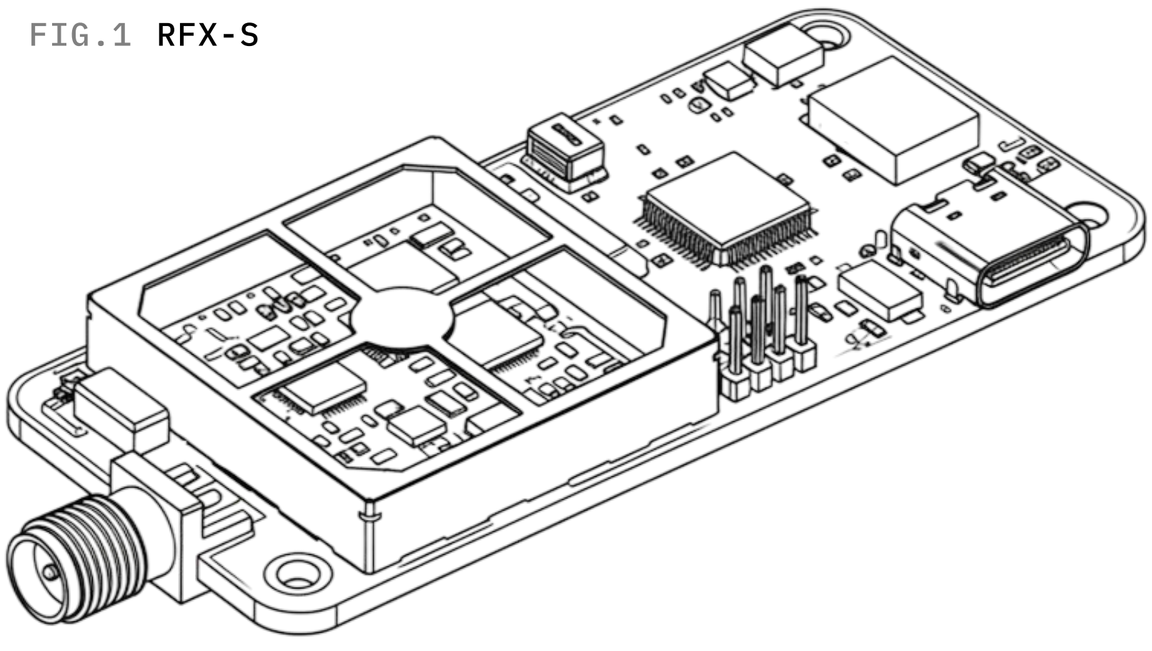
PRECISE, RESILIENT POSITIONING IN DYNAMIC & CONTESTED ENVIRONMENTS

Leo200-S GNSS SDR

FIG.1 RFX-S



MADE IN USA

RoHS

NDAA COMPLIANT

ABOUT

Leo200-S is Locus Lock's single antenna variant of the turnkey software-defined GNSS receiver for precise, resilient Positioning, Navigation, and Timing (PNT) in dynamic and contested environments. It combines Locus Lock's PpRx software-defined GNSS receiver with the RFx-S single-antenna, quadruple-frequency RF front end. RFx-S receives, filters, and digitizes GNSS signals for real-time processing by PpRx running on general-purpose compute. This software-defined architecture allows GNSS capabilities to be configured and upgraded through software rather than constrained by fixed-function receiver hardware.

Leo200-S uses an inertial measurement unit (IMU), magnetometer, and GNSS measurements to enable GNSS/inertial sensor fusion, which supports resilient navigation as signal conditions degrade, including in obstructed, jammed, and spoofed environments.

Leo200-S supports L1, L2, and L5 frequency bands with multi-constellation support for GPS, Galileo, BeiDou, SBAS, and QZSS and emerging commercial LEO PNT constellations. Its software-defined signal processing architecture enables new signals, algorithms, and threat-mitigation capabilities to be deployed through software as operating requirements and RF threats evolve.

DEPLOYMENT

Leo200-S is available as a turnkey evaluation kit optimized for rapid setup and evaluation. The kit includes a preconfigured Linux host with PpRx, GUI, and supporting tools installed, providing immediate access to receiver configuration, visualization, data collection, and analysis. For platform deployment, PpRx can run directly on compatible general-purpose computers. Headless, CLI-only configurations require significantly fewer compute resources than the full evaluation environment, enabling real-time GNSS processing on resource-constrained edge computers.

KEY FEATURES

- Software-Defined & Upgradeable: GNSS signal processing and navigation capabilities can be configured and upgraded through software without redesigning the receiver hardware.
- Multi-Band, Multi-Constellation: L1, L2, and L5 reception across global, regional, and emerging GNSS/PNT signals.
- Resilient PNT: Anti-jam, anti-spoof, inertial aiding, PVT holdover, and rapid reacquisition capabilities for degraded and contested GNSS environments.
- Flexible Deployment: Evaluate with a turnkey, preconfigured host or deploy PpRx directly on resource-constrained edge compute.
- Integration-Ready: CLI and GUI interfaces, external IMU support, USB-C connectivity, and configurable high-rate RF sample streaming.

