# End-Fed Half-Wave Antennas for Field Use

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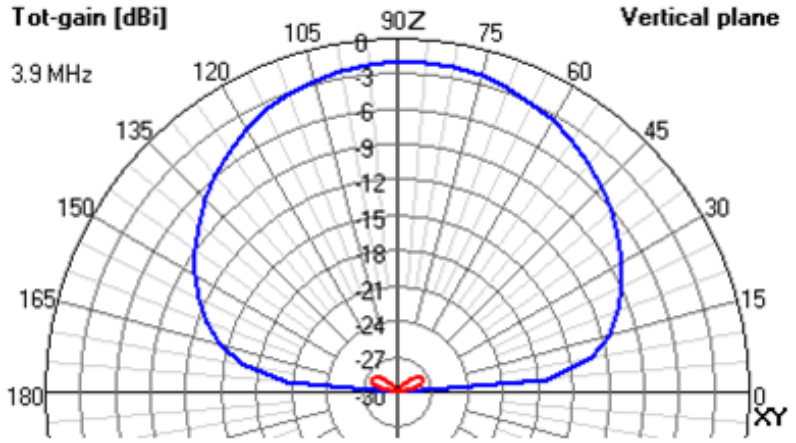
# Rational

- High-frequency military field radios generally come with an easily carried and erected whip antenna for direct-wave communications out to about 10-15 miles.
- They are also provided with half-wave wire antennas for long range comms.
- Over many years of MRCA field exercises, we've proved the effectiveness of a low dipole for NVIS paths out to 250-300 miles using 20-watt SSB radios.




**So, What's Wrong with My Whip?**

- Your signal is shown in red.
- Low half-wave in blue.

# A Dipole is a Dipole

- A dipole is ½ wavelength long at the operating frequency.
  - Dipole length ( λ / 2 = 468 feet / Freq (MHz)
  - Usually, we feed the dipole at the center where the impedance is low, 50-75 Ohms.
- We can also feed the dip[ole at one end, where the impedance is very high, thousands of ohms.
  - For a field radio, this eliminates the feed line.
  - Makes it easier to adjust length for other bands.
  - Little or no ground is required because of the high-impedance.

