PRODUCT BRIEF

MS20 GPS Receiver

Description

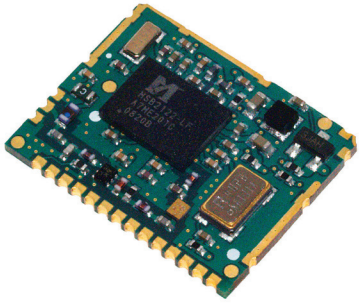
The MS20 uses the physical form factor of our earlier CW20 module with changes in the power and voltage requirements.

The MS20 GPS module is a highly sensitive, compact single chip solution for GPS applications. It includes an RF receiver, complete baseband processor, Flash memory and a power control unit. The RF receiver uses a single conversion low-IF digital architecture, with the high-level integration leaving a few off-chip matching and decoupling components, minimizing system cost. The baseband processor is controlled by adaptive signal processing, and the navigation firmware is optimized for execution on a low power microprocessor. Optimal signal acquisition and tracking strategy are enabled by sophisticated adaptive control algorithms.

Sophisticated adaptive control algorithms provide optimal signal acquisition/tracking strategy.

Applications

- PND
- Mobile Phone
- UMPC
- Vehicle tracking
- Asset tracking
- Personnel tracking
- DSC and GPS related
- Marine and Timing Navigation



Features

- GPS L1 C/A code
- High sensitivity of -159dBm in tracking & -144dBm in acquisition
- Build in power-on-reset and calibration circuits
- Assisted/Autonomous operation
- Fast TTFF in all modes (a typical outdoor)
  - hot-start in 1.5s,
  - warm-start in 32s
  - cold-start in 35s
- Up to 60,000 simultaneous search windows
- 48 acquisition & 12 tracking channels
- SBAS (WAAS/EGNOS/MSAS) capable
- Support standard NMEA-0183
- TCXO & RTC integrated
- Integrate a high-performance MIPS M4K CPU
- Integrated a 512 kB NOR flash memory
- Easy to integrate
  - UART data interface
  - 3.3V tolerant I/O pins
  - 1 PPS (200 ns RMS)
  - 3.2 - 5V Supply
- Operates at 1.2V/3.0V (core/IO), integrate LDO
- Battery backed RAM & RTC and direct connection
- 0.18um CMOS for RF and 0.11um CMOS for Baseband
- Avg Current (33mA @ 3.3V, 29mA @ 5V)
- 21.0 x 16.44 x 2.52 mm

NAVSYNC
Global Positioning Technologies

Bulletin	**NS34-PB**
Revision	**P01**
Date	**03 Aug 2009**

Specifications

Performance

Physical			
Module Dimensions	21mm (D) x 16.44mm (W) x 2.52mm (H) ±.2mm		Notes
Electrical			
Supply Voltages	3V3 (NVDD), 2V5 (VBAT)		1
Operating Temperature Range	-30°C to 65°C		
Storage Temperature Range	-40°C to 85°C		
GPS Performance			
GPS Channels	12 Tracking (48 acquisition)		
Frequency	1575.42 MHz – L1 C/A Code		
TTFF Cold Start	34 seconds		2, 8
TTFF Warm Start	32 seconds		2, 8
TTFF Hot Start	1.5 seconds		2, 8
Re-acquisition time	<1 seconds		3
Acquisition Sensitivity (fix not available)	TTFF (Hot) with all signals at -138 dBm: 30 s		4
Acquisition Sensitivity (dBm)	-144 dBm		5
Tracking Sensitivity (dBm)	-159 dBm		6
Acquisition Sensitivity SBAS Satellites (dBm)	TBD		7
Tracking Sensitivity SBAS Satellites (dBm)	TBD		7
Static Accuracy (without SBAS)	50% Confidence (CEP) 95% Confidence	1.7 m 2.9 m	8
Static Accuracy (with SBAS)	50% Confidence (CEP) 95% Confidence	1.2 m 2.4 m	9
Maximum Horizontal Speed	515 m/s (1000 Knots)		10
Maximum Altitude	18 Km (60000 feet)		10
Maximum Acceleration, Jerh	4 g, 7 g/s		
Power			
During acquisition (fully active) @ 3.3V	145 mW		
While tracking (fully active) @ 3.3V	110 mW		
During Sleep Mode (NVDD)	TBD		
VBAT Current	TBD		
Interfaces			
I/O Port	UART x 2 (9600 8N1)		
Protocols	NMEA 0183		
Antenna			
Configuration Supported	Active or Passive		
Impedance	50Ω		
Voltage	2.8 - 3.1V		

