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58530A
GPS L1 Bandpass Filter

Information Note

This information note describes accessory equipment for a Symmetricom GPS receiver for a telecommunications network.

The accessory is a GPS L1 bandpass filter. Model 58530 is designed to protect the GPS receiver from out-of-band noise and interference.

For assistance, contact:

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Warning Symbols Used In This Book

Instruction manual symbol; the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual.

Indicates hazardous voltages.

Indicates earth (ground) terminal.

or

Indicates terminal is connected to chassis when such connection is not apparent.

Indicates Alternating current.

Indicates Direct current.

Figure 1. 58530A GPS L1 Bandpass Filter

1.0 Introduction

The 58530A GPS L1 Bandpass Filter is one component of a complete line of GPS accessories available from Symmetricom. These accessories are designed to deliver precise GPS signals over a wide temperature range and in harsh environmental conditions.

2.0 Description

The 58530A GPS L1 Bandpass Filter is designed to protect the GPS receiver from out-of-band noise and interference.

The filter features narrow bandwidth and steep roll-off that preserves the GPS signal while attenuating nearby signals. It insures accurate satellite tracking and signal reception even in the presence of electromagnetic disturbances.

The key features of the filter include:

- Low insertion loss.
- Weather-resistant construction for use outdoors.

3.0 Installation

A good location for the filter is inside the antenna mounting mast as shown in Figure 3. The 58530A is shaped so it will fit easily inside a mounting mast; otherwise mount the filter so it will not be immersed in, or exposed to, standing water.

Antenna systems with long cable runs in urban environments will benefit from a second 58530A. This 58530A should be installed near the GPS receiver to attenuate any interfering signals picked up by the antenna cable.

This Information Note describes how to install the filter inside the mounting mast, how to mount the filter on a surface or a pole using a mounting plate, and how to weatherproof connections for exposed outdoor installations.

Note: When installing any electrical device always follow the rules prescribed by your local electrical and building ordinances. Contact as described below for additional technical recommendations for installation.

Parts Required

Having the items listed below on hand will help save time during installation. When protecting connections from moisture, you may wish to use the supplied shrink tubing in locations that require minimum protection. For maximum protection, a multi-barrier process is suggested. This is described below, under "Environmental Considerations."

- **Included with the Filter:**
  - 2 pieces 3M™ Heat Shrinkable Environmental Protection Tubing (part number 58509–60201).
  - A Type-N plug to Type-N plug adapter (part number 1250–0778) for connecting the filter to the 58532A antenna.
  - If Option AUB was ordered with the product, a mounting plate with brace and 4 screws are included. If Option 800 was ordered, two Type-N cable connectors are included for the extra cable connections needed when mounting the amplifier to a pole or surface.
- **Customer Supplied:**
  - If the filter will be mounted on a pole or a surface, a mounting device is needed. Option AUB provides a mounting plate and brace with 4 screws. Otherwise, order part number 58509–00003 (mounting plate), part number 58529–00001 (brace) and (4) part number 0515–1430 (screws). (See Figure 4.)
  - If the filter will be mounted on a pole, a U-bolt–76.2 mm (3 in) is needed.
  - If the filter will be mounted on a surface, fasteners no more than 6.35 mm (1/4 in) in diameter are needed.

Note: If replacing a 58514A that was installed with a mounting plate (Option AUB), the mounting plate can be reused. It is only necessary to have the brace (part number 58529–00001) in order to secure the 58530A to your existing mounting plate. (See Figure 4.)

Tools Required

- Scissors or knife to cut the shrink tubing if needed.
- A heat gun or equivalent heating source to shrink the tubing.
- Small to medium size adjustable wrench.
- Small Phillips screwdriver and 4 mm hex wrench (for antenna assembly).

Dimensions of L1 Filter

Figure 2 shows the major dimensions of the filter.