COMMON APPLICATIONS

- Unmanned Air, Ground & Maritime Systems: Precise, resilient PNT for autonomous platforms operating across dynamic and contested RF environments.
- Manned Aircraft & Ground Vehicles: Multi-band GNSS, inertial aiding, and configurable threat-mitigation capabilities for integration with existing navigation and mission systems.
- Low Earth Orbit: Software-configurable GNSS processing for orbital dynamics and non-terrestrial signal conditions, with capability changes delivered through software rather than receiver hardware redesign.
- ISR & Mission Systems: Real-time PNT and GNSS observables for integration with navigation, sensing, and mission-compute architectures.

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LAST UPDATED
OCTOBER 2026

Leo200-S CAPABILITIES

RFx-S

- QUADRUPLE-FREQUENCY RFX-S RF FRONT END
- INTEGRATED IMU AND MAGNETOMETER
- 1 PPS OUTPUT

PpRx

- QUADRUPLE-FREQUENCY RFX-S RF FRONT END
- INTEGRATED IMU AND MAGNETOMETER
- OPTIMIZED DIGITAL SIGNAL PROCESSING FOR DEPLOYMENT ON LOW-SWAP GENERAL-PURPOSE COMPUTE
- REAL-TIME AND POST-PROCESSING OPERATIONAL MODES
- SOFTWARE-UPGRADEABLE SIGNAL PROCESSING AND NAVIGATION CAPABILITIES
- GNSS/INERTIAL SENSOR FUSION FOR 3D POSITION, VELOCITY, AND ATTITUDE ESTIMATION
- ANTI-JAM CAPABILITIES, INCLUDING DIRECT-TO-L5 ACQUISITION, DYNAMIC SIGNAL SELECTION, AND SIGNAL FILTERING
- ANTI-SPOOF CAPABILITIES, INCLUDING NAVIGATION FILTER CONSISTENCY CHECKS
- PVT HOLDOVER AND RAPID GNSS REACQUISITION

SUPPORTED GLOBAL SIGNALS

GPS	L1C/A, L1C, L2C, L5
GALILEO	E1b, E1c, E5a, E5b
SBAS	L1
BEIDOU	B1C, B2a

SUPPORTED REGIONAL SIGNALS

QZSS	L1C/A

EMERGING COMMERCIAL LEO PNT CONSTELLATIONS

RFx-S RF HARDWARE SPECS

RF SAMPLING

L1/L2 SAMPLING RATE	10 MSPS
L5 SAMPLING RATE	40 MSPS
E5B SAMPLING RATE	20 MSPS

PHYSICAL

DIMENSIONS, EXCLUDING SMA CONNECTORS	32 x 65 x 10 mm
DIMENSIONS, INCLUDING SMA CONNECTORS	32 x 75 x 10 mm
WEIGHT	14 g

POWER CONSUMPTION

CONNECTED, IDLE	0.64 W
CONNECTED, STREAMING[1]	1.39 W

INTERFACES

POWER CONSUMPTION

CONNECTOR	1 x USB 2.0 Type-C
SUPPLY VOLTAGE	5 VDC
DATA OUTPUT	RAW RF & IMU DATA

RF INPUTS

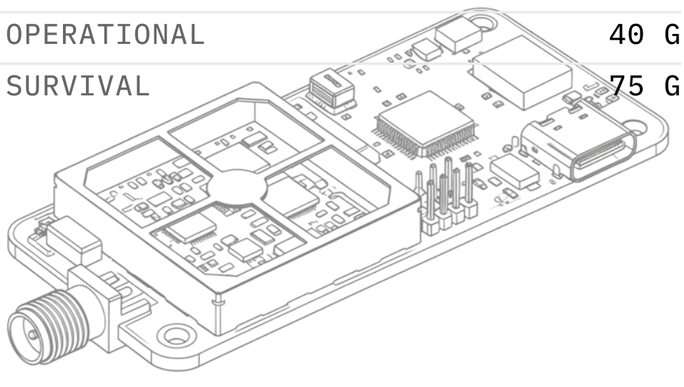
CONNECTOR	1 x SMA Female
ANTENNA BIAS	CONFIGURABLE, OFF (0V) OR ON (3.3V)
ANTENNA BIAS CURRENT	< 50 mA

TIMING

PPS OUTPUT	HEADER PIN

ENVIRONMENTAL

OPERATING TEMP	-20 C TO +70 C
STORAGE TEMP	-40 C TO +85 C
OPERATING HUMIDITY	5-95% RH, NON-CONDENSING
VIBRATION	7.7 G RMS [MIL-STD-810H]
SHOCK MIL-STD-810H - OPERATIONAL	40 G
SHOCK MIL-STD-810H - SURVIVAL	75 G



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PpRx SOFTWARE SPECIFICATIONS

