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# Satellite Dish Installation Manual

Provided by  
DiscoverNet, Inc.

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## Section 1: Introduction

Welcome to SkySat DSL, the affordable High Speed Internet solution for anybody, anywhere. Please keep these things in mind during installation:

1. Software installation support is available 7 days a week from DiscoverNet. (9am - 9pm Monday – Friday | 12pm - 8pm Saturday – Sunday)
2. If you find that you cannot successfully install your SkySat DSL system yourself, one of DiscoverNet’s professional satellite installers can be called upon to finish the install for you. However, **you will still be charged the full install price no matter what stage of the install you are on.**
3. **Please read this manual thoroughly before starting the install.** If you have any questions, please call us at (888)284-4531.

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## Section 2: Recommended Tools and Materials

***Note: The items below are not included with this system and will need to be obtained separately. Please read this manual completely for additional tools and materials.***

1. Satellite signal meter (preferably a Birdog or similar)
2. Compass
3. 7/16" and 1/2" Wrenches
4. Socket Set
5. Drill (hammer drill is preferred for brick walls)
6. 5/16 Wood or Masonry Bit
7. 5/16 Lag Bolts for a wooden structure or 5/16 concrete anchors for a block or brick wall
8. Torpedo Level
9. Phillips-head Screwdriver
10. Channel Lock or Pliers
11. Coaxial Cable (RG-6 60%)
12. Coaxial ('F' Connectors)
13. Coaxial Cable-stripper
14. Coaxial Cable-crimper
15. Feed-through Bushings
16. Caulk
17. Permanent Marker

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## Section 3: Getting Started

The first step in installing your Satellite Dish is to make sure you've received all of the components. You should have:

1. Satellite Dish
2. LNB
3. Satellite Modem (Internal PCI or External USB)
4. DiscoverNet SkySat DSL CD ROM
5. SkySat DSL Software Installation Manual



Satellite in Shipping Box



LNB



Internal PCI Satellite Modem



External USB Satellite Modem



SkySat DSL CD ROM

### SkySat DSL v2.2.4 Installation Manual

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Installation Manual

The next step is to determine where on your property is the best place for installing the antenna.

The included SatFinder software will assist in obtaining the correct Azimuth and Elevation to properly align and locate the satellite dish.

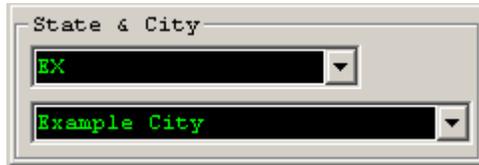
You can find SatFinder in the 'Tools' folder of the SkySat DSL CD. If you simply insert the CD now, it should create a folder on your desktop named 'SatFinder' with the software in it.

SatFinder is also available online in the Downloads Section of [SkySatDSL.com](http://SkySatDSL.com).

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In **SatFinder**, there are a few things you are going to need to consider.

- You can enter in your location by City/State.



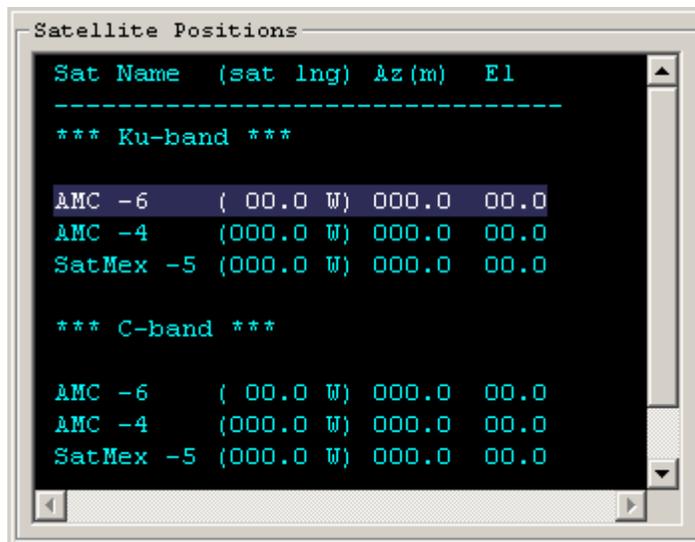
OR

- You can enter your location by Zip Code (hit '**Compute**' to get results).