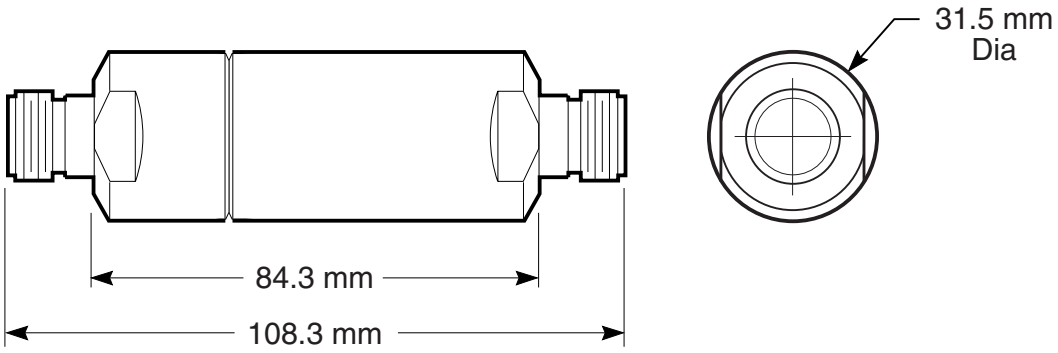


Figure 2. 58530A GPS L1 Bandpass Filter

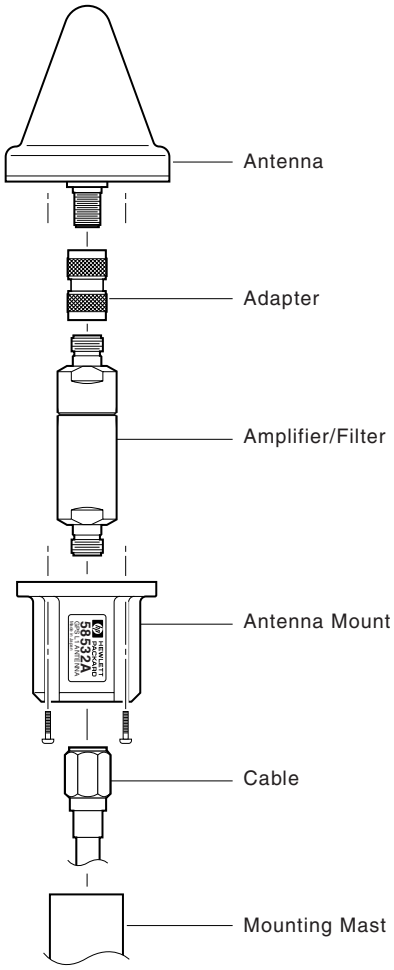


Figure 3. Antenna to Filter Assembly Drawing

4.0 Antenna to Filter Assembly Procedure (Refer to Figure 3 while following this procedure.)

1. Attach a Type-N plug to Type-N plug adapter to the antenna and tighten.
2. Attach the adapter to the filter and tighten.

   Note: Although the supplied shrink tubing can be used to protect the connections from moisture, when the filter is mounted inside a mast the shrink tubing is not necessary. Refer to Section 8.0 for more information about protecting outdoor connections.

3. Lower the antenna/filter assembly through the antenna mount.
4. Attach the antenna to the antenna mount by tightening the four pan head screws into the antenna using a Phillips screwdriver. Do not over-tighten.

   Note: The gasket creates a very tight seal between the antenna and the antenna mount. Consequently, extra pressure may be required to disassemble the antenna from the antenna mount. Carefully use a flat-blade screwdriver as a wedge when disassembly is required.

5. Route the cable through the mast.
6. Attach the cable to the filter connector and tighten.

7. Attach the antenna/filter assembly to the mast by sliding the assembly over the mast until the mounting base rests against the top of the mast. Tighten the two set screws (4 mm) in the mount against the mast so the antenna/filter assembly is securely held in place on the mast.
8. Secure the cable to a fixed object where it exits the mast to take the weight of the cable off the cable-to-filter connection.

5.0 Mounting Plate and Brace (Option AUB)

Refer to Figure 4. A mounting plate and brace (**1** & **2**) are available for the 58530A filter (**3**). Four screws (**4**) attach the brace around the filter to the mounting plate. For ordering information, see "Parts Required," above.

The mounting plate provides two oblong shaped-slots for mounting the filter to a pole or surface. These slots are 7.9 mm (5/16 in) by 15.87 mm (5/8 in).

Attaching the Filter to the Mounting Plate using the Brace

The mounting plate has four countersunk screw holes on one side. The screws will be inserted from this side of the plate.

1. Position the brace on the mounting plate. Align the threaded holes in the brace over the four holes in the mounting plate.
2. Insert the four screws and turn the screws enough to attach the brace loosely to the mounting plate.
3. Slide the filter under the brace and position so that the label is visible through the opening in the brace.
4. Tighten the screws and verify that the filter is held securely in place.

