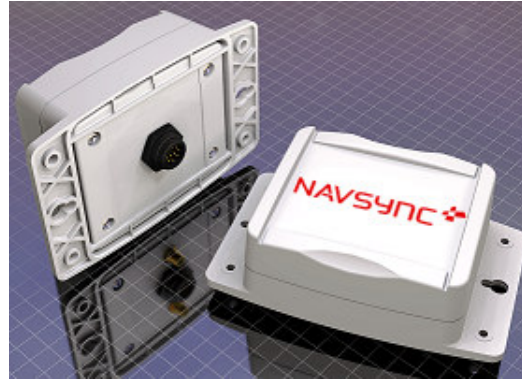


CW46S GPS Sensor

Description

The CW46S GPS sensor is a fully integrated module that includes the CW25 GPS receiver, DC/DC converter, RS232, RS422 interface options, and active GPS antenna — all housed in a small weatherproof (IP67 rated) enclosure.



The CW25 GPS receiver, at the center of the CW46S sensor, has been designed specifically for acquiring and tracking satellites in weak signal areas such as under dense foliage, severe urban canyons and even inside buildings.

The CW46S can acquire satellites at signal levels down to -155dBm with network assisted ephemeris data, and track satellites down to -155dBm . The CW46S can also autonomously acquire satellites at signal levels as low as -143dBm

The CW46S utilizes the CW25-TIM GPS receiver inside, allowing the CW46S to act as a complete timing module capable of outputting a GPS disciplined frequency of 10Mhz that can achieve full PRC MTIE performance in good signal areas.

The CW46S can also continue to provide synchronization in very weak signal areas, dramatically reducing installation costs.

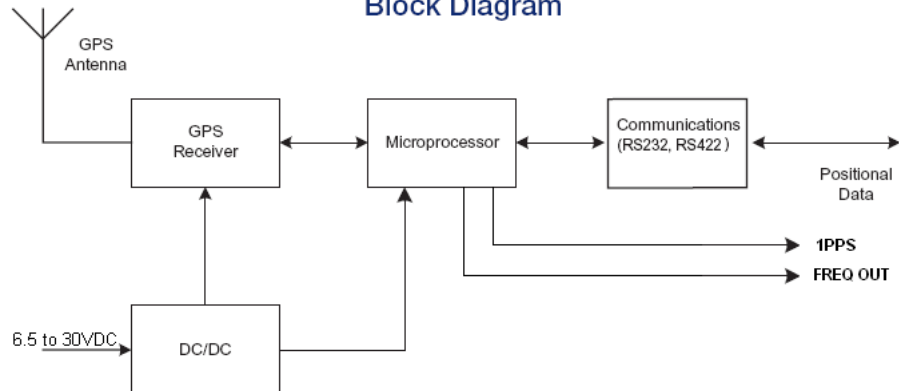
Features

- 1PPS aligned to UTC second
- GPS disciplined 10Mhz
- Wide DC Power Range
- IP67 Rated Waterproof Box
- RoHS compliant

Applications

- Stratum 1 Time Source
- Synchronizing Wireless Networks
- Synchronizing Remote Switch sites

