

Installing the TimeProvider GPS Antenna

This document describes the procedures for installing the Symmetricom TimeProvider rooftop GPS antenna and the TimeProvider Interface Unit (TPIU).

Tools

These standard tools and materials are not supplied, but may be required for installing the antenna and TPIU:

- Standard tool kit
- Fasteners for mounting the equipment in rack
- PVC glue

Parts

The following table identifies the parts available for the GPS antenna.

Table 1-1. GPS Parts and Accessories

Part Number	Description
990-58545-01 ¹	TimeProvider Integrated GPS Antenna Kit, Rear Access
990-58545-02 ²	TimeProvider Integrated GPS Antenna Kit, Front Access
090-58545-01	TimeProvider GPS Antenna (spare)
090-58545-21	TPIU (spare) for Front or Rear Access shelf
043-00018-01	Lightning suppressor (spare)
060-58543-03	Front Access TPIU Interconnect cable, 1 m (3 ft)
060-58543-10 ³	Front Access TPIU Interconnect cable, 3 m (10 ft)
060-58543-20 ³	Front Access TPIU Interconnect cable, 6 m (20 ft)
060-58543-50 ³	Front Access TPIU Interconnect cable, 15 m (50 ft)
060-58544-03	Rear Access TPIU Interconnect cable, 1 m (3 ft)
060-58544-10 ³	Rear Access TPIU Interconnect cable, 3 m (10 ft)
060-58544-20 ³	Rear Access TPIU Interconnect cable, 6 m (20 ft)
060-58544-50 ³	Rear Access TPIU Interconnect cable, 15 m (50 ft)

Table 1-1. GPS Parts and Accessories (Continued)

Part Number	Description
060-58545-01 ⁴	RG-58 cable, 3 m (10 ft)
060-58545-02	RG-58 cable, 6 m (20 ft)
060-58545-05	RG-58 cable, 15 m (50 ft)
060-58545-10	RG-58 cable, 30 m (100 ft)
060-58545-20	RG-58 cable, 60 m (200 ft)
060-58545-30	RG-58 cable, 90 m (300 ft)
060-58545-50	RG-58 cable, 150 m (500 ft)
060-58545-60	RG-58 cable, 180 m (600 ft)
060-58545-80	RG-58 cable, 240 m (800 ft)
060-58545-99	RG-58 cable, 300 m (1000 ft)
154-00023-01	Crimp tool for RG-58 cable
093-72010-98	TNC connectors for RG-58 cable

¹Kit includes GPS antenna, TPIU, Rear Access Interconnect Cable (3 foot), lightning suppressor, and mounting hardware. Order antenna cables separately.

²Kit includes GPS antenna, TPIU, Front Access Interconnect Cable (3 foot), lightning suppressor, and mounting hardware. Order antenna cables separately.

³The antenna kit includes a 3-foot Interconnect Cable; this cable is for installations requiring greater length, and must be ordered separately.

⁴Order two lengths of cable: one connecting the antenna to the lightning suppressor and one from the suppressor to the TPIU. Or order one length of cable; customer to cut cable and terminate properly, and to supply tools.

