BAE SYSTEMS

MicroGRAM™-M GPS Receiver

Precise positioning

Enhancing awareness in any environment

Today, enhanced situational awareness in unpredictable territory is paramount for warfighter's mission success. BAE Systems is building upon a proven heritage of Selective Availability Anti-Spoofing Module (SAASM)- based products with the MicroGRAM™-M GPS receiver. Our receiver uses M-Code to facilitate surface mobility while augmenting alertness and preparedness.

The MicroGRAM-M receiver retains key functionality in a smaller, lighter package than its predecessors, MPE-S and MPE-M, while maintaining the same footprint of SAASM-based MicroGRAM. The receiver delivers geolocation and precise positioning capabilities for military applications such as tactical communications, field computers, and unmanned aircraft. MicroGRAM-M is size-competitive with commercial GPS receiver chipsets and contains the required SAASM functionality while providing increased mission effectiveness and safety through operation with M-Code signal.

Key capabilities for ground-embedded applications

- Capabilities of the next-generation GPS YMCA Application-Specific Integrated Circuit (ASIC) developed by Military GPS User Equipment (MGUE)
- All-in-view navigation of up to 12 GPS satellites
- Advanced correlator engine for accelerated Direct-Y and Direct-M Code acquisitions
- Operates in mixed Y-Code and M-Code constellation
- Blue Force Electronic Attack (BFEA) mitigation
- Next-generation security architecture
- Unclassified-when-keyed operation
- Black key capable for Over-The-Air- Rekeying (OTAR) when available from GPS satellites

Key features and benefits

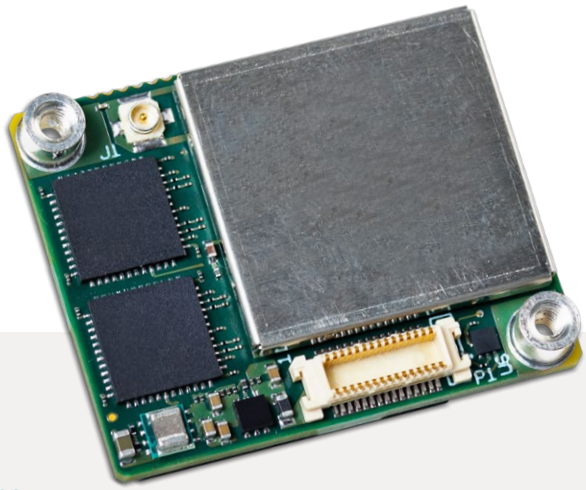
- Plugable for easier logistics and manufacturing
- Easily implemented with the same serial interface protocol as MPE-S for commonality
- 12-channel continuous satellite tracking allows the receiver to monitor up to 12 satellites and choose the best position
- Simultaneous L1 and L2 dual-frequency GPS signal reception maintains the capability of the SAASM receiver
- Rapid satellite acquisition/reacquisition allows for enhanced operating efficiencies
- Extended performance in a jamming environment for increased mission effectiveness and safety through operation with M-Code

Interface compatible

The MicroGRAM-M is an optimized, lightweight, low-power design that uses Complimentary Metal Oxide Semiconductor (CMOS) logic for efficient message protocol compatible with the MPE-S and SAASM based MicroGRAM. The low-power serial data port has full duplex interface with the MicroGRAM heritage of ICD-GPS-153C. There are one pulse per second input and output timing pulses available for the host application to synchronize time. MicroGRAM-M provides DS-101 (CMOS) keying interfaces.

Dual-frequency RF

An advanced dual frequency RF front end allows tracking with both L1 and L2 GPS frequencies while minimizing the footprint on this miniaturized GPS receiver. Even when turned off, a precision time source runs continuously, when auxiliary power is supplied, to allow rapid acquisition of the GPS satellites when the MicroGRAM-M is turned on. All this capability requires only a single 3-volt power source.



Extended performance in jamming environments

System characteristics

Dynamics (velocity)	Man-portable: 10 m/s maximum Surface vehicle: 25 m/s maximum Low dynamic aircraft: 250 m/s maximum*
Time accuracy	100 nanoseconds
Position accuracy	PPS: <5 meters CEP*
Acquisition time	TTFF (95%): <15 sec hot start, <90 sec warm start TTSF (95%): <20 sec (Off or Standby <15 min) TTSF (95%): <38 sec (Off or Standby <60 min)
Velocity accuracy	0.04 m/sec steady rate (3D 95%)

* Export of precise positioning service (PPS) units is authorized for GPS Memorandum of Understanding countries only. PPS security modules must be obtained through foreign military sales (FMS) procurement.

Interfaces

Interconnect

• RF connector	Amphenol AMC RF Jack #A1JB
• Power and data	MOLEX 53748-0308D connector

Hardware interfaces

- Independent serial port (full duplex CMOS)
- 1 pulse per second input (CMOS)
- 1 pulse per second output (CMOS)
- L1/L2 active RF antenna port, 3.3 V dc
- DS-101 key loading

Physical characteristics

Power	Operating: 3.3 V dc, <0.8 W typical Keep alive: 3.3 V dc, <0.3 mW typical
Weight	0.35 oz (10 gm) nominal
Size/volume	1.0 x 1.25 x 0.275 in. maximum (25.4 x 31.75 x 7 mm)
Temperature range	-40° C to +85° C operating -55° C to +85° C storage

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