Block Diagram



Bulletin	NS15
Revision	PA
Date	28 5 2010

CW46S GPS SENSOR SPECIFICATIONS

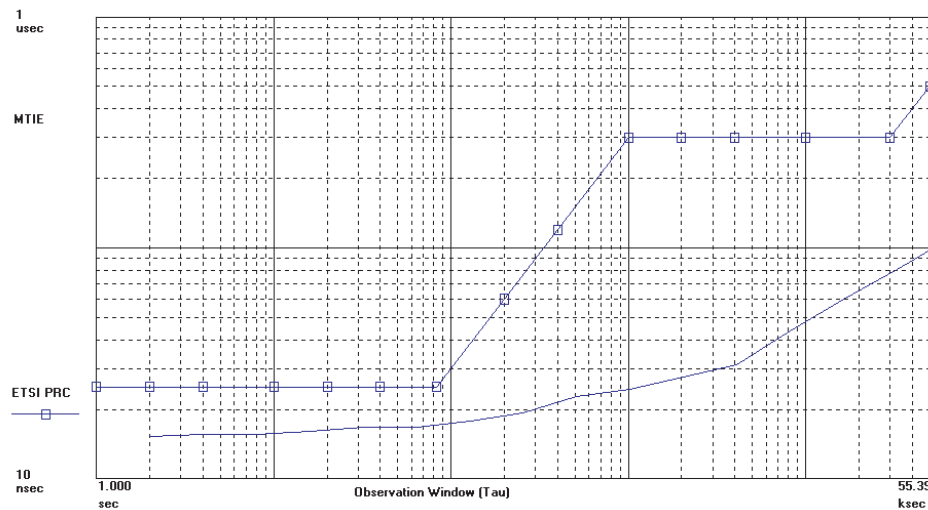
SPECIFICATIONS

Physical	Module dimensions	140mm (length) x 91mm (width) x 43mm (height)
	Module Rating	IP67
	Supply voltage	6.5V – 30V DC (48VDC option also available)
	Operating / Storage Temp	-30°C to +75°C / -40°C to +85°C
	Humidity	5% to 95% non-condensing
	Max Velocity / Altitude	515ms ⁻¹ / 18,000m
	Max Acceleration / Jerk	4g / 1gs ⁻¹ (sustained for less than 5 seconds)
Sensitivity	Acquisition/Tracking	-155dBm / -155dBm
Acquisition Time		Cold: <45s
		Warm: <38s
		Hot: <5s
		Re-acquisition: <0.5s (90% confidence)
Accuracy	Position: Outdoor	<5m rms
	Velocity	<0.05ms ⁻¹
	Latency	<200ms
	Raw Measurement Accuracy	Pseudorange <0.3m rms, Carrier phase <5mm rms
	Tracking	Code and carrier coherent
Power	1 fix per second	0.6W typically (dependant of software build)
Interfaces	Serial	RS232 or RS422 - Programmable Baud Rate upto 38400 default baud set to 38400
	Protocols	NMEA 0183, Proprietary ASCII
	1pps Timing Output	30ns rms accuracy, <5ns resolution
	Frequency Output	RS422 Format 10Mhz, Sine Wave 3.1Vp-p into 100ohms
	Receiver Type	12 parallel channel x 32 taps up to 32 point FFT. Channels, taps and FFT can be switched off to minimize power or simulate simpler designs.
General	Processor	ARM 966E-S on a 0.18 micron process at up to 120 MHz.

CW46S GPS MTIE PERFORMANCE

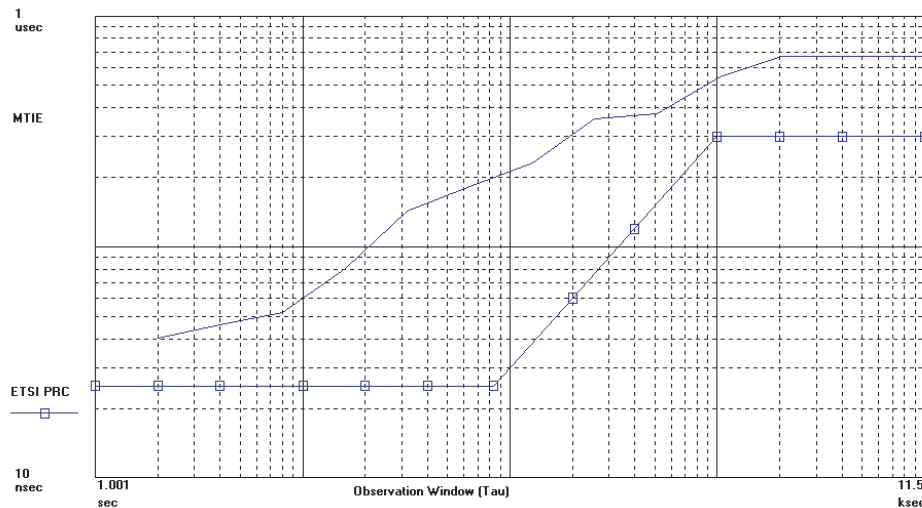
The graph below demonstrates the MTIE performance of the CW46S output frequency relative to a Cesium atomic clock, with the CW46S operating with a clear view of the sky.

