

# Installation Instructions - Models HF1 & Hf2 Pick-Up Truck Antenna Mount

U.S. Patent No. 5,995,053

For using any standard mobile antenna with a 3/8"-24 style screw base.

Thank you for purchasing our GeoTool Model HF-1 Mount!

You will need a soldering gun or iron, some electrical tape and 13/16", 1/2", 9/16", and 5/8" wrenches, and screwdrivers. You may also need a 3/4" wrench, for the new 1/2" anchor bolts, a rat-tail (round) file to enlarge the hole in the bottom of the stake pocket, and a 1/2" or 5/8" wood drill (like the one in the photo to the right) to make a hole in the bottom of the stake pocket if there is none. Read all instructions before proceeding. The basic installation concept is uncomplicated. However, the actual installation can be relatively easy to moderately difficult depending on your truck. The instructions below are a little long winded, but I want to provide you with the basics of the installation process, plus additional suggestions and helpful hints which may pertain to individual trucks.



Drill bit and extension for cutting 5/8" anchor hole.

**1. Select the stake pocket** - The mount will generally fit into the front and rear stake pockets of trucks without double wall construction. Pre-2000± long bed trucks (particularly Fords) may have tapered pockets in the center of each side, but the mount can still be installed in the front or rear pockets. Some Toyota Tundra stake pockets are smaller inside than at the top opening, and the top is slightly offset from the inside bracket. Newer trucks generally have straight stake pockets all around. Double wall construction, mud deflectors, or bed liners, can make installation more difficult because it may be harder to access the bottom of the stake pocket to tighten the anchor bolt. Rear stake pockets may be easier to use by removing the tail light for access. On Chevy's, the tail light may be removed by unscrewing two Phillips head screws, accessible when the tailgate is lowered. Other trucks may have similar fastenings.

**2. Adjust the height of the mount in the stake pocket** - Begin the installation by checking the height of the mount block in the stake pocket. It is easier to do this before installing the coaxial cable onto the mount. Measure the depth of the stake pocket. If it is longer than the mount body, determine how many of the 9/16" (or 1/2" depending on the bolt size) flat washers to put in the bottom of the stake pocket to raise the mount to the top of the stake pocket. 2011 Fords and other trucks with deep stake pockets trucks may use a new tubing and washer combination. If you don't have enough washers, the mounting bolt is too short, or the mount is too long, contact GeoTool for assistance..

**3. Attach the coaxial cable to the mount** - We recommend that you DON'T INSTALL THE PL-259 on the radio end of the coax until the mount installation is complete and the coax is routed inside cab. The largest diameter coax that will fit the slots in the side of the mount, is 1/4". Accordingly, only RG-8 Mini Coax or LMR-240 Ultra Flex are recommended. Route the coax through the bottom of the mount (only with drilled anchor bolt), or out the side of the mount using the slots in the body of the mount to allow inserting the mount into the stake pocket. The 3/8"-24 mounting hardware is shipped with the components connected in the recommended installation order. Attach the solderless connectors to the coax ends as shown on Figure 1, and **SOLDER THE COAX CONNECTIONS**.

Our new mounts have a round bare aluminum area where the grounding ring attaches inside the top of the mount. A few older mounts may not have this, and the anodizing should be carefully sanded or scraped away to provide a good ground contact under the top of the mount. Using an ohm meter, check that there is good conductivity between ground area (or cleaned surface), and the threads inside the bottom anchor bolt hole. The anchor bolt hole was threaded after anodizing to ensure that the bare aluminum provides a good ground connection (anodizing is non-conductive) The 3/8-24" antenna connector hardware should be tightened snugly to prevent it from working loose. Be sure the lower nylon washer extends into the mounting hole if possible, and that you insert the 3/8"IDx1/2"OD nylon spacer inside the top mounting hole. This is because only a small portion of the lower nylon washer extends beyond the ground lead solderless connector. Tighten the assembly securely. If not sufficiently tight, the nylon shoulder washers may loosen up and require retightening in a couple of days. Keep an eye on this part of the assembly for a few days. Following installation of the coaxial cable on the mount, be sure to **CHECK ALL CONNECTIONS FOR PROPER CONDUCTIVITY AND SHORTS**.

**4. Prepare the mount block and stake pocket for installation** - Refer to Figure 1 for the location of parts. You will need a 5/8" diameter hole in the bottom of the stake pocket to install the hollow 9/16" anchor bolt. If not already there, you will need to drill a hole. Follow the instructions in item 3 in the 'Troubleshooting' section on Page 2, and drill a 5/8" mounting hole. Using emery cloth, sandpaper, or other scraping tool, **REMOVE PAINT FROM THE OUTSIDE BOTTOM OF THE STAKE POCKET** to ensure a good ground. The ground connection is probably the most important part of the entire installation. If the ground is not good, the antenna will not resonate. The flat washers included with the mount are only for adjusting the height of the mount inside the stake pocket. They should be used inside the stake pocket only. If placed between the lock washer and the stake pocket, the star washer will not dig into the body of the truck, and the ground connection will not be adequate. Next, route the coaxial cable into the stake pocket, through the 9/16" flat washers, and out the hollow anchor bolt, or out the side of the stake

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# Instructions for Installation - Model HF-1 & HF-2 Pick-Up Truck Antenna Mount

For using any standard mobile antenna with a 3/8"-24 style screw base.

## CONTUNUED FROM PAGE 1

**5. Shim the top of the mount** - All trucks require some shimming at the top of the stake pocket. Pre-1999 Chevy and GMC trucks, and all Mazda and Ranger trucks need only a small amount of plastic electrical tape wrapped around the top of the mount to obtain a snug fit. The tape now comes in many colors, so if a little bit shows, it will not detract from the looks of the truck. The tape need not protrude from the top of the stake pocket to work properly. Most other trucks will have slightly larger spaces at the top of the stake pockets. I recommend using the linoleum shim material included with the mount only if it will fit snugly in the stake pocket when you install a shim (sometimes only 1 side needs be shimming), and still wrap about 2 turns of electrical tape around the mount. You can arrange the shims on the mount block to help level the top in the stake pocket. Shimming may require one or more layers of sticky-back linoleum. Cut each shim to slightly less than the length of the side of the mount, and check for fit before sticking it in place (it comes off easily, so don't worry if it is not in the proper location on the first try). Use a small amount of plastic electrical tape to hold the shims in place, and to take up the last bit of looseness at the top.

**6. Secure the Mount** - Insert the coax through a convenient opening in the stake pocket (i.e., at the top of the front or back of the pocket, or other openings in the interior bracket. Place the coax in the slot on the side of the mount, and insert the mount into the stake pocket. Secure the mount with the provided 1/2" or 9/16" anchor bolt, with the lock washer between the head of the anchor bolt and the outside bottom of the STAKE POCKET (to ensure a good ground connection). Check to ensure that the top of the mount does not wobble in the stake pocket. If it does, loosen the 9/16" bolt and add additional electrical tape to the shim. Note: If you stretch the electrical tape, it becomes thinner, and this may help you to achieve a tighter fit. When installing, I try to get the shims just to the point where they will not slide into the hole. If the mount is looser in one direction than the other, then cut a short piece of tape and put it along one side, covering it with the last turn of the main tape. Then using a little saliva, lubricate the tape and gently wiggle the mount from side to side, or push slightly against one side to 'compress' the shim on the other side, as you work it into the stake pocket. Using the ohm meter, CHECK CONNECTIONS FOR GOOD GROUND, CONTINUITY AND SHORTS.