There is also an option below the Zip Code section to enter in GPS co-ordinates if you know your current GPS location.

Once you've entered your information, results will appear on the right side of the window.



Please refer to the AMC-6 line of the Ku-Band section for your Azimuth and Elevation values. Disregard the other values.

**NOTE: The Azimuth correlates to what you want your compass to read. In Azimuth, 0° is due North, 90° is due West, 180° is due South and 270° is due West.**

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Once you have the position of the satellite, walk the property with a compass (shown in Figure 1) to determine the best placement of the dish with a **CLEAR VIEW** towards the satellite. This means there can be no buildings, trees, power lines, etc., between your compass and the sky. Then determine where the computer is located and how the cable needs to be run to reach the computer.



Figure 1

Now, let's begin to assemble the satellite dish. First, lay out all the parts included in the antenna box (refer to Figures 2 - 6).



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6

***NOTE: Your dish may be slightly different than the example in this manual. Please refer to instructions included with the dish for more detailed assembly instructions.***

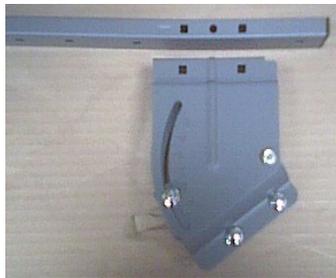
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## Section 4: Satellite Dish Assembly

Lay the dish flat to ensure it is not out of shape or damaged. Then attach the left and right reflector brackets and hand tighten them using four (4)  $\frac{1}{4}$ " x  $\frac{1}{2}$ " round head bolts and  $\frac{1}{4}$ " hex nuts.

Assemble the LNB Mast Bracket using two (2)  $\frac{1}{4}$ " x 2" round head bolts with  $\frac{1}{4}$ " hex nuts on the sides and two (2)  $\frac{1}{4}$ " x  $\frac{7}{8}$ " round head bolts with  $\frac{1}{4}$ " hex nuts on the end of the bracket.

Then, attach the bracket to the dish using two (2)  $\frac{1}{4}$ " x 1" round head bolts and  $\frac{1}{4}$ " hex nuts on the top and bottom and one (1)  $\frac{1}{4}$ " x 1" bolt and  $\frac{1}{4}$ " hex nut on the end of the LNB Bracket to secure the LNB after the dish has been mounted.



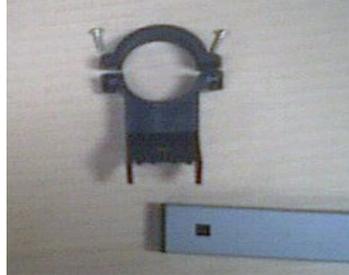
LNB Arm & Mast Bracket



LNB Arm & Mast Bracket



Mast Bracket Attached



LNB Clamp - Bracket



LNB Clamp - Bracket

Tighten all nuts and bolts with the  $\frac{7}{16}$ " ratchet wrench or socket. Insert the plastic covers at the ends of the LNB Bracket, and set it aside.



Front View of Dish



Rear View of Dish

Now let's work on installing the Mast Bracket. Go on to **Section 5** (page 9) if you intend to Wall-Mount it, **Section 6** (page 10) if you intend to Pole-Mount it and **Section 7** (page 12) if you intend to Roof-Mount it.

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## Section 5: Wall-Mounting the Mast Bracket

First, find a smooth surface with a clear view of the satellite (refer to the Azimuth and Elevation you got from SatFinder).

**Masonry:** (See Figure 8) Drill a 5/16" pilot hole through the upper left hole in the bracket with the masonry bit. Using a torpedo level, **make sure the bracket is perfectly level and plumb**. Drill the remaining three (3) holes, and then insert four (4) 5/16" x 1 1/2" red head anchors for masonry walls.

**Wood:** (See Figure 9) Drill a 5/16" pilot hole through the upper left hole in the bracket with a wood bit. Using a torpedo level, **make sure the bracket is perfectly level and plumb**. Drill the remaining three (3) holes, and then insert four (4) 5/16" x 1 1/2" lag bolts.