MTIE: Fo=10.00 MHz; Fs=1.000 Hz; 11/19/03 05:45:08 PM, 11/20/03 09:08:18 AM,
HP 53132A: Test 545; 10 MHz NCO: Samples: 55388; Gate: 1 s; Ref ch2: 10.00 MHz; TI/Time Data Only; TI 1>2

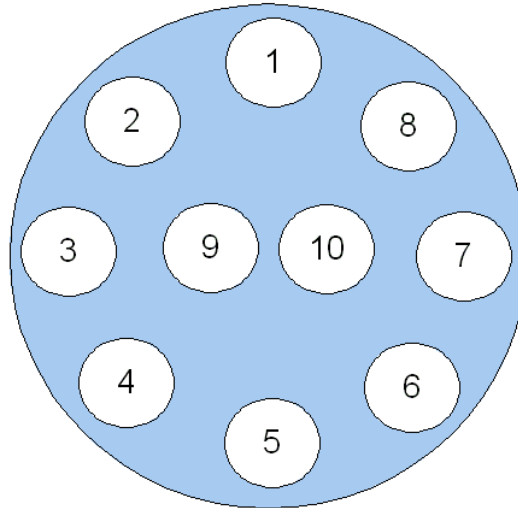


The graph below demonstrates the ability of the CW46S to continue to provide a GPS disciplined output frequency with the GPS aerial located completely inside a building (the degradation of MTIE performance is due to the effects of signal multi-path)

MTIE: Fo=10.00 MHz; Fs=999.0 MHz; 2/12/04 02:38:18 PM, 2/12/04 05:50:27 PM,
HP 53132A: Test 589; CW25_indoor_tim; Samples: 11506; Gate: 1 s; Ref ch2: 10.00 MHz; TI/Time Data Only; TI 1>2



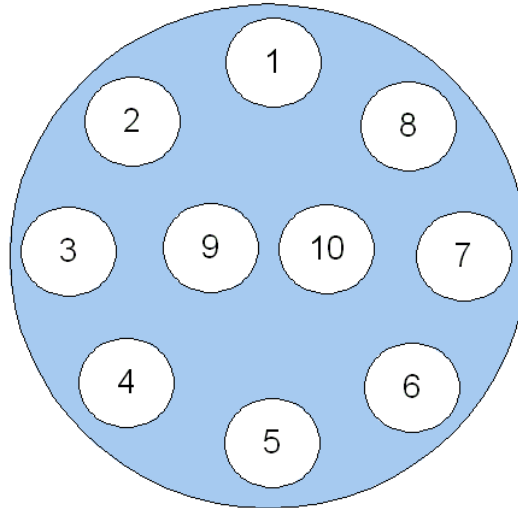
CW46S-RS232 Pin-Out



View : Looking into CW46S Connector

Pin	Name	Description
1	NC	Not Connected
2	TX	Serial Transmit (RS232) Output
3	RX	Serial Receive (RS232) Input
4	PPS+	1 Pulse Per Second Signal (RS422, Non-Inverted) output
5	PPS-	1 Pulse Per Second Signal (RS422, Inverted) output
6	10M	10Mhz Freq Output, Sine Wave ~3.1Vp-p into 100ohm
7	C Shield	Cable Shield option, Can help reduce noise on timing signals
8	NC	Not Connected
9	Vin	Voltage Supply Input; +6.5V to +30V DC to be supplied here
10	GND	Ground, Power Supply return