**7. Route the coaxial cable to the radio location** - Route the coax along the top of the truck frame (to keep the coax from being damaged by rocks or brush), or any convenient path to the cab. Secure it with zip ties. The cable can enter the cab through a hole drilled in the floor, or by removing an existing rubber or plastic or metal plug from one of the holes already drilled in the bottom of the truck cab. Rubber hole seals, or gromets, are available at most hardware stores that will fit this opening if you want to plug it up for resale. One or more coax cables can be routed into the truck through a hole cut in some types of larger rubber seal. When you have determined the final location of the radio and have routed the coax into the cab of the truck, install the appropriate connector for your radio to the end of the coax. This completes the installation.

### **Potential Problems**

**1. The stake pocket will not accept the antenna mount body** - Try bending the interior flanges of the stake pocket opening slightly to allow the mount to drop into place, or try another stake pocket. A piece of wood will minimize the potential for chipping paint. Stake pocket dimensions vary a lot, as you will see if you place the antenna mount in each of the openings. If the mount will not fit in any opening easily, you may not be able to use this mount without modification. A metal shop may be able to mill a few thousandths off the body of the mount, but this will also remove the anodizing.

**2. The stake pocket will not accept the 9/16" hollow anchor bolt** - Use a round file or drill or reamer to enlarge the hole so the bolt will fit. Be sure to protect the paint on the upper part of the hole while filing.

**3. The stake pocket has no anchor bolt hole** - As mentioned in section 3 on page 1, you will need to drill a hole 1/2" or 5/8" diameter or larger to accept the mount. Carefully mark the location of this hole with the antenna mount in place, prior to installing the NMO connector in the mount. The location of the hole will control the vertical alignment of the antenna, and is somewhat critical. Park the truck on a level surface and make the top of the mount level using a hand level, or use a straightedge to align the side of the mount vertically sighting on the side of a building or other vertical object. Carefully mark the center of the hole using a pencil or other instrument and drill a 5/8" hole. Actually, a flat bladed 5/8" wood drill, like the one shown on Page 1, is pretty inexpensive and will cut the 1/32" soft steel. These will easily survive cutting a few holes in the soft sheet metal of your truck. Extensions (as shown) are available for them also, to enable you to reach down to the bottom of the stake pocket. Also, a 5/8" chassis punch may work.

**4. Front stake pocket installation** - Front installation, is possible but may require a socket or 'crow-foot' wrench with a long extension. Also, you may be able to route the coax out the side of the mount if your stake pocket opening is greater than 1.75" wide.

**5. No access through tail light opening** - You will have to access the bottom of the stake pocket from under the truck using a crow foot wrench or an end wrench. If you cannot use a socket wrench with the coaxial cable extending from the drilled anchor bolt, the method described below may work.

**6. Alternate coax routing** - If you can't use the existing openings in the stake pocket, you may have to drill a hole for the coax. Using a long drill bit which you can pick up from Ace Hardware, or any other good hardware store, you can drill a hole in the bottom corner of the stake pocket, directly below the location of the slot in the side of the mount. I recommend using additional chafing protection for the coax because of the sharp edges of the sheet metal in the stake pocket openings. Or drill a slightly larger hole and insert a grommet

**7. Nylon Spacer Too Long** - If the nylon spacer is too long, you can easily shorten it by sanding on medium grade paper. A circular motion will result in a more even length. The spacer should not hold the brass NMO mount away from the aluminum mount body.

**Questions:** If you have questions, contact us at the address, phone, or E-mail location shown below. Best to call in the evening Monday through Friday, and on weekends.

**Returns** - If you have not scratched the mount, you may return it, for a full refund to dealer from whom you purchased it. If the mount can be resold, even though scratched a bit, I will refund up to 50% of the purchase price. Contact me for details

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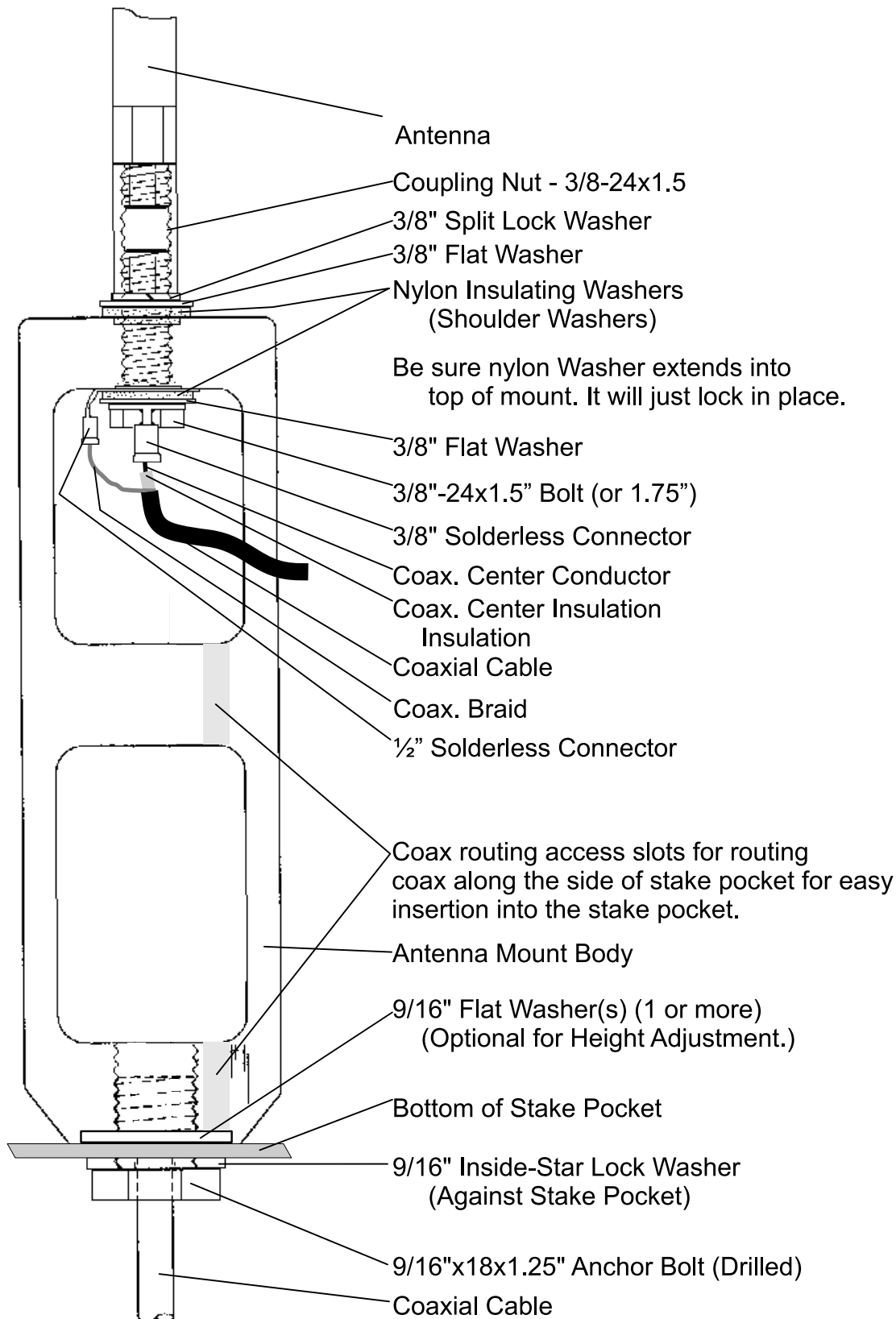
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# Figure 1 - Model HF-1&2 Antenna Mount Schematic

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**NOTE:** It is now easier to install the anchor bolt if you route coax out the side, front, or back, of the stake pocket. Place the coax into the side channels to allow the mount to slip into the stake pocket. A socket wrench can then be used on the anchor bolt since the coax does not exit through the bolt.



