Datasheet : F-1GPS-TxRx

1 GPS Fiber Transport System

Portable single GPS timing over Fiber

The Thor Fiber portable F-1GPS-TX/RX systems are available to support the remote location of industrial GPS antennas. These kits are assembled and tuned to the unique requirements of each application. Thor GPS over fiber systems are an excellent solution for distance limitation between maritime or government GPS antennas and radio signal receiver equipment. Typically any sensor equipment or tuning hardware such as universal time receivers or GPS navigation gear must be installed and located within 100 ft of the antenna system. Most modern industrial type systems require antennas with a clear view of the horizon to function properly. In the case of large ocean going vessels, underground military installations, or large buildings or structures(metropolis); it can be a challenge to install GPS equipment within 100 ft of a suitable antenna location. Thor solves this problem by extending the distance to over 20km by converting the GPS signal from the antenna's coax to fiber optic cable. F-GPS systems are available in a variety of form factors, and can be custom tuned to individual users applications.

GPS reference timing signals are widely used to synchronize cellular base stations.

GPS systems typically consist of an active rooftop antenna, a GPS receiver and a length of coaxial cable to connect them. Common challenges arise when the distance between the rooftop antenna and the cellular base station equipment (usually in the basement) is greater than 300 ft. Coaxial cable runs over 300 ft are not practical for most GPS receiver systems, so a fiber optic link is required at such distances, and Thor Fiber optic links are some of the most trusted, cost-effective links in the industry.

F-1GPS-TxRx

Features :

- Supports all GPS frequencies internationally
- **Supports L1 at 1575.42 MHz, L2 at 1227.60 MHz, L3 at 1381.05Mhz , L4 at 1379.913Mhz and L5 at 1176.45 MHz, L6 at 1278.75Mhz, L7 at 1267.6Mhz GPS bands**
- Extends the range between GPS antennas and equipment to over 20 miles
- Fiber links are immune to RF interference problems associated with coax
- Ideal for broadcasting towers, cell sites, military installations, and large ships
- Provides a fiber security break and insulates from lightning strikes
- 1 GPS input
- 1 Independent fiber optic output SC/APC
- N Female Type RF Connector
- Portable power supply
- Supports high level of optical split and RF split for flexible routing of GPS for small cells and extended base station sites
- Simple to install – no adjustment
- Minimal signal loss and degradation over very long cable runs up to 20km.
- Provides a highly secure tamper-proof GPS over fiber connection between antenna and receiver.
- Interference free link through noisy environments, the optical signal is unaffected by electrical noise.
- Electrical isolation between antenna and receiver protects against lightning strikes and electrical surge
- Selectable GPS antenna powering voltage
- Supports all L2 & L1& L5 GPS bands
- The transmitter receiver Kit comes with 110-220V AC to DC power supply

- GPS base stations with long antenna cable runs
- Run the GPS carrier to multiple GPS timing boards throughout a company
- Run GPS throughout an aircraft
- Satisfies the requirement of supplying multiple GPS receivers with a carrier, spread over a great distance
- For R&D facilities, supplies a GPS carrier to a multitude of engineers and technicians with only one antenna on the roof.
- DAS, WiMax, Satcom, LTE over fiber

IMPORTANT NOTE* (it is very important to interface our unit with SC/APC - Angle Polished Connector to avoid any light reflections.**

If your fiber is terminated with the SC, ST, FC /PC flat connector, you need to use an optical jumper from PC type to SC/APC for proper conversion.

The **L** signals are different frequency bands used by the GPS (Global Positioning System) satellites to transmit signals to GPS receivers. These frequencies are part of the evolution of GPS technology, providing higher accuracy, better reliability, and more advanced features, especially with the modernization of GPS.

Here are the key **L** bands for GPS and their corresponding frequencies:

1. L1

- **Frequency: 1575.42 MHz**
- **Description:** The L1 frequency is the most commonly used frequency for civilian GPS receivers. It carries the C/A (Coarse/Acquisition) code and the P(Y) code (for military use).

