

SAN 24/MD 1

Installation Manual for DIRECTV PLUS™ Satellite Dish Antenna or DIRECTV PARA TODOS™ Satellite Dish Antenna

INTRODUCTION

This antenna system, depending on the equipment supplied, can receive signals simultaneously from up to three adjacent satellites located at 101°, 110° and 119° West longitude orbital locations.

The installation procedures listed in this manual require some basic skills in construction, assembly and wiring, to safely make the complete installation. Some of these skills are as follows:

- Using hand tools for assembly.
- Drilling and sealing holes in mounting surfaces.
- Using a bubble level to plumb the mast. (Critical alignment - See Figure 2B.)
- Using a compass and clinometer or protractor to determine clear line of sight to satellite.
- Running coaxial cables thru the home from the antenna to the receivers.
- Climbing on ladders or roofs to mount and wire the antenna.
- Knowledge on local and NEC grounding codes.

If you feel this is beyond your experience and skill level, then contact the store where the system was purchased for advice on available professional installation services.

WARNINGS

Local building and electrical codes (see latest revision of National Electrical Code) require proper grounding of the antenna mount and coaxial cables. Improper installations can cause damage to equipment, the building and *injury or death to you*. Contact a licensed inspector or electrician in your area for assistance.

WATCH OUT for *Powerlines* overhead, buried underground and hidden behind walls. Take extreme care to avoid contact with any *powerlines* with ladders, satellite system parts or tools during the installation to avoid *severe injury or death*.

TOOLS REQUIRED

- #1 Phillips Screwdriver
- 5/16 Hex Socket or Spintite
- 7/16 Hex Wrench open or combination end
- Electric Drill & bits
- Bubble Level
- Compass
- Clinometer or Protractor

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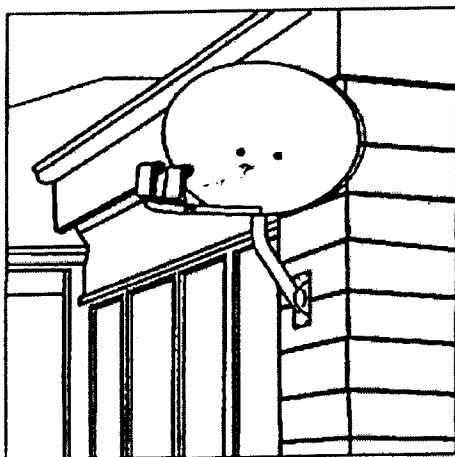
MOUNTING LOCATIONS

The typical mount locations are shown below. The mounting surface must be solid and rigid to prevent the antenna from moving during windy conditions.

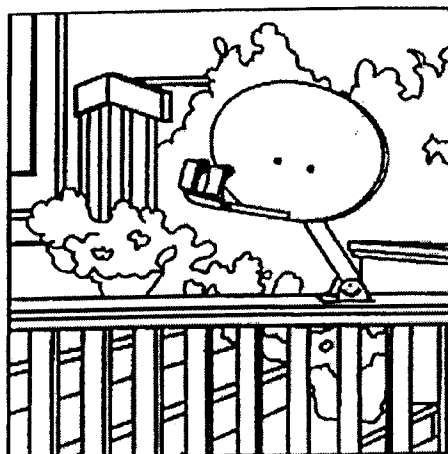
When attaching to wood framed structures use the center holes on the mounting base foot to fasten into the center of a stud or rafter.

When attaching to masonry structures use the four outside corner holes in base foot and four appropriate $\frac{1}{4}$ " double-expansion anchors or toggle bolts with flat washers (not included).

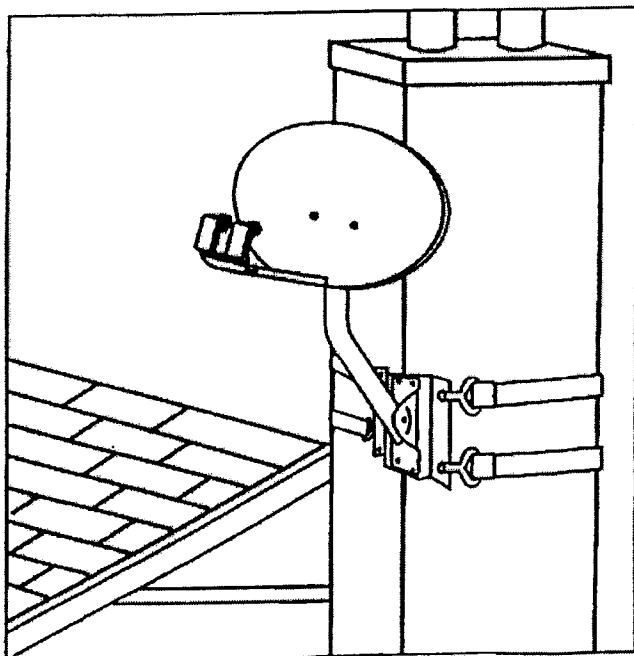
When using an optional accessory 1.66 O.D. steel ground mount pole (not included), dig a 12" diameter hole 36" deep for the pipe. **CAUTION: Make certain the area is free of underground utilities before digging.** Place flattened end of pipe in concrete to prevent rotation and attach required ground wire to punched hole. The pipe should extend at least 30" into the concrete pier.