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# Instructions for Installation - Model VHF-1 SO-239 Pick-Up Truck Antenna Mount

Fits Most Pickup Trucks

U.S. Patent No. 5,995,053

Thank you for purchasing our Model VHF-1 pickup Truck Antenna Mount. You will need a soldering gun or iron, some electrical tape and 13/16", 1/2", 9/16", and 5/8" wrenches, and screwdrivers. You may also need a 3/4" wrench, for the new 1/2" anchor bolts, a rat-tail (round) file to enlarge the hole in the bottom of the stake pocket, and a 1/2" or 5/8" wood drill (like the one in the photo to the right) to make a hole in the bottom of the stake pocket if there is none. Read all instructions before proceeding. The basic installation concept is uncomplicated. However, the actual installation can be relatively easy to moderately difficult depending on your truck. The instructions below are a little long winded, but I want to provide you with the basics of the installation process, plus additional suggestions and helpful hints which may pertain to individual trucks.



**1. Select the stake pocket** - The mount will generally fit into the front and rear stake pockets of trucks without double wall construction. Pre-2000± long bed trucks (particularly Fords) may have tapered pockets in the center of each side, but the mount can still be installed in the front or rear pockets. Some Toyota Tundra stake pockets are smaller inside than at the top opening, and the top is slightly offset from the inside bracket. Newer trucks generally have straight stake pockets all around. Double wall construction, mud deflectors, or bed liners, can make installation more difficult because it may be harder to access the bottom of the stake pocket to tighten the anchor bolt. Rear stake pockets may be easier to use by removing the tail light for access. On Chevy's, the tail light may be removed by unscrewing two Phillips head screws, accessible when the tailgate is lowered. Other trucks may have similar fastenings.

**2. Attach the coaxial cable to the mount** - We recommend that you DON'T INSTALL THE PL-259 on the radio end of the coax until the mount installation is complete and the coax is routed inside the cab. The SO-239 adaptor is designed for RG-8 Mini Coax, or LMR-240 Ultra Flex. Do not use RG-58 because of high losses and size mismatch at the SO-239 adaptor. Remove the cap on the bottom of the adaptor. Place the heat shrink tubing on the coax cable for use later. Strip the coax as shown on the diagram on the following page. Refer to the diagrams on Figure 1 for details on installing the coax into the coax connector. Only if necessary, gently turn the solder lug using a screwdriver until it is in position to allow the center conductor to rest freely in the slot. Lightly tin the slot in the center connector in the adaptor. Lightly tin the coax shield (braid) before inserting in inside the coax connector sleeve. Insert the coax into the connector sleeve, and solder the braid to the inside of the connector. Keep the center conductor aligned so that it does not short out if the insulation in the coax melts during soldering (a very common situation). Check for shorts and fix as necessary. The center conductor of the coax should reach over the center conductor terminal inside the SO-239, but not extend past it. Using a small soldering iron, carefully solder the center conductor wire to the center terminal slot. (Remember, minimal heat on the center conductor.) Check for shorts and conductivity. If all connections are good and there are no shorts, attach the heat shrink tubing and shrink around the end of the coax and the connector sleeve. Place the cap screw in the hole on the bottom of the SO-239 connector tighten.

**3. Attach the adaptor to the mount block** - A 1" diameter area on the underside of the top of the aluminum mount block has been left un-anodized so it will conduct electricity. It may need to be cleaned a little bit (scotch brite pads work well for this). This will provide a good ground connection for the SO-239. Using an ohm meter, check that there is good conductivity between the bottom of the mounting hole where the SO-239 connector will be grounded, and the threads inside the bottom anchor bolt hole. The anchor bolt hole was threaded after anodizing to ensure a good ground connection. Recheck the SO-239 connector for shorts. Install the UHF adaptor into the top mounting hole. I recommend using the hex nut only if necessary to adjust the height of the SO-239. The SO-239 should sit as high as possible, while still allowing the antenna base to contact the wide flange nut firmly. If necessary, use the thin nut inside the mount block to adjust the height of the antenna. Tighten the top flange nut just snug enough to ensure that the mount will not become loose (25mm or 1" wrench), but remember it is brass and there are very few threads. Over tightening will strip the threads relatively easily. leaving the coax extending out the side of the mount. Following installation of the coaxial cable and SO-239 connector, be sure to CHECK ALL CONNECTIONS FOR PROPER CONDUCTIVITY AND SHORTS.

**4. Prepare the mount block for installation** - Refer to Figure 1 for the names and locations of parts. You will need a 1/2" or 5/8" hole in the bottom of the stake pocket to accommodate the 1/2" or 9/16" anchor bolt. If not already there, you will need to drill one. Follow the instructions in item 3 in the Troubleshooting section on Page 2 to drill the anchor bolt hole. REMOVE PAINT FROM THE OUTSIDE BOTTOM OF THE STAKE POCKET to ensure a good ground. A sharp edged, flat bladed screwdriver will work, if there is room. Otherwise, sandpaper, or other tools will probably work. Measure the depth of the stake pocket. If it is longer than the mount body, determine how many of the 9/16"(or 1/2" depending on the bolt size) flat washers to put in the bottom of the stake pocket to raise the mount to the top of the stake pocket. 2011 Fords and other trucks with deep stake pockets trucks may use our new aluminum tubing and washer combination. (If you have this type of hardware, be sure to put a washer between the tubing and the bottom of the stake pocket. If you don't have enough washers, the mounting bolt is too short, or the mount is too long, contact GeoTool for assistance.

**5. Shim the top of the mount** - All trucks require some shimming at the top of the stake pocket. Pre-1999 Chevy and GMC trucks, and all Mazda and Ranger trucks need only a small amount of plastic electrical tape wrapped around the top of the mount to obtain a snug fit at the top stake pocket opening. The tape now comes in many colors, so if a little bit shows, it will not detract from the looks of the truck. The tape need not protrude from the top of the stake pocket to work properly. Most other trucks will have slightly larger spaces at the top of the stake pockets.

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# Instructions for Installation - Model VHF-1 Pick-Up Truck Antenna Mount

"Fits Most Pickup Trucks

## CONTINUEDED FROM PAGE 1

I recommend using the linoleum shim material included with the mount only if it will fit snugly in the stake pocket when you install a shim (sometimes only 1 side needs be shimming), and still wrap about 2 turns of electrical tape around the mount. Shimming may require one or more layers of the sticky-back linoleum material. Cut each shim to slightly less than the length of the side of the mount, and check for fit before sticking it in place (it comes off easily, so don't worry if it is not in the proper location on the first try). Use a small amount of plastic electrical tape to hold the shims in place, and to take up the last bit of looseness at the top.

**6. Secure the Mount** - Insert the coax into a convenient opening in the stake pocket (i.e., at the top of the front or back of the pocket, or other openings in the interior bracket. Secure the mount with the ½" or 9/16" anchor bolt, with the lock washer between the head of the anchor bolt and the outside bottom of the STAKE POCKET (to ensure a good ground connection). Check to ensure that the top of the mount does not wobble in the stake pocket. If it does, loosen the 9/16" bolt and add additional electrical tape to the shim. Note: If you stretch the electrical tape, it becomes thinner, and this may help you to achieve a tighter fit. When installing, I try to get the shims just to the point where they will not slide into the hole. If the mount is looser in one direction than the other, then cut a short piece of tape and put it along one side, covering it with the last turn of the main wrapping. Then using a little saliva, I lubricate the tape and gently wiggle the mount from side to side, or push slightly against one side to 'compress' the shim on the other side, as you work it into the stake pocket. Using the ohm meter, CHECK ALL CONNECTIONS FOR GOOD GROUND AND SHORTS.