2. L2

- **Frequency: 1227.60 MHz**
- **Description:** L2 is mainly used for military applications but can also be used for civilian applications, particularly in high-accuracy GNSS systems with dual-frequency receivers. It carries the P(Y) code and the L2C code for civilian use.

3. L3

- **Frequency: 1381.05 MHz**
- **Description:** L3 is used primarily for nuclear detonation detection and is not used for standard GPS navigation.

4. L4

- **Frequency: 1379.913 MHz**
- **Description:** L4 is used primarily for the ionospheric calibration and research purposes. It is part of the GPS III modernization but has not yet been widely used for navigation.

5. L5

- **Frequency: 1176.45 MHz**
- **Description:** L5 is a high-precision, safety-of-life signal for both civilian and professional applications. It offers improved accuracy and is used for critical applications such as aviation. L5 is a new signal available from GPS III satellites.

6. L6

- **Frequency: 1278.75 MHz**
- **Description:** L6 is used primarily for commercial purposes and is part of the GPS III modernization. This signal is intended for high-accuracy applications and is used by the GPS III satellites to provide improved performance.

7. L7

- **Frequency: 1267.6 MHz**
- **Description:** L7 is part of the GPS III modernization program and is intended for both military and civilian use, contributing to a more robust and accurate GPS system.

Summary of GPS L Bands and Corresponding Frequencies:

Signal	Frequency (MHz)	Description
L1	1575.42	Civilian (C/A code), Military (P(Y) code)
L2	1227.60	Military (P(Y) code), Civilian (L2C code)
L3	1381.05	Nuclear Detonation Detection (Not used for navigation)
L4	1379.913	Ionospheric Research (Limited Use)
L5	1176.45	Civilian Safety-of-Life (Aviation)
L6	1278.75	Commercial Use (GPS III)
L7	1267.6	Modernized GPS III Signal

These frequencies ensure that GPS signals can be used effectively in various applications, from consumer navigation to precise scientific and military purposes. The modernized signals like L5, L6, and L7 are designed to offer enhanced performance in terms of accuracy, reliability, and resistance to interference.

