



RubiSource T&M

Portable Rubidium Timing Signal Reference

KEY FEATURES

- Compact, Robust & Lightweight
- Easy Handling
- Multiple Frequency Outputs
- GPS/Cesium Reference Inputs with Auto-Calibration Feature
- 1 PPS Output
- 1 PPS Synchronization Input

INTRODUCTION

The RubiSource® T&M is a portable timing reference based on Symmetricom's well known rubidium oscillator technology for universal use in test and measurement applications. A variety of coherent standard frequencies are provided:

- Sine wave 10 MHz, 5 MHz & 1 MHz
- Square wave 10 MHz & 5 MHz

The RubiSource T&M's 1 PPS output signal provides exact timing information. This output can be synchronized to an external 1 PPS input signal.

The reliable output signals are based on the highly accurate and stable rubidium oscillator inside. The rubidium's fast warm-up eliminates the need for bulky backup batteries.

The RubiSource T&M can be locked to an external primary source such as a GPS receiver or cesium Standard for automatic frequency calibration of the rubidium oscillator and/or enhancing the intrinsic rubidium accuracy to near-cesium quality.



RubiSource T&M

APPLICATIONS

The sine wave and square wave outputs of the RubiSource T&M are typically provided for metrology and calibration laboratory equipment such as:

- Universal Counter
- Spectrum Analyzer
- Synthesized Signal Generator

OPERATION WITH OTHER SYMMETRICOM PRODUCTS

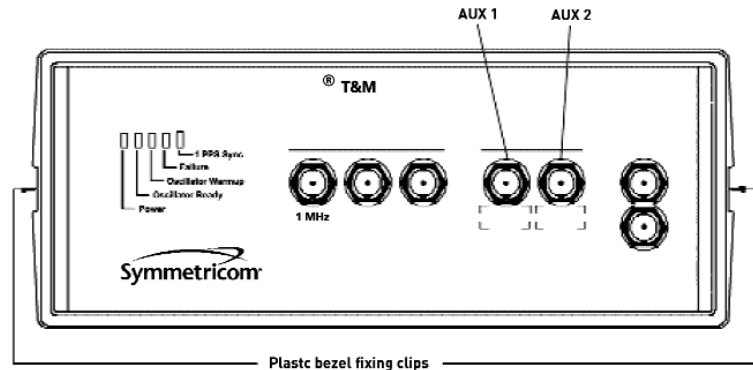
The RubiSource T&M has one reference input specifically designed for easy connection to Symmetricom's GPS-FC to provide exact GPS timing information.

AUTOMATIC FREQUENCY ADJUSTMENT

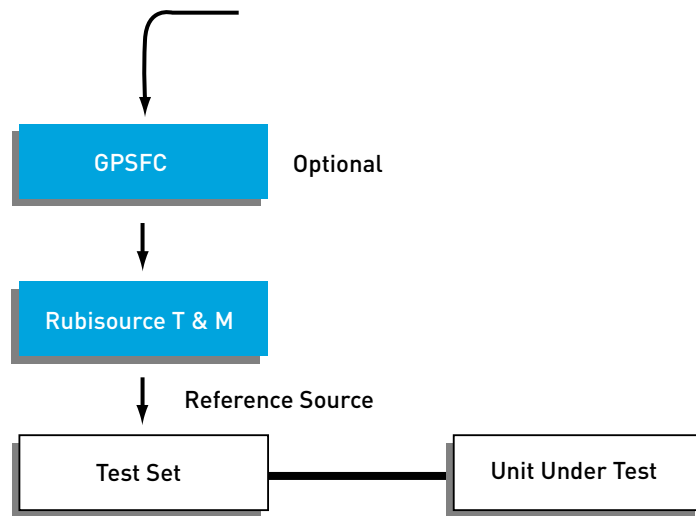
Calibration of the RubiSource T&M has been made extremely simple. There is no need for external frequency difference meters or phase comparators. Just connect a 5 MHz or 10 MHz reference signal from a primary standard (Cesium, GPS disciplined rubidium) to the rear panel input. The RubiSource T&M will automatically sense the signal, evaluate its stability and slowly (typically within 10 minutes) tune the output signals to a frequency accuracy of $2.0E-11$. The unit will continue to operate with the excellent performance of the internal rubidium oscillator until a new calibration cycle is started. The calibration parameters will be retained in a non-volatile memory.

By connecting Symmetricom's smart GPS antenna (GPS-FC) the RubiSource T&M can serve as a GPS disciplined frequency standard exceeding even the long-term frequency accuracy of cesium.

Automatic frequency adjustment can be disabled with a recessed slide switch. Switch tampering can be prevented by placing a calibration sticker across its access opening.



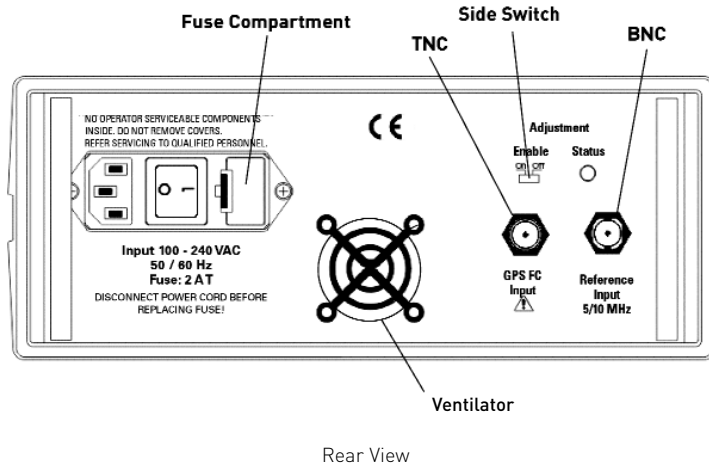
Front View



Frequency Adjustment



The Symmetricom GPS-FC GPS Frequency Controller is a very compact GPS-disciplined low cost frequency system. This smart system makes use of the accurate GPS timing signals and generates high performance frequencies.



