Metricom

Network Radio Installation Guide

4 February 1998

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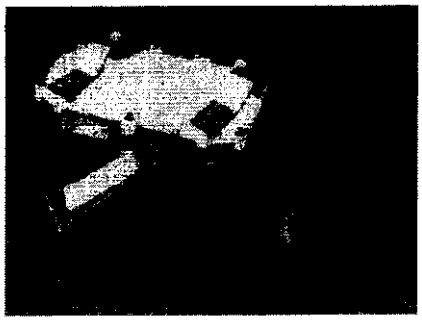
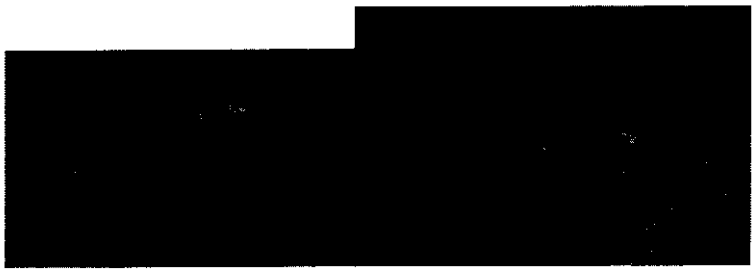
1. Equipment Required

For a standard poletop installation, either horizontal or vertical, you will need the following equipment:

A. Radio.
You may be required to install a Filtered Network Radio (Part 105216-500), or a Gen 1.1 Network Radio (Part 106470-100) all of which are filtered. The only way to distinguish between these two parts visually is by the label on the connector side of the radio. The part number is printed on the end of the radio, on a small sticker that also indicates the code revision of the PROM.



B. Mounting Hardware:
(1) Standard Installation Kit (Part 106465-000) consisting of:



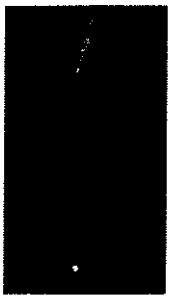
- 1ea Photocell Adapter (Part 103826-000)
- 2ea Bracket (Part 101877-000)

- 4ea Bolt, 1/4-20 x 3-1/2" (Part 101887-350)
- 4ea Flange Nut, 1/4-20 (Part 101983-025)
- 1ea Whip Antenna, 5dB (Part 106118-000)
- 1ea Tie-wrap, 16" (Part 106462-000)

(2) Vertical Installation Kit (Part 106464-000) consisting of:

- 2ea Hex Nut, 1/4-20 (Part 101676-025)
- 2ea Bolt, 1/4-20 x 1-3/4" (Part 103917-175)
- 1ea Ground Plane (Part 105657-000)
- 1ea Coax Cable Assembly (Part 105587-014)
- 1ea Vertical Antenna Bracket (Part 105597-000)
- 2ea Stainless Hose Clamp (Part 106461-000)

(3) Articulated Vertical Mount (Part 106590-000). This mount allows the ground plane and antenna portion of the antenna bracket to be rotated vertically to allow the antenna to be secured in a position perpendicular to the earth. This allows the radio to achieve the best signal propagation.



C. Leveling Tools Required:

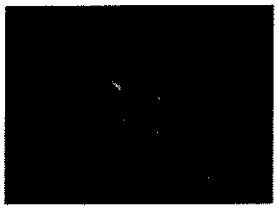
(1) Bubble Level

(2) Rubber Shims (Part 106546-000). These shims have adhesive tape on one side and can be stacked together and applied to the pole up to three thick.

(3) Use a third mounting bracket (Part 101877-000), additional flange nuts (Part 101983-025), and 7" threaded rod (Part 102381-000) when more than three rubber shims are required to level the radio. Install the third bracket under the pole arm using the threaded rod and

additional two nuts, and clamp the two opposing brackets around the pole arm.

(4) For extreme conditions use a Radio Leveling Kit (Part 106070-000) consisting of:



- 1ea Leveling Bracket (Part 106071-000)
- 1ea Cradle Bracket (Part 106072-000)
- 1ea Bolt, 3/8 x 5" (Part 106073-500)
- 1ea Hex Nut, 3/8" (Part 106074-038)

When using Radio Leveling Kit, you still MUST install both brackets as in the photo, for both safety and reliability.