# Important Clues from TM-11-263

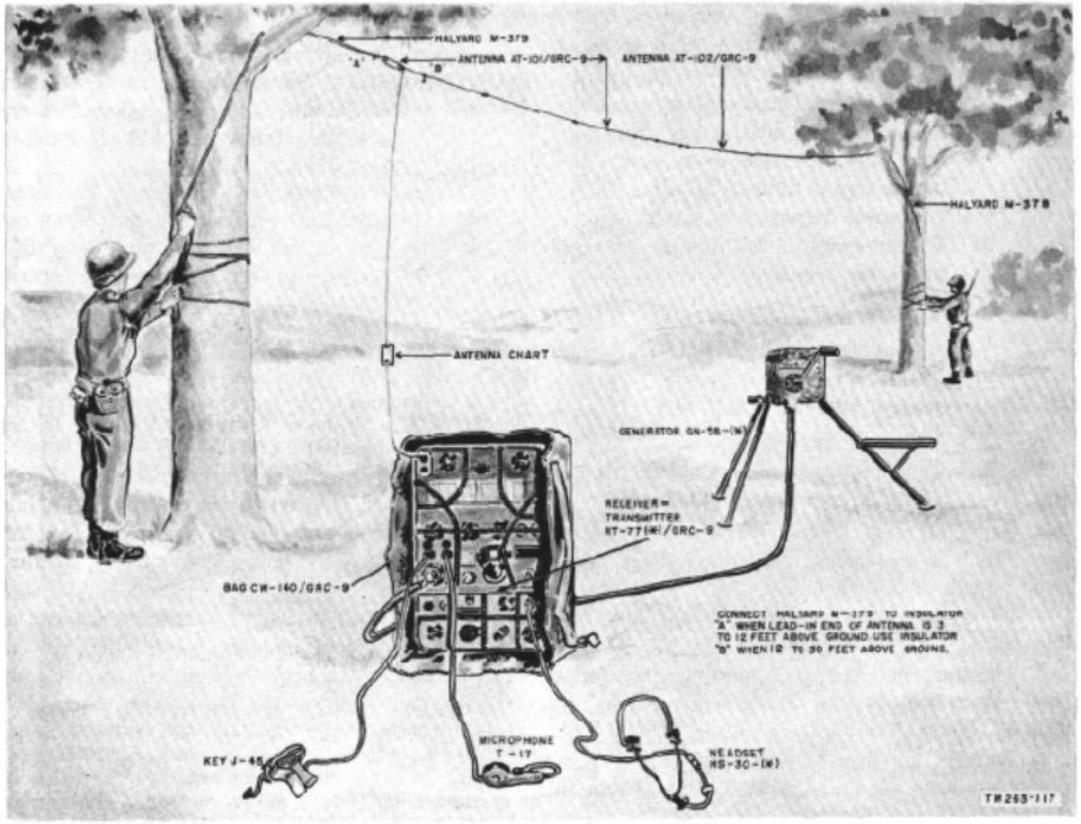



*Figure 19. Installation of antennas AT–101/GRC–9 and AT–102/GRC–9.*

**The AN/GRC-9 wire antenna is an end-fed half-wave. The radio's internal tuner was designed to take advantage of such an antenna.**

**ANTENNA AT – 101/GRC – 9**

| FREQ. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 12000–9900 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9900–9000 | X | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9000–8400 | X | X | 0 | 0 | 0 | 0 | 0 | 0 |
| 8400–7500 | X | X | X | 0 | 0 | 0 | 0 | 0 |
| 7500–6000 | X | X | X | X | 0 | 0 | 0 | 0 |
| 6000–5300 | X | X | X | X | X | 0 | 0 | 0 |
| 5300–4900 | X | X | X | X | X | X | 0 | 0 |
| 4900–4300 | X | X | X | X | X | X | X | 0 |

X = CLOSED JUMPER
0 = OPEN JUMPER

**ANTENNA AT – 102/GRC – 9**

| FREQ. | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|
| 4300–3900 | X | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3900–3200 | X | X | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3200–3100 | X | X | X | 0 | 0 | 0 | 0 | 0 | 0 |
| 3100–2900 | X | X | X | X | 0 | 0 | 0 | 0 | 0 |
| 2900–2700 | X | X | X | X | X | 0 | 0 | 0 | 0 |
| 2700–2550 | X | X | X | X | X | X | 0 | 0 | 0 |
| 2550–2400 | X | X | X | X | X | X | X | 0 | 0 |
| 2400–2200 | X | X | X | X | X | X | X | X | 0 |
| 2200–2000 | X | X | X | X | X | X | X | X | X |

