

VIAVI JACKSON LAB PNT

Product Brief

COMTEST: 铁路电信网络和信号系统的测试、测量和监控解决方案

CANGO NETWORKS: 提供完整的服务保障平台

NG4T: 验证身份管理和身份验证等网络协议

ANUVIEW: 网络安全和威胁检测软件

JACKSON LAB TECHNOLOGIES: 军用和民用定位、导航和定时 (PNT) 解决方案

2021 年至 2022 年

VIAVI

2018 年至 2020 年

RPC PHOTONICS: 光整形光学器件

COBHAM: 增加 AvComm 和无线业务

NORDIASOFT: 为软件无线电市场提供测试仪器

3Z TELECOM: 增加天线指向校准

EXPANDIUM: 扩展云本地虚拟化产品组合

JACKSON LAB介绍

Jackson Labs Technologies, Inc (JLT) 为全世界客户提供完整的GPS定位，导航和授时的解决方案。



Military



Internet



Telecommunication

JACKSON
LABS



Power Generation



Transportation

- 军方应用
- 全球以太网应用
- 通信网络应用
- 航空交通应用
- 电力行业应用

PNT 产品的主要功能

GPS 时序信号功能

Jackson Labs的产品可以通过射频端口直接接收卫星信号，择优选择当前卫星信号源，其中包括GPS, Galileo, Glonass, 北斗等定位卫星信号源。接收卫星定位信号和授时信号后，通过模块处理，将输出1pps、10MHz, 5MHz等晶振信号，提供客户板卡需求的时序信号，保证时序同步。

GPS位置信号功能

Jackson Labs的产品可以通过射频端口直接接收卫星信号，择优选择当前卫星信号源，其中包括GPS, Galileo, Glonass, 北斗等定位卫星信号源。

接收卫星信号中的位置信息，通过输出GPS L1波段RF信号进行对外位置信息的输出，满足客户应用。

GPS 导航信号功能

Jackson Labs的产品可以通过射频端口直接接收卫星信号，择优选择当前卫星信号源，其中包括GPS, Galileo, Glonass, 北斗等定位卫星信号源。

接收卫星信号中的位置信息，通过输出GPS L1波段RF信号进行对外位置信息的输出，动态仿真模拟位置信息，对汽车，轮船，航空等进行动态导航模拟

PNT 产品分类

频率晶振/授时类产品模块



GPS接收机模块



GPS 仿真模拟测试仪表



PNT 详细产品资料 – CLAW GNSS SIMULATOR



➤ PRELIMINARY SPECIFICATION

TYPICAL ELECTRICAL SPECIFICATIONS:

Module Specification:	
Applications:	<ul style="list-style-type: none"> • Up to 18-channel GPS simulation for testing of GPS receivers, especially timing-related GPS • Low-Cost general-purpose Laboratory GPS-Simulation for R&D • GPS Spoofing and Jamming testing • Retrofitting (transcoding) of GPS units with SAASM, M-Code, CSAC, Glonass, Galileo, BeiDou, INS • Testing of production GPS receivers for Leapsecond-, and/or week 1023 rollover-events
Features:	<ul style="list-style-type: none"> • Generates a GPS L1-C/A code RF-output as if the signal where coming from a Live-Sky GPS antenna. Full-constellation GPS output • Fully controllable RF output power for receiver sensitivity testing • Built-in RF Signal generator function for jamming and interference testing • Compatible to external GNSS receivers as PVT source (uBlox, Rockwell Collins, etc) • Low-latency NMEA position to GPS RF-Output encoding (<100ms) • Encodes time with nanosecond accuracy for GPS Timing Receivers • 10MHz and 1PPS inputs and outputs, can be connected to external 10MHz reference • USB-powered, 1.2W allows long-term battery operation • Optionally externally powered (6.5V to 32V) • Configurable antenna DC load simulation for receivers requiring antenna current draw • Fully controllable via SCPI commands over the optional USB port • Automatic detection and initialization of externally connected GNSS receiver sources • Plug-and-Play: just plug in power, and the module will start the simulation and RF-output by itself • Internally stored waypoint vector file can be used to execute complex simulation scenarios
Data/Power connectors	Mini-USB for power and SCPI, 16-pin 2mm Hirose for power and external GNSS
RF output Accuracy	GPS Signal accuracy better than 0.5m rms, better than 5ns rms, better than +/-1.5dB
Internal monitoring GNSS receiver	Built-in 8 th generation GNSS receiver for background monitoring of RF output power, and RF signal quality
Outputs	One CMOS 1PPS output, one 10MHz CMOS output, disciplined by external 10MHz or 1PPS reference One RF SMA, GPS L1 C/A code, -100 to -145dBm, +/-1.5dB accuracy
Spectral Purity (1MHz to 13.2GHz)	< -33dBc in-band (L1, +/-20MHz), < -80dBm out-of-band
Harmonics of L1 (1.57542GHz)	< -150dBm
USB Control	SCPI-99 Control at 9.6K, 19.2K, 38.4K, 57.6K, 115.2K
External GNSS receiver compatibility	Any NMEA compatible source, direct control of Rockwell Collins GB-GRAM and MicroGRAM SAASM GPS, and u-Blox GNSS receivers
USB SCPI Control/Monitoring Port	Compatible to any terminal program and JLT-GPSCon, NMEA output sentences
Operating Temperature	Extended Temperature range of -40°C to +70°C
MTBF	> 600,000 Hours at +40°C

CLAW GPS Simulator Desktop Unit PN: 1005125 MADE IN USA

PNT 详细产品资料 – 6200SERIES GNSS SIMULATOR



➤ PRELIMINARY SPECIFICATION

TYPICAL ELECTRICAL SPECIFICATIONS:

Module Specification:	
1 PPS Stability	<5ns rms GPS locked, <65ns rms STL LEO locked
Holdover Performance over 24 hours (at 25°C, no airflow, no motion)	After 7 days with GNSS reference: <250ns (Rubidium), <2us DOCXO
RF Distribution (GPS Transcoder) GPS L1 RF output option	Generates GPS L1 C/A RF output signal to retrofit GPS equipment
NMEA Messages	USB and RS-232 connectors, GGA, RMC, ZDA, GSV, PASHR, GSA
GNSS Receiver	Multi-Frequency: L1, L2, L3, L5 GPS/Glonass/Galileo/BeiDou/QZSS/SBAS
STL LEO Receiver	Custom-designed Low Earth Orbit STL receiver
GPS Sensitivity	Acquisition -148 dBm, Tracking -167 dBm
GNSS TTFF	Cold Start - <29 sec, Warm Start - <2 sec, Hot Start - <2 sec
STL Sensitivity	-100dBm tracking
Supply Voltage (Vdd)	Single or Dual Redundant +12V DC inputs
Power Consumption	<10W (DOCXO variant)
Operating Temperature	-25°C to +75°C, forced air environment
Storage Temperature	-45°C to +95°C
External Reference input options (e.g. 5071A Cesium Beam Clock)	10MHz Sine Wave (0dBm to +15dBm), 1PPS CMOS options
Auto Switchover between external UTC references	GNSS (four frequencies), STL/LEO, PTP/IEEE1588, 10MHz, 1PPS
10MHz output	2x +13dBm 10MHz Sine Wave, Low Phase Noise and ADEV
1PPS Outputs	2x CMOS 3.3V 1PPS (5V option), 50 Ohms coax (>1K Ohms termination)
Oscillator Specification:	
Frequency Output	10MHz from TCXO, DOCXO, CSAC, or Rubidium oscillator options
10MHz Accuracy	<±0.2E-010 after 20 minutes with GNSS
Frequency Stability over Temperature (in Holdover)	-10°C to +75°C: ±0.2E-09 DOCXO option, ±5E-011 Rubidium option
Output spurs	<-110dBc/Hz
Connections:	
Connector Type:	
RF Antenna (one for STL, one for GNSS)	SMA
10MHz in/out, 1PPS in/out, TTL status	SMA
PTP/IEEE1588 Grandmaster/Slave option	32x to 256x PTP clients, RJ-45 for PTP and configuration console
In Situ firmware updates	Fully field upgradeable through USB or RS-232 serial ports

