Frequency Standards

FS752 — GNSS Time and Frequency Reference

FS752 GPS Time & Frequency Reference

- GPS/GNSS disciplined 10 MHz
- Double-oven OCXO timebase
- Low phase noise
- Five 10 MHz outputs
- Two 1 pps outputs
- Up to eight additional 10 MHz & 1 pps outputs (opt.)

FS752 ... $2250 (U.S. list)

The FS752 GNSS Disciplined Time and Frequency Reference provides calibrated time and frequency distribution to your laboratory. A built-in receiver tracks any of the four major GNSS constellations: GPS, GLONASS, BEIDOU, or GALILEO. The instrument comes with a double-oven OCXO timebase that has phase noise of less than -125 dBc/Hz at 10 Hz offset.

10 MHz and 1 pps Distribution

The FS752 provides five buffered 10 MHz outputs and two buffered 1 PPS outputs. The 10 MHz outputs generate 1 Vrms into...
50Ω and may be used as frequency references for laboratory equipment. The 1pps outputs generate 10µs pulses, with 5 V CMOS logic and rising edges aligned to UTC. Up to eight additional 10 MHz and 1 pps outputs are available as rear-panel options.

For the receiver’s sawtooth error, then phase locks the timebase to the GNSS 1 pps. The TDEV between two instruments is a few nanoseconds.

If the GNSS signal is lost, the timebase is left at the last locked frequency value. The timebase will age or drift in frequency by less than ±0.05 ppm/year.

**GNSS Antennas**

You may choose to purchase a GNSS antenna from SRS, or a third party, or use an existing GNSS antenna at your facility. SRS timing receivers require a net gain (after cable losses) of +20 dBi to +32 dBi, which is a very common level from a variety of available active antennas and typical cable lengths. The antenna input to SRS timing receivers have a female BNC connector, provide +5 V bias, and have a 50 Ω input impedance.

SRS offers two antenna solutions, both of which have LNAs. All systems components have a 50 Ω characteristic impedance.

**Alarms**

The FS752 includes a configurable SPDT switch on its rear panel. By default, the alarm is set to assert whenever the FS752 loses lock to the GNSS signal, but the switch can also be set to monitor the health of the timebase or the instrument’s holdover state.

**Communication**

The FS752 can be controlled and queried over its USB port. The instrument is fully programmable using its extensive high-level command set, and there is also a free GNSSDO application that makes sending commands, viewing instrument status, and changing the configuration of the FS752 easy.

**GNSS Receiver**

The FS752 provides bias for a remote active GNSS antenna. The unit’s GNSS receiver tracks all satellites in view, automatically surveys and fixes its position, then uses all received signals to optimize its timing solution. The FS752 time-tags the 1 pps output from the receiver, corrects the result
FS752 Specifications

**OCXO Timebase**
- Oscillator type: Double oven controlled, 3rd OT, SC-cut crystal
- Temp. Stability: $<2 \times 10^{-9}$ (20 to 30 °C)
- Aging: $<0.2$ ppm/year (undisciplined to GPS)
- Phase noise (SSB): $<-125$ dBc/Hz (typical)
- Stability: See graphs next page
- Holdover: $<40 \mu$s / 24 hr.

**GPS Receiver**
- Model: u-blox, NEO-M8T
- Satellite acq. time: Less than 1 minute (typ.)
- Almanac acq. time: Approximately 15 minutes when continuously tracking satellites
- Optimized for static applications: Over determined clock mode enables receiver to use all satellites for timing
- Accuracy of UTC: $<100$ ns
- Time wander: $<20$ ns rms (clear sky)
- Antenna delay: $\pm 0.1$ s

**1 pps Output**
- Period: 1 s
- Width: 10 µs
- Phase accuracy: $<2$ ns (relative to internal reference)
- Jitter: $<50$ ps (rms)
- Level: $\pm 5$ V CMOS logic
- Transition time: $<2$ ns
- Source impedance: 50Ω
- Reverse protection: $\pm 5$ VDC

**10 MHz Output (50 Ω load)**
- Amplitude: 13 dBm
- Amplitude accuracy: $\pm 1$ dB
- Harmonics: $<-40$ dBc
- Spurious: $<-90$ dBc (100 kHz BW)
- Output coupling: DC, 50Ω ±2 %
- User load: 50Ω
- Reverse protection: $\pm 5$ VDC

**Computer Interfaces**
- USB: Virtual COM port with FTDI drivers, 115.2k baud, 8 bits, no parity, 1 stop bit, RTS/CTS flow

**Optional Distribution Outputs**
- 10 MHz (Opt. A): Four additional 10 MHz outputs
- 1 pps (Opt. B): Four additional 1 pps outputs

**General**
- AC power: 30 W, 90 to 264 VAC
- EMI Compliance: FCC Part 15 (Class B), CISPR-22 (Class B)

**Dimensions**
- 17” × 2” × 12” (WHL)

**Weight**
- 10 lbs.

**Warranty**
- One year parts and labor on defects in materials and workmanship

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**Ordering Information**
- FS752 GNSS Time / Frequency Reference: $2250$
- Option A: Four additional 10 MHz outputs: $395$
- Option B: Four additional 1 pps outputs: $395$
- O740ANT1 GNSS antenna (indoor use): $100$
- O740ANT2 GNSS antenna (outdoor use): $650$

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**Indoor Antenna**

**Outdoor Antenna Kit**