

# GPS Module

## Ct-G434



## Specifications Sheet V0.2

### *Features:*

- ◆ *SiRF StarIV internal ROM-based ultra low power chipset*
- ◆ *Compact module size for easy integration : 14.7 x 13.1 x 5 mm*
- ◆ *Ct-G434 smart antenna module provide an I<sup>2</sup>C compliant interface to connect an optional external serial \*1 EEPROM to store power-up configuration settings*
- ◆ *Operating at 1.8V signal level*

*\*1 Please refer to the related External EEPROM Application Note*

## 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 , I2C and SPI which can be defined by customer). 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

### 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  
( \*2, Above features should be combined with external EEPROM, please refer to application note. )

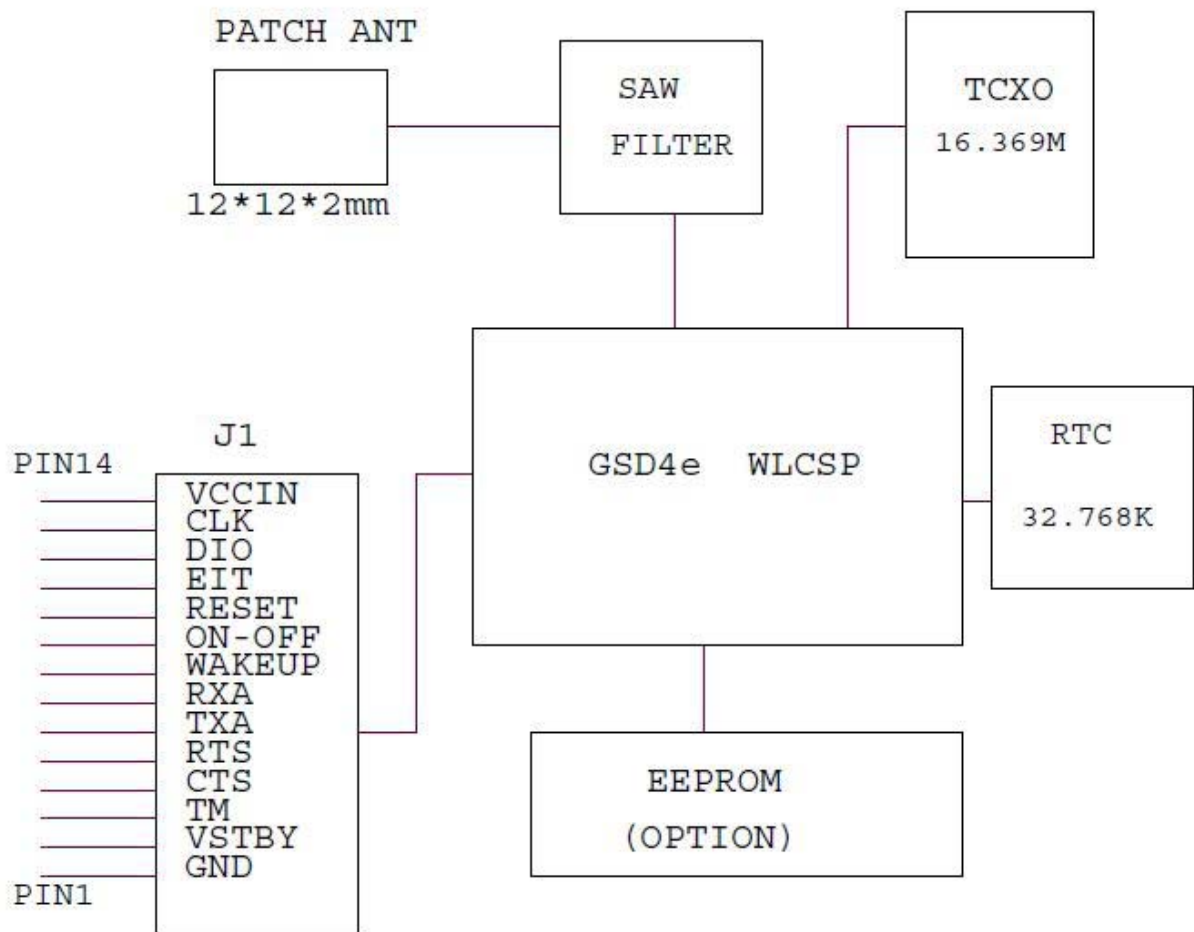
#### 1.1.2 Interface

- ◆ Multiple host interfaces (UART, I2C, and SPI)
- ◆ Secondary I<sup>2</sup>C 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
  - ◆ <sup>\*3</sup> 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 -163dBm, even without network assistance.
  - ◆ Support SiRF Aware technology
    - ◆ Support adaptive “Micro Power Controller” power management mode
    - ◆ <sup>\*4</sup> Support MEMS sensor through I<sup>2</sup>C 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
- ( <sup>\*3</sup>/<sup>\*4</sup>, Above features should be combined with external EEPROM, please refer to application note. )

### 1.3 Block Diagram



\*5 EEPROM(optional) : The external EEPROM can be part of storage for SiRFstat IV GSD4e, which can add-on more features and benefits for Ct-G434 GPS application.