POSITIONING ACCURACY[2,3] (STANDALONE GNSS)

STATIC	< 0.3 m H, < 0.6 m V
LOW SPEED[4]	< 0.5 m H, < 1.5 m V
HIGH SPEED[5]	< 1.5 m H, < 0.5 m V
ULTRA HIGH SPEED[6]	< 1.8 m H, < 4.3 m V
HEADING ACCURACY[7]	< 2.5 deg RMS, < 5 deg p95
VELOCITY ACCURACY	< 0.3 cm/s RMS
TIME ACCURACY[8]	< 0.5 ns RMS
1 PPS GPIO	± 0.1 - ± 0.25 ppm (Undisciplined)

LATENCY[9]

50TH PERCENTILE	< 6 ms
99.9TH PERCENTILE	< 10 ms

TIME TO FIRST FIX (TTFF)

COLD START[10]	~30 s
WARM START[11]	~25 s
HOT START[12]	~1 s

MINIMUM C/NO THRESHOLDS

ACQUISITION	35 dB-Hz
TRACKING	20 dB-Hz

OPERATIONAL LIMITS[13]

MAX VELOCITY	515 m/s
MAXIMUM ALTITUDE	18,000 ft

AVAILABLE OUTPUTS

NAVIGATION & GNSS DATA

GNSS DATA

UNCORRECTED PSEUDORANGE, DOPPLER, CARRIER PHASE, C/N0, SIGNAL HEALTH, ATMOSPHERIC PARAMETERS, AND CODE BIASES

NAVIGATION SOLUTION

3D POSITION, 3D VELOCITY, CLOCK BIAS, CLOCK DRIFT, ANGULAR RATE, ACCELEROMETER AND GYROSCOPE BIASES

CONFIGURABLE SOLUTION & DATA RATE	1 - 100 Hz

RAW SENSOR DATA

RAW RF	2-BIT IF SAMPLES, ~1.2 GB/min
RAW IMU & MAGNETOMETER MEASUREMENTS	~100 Hz

OUTPUT FORMATS & PROTOCOLS

GRID BINARY EXCHANGE (GBX), NMEA 0183, RINEX V2.11/V3.05, ROS2, MATLAB (.MAT), CSV (.LOG), KML, ASPN 2023

Leo200-S HOST COMPUTER REQUIREMENTS

SPECIFICATION	PPRX + GUI (REQUIREMENTS)
CPU	64-BIT, 4+CORES, 1+GHZ
RAM	2 GB
STORAGE	5 GB
OPERATING SYSTEM	UBUNTU LTS (22,24,26)

FOOTNOTES

1. RFX IS ACTIVELY STREAMING RAW INTERMEDIATE FREQUENCY (IF) GNSS DATA TO A CONNECTED GENERAL-PURPOSE PROCESSOR
2. TYPICAL PERFORMANCE FOR PPRX. PERFORMANCE SPECIFICATIONS SUBJECT TO GNSS SYSTEM CHARACTERISTICS, IONOSPHERIC AND TROPOSPHERIC CONDITIONS, SATELLITE GEOMETRY,
3. POSITION ACCURACY IS EXPRESSED AS CEP (CIRCULAR ERROR PROBABLE) 50%, INDICATING THE RADIUS WITHIN WHICH 50% OF POSITION MEASUREMENTS ARE EXPECTED TO FALL.
4. LOW SPEED IS <12 m/s.
5. HIGH SPEED IS >22 m/s. TEST ENVIRONMENT INCLUDED OBSTRUCTIONS, INCLUDING BUILDINGS AND TREES
6. ULTRA HIGH SPEED IS > 60 m/s AND < 2000 m/s.
7. RESULTS PROVIDED FOR GROUND VEHICLE IN DEEP URBAN ENVIRONMENT. PERFORMANCE DEPENDENT ON CONFIGURATION AND VEHICLE DYNAMICS.
8. TIME ACCURACY DOES NOT INCLUDE BIASES DUE TO RF FRONT-END AND/OR ANTENNA DELAY.
9. THESE NUMBERS INCLUDE THE ENTIRE RF CHAIN AND DSP PIPELINE UP THROUGH PVT ESTIMATE PUBLICATION VIA GBX. THEY DO NOT INCLUDE ANY EXTERNAL DECODING OR PROCESSING OUTSIDE OF PPRX.
10. COLD START: NO ALMANAC OR EPHEMERIDES AND NO APPROXIMATE POSITION OR TIME.
11. WARM START: EPHEMERIS AND ALMANAC KNOWN.
12. HOT START: EPHEMERIS, ALMANAC, AND INITIAL STATE ARE KNOWN.
13. EXPORT LICENSING TO COUNTRIES OUTSIDE OF THE US RESTRICTS OPERATION TO 515 m/s AND AN ALTITUDE OF 18,000 FEET. PLEASE CONTACT LOCUS LOCK AT SALES@LOCUSLOCK.COM IF YOUR APPLICATION EXCEEDS THESE LIMITS.