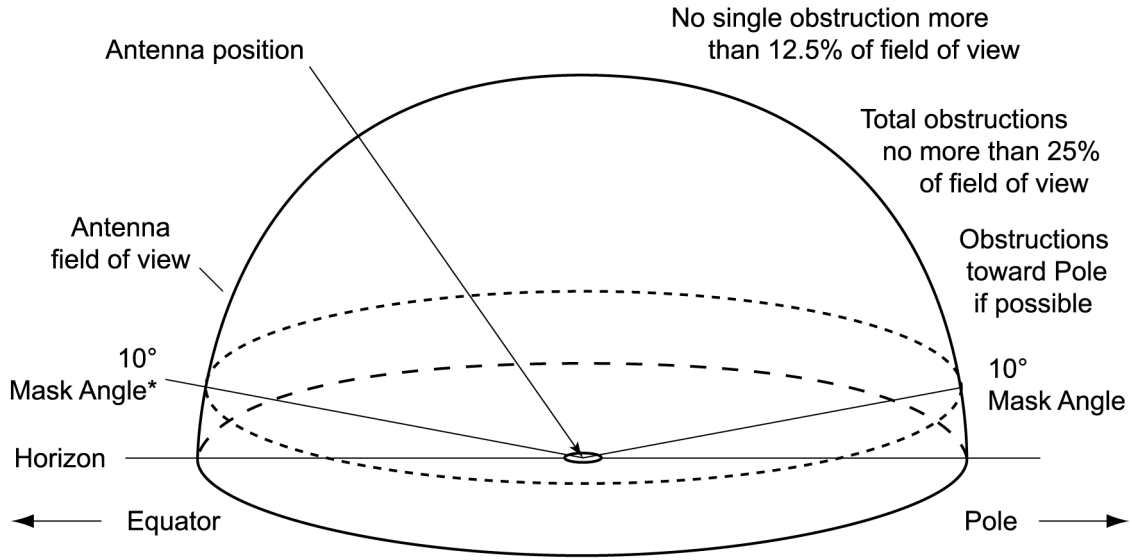
Making GPS Connections

To connect a GPS signal to the TimeProvider, you must install a GPS antenna and the TimeProvider Interface Unit (TPIU) using the procedure in this document.

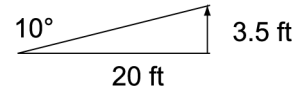
Installing the GPS Antenna

These installation procedures are to be used in support of local company procedures and the Installation Job Specification.

Prior to installing the antenna, the site, antenna location, lightning suppressor location, cable route, and all other details should be planned. Use [Figure 1-1](#) as a guide to locating the antenna.



* An angle of 10° masks objects up to about 3.5 ft above the horizon at 20 ft from the antenna (illustration at right).



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Figure 1-1. Locating the GPS Antenna

To install the antenna, refer to [Figure 1-2](#), and perform the procedure in this section. Ensure all user-supplied materials are available. The maximum distance between the antenna and the shelf is 1000 feet (304 m).



Warning: To prevent arcing, ensure that the lightning suppressor is installed away from electrical devices and cabling.



Note: Use the following antenna installation instructions as a guideline only. Install the antenna using company-approved techniques, and follow all appropriate local building and electrical codes.



Recommendation: Symmetricom recommends that you use one of the following grounding points:

- Valid roof ring ground system
- Cad weld to building structural steel
- Central office ground plate within 15 m of antenna cable entrance into building

You can order two lengths of cable: one connecting the antenna to the lightning suppressor and one from the suppressor to the TPIU. Or you can order one length of cable; you need to cut the cable and terminate it properly, using your own tools.