Notes:

1. *Typical listed*
2. *These are RMS values*
3. *Maximum Sensitivity -147 dBm*
4. *Simulator Test, all signals at specified power level.*
5. *Estimated*
6. *Simulator Test, continuous fix with all signals at specified power level.*
7. *Simulator Test with signal at specified power level.*
8. *Open-sky, 24 hrs statistic, active antenna (signal range is between 30 to 49 dB/Hz).*
9. *Open sky, 24 hrs statistic, active antenna (WAAS signal used).*
10. *Limited by International Traffic in Arms Regulation (ITAR)*

User Interface Messages

NMEA Protocol

The MS20 software is capable of supporting the following NMEA message formats.

NMEA Protocol

NMEA Message Prefix	Format	Direction
$GPRMC	Recommended minimum specific GNSS data	Out
$GPGGA	GPS fix data	Out
$GPGLL	Geographic position Latitude/Longitude	Out
$GPGSA	GNSS DOP and active satellites	Out
$GPGSV	Satellites in view	Out
$GPVTG	Velocity and track over ground	Out
$GPALM	Almanac data	Out
$GPZDA	Date and time	Out

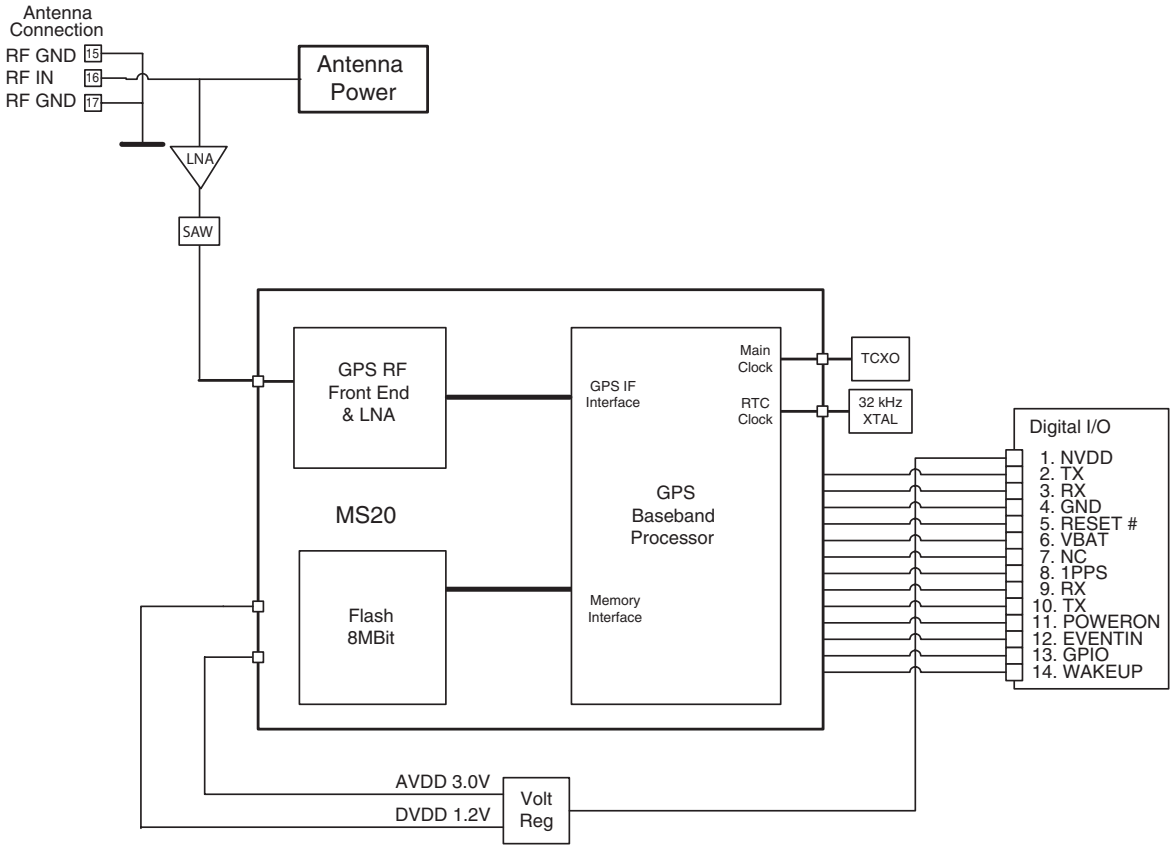
The maximum output rate supported is 1 Hz. The output of individuals messages can be turned off, or set with a periodicity of 1, 2, 3, 4, 5, 10, 15, 20, 30 or 60 seconds.