Model Selection

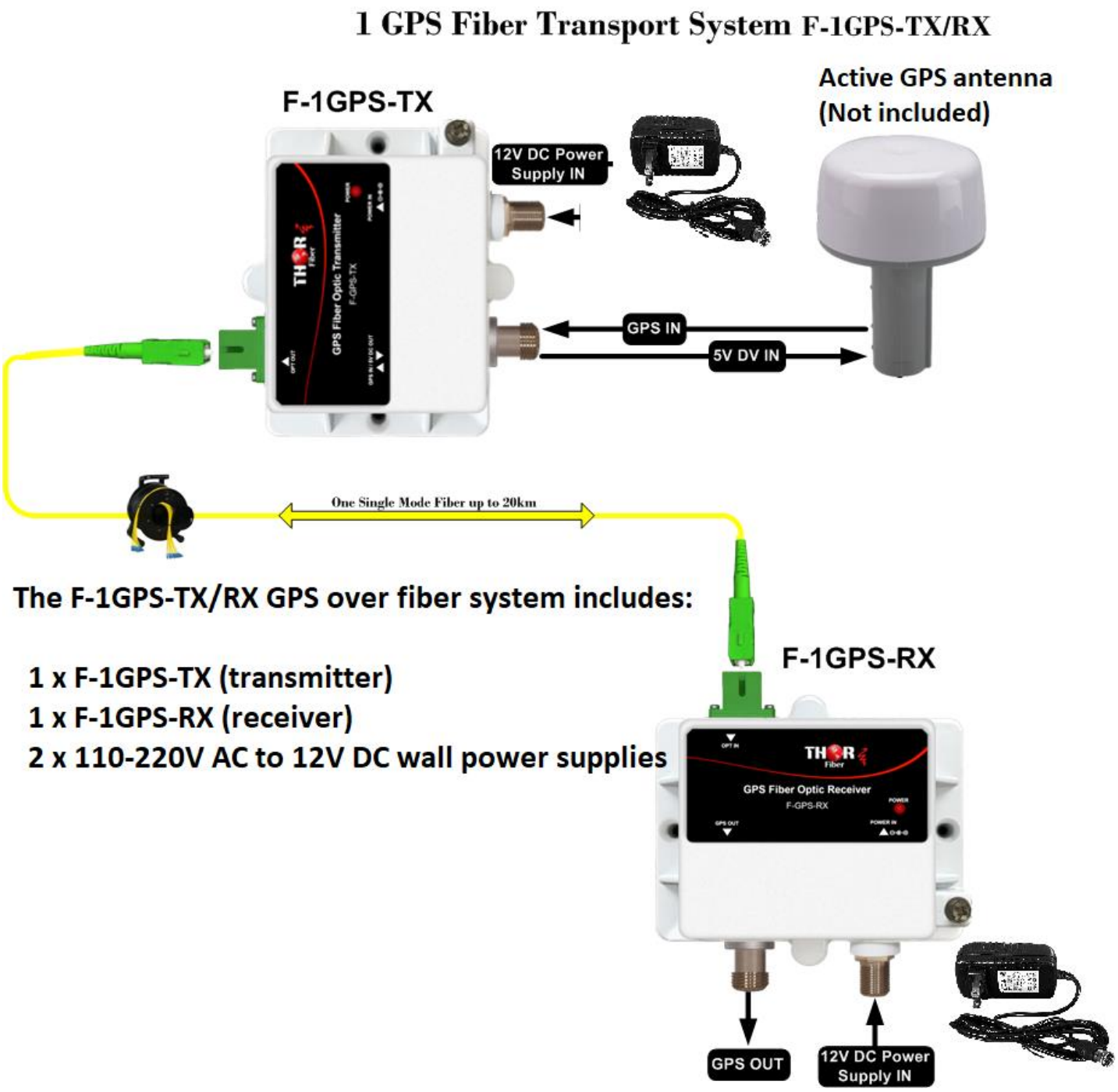
F-1GPS-TX/RX - 1GPS over fiber Transmitter/Receiver kit (both ends) - 1mW laser (20km distance)

F-1GPS-TX - 1GPS over fiber Transmitter only - 1mW laser - 0dBm optical output power (20km distance)

F-1GPS-RX - 1GPS over fiber Receiver only

F-1GPS-TX-10mW - 1GPS over fiber Transmitter only - 10mW laser +10dBm optical output power

Drawing:

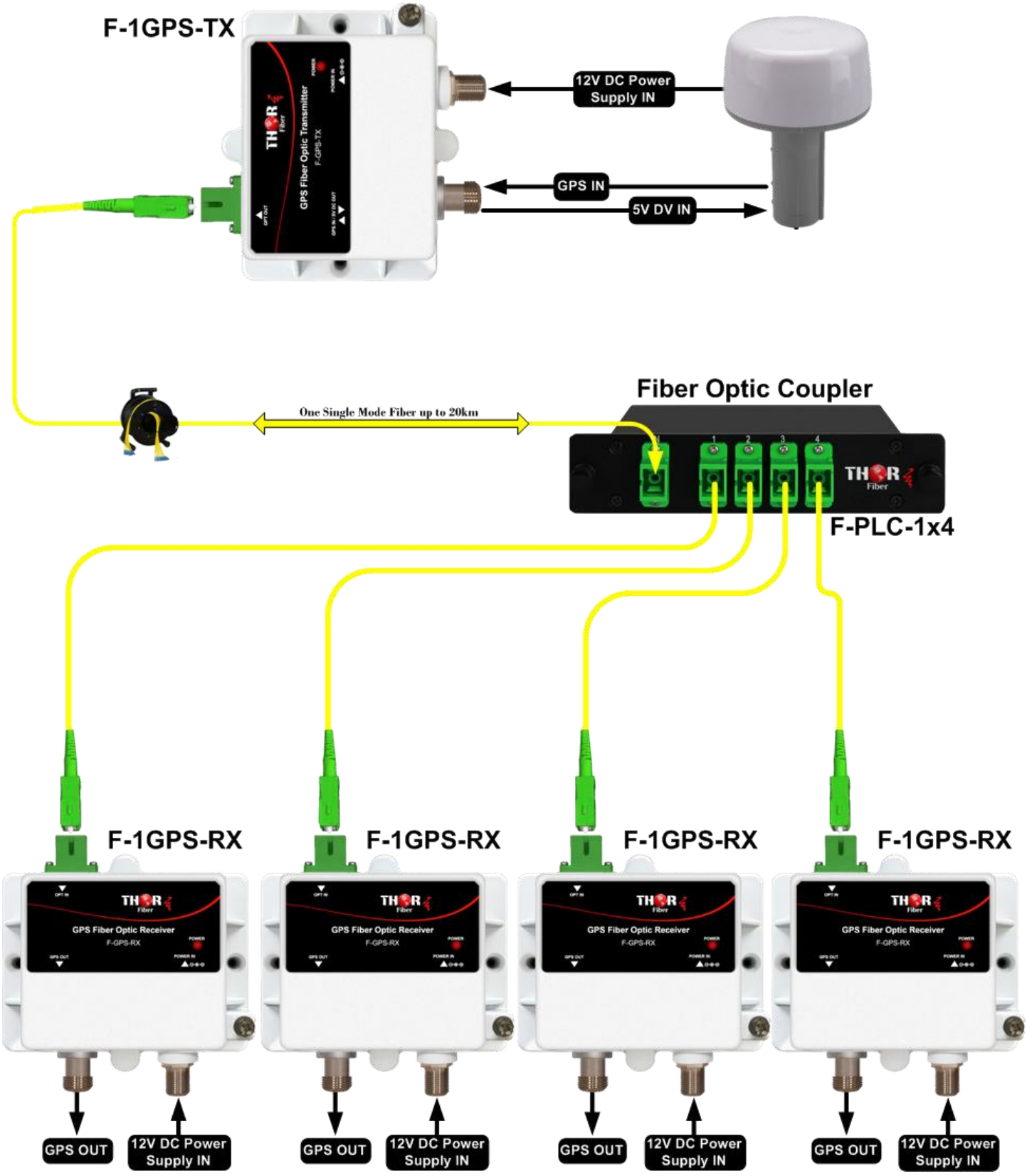


The F-1GPS-TX/RX GPS over fiber system includes:

1 x F-1GPS-TX (transmitter)
1 x F-1GPS-RX (receiver)
2 x 110-220V AC to 12V DC wall power supplies

1 GPS Fiber Transport System

F-1GPS-TX/RX



Specifications:

Electro Optical Characteristics	
• Optical Output • Optical output Power • Receiver Sensitivity • Optical budget	1 mW min. (F-1GPS-TX - 1GPS over fiber Transmitter only - 1mW laser - 0dBm optical output power (20km distance) (0-+3)dBm -10dBm 10db (*** **F-1GPS-TX-10mW** - 1GPS over fiber Transmitter only - 10mW laser +10dBm optical output power)
• Wavelength	1310 nm, (1550nm or CWDM special order only)
RF Characteristics	
• Frequency Range	1100 – 1585.42 MHz
• CNR	60dB
• Input VSWR (50 Ohm)	2.0:1 max
• MW/ma@1200Mhz	0.1mW/ma min
• 1dB Compression	-25 dBm
• Power • Power to the Antenna	12VDC, 1.5A AC to DC power supply - Included (F-Type Female) 5V DV (ON/OFF switch)
Physical Characteristics	
• Dimensions	Height 1 1/16" Width: 4 1/32" (with RF and Fiber connectors) Length: 4"
Link Characteristics	
• Link Loss	15 dB typical
• Carrier/Noise (30khz BW)	15 dB min with input drive level at 70 dBm

• 3rd Order Intercept	22dBm
Environmental Conditions	
• Operating Temperature	-25 to +70 (deg C)
• Storage Temperature	-30 to +75 (deg C)
Mechanical	
• Optical Connectors • Electrical Connector	SC/APC Fiber S/M 9/125 N type Female

*All Specifications Subject to Change Without Notice

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