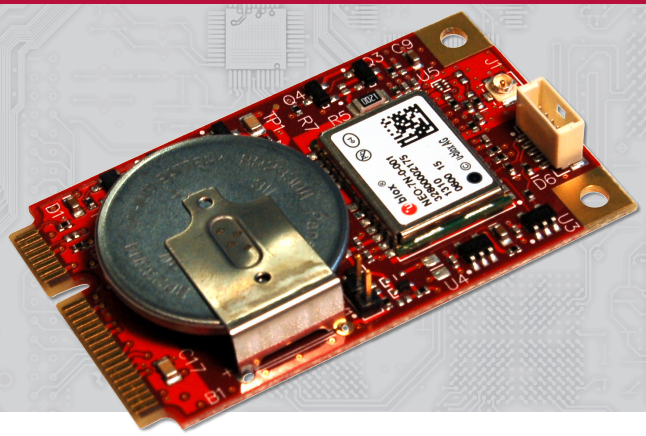
GPS Receiver

Mini PCIe Module



- Extremely small Mini PCIe module format
- GPS receiver
- Precision time reference
- Industrial temp. (-40º to +85ºC) operation
- MIL-STD-202G shock/vibe
- Latching connectors

Highlights

Mini PCIe Module Format
Small and flexible.

GPS Receiver
Supports GPS, GLONASS, Galileo, and QZSS. NMEA, UBX, and RTCM protocols.

Precision Time Reference
GPS/atomic clock precision pulse output.

Industrial Temperature Operation
-40° to +85°C operation for harsh environments.

MIL-STD-202G
Qualified for high shock/vibration environments.

Latching Connectors
Prevents detachment failures.

Class 3 Manufacturing (optional)
IPC-A-610 Class 3 for applications requiring extreme reliability.

RoHS

Overview

The VL-MPEu-G2 is an extremely small and rugged GPS module based on the industry-standard Mini PCIe module format. Unlike typical I/O expansion boards, Mini PCIe allows additional I/O functions to be added to a system with almost no increase in overall system / package size. Mini PCIe modules provide a simple, economical, and standardized way to add I/O functions to embedded computer products.

Details

In a very small package, this GPS receiver board provides global positioning and time-stamp information in embedded systems.

This GPS receiver module delivers complete position, velocity, and time (PVT) data for use in host applications. The GPS receiver provides simultaneous 56-channel operation for stable satellite tracking and aided GPS startup for fast initial signal acquisition. Support for GPS (United States), GLONASS (Russian), Galileo, and QZSS systems provide complementary coverage to enable reliable tracking in difficult environments such as cityscape / building canyons. GPS data is available in NMEA, UBX, and RTCM protocols. The GPS data is accessed via USB.

In addition to positioning and navigation applications, GPS/GNSS signals are widely used as accurate and low-cost precision time or frequency references used by remote or distributed wireless communication, industrial, financial, and power-distribution equipment. The TIMEPULSE output generates a precision time reference via a pulse train synchronized with the GPS or UTC time grid. Linked to the satellites' atomic clocks, this output produces intervals configurable from 0.25 Hz to 10 MHz. The high precision time reference may be used as a low frequency time synchronization pulse or as a high frequency reference signal. By default, the time pulse signal is configured to 1 pulse per second.

The standard model includes an on-board battery to retain satellite position data and support fast restart of the GPS chip. Connection to an external 3.0V battery is also supported.

This rugged product is designed and tested for full industrial temperature operation (-40º to +85ºC). It also meets MIL-STD-202G specifications for shock and vibration. Latching connectors provide additional ruggedization, making it at home in harsh environments.

This GPS receiver board is compatible with a variety of popular x86 operating systems including Windows, Windows Embedded, and Linux.

The module utilizes USB signaling and can be used in any system that supports USB signaling at the Mini PCIe socket.

It is manufactured to IPC-A-610 Class 2 standards. Class 3 versions are available for extremely-high-reliability applications.

Product customization is available, even in low quantities. Options include conformal coating, application-specific testing, BOM revision locks, special labeling, etc.

GPS Receiver

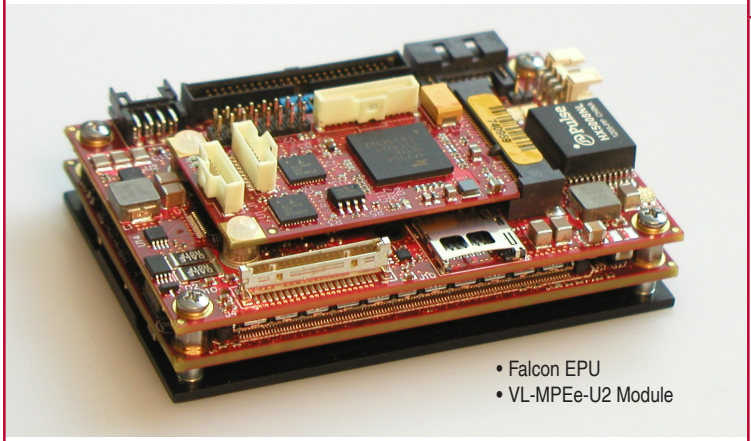
Mini PCIe Module

Ordering Information

Model	Function	Operating Temp.
VL-MPEu-G2E	GPS receiver with backup battery	-40° to +85°C
VL-MPEu-G2E-Z	GPS receiver, no battery	-40° to +85°C