**7. Route the coaxial cable to the radio location** - Route the coax along the top of the truck frame (to keep the coax from being damaged by rocks or brush), or any convenient path to the cab. Secure it with zip ties. The cable can enter the cab through a hole drilled in the floor, or by removing an existing rubber or plastic or metal plug from one of the holes already drilled in the bottom of the truck cab. Rubber hole seals, or gromets, are available at most hardware stores that will fit this opening if you want to plug it up for resale. One or more coax cables can be routed into the truck through a hole cut in some types of larger rubber seal. When you have determined the final location of the radio and have routed the coax into the cab of the truck, install the appropriate connector for your radio to the end of the coax.

### Potential Problems

**1. The stake pocket will not accept the antenna mount body** - Try bending the interior flanges of the stake pocket opening slightly to allow the mount to drop into place, or try another stake pocket. A piece of wood will minimize the potential for chipping paint. Stake pocket dimensions vary a lot, as you will see if you place the antenna mount in each of the openings. If the mount will not fit in any opening easily, you may not be able to use this mount without modification. A metal shop may be able to mill a few thousandths off the body of the mount. However, this will also remove the anodizing, reducing the protection it provides. But the shim tape will cover it up around the top so it will not look any worse.

**2. The existing hole in the stake pocket will not accept the ½" or 9/16" anchor bolt** - Use a round file, standard 9/16" drill, step-drill or reamer to enlarge the hole so the bolt will fit. Be sure to protect the paint on the upper part of the hole while filing or drilling.

**3. The stake pocket has no anchor bolt hole** - As mentioned in section 3 on page 1, you will need to drill a hole 1/2" or 5/8" diameter or larger to accept the mount. Carefully mark the location of this hole with the antenna mount in place, prior to installing the UHF connector in the mount. The location of the hole will control the vertical alignment of the antenna, and is somewhat critical. Park the truck on a level surface and make the top of the mount level using a hand level, or use a straightedge to align the side of the mount vertically sighting on the side of a building or other vertical object. Carefully mark the center of the hole using a pencil or other instrument and drill a 5/8" hole. Actually, a flat bladed 5/8" wood drill, like the one shown on Page 1, is pretty inexpensive and will cut the 1/32" soft steel. These will easily survive cutting a few holes in the soft sheet metal of your truck. Extensions (as shown) are available for them also, to enable you to reach down to the bottom of the stake pocket. Also, a 5/8" chassis punch may work.

**4. Front stake pocket installation** - Front installation, is possible but may require either a socket or 'crow-foot' wrench with a long extension. Also, you may be able to route the coax out the side of the mount if your stake pocket opening is greater than 1.75" wide.

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**Questions:** If you have questions, contact us at the address, phone, or E-mail location shown below. Best to call in the evening Monday through Friday, and on weekends.

**Returns** - If you have not scratched the mount, you may return it, for a full refund to dealer from whom you purchased it. If the mount can be resold, even though scratched a bit, I will refund up to 50% of the purchase price. Contact me for details.

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## Figure 1 - Model VHF-1 Antenna Mount Schematic

Note: Route coax out the side, front or back of the stake pocket. Insert the coax into the slots on the corner of the mount to allow the mount to slip into the stake pocket. A socket wrench is then be used to tighten the anchor bolt.

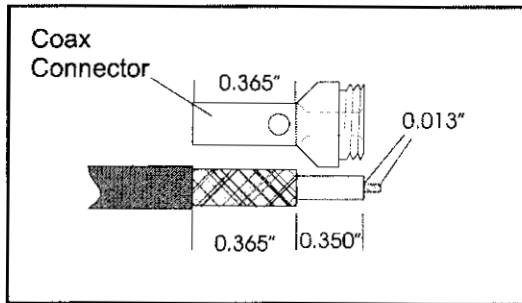
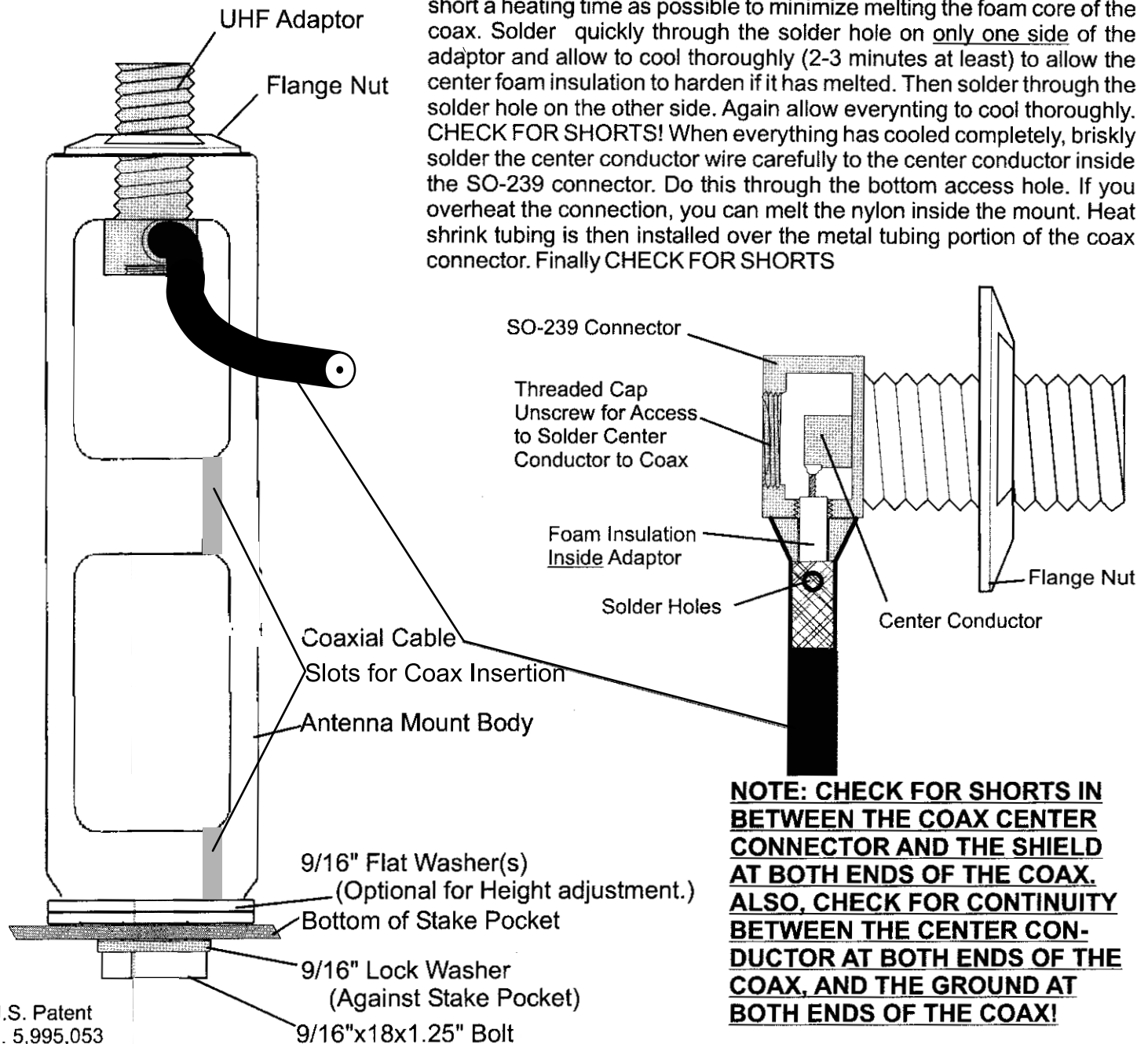


Figure 1. Guide for stripping coaxial cable.

