

TECHNICAL NOTE # 421C

USE OF REFLECTORS WITH SOUTHWEST MICROWAVE LINKS

Southwest Microwave T/R links (Models 300B, 310B, 316, 316-POE-S, 330, 334, 334-POE-S, 336, 336-POE-S and all High Rel and special models) are the most powerful exterior perimeter sensors available today. Superior detection, all weather reliability, attractive appearance and easy installation have made the links worldwide favorites.

The microwave T/R links has been used primarily on flat, level terrain where space is plentiful. Passive reflectors provide a reliable and cost-effective means of extending the usefulness of links to more demanding sites, while retaining all of T/R attributes that reflects microwave energy exactly like a mirror reflects light. A recommended reflector design is detailed in Figure 7.

CORNERS

A standard corner installation is shown in Figure 1. Adjacent beams are typically overlapped by 15 feet (4.57m) or more to eliminate the “dead zone” immediately under each transmitter or receiver. This works well, but a fence spacing of at least 20 to 30 feet (6.1 to 9.1m) is needed. Alternately, a reflector may be used as shown in Figure 2.

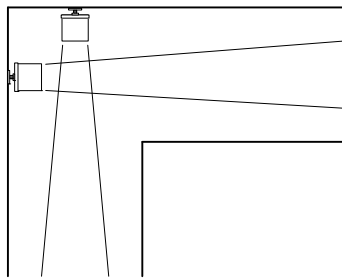


Figure 1 – Standard Corner Configuration

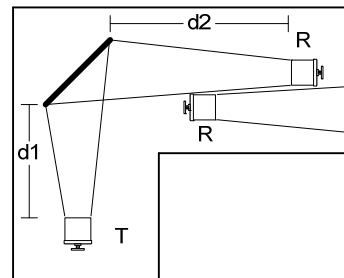


Figure 2 – Reflector at Corner

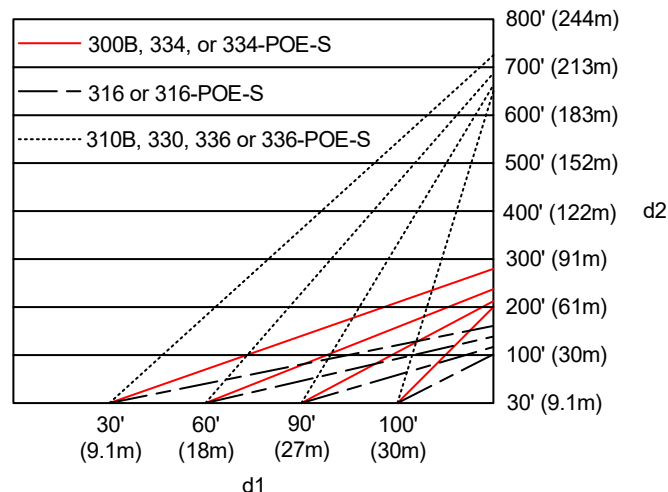


Figure 3 - Maximum Path Length

Here, the beams do not intersect at the corner. Instead, one beam is reflected around the corner with a passive reflector. Now the required fence spacing is reduced to perhaps 8 to 12 feet (2.4 to 3.6m), or whatever is dictated by the link distance and maximum pattern width of the beams themselves.

The total distance ($d1 + d2$) between the transmitter and receiver must be limited in order to conserve signal strength at the receiver. The maximum distance to be used with a reflector is half the maximum range of that link. Figure 3 gives the maximum distance ($d1 + d2$) for the recommended reflector of Figure 2. Minimum distance for $d1$ or $d2$ is 30 feet (9.1m). If $d1$ or $d2$ is less than 30 feet (9.1m), detection of crawling intruder will be degraded. Maximum distance for $d1$ is: 100 feet (30m). Example: A Model 300B has a maximum range of 600 feet (183m). The maximum range with a reflector is 300 feet (91m). If $d1$ is 30 feet (9.1m) $d2$ could be used from 30 feet (9.1m) to 270 feet (82m). The reflector will require careful alignment, both horizontally and vertically. While aligning the reflector, monitor received signal strength on a Southwest Microwave alignment meter (Model RM83) or software or a voltmeter (sensor dependent) and adjust reflector for maximum received signal.

