check for wiring that could be in the way. Failure to follow this simple procedure could result in severe electrical damage.

On top of the roof, a hole should be created from the long drill bit. Use a hole-drill bit to make a hole large enough for 2-4 coax cables and a control cable.



Drill a hole in the roof using the pilot hole as a guide. Drill till you are almost fully through the ceiling. Drill the last section from the inside of the vehicle up to keep the hole edges clean on both ends.



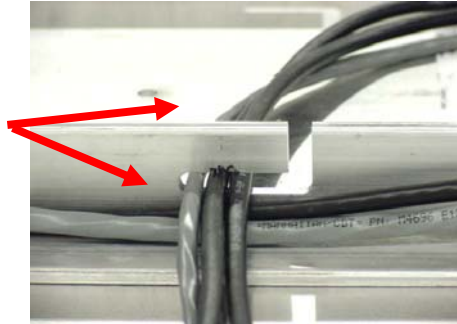
Run the wires through the hole on the ceiling.

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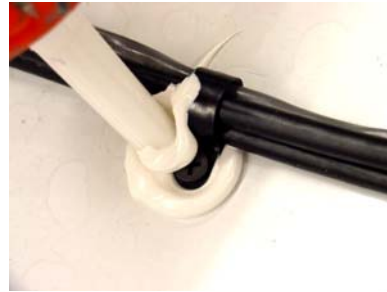


Use a plastic sleeve around cables at the hole if sharp edges can cut through the cables.

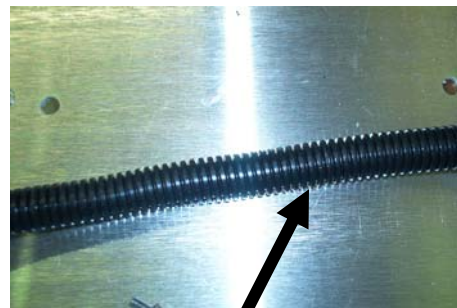
Cable ties at these locations will keep the cables from chaffing.



Run the cable through the slot on the mount.



Put a dab of Dicor under a cable clamp before you drill a hole to secure the clamp. After it is screwed in, cover the rest of the screw with Dicor.



Use of Split Loom (Hi Temp) is highly recommended for the "Professional" install.

Recommended

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Use Zip ties to secure wires to each other.



Use “Clam Shell” provided to cover cable entry hole. Use sealant under shell to seal entry.

Recommended

Spend time to assure a watertight seal where the cables enter the vehicle. Squeeze Dicor **between** the cables as well.



Connect cables to dish mount to complete the install on top of roof and secure the cable with cable clamps inside the vehicle in inconspicuous areas.

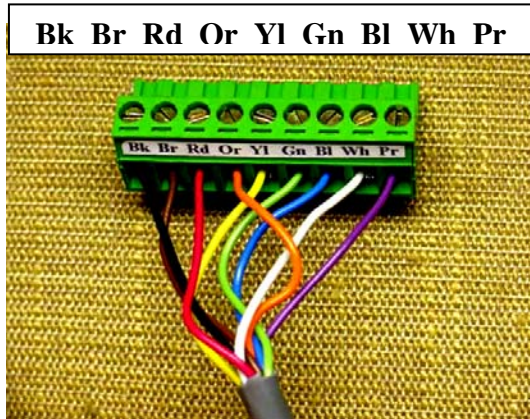
STEP 9. CONNECTING MAIN CONTROLLER & MODEMS



Cut the control cable to length once it has been pulled inside the vehicle. Remove 2" of the plastic cover to expose the wires.

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Use wire strippers to remove the sleeve around each wire, and the FOLD the wire back onto the sleeve as shown. (This makes a better connection).

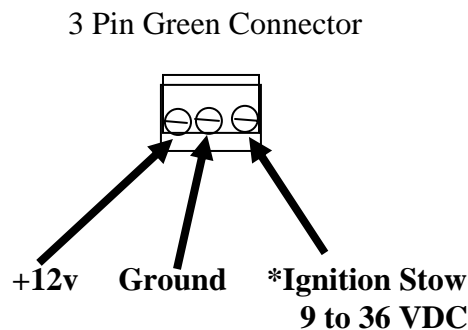


Improper wiring can cause damage to the DataStorm electronics (in the Mount as well as in the Controller). Be alert!