### Connector Assembly

Slip the heat shrink tubing over the end of the coax and run it a couple of feet down the wire for use later after soldering the connectors to the SO-239 and CHECKING FOR SHORTS! ..... The coax braid should be cut so that it extends just past the solder holes. Tin the braid carefully before installing it inside the fitting. Trim the foam insulation to extend just slightly beyond the end of the fitting before soldering the braid. Be sure the coax is very straight for about 6 inches or so, before soldering. If the coax is bent, the inner conductor may tend to migrate toward the braid, and cause a short. If this happens, heat the adaptor, remove the coax, and start over by trimming the end again. Then solder it in place inside the adaptor. When soldering the braid inside the coax connector, use as short a heating time as possible to minimize melting the foam core of the coax. Solder quickly through the solder hole on only one side of the adaptor and allow to cool thoroughly (2-3 minutes at least) to allow the center foam insulation to harden if it has melted. Then solder through the solder hole on the other side. Again allow everything to cool thoroughly. CHECK FOR SHORTS! When everything has cooled completely, briskly solder the center conductor wire carefully to the center conductor inside the SO-239 connector. Do this through the bottom access hole. If you overheat the connection, you can melt the nylon inside the mount. Heat shrink tubing is then installed over the metal tubing portion of the coax connector. Finally CHECK FOR SHORTS



**NOTE: CHECK FOR SHORTS IN BETWEEN THE COAX CENTER CONNECTOR AND THE SHIELD AT BOTH ENDS OF THE COAX. ALSO, CHECK FOR CONTINUITY BETWEEN THE CENTER CONDUCTOR AT BOTH ENDS OF THE COAX, AND THE GROUND AT BOTH ENDS OF THE COAX!**

**DON'T TRANSMIT IF YOU HAVE SHORTS OR OPEN CIRCUITS. YOU MAY DAMAGE YOUR RIG!**

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<http://www.geotool.com/antmount.htm>

# Instructions for Installation - Model VHF-2

## NMO VHF-UHF Pick-Up Truck Antenna Mount\*

### Any Size Pickup Truck

Thank you for purchasing our Model VHF-2 NMO pickup Truck Antenna Mount. You will need a soldering gun or iron, some electrical tape and 13/16", 1/2", 9/16", and 5/8" wrenches, and screwdrivers. You may also need a 3/4" wrench, for the new 1/2" anchor bolts, a rat-tail (round) file to enlarge the hole in the bottom of the stake pocket, and a 1/2" or 5/8" wood drill (like the one in the photo to the right) to make a hole in the bottom of the stake pocket if there is none. Read all instructions before proceeding. The basic installation concept is uncomplicated. However, the actual installation can be relatively easy to moderately difficult depending on your truck. The instructions below are a little long winded, but I want to provide you with the basics of the installation process, plus additional suggestions and helpful hints which may pertain to individual trucks.



**1. Select the stake pocket** - The mount will generally fit into the front and rear stake pockets of trucks without double wall construction. Pre-2000± long bed trucks (particularly Fords) may have tapered pockets in the center of each side, but the mount can still be installed in the front or rear pockets. Some Toyota Tundra stake pockets are smaller inside than at the top opening, and the top is slightly offset from the inside bracket. Newer trucks generally have straight stake pockets all around. Double wall construction, mud deflectors, or bed liners, can make installation more difficult because it may be harder to access the bottom of the stake pocket to tighten the anchor bolt. Rear stake pockets may be easier to use by removing the tail light for access. On Chevy's, the tail light may be removed by unscrewing two Phillips head screws, accessible when the tailgate is lowered. Other trucks may have similar fastenings.

**2. Attach the coaxial cable to the mount** - I recommend that you don't install the PL-259 on the radio end of the coax until the mount installation is complete and the coax is routed inside the cab. The NMO adaptor is designed for RG-58 Coax. HOWEVER, I recommend that you use RG-8X or LMR-240 Ultra Flex because of the lower line loss. To accommodate the RG-8X coax braid, bend the ground tabs on the end of the ground connector of the NMO adaptor out just enough to make better contact. The NMO adaptor was provided either in a plastic bag, or temporarily (loosely) installed in the correct position on the mount. You may remove it as, if you like, to do the soldering. The antenna may be fed to the adaptor at any angle from the way it is provided, to 90 degrees from this point. Most installations will work fine with the coax installed the way the adaptor is shipped. Strip the coax as shown on the attached assembly diagram, and carefully tin the braid lightly. Insert the coax between the the ground connector tabs, and solder the braid to the connector. When cool, solder the center conductor to the center conductor of the mount. Test for shorts between the center conductor and the braid!!! You will not be able to use the black cap with the RG-8X, so you may save or discard it.

**3. Attach the adaptor to the mount block** - A 1" diameter area on the underside of the top of the aluminum mount block has been left un-anodized so it will provide a good ground for the NMO adaptor. It may need to be cleaned a little bit (scotch brite pads work well for this). Using an ohm meter, check that there is good conductivity between the bottom of the mounting hole where the NMO connector will be grounded, and the threads inside the bottom anchor bolt hole. The anchor bolt hole was threaded after anodizing to ensure a good ground connection. Insert the nylon spacer (5/8" OD x 3/8" ID) into the top opening of the mount (if it is not already there). It is a tight fit, and may require tapping the assembly gently on a bench or table to get it started. Next, install the lower half of the NMO adaptor into the top mounting hole. Place the 'O' ring inside the grooves in the upper part of the NMO connector and being careful not to over tighten it, (the bottom half of the mount may bend if over tightened) secure it to the top of the mount body. Leave the coax extending out of the bottom or side of the mount, depending on the method of routing the coax once installed. Following installation of the coaxial cable and NMO connector, be sure to CHECK ALL CONNECTIONS FOR PROPER CONDUCTIVITY AND SHORTS.

**4. Prepare the mount block for installation** - Refer to Figure 1 for the names and locations of parts. You will need a 1/2" or 5/8" hole in the bottom of the stake pocket to accommodate the 1/2" or 9/16" anchor bolt. If not already there, you will need to drill one. Follow the instructions in item 3 in the Troubleshooting section on Page 2 to drill the anchor bolt hole. REMOVE PAINT FROM THE OUTSIDE BOTTOM OF THE STAKE POCKET to ensure a good ground. A sharp edged, flat bladed screwdriver will work, if there is room. Otherwise, sandpaper, or other tools will probably work. Measure the depth of the stake pocket. If it is longer than the mount body, determine how many of the 9/16"(or 1/2" depending on the bolt size) flat washers to put in the bottom of the stake pocket to raise the mount to the top of the stake pocket. 2011 Fords and other trucks with deep stake pockets trucks may use our new aluminum tubing and washer combination. (If you have this type of hardware, be sure to put a washer between the tubing and the bottom of the stake pocket. If you don't have enough washers, the mounting bolt is too short, or the mount is too long, contact GeoTool for assistance.

**5. Shim the top of the mount** - All trucks require some shimming at the top of the stake pocket. Pre-1999 Chevy and GMC trucks, and all Mazda and Ranger trucks need only a small amount of plastic electrical tape wrapped around the top of the mount to obtain a snug fit at the top stake pocket opening. The tape now comes in many colors, so if a little bit shows, it will not detract from the looks of the truck. The tape need not protrude from the top of the stake pocket to work properly. Most other trucks will have slightly larger spaces at the top of the stake pockets.