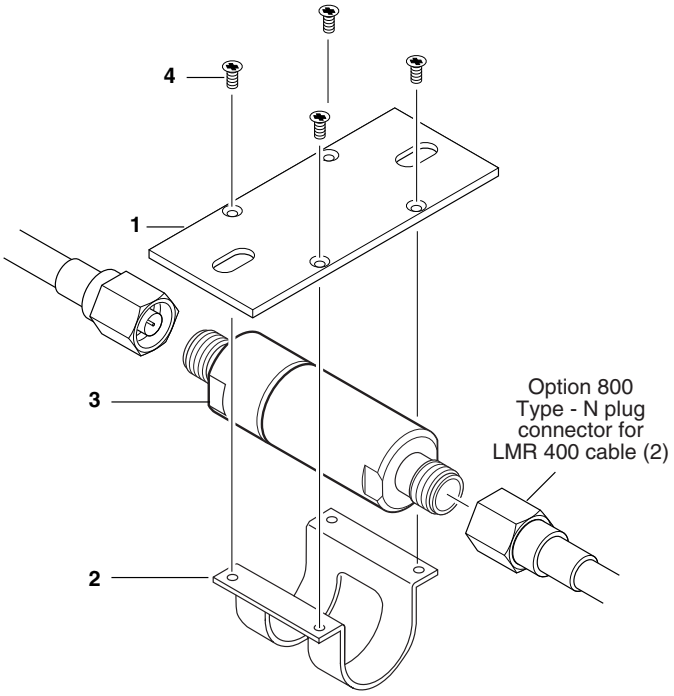


Figure 4. Filter and Mounting Plate with Brace

6.0 Mounting to a Pole

Refer to Figure 5. To mount the filter (**1**) on a pole (**2**), place the U-bolt (**3**), (customer-supplied) around the pole and slide the ends of the U-bolt through the oblong slots in the mounting plate (**4**). Place lock washers and nuts supplied with the U-bolt (**5**) over each threaded end of the U-bolt and tighten the nuts down securely.

Caution: To avoid deforming the mounting plate, tighten the nuts firmly but do not overtighten.

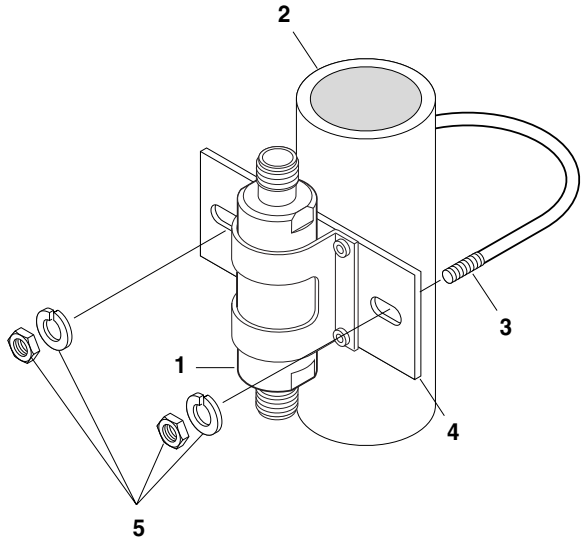


Figure 5. Pole Mounting the Filter

Caution: If you mount the filter to the antenna mast, you will have to bring the antenna cable from the bottom of the mast up to where the filter is located. In addition to weatherproofing the connections, make sure you have enough antenna cable to form a drip loop where the cable exits from the bottom of the mast.

- **Required Parts:**
  - Mounting plate, brace, and 4 screws (Option AUB or ordered separately).
  - U-bolt - 76.2 mm (3 in), with lock washers and nuts (customer-supplied).

Note: Protecting outdoor connections is recommended. Refer to Section 8.0 for more information.

7.0 Mounting to a Surface

The filter assembly can be mounted to any wood or masonry surface. Refer to Figure 6.

For wood mounting, drill two holes approximately 76.2 mm (3 in) apart. Fasten the filter assembly (**1** & **2**) to the surface using fasteners (**3**) no more than 6.35 mm (1/4 in) in diameter.

For masonry mounting, drill two holes approx. 76.2 mm (3 in) apart, using a masonry drill. The diameter of the holes will depend on the diameter of the masonry anchors you use. Select anchors that accept fasteners no larger than 6.35 mm (1/4 in) in diameter.

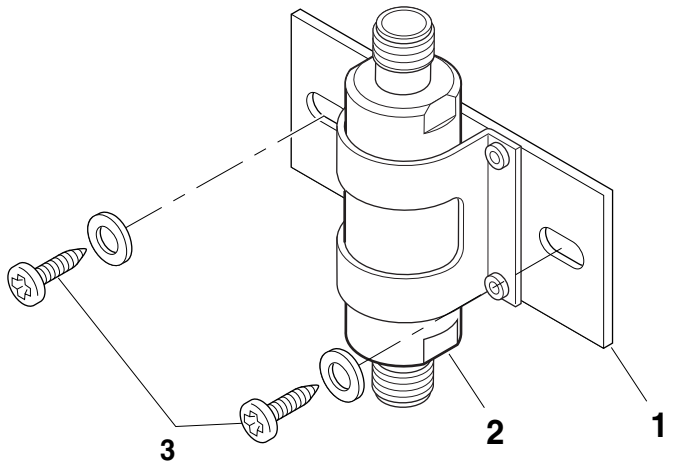


Figure 6. Surface Mounting the Filter

- **Required Parts:**
  - Mounting plate, brace, and 4 screws (Option AUB or ordered separately).
  - Anchors and fasteners for masonry surfaces (customer-supplied).
  - Wood screws for wood surfaces (customer-supplied).

