Jupiter 30

20-channel GPS receiver module

Data Sheet

Related documents

- Jupiter 30 Product brief LA000575
- Jupiter 30 Integrator's manual LA000577
- Jupiter 30 Development Kit guide LA000578
- Jupiter 30 Saving and Retrieving Configuration Data to Flash application note LA000266
- Low Power Operating Modes application note LA000513
- Navman NMEA reference manual MN000315
- SiRF Binary Protocol reference manual

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1.0 Introduction

Navman's Jupiter 30 receiver module offers the ultimate in high sensitivity GPS performance, capable of both autonomous and aided modes of operation.

The Jupiter 30 acquires GPS position faster under low signal conditions than all previous Jupiter receiver modules and can continue tracking in areas of dense foliage, built-up inner city environments and even indoors.

The module provides a 20-channel receiver that continuously tracks all satellites in view and provides accurate positioning data.

2.0 Technical description

Navman has enhanced the architecture of the SiRF GSC3e/LP chipset by adding carefully selected key components including TCXO, LNA and Flash. This ensures frequency stability, improved sensitivity at low level signals of better than –159 dBm, lower power consumption and a faster TTFF (Time To First Fix). The GSC3e/LP chip integrates both baseband and RF sections, thereby reducing power consumption.

By providing separate on-board regulators, the Jupiter 30 allows operation over a wide input voltage range, down to 3.0 VDC. This gives OEMs the ability to design with a single voltage supply that consumes less power.

The 20-channel architecture with more than 200 000 effective correlators provides rapid TTFF under all start-up conditions. Acquisition is guaranteed under all conditions due to higher sensitivity and the ability to use multi-mode aiding.

Protocols supported are selected NMEA (National Marine Electronics Association) data messages and SiRF Binary.

2.1 Product applications

The Jupiter 30 is designed specifically for applications where rapid TTFF and operation under low signal levels are primary requirements. The module offers high performance and maximum flexibility in a wide range of OEM configurations.

The high sensitivity of the module makes it ideal for:

- navigation systems – where athermic glass, or an unsuitably positioned antenna inside the vehicle will reduce visibility and signal strength
- vehicle and people tracking devices – where satellites are obstructed by partially covered car parks and walkways; Jupiter 30 will continue tracking indoors
- marine buoys – where multipath and unstable sea conditions make satellite visibility irregular
- asset tracking – where construction machinery is located in covered yards and areas of dense foliage

2.1.1 Compatibility

The Jupiter 30 is the successor to the established Jupiter 20, sharing the same form factor (25.4 x 25.4 mm) and electrical compatibility. This provides a low risk migration path for existing users requiring greater sensitivity, lower power consumption and a faster fix.

Refer to section 7.0 for further information about compatibility between the modules.

2.2 Receiver architecture

The functional architecture of the Jupiter 30 receiver is shown in Figure 2-1.

