

## Time & Frequency Standard

# TFS1.10 Module

Item Number: 85072918

### Features :

- Extremely low phase noise
- Highly immune to signal drops
- Module includes 10 MHz and 1PPS signals.



**The H+S TFS1.10 module** is a compact, self-contained GPS guided frequency reference device. It contains a precision OCXO, GPS receiver, RS232 level converter and voltage regulators. The output is buffered to enable the handling of a 50Ω load.

The TFS module's crystal oscillator provide extremely low phase noise and with no phase discontinuity. Unlike PLL-based solutions, our 1PPS is highly immune to drops in GPS signal, missing 1PPS pulses or pulse distortions caused by fading or other influences. The pulse is synchronized to the average of the GPS signal.

### The 1PPS pulse continues to operate with the OCXO accuracy in case of loss of GPS signal.

The TFS module offers a 10MHz electrical outputs with extremely low phase noise and a 1PPS signal. The module has a standard output level of +10dBm.

Once an antenna and a 12VDC power supply are connected, the 1PPS module is ready for use. Once powered, the LED will be red (Pin14=high) until a stable GPS signal is detected. During signal locking (Pin14 and Pin12=high) the LED will turn orange. Once a signal lock has been achieved, the LED will turn green (pin12=high).

The GPS module can be controlled and data can be retrieved via a standard RS232 interface.

1PPS Parameters		Value			Remarks
		Min.	Typ.	Max.	
All specifications at 25°C case Temperature T <sub>c</sub> , unless otherwise specified					
<b>Frequency Accuracy: Standard Oven</b>	Sec		< 10 <sup>-7</sup>		Typical
<b>Frequency Accuracy: GPS Locked</b>	Sec		< 2·10 <sup>-12</sup>		Typical
<b>After 1 year: Standard Oven</b>	Sec		< 10 <sup>-7</sup>		Typical / per year
<b>After 1 year: GPS Locked</b>	Sec		n/a		
<b>10 MHz Parameters</b>					
<b>Output</b>	dBm		+10		+/-2 dB
<b>Harmonics</b>	dBc		< -30		
<b>Phase Noise: 10 Hz</b>	dBc/Hz		< -130		
<b>Phase Noise: 100 Hz</b>	dBc/Hz		< -150		
<b>Phase Noise: 1 kHz</b>	dBc/Hz		< -155		
<b>Phase Noise: 10 kHz</b>	dBc/Hz		< -158		
<b>Phase Noise: 100 kHz</b>	dBc/Hz		< -160		
<b>Phase Noise: 1 MHz</b>	dBc/Hz		< -162		
<b>Phase Noise: 10 MHz</b>	dBc/Hz		< -162		
<b>Supply voltage V<sub>s</sub></b>	VDC	-0.5	+ 12	+ 15	
<b>Temperature range</b> operating	°C	-30		+ 70	
<b>RF Connectors: GPS Antenna</b>			SMA female		
<b>RF Connectors: 1PPS</b>			MCX female		
<b>RF Connectors: 10 MHz</b>			BNC female		

Subject to change without notice

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### Interfaces and supplies:

- GPS Antenna type: Active GPS antenna
- Antenna Power Supply: 3.3V, 50 mA (max)
- Antenna connector: SMA female
- Recommended antenna performance: Gain 15-50 dB, NF <=1.5 dB
- RF output: BNC female connector. +8 dBm (minimum) into 50  $\Omega$
- 1PPS output: 5V CMOS, MCX(f) connector.  
Tip= 1PPS, case= GND, positive pulse with 50% duty cycle.
- GPS-RS232: Standard level RS232 , connector D-Sub 9
- Power supply: 8 – 12 VDC / 650 mA peak connector D-Sub 9
- GPS Receiver: Linx GPS receiver, 20 channels, GPS L1 , C/A Code

#### PIN connections Sub-D :

1 / 2 : DC 12V  
3 / 4 : NC  
5 : RS232 TX  
6 : RS232 RX  
7 : RS232 GND  
8 : 1PPS Output  
9 / 10: DC GND  
11: NC  
12: Alarm Output grün  
13: Alarm GND  
14: Alarm Output rot  
15: NC

### GPS Antennas, cables and components (optional):

All of the components required in a Time & Frequency system are available at HUBER+SUHNER.  
Please feel free to contact us for support concerning the most appropriate interconnect options for your solution.