**Bk = Black
Br = Brown
Rd = Red
Or = Orange
Yl = Yellow
Gn = Green
Bl = Blue
Wh = White
Pr = Purple**

Using a small screwdriver, attach each wire to the green 9-Pin connector supplied. The connector is color coded so that each wire has a specific location to be secured into.

RUNNING 12 VOLT – You will have to run a 2-conductor cable (supplied) from a 12-volt source (**2 Amp Minimum, 3 Amp is preferred**) to the main controller. This power line should not be connected to the ignition where it can be turned off. It should always be on (such as an accessories socket) for safety reasons. Use a voltmeter to make sure that you have found a Positive and Negative lead. ***NEVER connect to a circuit that supplies power to a light fixture.***



Minimum Voltage

12 Volts DC
2.0 Amp

Improper voltage can cause system failure.

***Ignition Stow**

This pin will stow the dish, if it is up, when 9 to 36 Volts DC is applied. Find a DC Voltage source that is present when you want the dish to stow itself and wire it to this position.

MANUALLY MOVING THE DISH

WARNING – Make sure that you remove the 9-Pin Control Cable Connector from the back of the main controller BEFORE you put a power source to the dish control wires or you WILL damage the circuitry on the main controller.

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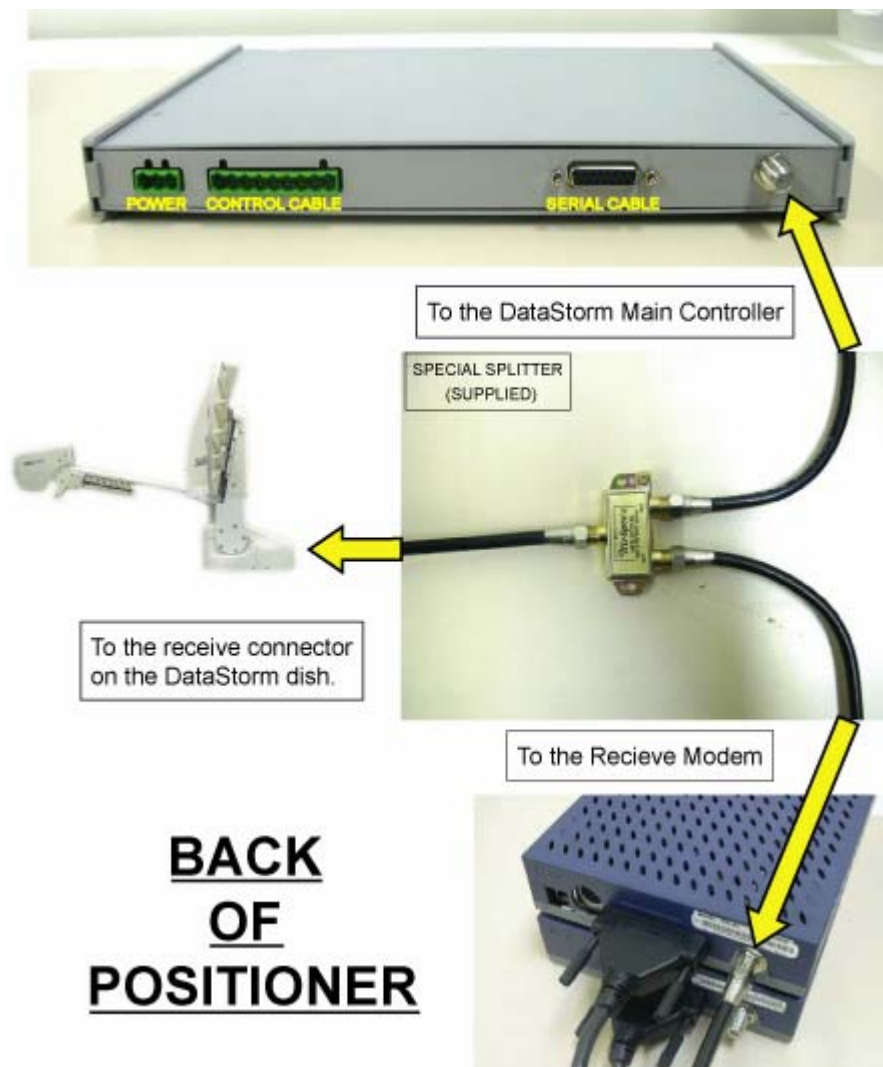
If you need to manually move the dish, you may do so by removing the 9-pin connector from the back of the main controller. Then, using a small screwdriver, remove the wires from the connector and plug in certain colors into the 12-volt power lead that powers the main controller.

