

GPS RECEIVER MODULE

CR-105 SPECIFICATION

HOLUX CONFIDENTIAL



1F, No. 30, R&D Rd. II, HsinChu City 300, Science-based Industrial Park, Taiwan

(300) 新竹市科學園區研發二路 30 號 1 樓

TEL: 03-6687000 FAX: 03-6687111

Website: www.holux.com

All Right Reserved

Version change history

Version	Date	Revised Reason
V.01	2007/4/19	Draft release

HOLUX CONFIDENTIAL

Outline

- 1 Introduction
 - 1.1 General introduction
 - 1.2 Key Features
 - 1.3 Applications
 - 1.4 Look& Feel
- 2 Technical Description
 - 2.1 Block Diagram
 - 2.2 Pin Definition
 - 2.3 Specification
- 3 Mechanical Dimension
 - 3.1 Mechanical Dimension
- 4 User Interface
 - 4.1 Protocol
 - 4.1.1 NMEA Protocol
 - 4.1.2 MTK NMEA Packet Format
- 5 Customer design recommendation
 - 5.1 Recommend Layout Pattern
 - 5.2 Recommend H/W
 - 5.2.1 FFC Connector Layout
 - 5.2.2 FFC connector cable
 - 5.2.3 Antenna
 - 5.2.4 Recommend circuit

1. Introduction

1.1 General introductions

CR-105 is an ultra miniature 18.5 * 25.45 * 5.8 mm GPS receiver module integrated with patch built in low power consumption MTK GPS solution. It provides superior sensitivity up to -159dBm and fast Time-To-First-Fix in navigation application. The stable performance of **CR-105** is your best choice to be embedded in your portable device design, like PDA 、PND 、mobile phone 、Digital Camera for GPS service.

1.2 Key Features

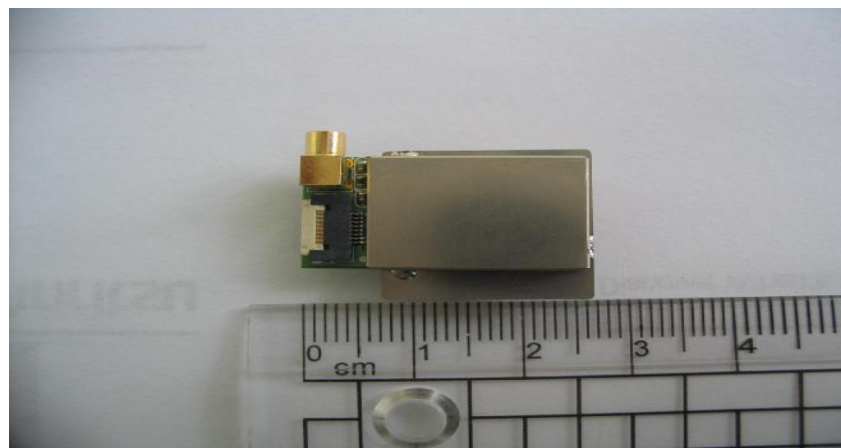
- small form factor: 18.5 * 25.45 * 5.8 mm
- RoHS/WEEE compliant
- High sensitivity -159dBm
- Searching up to 32 Channel of satellites
- Fast Position Fix
- Low power consumption
- EE Design benefit for customer

1.3 Applications

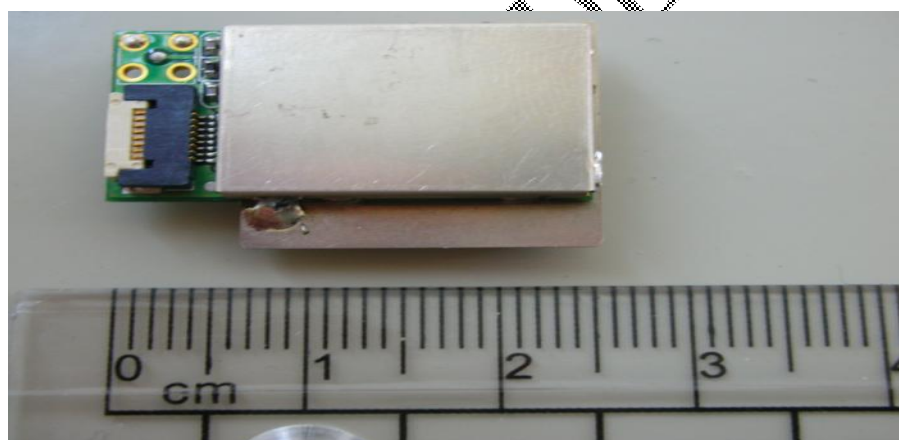
- Automotive and Marine Navigation
- Automotive Navigator Tracking
- Emergency Locator
- Geographic Surveying
- Personal Positioning
- Sporting and Recreation
- Embedded applications
- Smart phone, UMPC, PND, MP4