## 2. Specifications

### 2.1. Technical specifications

Feature	Item	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	0.1 meters/second
	Time	1 microsecond 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 <sup>3</sup> , 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/I2C/SPI
	Protocol messages	NMEA-0183
Antenna	Patch Antenna	12*12*2mm
		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 mm2 size

\* With external EEPROM

## 2.2 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

## 2.3 Physical Characteristics

Items	Description
Length	14.7 mm $\pm$ 0.3mm
Width	13.1 mm $\pm$ 0.3mm
Height	4.96 mm $\pm$ 0.3mm
Weight	3 g

## 2.4 Interface Specifications

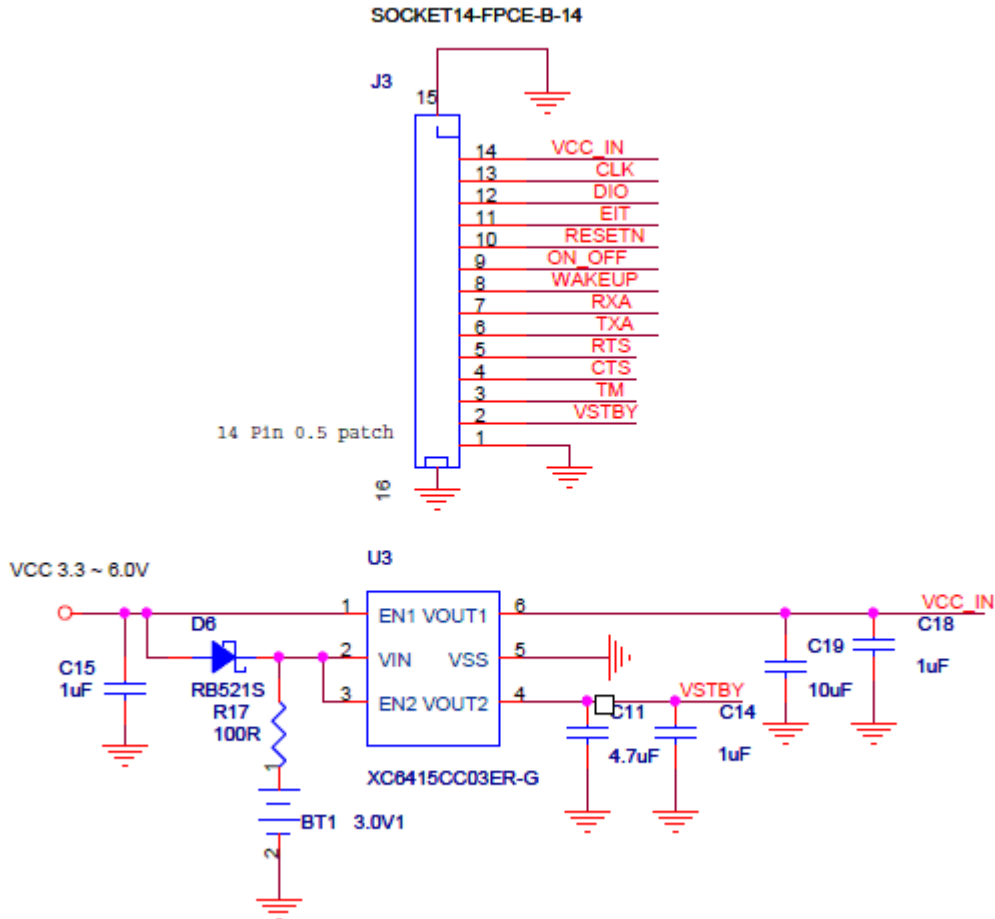
Items	Description
I/O	14 pin connector type
Serial I/O	UART, I <sup>2</sup> C, SPI by customer request

Serial I/O :