ORANGE & RED wires - raise and lower the dish (**Elevation**).

BROWN & BLACK wires - rotate the dish (**Azimuth**).

BROWN AND RED wires - tilt the dish face (**Skew**).

Simply reverse the wires to make the movement reverse.



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- The Positive lead for the power line is Red and comes from a 12-volt power source such as a 12 volt accessory plug 2 Amp Min (prefer 3 Amp).
- The Control Cable connects to the dish on the roof.
- The Serial Cable connects to the computer.
- The "To Modem" line goes to the splitter.



Note: Air circulation is required to prevent premature or intermittent failure due to overheating. Failure to provide proper ventilation may void warranty.

There are only 4 cables that attach to the back of the DIRECWAY modems.

1. The far-left white cable is the USB cable that attaches to the computer.
2. The black circular cable is the modems power supply.
3. The top right Coax Cable is the Receive Modem that connects to the splitter (see wiring diagram).
4. The bottom right Coax Cable is the Transmit cable that is connected directly to the DirecWay satellite dish.

STEP 10. CONNECTING COMPUTER



Connect the Serial cable from Main Controller and locate the USB cable from the modem. The other cable in this picture is the power cable for the laptop.

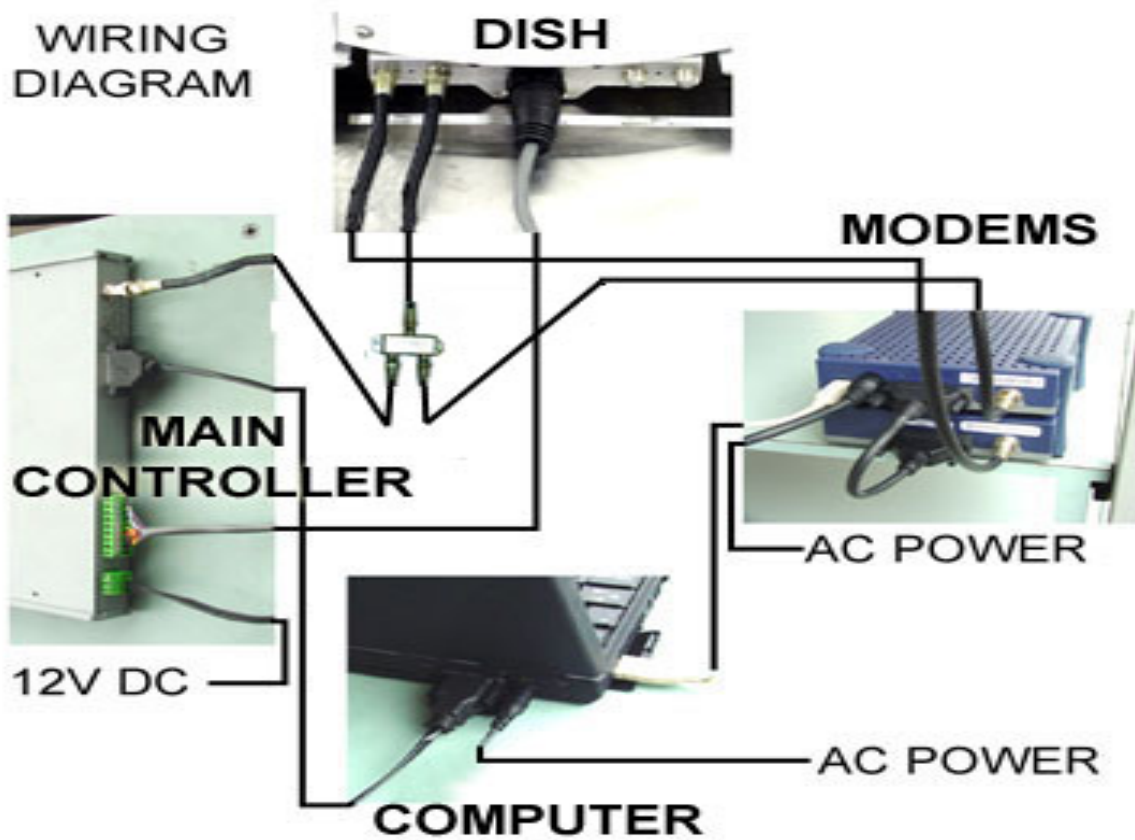
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We recommend that you install a UPS (Uninterrupted Power Supply)

