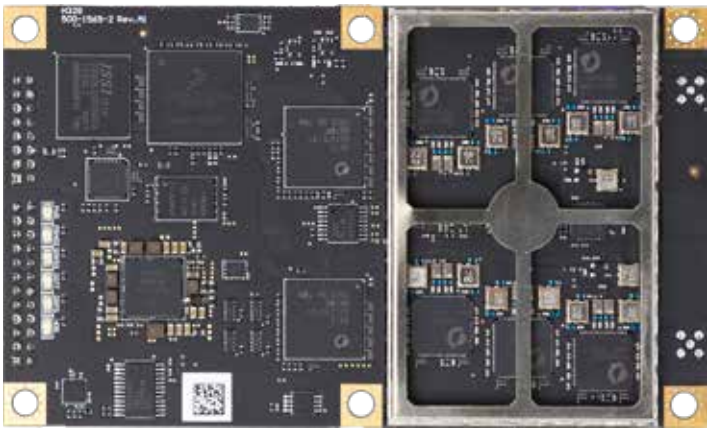
Hemisphere®

Eclipse™ Vector™ H328 GNSS OEM Board

ADVANCED HEADING AND RTK POSITIONING



atlas®

Develop sophisticated machine control and navigation solutions in a complex world full of dynamic environments. The Vector H328 is our most advanced GNSS heading and positioning board.

The Vector H328 uses dual antenna ports to create a series of additional capabilities to Eclipse Vector technology including fast, high-accuracy heading over short baselines, RTK positioning, onboard Atlas L-band, RTK-enabled heave, low-power consumption, and precise timing.

Scalable Solutions

With the Vector H328, positioning is scalable and field upgradeable with all Hemisphere software and service options. Use the same centimeter-level accuracy in either single frequency mode, or employ the full performance and fast RTK initialization times over long distances with multi-frequency multi-constellation GNSS signals. High-accuracy L-band positioning from meter to sub-decimeter levels are available via Atlas correction service.

Ease of Migration

Leverage the industry standard form factor for easy upgradeability from other manufacturers' modules.

Key Features

- Extremely accurate heading with long baselines
- Multi-frequency position, dual-frequency heading supporting GPS, GLONASS, BeiDou, Galileo, QZSS, IRNSS, and L-band
- Atlas® L-band capable to 4 cm RMS
- Athena™ GNSS engine providing best-in-class RTK performance
- Excellent coasting performance
- 5 cm RMS RTK-enabled heave accuracy
- Strong multipath mitigation and interference rejection
- New multi-axis gyro and tilt sensor for reliable coverage during short GNSS outages

GNSS Receiver Specifications

Receiver Type:	Multi-Frequency GPS, GLONASS, BeiDou, Galileo, QZSS, and Atlas
Signals Received:	GPS L1CA/L1P/L1C/L2P/L2C/L5 GLONASS G1/G2, P1/P2 BeiDou B1/B2/B3 GALILEO E1BC/E5a/E5b QZSS L1CA/L2C/L5/L1C Atlas
Channels:	1059
GPS Sensitivity:	-142 dBm
SBAS Tracking:	3-channel, parallel tracking
Update Rate:	10 Hz standard, 1 Hz or 20 Hz optional (with activation)
Timing (1 PPS) Accuracy:	20 ns
Rate of Turn:	100°/s maximum
Cold Start:	60 s typical (no almanac or RTC)
Warm Start:	30 s typical (almanac and RTC)
Hot Start:	10 s typical (almanac, RTC and position)
Heading Fix:	10 s typical (Hot Start)
Antenna Input Impedance:	50 Ω
Maximum Speed:	1,850 mph (999 kts)
Maximum Altitude:	18,288 m (60,000 ft)