X = CLOSED JUMPER
0 = OPEN JUMPER

TM 263-41

*Figure 22. Long wire antenna chart.*

# Important Clues from TM-11-263

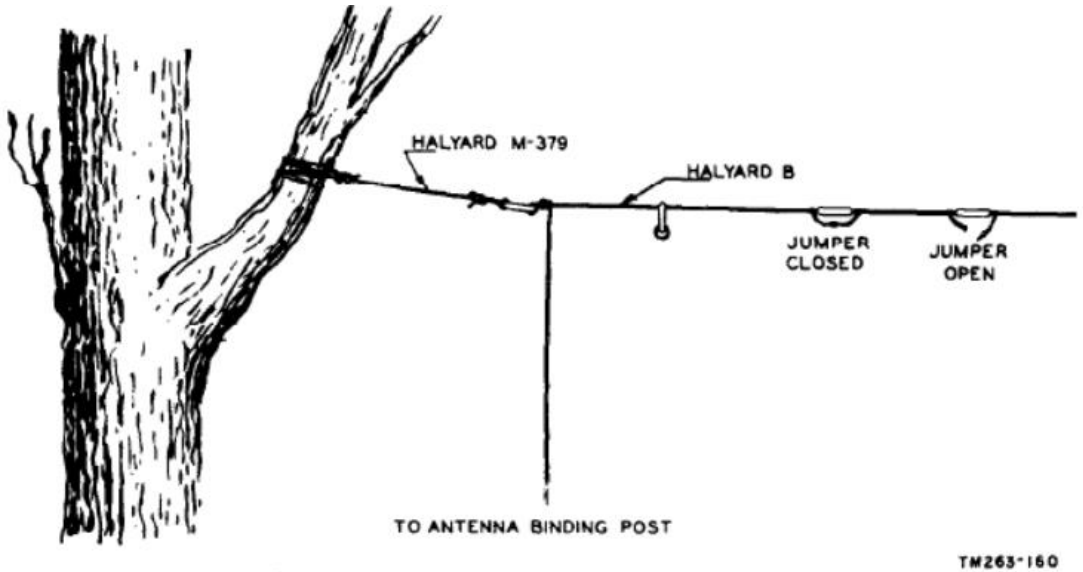



