

# Antenna extension provides open-door policy

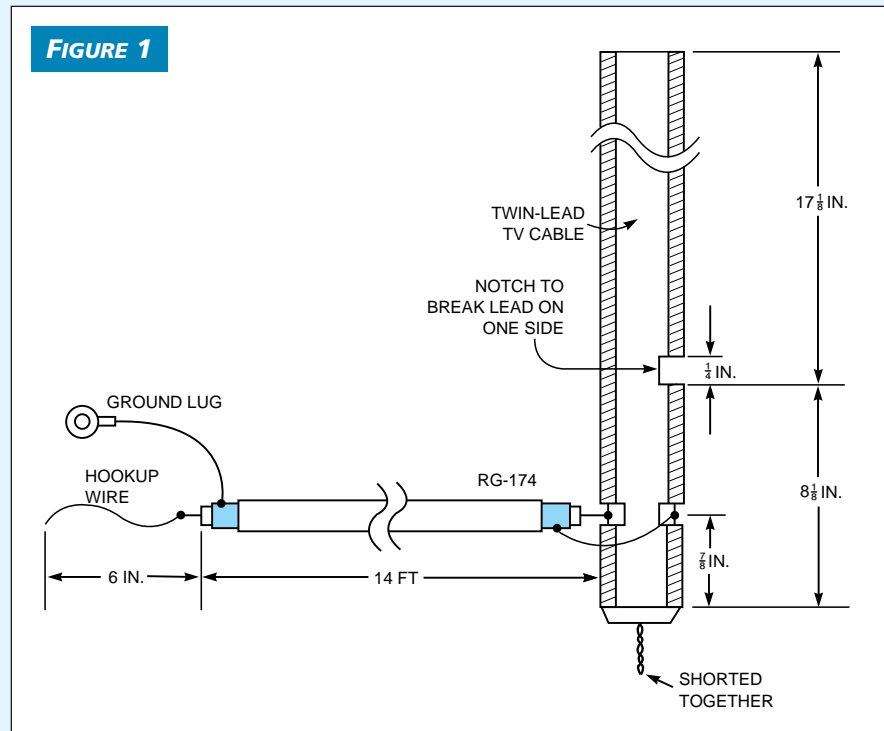
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Metal garage doors may be solid and secure, but they are not transparent to radio waves. If your garage has aluminum siding, you may experience frustration with the operation of your garage-door opener. If you must drive up to the door and nearly touch it or drive near a window to activate the door opener, this Design Idea is for you. The antenna extension in **Figure 1** moves the receiving antenna beyond the door so the system can respond to your command.

Construction is simple. The antenna is completely passive and uses a J-pole design. The antenna uses readily available 300 $\Omega$  flat TV twin-lead and RG-174 50 $\Omega$  miniature coaxial cable. The length suits an opener that operates at 310 MHz. Most popular openers, such as Stanley, Genie, and Chamberlain, operate at this frequency. However, some units operate at 315 MHz, some replacement controls operate at 390 MHz, and some automobile manufacturers offer 380-MHz designs. You can usually find the operating frequency in the user's manual, or you can obtain it directly from the manufacturer.

A J-pole antenna consists of a half-wave antenna matched to the low impedance of the coaxial cable by means of a quarter-wave matching stub. In **Figure 1**, the half-wave antenna comprises the piece of wire above the notch cut into one side of the 300 $\Omega$  flat TV twin-lead cable. You solder the lower ends of the stub together. Experiments show that the optimum location of the coaxial tap is  $\frac{7}{8}$  in. above the shorted end. You use 14 ft of RG-174 coaxial cable as the lead-in. Route this lead above the garage door and out through the weather stripping without drilling any holes. Be sure that the center conductor of the coaxial cable connects to the half-wave side of the twin-lead and that the ground braid connects to the notched side of the twin-lead. Solder both these connections and cover them with clear silicone rubber to protect them from weather conditions.

Prepare the end of the coaxial cable that connects to the existing garage-door antenna by exposing the center conductor and soldering on a 6-in. length of hookup wire. You can insulate the connection with heat-shrink tubing or tape. Twist the hookup wire tightly around the existing antenna wire for its full length to form a gimmick capacitor suitable for coupling the signal into the receiver without unduly loading the receiver and altering its characteristics. Secure



**A sensitivity treatment for your garage-door opener uses readily available coaxial cable and TV twin-lead in a simple configuration.**

the shield of the RG-174 coaxial cable to the frame of the door opener to effectively ground it. You can locate the antenna above the garage door on the wood trim. Do not staple across the 300 $\Omega$  twin-lead.

Mount the twin-lead to the door using adhesive pads and nylon cable ties or by means of a single small nail or screw at each end through the center web of the twin-lead. You can attach the coaxial cable to the garage rafters or ceiling with the same nylon cable ties and adhesive to keep it out of the way of moving parts. Route the cable above the door to allow normal operation of the door and out below the garage-door header beam so that the door's weather stripping seals when the door closes.

The addition of this antenna extension to any garage-door opener markedly increases operating range. Measurements show an improvement of approximately 2.5 dB, equivalent to a 30 to 40% increase in range. The improvement is especially noticeable for installations in which the garage is effectively shielded by metal doors, metal siding, and a lack of windows. (DI #2152)

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