

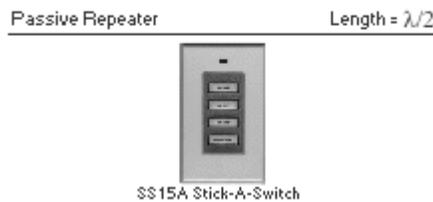
## Boosting Signal Strength

It is possible to increase the range of most fixed location, low power X-10 RF transmitters without modifying the transmitter itself merely by coupling a *passive repeater* to it. This method neither replaces the antenna nor modifies any transmitter circuitry. It does not even require opening the case of the transmitter as there is no physical connection between the repeater and the transmitter. The passive element merely receives the RF energy radiated by the transmitter and re-radiates it.

Our passive repeater consists of a single piece of 5/64" steel wire cut to 1/2 wavelength (about 18.25" at 310MHz - see NOTE below) affixed to the top of the transmitter housing. For our tests, we used a strong rubber band to hold the wire to the DS10A transmitter case. Our wire came from a coathanger. A permanent arrangement might use silicone sealant to hold the wire in place or merely wedge the wire between the sensor and wall.

*Alternately, a user reported that drilling two holes through the drywall (one above the other) behind the transmitter module and pushing the ends of the wire through them hides the wire completely once the transmitter module is mounted over the visible portion. He reported that the vertical orientation also worked better. I found no major difference between vertical and horizontal orientations but that may vary from one model transmitter to another so it is probably best to **experiment until you find the best orientation**.*

We have added passive repeaters to several other transmitters with the same excellent results. For our SS15A Stick-A-Switch, mounted on a door, we scotch-taped the repeater element to the door about 1/4" above the switch as shown below.



NOTE: Wavelength in air (in meters) =  $300 / f(\text{in MHz})$  but we need to multiply this by a velocity factor to compensate for the slower speed of the wave in the wire. For 310MHz, wavelength/2 in air is...

$$(300/310) \times 39.37 / 2 = 19.685 \text{ inches}$$

We have found that any length around 18-19" works well and we have not tried fine tuning the length.

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