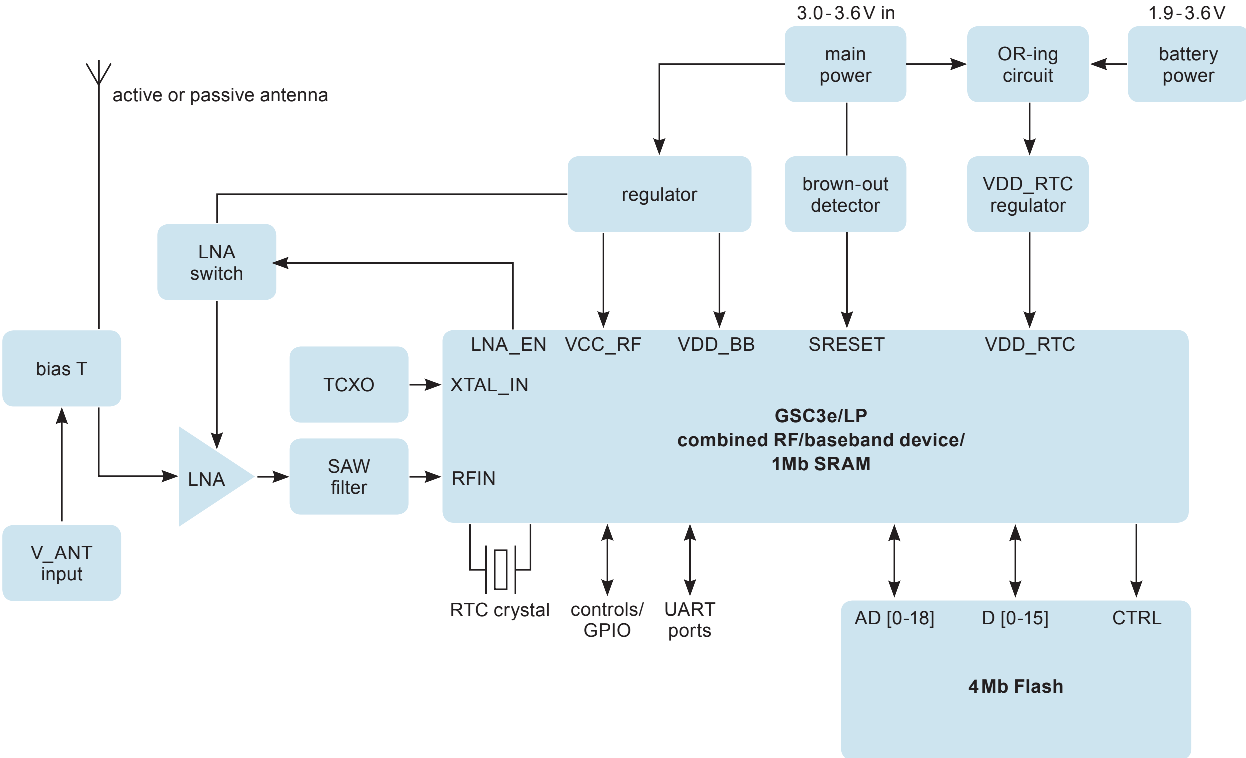

Figure 2-1: Jupiter 30 architecture

2.3 Major components of the Jupiter 30

LNA (Low Noise Amplifier): this amplifies the GPS signal and provides enough gain for the receiver to use a passive antenna. A very low noise design is used to provide maximum sensitivity.

LNA switch: this switch controls the LNA during low power modes.

Bias T: this provides the voltage to an external active antenna.

Bandpass SAW filter (1.575 GHz): this filters the GPS signal removing unwanted signals caused by external influences that would corrupt the operation of the receiver. The filtered signal is fed to the RF input of GSC3e/LP chipset for further processing. The filter has a bandwidth of 2 MHz.

TCXO (Temperature Compensated Crystal Oscillator): this highly stable 16.369 MHz oscillator controls the down conversion process for the RFIC block.

Regulator: this dual low-noise regulator provides two outputs of 2.85 V power to the RF section and the digital IO section of the GSC3e/LP chip.

Main power: primary supply voltage range is 3.0–3.6 V.

Brown out detector: the precision voltage detector chip senses the input voltage and resets the module in case of any drop in the voltage. This detector chip also serves the function of power-on-reset.

OR-ing circuit: this circuit distributes the RTC/SRAM voltage from either the main voltage supply or the back-up voltage input in order for the RTC/SRAM elements to work in low power and continuous modes. However a back-up voltage must be connected if the device is to be shut down and expected to perform Hot and Warm starts.

VDD_RTC regulator: supplies a regulated voltage for the RTC/SRAM cell within the GSC3e/LP chip.

Battery power: the back-up battery supply feeds the VDD_RTC regulator through the OR-ing circuit, and provides the power to the battery-backed SRAM and the RTC section of the GSC3e/LP.

GSC3e/LP chip: this single chip GPS device includes an integrated Baseband and RF section.

Flash: the 4 Megabit Flash memory stores software and also some long term data.

RTC (Real Time Clock) crystal: the 32 kHz crystal operates in conjunction with the RTC inside the baseband block, and provides an accurate clock function when main power has been removed, if the battery backup is connected.

2.4 Physical characteristics

The Jupiter 30 receiver is identical in form and fit to the Jupiter 20. It is a surface mount device packaged on a miniature printed circuit board, with a metallic RF enclosure on one side.

2.5 Mechanical specification

The physical dimensions of the Jupiter 30 are as follows:

length: 25.4 mm ± 0.1 mm
width: 25.4 mm ± 0.1 mm
thickness: 3.0 mm max
weight: 4.0 g max

Refer to Figure 8-1 for the Jupiter 30 mechanical drawing.

2.6 External antenna surface mount pads

The RF surface mount pad for the external antenna has a characteristic impedance of 50 ohms.

2.7 I/O and power connections

The I/O (Input Output) and power connections use surface mount pads with edge plating around the edge of the module.