Note: Protecting outdoor connections is recommended. Refer to Section 8.0 for more information.

8.0 Environmental Considerations

It is recommended that all cable connections that are outdoors or exposed to wet or humid environments be sealed to prevent moisture from entering the connector. Shrink tubing is supplied with the filter, but for maximum protection, a multi-barrier process is suggested. Both procedures are described here.

A Multi-Barrier Process

A multi-barrier process provides maximum protection for connections. An example of this process might consist of the following steps:

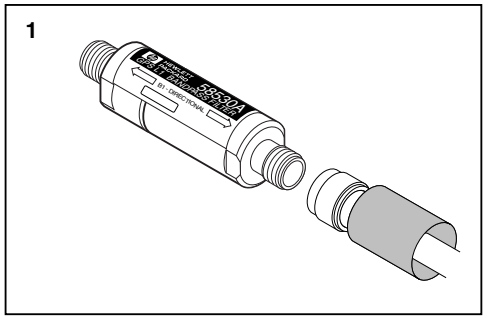
1. Wrap the connection with a self-fusing, insulating tape (for example, 3M Scotch™ 23 Rubber Splicing Tape).
2. Overwrap the self-fusing tape with a layer of vinyl electrical tape (for example, 3M Scotch™ Super 88 Vinyl Electrical Tape).
3. Cover with a layer of oil and water resistant coating (for example, 3M Scotchkote™ Electrical Coating.

Note: For specifics, please refer to the manufacturer's instructions.

Weatherproofing a Filter with Shrink Tubing

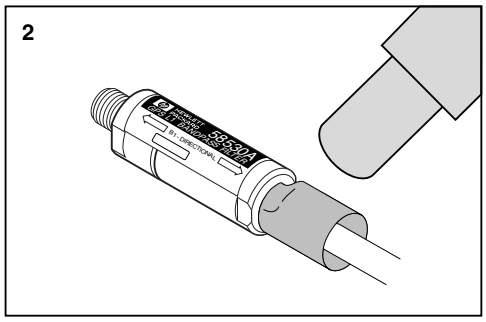
Although a multi-barrier process is suggested for weatherproofing (described above), shrink tubing can be used for a minimum level of protection. The following steps describe how to apply shrink tubing to a filter connector.

Step 1. Slip one of the pieces of the supplied shrink tubing over a cable, and connect the cable to the connector of the filter.

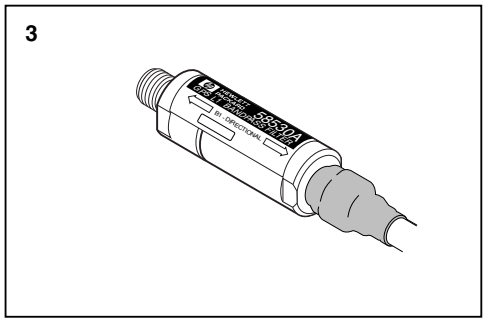


Step 2. Push or position the shrink tubing tightly against the case of the filter. Using a heat gun or similar heat source, start heating the shrink tubing at the end of the filter, working toward the cable as shown.

Caution: Ensure that you do not overheat the filter. Do not point the heat source directly at the filter for an extended period of time.



Step 3. When properly installed, the shrink tubing should cover the RF connector as shown.



9.0 Maintenance

No periodic maintenance is required for the filter. However, over time it is inevitable that exposure to weather will cause deterioration in the ability of the protected cable connections to resist moisture and weathering. It is recommended that all components of the antenna system that are exposed to weather be checked periodically and replaced, if necessary, as specified in your company procedures.

10.0 Specifications/Characteristics

The following table presents the specifications for the 58530A GPS L1 Bandpass Filter.

Table 1. 58530A Specifications/Characteristics

Input/Output Impedance	50 Ω
Bandwidth (–3 dB)	1575.42 MHz (L1) ± 5 MHz
Filter Attenuation	> 7 dB @ L1 ± 35 MHz > 30 dB @ L1 ± 140 MHz
Insertion Loss	< 3.5 dB (2 dB typical)
VSWR	1.5:1 (typical)
Maximum dc Pass-through Voltage	+13 Vdc
Connectors	2 Type-N Jacks
Operating Environment	–40°C to +80°C
Weight	440 g
Dimensions (including connectors)	31.5 mm D x 108.3 mm L