



# Digital Range Extender

78-6911-4961-7

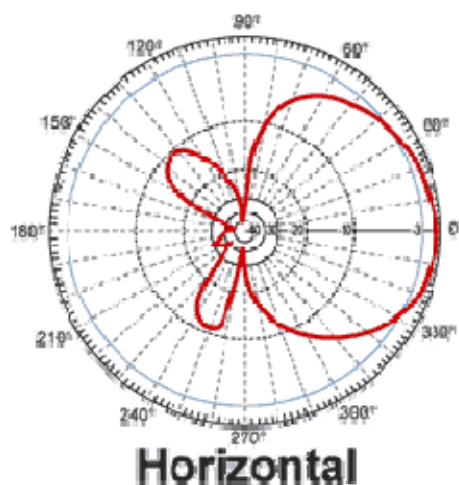
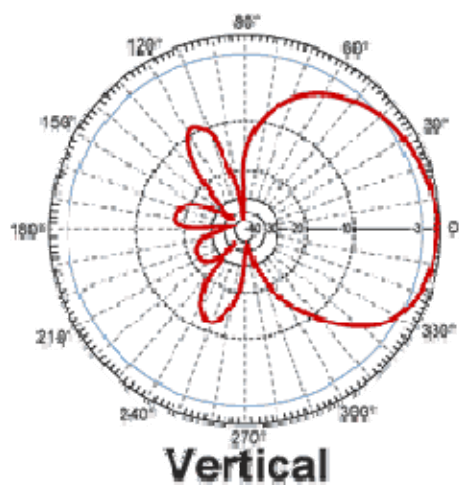
# Installation Instructions

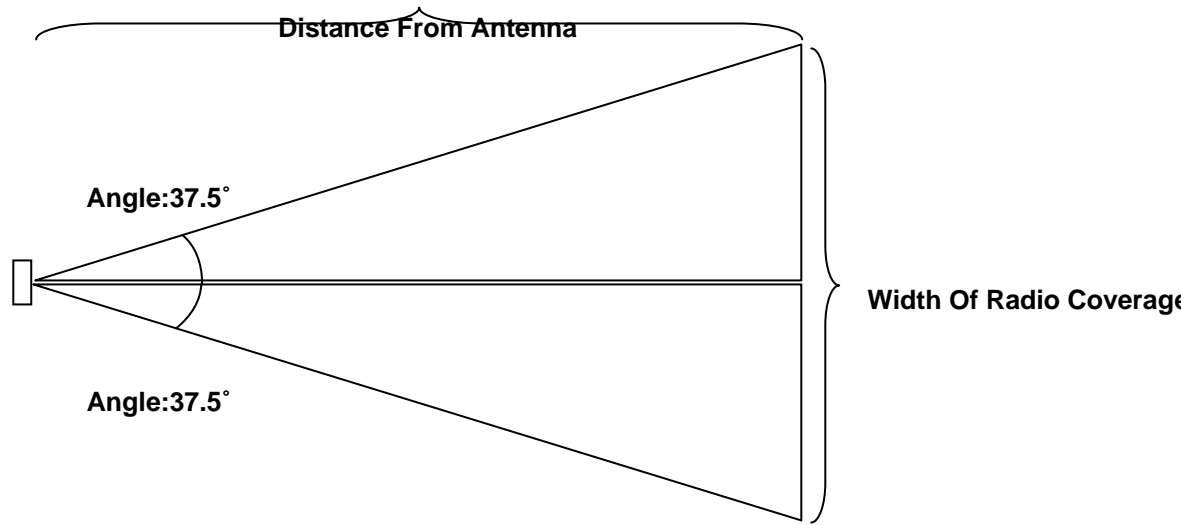
## PURPOSE

To "fill in" areas of poor radio coverage due to blockage of the RF signal by large metal objects and to extend working distance from the digital system base station.

## Radiation Pattern

The Digital Range Extender is not an omni-directional antenna similar to 3M's previous Signal Enhancer; it is more directional. The attached diagram shows its Radiation Pattern.