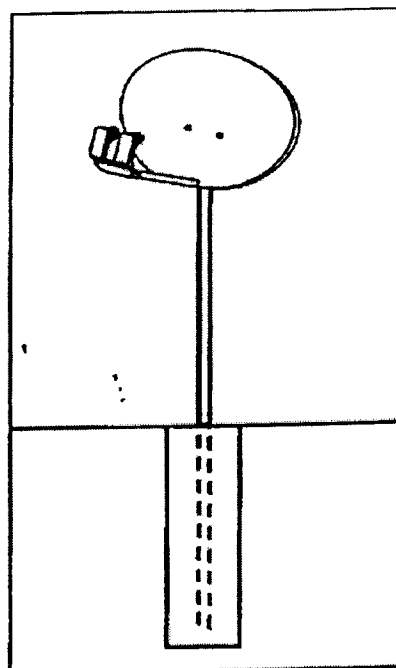
WALL MOUNTED



RAIL MOUNTED



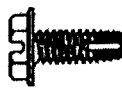
CHIMNEY MOUNTED
Requires optional mount kit



POLE MOUNTED
Requires optional mount kit

HARDWARE SORTER

Unpack and identify parts using figures in manual. Read manual thoroughly before beginning installation.



#10 Hex Washer Head Screw
(Ground Screw)
1 Supplied



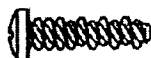
1/4" Lock Nut (ESNA Type)
3 Supplied
plus 1 with optional fine elevation bag



#8 x 1" Phillips Head Screw
(LNB & Adapter Mounting)
3 Supplied



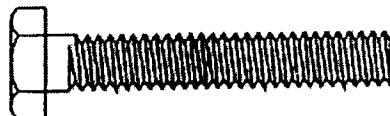
1/4" Hex Flange Nut
6 Supplied



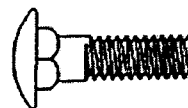
#8 x .625 Phillips Head
Hi-Lo Self Threading Screw
2 Supplied



#8 Insert Nut
(LNB & Adapter Mounting)
3 Supplied



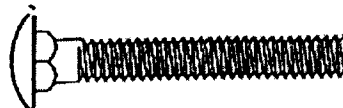
1/4" x 1-1/2" Hex Head Bolt
(Feed Tube Mounting)
1 Supplied



1/4" x 7/8" Long Carriage Head Bolt
(Azimuth Clamp Bolt)
2 Supplied



1/4" x 1/2" Long Carriage Head Bolt
(Most Adjusting Bolts)
4 Supplied
Plus 1 with optional fine elevation bag

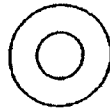


1/4" x 1-3/4" Long Carriage Head Bolt
(Antenna Mounting Bolt - Painted Head)
2 Supplied

HARDWARE SORTER (continued)



#8 Flat Washer
2 Supplied



1/4" Flat Washer
4 Supplied



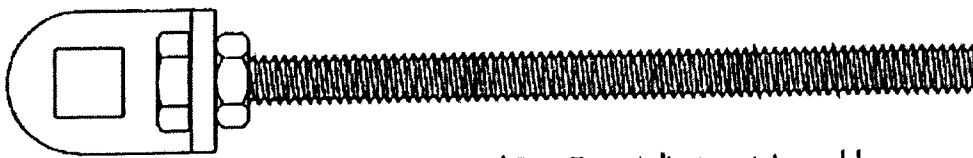
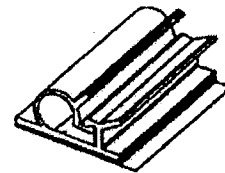
1/4" External Tooth Washer
2 Supplied



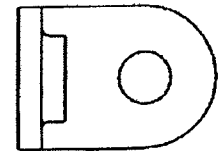
.81 Long Spacer
(Feed Tube Mounting)
1 Supplied



Self Adhesive Cable Clip
2 Supplied



Optional Fine Tune Adjustment Assembly
1 Supplied



SELECTING ANTENNA LOCATION

In this section, you will have to determine the azimuth, elevation, and tilt settings for your site. This information will be used for aligning the antenna to the satellite. Refer to the Satellite Receiver owners/instruction manual for this on-screen information found using your Zip code.

Write them here. Azimuth _____ Elevation _____ Tilt _____

- The antenna will need to point at the satellite in the Southern sky. Use a compass to find the azimuth direction the antenna will face. Pick a landmark or lay down a stick in that direction for reference from the mounting point. Metal objects or electrical devices nearby can affect the compass accuracy.
- Use a clinometer or protractor to make an elevation sighting or estimate the angle. 0 degrees is looking straight out at the horizon & 90 degrees is looking straight upward, so your elevation is in that range.
- Compass readings can be inaccurate relative to True North due to earth magnetic deviations in your area and hidden metal objects. *From this rough sighting allow plenty of clearance for the final alignment and remember trees grow up and out possibly blocking the signal in the future.*
- Also keep in mind the mount location in relation to the TV sets and how the cables can be routed. Take time to review all possible sights for the antenna before picking the best one, it will save time in the end.
- A 100mph wind can exert 135lbs. of force on the antenna surface, so be sure you pick a solid stable spot for the mount. Deflection or movement of the antenna in the wind can cause loss of signal.

ASSEMBLY STEPS

It is recommended that much of the assembly work be done on the ground in a clear area to prevent lost hardware.

1. On universal mount assembly insert (2) $\frac{1}{4}$ " x $\frac{1}{2}$ " long carriage bolts through mast and bracket slot and capture with a external tooth washer and flange nut. Install #10 self-tapping screw for ground wire attachment. See Figure 1.

