GPS Module

Ct-G430/Ct-G430P

Specifications Sheet V0.2

Features:

◆ **SiRF StarIV ultra low power chipset**
◆ **Compact module size for easy integration : 24 x 20 x 2.9 mm**
◆ **I^2C/SPI pins reserved for customizing special user applications (Default: UART)**
◆ **Fully utilized SS4 upgrade features**

1. Introduction

The Connectec Ct-G430/Ct-G430P GPS module is a high sensitivity, low power, Surface Mount Device (SMD) that can be compatible to Ct-G348 or fully utilized SiRFstarIV upgrade features. This 48-channel global positioning system (GPS) receiver is designed for a wide range of OEM applications and is based on the GPS signal search capabilities of the SiRFstarIV GSD4e chipset, SiRF's newest chipset technology. The Ct-G430 provides flexible I/O interfaces (UART is default, I^2C and SPI by customer requirement).

The Ct-G430/Ct-G430P is designed to allow quick and easy integration into GPS-related applications such as:

- PDA, Pocket PC, Tablet and other computing devices
- Fleet Management /Asset Tracking
- AVL and Location-Based Services
- Hand-Held Device for Personal Positioning and Navigation
- All applications of battery drive device that needs lower power consumption

1.1. Features

1.1.1 Performance

- ◆ Highest performance GPS PVT engine
- ◆ High acquisition sensitivity for fast TTFF
- ◆ Extremely low weak signal tracking sensitivity
- ◆ High jamming immunity
- ◆ Smallest footprint and total solution size
- ◆ Highest level of BOM integration
- ◆ Value added software enhancements
- ◆ Multimode A-GPS (Autonomous, MS-Based, and MS-Assisted) – Need operator Support
- ◆ Embedded CGEE / SGEE (Need server support) speed up TTFF a lot and makes cold start time to be around 22 seconds.
- ◆ SiRFGeoRecov^{TM} Reverse EE make positioning process being done under power saving mode.
- ◆ Reacquisition Time: 0.1 second
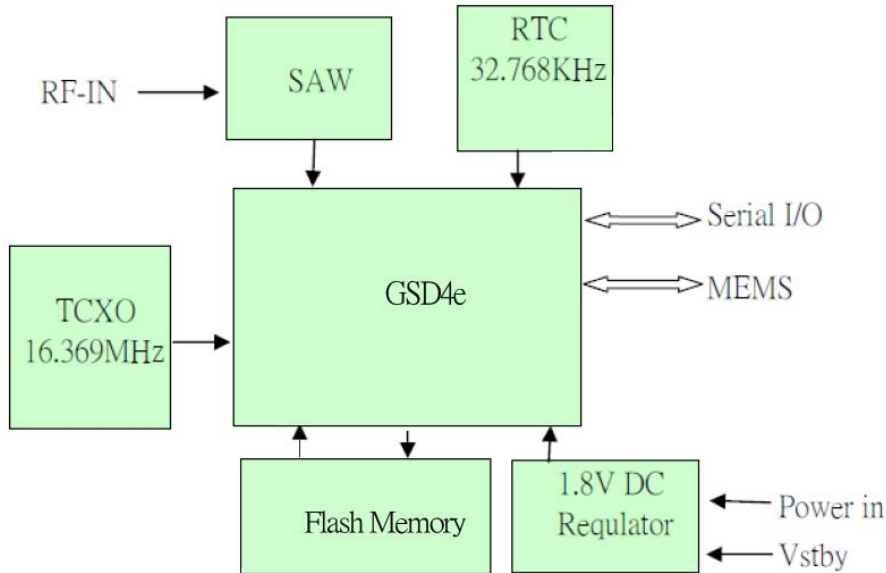- ◆ RF Metal Shield for best performance in noisy environments

1.1.2 Interface

◆ Multiple host port interfaces (UART, I^{2}C, and SPI)

◆ One I^{2}C port for MEMS connection

◆ Protocol: NMEA-0183(default)

◆ Baud Rate: 4800 bps

1.2 Advantages

◆ Built-in LNA.

◆ 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 within 2 seconds 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.

◆ Maintain tracking sensitivity as low as -163dBm, even without network assistance. (SiRF StarIII has only -159dBm sensitivity)

◆ Support SiRFaware technology :

 ◆ Support adaptive "Micro Power Controller" power management mode

 ◆ Support MEMS sensor through I^{2}C interface.(V4.X.X firmware will be support) MEMS interrupt can improve MicroPower Mode performance.

 ◆ Only 8mW Trickle Power, so user can leave power on all day instead of power off

◆ 5 Hz Navigation Update Rate : User can select 1 Hz or 5 Hz navigation update rate. (V4.1.0 firmware will be support)

◆ SBAS Ranging : SBAS satellite measurements will be used in the navigation solution for improved DOP and coverage.(V4.1.0 firmware will support)

◆ Suitable for battery drive devices that need lower power consumption application

◆ Ideal for high volume mass production(Taping reel package)

◆ Cost saving through elimination of RF and board to board digital connectors

◆ Flexible and cost effective hardware design for different application needs

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1.3 Block Diagram

Block Diagram

RF-IN → SAW

RTC 32.768KHz

TCXO 16.369MHz → GSD4e

← → Serial I/O

← → MEMS

Flash Memory

1.8V DC Regulator ← Power in

← Vstby

2. Specifications

2.1. Technical specifications

2.1.1 Module Specification

Feature	Item	Description
Chipset	GSD4e	SiRF StarIV low power single chipset
General	Frequency	L1, 1575.42 MHz
	C/A code	1.023 MHz chip rate
	Channels	48
Accuracy	Position	<2.5 meters
	Velocity	0.01 meters/second
	Time	1 microsecond synchronized to GPS time
Datum	Default	WGS-84
	Other	selectable for other Datum
Time to First Fix (TTFF) (Open Sky & Stationary Requirements)	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	2.8 ~ 5.0 VDC input
	Power consumption	50 mA (Tracking Mode)
	Backup Power	2.8 ~ 5.0 VDC battery input
Serial Port	Electrical interface	Default UART : NMEA-0183@4800bps (I2C/SPI TBA)
	Protocol messages	NMEA-0183@4800 bps (Default)