**HORIZONTAL BEAM WIDTH (Width)**

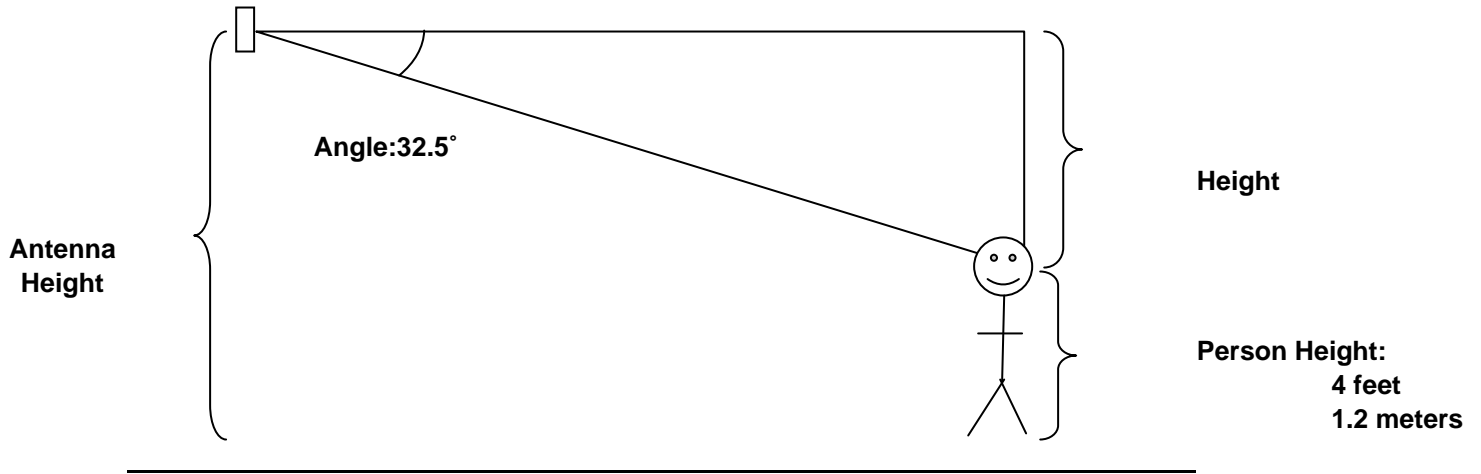
Width Of Radio Coverage = 2 \* Distance From Antenna \* (tan 37.5°) or 1.53 \* Distance From Antenna

Distance From Antenna (feet)	Width Of Radio Coverage (feet)	Distance From Antenna (meters)	Width Of Radio Coverage (meters)
3	4.6	0.9	1.4
4	6.1	1.2	1.9
5	7.7	1.5	2.3
6	9.2	1.8	2.8
7	10.7	2.1	3.3
8	12.2	2.4	3.7
9	13.8	2.7	4.2
10	15.3	3.0	4.7
11	16.8	3.4	5.1
12	18.4	3.7	5.6
13	19.9	4.0	6.1
14	21.4	4.3	6.5
15	23.0	4.6	7.0
16	24.5	4.9	7.5
17	26.0	5.2	7.9
18	27.5	5.5	8.4
19	29.1	5.8	8.9
20	30.6	6.1	9.3
21	32.1	6.4	9.8
22	33.7	6.7	10.3
23	35.2	7.0	10.7

Final Draft

24	36.7	7.3	11.2
25	38.3	7.6	11.7
26	39.8	7.9	12.1
27	41.3	8.2	12.6
28	42.8	8.5	13.1
29	44.4	8.8	13.5
30	45.9	9.1	14.0
31	47.4	9.5	14.5
32	49.0	9.8	14.9
33	50.5	10.1	15.4
34	52.0	10.4	15.9
35	53.6	10.7	16.3
36	55.1	11.0	16.8
37	56.6	11.3	17.3
38	58.1	11.6	17.7
39	59.7	11.9	18.2
40	61.2	12.2	18.7
41	62.7	12.5	19.1
42	64.3	12.8	19.6
43	65.8	13.1	20.1
44	67.3	13.4	20.5
45	68.9	13.7	21.0
46	70.4	14.0	21.5
47	71.9	14.3	21.9
48	73.4	14.6	22.4
49	75.0	14.9	22.9
50	76.5	15.2	23.3

