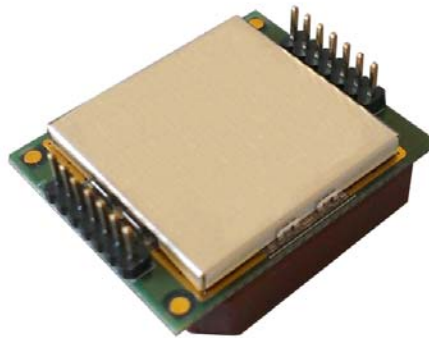


GPS Module

Ct-G434



Specifications Sheet V0.4

Features:

- ◆ *SiRF StarIV internal ROM-based ultra low power chipset*
- ◆ *Compact module size for easy integration : 22 x 18 x 7 mm*
- ◆ *Ct-G434 smart antenna module*
- ◆ *Operating at 1.8V signal level*

1. Introduction

The Ct-G434 is a high sensitivity, low power and very compact smart antenna module, with built in GPS receiver. This 48-channel global positioning system (GPS) receiver is designed for a wide range of OEM applications then based on the fast and deep GPS signal search capabilities of SiRFstarIV GSD4e ROM chipset, SiRF's newest chipset technology. The Ct-G434 provides flexible I/O interfaces (UART). Ct-G434 is designed to allow quick and easy integration into GPS-related applications such as:

- PDA, MID, and other portable devices
- Car and Marine Navigation
- Fleet Management / Asset Tracking
- AVL and Location-Based Services
- Hand-Held Device for Personal Positioning and Navigation
- Use of software control modules to achieve power saving state

1.1. Features

1.1.1 Performance

- ◆ High Performance Solution:
 - High sensitivity navigation engine (PVT) tracks as low as -160dBm
 - 48 track verification channels
 - SBAS (WAAS or EGNOS)
- ◆ Active Jammer Remover:
 - Removes in-band jammers up to 80 dB-Hz
 - Tracks up to 8 CW jammers
- ◆ Multimode A-GPS (Autonomous, MS-Based, and MS-Assisted) – With operator support
- ◆ *2 Embedded CGEE / SGEE (With back-end server support) speed up TTFF a lot and makes cold start time to be around 20+ seconds
- ◆ SiRFGeoRecov™ Reverse EE makes positioning process being done under power saving mode.
- ◆ RF Metal Shield for best performance in noisy environments

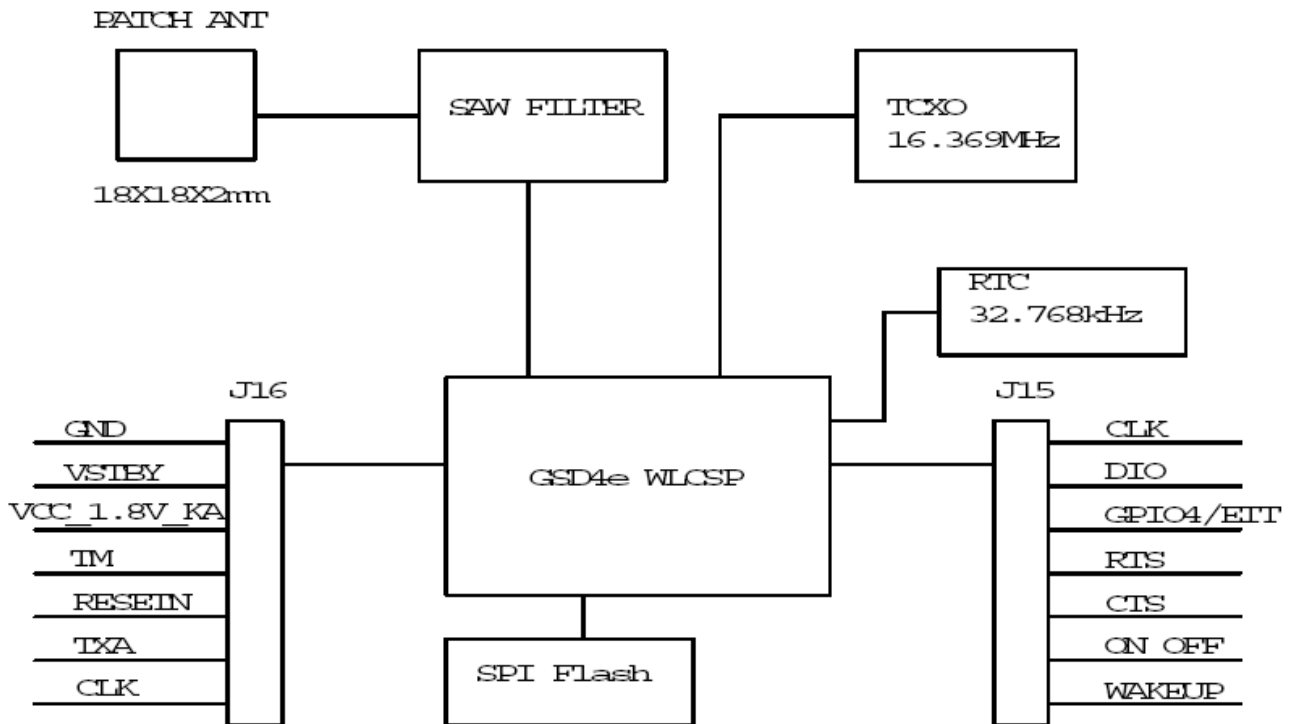
1.1.2 Interface

- ◆ Multiple host interfaces (UART)
- ◆ Secondary I²C port for MEMS connection
- ◆ Protocol: NMEA-0183 (default)