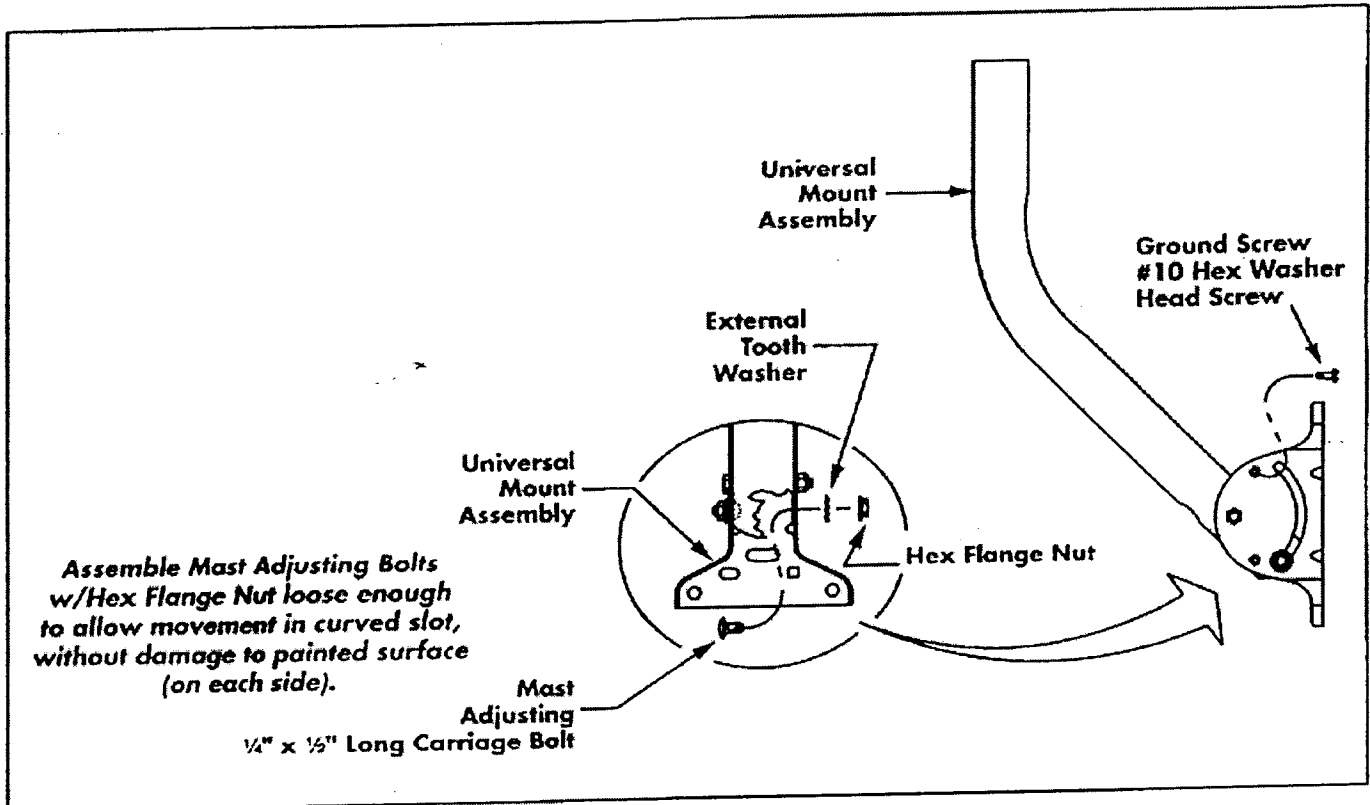


FIGURE 1

2. After the mounting location is determined drill mounting holes in the structure to match the Universal base bracket.

IMPORTANT! Take time to plumb the top straight section of the mast in all directions before drilling the holes in the structure and after the Universal Mount is installed. If the mast is not plumb alignment to the satellite will be very difficult or impossible. See Figure 2B.

- When attaching to wood framed structures use the two center inside holes in the mounting base. They must be aligned on the centerline of the stud or rafter. Attach with two $\frac{5}{16}$ " x 3" lag bolts and flat washers (not included) screwed into a $\frac{7}{8}$ " dia. pilot hole in a solid wood structural member. Apply silicone sealant around bolt entry to prevent water ingress. See Figure 2.
- When attaching to masonry structures use the four corner outside holes in base bracket and four appropriate $\frac{3}{4}$ " double-expansion anchors or toggle bolts with flat washers (not included). See Figure 2A.

