GNSS Receiver SINGLE

The GNSS Receiver SINGLE is a highly integrated advanced NewSpace GNSS Receiver available in a PC104[1] format or as a stand-alone equipment protected by in a space-grade mechanical housing.

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 advanced GNSS Receiver can process signals from up to 448 channels simultaneously to provide high performance position, velocity and timing.

The GNSS Receiver SINGLE is equipped with a highly performant rad-hard microcontroller and a clock management function to provide advanced features like GNSS data monitoring and innovative navigation algorithms.

The GNSS Receiver SINGLE is part of a full range of NewSpace GNSS Receivers that offers options around PC104 or full housing, mono/bi/tri antennas and clock management functions. In addition to the GNSS Receiver range, Rakon offers timing and frequency distribution products (MROs) and SDR (Software Define Radio) devices as part of its NewSpace Equipment portfolio.
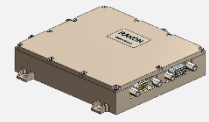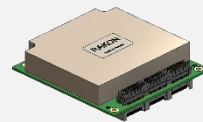
Key Features

- Multi-constellation, multi-band
- Up to 448 channels
- Position accuracy (800 km altitude): <1.2 m
- Warm/cold TTFF: <20 s / <45 s
- Mono or Bi (active or passive)

- Rad-hard microcontroller
- PPS signal output
- Optional 10 MHz clock input
- Power consumption: <4 W
- Supply voltage: 3.3 to 32 V
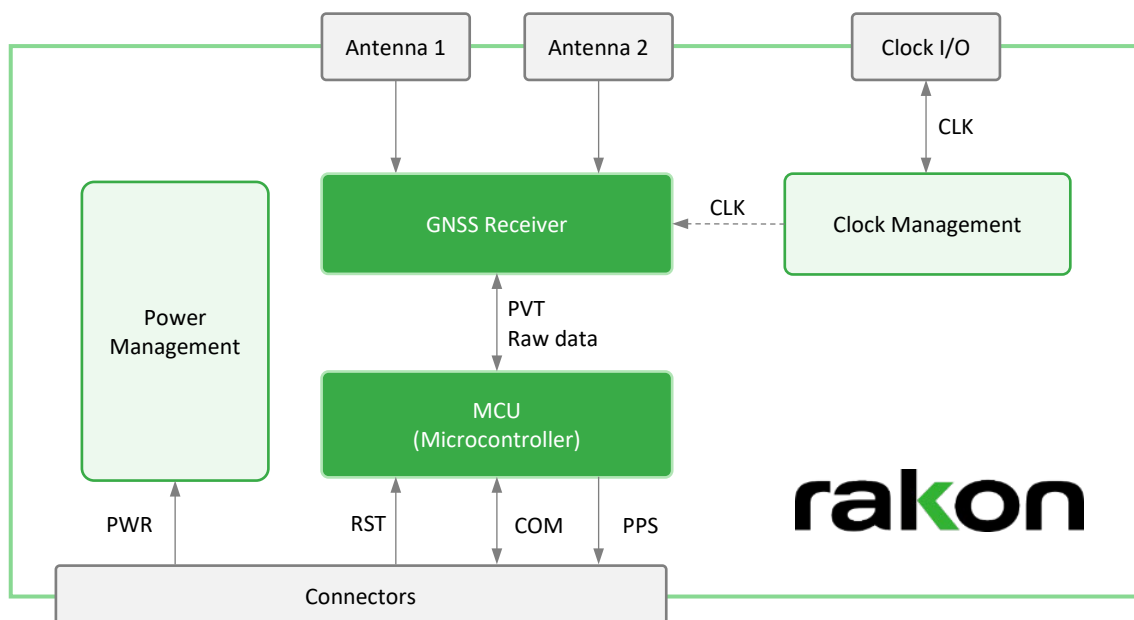
96 x 90 x 28 mm

PC104 format

130 x 122 x 24 mm

Full housing format

Block Diagram

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

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GNSS Constellation

Parameter	Condition / Remarks	Specification
Channels		Up to 448
GPS		L1C/A, L1PY, L2C, L2PY, L5
GALILEO		E1, E5a, E5b, E5 AltBoc, E6*
BEIDOU		B1I, B1C, B2a, B2I, B3
QZSS		L1C/A, L2C, L5
GLONASS		L1CA, L2CA, L3 CDMA
NAVIC		L5
SBAS		Egnos, WAAS, GAGAN, MSAS, SDCM (L1, L5)

support of HAS corrections messages

Performances

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
Velocity accuracy	(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			10	Hz

Electrical Parameters

Parameter	Condition / Remarks	Min.	Typ.	Max.	Units
Power supply		3.3	5	32	VDC
Antenna					
Pre-amplification range		15		50	dB
Antenna supply voltage			3.3		VDC
Antenna supply current				150	mA
Power consumption			3.5	4.2	W
Electrical interfaces					
UART	RS485		1		
CAN			1		
PPS outputs	RS422		1		
On/Off input	+3.3V LVTTL input		1		
External reset input	+3.3V LVTTL input		1		
Clock I/O	10 MHz Input		1		