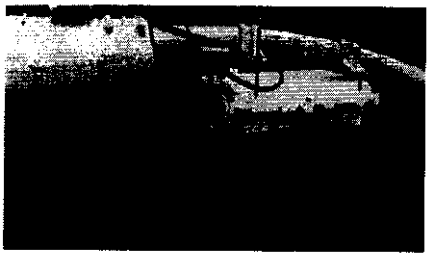
2. Installing Network Radios

A. Test the power at the pole before attempting installation. Remove the photocell switch. Using a voltmeter, check the voltage by inserting meter probes into the photocell socket. The voltage must be between 100 and 250 volts (the radio operates on 110V or 220V, there is no external switch to change the input voltage). If the voltage at the pole does not meet this specification, do not install the radio. Mark the installation or repair map indicating the voltage at the pole.

B. Install the photocell adapter between the street light and the photocell. Twist the photocell adapter until its bayonet lock is fully engaged. Reinstall the photocell switch. Test the switch for proper operation by covering the lens on the photocell. If the streetlight does not illuminate, remove the photocell adapter, reinstall the photocell and test again. If the streetlight works without the photocell adapter, try reinstalling the photocell adapter and test again. If the streetlight does not work when the photocell adapter is installed the second time, mark the photocell adapter as defective and try with a new one.

C. Install the radio so that the light can be serviced. Make sure that the radio will not block the swinging action of the light cover or

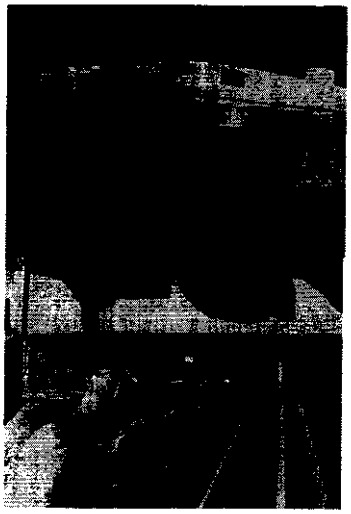
lens. Connect the photocell adapter to the radio.



D. Use a tie wrap to dress the cable and to provide a drip loop to keep water from running into either the M/S connector on the radio or to the photo cell adapter. The picture at right shows a poor installation. Any moisture on the cable will make its way to the radio connector and possibly corrode the M/S connector.

E. Install the antenna. Be sure to engage the threads properly. A cross-threaded antenna will cause a loss of both receive sensitivity and output power.

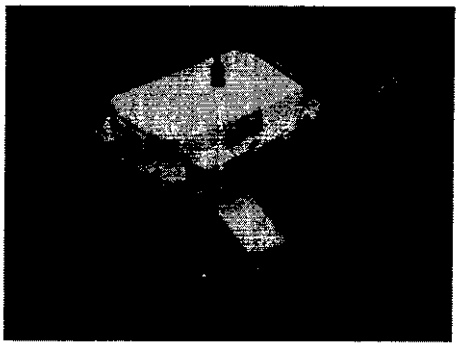
F. Level the radio. Check for level both in-line (parallel) with the pole and across (perpendicular to) the pole. A small deviation from level can result in a significant signal loss.



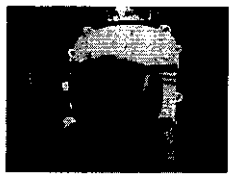
3. Installing Vertical Mount Antennas

A. Test the light pole for power before beginning installation.

B. Attach the vertical antenna mount to the radio with two bolts and nuts. Attach the coax cable to the radio and the antenna mount. Thread the ground plane onto the male-male N adapter.



C. Use two stainless steel straps (part 106461-000) to strap the radio and mount assembly vertically to the light pole with the ground plane and antenna facing up.



D. Install the antenna and the photocell adapter and ensure that the streetlight still has power by covering up the photo sensor to see if the light comes on. If the light does not come on check the photocell adapter for a secure connection.

E. Regardless of the vertical kit you use, your finished installation should look similar to the picture at right. Notice the drip loop in the power cable just below the M/S connector.

