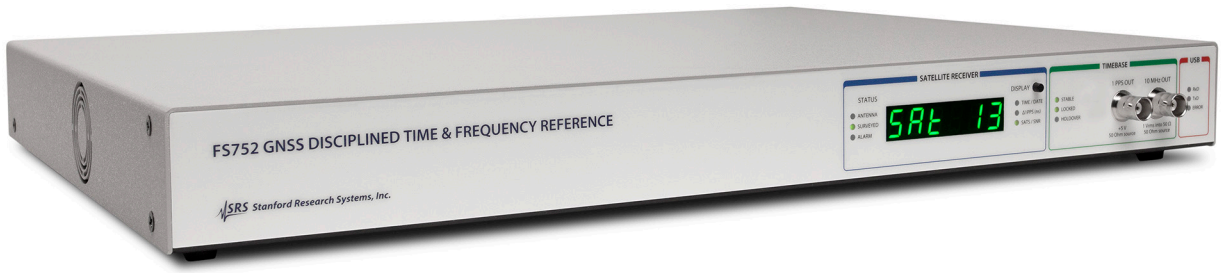
Frequency Standards

FS752 — GNSS Time and Frequency Reference

GENERAL
MICROTECHNOLOGY
& PHOTONICS



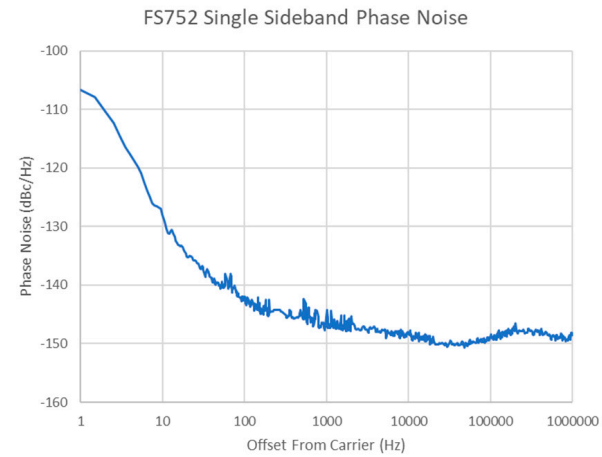
FS752 GPS Time & Frequency Reference

- **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.)**

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



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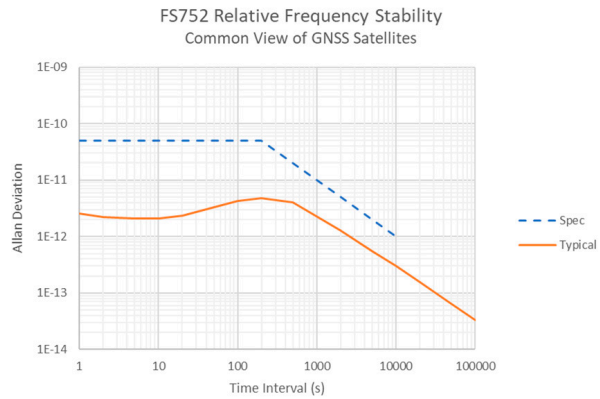
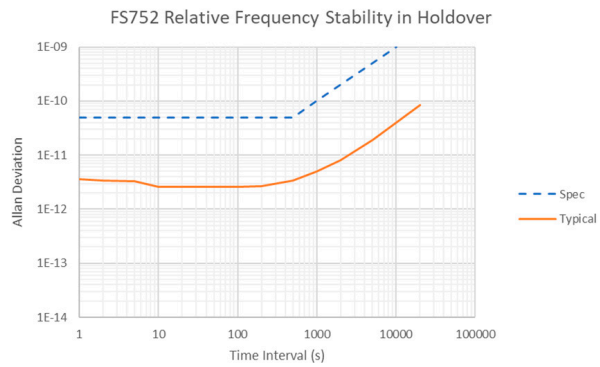
50 Ω and may be used as frequency references for laboratory equipment. The 1 pps outputs generate 10 µs pulses, with 5 V CMOS logic and rising edges aligned to UTC. Up to eight additional 10 MHz and 1 pps outputs are available as rear-panel options.





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 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.

FS752 front panel

FS752 rear panel

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.

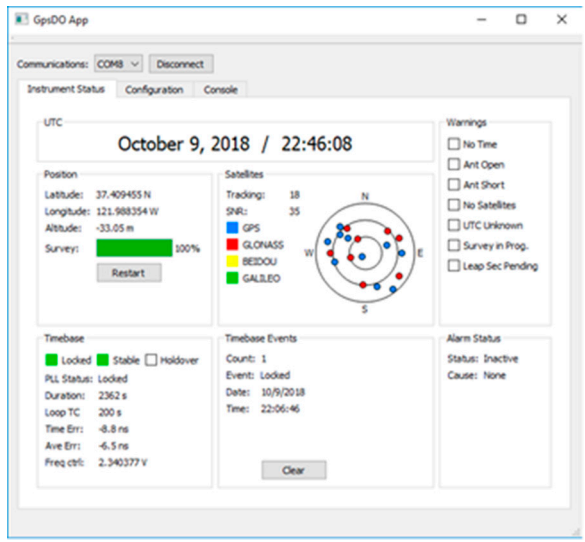
SRS offers two antenna solutions, both of which have LNAs. All systems components have a 50 Ω characteristic impedance.

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.



GNSSDO Application

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 µs / 24 hr.

GPS Receiver

Model	u-blox, NEO-M8T
Satelite 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 correction range	±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	+5 V CMOS logic
Transition time	<2 ns
Source impedance	50 Ω
Reverse protection	±5 VDC

10 MHz Output (50 Ω load)

Amplitude	13 dBm
Amplitude accuracy	±1 dB
Harmonics	<–40 dBc
Spurious	<–90 dBc (100 kHz BW)
Output coupling	DC, 50 Ω ±2 %
User load	50 Ω
Reverse protection	±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 47 to 63 Hz with PFC
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

Indoor Antenna

Outdoor Antenna Kit