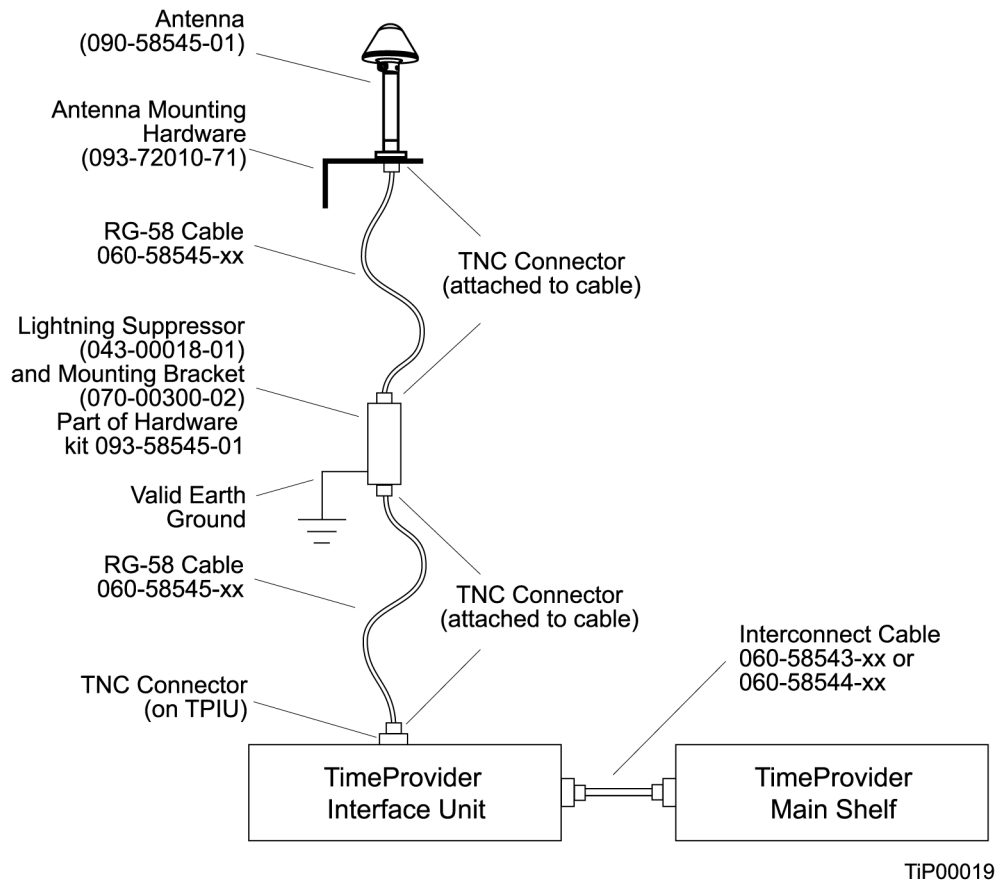
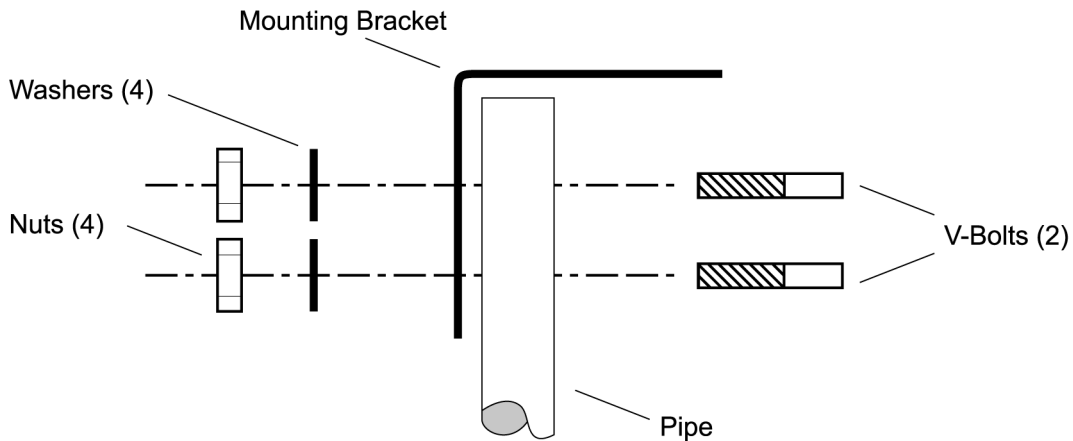


Figure 1-2. Antenna-to-Shelf Cabling

To install the antenna:

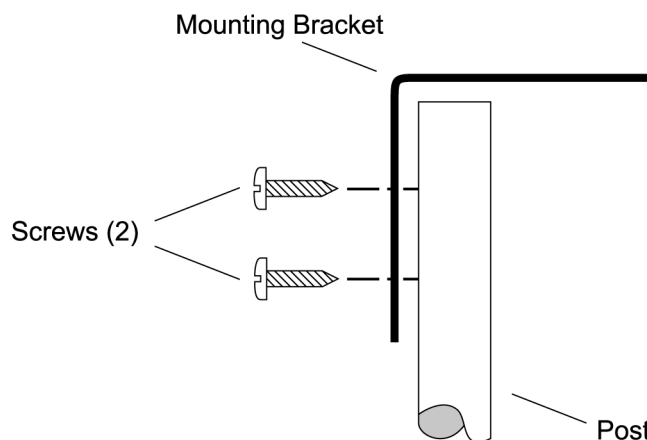
1. Attach the antenna mounting bracket to a 1-inch (2.5 cm) diameter pipe or wood post.
 - If you are mounting the bracket to a pipe, assemble as shown in [Figure 1-3](#). Slide the two V-bolts over the pipe, and through the mounting bracket slots; then place the provided four washers and four nuts over the V-bolts, against the mounting bracket. Leave the V-bolts loose enough to allow for final adjustments.



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Figure 1-3. Installing the Antenna Bracket on a Pipe

- If you are mounting the bracket to a wood post, assemble as shown in [Figure 1-4](#). Install the provided two self-tapping screws in two diagonally positioned mounting bracket slots, and attach to the post.

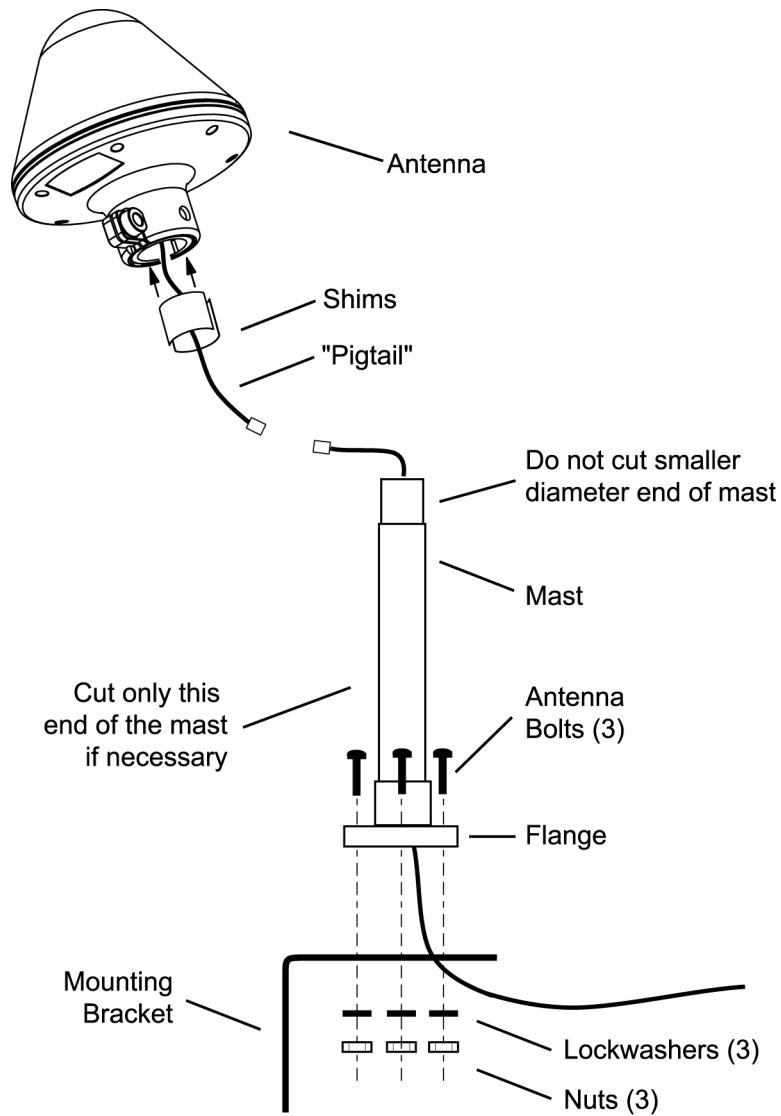


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Figure 1-4. Installing the Antenna Bracket on a Post

Mount the antenna and mast assembly to the “L” bracket.