FIGURE 2
WOOD STRUCTURES

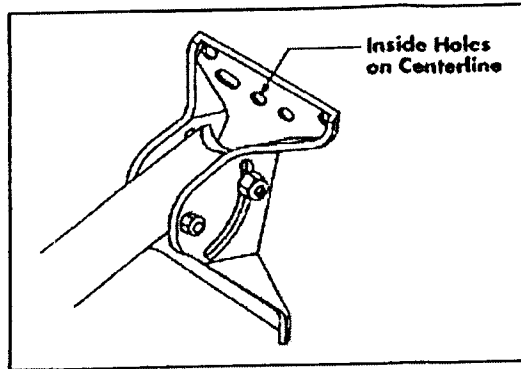


FIGURE 2A
MASONRY STRUCTURES

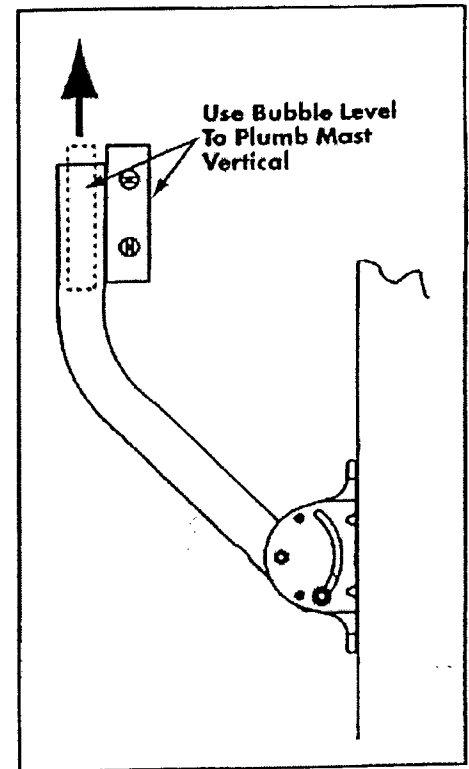
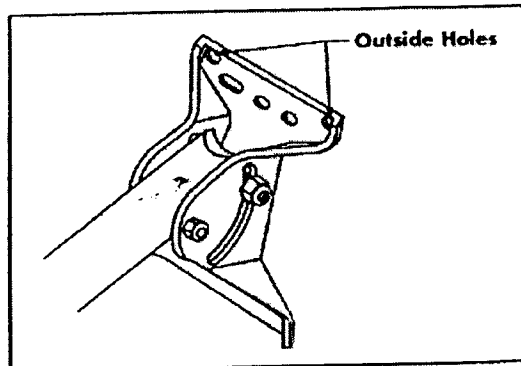


FIGURE 2B

3. On clamp/mount assembly, install (2) $\frac{1}{4}$ " long carriage bolts and flange nuts as shown in Figure 3. Do not tighten at this time.
4. Assemble long fine tune elevation bolt to the AZ/EL mount elevation bracket that has an embossed scale using a $\frac{1}{2}$ " long carriage bolt and ESNA locknut. Tighten and then loosen $\frac{1}{4}$ turn to allow bracket to pivot. See Figure 4.
5. Thread the L-bracket onto the long fine tune adjustment bolt approximately 1 inch. Then assemble L-bracket to elevation slot with $\frac{1}{2}$ " long carriage bolt passing through square hole in the clamp tab, elevation adjustment slot, L-bracket and finally captured with a flange nut. Tighten nut and then loosen $\frac{1}{4}$ turn. See Figure 4.

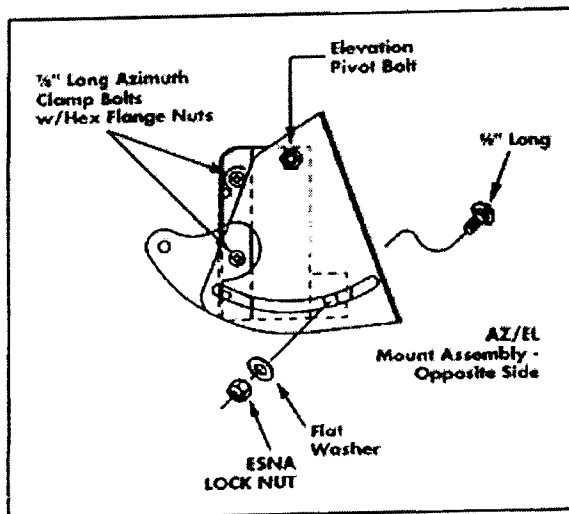


FIGURE 3

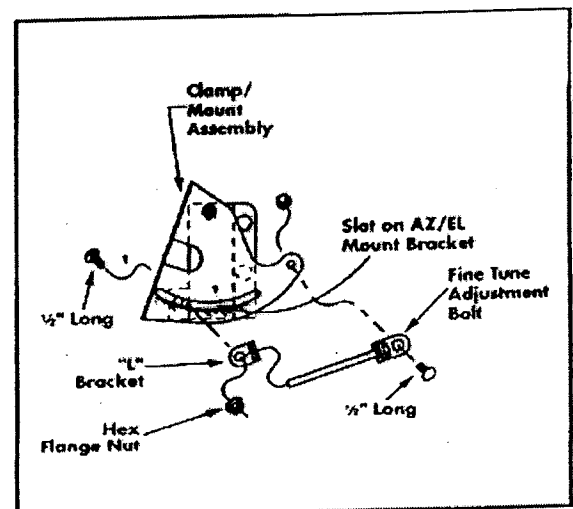


FIGURE 4

6. On the opposite side install the second $\frac{1}{2}$ " long carriage bolt through square hole in the clamp tab, elevation adjustment slot and capture with a flat washer and ESNA locknut. Tighten nut and loosen $\frac{1}{4}$ turn. See Figure 3.

7. Make the **Initial elevation** adjustment per the value listed for your site location determined on Page 5. Be sure both bolts in the slots are 1/3 turn loosened from tight. Turn the long fine tune bolt until the **white painted clamp tab edge indicator** aligns with the desired elevation value on scale. See Figure 5. Note: For an easy quick coarse adjustment, use your left hand to lift upward slightly on the elevation bracket and then turn fine tune bolt with right hand.

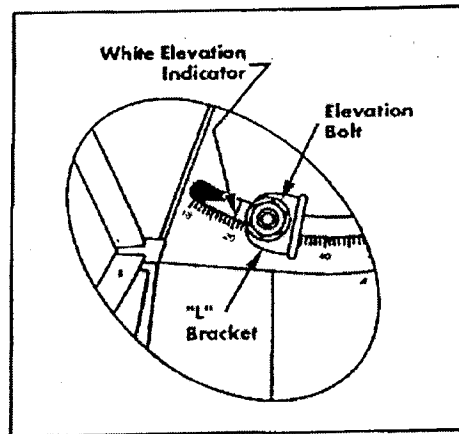


FIGURE 5

8. Attach the antenna to the tilt slots on the clamp/mount assembly with (2) 1-3/4" long carriage bolts, flat washers and ESNA locknuts making sure the center pin on the antenna is in the mating hole in mount tab before tightening. See Figure 6.