*Figure 20. Antenna supports and connections.*

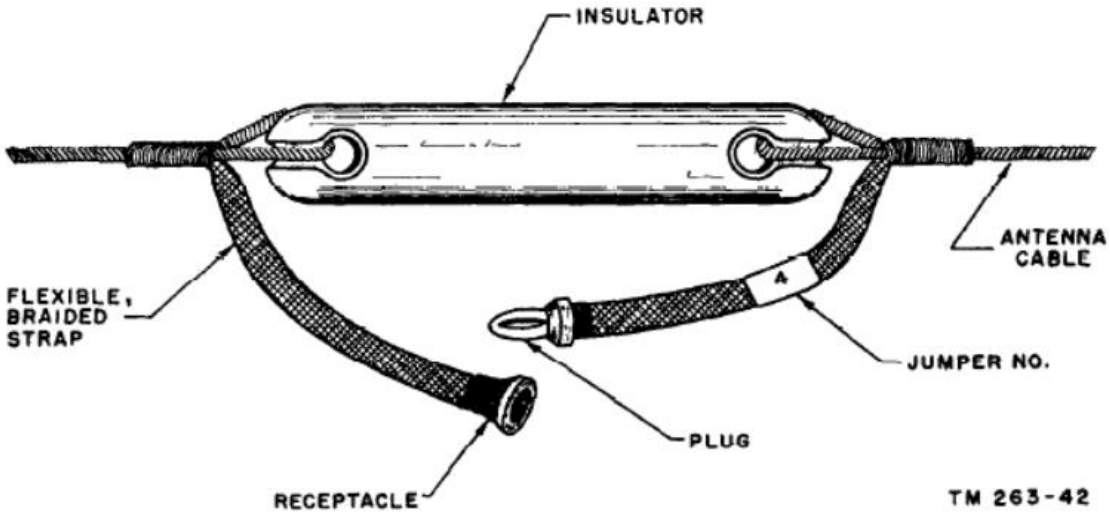
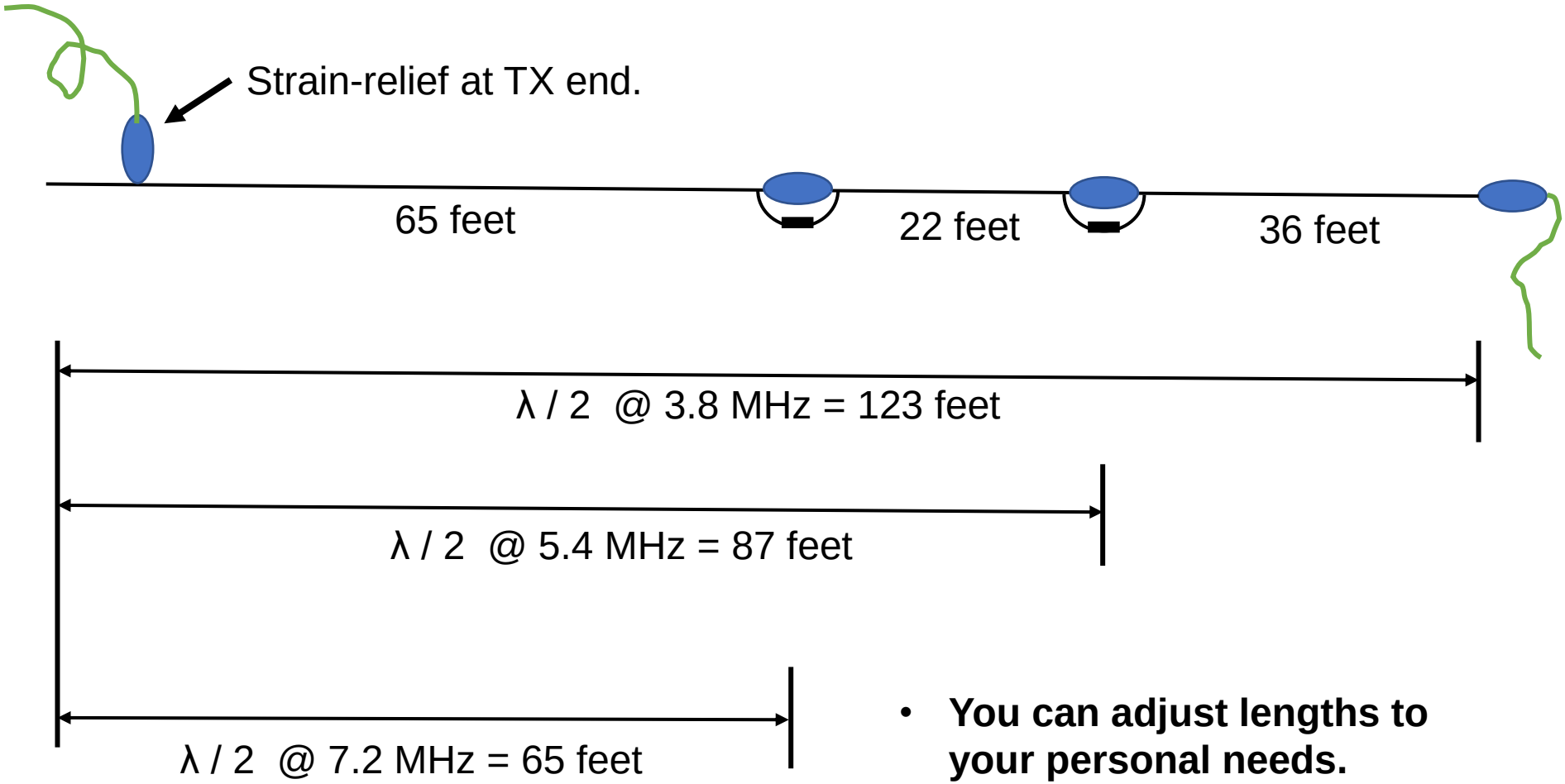



