



RFS10E: 10 MHz Rubidium Frequency Standard



Key Features

- Rubidium Oscillator as main frequency reference
- Five sinewave outputs as standard.
- Five additional outputs available as option 01
- Very Low Phase Noise and monthly ageing
- RS232 and Ethernet Interfaces
- Additional five outputs at different frequency
- Many options available. See list in this brochure
- Custom built options available upon request
- 19" 1U high rack mountable case
- Free Windows Software

Description

The RFS10E is a 10 MHz rubidium frequency standard with many options as described below. An optional input allows the RFS10E to be locked to a 1 pps signal such as GPS, or to other frequencies such as 5 or 10 MHz. Also the 1 pps output derived from the rubidium will align itself in time to the 1 pps input to within 50 ns. The RFS10E has very low phase noise and exceptional Allan Deviation for a rubidium oscillator.

Options

Various options are available such as:

- Very low phase noise outputs at 10.23 MHz, 13 MHz or 20 MHz. Other frequencies on request. All outputs locked to main rubidium reference.
- Very low Allan Deviation, 1.5×10^{-12} (1 second) and 7×10^{-13} (100 sec)
- Squarewave Outputs. TTL, ECL, RS232, RS422, E1 levels. Any frequency from 0.1 pps to 100 MHz
- DDS output programmable from 0 to 80 MHz in $1 \mu\text{Hz}$ steps. Sinewave and squarewave outputs.
- Output levels to +19 dBm.
- Redundancy. Two units operate together for high reliability systems, or 2nd redundant input connector.
- Second redundant AC power supply or external DC input.
- Extra sinewave outputs.
- Multiplied or divided outputs.