2. Connect the mast to the flange using PVC glue.
3. Feed an RG58 (060-58545-xx) cable through the bottom of the mast as illustrated. See [Table 1-1](#) for specific cable lengths.
4. Connect the cable to the antenna "pigtail" and pull the cable back through the mast.
5. Mount the antenna to the mast using the supplied shims.
6. Mount the antenna and mast assembly to the "L" bracket using the supplied nuts, bolts, and washers, as shown in [Figure 1-5](#).



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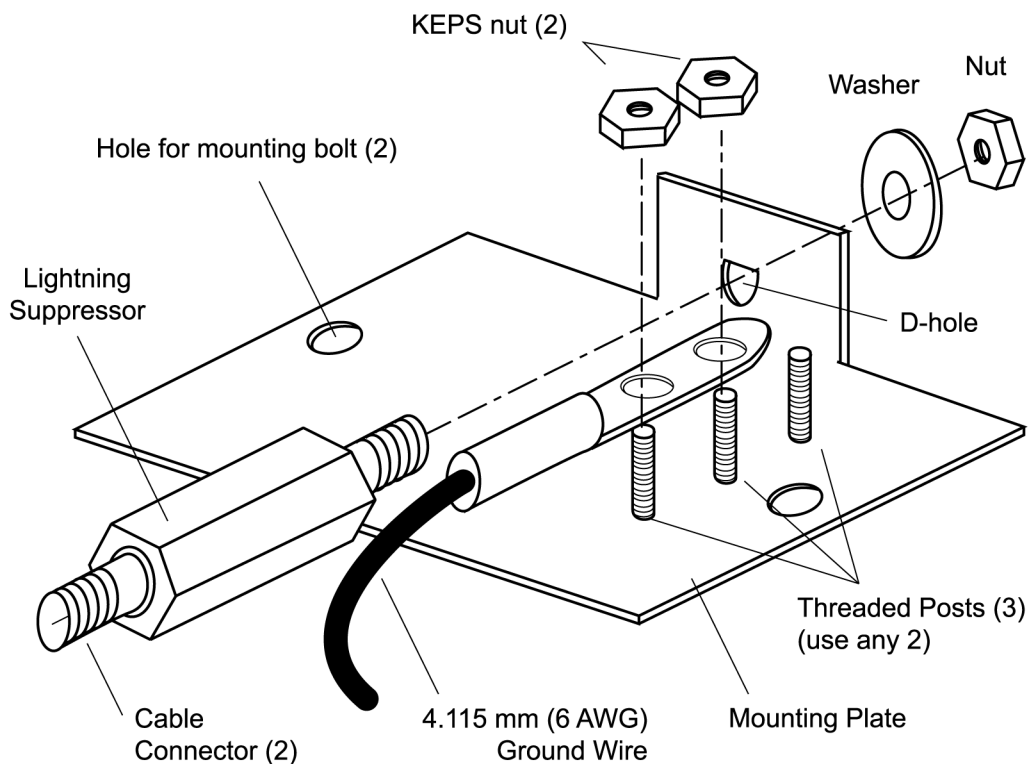
Figure 1-5. Attaching the Antenna to the Bracket

7. Using a plumb line or bubble level, ensure the antenna is within 5° of vertical (perpendicular to the horizon), and tighten the mounting bracket bolts.
8. Bolt the lightning suppressor mounting plate to a flange that is attached to a valid earth ground. The roof ring ground system, a Central Office grounding plate, and building structural steel are examples of valid earth ground points. If the mounting plate cannot be bolted to a valid earth ground, bolt the mounting plate to a point within 15 feet (4.6 m) of the chosen valid earth ground. If the mounting plate is to be installed in a nonmetallic junction box, perform the installation and bolt the assembly near the chosen valid earth ground.