*Figure 21. Typical antenna jumper.*

# End-Fed Half-Wave for 40, 60, and 75 meters



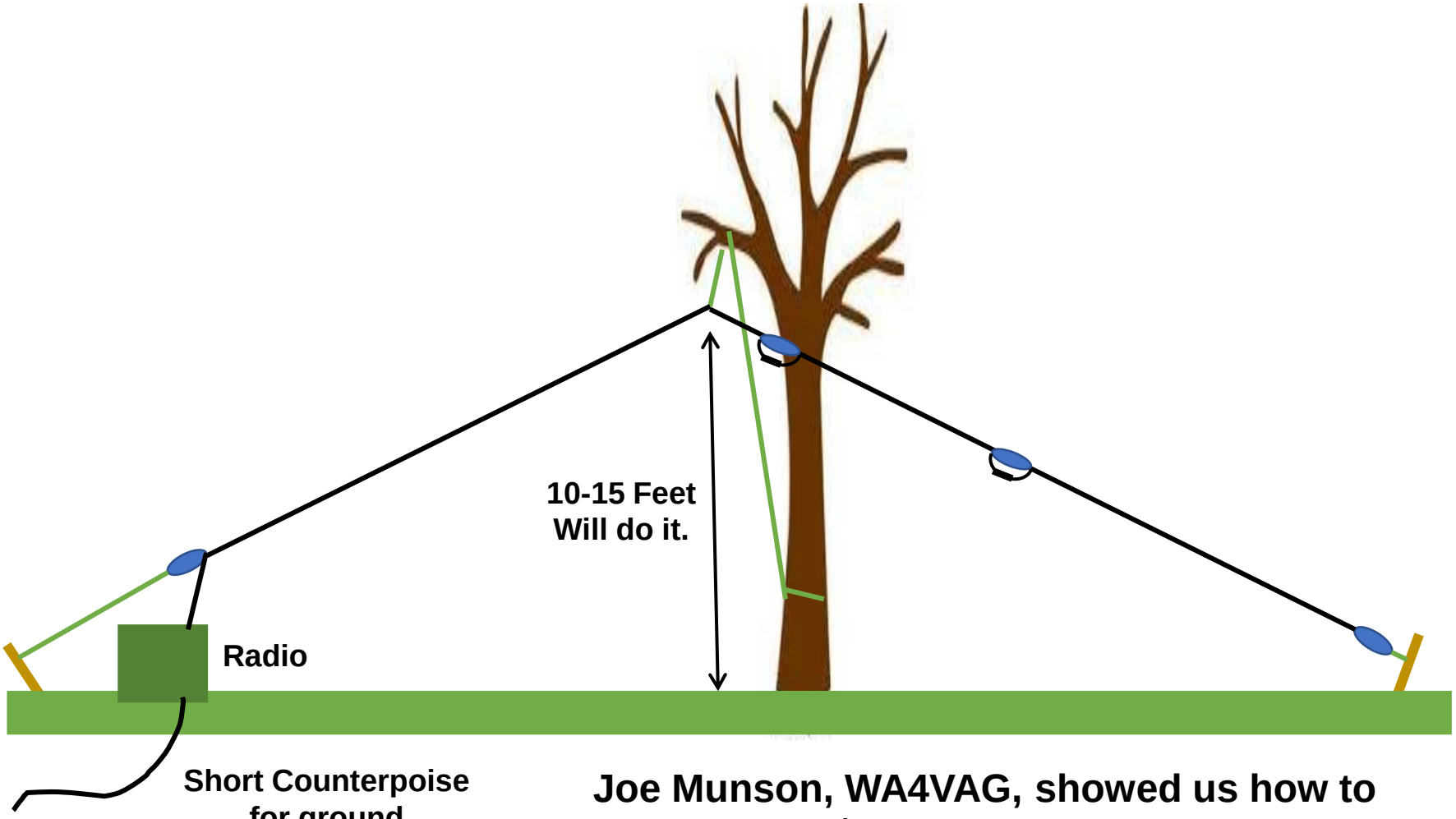

- **You can adjust lengths to your personal needs.**
- **λ / 2 = 468 ffet / Freq. (MHz))**

# Construction Details

I used WD-1/TT field-phone wire. It's light, strong, and flexible. You can use whatever is handy, but insulation is a plus for field use. Jumpers are banana plugs and jacks. Provide a short length of parachute cord at each end.


A simple halyard is a useful accesory.

# Typical Deployment




**Joe Munson, WA4VAG, showed us how to do this in 93rd-Psyop fashion. Three guys hold up the antenna until the message is sent. Then you all disappear into the woods.**

# Radios

- My PRC-104 works just fine with an end-fed half-wave antenna.
- My PRC-2000 pretended  to tune up, but got out much better with an external tuner. See: Fuchs Tuner.

- Let me know your experiences with other pack-sets, and we'll make a list.
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