Jackson Labs Technologies, Inc. Proprietary

PNT-620x™ Assured Position, Navigation, and Timing Reference **MADE IN USA**

PNT 详细产品资料 – RSR Transcoder RSR GNSS收发模块



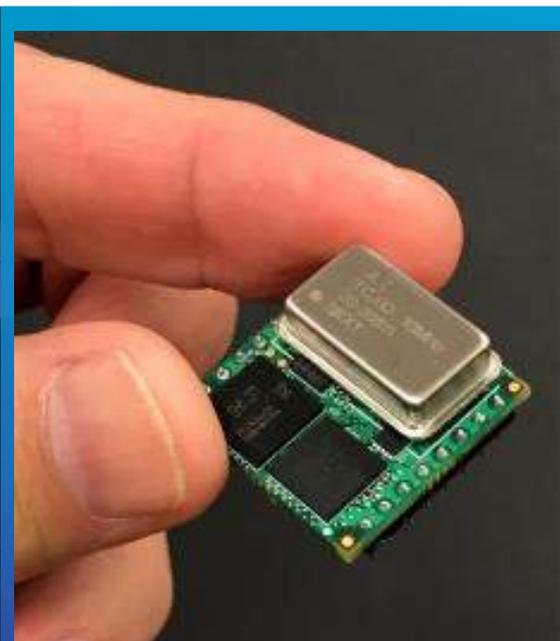
TYPICAL ELECTRICAL SPECIFICATIONS:

Module Specification:	
Applications:	<ul style="list-style-type: none"> Retrofitting legacy GPS systems with SAASM, M-Code, CSAC-Holdover, Glonass, Galileo, BeiDou, or Inertial Navigation System 10-channel GPS simulation for manufacturing of GPS receivers, especially timing-related GPS Low-Cost general-purpose Laboratory GPS-Simulation for R&D
Features:	<ul style="list-style-type: none"> Generates a GPS L1-C/A code RF-output as if the signal were coming from a Live-Sky GPS antenna. Full-constellation GPS output Compatible to SAASM receivers (L-3, Rockwell Collins, and others) Low-latency NMEA position to GPS RF-Output encoding (<100ms) Encodes time with nanosecond accuracy for GPS Timing Receivers 10MHz and 1PPS output, as well as 1PPS external ref. timing input Built-In fully-functional optional CSAC GPSDO, or high-stability TCXO USB-powered (3V to 5.8V), 1.2W, or single LiIon/LiPo cell Optionally externally powered (7V to 36V) Emulates antenna current for products that sense external antennae such as the Rockwell DAGR Glue-less connection to Rockwell Collins RSR SAASM GPS Puck, and u-Blox GNSS receivers as the PNT reference via RS-232 port Fully controllable via SCPI commands over the optional USB port Provides power and initialization to external GNSS receiver Plug-and-Play: just plug in power, and the module will start the simulation and RF-output by itself
Data/Power connectors	Mini-USB for power and SCPI, 12-pin 2mm Hirose for power and external GNSS
Built-in Inertial Navigation System	9-degrees of freedom Accelerometer, Gyroscope, and Magnetometer INS
Outputs	One 3V CMOS 1PPS output, one 10MHz CMOS 3V output, disciplined by external 1PPS reference or internal CSAC Atomic Clock One RF SMA, GPS L1 C/A code, -100 to -125dBm
Spectral Purity (1MHz to 13.2GHz)	< -33dBc in-band (L1, +/-20MHz), < -80dBm out-of-band
Harmonics of L1 (1.57542GHz)	< -150dBm
USB Control	SCPI-99 Control at 9.6K, 19.2K, 38.4K, 57.6K, 115.2K
External GNSS receiver compatibility	Any NMEA compatible source, direct control of Rockwell Collins GB-GRAM and MicroGRAM SAASM GPS, and u-Blox GNSS receivers
USB SCPI Control/Monitoring Port	Compatible to any terminal program and JLT-GPSCon, NMEA output sentences
Operating Temperature	-40°C to +75°C with TCXO, -10 to +70°C with CSAC
MTBF	> 600,000 Hours with TCXO