2.8 Environmental

The environmental operating conditions of the Jupiter 30 are as follows:

temperature: –40ºC to +85ºC

humidity: up to 95% non-condensing or a wet bulb temperature of +35ºC

altitude: –304 m to 18 000 m

vibration: random vibration IEC 68-2-64

max. vehicle dynamics: 500 m/s

shock (non-operating): 18 G peak, 5 ms

2.9 Compliances

The Jupiter 30 complies with the following:

- Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
- CISPR22 and FCC: Part 15, Class B for radiated emissions
- Automotive standard TS 16949
- Manufactured in an ISO 9000 : 2000 accredited facility

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2.10 Marking/Serialisation

The Jupiter 30 supports a code 128 barcode indicating the unit serial number. The Navman 13-character serial number convention is:

characters 1 and 2: year of manufacture (e.g. 06 = 2006, 07 = 2007)

characters 3 and 4: week of manufacture (e.g. 01 = 1st week of year, 02 = 2nd week of year)

character 5: manufacturer code

characters 6 and 7: product and type

character 8: product revision

characters 9-13: sequential serial number

3.0 Performance characteristics

3.1 TTFF (Time To First Fix)

TTFF is the actual time required by a GPS receiver to achieve a position solution. This specification will vary with the operating state of the receiver, the length of time since the last position fix, the location of the last fix, and the specific receiver design.

Aiding is a method of effectively reducing the TTFF by making every start Hot or Warm.

3.1.1 Hot start

A hot start results from a software reset after a period of continuous navigation, or a return from a short idle period (i.e. a few minutes) that was preceded by a period of continuous navigation. In this state, all of the critical data (position, velocity, time, and satellite ephemeris) is valid to the specified accuracy and available in SRAM. Battery backup of the SRAM and RTC during loss of power is required to achieve a hot start.

3.1.2 Warm start

A warm start typically results from user-supplied position and time initialisation data or continuous RTC operation with an accurate last known position available in memory. In this state, position and time data are present and valid but ephemeris data validity has expired.

3.1.3 Cold start

A cold start acquisition results when either position or time data is unknown. Almanac information is used to identify previously healthy satellites.

3.2 Acquisition times

Table 3-1 shows the corresponding TTFF times for each of the acquisition modes.

Mode	@ –125 dBm		@ –140 dBm	
	Typ	90%	Typ	90%
hot start TTFF	500 ms	<1 s	<1 s	<1 s
warm start TTFF	32 s	38 s	49 s	59 s
cold start TTFF	34 s	42 s	52 s	66 s
re-acquisition (<10 s obstruction)	1 s		1 s	

Table 3-1: Acquisition times at –125 dBm and –140 dBm

3.3 Timing 1PPS output

The 1 PPS output of the Jupiter 30 receiver is < 1 μs, typical ± 300 ns ref UTC. Refer to Table 6-2 for the default status on the Jupiter 30.

3.4 Power management

The Jupiter 30 offers two power saving modes: Adaptive TricklePower and Push-To-Fix, which can be set using NMEA or SiRF Binary messages.

3.4.1 Adaptive TricklePower

The Jupiter 30 can use the Adaptive TricklePower (ATP) feature, which reduces power consumption by intelligently switching between full power in tough GPS environments and low power in strong GPS signal areas.

When signal levels drop, the receiver returns to full power so that message output rates remain constant. This results in variable power savings but much more reliable performance for a fixed output rate. Applications using ATP should give performance very similar to full power, but with significant power savings in strong signal conditions.

ATP is best suited for applications that require solutions at a fixed rate as well as low power consumption and still maintain the ability to track weak signals.

With ATP at a 1 second update, a power saving of 50% can easily be achieved with minimal degradation in navigation performance.

3.4.2 Push-To-Fix mode

Push-To-Fix mode always forces the GPS software to revert to a continuous sleep mode after a navigation position fix. It will stay in sleep mode until woken by activation of the WAKEUP input (pad 26) to compute a fresh position.

If the ephemeris data become invalid, the RTC has the ability to self activate and refresh the data, thus keeping the restart TTFF very short.

This mode yields the lowest power consumption of the module, and is ideal where a battery powered application requires very few position fixes.

For further information refer to the Navman Low Power Operating Modes application note (LA000513), Navman NMEA reference manual (MN000315) and the SiRF Binary Protocol reference manual.