**Note: The lag bolts and anchors are not supplied with the antenna.**



Figure 8



Figure 9

Attach the pole to the bracket you mounted with one (1) 1/4" x 2 1/4" hex head cap bolt with 1/4" hex nut through the bracket and pole. At this time, simply hand-tighten to allow for adjustments. Using the torpedo level, adjust the pole so that the vertical section is **level and plumb** (refer to Figures 11 and 12).



Figure 11



Figure 12



Figure 13

Attach the clamp and side brackets using one (1) 5/16" x 3" hex screw with 5/16" hex nut and two (2) lag bolts for either wood or concrete as required (refer to Figure 13). **Make sure the pole is level and plumb** and then tighten everything down.

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## Section 6: Pole-Mounting the Mast Bracket

### Recommended Tools and Materials:

1. Post hole digger
2. Shovel
3. Concrete
4. Wheelbarrow or large pail for mixing concrete
5. Steel Pipe - 6 foot (it is recommended that you bring your mast bracket with you to ensure you have the right size pipe)
6. Flange
7. 4 bolts with nuts  $\frac{1}{4}$ "
8. Cinder Block 8" square (to fit over pole on ground)

Find a place on the property close to where the cable will penetrate the wall that has a clear view of the satellite (refer to the Azimuth and Elevation from **Section 3**) for placement of the pipe.

Screw the flange onto the pipe and insert the four (4) bolts looking up from the bottom and attach the nuts. This will prevent the pipe from spinning in the hole. Set aside until the hole is ready (refer to Figures 14 and 15).



Figure 14



Figure 15

Dig a hole in the ground approximately 3 feet deep and 8" round. Insert the pipe with flange on the bottom, and fill with concrete (refer to Figures 16 and 17).



Figure 16



Figure 17

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When the hole is filled to the ground level, insert the block over the pipe and fill with concrete (refer to Figures 18 - 20). **Make sure the pipe is perfectly plumb and level.**



Figure 18



Figure 19



Figure 20

Continue to check the pipe for level and plumb. Once the concrete hardens, you are ready to insert the dish over it and continue with the installation.

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## Section 7: Roof-Mounting the Mast Bracket

***Note: DiscoverNet does not support the penetrating of any roof nor will DiscoverNet be held liable for any damages resulting from the mounting of the dish on to or on top of any structure of any kind.***

### Recommended Tools and Materials:

1. Felt Paper
2. Cinder Blocks
3. Dry Wall Bead
4. Tin Snips

This section will outline a low cost method for installations of this type. However, it should **never** be used in a public building, a building over two (2) stories, or a high wind area. If you need clarification on this, please call (888)284-4531 for assistance.

Installing the dish on a flat roof can be dangerous if not done properly. Before going forward, DiscoverNet recommends that you contact a structural engineer to calculate wind load and stress factors as well as purchase an approved non-penetrating roof mount with the appropriate number of blocks.

Lay out the felt paper under the blocks. Using three (3) blocks initially, attach the Mast Bracket to the cinder blocks by drilling holes through the top of the blocks and attaching the bracket using four (4) 5/16" x 2" bolts, flat washers and lock washers with the 5/16" hex nuts and one (1) 5/16" x 2" bolts, flat washers and lock washers with the 5/16" hex nuts on each of the side brackets. Use additional washers as needed for leveling and plumbing of mount. Lay out the additional blocks; following the block pattern diagram (refer to Figure 21-23).