This model is defined to fully utilize SS4 extra upgrade features from SS3. Original design can also be compatible to Ct-G348. The comparison is as below table:

2.1.2 Module Comparison

	GSD4e Feature List	Ct-G430P Compatible to Ct-G348	Ct-G430 Full SS4 Features	Remark
	Power Management			
1	Full Power	●	●	
2	Trickle Power		●	
3	Push to Fix		●	
	Value added software enhancements			
4	Multimode A-GPS(Autonomous, MS-Based, and MS-Assisted	●	●	Requires Operater Support
5	Embedded CGEE	●*	●	* Production version support
6	SGEE	●	●	Requires Host "downloader"
7	SiRF GeoRecov Reverse EE	●	●	For post-processed navigation computation
	Interface			
8	MEMS sensor I2C Interface		●	
9	Single 1.8 Vdc supply voltage		●	Option
10	2.8Vdc to 5.5Vdc supply Voltage	●	●	
11	Multiple host port interfaces UART/ I2C/SPI Bus : 3.3V	●	●	Option, Selected by hw pin(CTS/RTS) and it need to be selected by buyer before shipping
12	Single ON_OFF power control pin		●	
13	Wakeup pin for external regulator shutdown control		●	
14	Reset control pin	●*	●	* Production version support
15	Backup battery pin	●*	●	* Production version support
16	1.8V I/O interface	●**	●**	** Option
	External Device Support			
17	MEMS support		●	

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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	24 mm ± 0.3mm (0.94 in)
Width	20 mm ± 0.3mm (0.79 in)
Height	2.9 mm ± 0.3mm (0.11 in)
Weight	2 gram

2.4 Interface Specifications

Items	Description
I/O	28 pin SMD micro package
Serial I/O	UART, I^2C, SPI by customer request

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3. Software

The Ct-G430/Ct-G430P module includes GSD4e, the SiRF standard GPS software for SiRFstarIV low power single chipset receivers and its features include:

- Excellent sensitivity

- High configurability

- 1 Hz / 5Hz (GSD4e_4.1.0) position update rate

- Supports use of SBAS(satellite-based augmentation systems), WAAS, EGNOS, MSAS,GAGAN

- Enhanced Navigation Performance

- Improved Jamming Mitigation

- Improved Ephemeris Availability

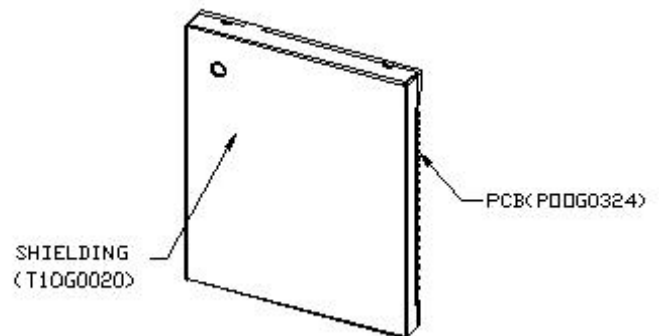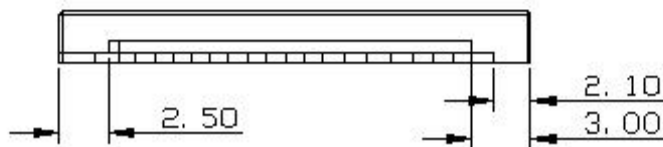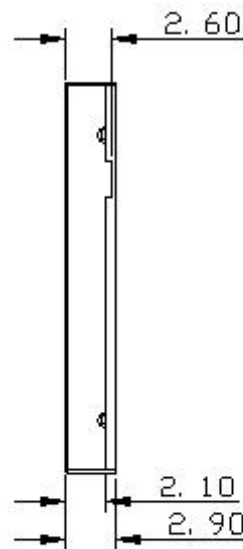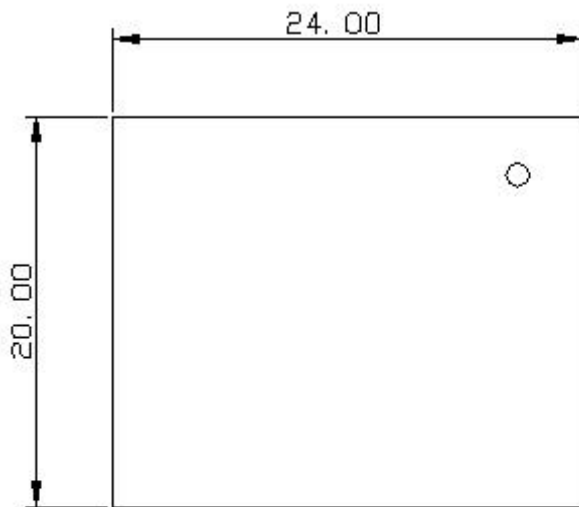- Default configuration is as follows:

Item	Description
Core of firmware	SiRF GSD4e_4.1.0
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 Dimensions

4.1 Outline Drawing

Tolerance:

Length	24.0 ± 0.3 mm
Width	20.0 ± 0.3 mm
Height	2.90 ± 0.3 mm

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4.2 Recommended Footprint

(Unit : mm)

PCB LAYOUT