3.5 Differential aiding

3.5.1 Differential GPS (DGPS)

DGPS is not available on the Jupiter 30.

3.5.2 Satellite Based Augmentation Systems (SBAS)

The Jupiter 30 is capable of receiving SBAS differential corrections including WAAS and EGNOS. SBAS improves horizontal position accuracy by correcting GPS signal errors caused by ionospheric disturbances, timing and satellite orbit errors.

3.6 Core processor performance

The standard Jupiter 30 with GSW3 software runs at a CPU clock speed of 49 MHz. An SDK (Software Development Kit) is available from SiRF to customise the Jupiter 30 firmware.

3.7 Sensitivity

Sensitivity of the Jupiter 30 is measured assuming a system noise value of 3 dB. The sensitivity values are as follows:

Parameter	Signal strength	C/N_0
acquisition – cold start	–144 dBm	26 dBHz
acquisition – hot start	–155 dBm	15 dBHz
navigation	–157 dBm	13 dBHz
tracking	–159 dBm	10 dBHz

Table 3-2: Sensitivity

3.8 Dynamic constraints

The Jupiter 30 receiver is programmed to deliberately lose track if any of the following limits is exceeded:

velocity: 500 m/s max

acceleration: 4 G (39.2 m/s^2) max

vehicle jerk: 5 m/s^3 max

altitude: 18 000 m max (referenced to MSL)

3.9 Position and velocity accuracy

The position and velocity accuracy of the Jupiter 30 are shown in Table 3-3, assuming full accuracy C/A code. These values are the same in normal operation and when Adaptive TricklePower is active.

Parameter	Value
horizontal CEP*	2.2 m
horizontal (2 dRMS)	5.5 m
vertical VEP*	2.0 m
velocity 2D (2 sigma)	TBD
**position error 50%*	

Table 3-3: Position and velocity accuracy

4.0 Multi-mode aiding

Multi-mode aiding technology makes navigation information available to GPS devices when, due to obstruction, not enough Satellite Vehicles (SVs) are visible.

A type of multi-mode aiding currently supported by the Jupiter 30 is Ephemeris Extensions (SiRFInstantFix). Synthetic ephemeris data is downloaded from application IP servers to the host processor.

In autonomous operation mode, the GPS receiver requires a signal level of 28 dBHz or higher in at least 4 SVs to download ephemeris. This requires an uninterrupted block of time from each SV which increases the TTFF.

Ephemeris Extensions (EE) provides a more stable and efficient download. Using EE, the Jupiter 30 requires a signal level of 28 dBHz from only 1 SV to download the ephemeris within 2 seconds, thereby enabling a hot start every time. Data remains valid for up to 7 days even when network connectivity is unavailable. This means that the system will continue to work without interruption in continuous mode in environments where satellite signal strengths are below 25 dBHz for 7 days, without needing to see any satellites above 28 dBHz.

To use any mode of aiding, certain system requirements must be met. An Application Note providing further information about these requirements is in preparation and will be available at a later date.

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5.0 Electrical requirements

5.1 Power supply

5.1.1 Primary power

The Jupiter 30 receiver is designed to operate from a single supply voltage, meeting the requirements shown in Table 5-1.

Parameter	Value	
input voltage	3.0 to 3.6 VDC	
average sustained power (after 1st solution)	@ 3 V: <117 mW	@ 3.3 V: <136 mW
average sustained acquisition power (before 1st solution)	@ 3 V: <132 mW	@ 3.3 V: <149 mW
average initial acquisition power (1.5–2 s)	@ 3 V: <168 mW	@ 3.3 V: <189 mW
power (typ) using ATP*	80 mW at 3.3 V	
battery backup voltage**	1.9 to 3.6 VDC	
battery backup current	5 to 6 μA (typ)	
ripple	not to exceed 50 mV peak to peak	
*Using Adaptive TricklePower with a 1 s update **Battery backup voltage **must not** fall below 1.4 V		

Table 5-1: Operating power for the Jupiter 30

5.1.2 Battery backup (SRAM/RTC backup)

During ‘powered down’ conditions, the SRAM and RTC (Real Time Clock) may be kept operating by supplying power from the VBATT as shown in Table 5-1.

5.1.3 VCC_RF power supply

The VCC_RF (pad 20) provides a regulated 2.85 V power source. The specifications for this supply are as follows:

voltage: 2.85 V ± 2%

current max: 50 mA

5.1.4 External antenna voltage

DC power is supplied to the external antenna through the antenna power input pad (VANT). The receiver does not use this supply. The DC supply to the RF connection does not use current limiting in the event of a short circuit. Reference designs for antenna current limiting are available in the Jupiter 30 Integrator’s manual (LA000577).