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# Instructions for Installation - Model VHF-2 Pick-Up Truck Antenna Mount

"Fits Most Pickup Trucks

CONTINUED FROM PAGE 1

I recommend using the linoleum shim material included with the mount only if it will fit snugly in the stake pocket when you install a shim (sometimes only 1 side needs be shimming), and still wrap about 2 turns of electrical tape around the mount. Shimming may require one or more layers of the sticky-back linoleum material. Cut each shim to slightly less than the length of the side of the mount, and check for fit before sticking it in place (it comes off easily, so don't worry if it is not in the proper location on the first try). Use a small amount of plastic electrical tape to hold the shims in place, and to take up the last bit of looseness at the top.

**6. Secure the Mount** - Insert the coax into a convenient opening in the stake pocket (i.e., at the top of the front or back of the pocket, or other openings in the interior bracket. Place the coax in the slot on the side of the mount, and insert the mount into the stake pocket. Secure the mount with the 1/2" or 9/16" anchor bolt, with the lock washer between the head of the anchor bolt and the outside bottom of the STAKE POCKET (to ensure a good ground connection). Check to ensure that the top of the mount does not wobble in the stake pocket. If it does, loosen the 9/16" bolt and add additional electrical tape to the shim. Note: If you stretch the electrical tape, it becomes thinner, and this may help you to achieve a tighter fit. When installing, I try to get the shims just to the point where they will not slide into the hole. If the mount is looser in one direction than the other, then cut a short piece of tape and put it along one side, covering it with the last turn of the main tape. Then using a little saliva, I lubricate the tape and gently wiggle the mount from side to side, or push slightly against one side to 'compress' the shim on the other side, as you work it into the stake pocket. Using the ohm meter, CHECK ALL CONNECTIONS FOR GOOD GROUND AND SHORTS.

**7. Route the coaxial cable to the radio location** - Route the coax along the top of the truck frame (to keep the coax from being damaged by rocks or brush), or any convenient path to the cab. Secure it with zip ties. The cable can enter the cab through a hole drilled in the floor, or by removing an existing rubber or plastic or metal plug from one of the holes already drilled in the bottom of the truck cab. Rubber hole seals, or gromets, are available at most hardware stores that will fit this opening if you want to plug it up for resale. One or more coax cables can be routed into the truck through a hole cut in some types of larger rubber seal. When you have determined the final location of the radio and have routed the coax into the cab of the truck, install the appropriate connector for your radio to the end of the coax.

## Potential Problems

**1. The stake pocket will not accept the antenna mount body** - Try bending the interior flanges of the stake pocket opening slightly to allow the mount to drop into place, or try another stake pocket. A piece of wood will minimize the potential for chipping paint. Stake pocket dimensions vary a lot, as you will see if you place the antenna mount in each of the openings. If the mount will not fit in any opening easily, you may not be able to use this mount without modification. A metal shop may be able to mill a few thousandths off the body of the mount, but this will also remove the anodizing.

**2. The stake pocket will not accept the 9/16" hollow anchor bolt** - Use a round file or drill or reamer to enlarge the hole so the bolt will fit. Be sure to protect the paint on the upper part of the hole while filing.

**3. The stake pocket has no anchor bolt hole** - As mentioned in section 3 on page 1, you will need to drill a hole 1/2" or 5/8" diameter or larger to accept the mount. Carefully mark the location of this hole with the antenna mount in place, prior to installing the NMO connector in the mount. The location of the hole will control the vertical alignment of the antenna, and is somewhat critical. Park the truck on a level surface and make the top of the mount level using a hand level, or use a straightedge to align the side of the mount vertically sighting on the side of a building or other vertical object. Carefully mark the center of the hole using a pencil or other instrument and drill a 5/8" hole. Actually, a flat bladed 5/8" wood drill, like the one shown on Page 1, is pretty inexpensive and will cut the 1/32" soft steel. These will easily survive cutting a few holes in the soft sheet metal of your truck. Extensions (as shown) are available for them also, to enable you to reach down to the bottom of the stake pocket. Also, a 5/8" chassis punch may work.

**4. Front stake pocket installation** - Front installation, is possible but may require a socket or 'crow-foot' wrench with a long extension. Also, you may be able to route the coax out the side of the mount if your stake pocket opening is greater than 1.75" wide.

**5. No access through tail light opening** - You will have to access the bottom of the stake pocket from under the truck using a crow foot wrench or an end wrench. If you cannot use a socket wrench with the coaxial cable extending from the drilled anchor bolt, the method described below may work.

**6. Alternate coax routing** - If you can't use the existing openings in the stake pocket, you may have to drill a hole for the coax. Using a long drill bit which you can pick up from Ace Hardware, or any other good hardware store, you can drill a hole in the bottom corner of the stake pocket, directly below the location of the slot in the side of the mount. I recommend using additional chafing protection for the coax because of the sharp edges of the sheet metal in the stake pocket openings. Or drill a slightly larger hole and insert a grommet

**7. Nylon Spacer Too Long** - If the nylon spacer is too long, you can easily shorten it by sanding on medium grade paper. A circular motion will result in a more even length. The spacer should not hold the brass NMO mount away from the aluminum mount body.

**Questions:** If you have questions, contact us at the address, phone, or E-mail location shown below. Best to call in the evening Monday through Friday, and on weekends.

**Returns** - If you have not scratched the mount, you may return it, for a full refund to dealer from whom you purchased it. If the mount can be resold, even though scratched a bit, I will refund up to 50% of the purchase price. Contact me for details.

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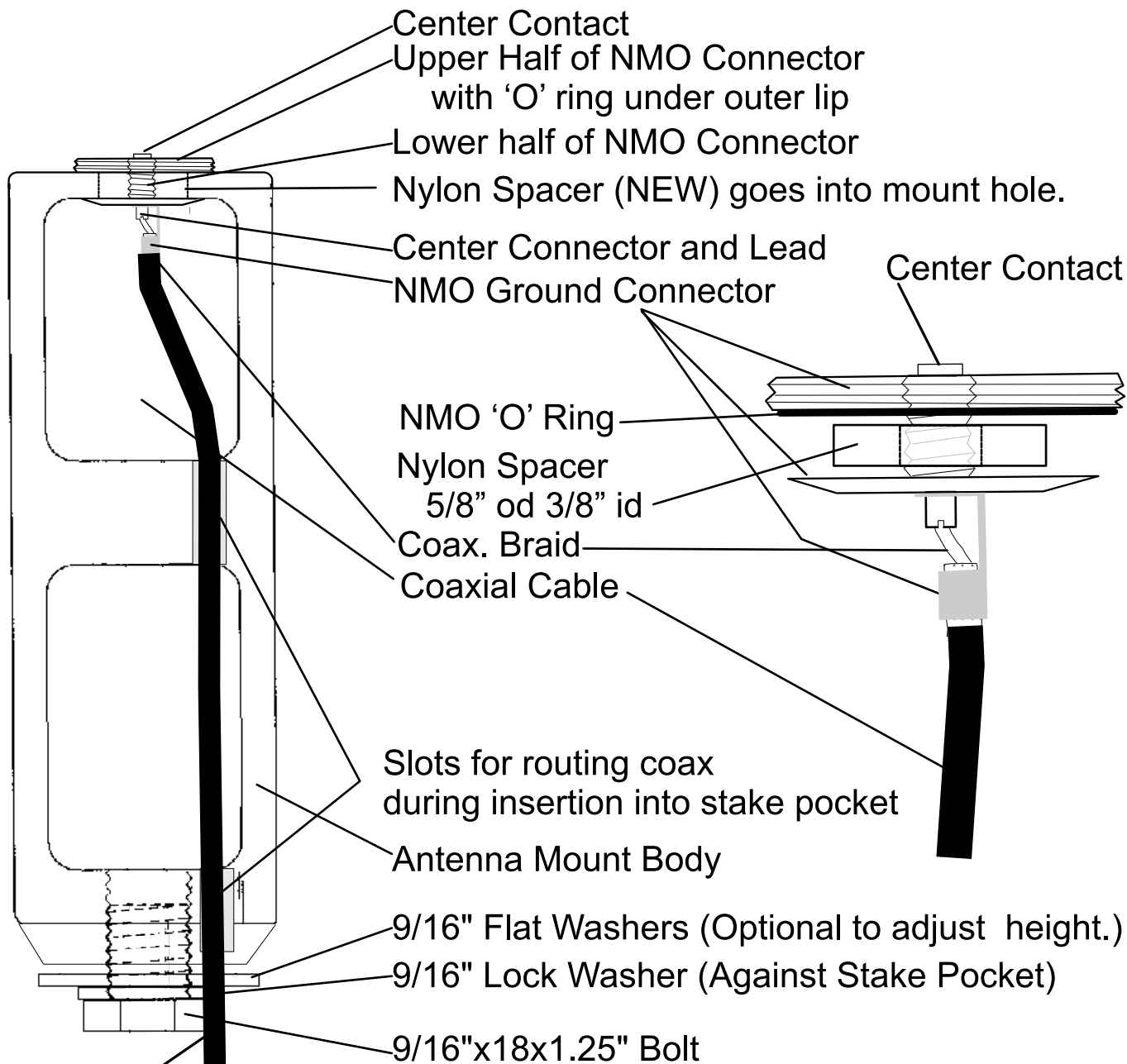
U.S. Patent No. 5,995,053