Final Draft



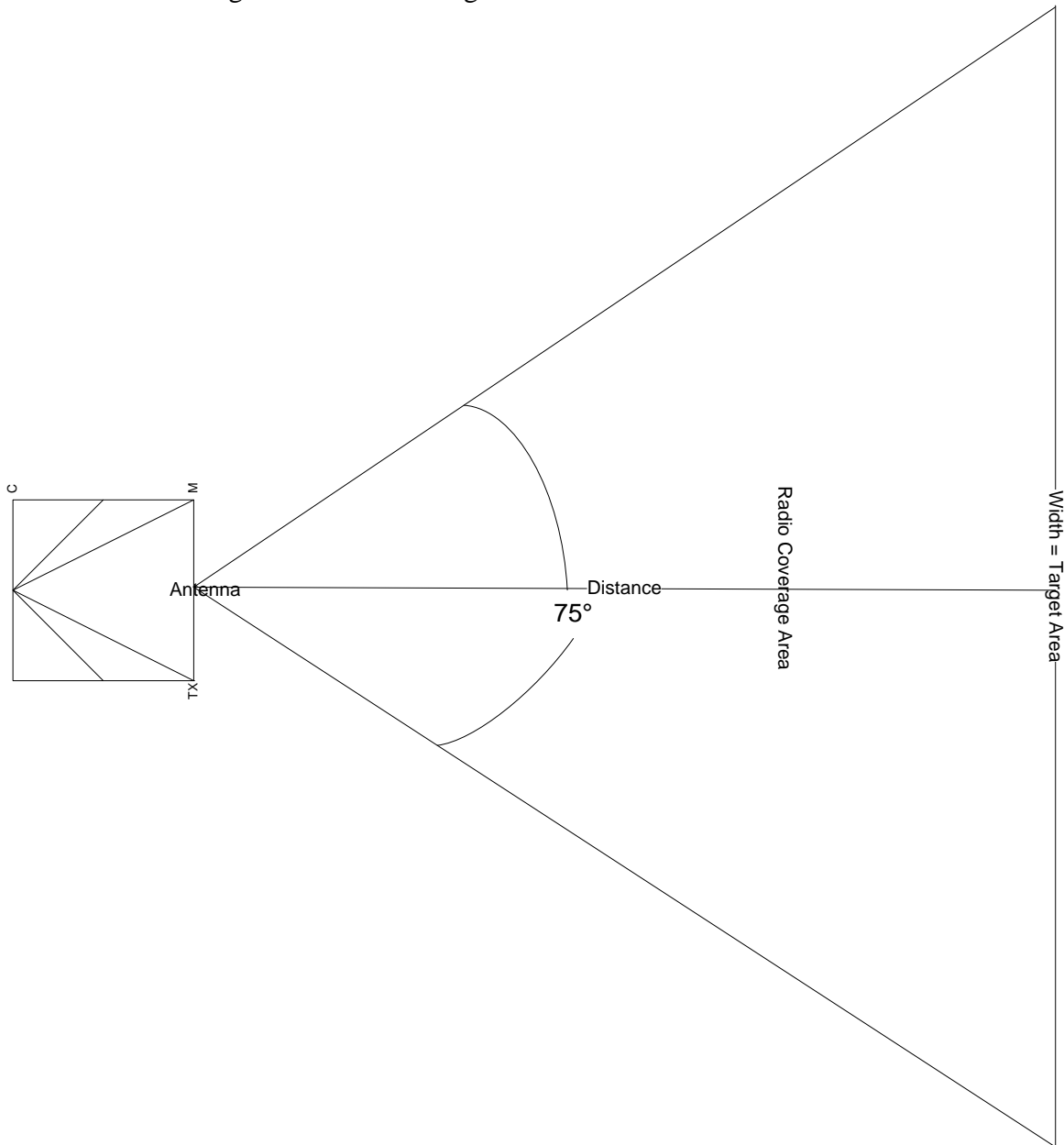
**VERTICAL BEAM WIDTH (Height)**

Minimum Distance = (Height - Person Height) / (tan 32.5°) or 1.57 \* (Height - Person Height)

Antenna Height (feet)	Minimum Distance (feet)	Antenna Height (meters)	Minimum Distance (meters)
6	3.1	1.8	1.0
7	4.7	2.1	1.4
8	6.3	2.4	1.9
9	7.9	2.7	2.4
10	9.4	3.0	2.9
11	11.0	3.4	3.3
12	12.6	3.7	3.8
13	14.1	4.0	4.3
14	15.7	4.3	4.8
15	17.3	4.6	5.3
16	18.8	4.9	5.7
17	20.4	5.2	6.2
18	22.0	5.5	6.7
19	23.6	5.8	7.2
20	25.1	6.1	7.7

## How to determine the proper location of the antenna

You can visualize the radio coverage area of the Digital Range Extender as a cone with a 75 degree dispersion whose starting point is the antenna. Attached is a two dimensional drawing of the antenna radio coverage, where the area inside the triangle has radio coverage.