The external antenna characteristics are as follows:

voltage (typ): 3 V

voltage max: 12 V

current max: 50 mA

WARNING

The GPS receiver will experience permanent damage if the antenna or its cable develops a short circuit and the external antenna current is not limited.

5.1.5 RF (Radio Frequency) input

RF input is 1575.42 MHz (L1 Band) at a level between –135 dBm and –159 dBm into a 50 ohm impedance. This input may have a DC voltage impressed upon it to supply power to an active antenna. The maximum input return loss is –9 dB.

5.1.6 Antenna gain

The receiver will operate with a passive antenna with unity gain. However, GPS performance will be optimum when an active antenna is used. The gain of this antenna at the input of the module should ideally be 16 dB.

For recommendations on antenna use and testing see the Jupiter 30 Integrator's manual (LA000577).

5.1.7 Burnout protection

The receiver accepts without risk of damage a signal of +10 dBm from 0 to 2 GHz carrier frequency, except in band 1560 to 1590 MHz where the maximum level is –10 dBm.

5.1.8 Jamming performance

The typical jamming performance of the receiver based upon a 3 dB degradation in C/N_0 performance is shown in Table 5-2. This is with reference to the external antenna.

Frequency MHz	Jamming signal power dBm
200	3
400	4
800	–9
1400	–2
1425.42	–2
1530	–11
1555	–44
1575.42	–97
1625.42	–4
1725.42	–2

Table 5-2: Typical jamming performance

5.1.9 Flash upgradability

The firmware programmed in the Flash memory may be upgraded via the serial port. The user can control this by driving the Serial BOOT (pad 3) high at startup, then downloading the code from a PC with suitable software (e.g. SiRFFlash). In normal operation this pad should be left floating for minimal current drain. It is recommended that in the user's application, the BOOT pad is connected to a test pad for use in future software upgrades.

5.1.10 Reset input

This active low input (pad 22) allows the user to restart the software from an external signal. In normal operation this pad should be left floating or activated by an open drain driver. Active pull-up is not recommended.

5.2 Data input output specifications

All communications between the Jupiter 30 receiver and external devices are through the I/O surface mount pads. These provide the contacts for power, ground, serial I/O and control. Power requirements are discussed in Section 5.1.

5.2.1 Voltage levels

The I/O connector voltage levels measured at PWR_IN = 3 V are shown in Table 5-3.

Signal	Parameter	Value
TXD & RXD GPIOs	V_{IH} (min)	1.995 V
	V_{IH} (max)	3.15 V
	V_{IL} (min)	0.3 V
	V_{IL} (max)	0.855 V
	V_{OH} (min) at I_{OH} 2 mA	2.137 V
	V_{OH} (max)	2.85 V
	V_{OL} (min)	0 V
	V_{OL} (max) at I_{OL} –2 mA	0.7125 V
Reset input*	max capacitance Cmax	100 pF
	input current max	–600 µA
	pulse time min	250 ms
Reset input should not be driven high by external circuits. It is recommended that this input is driven low by an open drain interface.		

Table 5-3: Interface voltage levels

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5.2.2 I/O surface mount pads

Details of the surface mount pad functions are shown in Table 5-4.

Pad No.	Name	Type	Description
1	PWRIN	P	main power input (3.3 V)
2	GND	P	ground
3	BOOT	I	serial boot (active high)
4	RXA	I	CMOS level asynchronous input for UART A
5	TXA	O	CMOS level asynchronous output for UART A
6	TXB	O	CMOS level asynchronous output for UART B
7	RXB	I	CMOS level asynchronous input for UART B
8	NANT_SC	I	antenna short circuit sensor input (active low)
9	RF_ON	O	output to indicate whether the RF section is enabled (active high)
10	GND	P	ground
11	GND	P	ground
12	GND	P	ground
13	GND	P	ground
14	GND	P	ground
15	GND	P	ground
16	GND	P	ground
17	RF_IN	I	RF input
18	GND	P	ground
19	ACTIVE_PWR	P	active power input
20	VCC_RF	O	RF Power (+2.85 V) supply output
21	V_BATT	P	backup battery input
22	NRESET	I	external reset (active low)
23	GPS_FIX	O	GPS fix indication (active low)
24	GPIO13	IO	not connected
25	GPIO4	IO	not connected
26	WAKEUP	I	push-to-fix wakeup (active on +ve going edge)
27	ANT_OC	I	antenna open circuit sensor input (active high)
28	ANT_CTRL	O	active antenna control output
29	1PPS	O	1 pulse per second output
30	GND	P	ground

Table 5-4: Jupiter 30 receiver pad functions

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6.0 Software interface

The host serial I/O port of the receiver's serial data interface supports full duplex communication between the receiver and the user.