# Model VHF-2 Figure 1 - NMO Antenna Mount Schematic

U.S. Patent No. 5,995,053

**NOTE:** Route the coax out and down and in the slots on the side of the mount block to allow the mount to slip easily into the stake pocket. A socket wrench is then used to tighten the anchor bolt.



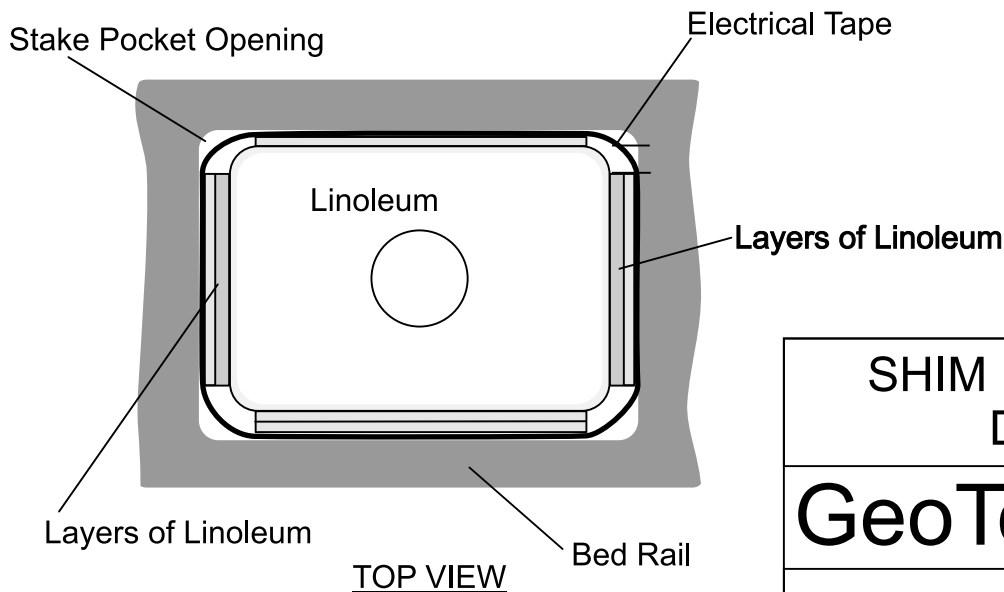
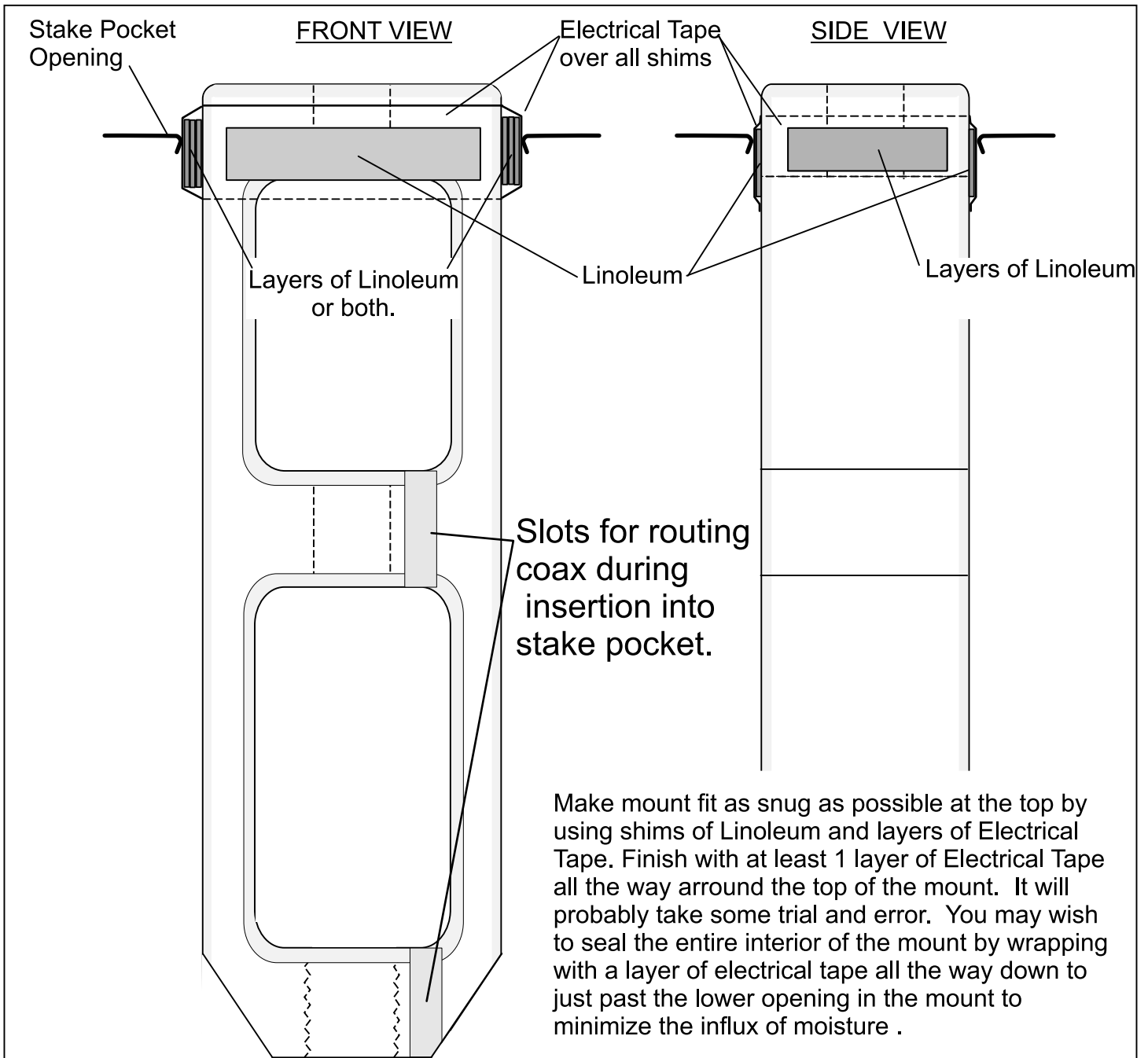
Coax shown in position to insert mount block into stake pocket.