Note: A junction box must have inside dimensions of 7 cm by 7 cm by 4 cm to hold the mounting plate and attached components.

9. Assemble the lightning suppressor as shown in [Figure 1-6](#).



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Figure 1-6. Assembling the Lightning Suppressor

10. Install 1.5 inch (3.8 cm) nonmetallic conduit from the antenna to the lightning suppressor, and from the lightning suppressor to the cable entrance into the building.

11. Install a user-supplied bracket, preferably non-metallic, to support the vertical section of conduit to the antenna.
12. Route the antenna cable through the conduit, and connect the cable to the lightning suppressor. See [Table 1-1](#) for specific cable lengths.
13. If the lightning suppressor is not mounted directly to a valid earth ground, crimp a length of 4.115 mm (6 AWG) ground cable to the two-hole terminal, slide the terminal over two of the three threaded posts on the lightning suppressor mounting plate, and attach the terminal to the mounting plate with two KEPS nuts. Use the two posts that allow the least bending of the cable.
14. Connect an RG58 (060-58545-xx) cable between the lightning suppressor and the TPIU. See [Table 1-1](#) for specific cable lengths.
15. Install fire-stopping material in all holes opened in the roof and/or walls during this procedure.
16. Check all connections for tightness to prevent arcing and intermittent operation.
17. Coat all exposed connectors with an electrically conductive antioxidant compound (e.g. Kopr-Shield spray).

Installing the TPIU

You mount the TPIU on a rack near the TimeProvider main shelf. Symmetricom supplies the connecting cable (060-58543-xx or 060-58544-xx) in several lengths, as listed in [Table 1-1](#) (the Integrated GPS Antenna Kit 990-58545-01 and 990-58545-02 contains a 3-foot connecting cable). Mount the TPIU to the rear rails of the rack using the provided rack ears. Install the TPIU so that the front panel is on the same side as the Output modules. [Figure 1-7](#) and [Figure 1-8](#) illustrate alternate mounting schemes.

To connect the TPIU to the shelf, attach the DB15 interconnect cable (060-58543-03 or 060-58544-03) to the connector labeled “GPS” on the TimeProvider shelf. This connector is on the front panel of the Model 1000 and on the rear panel of the Model 1100. Connect the other end of the cable to the DB15 connector on the TPIU.

To use the GPS signal, set the TimeProvider to the PRR mode, as described in the *TimeProvider User’s Guide*, or enable the GPS input when in SSU mode.

