

GNSS Receiver DB

The GNSS Receiver DB is a highly integrated NewSpace GNSS Receiver offered as a Daughter Board (DB) format. It is an off-the-shelf GNSS Receiver with low power consumption and is specifically designed for small and nanosatellites. With multi-band and multi-constellation support, this solution enables the daughter board GNSS Receiver to process signals from up to 448 channels simultaneously to provide high performance position, velocity and timing.

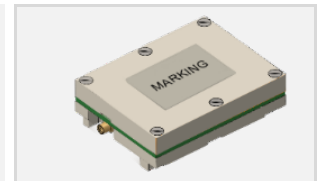
The GNSS Receiver DB's footprint size is less than half of a PC104¹ card. It can be easily integrated into a motherboard or directly into the space equipment. This new generation GNSS Receiver supports passive and active antennas.

The GNSS Receiver DB is part of Rakon's NewSpace Equipment portfolio which includes timing and frequency distribution products (MROs), GNSS receivers and S-Band communication devices for NewSpace constellations.

Key Features

55 x 41 x 16 mm

- Multi-Constellation, Multi-Band
- Up to 448 channels
- Position accuracy (800 km altitude): <1.2 m
- Warm/cold TTFF: <20 s / <45 s
- Mono-Antenna (active or passive)
- PPS signal output
- Power consumption: 0.6 to 1.1 W
- Supply voltage: 3.3 V



GNSS Constellation

Parameter	Condition / Remarks	Specification
Channels		Up to 448
GPS		L1C/A, L1PY, L2C, L2P, L5
GALILEO		E1, E5a, E5b, E5 AltBoc, E6*
BEIDOU		B1I, B1C, B2a, B2I, B3
QZSS		L1C/A, L2C, L5
GLONASS		L1CA, L2CA, L2P, L3 CDMA
NAVIC		L5
SBAS		Egnos, WAAS, GAGAN, MSAS, SDCM (L1, L5)

*support of HAS corrections messages

Performance

Parameter	Condition / Remarks	Typ.	Max.	Units	
Time To First Fix (TTFF)	Cold start	No information available (no almanac, no approx. position)	45		s
	Warm start	Ephemeris and approx. position known	20		s
Positioning accuracy	Standalone	800 km altitude (RMS)	1.2		m
		(RMS)	3		cm/s
Time precision	1PPS out	After convergence	5		ns
	Event accuracy	C/N0 threshold		20	ns
Tracking performance	Tracking		20		dB-Hz
	Acquisition		33		dB-Hz
PVT update rate			20		Hz

¹ PC104: Standards defining PCB form factors and connectivity are widely used in CubeSats and the embedded computer industry.

Electrical Parameters

Parameter	Condition / Remarks	Min.	Typ.	Max.	Units
Power supply			3.3		VDC
Antenna:					
Pre-amplification range		15		50	dB
Antenna supply voltage			3.3		VDC
Antenna supply current				150	mA
Power consumption		0.6		1.1	W
Electrical interfaces:					
UART	+3.3V LVTTTL		4		
USB			1		
PPS outputs	+3.3V LVTTTL output		1		
GPIO	+3.3V LVTTTL input/output		2		
Ready status	+3.3V LVTTTL output		1		
3DFix status	+3.3V LVTTTL output		1		
Event/TimeSync input	+3.3V LVTTTL input		2		
On/Off input	+3.3V LVTTTL input		1		
External reset input	+3.3V LVTTTL input		1		
DC connector		SEMS 60-pin dual row female socket (0.8 mm pitch)			
Antenna connector		MMCX female connector, 50 Ω			

Environmental Conditions

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Non-operating temperature		-40		85	°C
Operating temperature		-30		70	°C
Thermal cycles	8 cycles ±5 °C/minute slope 1 hour at min/max temperature	-30		70	°C
Random vibration	20 to 50 Hz: 50 to 350 Hz: 350 to 2000 Hz: Overall:		+6 0.8 -6 22		dB/octave g ² /Hz dB/octave grms
Sine vibration	20Hz - 100Hz:		20		g
Mechanical shock	MIL-STD-202 method 213: <ul style="list-style-type: none"> Half sine with a peak acceleration of 2000g for a duration of 0.3msec 3 shocks per direction, applied along the 3 mutually perpendicular axes 18 shocks in total 				
Radiation	LEO		5	7	year