1.2 Advantages

- ◆ Built-in LNA.
- ◆ Built-in internal ROM and based on Firmware 4.x.x
- ◆ ^{*3} Embed CGEE (Client Generated Extended Ephemeris) that can capture ephemeris data from satellites locally and predicts ephemeris out to 3 days. So if the module was off within 3 days, it could complete positioning process with limited time just like hot start.
- ◆ It can remove in-band jammer up to 80db-Hz and track up to 8CW jammers, so the module can prevent GPS signal interference when design-in the electrical device with noisy electrical signal interferences such as Laptop, mobile phone, DSC, etc.
- ◆ Tracking sensitivity as low as -160dBm, even without network assistance.
- ◆ Support SiRF Aware technology
 - ◆ Support adaptive "Micro Power Controller" power management mode
 - ◆ ^{*4} Support MEMS sensor through I²C interface. (V4.X.X firmware is available for now)
 - ◆ MEMS interrupt can improve Micro Power Mode performance.
 - ◆ Only 8mW Trickle Power, so user can leave power on all day instead of power off
- ◆ Suitable for battery drive devices that need lower power consumption application
- ◆ Cost saving through elimination of RF and board to board digital connectors
- ◆ Flexible and cost effective hardware design for different application needs

1.3 Block Diagram



2. Specifications

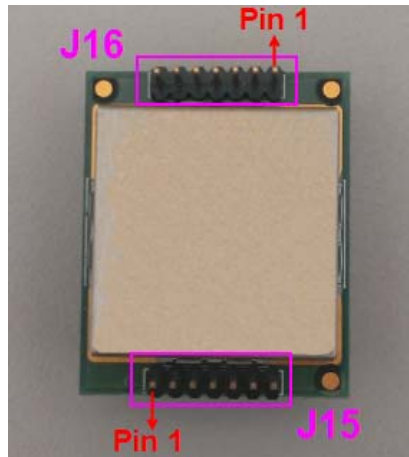
2.1. Technical specifications

2.1.1 Module Specification

Feature	Content	Description
Chipset	GSD4e/ROM base	SiRF StarIV-ROM core logic
General	Frequency	L1, 1575.42 MHz
	C/A code	1.023 MHz chip rate
	Channels	48
	Sensitivity	-160dB *
Accuracy	Position	<2.5 meters
	Velocity	0.01 meters/second
	Time	1 uS synchronized to GPS time
Datum	Default	WGS-84
	Other	selectable for other Datum
Time to First Fix (TTFF @-130dBm)	Reacquisition	0.1 sec., average
	Snap start	1 sec., average
	Hot start	1~2 sec.
	Warm start	9~15 sec. *
	Cold start	25~35 sec. *
Dynamic Conditions	Altitude	18,000 meters (60,000 feet) max.
	Velocity	515 meters/second (1000 knots) max.
	Acceleration	4g, max.
	Jerk	20 meters/second ³ , max.
Power	Main power input	1.71 ~ 1.89 VDC input
	Power consumption	Average: 46mA (Tracking Mode)
	Backup Power	1.71 ~ 1.89 VDC input
Serial Port	Electrical interface	UART
	Protocol messages	NMEA-0183
Antenna	Patch Antenna	18*18*4mm
		Gain -1.22 dBic Max* (@ Zenith)
		Polarization Right Hand Circular Polarization
		Bandwidth 10 MHz Min* (@ -10dB)
		Axis Ratio ≤ 5.5dB*
		* Based on ground size 60* 60 mm size

2.2 Electrical Specifications

2.2.1 Pin Location



Connector	PIN	NAME	DESCRIPTION
J15	1	Wakeup	Wake up output for control of external memory or power supply
	2	ON_OFF	Power control pin
	3	CTS	SSPI_CLK: slave SPI clock input (Reserve)
			CTS: clear to send , active low
	4	RTS	SSPI_SS_N: salve SPI chip select, active low (Reserve)
			RTS: ready to send, active low
	5	EIT	Interrupt
6	DIO	MEMS_ I ² C _DIO: MEMS I ² C bus data	
7	CLK	MEMS_ I ² C _DIO: MEMS I ² C bus clock	
J16	1	GND	Ground
	2	VSTBY	DC +1.8V input, RTC backup battery input
	3	VCCIN	DC +1.8V input
	4	TM	1PPS Time mark output
	5	RESETN	System reset (active low)
	6	TXA	SSPI_DO: slave SPI data output (Option)
			TX: data transmit (Default)
			I ² C _CLK: I ² C BUS clock (Option)
	7	RXA	SSPI_DI: slave SPI data input (Option)
			RX: data receive (Default)
I ² C _DIO: I ² C BUS data (Option)			