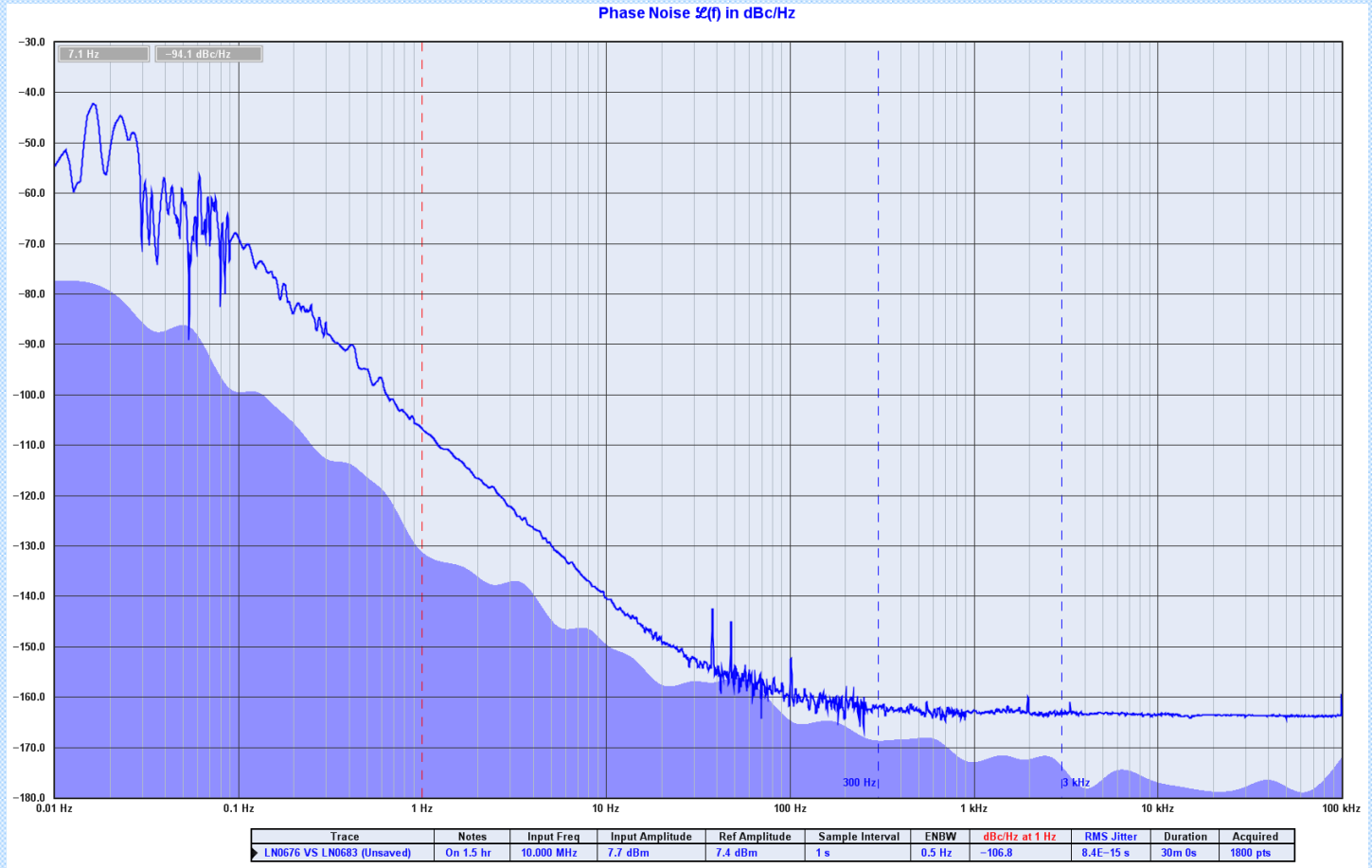
Windows Software

The RFS10E is supplied with two types of windows software as well as Telnet commands. A Console program is PC software that connects to the RFS10E either via RS232 or Ethernet. The Console program monitors all parameters of the RFS10E to be monitored and controlled.

Also, there is an embedded web page inside the RFS10E. This allows any browser to simply connect to the RFS10E using its IP address. Again the Web page monitors all functions and allows many parameters to be changed. Also this software can be set up to allow remote viewing and control of the RFS10E from anywhere in the world.

Thirdly Telnet commands are available.

Typical phase noise for a 10.00 MHz Output



Specifications

| Description | Specification | Remarks |
|--|---|--|
| Rubidium Oscillator | | |
| Output Frequency | 10 MHz sinewave | Optional change to 5 MHz |
| Aging (after 90 days continuous operation) | < 5 x 10 ⁻¹¹ /month or < 5 x 10 ⁻¹⁰ /year | Options to < 1 x 10 ⁻¹¹ /month available. |
| Accuracy at shipment | < ± 5 x 10 ⁻¹¹ @ 25 °C | |
| Allan Deviation | < 1.5 x 10 ⁻¹² (1s), < 7.0 x 10 ⁻¹³ (100s), | Options to < 1.2 x 10 ⁻¹² (1 sec) exist. |
| Spurious | < -120 dBc (100 kHz BW) | |
| Frequency Retrace | ± 5 x 10 ⁻¹¹ (72 hours on, 72 hours off) | |
| 1 PPS Out Holdover time | < 1 us / 24 hour | Temp variation ± 2 °C |
| Digital Frequency Adjustment | ± 5 x 10 ⁻⁹ Resolution < 5.12 x 10 ⁻¹³ | |
| Trim Range | ± 5 x 10 ⁻⁹ (bottom panel,) | |
| Warm-Up Time | < 12 minutes to within 5 x 10 ⁻¹⁰ | Optional < 4 minutes |
| Temperature Coefficient | 1 x 10 ⁻¹⁰ (-10 °C to +55 °C) | |
| Magnetic Field | < 2 x 10 ⁻¹⁰ for 1 Gauss field reversal | |
| Design Life | 10 to 20 years | |