1.4 Look & Feel

1.4.1 To have MMCX

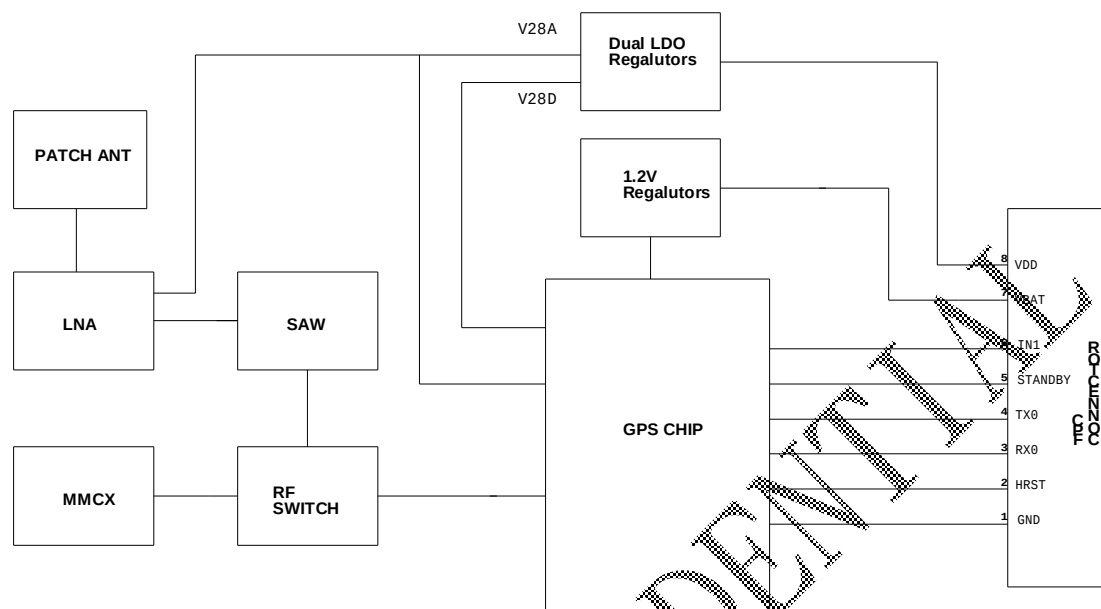


1.4.2 without MMCX



2 Technical Description

2.1 Block Diagram

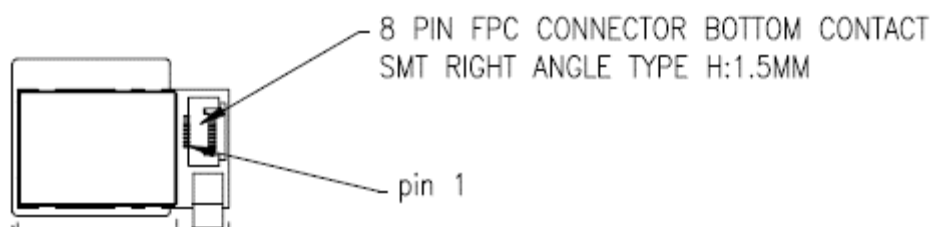


2.2 Pin Definition

Pin	Pin Name	Type	Function description
1	GND	I	GND
2	HRST	I	System reset, Active low
3	RXD0	I	Serial Data input UART0
4	TXD0	O	Serial Data Output UART0
5	STANDBY	I	Standby Mode Hi: Standby mode, Low: Normal mode
6	INT1	I/O	GPIO/External interrupt
7	VBAT	I	3 ~ 5 V supply input
8	VDD	I	3 ~ 5 V supply input