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<b>SHIM INSTALLATION DIAGRAM</b>	
<b>GeoTool</b>	Drawn by: R.C.
	Review by: K.C.
Date: 8-11	

# Instructions for Installation - Model SM-1 Grounded Stake Pocket Stud-Mount

Fits: Chevrolet and GMC Trucks, Ford, Toyota, Dodge, & Late Model Chevy/GMC with Additional Top Shimming

Thank you for purchasing our Model SM-1 pickup Grounded Stake Pocket Antenna Mount. The following instructions will help you install the mount on your truck. The top stud has been installed at our factory, and should not need any attention. Over time the bolt may loosen, and require retightening. Installation of the mount is relatively simple, and requires only a few tools. The following are suggested steps in a normal installation:

1. **Select the mounting hole.** Trucks without double wall construction can generally accept the mount in the front and rear stake pockets. Long bed trucks often have tapered pockets in the center of each side, but the mount can be still installed in either the front or rear pockets. On some trucks, double wall construction makes installation in front pockets difficult. It is recommended that the rear pockets be used on these trucks. They are easily accessed by removing the rear tail light assembly, which is held in place by two Phillips head screws, accessible when the tailgate is lowered.

2. **Install the antenna mount.** Be sure to follow Figure 1. Remove paint from the outside bottom of the stake pocket to ensure a good ground. Use of the flat washer is optional, to raise the mount in the hole. Place the antenna mount body in the stake pocket and check for looseness at the top of the mount. It is recommended that you wrap a small amount of plastic electrical tape at the elevation of the truck body to reduce the amount of looseness to the minimum possible. The tape now comes in many colors, so if a little bit shows, it will not detract from the looks of the truck. The tape need not protrude from the top of the stake pocket to work properly. Ford trucks have larger stake pockets and require additional shimming material, which can be heat shrink tubing, split neoprene tubing, or several layers of tape. Secure the mount with the 9/16" hollow bolt, with the lock washer outside the bottom of the hole. Check to ensure that the top of the mount does not wobble in the stake pocket. If it does, loosen the 9/16" bolt and adjust the electrical tape shim.

3. **Attach the 3/8"-24 coupling nut.** Place a 3/8" I.D. flat washer over the mounting stud, and then place a lock washer on the stud. Finally, screw the 3/8"-24 coupling nut to the top of the mount, and tighten securely with a wrench. Masts (like hustler masts) can then be installed in the coupling nut to support loop antennas, or any other antenna requiring a grounded mast.

4. **Install a Screwdriver Antenna.** Use the 3/8"-24 mounting stud to attach your screwdriver antenna to the mount. A neoprene rubber fender washer may help to attach the antenna, and prevent damage to your paint. These are available from most hardware stores.

## Potential Problems

1. **The stake pocket will not accept the antenna mount body.** If you cannot bend the interior flanges of the hole enough to allow the mount to drop into place, try another stake pocket. Stake pocket dimensions vary a lot, as you will see if you place the antenna mount in each of the openings. If the mount will not fit in any opening easily, you may not be able to use this mount without modification. A metal shop may be able to mill a few thousandths off the body of the mount, but this will also remove the anodizing. If you have not scratched the mount, you may return it, for a full refund.

2. **The stake pocket will not accept the 9/16" hollow anchor bolt.** Use a round file to enlarge the hole so the bolt will fit. Be sure to protect the paint on the upper part of the hole while filing.

3. **The stake pocket has no anchor bolt hole.** You will need to drill a hole 5/8" diameter or larger to accept the mount. Be sure to drill it as close to the center of the opening as possible.

If you have questions, contact us at the address, phone, or E-mail location shown below.

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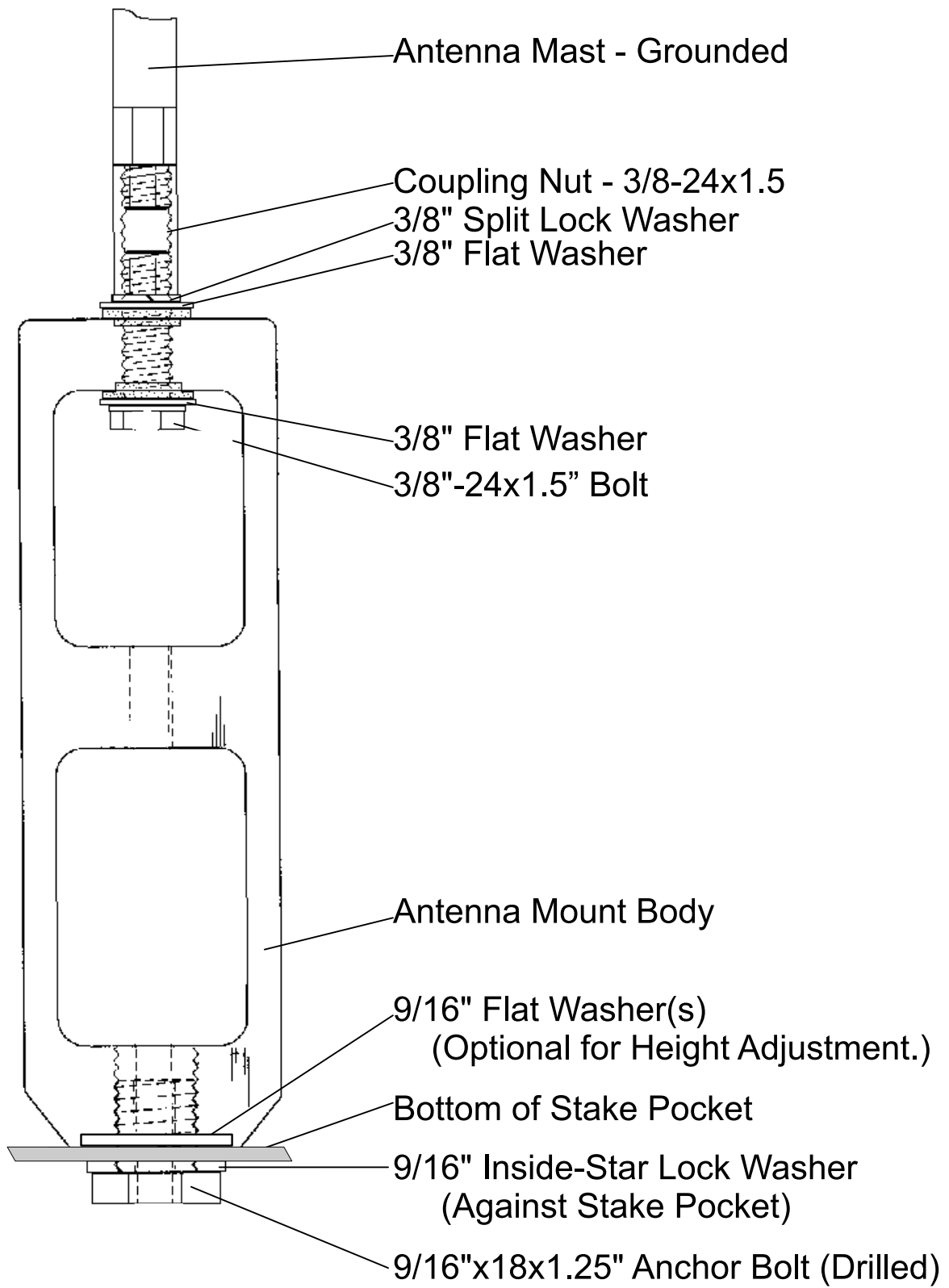


Figure 1 - Model SM-1 Antenna Mount Schematic

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