The default serial modes are as follows:

Port A: NMEA, 9600 bps, 8 data bits, no parity, 1 stop bit

Port B: SiRF Binary, 38400 bps, 8 data bits, no parity, 1 stop bit

6.1 NMEA output messages

NMEA is a standard protocol used by GPS receivers to transmit data. The output NMEA (0183 v2.2) messages for the Jupiter 30 are listed in Table 6-1. A complete description of each NMEA message is contained in the Navman NMEA reference manual (MN000315).

Message ID and description	Refresh rate
GGA – global positioning system fix data	1 s
GSA – DOP and active satellites	1 s
GSV – satellites in view	1 s
RMC – recommended minimum specific GPS data	1 s
VTG – track made good and ground speed	1 s
GLL – latitude, longitude, UTC of position fix and status	1 s
ZDA – PPS timing message	1 s

Table 6-1: Default NMEA messages

6.2 SiRF Binary

SiRF Binary is the proprietary interface protocol of SiRF. It allows the Jupiter 30 a greater level of configurability and a more standardised message set than NMEA. A complete description of each binary message is contained in the SiRF Binary Protocol reference manual.

6.3 Software functions and capabilities

Table 6-2 shows the software features available to the Jupiter 30.

Feature	Description	Availability
SBAS capability	Improves position accuracy by using freely available satellite-based correction services called SBAS (Satellite Based Augmentation System)	A
Adaptive TricklePower	Improves battery life by using enhanced power management and intelligently switching between low and full power depending on the current GPS signal level	A
Push-to-Fix	Provides an on-demand position fix mode designed to further improve battery life	A
Almanac to Flash	Improves cold start times by storing the most recent almanac to flash memory	yes
Low signal acquisition	Acquires satellites and continues tracking in extremely low signal environments	yes
Low signal navigation	Continues navigating in extremely low signal environments	yes
1 PPS	A timing signal generated every second on the second	yes
Write to Flash	saves and restores user configurations and preferences to Flash memory (software version 2.0 and higher)	yes
yes = always enabled A = available, but not enabled by default		

Table 6-2: Jupiter 30 software capability

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7.0 Jupiter 20/30 comparison

This section highlights the differences between the Jupiter 20 and Jupiter 30 to assist with replacing modules in existing applications.

7.1 Active antenna specification

Feature	Jupiter 20	Jupiter 30
antenna gain	active antenna gain should be in the range of 20 to 30 dB	best results achieved with an active antenna gain of 16 dB at the module input

Table 7-1: Active antenna comparison

7.2 Electrical interface

The following table highlights the differences between the electrical connector pins.

	Jupiter 20		Jupiter 30	
Pin no.	Name	Description	Name	Description
24	GPIO6	user GPIO	GPIO13	no function
25	GPIO5	user GPIO	GPIO4	no function
26	GPIO7	user GPIO	Wake_Up	Push-to-Fix wake up (active high)

Table 7-2: Connector pin differences

7.3 Functionality

Feature	Description	J20	J30
RTCM DGPS	Accepts DGPS corrections in the RTCM SC-104 format	yes	no
SBAS DGPS	Accepts DGPS corrections in the SBAS format	yes	yes
PPS time message	PPS binary output message, MID52 (0x34)	yes	no
SBAS message	SBAS operating parameters message MID50 (0x32)	yes	no
user GPIO	proprietary NMEA messaging to control User GPIO	yes	no