Accessories

Part Number	Description
Cables	
VL-CBR-0202	12" U.FL to RP-SMA female bulkhead – antenna cable
VL-CBR-0502	12" 5-wire timing and battery cable
VL-CBR-ANT02	GPS antenna with SMA connector - supports GPS signals
VL-CBR-ANT03	Active antenna with SMA connector - supports GPS and GLONASS signals
Hardware	
VL-HDW-108	Mini PCIe module hold-down screws (10) for use with 2.5 mm standoffs
VL-HDW-110	Mini PCIe module hold-down screws (10) for use with 2.0 mm standoffs



- Falcon EPU
- VL-MPEe-U2 Module

Other VersaLogic Mini PCIe Modules

Model	Function	Signaling
VL-MPEe-A1E	Analog input (12-bit resolution)	PCIe
VL-MPEe-A2E	Analog input (16-bit resolution)	PCIe
VL-MPEe-FW1	1394 Firewire Module, Industrial Temp.	PCIe
VL-MPEe-E3E	Gigabit Ethernet adapter	PCIe
VL-MPEe-U2E	Quad serial plus twelve GPIOs	PCIe
VL-MPEe-W2E	Wi-Fi 802.11 a/b/g/n	PCIe
VL-MPEs-F1E	mSATA drive (4/16/32 GB)	SATA
VL-MPEs-S3E	SATA adapter	SATA

Specifications

General	Board Size	Mini PCIe module (full size): 30 mm x 50.95 mm x 6.32 mm	
	Power Requirements	3.3V @ 0.22W (supplied from the Mini PCIe socket)	
	Manufacturing Standards	Standard	IPC-A-610 Class 2 modified
		Optional	IPC-A-610 Class 3 modified
	Regulatory Compliance	RoHS	
	Mini PCIe Signal Type	USB 2.0	
Environmental	Operating Temperature	-40° to +85°C	
	Storage Temperature	-40° to +85°C	
	Altitude *	Operating	To 15,000 ft. (4,570m)
		Storage	To 40,000 ft. (12,000m)
	Cooling	None (fanless)	
	Airflow Requirements	None (free air)	
	Thermal Shock	5°C/min. over operating temperature	
	Humidity	Less than 95%, noncondensing	
	Vibration, Sinusoidal Sweep †	MIL-STD-202G, Method 204, Modified Condition A: 2g constant acceleration from 5 to 500 Hz, 20 min. per axis	
	Vibration, Random †	MIL-STD-202G, Method 214A, Condition A: 5.35g rms, 5 min. per axis	
	Mechanical Shock †	MIL-STD-202G, Method 213B, Condition G: 20g half-sine, 11 msec. duration per axis	
Device I/O	GPS/GLONASS	On-board GPS/GLONASS module	
	Accuracy	Autonomous Position	2.5m
		SBAS Position	2.0m
		Velocity	0.01 m/s
	Startup Time	Aided Start	5 sec.
		Hot Start	1 sec.
		Cold Start	29 sec.
	Timing Output	The TIMEPULSE output generates pulse trains synchronized with the GPS time grid. The default time pulse signal is 1 pulse per second. Latching connector.	
		Frequency Range	0.25 Hz to 10 MHz (configurable)
		Interface	3.3V TTL
	Sensitivity	Tracking	-162 dBm
		Reacquisition	-160 dBm
	Antenna ‡	U.FL antenna connector. Compatible with active antennas only. Latching connector.	
	Host Communication	Interface	Mini PCIe – USB signaling
		Protocol	NMEA, UBX, RTCM
	Battery – On-board	On-board battery facilitates faster startup times	
	Battery – External	Supports external 3.0V battery to facilitate faster startup times	
Software	Operating Systems	Compatible with most x86 operating systems including Windows, Windows Embedded, and Linux	

* *Extended altitude specifications available upon request*

† *MIL-STD-202G shock and vibe levels are used to illustrate the ruggedness of this product in general. Testing to higher levels and/or different types of shock or vibration methods can be accommodated per the specific requirements of the application. Contact a VersaLogic Sales Engineer for further information.*

‡ *Short circuit protection*

03/16/16

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