



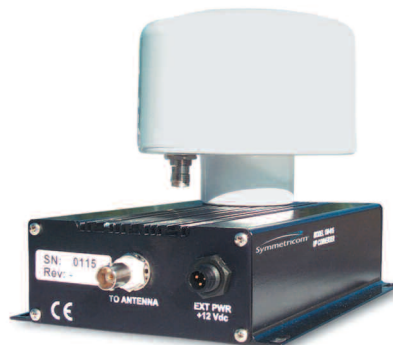
# GPS Antenna Accessories

## Lightning Arrestor



Lightning may damage GPS system components and receiving equipment, even without a direct hit, resulting in costly repairs and critical interruption of service. The lightning arrestor is designed to work in conjunction with a low-resistance, low-inductance ground to protect your GPS receiver and elements of the antenna system from lightning discharges and field-induced electrical surges. In-line lightning arrestors are mounted between the antenna and the point where the cable enters the building and require no additional power or wiring except the ground lead.

## L1 Antenna GPS Up/Down Converter



Use the GPS Down/Up converter for cable runs of 250 to 1500 feet (75 m to 457 m). GPS signal down/up conversion is required when signal losses in the antenna cable limit the distance between the receiver and the antenna assembly. The Down/Up Converter may also work with non-Symmetricom L1 GPS receivers. The signal output from the converter is L1 C/A code that can be decoded by any L1 GPS receiver.

## In-Line Antenna Amplifier



In-line amplifiers overcome signal attenuation in by amplifying the GPS signal. Mounting the amplifier inside the mounting mast helps protect it from moisture and exposure to the elements. Use the in-line amplifier for cable runs of 150 to 300 feet (45 m to 90 m).

## Antenna Splitter



An antenna splitter may be used to drive multiple GPS receivers using a single antenna. With built-in amplification to overcome splitter losses, the Active Splitters may be conveniently cascaded without adding separate amplifiers and bias-tees between splitters. Power is conveniently obtained from the GPS receiver(s) connected to the amplifier, eliminating the need for a separate dc power supply and wiring.

# GPS Antenna System Rules

## Rule 1. Antenna placement.

### A. View of the sky

Select an area where the GPS antenna will have an unobstructed view of the sky. An ideal position has no obstructions above 10 degrees above the horizon. The total blockage of the sky (due to buildings, mountains, etc.) should be less than 50%. If less than 50% of the sky is visible to the antenna, contact Symmetricom for further assistance.

### B. Lightning considerations

Locate the antenna at least 15 meters away from lightning rods, towers, or structures that attract lightning. GPS antenna damage is usually not the result of a direct lightning strike, but the effects of a lightning strike on a nearby structure. Locate the GPS antenna lower than any structures that may attract a strike.

### C. Maintenance considerations

If the GPS antenna fails or must be checked, having the antenna positioned in an accessible location will facilitate maintenance. Avoid installing the antenna on a tower, which requires a specialist to maintain.

### D. Interference consideration

Avoid the direct radiation from transmitting antennas (such as TV or Cellular).

## Rule 2. Is a GPS line amplifier needed?

### A. Cable length

Add up the total length of all the cables for the installation. If the total cable length is 150 feet or less, no amplifier is needed. If the total length is between 150 feet and 300 feet, a line amplifier is required. For lengths greater than 300 feet, contact Symmetricom for further assistance.

### B. Placement

Mount line amplifiers as close to the antenna as possible. Connect the amplifier directly to the antenna. The line amplifiers fit nicely inside the antenna mast where they are protected from the weather.

## Rule 3. Lightning arrestors.

### A. Is a lightning arrestor needed?

Very probably, yes. Lightning does not have to strike the antenna to significantly damage the antenna and GPS receiver. Lightning strikes induce damaging voltages in the antenna system when striking nearby objects.

### B. What do I need?

A commonly used configuration is to place a lightning arrestor where the antenna cable enters the building (either inside or outside), because there is often a good earth ground nearby to connect to. If the cable between this lightning arrestor and the GPS receiver is longer than four meters, it is good practice to place a second lightning arrestor within four meters of the GPS receiver. The second arrestor reduces any lightning-induced voltages in the cable to the receiver.

### C. Grounding

The lightning arrestor does not need a grounding strap if it is directly bolted to a grounding plate. A grounding strap should be used if you cannot connect directly to a grounding plate.

If you are not comfortable designing your own lightning protection system, seek professional assistance. This is only a guide.

## Rule 4. Interconnect cables.

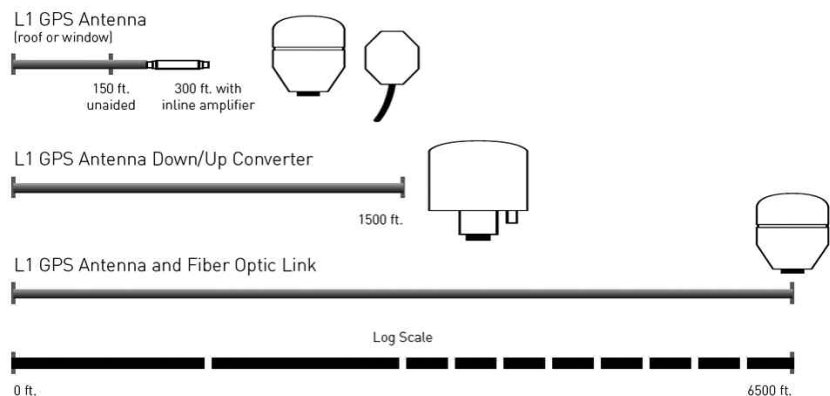
### A. Cable options

Symmetricom's interconnect cables are available in various lengths. For ease of pulling antenna system cable through a conduit, or if you wish to cut the cable to an exact length, you may choose to have a connector on only one end.

### B. Multiple antenna site installations

Multiple site installations may be done more efficiently using bulk cable and a connector installation tool kit. For more information about multiple antenna site installations or general questions about GPS antenna system installation, please contact Symmetricom's Customer Technical Assistance Center.

## Extended Cable Length Solutions



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