4. Installing on Short Streetlight Arms

A. Hardware Required:

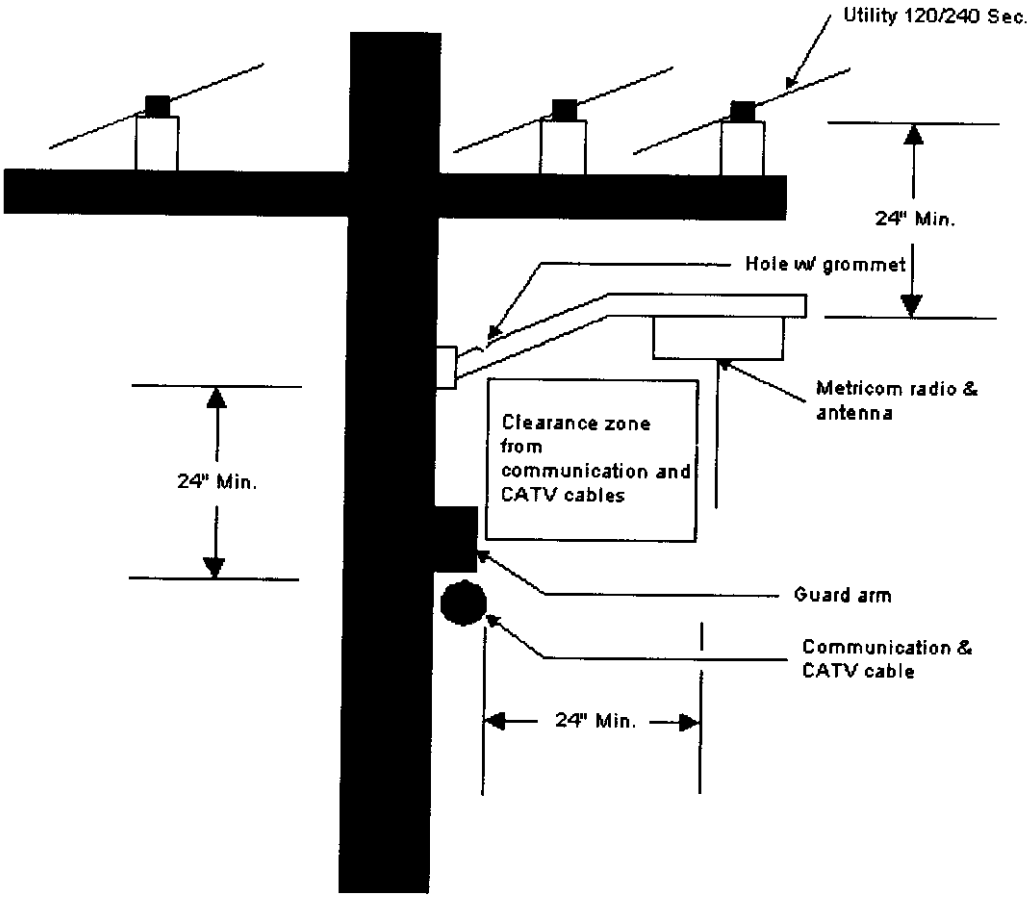
(1) Streetlight Arm, RIC, Poletops (Part 107573-000), which includes the following mounting hardware:

- 1ea Bolt, Machine, 5/8" x 10", Galvanized
- 2ea Screw, Lag, 1/2" x 4", Galvanized
- 1ea Washer, 2-1/2", Galvanized

(2) Assembly, Cable, Power, MS, 2 Wire, 20 Ft, 10 AWG (Part 103514-100)

B. Installation:

(1) Attach the streetlight arm to the pole as shown in the following diagram. Treat all cuts on wooden poles with Cupric Green. If the furnished bolt is not long enough to secure the mount, replace it with Bolt, 5/8" Dia, 14" L, HD Galv, Streetlight Arm (Part 107572-014).



(2) Attach the radio to the streetlight arm.

(3) Attach the power cord to the radio. Thread the power cord into the open end of the streetlight arm and out through the hole and grommet.

(4) Depending on the pole owner's desires, either:

(a) Loop and zip-tie the cable where it exits the arm or,

(b) Run the cable in a conduit up the pole. Use MC straps at each end of the conduit to fix the conduit to the pole. If the conduit is longer than 4', use an additional MC strap midway between the ends of the conduit. Use 3" or longer galvanized nails to attach the MC straps to wooden poles.

(5) Tag the pole as required by the pole owner.

(6) Notify the pole owner that the installation is ready for inspection and connection to secondary power.