CW46S-RS422 Pin-Out



View : Looking into CW46S Connector

Pin	Name	Description
1	RX-	Serial Receive (RS422) Inverted Input
2	TX+	Serial Transmit (RS422) Non-Inverted Output
3	RX+	Serial Receive (RS422) Non-Inverted Input
4	PPS+	1 Pulse Per Second Signal (RS422) Non-Inverted output
5	PPS-	1 Pulse Per Second Signal (RS422) Inverted output
6	10M	10Mhz Freq Output, Sine Wave ~3.1Vp-p into 100ohm
7	C Shield	Cable Shield option, Can help reduce noise on timing signals
8	TX-	Serial Transmit (RS422) Inverted Output
9	Vin	Voltage Supply Input; +6.5V to +30V DC to be supplied here
10	GND	Ground, Power Supply return

CW46S OVERVIEW & SETUP INSTRUCTIONS



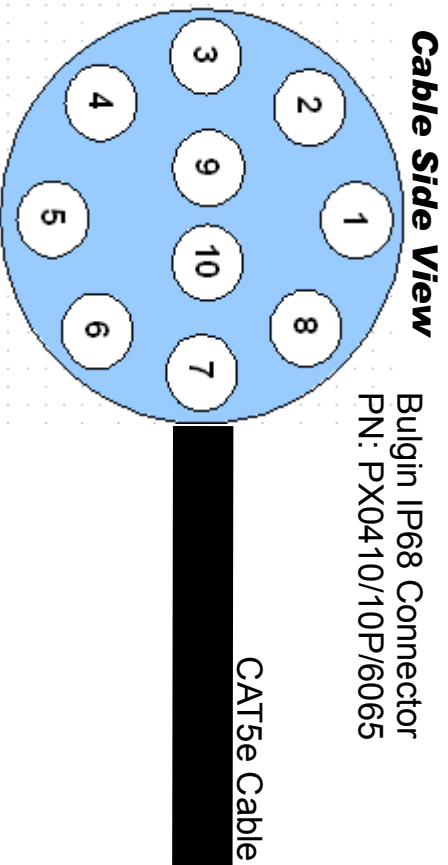
Setup Instructions

Place the CW46M where it has a good view of the sky.

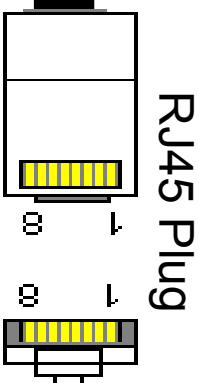
1. Secure Cable Assembly to CW46M.
 2. Connect the Comms and Timing Signals to appropriate device(s).
 3. Apply Power Supply Voltage(6.5V to 30V DC)
 4. Data should start to stream at 38400 Baud, 8 Bits, no parity, 1 stop Bit.
 5. Wait for GPS lock.
 6. The 1PPS and 10Mhz are available and are ready for use, but the CW46 will survey its position for 10minutes, typically, after which the phase error of these signals will be further reduced.
-

For more information on the details of the NMEA stream see Navsync's CW25 User Manual.

APPENDIX 1
 CW46S-RS232 Standard Cable Assembly



Pin	Name	Description
1	NC	
2	TX	BROWN/WHITE
3	RX	BLUE
4	PPS+	ORANGE
5	PPS-	ORANGE/WHITE
6	10M	GREEN/WHITE
7	Shield	Silver Wire
8	NC	
9	Vin	BROWN
10	Gnd	GREEN



Pin	Name	Description
1	TX	BROWN/WHITE
2	RX	BLUE
3	PPS+	ORANGE
4	PPS-	ORANGE/WHITE
5	10M	GREEN/WHITE
6	Gnd	GREEN
7	Vin	BROWN
8		

Standard Cable Lengths available:
 5, 10, 20, 30 Meters

Cable Assembly and Cable Length
 can be customized as required



CW46S GPS Sensor

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