RSR Transcoder Module PN: 1005123/1005124 MADE IN USA



PNT 详细产品资料 – Micro-Transcoder微型收发机



Module Specification:	
Applications:	<ul style="list-style-type: none"> Retrofitting legacy GPS systems with SAASM, M-Code, CSAC-Holdover, Glonass, Galileo, BeiDou, Iridium-STL, or Inertial Navigation System 10-channel GPS simulation for manufacturing of GPS receivers, especially timing-related GPS Low-Cost general-purpose Laboratory GPS-Simulation for R&D
Features:	<ul style="list-style-type: none"> Generates a GPS L1-C/A code RF-output as if the signal were coming from a Live-Sky GPS antenna. Full-constellation GPS RF output Compatible to SAASM receivers (L-3, Rockwell Collins, and others) and Iridium-STL receivers Low-latency NMEA position to GPS RF-Output encoding (<100ms) Add INS capability to existing GPS legacy equipment Encodes time with nanosecond accuracy for GPS Timing Receivers 10MHz and 1PPS output, as well as 1PPS external ref. timing input Built-In high-stability TCXO Powered by 3.3V, 0.95W typical Built-in GNSS receiver for monitoring RF output quality and accuracy Glueless connection to Rockwell Collins RSR SAASM GPS Puck, and u-Blox GNSS receivers as the PNT reference via COM2 serial port Fully controllable via SCPI commands Connects gluelessly to external GNSS receiver or PNT source Plug-and-Play: just plug in power, and the module will start the simulation and RF-output by itself
Data/Power connectors	Standard DIP 100mil footprint, can be soldered or socketed into customer PCB
Built-in GNSS monitoring receiver	72 channel gen-8 GNSS receiver
Outputs	One 3.3V CMOS 1PPS output, one 10MHz CMOS 3.3V output, disciplined by external 1PPS reference, One RF GPS L1 C/A code, -105dBm to -128dBm
Spectral Purity (1MHz to 13.2GHz)	< -30dBc in-band (L1, +/-20MHz), < -70dBm out-of-band
Harmonics of L1 (1.57542GHz)	< -140dBm
Serial Control	SCPI-99 Control at 9.6K, 19.2K, 38.4K, 57.6K, 115.2K
External GNSS receiver compatibility	Any NMEA compatible source, direct control of Rockwell Collins GB-GRAM and MicroGRAM SAASM GPS, and u-Blox GNSS receivers, supports Satelles/Iridium-STL receivers
SCPI Control/Monitoring Port	Compatible to any terminal program, SimCon, and GPSCon, NMEA output sentences
Operating Temperature	-40°C to +75°C
MTBF	> 600,000 Hours