The first step in achieving adequate radio coverage is determining the area where the customer requires increased operations. Once the area has been identified, the distance of the antenna from the target coverage area is calculated as follows:

$$\text{Target Area} = \text{Distance} * 1.5$$

Example:

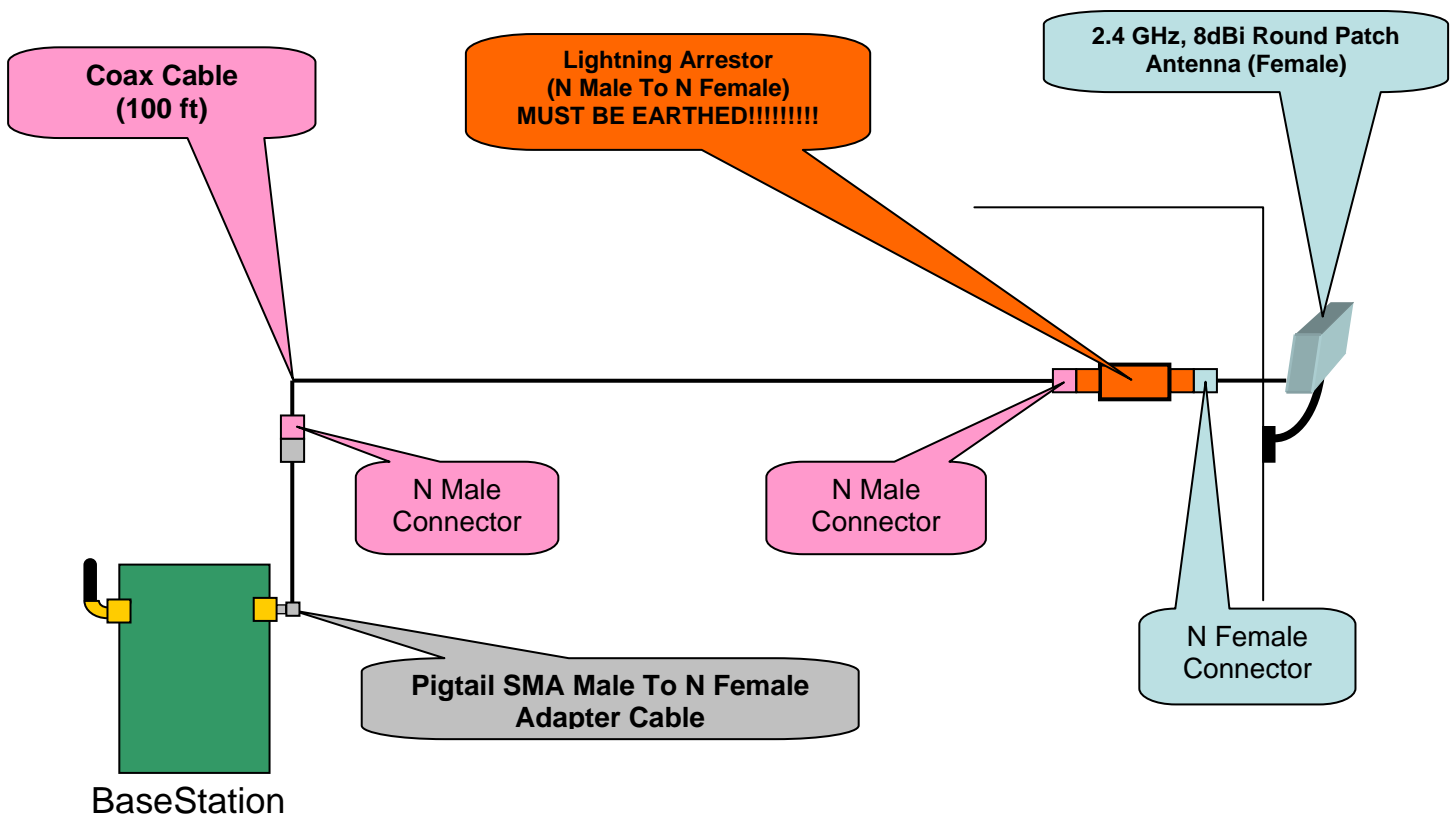
If an area 15 ft wide needs radio coverage, the antenna needs to be at a distance of 10 ft or greater in order to have adequate radio coverage.