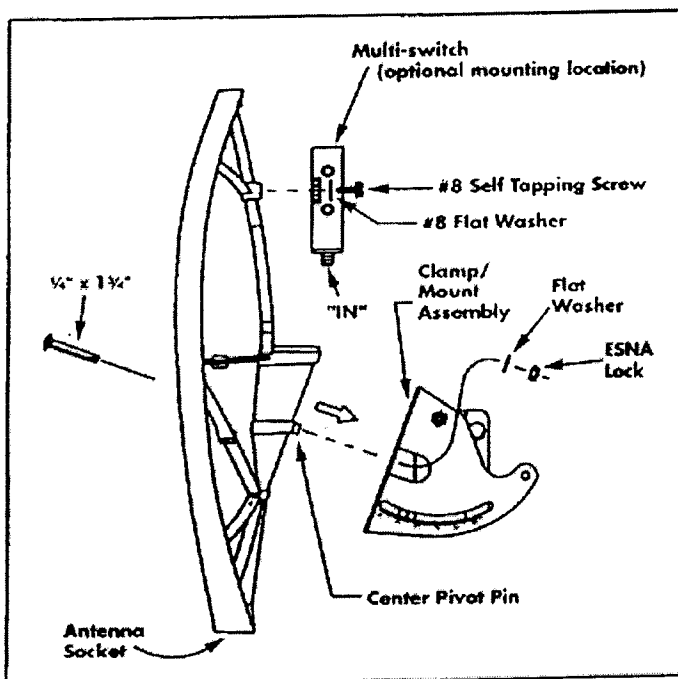


FIGURE 6

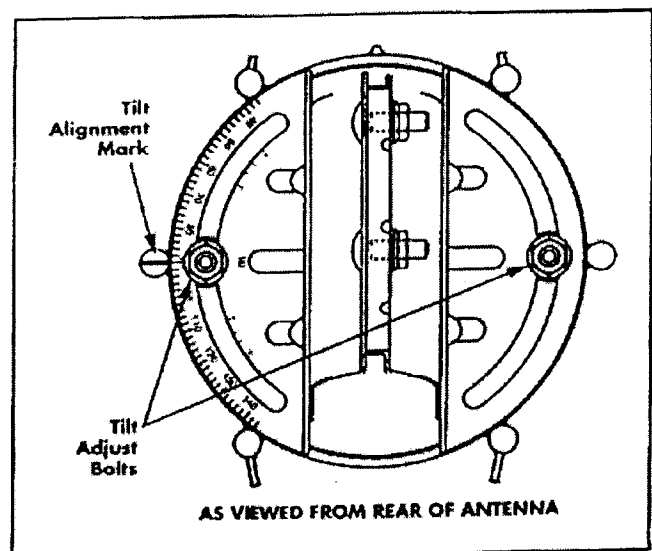


FIGURE 6A

9. See Multi-switch mounting location options in Step 14. If the back of antenna option is chosen, attach multi-switch to hollow bosses on the back of the antenna directly above the mount using (2) #8 self-tapping screws and (2) #8 flat washers. See Figure 6.
10. Make the **PERMANENT TILT** adjustment per the value listed for your site location found in the AZ-EL Tilt Chart. Be sure both bolts in the slots are 1/3 turn loosened from tight during adjustment and then securely tighten after the desired tilt scale number is aligned with the molded indicator line on the antenna. See Figure 6A.

IMPORTANT! DO NOT MAKE ANY FURTHER ADJUSTMENTS TO THIS TILT SETTING.