Pin Out

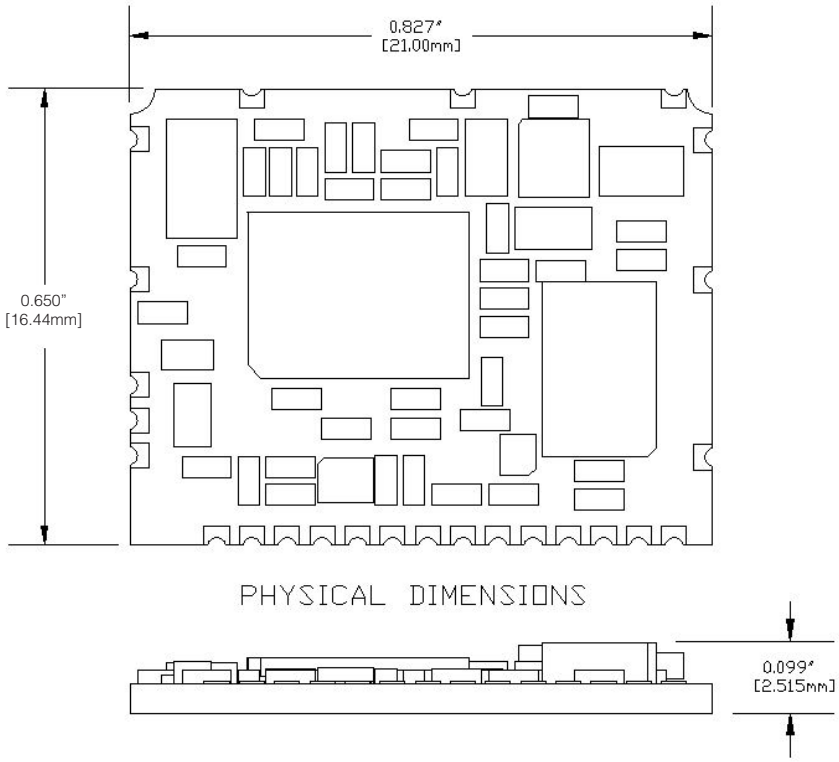
1	NVDD	Primary Supply (3.2 - 5.0V)
2	TX (PRIMARY)	Serial Data Transmit from Module (NMEA Output 9600 8N1)
3	RX (PRIMARY)	Serial Data Receive to Module
4	GND	Ground
5	RESET#	Active Low Device Reset
6	VBAT	Backup Supply (2.2 - 5.0V) Required, if no battery connect to primary
7	NC	Not Connected (CW20:DSUMUX)
8	1PPS	One Pulse Per Second
9	RX (SECONDARY)	Serial Data Receive to Module (CW20:DSU_RX)
10	TX (SECONDARY)	Serial Data Transmit from Module (CW20:DSU_TX)
11	POWERON	Ground to turn internal regulators off (CW20:DSUEN)
12	EVENTIN	Event Input with custom firmware (CW20:DSUBRE)
13	GPIO	General Purpose IO with custom firmware (CW20:DSUACT)
14	WAKEUP	Pull high to suspend.
15	RF GND	RF Ground
16	RF IN	RF Input, with ~3.0V DC Bias for active antenna
17	RF GND	RF Ground

MS20 GPS Receiver

Block Diagram



Mechanical Dimensions and Layout



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