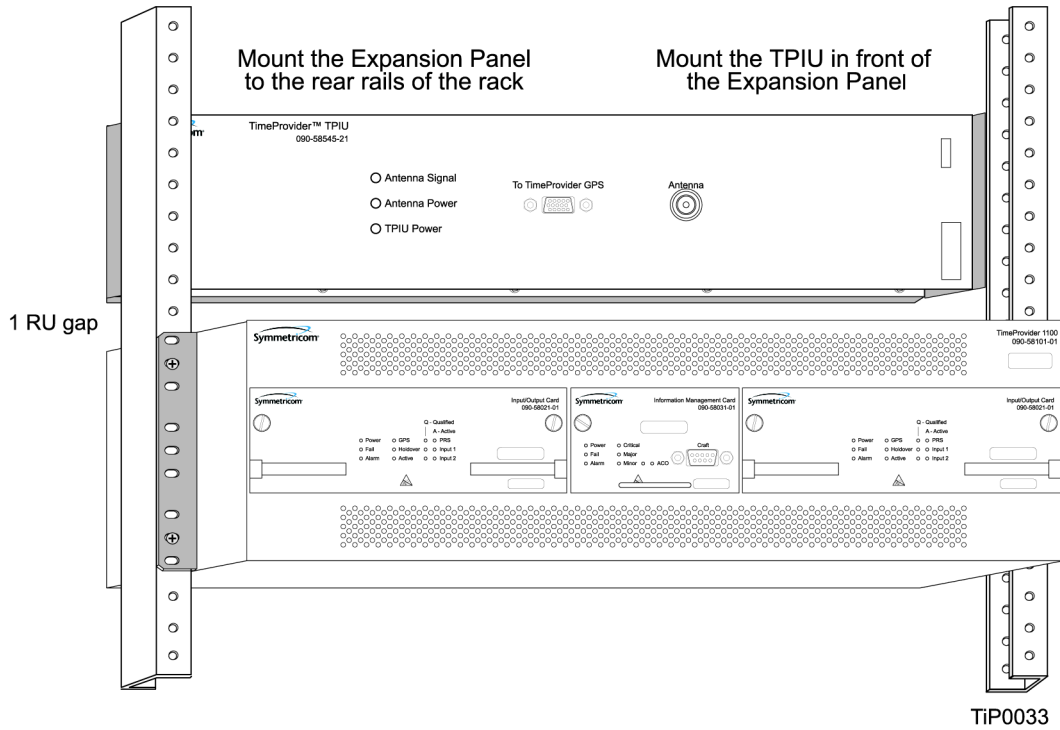


Figure 1-7. Mounting the TPIU and Expansion Panel on the Same Rack Ears

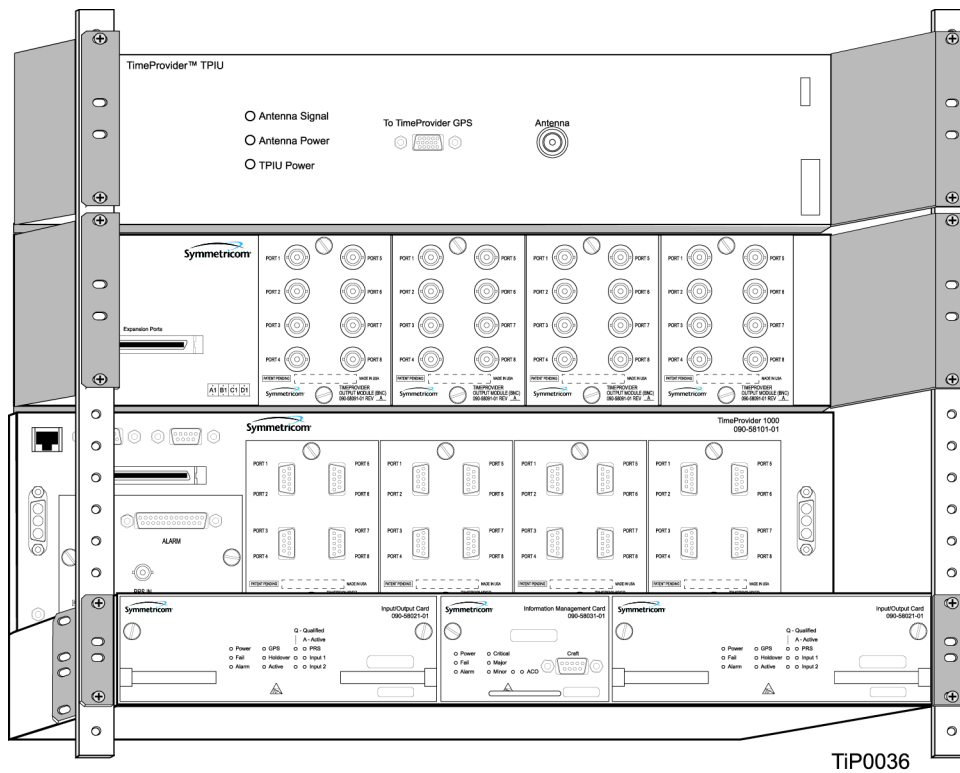


Figure 1-8. Mounting the TPIU with a Model 1000 ETSI-Style Shelf