## EQUIPMENT NEEDED

- Wire (18 Gauge recommended) to connect lightning arrestor to Earth Ground
- Mounting Hardware for antenna

## BILL OF MATERIALS

- 78-8117-4330-7 – Pigtail - SMA Male to N Female Adaptor Cable (90deg.)
- 78-8117-4331-5 – Lightning Arrestor (N Male to N Female)
- 78-8117-4332-3 – 2.4 GHz 8 dB Round Patch Antenna (Female)
- 78-8117-4333-1 – Coax Cable (100 ft) w/ N Male Connectors



## INSTALLATION WITH A DIGITAL WIRELESS BASE STATION

1. Remove the Base Station cover
2. Disconnect power to the Base Station
3. Remove either the left or right base station antenna
4. Connect the pigtail to base station antenna connector, in spot where antenna was removed

**NOTE: DO NOT use a tool to tighten the pigtail to the Base Station, leave the connection finger tight.**

5. Connect coaxial cable to pigtail.

NOTE: Be sure to form coaxial cable into a "drip loop" and secure to mounting surface when connecting to Remote Antenna

6. Reconnect power to the Base Station

7. Attach the Base Station Cover.

8. Locate the area in which enhanced radio coverage is desired

NOTE: Obstruction-free line of sight to headsets is required with no large solid metal objects between Remote Antenna and headset.

9. Pull the Coax Cable to desired antenna location.

10. Connect the lightning arrestor to Coax

11. Connect the lightning arrestor to antenna

12. Test the system range.

- Have someone hold the antenna in the selected location
- Verify antenna operation in required area
- If necessary reposition or move the antenna in order to get desired coverage

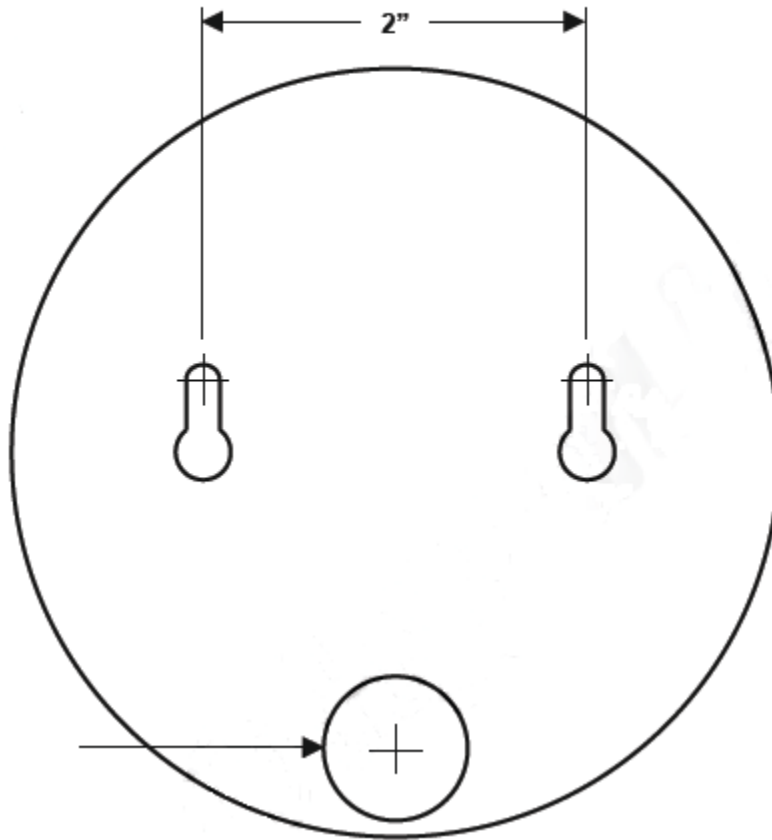
13. Mount Antenna in location in order to get desired coverage

14. Mount the lightning arrestor

15. Run 18 Gauge wire from lightning arrestor to an Earth Ground

16. Test the system range.

## INSTALLATION TEMPLATE (For Flat Mounting)



**FCC NOTICE:** The use of all radio equipment is subject to radio regulations in each country. It is the responsibility of the purchaser/installer/operator to insure that only approved equipment/systems are deployed. For the ISM band equipment manufactured, sold/or used in the USA, FCC Title 47, Part 15 governs the sale, lease, use and manufacture of equipment (wireless LAN cards, wireless Access points, amplifiers, etc.) and prohibits the same unless such equipment is used in the FCC-certified system configuration with which such equipment is authorized.

According to FCC rules, this equipment requires professional installation. This equipment must be purchased only from 3M authorized dealers. Installation must be controlled and done by 3M certified professionals. The installation of this equipment requires special training to ensure that placement and set up is done appropriately to meet the needs of individual customers and locations. Installation of this equipment also may require a trained electrician to ensure system components are installed in compliance with applicable building codes. This equipment is intended for use in industrial or commercial environments only, and is not intended for use by the general public.