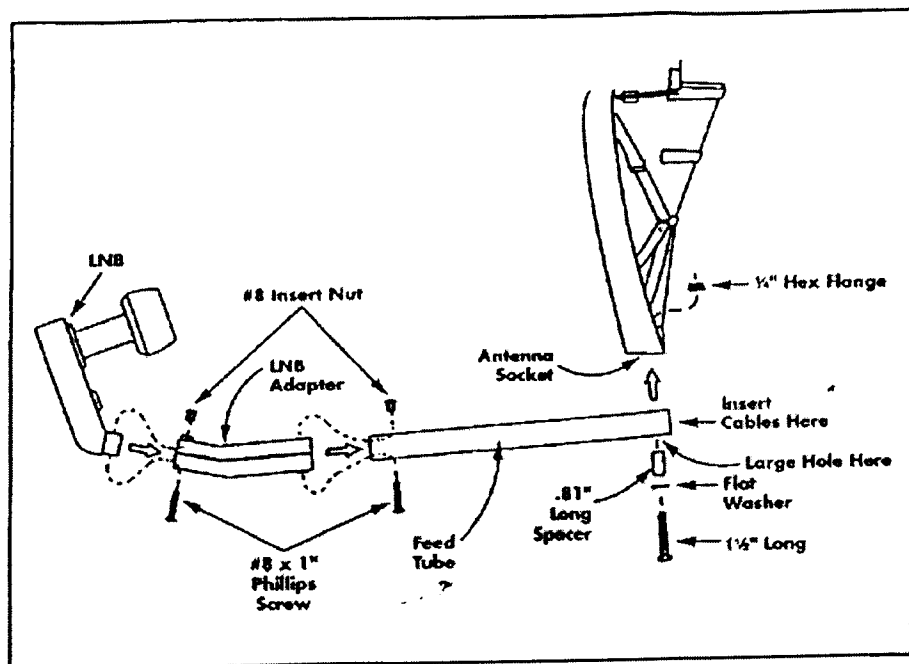


FIGURE 7

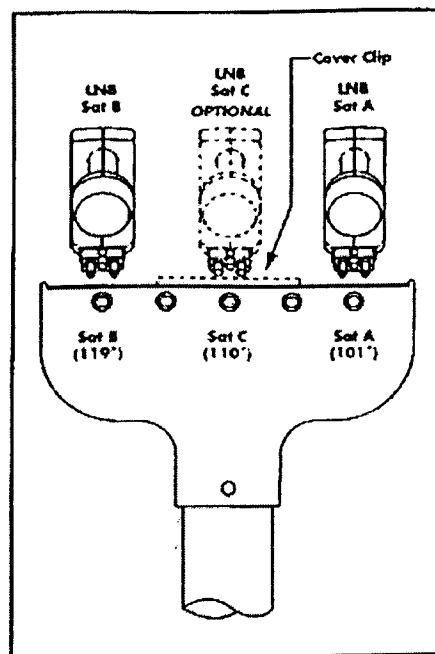


FIGURE 8

11. Attach the rectangular feed tube to the antenna socket making sure the large round hole for the spacer is positioned as shown in Figure 7. Tighten bolt while holding nut. Slight movement of adapter after tightening is normal.
12. Attach the LNB adapter to the feed tube with #8 hex insert nut and 1" long Phillips head screw. See Figure 7.
13. If Optional "Sat C" LNB is not used, install Cover Clip in the Plastic LNB Adapter in the empty space between Sat A and Sat B LNBs before mounting LNBs. See Figure 8.
14. The next steps involve making the coaxial cable interconnections between the LNB's, Multi-switch and the Satellite Receivers. First choose one of the mounting location options for the Multi-switch listed below that best fits your installation. Use approved installation kits for High Quality low loss RG6 coaxial cable to insure best performance under all conditions. All coaxial cables must be grounded outside at the point of entry. Contact a licensed inspector or electrician in your area for assistance.

MULTI-SWITCH LOCATION:

- Option #1: Mount a weatherproof Multi-switch to the back of the antenna as shown in Figure 6. This location is simplest for installations using only one receiver since only one cable enters the building. If this option is selected, connect the LNB's to the Multi-switch per the following instructions while on the ground with 32" long cables.
- Option #2: Mount the Multi-switch inside the building. This may provide the easiest access for future wiring changes such as adding additional Satellite Receivers and provides the best weather protection.
- Option #3: Mount the weatherproof Multi-switch under the building eaves at the point of cable entry. This provides excellent weather protection to the wire connections and the switch. It also may eliminate the coaxial ground blocks and extra connections required to ground cables at point of entry. One ground wire from the Multi-switch ground terminal to the building electrical service ground may satisfy the local and NEC codes.

This completes the ground level assembly work.

15. Slide the Clamp/Mount on the Antenna assembly onto the universal mount mast and tighten the (2) Azimuth clamp bolts (See Figure 4) just enough that the antenna mount assembly can be easily rotated on the mast for azimuth adjustment.
16. Select two coaxial cables long enough to connect the LNB's to the Multi-switch location chosen. Pass one end of two coaxial cables (labeled "Sat A" on both ends) through the rectangular feed tube on the side marked "Sat A". Then attach them to the LNB that will be mounted in the position marked "Sat A" at the end of plastic adapter. The cables may be routed up thru the 1.66" Universal mast tube for a neat appearance. **IMPORTANT! If labeled cables are not supplied then mark two cables on both ends "Sat A" with masking tape.**
17. Repeat Step 16 for inserting the two coaxial cables (labeled "Sat B" on both ends) in the other side of the feed tube and connect to the second LNB that will be mounted in position marked "Sat B". Tighten all cable connectors on both LNB's. See Figure 8.
18. If Optional "Sat C" LNB (not included) is to be used, then insert one coaxial cable (labeled "Sat C" on both ends) in either side of the feed tube and connect to the third LNB that will be mounted in position marked "Sat C". Tighten all cable connectors on LNB's.
19. Carefully push the LNB's and attached cables into the LNB adapter and secure with #8 Insert Nut and 1" long #8 phillips head screw. See Figure 7. Slight movement of LNBs after tightening is normal.
20. Review Figure 9 if only the two LNBs ("Sat A" and "Sat B") are being used or review Figure 9A if the three LNBs ("Sat A", "Sat B" and Optional "Sat C") LNB's are being used.

Installations Using ONLY Sat A & Sat B (Two LNBs)