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PPS Output

Parameter	Condition / Remarks	Min.	Typ.	Max.	Units
Level			3.3		VDC
Interval	Configurable	0.01	1	60	s
Pulse width	Configurable	0.001	0.005	1	s

Physical Parameters

Parameter	Condition / Remarks	
Dimensions	PC104 format	96 x 90 x 28 mm
	Full housing format	130 x 122 x 24 mm
Mass	PC104 format	< 250 g
	Full housing format	< 450 g

Environmental Conditions

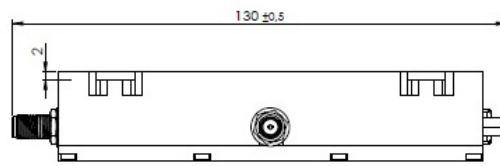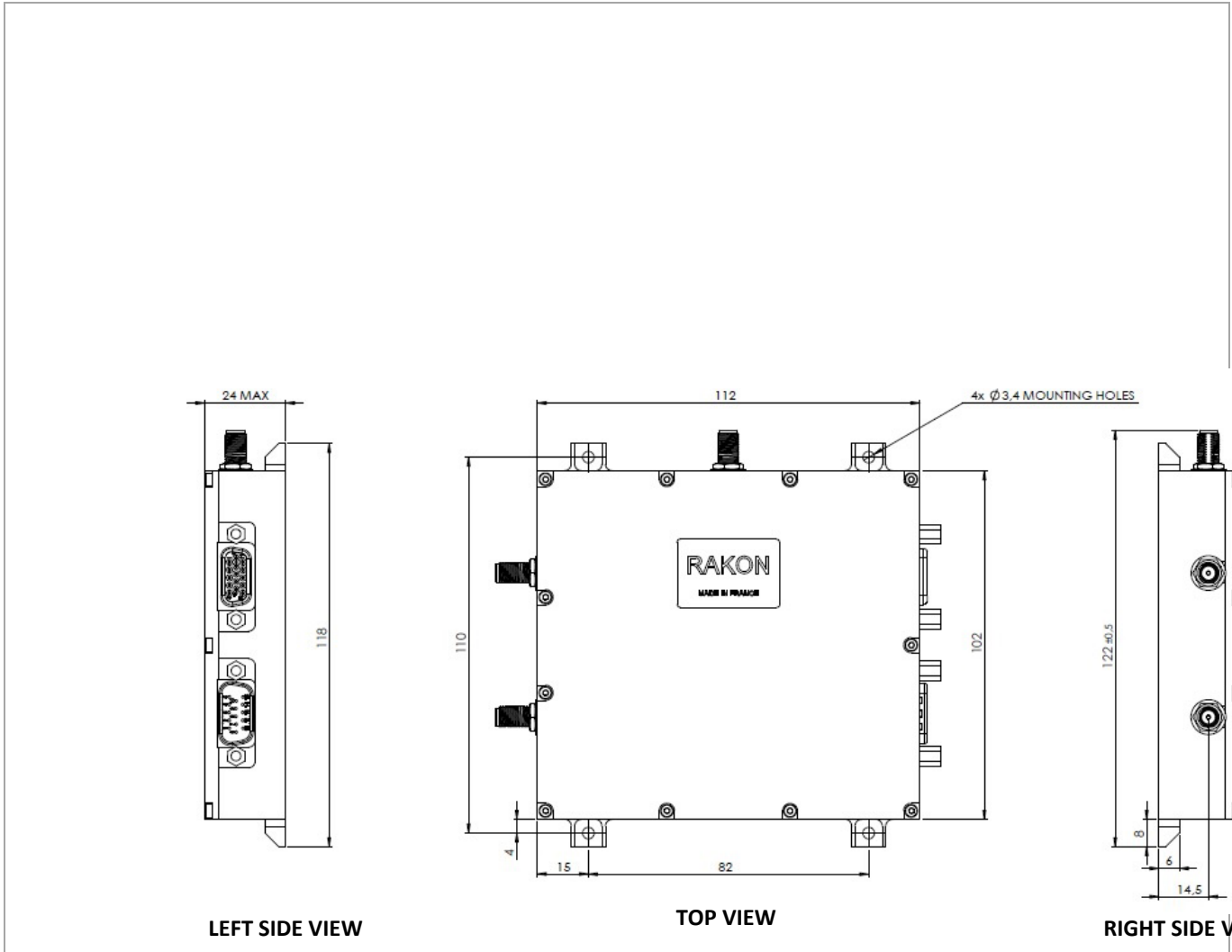| Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Non-operating temperature		-40		85	°C
Operating temperature		-30		70	°C
Thermal cycles	8 cycles ±5 °C/minute slope 1 hour at min/max temperature	-30		70	°C
Random vibration	20 to 50 Hz: 50 to 350 Hz: 350 to 2000 Hz: Overall:		+6 0.8 -6 22		dB/octave g²/Hz dB/octave grms
Sine vibration	20Hz - 100Hz:		20		g
Mechanical shock	MIL-STD-202 method 213: • 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