Figure 21



Figure 22

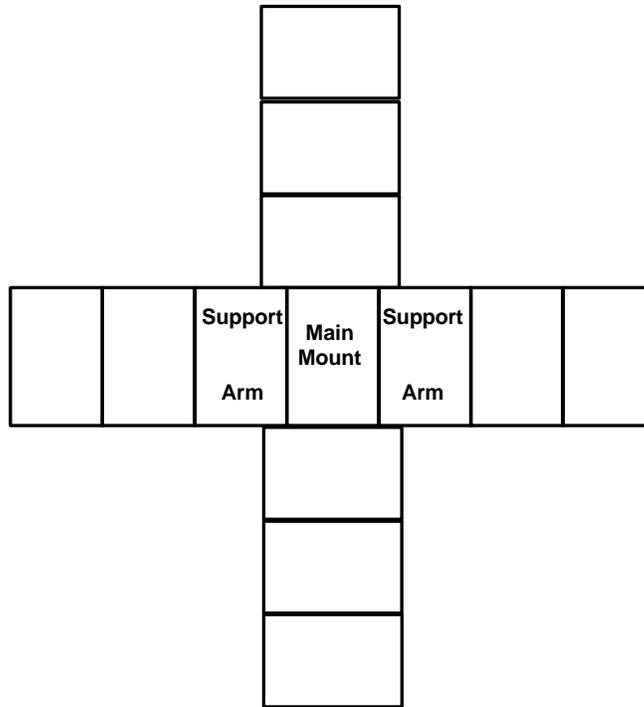


Figure 23

Using your tin snips cut the bottom side of the dry wall bead, then bend it into a 90 degree angle, and insert it under the blocks. At each row end, cut it again and wrap the blocks. This will make a secure channel that the blocks will set in. You can attach the overlapping bead with a screw and nut or a rivet if available. Also, it is recommended to place cement bags on the blocks for extra weight.

**Make sure the pole is perfectly level and plumb** and then continue with the installation.

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## Section 8: Attaching the Satellite Dish and LNB

Carefully lift the satellite dish you assembled earlier and place it over the pole so it slips down (refer to Figures 24 and 25). Then slightly tighten the bolts.



Figure 24



Figure 25



Figure 26

Attach the LNB to the bracket (see Figure 26) and position the “F” connector at the ‘7 o’clock position (see Figure 27).

The LNB should be placed in the middle of the bracket. The “F” connector should face the ‘7 o’clock position when looking towards the front of the dish (see Figure 27). The LNB must be placed in the center of the bracket (see Figure 28).

To optimize the signal quality, slide the LNB in both directions (as shown in Figure 29) and find the peak signal (see Section 11 for Signal Measurement information).



Figure 27



Figure 28

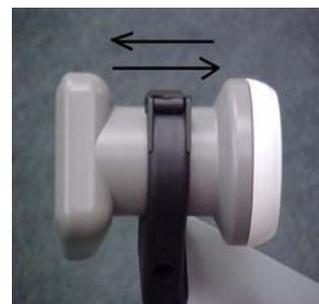


Figure 29

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## Section 9: Coaxial Cable and Connectors

The RG-6 cable should be of 60% or better braiding, copper clad and no longer than 150 feet in length.

There are many approved manufactures of "F" connectors. DiscoverNet recommends F56-324T connectors by Holland Electronics, Gilbert and LRC (see Figures 30 and 31).



Figure 30



Figure 31

These outdoor connectors have a ring and sealant that is used for weather protection. We also recommend using a weather boot for additional protection.

In installing the connectors, strip the coaxial cable with a cable stripper (9/16") to expose the white dielectric. Then, strip the white dielectric to expose 5/16" of the copper center conductor (see Figure 32). The outside of the center conductor carries the signal, be very careful not to score or damage it.

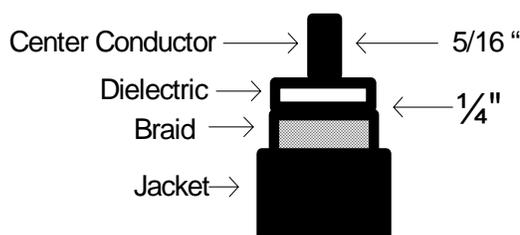


Figure 32

**Note: Make sure the center conductor is clean of all materials, and that none of the braiding is touching it. If the braid or shielding touches the center conductor, it can short out the LNB and attenuate the signal.**

Carefully slip the stripped cable into the connector. Again, **make sure that only the center conductor fits through the hole.** Push the cable into the connector until the white dielectric is level with the bottom of the nut. Crimp the connector with a hex type RG-6 crimping tool.

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To test the 18Vdc voltage from the modem, connect the coaxial cable to the modem after it is installed. Next, using an approved volt meter set the probes to read DC voltage. Place the common probe (-) on the outside of the connector, and the positive probe (+) on the center conductor. This should read +18Vdc.