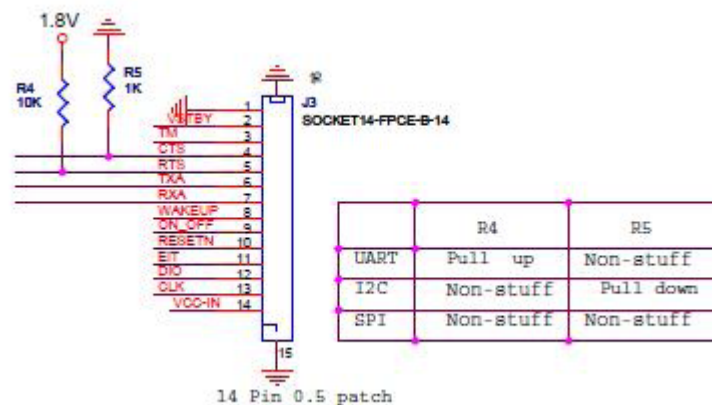
Item	Communications Speed
UART	4800~115200 bps
I <sup>2</sup> C	400K bit/s (MAX)
SPI	4000K bit/s (MAX)

## 2.5. Reference design

Power Supply :

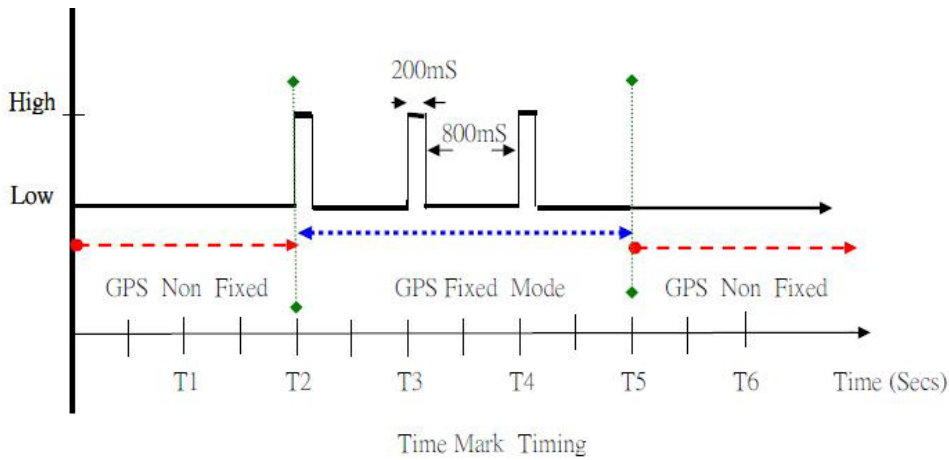


BUS Interface :



- All ground pads attach to ground plane through via directly.

※ TM(Time Mark) : when GPS is fixed, the cycle will be shown as below :



### 3. Software

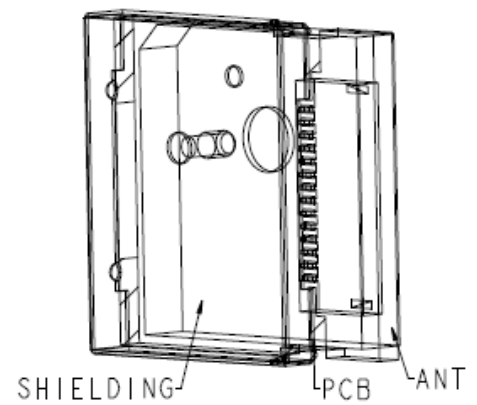
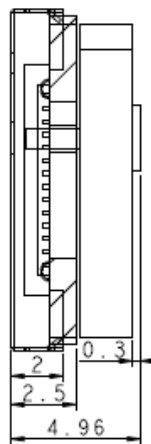
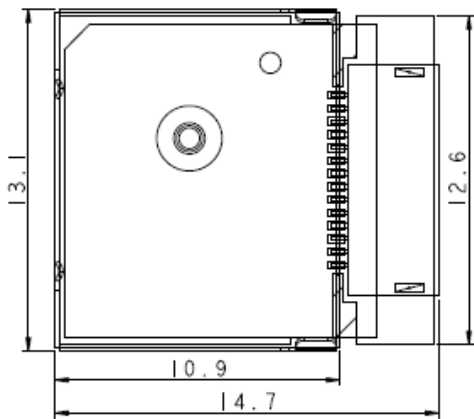
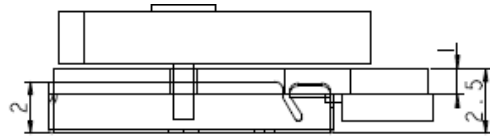
The Ct-G434 includes GSW4e, the SiRF standard GPS software for SiRFstarIV low power single chipset receivers and its features include:

- 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.X.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. Electrical specifications

### 4.1 Outline Drawing



### ※ Tolerance

Length	14.7±0.3mm
Width	13.1±0.3mm
Height	4.96±0.3mm

## 5. Appendix

5.1 Ct-G434 14p connector specification, Please refer follwing:

**FPC CONNECTOR SMD P0.5mm**