Accuracy

Positioning:	**RMS (67%)**	**2DRMS (95%)**
Autonomous, no SA: [1]	1.2 m	2.5 m
SBAS: [1]	0.3 m	0.6 m
Atlas H10: [1, 3]	0.04 m	0.08 m
Atlas H30: [1, 3]	0.15 m	0.3 m
Atlas Basic: [1, 3]	0.50 m	1.0 m
RTK: [1]	8 mm + 1 ppm	15 mm + 2 ppm
Heading (RMS):	0.16° rms @ 0.5 m antenna separation 0.08° rms @ 1.0 m antenna separation 0.04° rms @ 2.0 m antenna separation 0.02° rms @ 5.0 m antenna separation	
Pitch/Roll (RMS):	1°	
Heave (RMS): [1]	30 cm rms (DGNSS) , 5 cm rms (RTK)	

L-Band Receiver Specifications

Receiver Type:	Single Channel
Channels:	1525 to 1560 MHz
Sensitivity:	-130 dBm
Channel Spacing:	5.0 kHz
Satellite Selection:	Manual and Automatic
Reacquisition Time:	15 seconds (typical)

1. Depends on multipath environment, number of satellites in view, satellite geometry, and ionospheric activity
2. Depends on multipath environment, number of satellites in view, SBAS coverage, satellite geometry, and ionospheric activity
3. Hemisphere GNSS proprietary
4. With future firmware upgrade and activation
5. CMR and CMR+ do not cover proprietary messages outside of the typical standard

Communications

Ports:	3 x full-duplex (1 x 3.3V CMOS, 1 x 3.3V CMOS with flow control, 1 x RS-232 with flow control) 1 x USB Device 1 x Ethernet 10/100Mbps 2 x CAN (NMEA2000, ISO 11783) 1 x SPI
Interface Level:	3.3V CMOS
Baud Rates:	4800 - 115200
Correction I/O Protocol:	Hemisphere GNSS proprietary ROX format, RTCM v2.3, RTCM v3.2, CMR[5], CMR+[5]
Data I/O Protocol:	NMEA 0183, Crescent binary [5]
Timing Output:	1 PPS, CMOS, active high, rising edge sync, 10 kΩ, 10 pF load
Event Marker Input:	CMOS, active low, falling edge sync, 10 kΩ,10 pF load

Power

Input Voltage:	3.3 VDC +/- 5%
Power Consumption:	2.0 W nominal GPS (L1) 2.7 W nominal GPS (L1/L2) and GLONASS (G1/G2) 3.8 W nominal All Signals + L-band
Current Consumption:	0.61 A nominal GPS (L1) 0.82 A nominal GPS (L1/L2) 1.15 A nominal All Signals + L-band
Antenna Voltage:	5 VDC maximum
Antenna Short Circuit Protection:	Yes
Antenna Gain Input Range:	10 to 40 dB

Environmental

Operating Temperature:	-40°C to +85°C (-40°F to +185°F)
Storage Temperature:	-40°C to +85°C (-40°F to +185°F)
Humidity:	95% non-condensing (when in an enclosure)
Mechanical Shock:	EP455 Section 5.14.1 Operational (when mounted in an enclosure with screw mounting holes utilized)
Vibration:	EP455 Section 5.15.1 Random
EMC:	CE (IEC 60945 Emissions and Immunity) FCC Part 15, Subpart B CISPR 22

Mechanical

Dimensions:	100 L x 60 W x 10 H (mm) 3.9 L x 2.4 W x 0.4 (in)
Weight:	44 g (1.56 oz)
Status Indications (LED):	Power, Primary and Secondary GNSS lock, Differential lock, DGNSS position, Heading
Power/Data Connector:	24-pin male header 2 mm pitch 16-pin male header 2 mm pitch
Antenna Connectors:	MMCX, female, straight

Aiding Devices

Gyro:	Provides smooth and fast heading reacquisition. During loss of GNSS signals heading stability is degraded by < 1° per minute for up to 3 minutes.
Tilt Sensors:	Provide pitch, roll data and assist in fast start-up and reacquisition of heading solution

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