5. Completing the Paperwork

A. Blue Tags.

Information that you record on the blue tag must be correct and complete. Each element of information is critical to the correct configuration of the radio and directly affects network

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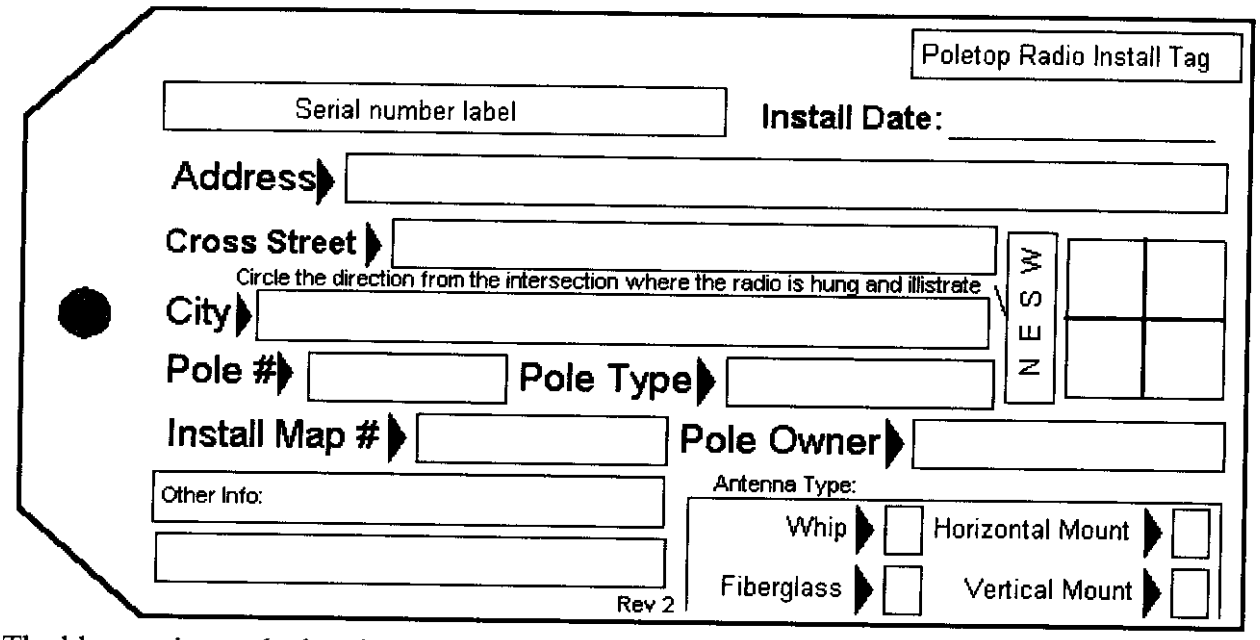
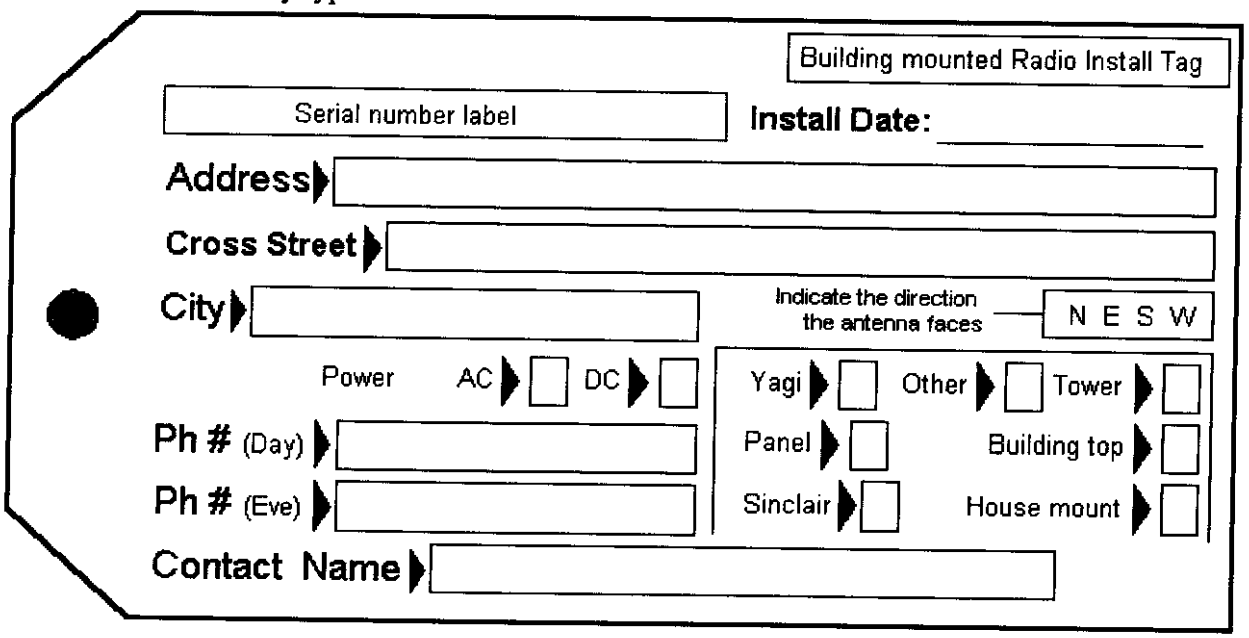