WARNING – KEEP THE USB CABLE UNPLUGGED TO THE COMPUTER UNTIL (during initial setup) THE DIRECWAY SOFTWARE ASKS THAT YOU TO PLUG IT IN... OR ELSE THE COMPUTER MAY LOAD THE WRONG USB SOFTWARE TO THE COMPUTER.



Installation requires a phone line connection the *first time* the DIRECWAY software is installed and "Web Setup" is run. Please refer to the **Software Installation Manual** for this procedure.



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FINAL INSTALL TEST – If the DataStorm folder has been copied over to your Desktop from the CD-ROM, simply open it and run the DataStorm software.

Once the main screen is open, click on "Test Dish" to see the dish is working.

Test dish takes approx. 10 minutes to perform.

For the purposes of installation, we are only concerned that the dish is receiving commands from the computer.

Test Dish should be run again following the Calibration Tilt procedure.

DATASTORM SPECIFICATIONS

MOUNTING PLATE DIMENSIONS

48" inches long by 21 ¾" inches wide.

MOUNTING AREA REQUIRED

40" wide by 56" long

DISH STOWED DIMENSIONS

**54" inches Long by 39 ½" inches wide
by 10 ½" inches tall.**

DISH FACE DIMENSIONS

39 ½" wide.

TOTAL WEIGHT OF DISH MOUNT

105 lbs.

MAIN CONTROLLER BOX

**1" inch tall, by 11" inches wide, by 9"
inches long. (Located inside the vehicle)**

TRANSMIT AND RECEIVE MODEMS

12" long, by 7" wide by 3 ¾" tall (Stacked). (Located inside vehicle)

OPERATING PARAMETERS

-20 degrees F to 120 degrees F

POWER

12 Volt DC 2 amp for Main Controller

120 Volt AC for Modems

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NOTE:

Air circulation to the modems is required to prevent premature or intermittent failure due to overheating. Failure to provide proper ventilation may void warranty.

FCC ID: K3Y1021938

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This product is the subject of one or more U.S. or foreign patents pending.

DirecPC is a trademark of Hughes Electronics Corporation.

Document#1030403-0001 Rev C

APPENDIX B – USE OF Bird on Wire (BOW) for Satellite TV Reception

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There is a lot of confusion concerning the proper Bird on the Wire configuration on each of the satellites that provide the Internet capability. This bit of information should clear up the confusion.

Bird on the Wire configuration for Internet satellite location and the proper BOW.

Internet

<i>Satellite Location</i>	<i>Name</i>	For <u>DirectTV®</u> 101°/110°/119°
99°	G4R	Kit A (101° only) (Mounts under LNB cover)
99°	G4R	Kit B* (110° and 119°) (DO NOT USE) The bracket will not clear dish and will cause an Interlock problem. Do not use this Kit B bracket.
116.8° (117°)	SatMex5	Kit B* (101° and 110°) (OK to Use)

Internet

<i>Satellite Location</i>	<i>Name</i>	For <u>Dish Network®</u> 101°/110°/119°
99°	G4R	Kit B* (110° and 119°) (DO NOT USE) The bracket will not clear dish and will cause an Interlock problem. Do not use this Kit B bracket.
116.8° (117°)	SatMex5	Kit A (119° only) (Mounts under LNB cover) (OK to Use)
116.8° (117°)	SatMex5	Kit B* (101° and 110°) (OK to Use)

Note: It is possible to use both Kit A and Kit B together when using SatMex5.

*Kit B contains two brackets.

- One for satellite 99° for TV 110° and 119° **(Do Not Use)**
- One for satellite 116.8 ° (117°) TV 101° and 110° **(OK to Use)**
- MUST HAVE MotoSAT Extender Bracket, supplied by MotoSAT, installed to use the “B” Kit (NO EXCEPTIONS).**

HDTV IS NOW AVAILABLE FOR YOUR DATASTORM!

FOR DIRECTV ON SATELLITE 117° (SATMEX 5) ONLY

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