Table 3-3: Functionality comparison

8.0 Jupiter 30 mechanical drawing

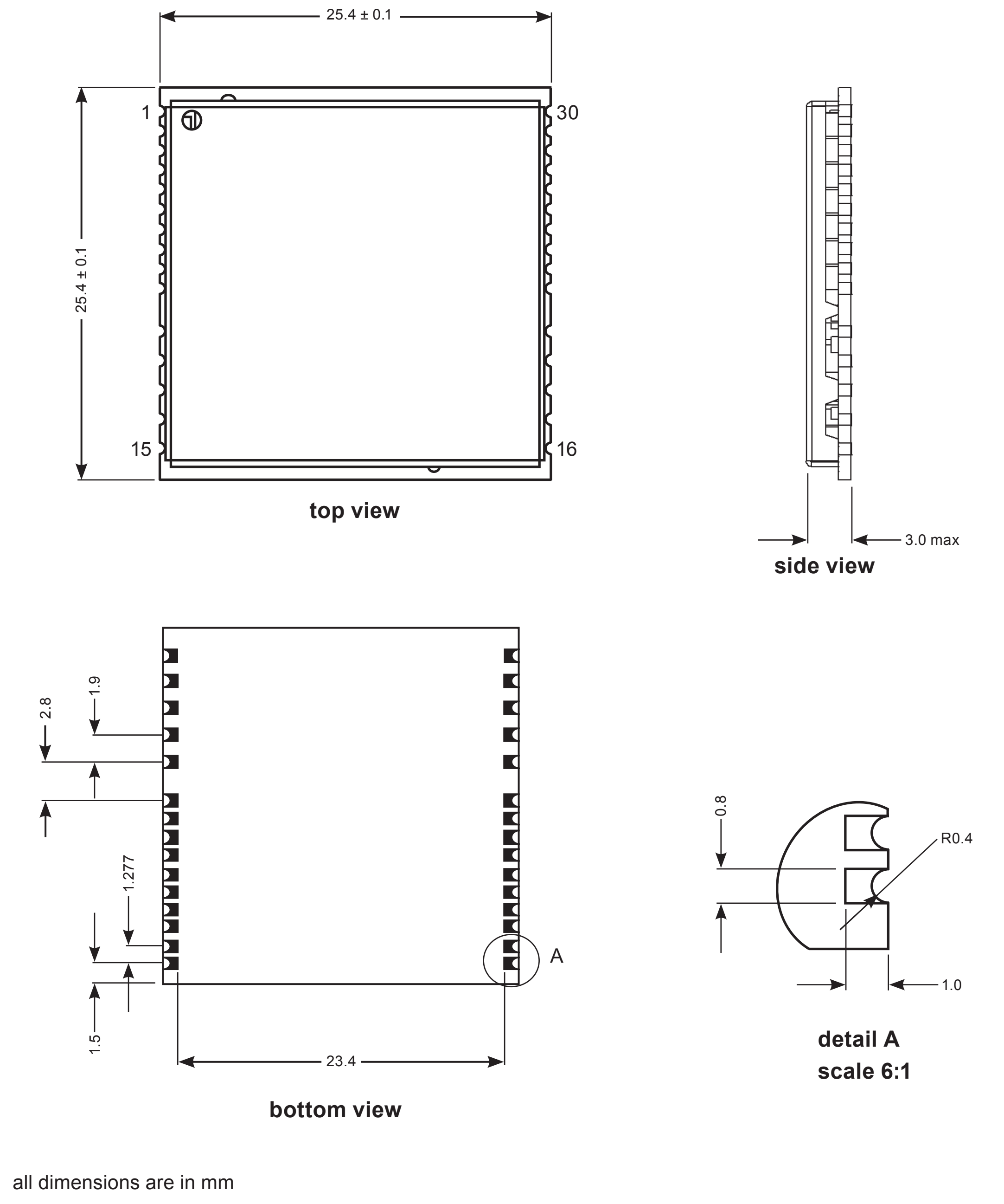


Figure 8-1: Jupiter 30 mechanical layout

9.0 Jupiter 30 Development kit

The Jupiter 30 Development kit is available to assist in the development and integration of the Jupiter 30 module in custom applications. The Development kit contains all of the necessary hardware and software to carry out a thorough evaluation and development of applications using the Jupiter 30 module.

10.0 Product handling

10.1 Packaging and delivery

Jupiter 30 modules are shipped in Tape and Reel form. The reeled modules are shipped with 250 units per 300 x 44 mm (D x W) reel with a pitch of 32 mm. Each reel is 'dry' packaged and vacuum sealed in an MBB (Moisture Barrier Bag) with two silica gel packs and placed in a carton.

The MOQ (Minimum Order Quantity) for shipping is 250 units.

All packaging is ESD protective lined. Please follow the MSD and ESD handling instructions on the labels of the MBB and exterior carton (refer to sections 10.2 and 10.3).