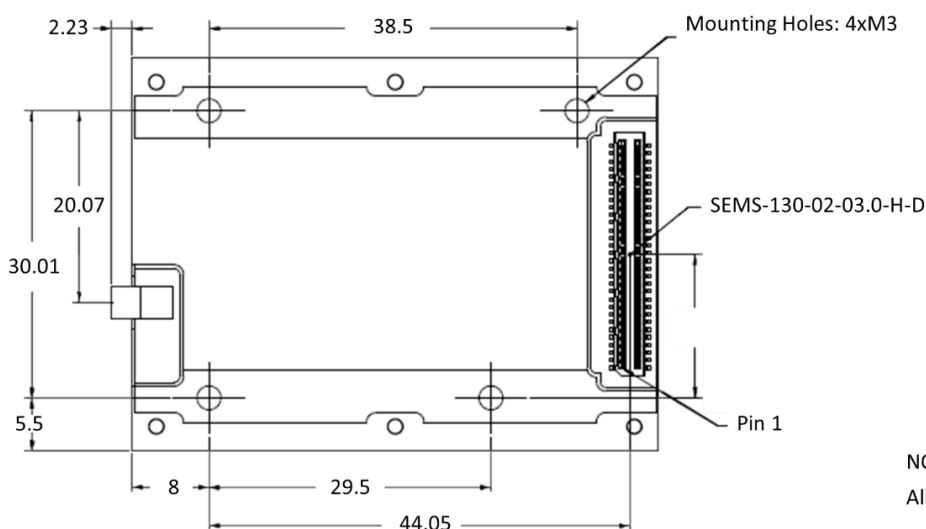
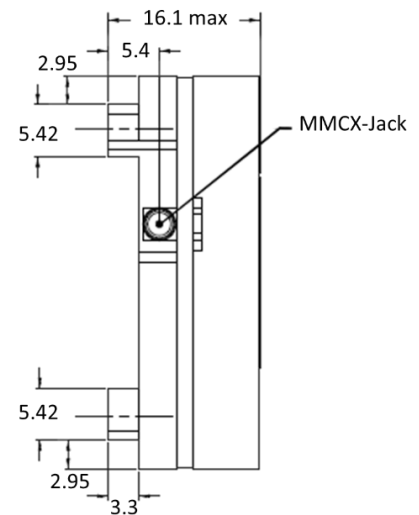
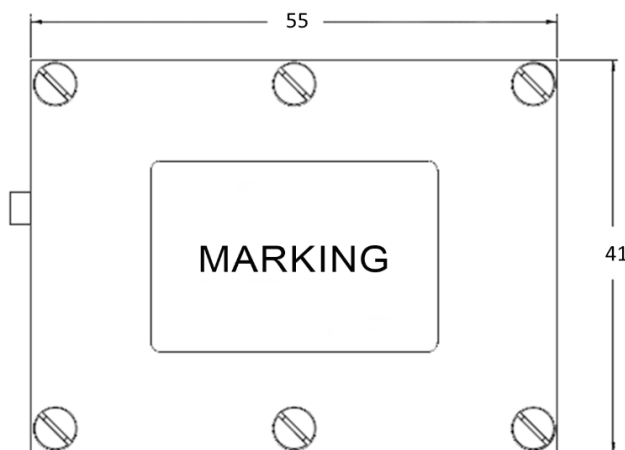
Physical Parameters

Parameter	Condition / Remarks	Specification
Dimensions		55 x 41 x 16 mm
Mass		56 g

Testing

Test	Condition / Remarks	Qualification testing	Acceptance testing
Functional		✓	✓
Vibration		✓	✓
Mechanical shocks		✓	–
Thermal cycling		✓	✓
Thermal vacuum		✓	–

Product Outline



NOTE:
All dimensions are in mm