1 PPS INPUT/OUTPUT SYNCHRONIZATION

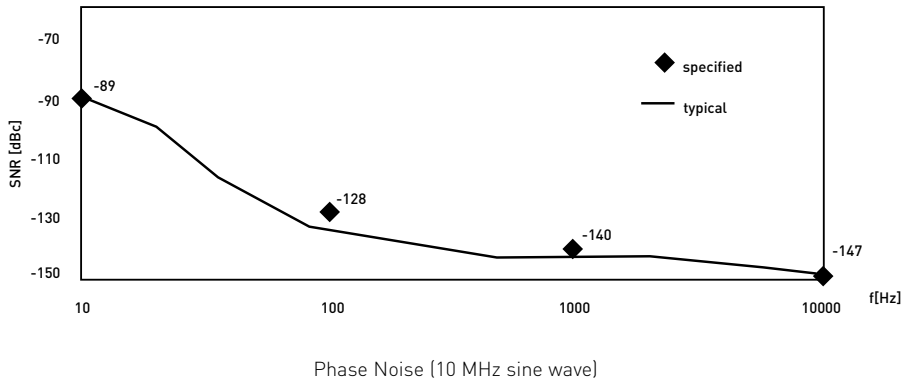
The 1 PPS output can be synchronized to an external reference 1 PPS. The RubiSource integrity checks the signal at the 1 PPS input and synchronizes its output to better than 100ns. A front panel LED indicates successful synchronization. The LED turned off indicates loss of synchronization.

FUNCTIONAL MONITORING/ BUILT-IN TEST EQUIPMENT

Extensive continuous self tests monitor critical functions of the RubiSource T&M to ensure its high accuracy. Failures of the equipment hardware compromising the frequency accuracy of the output signals will be detected.

When power is applied the unit enters into a warm-up phase for a few minutes until it reaches full accuracy.

Front panel LED indicators inform the user of the status of the unit.



Allan Deviation (10 MHz sine wave)

$\tau = 1$ second	<2.5E-11 typically <1.0E-11
$\tau = 10$ seconds	<0.8E-11
$\tau = 100$ seconds	<0.25E-11

The Balun Transformer is a bi-directional adapter for frequency and traffic interfaces converting signals from 120Ω balanced (Sub-D9 interface) to 75Ω unbalanced (BNC interface) and vice versa.



RubiSource T&M Specifications

ELECTRICAL SPECIFICATIONS

- Output
 - 1 x sine wave 1 MHz, 1Vrms into, 50Ω, BNC
 - 1 x sine wave 5 MHz, 1Vrms into, 50Ω, BNC
 - 1 x sine wave 10 MHz, 1Vrms into, 50Ω, BNC
 - 1 x square wave, minimum 2.4 V into 50Ω, BNC (factory setting: 10 MHz TTL)*
 - 1 x square wave, minimum 2.4 V into 50Ω, BNC (factory setting: 5 MHz TTL)*
 - 1 x square wave 1 PPS (pulse length typical 10 us), minimum 2.4 V into 50Ω, BNC
- *User configurable to:
 - 10 MHz TTL
 - 5 MHz TTL
 - 1 MHz TTL
 - 8 kHz TTL
 - 100 Hz TTL
 - 1 PPS (pulse length typical 10 us)
- Accuracy
 - Frequency accuracy (factory shipment): $\pm 5.0E-11$ @ 25° C
- Internal time base
 - Symmetricon's rubidium oscillator
- Aging
 - <5.0E-11/month
 - <1.0E-9 over 10 years
- Input
 - 1 x external reference signal, BNC/50Ω
 - sine wave or square wave 5 MHz or 10 MHz
 - signal levels: 1 Vrms $\pm 10\%$ or TTL min. 2.4 V/max. 5V, MTIE (200S) <1 ns
 - 1 x GPS disciplined frequency signal from Symmetricon's GPS FC product, TNC/50Ω
 - 1 x 1 PPS signal, BNC/50Ω
 - square wave 1 Hz $\pm 1.0E-8$, 1-10 Vpp, pulse length minimum 150 ns, slope <15 ns

ENVIRONMENTAL & PHYSICAL SPECIFICATIONS

- MTBF values: 65,000 hours (Based on field-experience)
- Standards: EN 61326-1:1997
EN 61010-1:1993
- Calibration input
 - 1x auto-calibration input: 10/5 MHz (LED status of external calibration)
 - 1x input reference: Symmetricon's GPS-FC product
- Power supply
 - Voltage: 100-240 Vac, 50-60 Hz
 - Current consumption: Maximum 1.0A
 - Power consumption: Typ. 30 W at 230 VAC, 22 W at 110 VAC
- Size
 - Width: 10.24" (260 mm)
 - Height: 4.72" (120 mm)
 - Depth: 14.37" (365 mm)
- Weight: 9.5 lbs. (4.3 kg) Nominal

OPTIONS

- Power supply
 - Voltage: Nominal 24 VDC, +20-30 VDC
 - Current consumption: Maximum 2.5 A
- Accessories
 - Symmetricon GPS-FC 10 MHz product (including mounting parts) **Part No.** 84000000
 - Transport case 81700001
 - Interface cable (RubiSource T&M / GPS-FC) 45400710
 - Cable length 25 m 45400720
 - Cable length 50 m (note: with cable type RG58 up to 250 m available)
 - Balun transformer



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