Micro-Transcoder™ Module PN: 1005220, eval board PN: 1005250 - MADE IN USA

PNT 详细产品资料 – FireFly-1A Global Positioning System

Disciplined Oscillator 微型GPS驯服晶振



ELECTRICAL SPECIFICATIONS:			
Module Specification:			
1 PPS Accuracy	±30ns to UTC RMS (1-Sigma) GPS Locked		
Frequency Accuracy	Better than ±3E-010 after 1 hours operation with GPS locked		
Holdover Stability	<±7us over 24 Hour Period @+25°C (No Motion)		
ADEV	1s to 1000s: 5 to 9E-12 with GPS lock typical		
1 PPS Outputs (OCXO Flywheel Generated)	Three outputs: 5V CMOS, LVDS, and RS-232 level output		
10/100MHz Outputs (9 outputs total, 7 @100MHz, 2 at 10MHz)	4x LVDS 100MHz, 2x +7dBm, 1x CMOS, 1x Sine 10MHz, 1x LVDS 10MHz		
RS-232 Control	Full control via SCPI-99 Control Commands, NMEA-0183		
GPS Frequency	L1, C/A 1574MHz		
GPS Antenna	Passive or Active, 5V		
GPS Receiver	50 Channels, Mobile, GPS, WAAS, EGNOS, MSAS supported, Galileo ready		
Sensitivity	Acquisition -144 dBm, Tracking -160 dBm		
GPS TTFF	Cold Start - <45 sec, Warm Start - 1 sec, Hot Start - 1 sec		
TTL Alarm Output	GPS Unlock and Hardware Failure indicator		
Warm Up Time / Stabilization Time	<10 min at +25°C to 1E-09 Accuracy Typ.		
Supply Voltage (Vdd)	11.0V to 16.0V DC Nominal		
Power Consumption	< 4W at +25°C with DOCXO		
Operating Temperature	-25C to +75C (+85C extended temp range option)		
Environmental Conformance	MIL-STD-202, Method 204, Condition I-A		
Storage Temperature	-45°C to +85°C		
Oscillator Specification:			
Frequency Output	Both 10MHz, and 100MHz outputs		
10/100MHz Retrace	±2E-08 After 1 Hour		
Frequency Stability	±2.5E-010 over temperature, low-q option: ±3E-010 per q per axis		
Output Amplitude	100MHz: LVDS, CMOS 5V, +7dBm Sine. For 10MHz: LVDS, +12dBm Sine		
Warm Up Time	< 12 min		
Phase Noise		100MHz Out	10MHz Out
	1Hz	-60dBc/Hz	-100dBc/Hz
	10Hz	-95dBc/Hz	-125dBc/Hz
	100Hz	-118dBc/Hz	-140dBc/Hz
	1kHz	-140dBc/Hz	-142dBc/Hz
	10kHz	-155dBc/Hz	-145dBc/Hz
	100kHz	-160dBz/Hz	-145dBc/Hz
Designed Lifetime	>10 years		

100MHz GPSDO Mechanical Drawing

PNT 详细产品资料 – LC_XO GPS-Disciplined-Oscillator 迷你 GPS驯服晶振

VIAMI/Restricted



TYP. ELECTRICAL SPECIFICATIONS:

Module Specification:	
1 PPS Accuracy	±50ns to UTC RMS (1-Sigma) GPS Locked
Holdover Stability	<±35us over 3 Hour Period @+25°C (No Motion, No Airflow)
1 PPS Output	3.3VDC CMOS
Serial Control	SCPI-99 TTL Level, GPS NMEA Output
GPS Frequency	L1, C/A 1574MHz
GPS Antenna	Active or Passive
GPS Receiver	50 Channels, Mobile, SBAS WAAS, EGNOS, MSAS capable
Sensitivity	Acquisition -142 dBm, Tracking -158 dBm
GPS TTFF	Cold Start - <45 sec, Warm Start - 1 sec, Hot Start - 1 sec
ADEV	10Ks <2E-012 (GPS Locked, 25°C, no motion, no airflow)
TTL Alarm Output	GPS LOCK Indicator
Warm Up Time / Stabilization Time	<10 min at +25°C to 1E-09 Accuracy
Supply Voltage (Vdd)	3.3V Single-Supply only (5V internally generated and filtered)
Power Consumption	0.4W with TCXO
Operating Temperature	-10°C to +75°C, -40C to +85C optional
Storage Temperature	-45°C to +85°C
Additional Features	Firmware field-upgradable, external 1PPS input, status LEDs, compatible to GPSCon, SNTP, GPSD, and Z38xx software applications, full NMEA
Oscillator Specification (TCXO):	
Frequency Output	10MHz CMOS 5Vpp (3.3Vpp optional)
10MHz Retrace	±2E-08 After 1 Hour @ +25°C
Frequency Stability Over Temperature (Unlock Condition)	±7.5E-08 (TCXO, 0C to +60C)
Output Amplitude	5Vpp CMOS
TCXO Warm Up Time	Instant-on, no warmup period required
Phase Noise (with 33uF or larger cap on 5V_Output pin 6)	TCXO
	1Hz -65dBc/Hz
	10Hz -102dBc/Hz
	100Hz -132dBc/Hz
	1kHz -148dBc/Hz
	10kHz -152dBc/Hz
	100KHz <-155dBc/Hz
Connections:	
1PPS Output, 10MHz Output, power, serial communication, system status, NMEA, 1PPS in, ISP mode enable, antenna input	Connector Type: 100 mil spacing on pins, can be soldered, or plugged into a socket, gold-plated pins