Testing

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

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Product Outline - PC104 format

TOP VIEW

SIDE VIEW
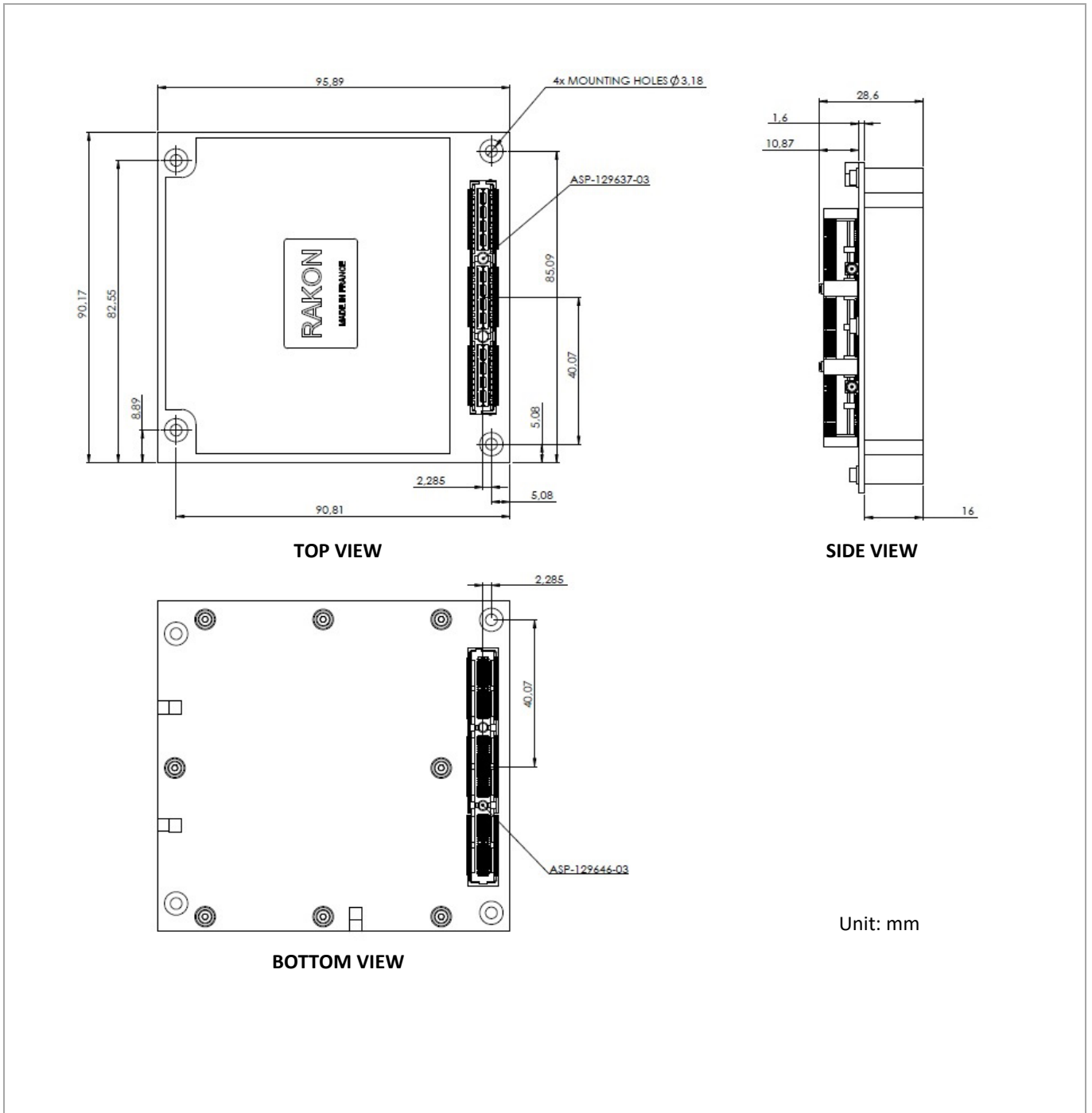
BOTTOM VIEW

Unit: mm

Product Outline - Full housing format

24 MAX

118

LEFT SIDE VIEW

112

4x Ø 3,4 MOUNTING HOLES

RAKON

MADE IN FRANCE

110

102

4

15

82

TOP VIEW

122 ±0,5

8

6

14,5

RIGHT SIDE VIEW

130 ±0,5

2

BOTTOM VIEW

Unit: mm

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