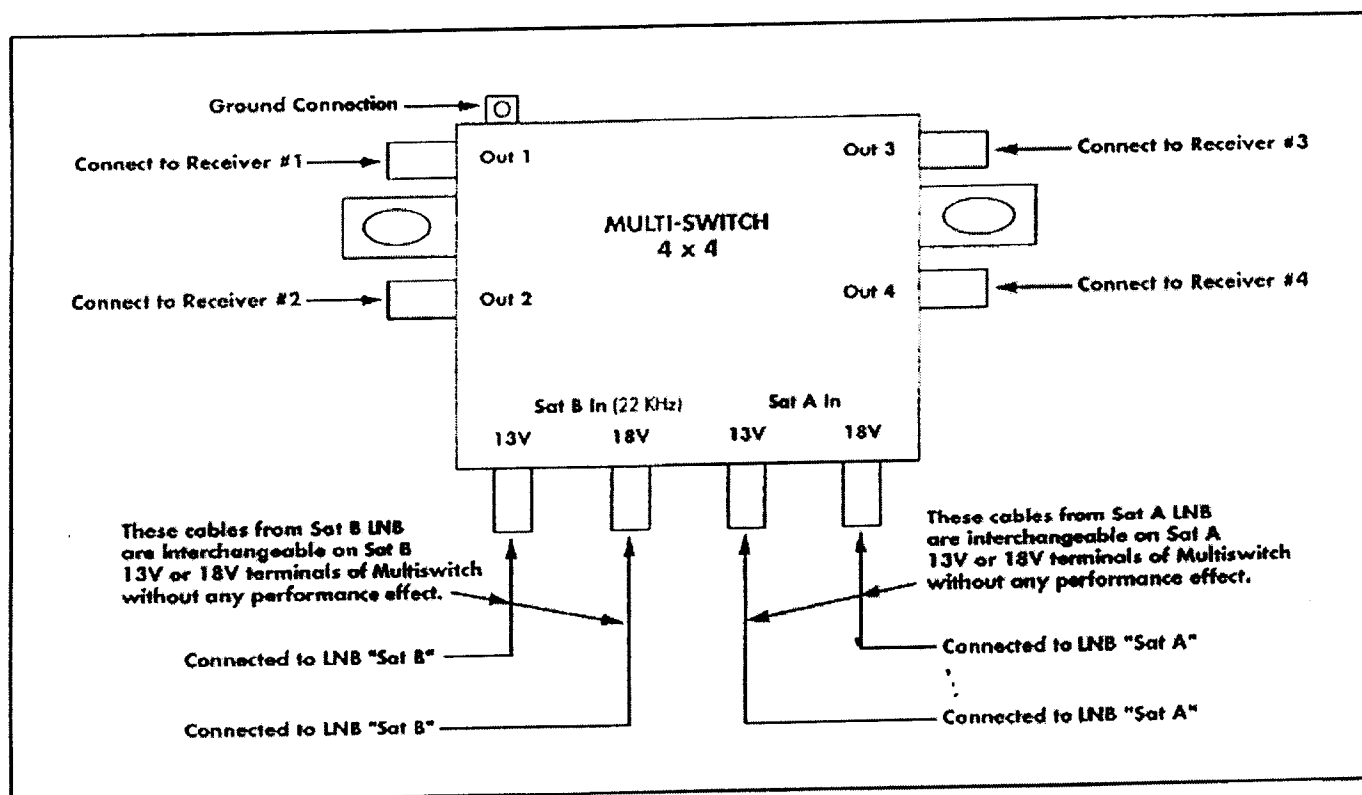


FIGURE 9

21. Connect opposite loose end of the cables labeled "Sat A" from "Sat A" LNB to the multi-switch "Sat A" terminals as shown in Figure 9. It does not matter which "Sat A" labeled cable connects to 13V or 18V Multi-switch terminals—they are interchangeable.
22. Repeat for connecting opposite loose end of the cables labeled "Sat B" to the multi-switch "Sat B" terminals as shown in Figure 9. Or if Optional Sat C is being used, see Figure 9A. It does not matter which "Sat B" labeled cable connects to 13V or 18V Multi-switch terminals (Fig. 9) or in the Optional (Fig. 9A) 13V and Combiner terminals—these two Sat B cables are interchangeable in either installation.

Installations Using Sat A, Sat B, & Sat C (Three LNBs)