2.2.2 Electrical Characteristics

Operation Conditions				
Parameter	Min	Typ	Max	Units
Input Operation supply voltage	1.71	1.8	1.89	V
Peak supply current	- -	70	- -	mA
Sustained supply current	- -	60	- -	mA
Standby Backup current(On/Off Pin control)	- -	30	- -	uA
Input Backup battery voltage(V_RTC)	1.71	1.8	1.89	V
Input Backup battery current(V_RTC)	- -	1.5	- -	mA
I/O Input high level(VIH)	1.26	- -	3.6	V
I/O Input low level(VIL)	-0.4	- -	0.45	V
I/O Output high level(VoH)	1.35	- -	- -	V
I/O Output low level(VoL)	- -	- -	0.4	V

2.3 Environmental Characteristics

Items	Description
Operating temperature rage	-40 deg. C to +85 deg. C
Storage temperature range	-55 deg. C to +100 deg. C
Humidity	Up to 95% non-condensing or a wet bulb temperature of +35 deg. C

2.4 Physical Characteristics

Items	Description
Length	22 mm \pm 0.3mm
Width	18 mm \pm 0.3mm
Height	7 mm \pm 0.3mm
Weight	5 g ram

*Outline Drawing Tolerance does not contain connectors

2.5 Interface Specifications

Items	Description
I/O	14 pin connector type
Serial I/O	UART by customer request

Serial I/O :

Item	Communications Speed
UART	4800 bps (Default, Configurable up to 115200 bps)

3. Software

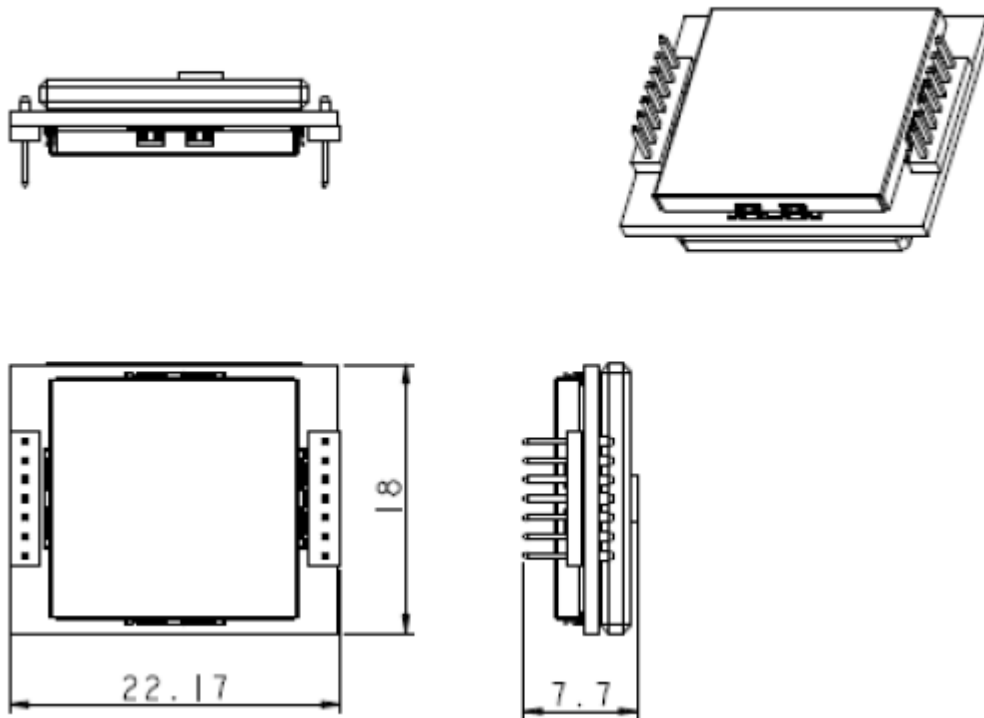
The Ct-G434 includes GSW4e, the SiRF standard GPS software for SiRFstarIV low power single chipset receivers and its features include:

- Excellent sensitivity
- High configurability
- 1 Hz / 5Hz position update rate
- Supports use of SBAS (satellite-based augmentation systems) ,WAAS, EGNOS
- Enhanced Navigation Performance
- Improved Jamming Mitigation
- Improved Ephemeris Availability
- Default configuration is as follows:

Item	Description
Core of firmware	SiRF GSW4e_4.1.X
Baud rate	4800 bps
Code type	NMEA-0183 ASCII
Datum	WGS-84
Protocol message	GGA(1sec), GSA(1sec), GSV(5sec), RMC(1sec)
Output frequency	1 Hz

4. Mechanical Drawing and Footprint

4.1 Outline Drawing



※ Tolerance

Items	Description
Length	22±0.3mm
Width	18±0.3mm
Height(Patch Antenna 4mm)	7±0.3mm
Weight	5g ram

*Outline drawing tolerance does not contain connectors