Mini-PCIexpress LTE-Lite Low Cost 20MHz GPSDO Module Spec

Jackson Labs

"the next generation in frequency and timing"

- **Mini-PCIe Module with GPS, TCXO**
- **Excellent ADEV performance**
- **65 Channels WAAS, QZSS GPS**
- **20MHz, optional Synthesized output: 80MHz/40MHz/26.66/16/13.33/10MHz**

TYP. PRELIMINARY ELECTRICAL SPECIFICATIONS:

Module Specification:	
1 PPS Timing Accuracy from GPS receiver	<10ns to UTC RMS (1-Sigma) GPS Locked
Holdover Stability (1 week with GPS)	<±50us over 3 Hour Period @+25ºC (No Motion, No Airflow)
1 PPS Output	3.3VDC CMOS, as well as on DCD# pin of COM port for NTP/1588
Serial Port	COM Port, NMEA Output with Oscillator Status/Health sentence
GPS Frequency	L1, C/A 1574MHz
GPS Antenna	Active or Passive (0dB to +30dB gain)
GPS Receiver	65 Channels, QZSS, SBAS WAAS, EGNOS, MSAS capable
Sensitivity	Acquisition –148 dBm, Tracking -165 dBm
GPS TTFF	Cold Start - <32 sec, Warm Start – 1 sec, Hot Start - 1 sec
ADEV	10s: <7E-011, 10Ks: <2E-012 (GPS Locked, 25°C, no motion, no airflow)
TTL Alarm Output	CMOS LOCK indicator, LOCK LED
Warm Up Time / Stabilization Time	<10 min at +25°C to better than 1E-09 Accuracy
Supply Voltage (Vdd)	Via Mini-PCIe connector, 3.3V Single-Supply, +0.2V/-0.15V
Power Consumption	<0.2W
Operating Temperature	-10°C to +70°C, -40°C to +85°C optional
Additional Features	Can be connected to standard USB port via adaptor, U.Fl coax connectors for 1PPS/20MHz/LOCK-OK/GPS antenna
Oscillator Specification:	
Frequency Output of low Phase Noise crystal	20MHz CMOS 3Vpp on U.Fl coax connector
Optional Synthesized CMOS output (Phase-Locked to 20MHz)	Resistor-Stuffing selectable: 80MHz/40MHz/26.666MHz/16MHz/13.333MHz/10MHz/5MHz
20MHz Retrace	±2E-08 After 1 Hour @ +25°C without GPS
Frequency Stability Over Temperature (0°C to +60°C)	±100ppb (without GPS)
RF Output Amplitude	3Vpp CMOS
20MHz Phase Jitter (100Hz to 10MHz)	<0.135ps rms
Phase Noise	1Hz: <-68dBc/Hz; 10Hz: <-98dBc/Hz; 100Hz: <-122dBc/Hz; 1kHz: <-142dBc/Hz; 10kHz: <-152dBc/Hz; 100KHz: <-155dBc/Hz (10MHz TCXO)
Connections:	**Connector Type:**
1PPS CMOS Output, 20MHz CMOS Output, LOCK-OK CMOS Output, power, USB, antenna input	Mini-PCIe standard (USB interface), U.Fl coaxial

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Table 1. Available Crystal options and optional PLL synthesized output frequencies

The RF U.Fl coax connector can either be configured via resistor stuffing options for buffered TCXO output (default, 20MHz) or to output the following synthesized frequencies as required:

FREQ_SEL	10 MHz TCXO	15.36 MHz TCXO	19.2 MHz TCXO	20 MHz (default)
111	disabled	disabled	disabled	**disabled**
110	5MHz	4.608MHz/1.024MHz	4.8MHz	**5MHz**
101	13.33333333MHz	10.24MHz/2.048MHz	9.6MHz	**10MHz**
100	16MHz	15.36MHz/3.072MHz	12.8MHz	**13.33333333MHz**
011	20MHz	23.04MHz/5.12MHz	15.36MHz	**16MHz**
010	26.66666667MHz	30.72MHz/10.24MHz	25.6MHz	**26.66666667MHz**
001	40MHz	46.08MHz/30.72MHz	38.4MHz	**40MHz**
000	80MHz	92.16MHz	76.8MHz	**80MHz**

Figure 1. Typical Phase Noise plot with 10MHz TCXO

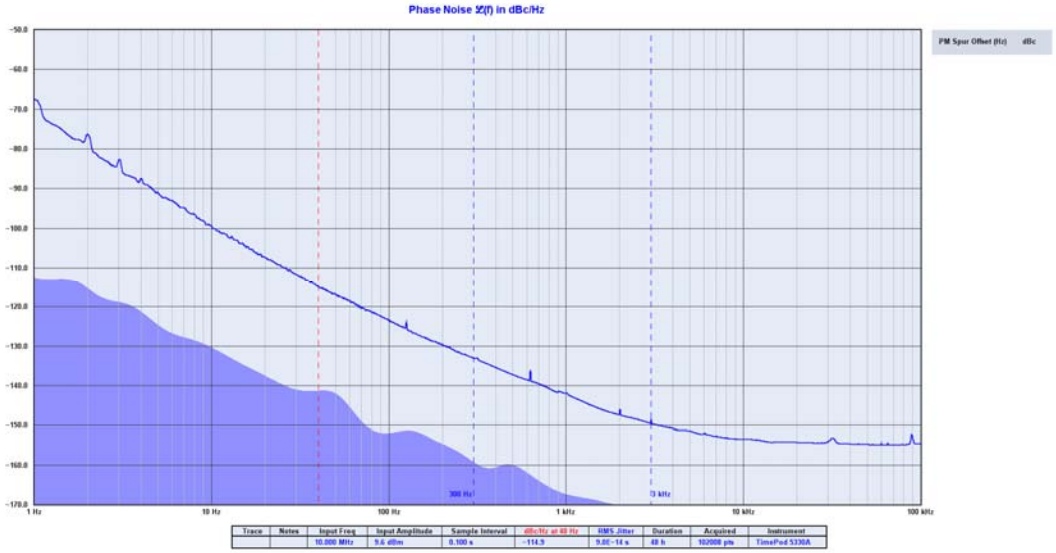

Figure 2. Typical ADEV Short Term Stability plot with 20MHz TCXO