If there is no voltage, check the connector(s) carefully to ensure that there is no braids shorting it out. If the coaxial cable is clean, you may have a bad satellite modem and you should contact DiscoverNet technical support.

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## Section 10: Grounding the Satellite Dish

The satellite installation should be grounded to prevent any damage to your computer. Please refer to the NEC codes in your area for specific rules and regulations.

If there are no specific codes, DiscoverNet recommends the following:

1. Install an approved ground block before the point where the cable penetrates the building.
2. Make sure you install weather boots and the correct outdoor connectors.
3. Run a #6 solid copper insulated wire to a cold water pipe or an electrical meter if it's within 25 feet of your ground block.
4. If not, insert an 8 foot ground rod into the ground. Connect the insulated wire.
5. There are ground blocks with lightning arrestors for additional protection available.
6. Use a surge protector for protection where you plug your computer into the wall outlet.

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## Section 11: Signal Measurement

While aligning your dish, you can measure your signal strength by using either the indicator built in to your satellite modem's software or a signal level meter.

Note that if **you use the satellite modem to measure your signal**, you will need to first follow the instructions in Sections 1 - 4 of the SkySat DSL Software Installation Manual to make sure the modem and its software are properly installed.

Once those steps are complete, you can go back into the '**Setup4PC Window**' (as described in the beginning of Section 4 of the SkySat DSL Software Installation Manual) and click on the '**Status**' button to view the current signal strength (labeled '**Signal Quality**').

Signal strength updates every few seconds, so there will be some delay from when you move the dish and when the change registers on the computer screen. If you can't see the screen, have someone watch it for you during the moving process so you can ensure the best-possible signal.

Also, remember that your computer should be powered off and unplugged whenever connecting or disconnecting the RG-6 coax cable. You can damage your satellite modem by connecting and disconnecting the RG-6 while your computer is powered on and plugged in.

Of course, the computer will need to be turned on again in order to get a signal reading.

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## Section 12: Satellite Dish Alignment

Now, connect the coaxial cable from the LNB to a Signal Meter or the satellite modem (make sure the computer is off before connecting).

Refer to your SatFinder results from Section 3 of this guide for your Elevation. Lightly tighten all the bolts on the elevation bracket and mast bracket to allow for slight movement and adjustment.

Standing at the rear of the dish, carefully set the elevation by adjusting the bolt to the respective setting (refer to Figures 33 and 34). Remember to tighten the bolts enough so that the dish won't slip, but is still slightly movable.



Figure 33

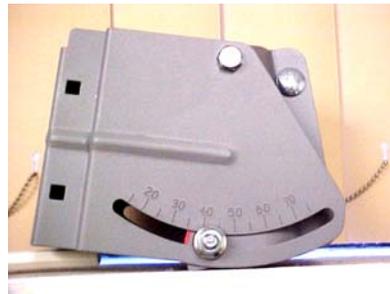


Figure 34

Refer to your SatFinder results from Section 3 of this guide for your Azimuth.

Standing behind the dish, move it towards the correct compass setting. Now, **very slowly**, move it in both directions until you receive a signal on your meter/screen. Then move the dish **very slowly** up and down to peak the signal.

Then turn the LNB very slowly and move it in and out of the bracket. These steps should be done repeatedly, until the maximum signal is received. Once you are satisfied with your signal strength, tighten all the bolts.

Using a permanent marker, draw a line on the elevation bracket where the bolts are and also three (3) lines on the mast bracket to the pole for a reference should the dish ever move. Confirm the elevation setting on the bracket.

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## Section 13: Finishing Up

**If you used a Signal Meter to align the dish,** refer to Sections 1 - 6 of the SkySat DSL Software Installation Manual to complete the installation of the receiver card and its software.

**If you used the Setup4PC Status window to align the dish,** you should now follow the instructions provided in Sections 5 and 6 of the SkySat DSL Software Installation Manual to verify that you are able to connect to and use your SkySat DSL service.

**Enjoy the Speed of the Internet by DiscoverNet**