| 10 MHz Outputs | | |
|--|--|---|
| Connector | BNC Standard (option SMA or TNC) | Rear panel connectors. |
| Number of Outputs | Five as standard, ten with option 01 | |
| Frequency | 10 MHz | |
| Accuracy | Same as main Rubidium Reference | |
| Signal Type | Sine wave | |
| Amplitude | 0 dBm to +13 dBm adjustable | Internally adjustable. Default = +13 dBm. |
| Harmonic Distortion | -45 dBc @ 10 MHz | |
| Return Loss | > 20 dB @ 10 MHz | |
| Phase Noise (dBc/Hz) @ offset frequency @ 10 MHz carrier frequency. Standard Unit | -103 dB @ 1 Hz, -137 @ 10Hz, -153 @ 100 Hz, -155 @ 1 kHz, -159 @ 10 kHz | Better phase noise is optionally available |
| Phase Noise (dBc/Hz) @ offset frequency @ 10 MHz carrier frequency. Option 05D | -113 dB @ 1 Hz, -142 @ 10Hz, -159 @ 100 Hz, -160 @ 1 kHz, -161 @ 10 kHz | Option 05D Low phase noise option |
| 1 pps Output | | |
| Connector | BNC on rear panel | Pulse width programmable from 0 to 1 second in (133 ns steps). |
| Number of Outputs | One | |
| Frequency | 1 pulse per second | |
| Signal Type | Pulse Output | Output level 0 – 5V (open) or 0-3.0V (50 Ω) |
| Amplitude (open circuit) | 0 to 5 V, TTL Compatible | |
| Optional TTL Outputs (Option 30A, 30C, 30F, 30K) | | |
| Connector | BNC Standard (option SMA or TNC) | Rear panel connectors. |
| Number of Outputs | Five | In addition to standard sinewave outputs |
| Frequency (option 30A) | 1 MHz | |
| Frequency (option 30C) | 5 MHz | |
| Frequency (option 30F) | 1 pps (1 Hz) | |
| Frequency (option 30k) | 10 MHz | |
| Signal Type | Squarewave TTL Compatible | |
| Output Amplitude | 0-5V (open circuit) and 0-3V (50 Ω) | TTL Compatible |
| Optional 1 pps Input (Option 02) or Optional 10 MHz Input (Option 02B) | | |
| Connector | BNC standard (option SMA or TNC) | Other external input frequencies available, e.g. 5MHz, 10.23 MHz, 100 MHz |
| Input type (1pps) | 1 pulse per second at TTL levels | |
| Input type (10 MHz) | 10 MHz sinewave @ > 3 dBm | |
| RS232 | Baud 115200, 8 data bits, 1 stop bit, no parity | Free Console Software |
| Ethernet | RJ45 Connector | Embedded Web Page |
| Environmental | | |
| Operating Temperature | 0 °C to +50 °C | |
| Storage Temperature | -20 °C to +60°C | |
| Magnetic Field | < 2 x 10E ⁻¹⁰ for 1 Gauss field reverse | |
| Humidity | GR-63 CORE, Section 5.1.2 | |
| Operation Vibration | GR-63 CORE, section 5.4.2, Random & Sinusoidal MIL-PRF-28800F, Class 3,4 | Phase noise may be impaired during vibration |
| G-Tip Over Test | < 2 x 10 /g in worst axis | |
| Miscellaneous | | |
| AC Power Inlet with switch | IEC320 power cord | |
| AC Voltage Range | 100 - 240 VAC | |
| Power consumption | 100 W Max (warm up), 70 W (operating) | Rear Panel |
| Width x Depth x height. / Weight | 482.6 x 280 x 44 mm / 6 kg's | Usable 90 - 260 VAC |
| Consult Precision Test Systems for further details of these options. Not all options can be fitted at the same time. | | |

| Head Office - UK | USA |
|---|---|
| Precision Test Systems LTD Unit 4B Grange Farm Abbots Ripton, Huntingdon Cambridgeshire, PE28 2PH, UK Tel: +44 (0) 333 444 9608 Email: uksales@ptsyst.com Web: www.ptsyst.com | Precision Test Systems L.L.C 304 S. Jones Blvd Suite #807 Las Vegas, NV, 89107 Tel: 1 814 300 8351 Email: usasales@ptsyst.com Web: www.ptsyst.com |

Full specifications available from www.ptsyst.com. Specifications and features subject to change without notice (231024)