END OF LINE

Perimeter fences are frequently interrupted by buildings. Figure 4 shows how a reflector may be used to provide excellent detection at this junction. (Reflector is mounted to building surface.) Distances $d1$ and $d2$ may be selected for convenience, within the constraints of Figure 3.

A special case of the end of line reflector is shown in Figure 5. Here, transmitter and receiver are mounted on the same pole and pointed directly at a reflector. One typical detection pattern is shown in Figure 6.

This arrangement provides very high security at ranges up to 400 feet (with Model 310B) with the obvious additional advantages that wiring is required at only one end.

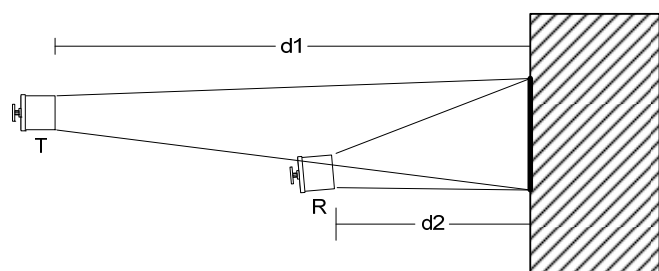


Figure 4 – End of Line Reflector (Surface Mounted)

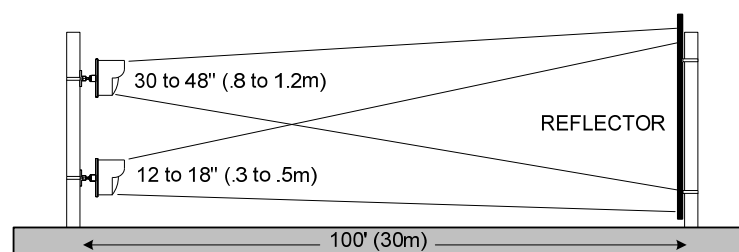
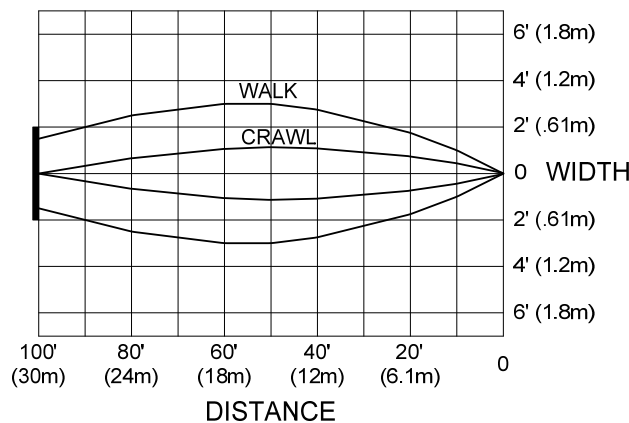


Figure 5 – Link with Reflector (Free Standing)



Model 300B Link per Figure 5. Rx
at 18" (.45m), Tx at 36" (.91m)

Figure 6 – Example Detection Pattern

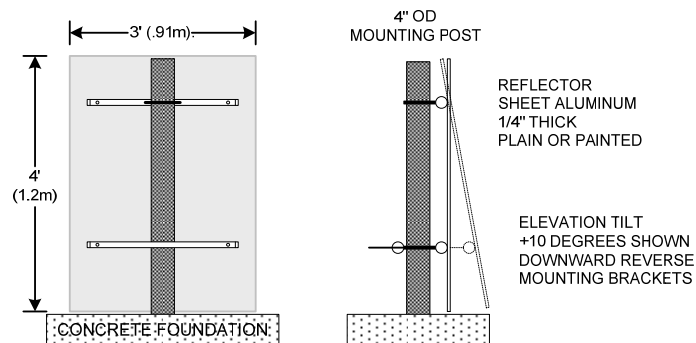


Figure 7 – Reflector Mounted to Post

Reflectors are useful in many other applications. Let us help you decide whether a reflector would work at your site. Call:

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