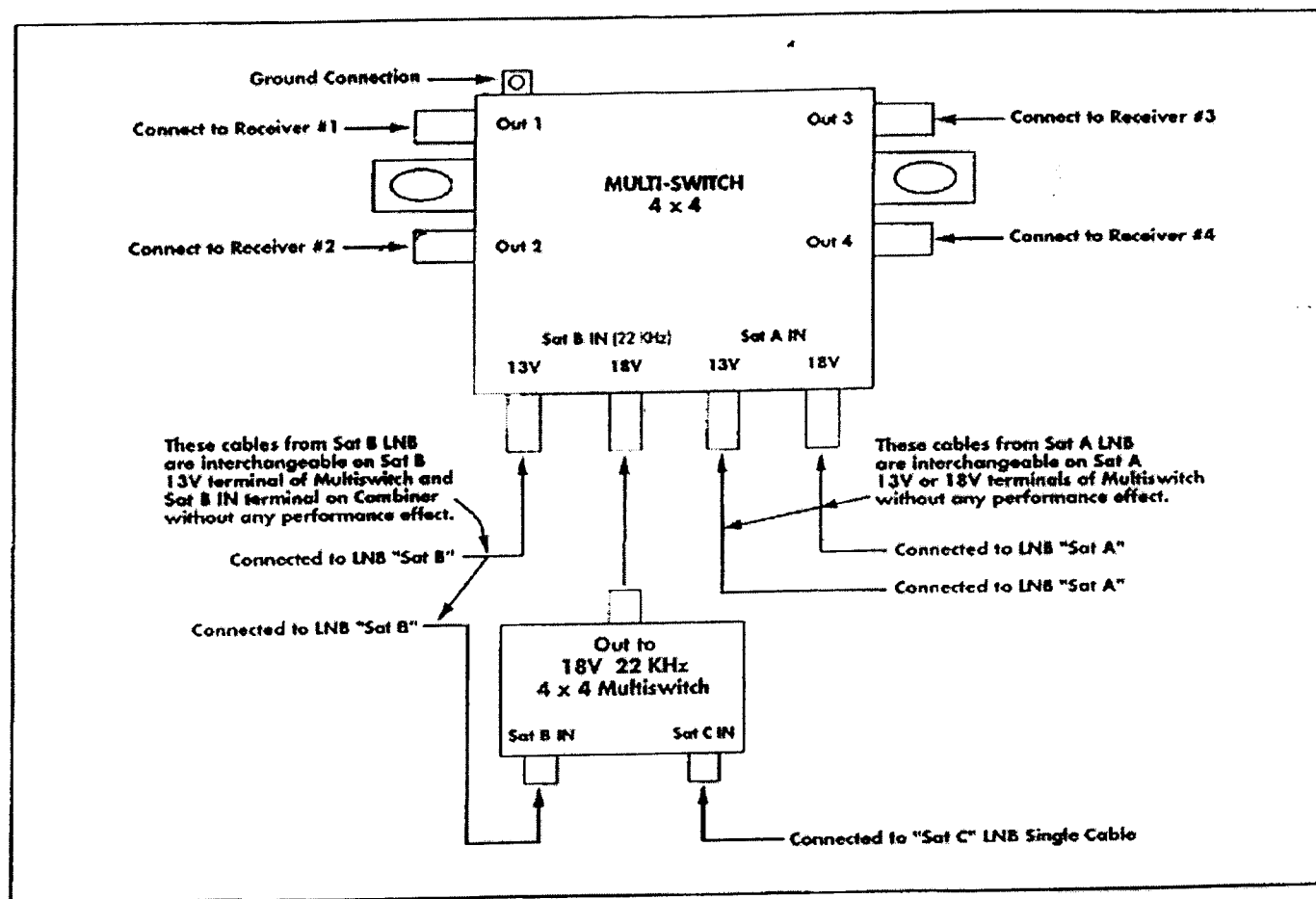


FIGURE 9A

23. If Optional Sat C LNB (not included) is being used:

- Attach loose end of the "Sat C" labeled cable (from the Sat C LNB), to the "Sat C In" terminal on the Sat B and Sat C Combiner. See Figure 9A.
- Using the 32 inch long coax supplied to connect the OUT terminal of the Sat B and Sat C Combiner to the Sat B 18V (22 KHz) terminal on the Multi-switch. The Combiner can be mounted near the Multi-switch or tie-wrapped to the mast in line with cables.

24. Connect the cables from the Multi-switch to the Satellite Receiver boxes as instructed in the Satellite Receiver manual.

25. The Universal Mount and coaxial cables must be properly grounded to the building Power service ground per the latest revision of the National Electric Code. See Figure 10.

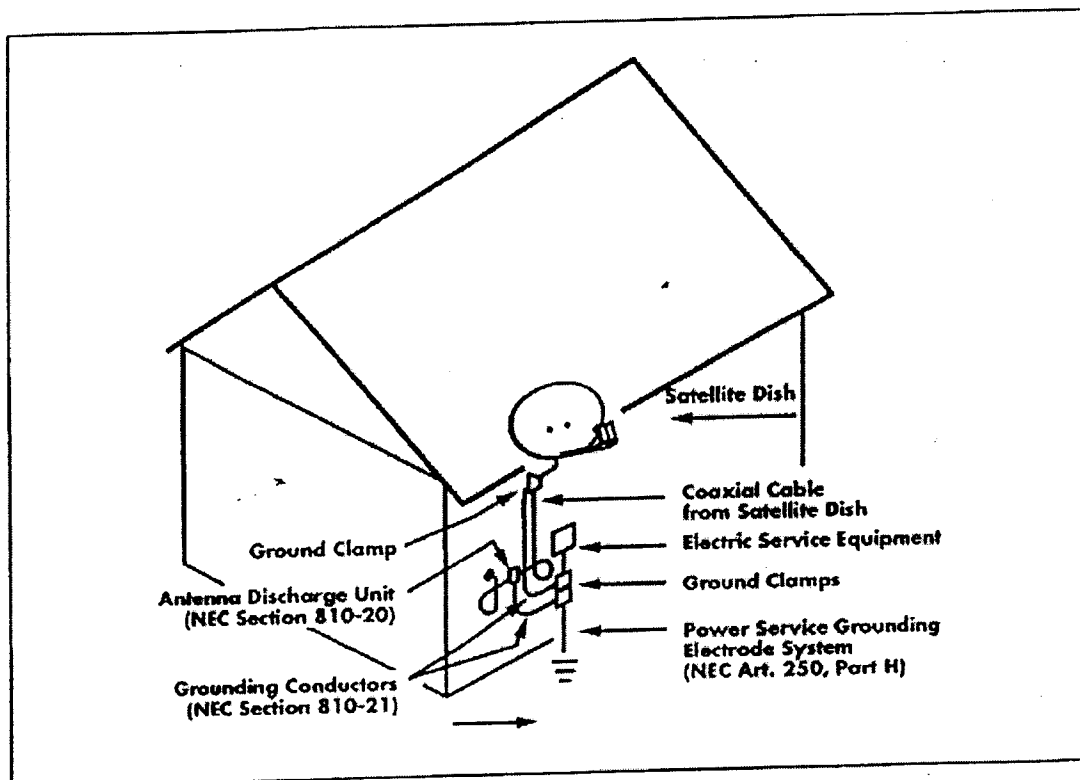


FIGURE 10

IMPORTANT!

Verify that the elevation and tilt adjustments are accurately set for your site.
Do not adjust the tilt setting again during the alignment to the satellite. It will make proper alignment impossible due to the interaction with the azimuth and elevation alignments.

26. Align the antenna to the satellites by first rotating the mount on the mast **sweeping slowly** through the azimuth direction found in the AZ-EL Chart. If the mast has been mounted plumb, coaxial cables properly connected and the elevation initial setting are correct then the satellites should be found during this first sweep. Consult the receiver manual for peaking signal strength. If signal is not found, adjust the Elevation up in 2-degree steps and repeating azimuth sweeps. If again signal is not found, move the Elevation down from the original setting in 2-degree steps and repeating azimuth sweeps.
27. Once signal is obtained, **peak for maximum signal strength** by slowly tweaking elevation adjustment bolt and azimuth direction alternately. After the signal is peaked tighten the two elevation bolts in the adjust slots and the two Azimuth Clamp bolts to 72 in-lbs. Recheck the signal strength to be sure it is still peaked.
28. Professional installers may want to use the Channel Master Model 1006IFD Dual Satellite Signal Level Meter (or equivalent) in order to speed up alignment and achieve maximum signal strength on both satellites.

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