Symmetricom

RubiSource T&M

Portable Rubidium Timing Signal Reference

KEY FEATURES

- Cost-Effective Timing Source for Metrology and Calibration Laboratories
- Test & Measurement Applications
- Multiple Frequency Outputs
- Compact, Robust & Lightweight
- Easy Handling
- Cesium Reference Input with Auto-Calibration Feature
- 1 PPS Output
- 1 PPS Synchronization Input
- CE Compliant

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 cesium standard for automatic calibration of the rubidium clock.

APPLICATIONS

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

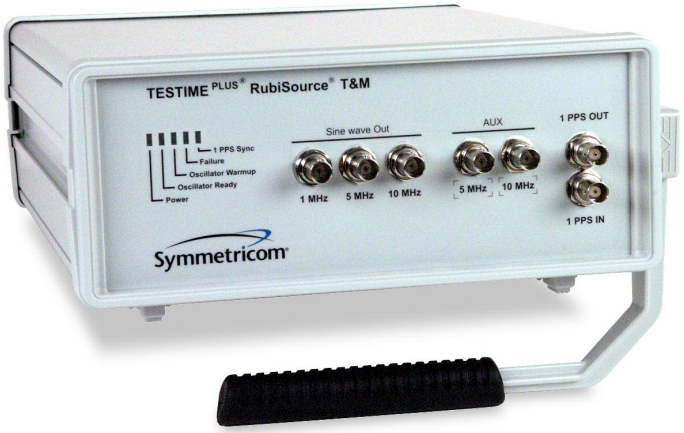
- Universal Counter
- Spectrum Analyzer
- Synthesized Signal Generator

1 PPS INPUT/OUTPUT SYNCHRONIZATION

The 1 PPS output can be synchronized to an external reference 1 PPS. The RubiSource T&M 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.

AUTOMATIC FREQUENCY ADJUSTMENT

Calibration of the RubiSource T&M has been made extremely simple. There is no need for external frequency difference meters or



RubiSource T&M

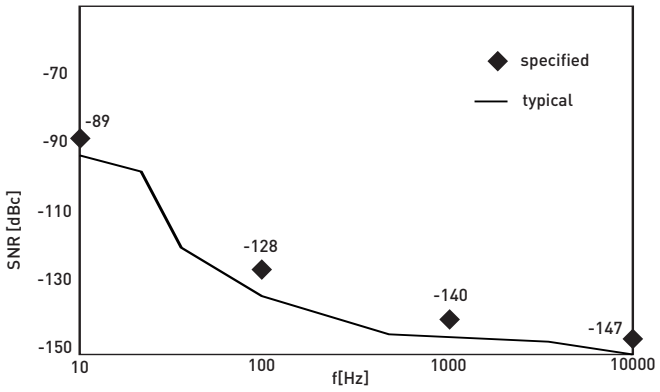
phase comparators. Just connect a 5 MHz or 10 MHz reference signal from a primary standard (Cesium, GPS disciplined rubidium) to the rear panel input. The RubiSource T&M will automatically sense the signal, evaluate its stability and slowly (typically within 10 minutes) tune the output signals to a frequency 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.

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.

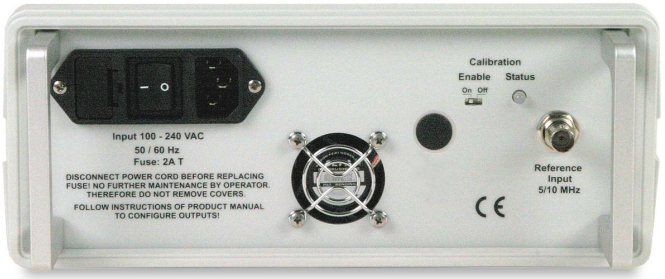
Allan Deviation (10 MHz sine wave)

τ = 1 second	$<2.5 \times 10^{-11}$
	typically $<1.0 \times 10^{-11}$
τ = 10 seconds	$<0.8 \times 10^{-11}$
τ = 100 seconds	$<0.25 \times 10^{-11}$

PHASE NOISE (10 MHz sine wave)



Non-harmonic spurs < -68 dB



Rear View

RubiSource T&M Specifications

PHYSICAL SPECIFICATIONS

- Size (WxHxD): Maximum 260 x 120 x 365 mm
  10.24 x 4.72 x 14.37 inch
- Weight (without handle): Maximum 4.3 kg

ENVIRONMENTAL CONDITIONS

- Stationary use: 5°C ... 40°C operating with specified accuracy
  -10°C ... 55°C operating with de-rated accuracy
  (EN 300 019-1-3 class 3.1)
- Transportation: -25° ... 70°C (EN 300 019-1-2 class 2.2)
- Storage: -40°C ... 85°C (EN 300 019-1-1 class 1.2)
- Humidity: 95 % non-condensing

REGULATIONS AND STANDARDS

- EN 61326-1:1997
- EN 61010-1:1993

MTBF VALUE

- 65,000 hours (based on field experience)

RubiSource T&M P/N 81710000

- Power supply
  - Voltage: 100 ... 240 VAC, 50 ... 60 Hz
  - Current consumption: maximum 1.0 A
  - Power consumption: typically 30 W at 230 VAC, 22 W at 110 VAC
- Inputs
  - 1 x external reference: 5 MHz or 10 MHz sine wave or square wave, 0.5 ... 5.0 Vpp into 50Ω / BNC, MTIE (200 s) < 1 ns
  - 1 x 1 PPS signal: 1 Hz ±1 x 10^{-8} square wave, 1...10 Vpp into 50Ω/ BNC, pulse length minimum 150 ns, slope < 15 ns
- Outputs
  - 1 x 1 MHz sine wave: 1 Vrms into 50Ω, BNC
  - 1 x 5 MHz sine wave: 1 Vrms into 50Ω, BNC
  - 1 x 10 MHz sine wave: 1 Vrms 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: minimum 2.4 V into 50Ω, BNC (pulse length typ. 10 us)
  - *) user configurable to: 10 MHz TTL, 5 MHz TTL, 1 MHz TTL, 8 kHz TTL, 100 Hz TTL, 1 PPS (pulse length typ. 10 us)
- Frequency accuracy
  - Factory shipment: < 5 x 10^{-11} @ 25°C
  - With primary reference adjusted: < 2 x 10^{-11} relatively to the reference
- Internal time base: Symmetricom's rubidium oscillator
  Aging < 5 x 10^{-11} / month
  < 1 x 10^{-9} over 10 years

ACCESSORIES

- Transport Case P/N 81700001
- Balun Transformer P/N 80719011

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