LC_XO TCXO Gen2, PN: 1009302-q2



PNT 详细产品资料 – MICRO JLT 最新版本GPSDO



TYPICAL ELECTRICAL SPECIFICATIONS:		
Module Specification:		
1 PPS Stability	<10ns to UTC RMS (1-Sigma) GPS Locked	
Serial Control	GNSS NMEA and Status Output, SCPI-99 control, RS-422 Port	
GNSS Frequency, antenna power	GPS/Glonass/Galileo/BeiDou/QZSS 3.3V antenna-power built-in	
GNSS Receiver	72 Channels, Auto-Survey, Position-Hold Mode, and SBAS capable	
Sensitivity	Acquisition -148 dBm, Tracking -167 dBm	
GNSS TTFF	Cold Start - <29 sec, Warm Start - <2 sec, Hot Start - <2 sec	
ADEV SOCXO at 25.0°C, no airflow/motion/vibration, 5 days GPS locked	0.1s < 3E-12, 1s < 6E-12, 1Ks < 9E-12, 10Ks < 4E-12	
Holdover at 25.0°C, no airflow, no motion/vibration, 5 days GPS locked	<2us in 5 hours	
Warmup and Stabilization Time	<12 min at +25°C to <1E-09 Accuracy to GNSS	
Supply Voltage (Vdd)	5.5V +0.5V/-0.3V, 5.0V optional	
Power Consumption	<2.6W @25C, <6W during warmup (SOCXO)	
Operating Temperature	-40°C to +85°C	
1PPS External Reference Input	Supports an optional external 1PPS TTL/CMOS input	
10MHz output	+8.5dBm ±0.5dB	
1PPS Output	OCXO flywheel generated, LVDS	
Oscillator Specification:		
Frequency Output	10MHz Sine Wave	
10MHz Retrace	<±1E-09 After 1 Hour @ +25°C (no GNSS)	
Frequency Stability over Temperature, and over 24hrs	±6E-09, <1E-012 over 24hrs (with GNSS), ±2E-010 optional w. DOCXO	
Output Harmonics, spurs	<-50dBc/Hz, <-125dBc/Hz	
OCXO aging (fully compensated by GNSS)	<±0.1ppm per year without GNSS	
Phase Noise @ 10MHz	SOCXO	
	1Hz	-92dBc/Hz
	10Hz	-128dBc/Hz
	100Hz	-150dBc/Hz
	1kHz	-156dBc/Hz
	10kHz	-157dBc/Hz
100KHz	<-162dBc/Hz	
Connections:		
10MHz Sine Wave Out, GNSS Antenna	Connector Type: SMA	
+5.5V Power, 1PPS output, RS-422 serial	12-pin Hirose, PN: DF11-12DP-2DSA(01)	
3-pin 100mil through hole (optional)	1PPS Input, ISP#	

Micro-JLT GNSSDO™ Module PN: 100316: **MADE IN USA**





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