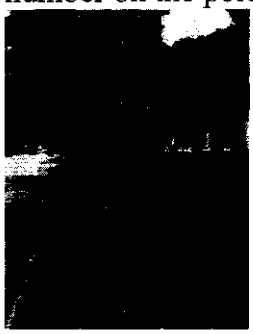
The blue tag is attached to the radio at the factory. The serial number of the radio is preprinted on both sides of the blue tag. Make sure that the serial number printed on the tag matches the serial number on the radio. You use one side of the tag (shown above) to record details of a typical pole installation. Use the other side (shown below) to record building-mounted, house-mounted, or tower-mounted radios of any type.



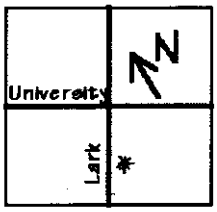
1. Enter the installation date in the "Install Date" field.
2. Enter the street address where the radio is installed in the "Address" field. If there are no street numbers where the installation is, write the street name here.
3. Enter the name of the nearest cross street in the "Cross Street" field. This is the nearest street that intersects with the street named in the "Address" field.
4. Enter the name of the city where the radio is actually installed in the "City" field. Refer to the install map to make sure that the name is correct.
5. Enter the compass direction from the intersection to the radio in the "Direction" field. In the

case of a building mounted or directional antenna, enter the direction the antenna is pointed.

6. Enter the pole number in the "Pole Number" field. If you are using a streetlight or pole location map, and the number written on the pole does not agree with the number on the map, write the number on the pole, a slash "/" and the number of the pole on the map.



7. Draw a sketch in the "Illustration Box" to show the intersection of the street address, the cross street and where the radio is hanging in relation to that intersection. Also, indicate North in the sketch.



8. Record the construction material of the pole in the "Pole Type" field. The three most common types of material are wood, metal, and marblelite (marblelite is shown in picture).
9. Enter the number of the installation map in the "Install Map #" field.
10. Enter the name of the party who actually owns the pole in the "Pole Owner" field. Typically this would be the name of the city, the local utility company or a joint pole with more than one owner.
11. Check the boxes that apply to this installation. Does the installation use the standard whip antenna or a Fiberglas antenna? Is the installation a vertical or a horizontal mounting?
12. Write any other pertinent information on the tag in the "Other Info" field. For example, if the radio is installed with the articulated vertical mount hardware or if the antenna is other than a standard whip or Fiberglas.
13. Check the appropriate "Power" box to indicate the power source for the radio.
14. Check the appropriate "Antenna" boxes to indicate which type of antenna is installed and the type of installation performed.
15. Use the "Other" box when the antenna or the type of installation is not one of the check box choices.
16. Enter the name of the primary contact for access to the structure in the "Contact Name" field. This is the person who can permit access to that particular structure.
17. Enter the appropriate phone numbers for the contact in the two "Phone #" fields, "Day" and "Eve."
18. Send completed tags and their associated installation maps to Network Operations as soon as possible. See the section on maps below.

B. Maps. Normally, you install poletops at locations specified on furnished maps. These maps will be marked with strategic "hit points" or pole numbers where radios are to be mounted.

When you place a radio in a location other than the location specified on the map, draw an arrow

requested location to the actual location. We need this information in order to find the radios later. It also provides a cross-check for the address location noted on the blue tag.

Send the map and associated blue tags to Network Operations when you complete installation for that map.

Return maps and blue tags to:

Metricom, Inc.
Network Operations
16801 Greenspoint Park Dr., Suite 150
Houston,TX 77060
Phone: 281-873-3400
Fax: 281-876-4500

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Send comments or suggestions: Tom Jacoby