10.2 Moisture sensitivity

The Jupiter 30 GPS receiver is an MSD (Moisture Sensitive Device) level 3. Precautionary measures are required in handling, storing and using such devices to avoid damage from moisture absorption. If localised heating is required to rework or repair the device, precautionary methods are required to avoid exposure to solder reflow temperatures that can result in performance degradation.

Further information can be obtained from the IPC/JEDEC standard J-STD-033: Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices.

10.3 ESD sensitivity

The Jupiter 30 GPS receiver contains class 1 devices and is ESDS (ElectroStatic Discharge Sensitive). Navman recommends the two basic principles of protecting ESDS devices from damage:

- Only handle sensitive components in an ESD Protected Area (EPA) under protected and controlled conditions
- Protect sensitive devices outside the EPA using ESD protective packaging

All personnel handling ESDS devices have the responsibility to be aware of the ESD threat to reliability of electronic products.

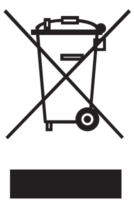
Further information can be obtained from the IEC Technical Report IEC61340-5-1 & 2: Protection of electronic devices from electrostatic phenomena.

10.4 Safety

Improper handling and use of the Jupiter GPS receiver can cause permanent damage to the receiver and may even result in personal injury.

10.5 Disposal

This product should not be treated as household waste. For more detailed information about recycling of this product, please contact your local waste management authority or the reseller from whom you purchased the product.



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11.0 Ordering information

The part numbers of the Jupiter 30 variants are shown in Table 11-1.

Part Number	Description
AA003025-G	Jupiter 30 (standard)
AA003027-G	Jupiter 30 adapter board
AA003029-G	Jupiter 30 Development Kit

Table 11-1: Jupiter 30 ordering information

12.0 Future developments

Future developments to the Jupiter 30 GPS receiver will include the following:

- Multipath mitigation – complex algorithms that enhance the GPS navigation performance.
- SiRFLoc – SiRF's MultiMode A-GPS software that allows users to determine their position with network aiding.
- Dead Reckoning – the ability to provide reliable positioning when GPS signals are temporarily unavailable.

13.0 Glossary and acronyms

2dRMS: twice-distance Root Mean Square
A horizontal measure of accuracy representing the radius of a circle within which the true value lies at least 95% of the time.

Almanac
A set of orbital parameters that allows calculation of approximate GPS satellite positions and velocities. The almanac is used by a GPS receiver to determine satellite visibility and as an aid during acquisition of GPS satellite signals. The almanac is a subset of satellite ephemeris data and is updated weekly by GPS Control.

C/A code: Course Acquisition code
A spread spectrum direct sequence code that is used primarily by commercial GPS receivers to determine the range to the transmitting GPS satellite.

C/N_0: Carrier to Noise ratio

DGPS: Differential GPS
A technique to improve GPS accuracy that uses pseudo-range errors recorded at a known location to improve the measurements made by other GPS receivers within the same general geographic area.

GDOP: Geometric Dilution of Precision
A factor used to describe the effect of the satellite geometry on the position and time accuracy of the GPS receiver solution. The lower the value of the GDOP parameter, the less the error in the position solution. Related indicators include PDOP, HDOP, TDOP and VDOP.

EGNOS: European Geostationary Navigation Overlay Service
The system of geostationary satellites and ground stations developed in Europe to improve the position and time calculation performed by the GPS receiver.

Ephemeris
A set of satellite orbital parameters that is used by a GPS receiver to calculate precise GPS satellite positions and velocities. The ephemeris is used to determine the navigation solution and is updated frequently to maintain the accuracy of GPS receivers.

GPS: Global Positioning System
A space-based radio positioning system that provides accurate position, velocity, and time data.

OEM: Original Equipment Manufacturer

Re-acquisition
The time taken for a position to be obtained after all satellites have been made invisible to the receiver.

NAVMAN

SBAS: Satellite Based Augmentation System
Any system that uses a network of geostationary satellites and ground stations to improve the performance of a Global Navigation Satellite System (GNSS). Current examples are EGNOS and WAAS.

SRAM: Static Random Access Memory

SAW filter: Surface Acoustic Wave filter

WAAS: Wide Area Augmentation System
The system of satellites and ground stations developed by the FAA (Federal Aviation Administration) that provides GPS signal corrections. WAAS satellite coverage is currently only available in North America.