I: Input O: Output I/O: Input or Output, Open if not used

Bottom View



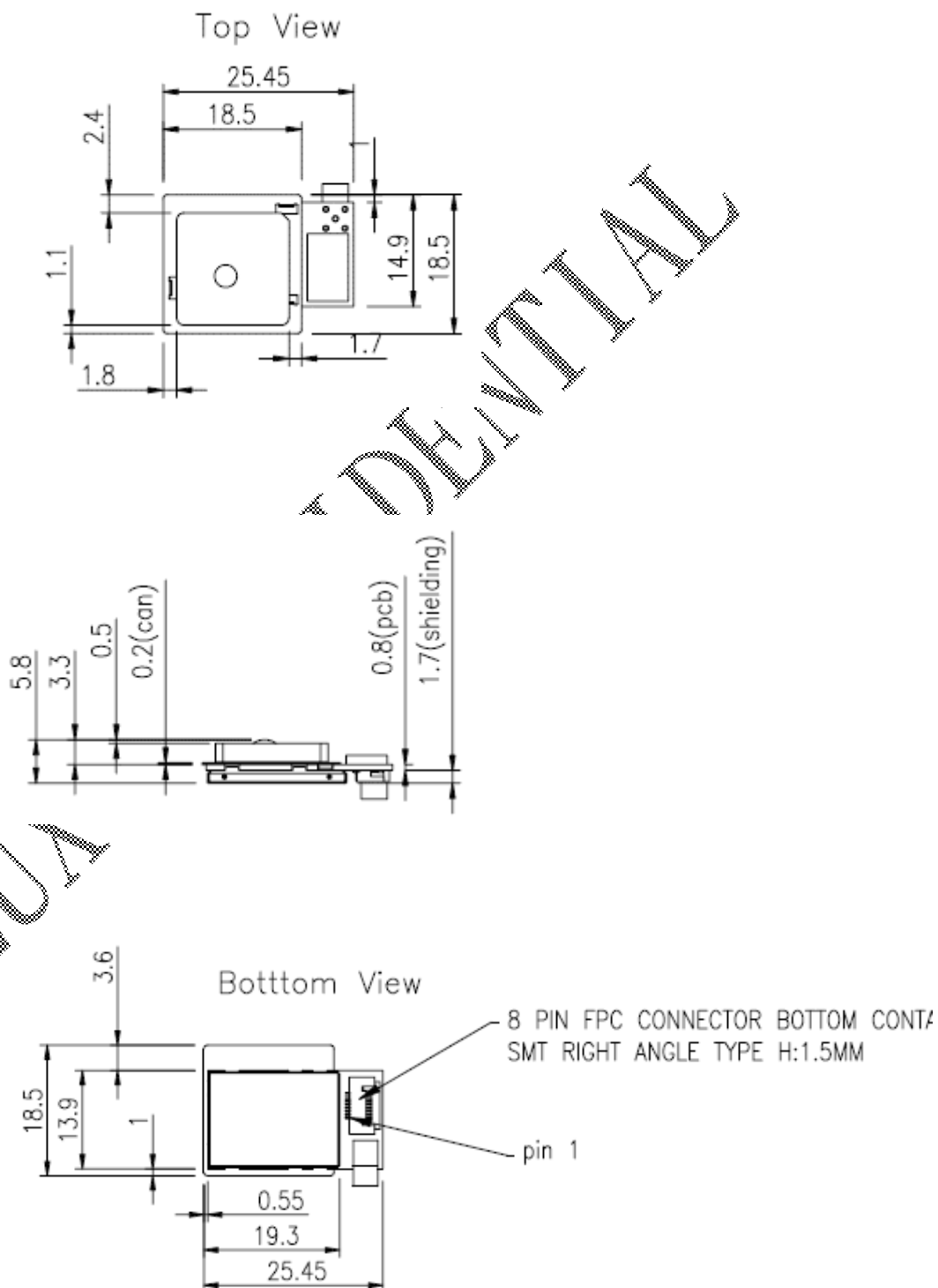
2.3 Specification

General	
GPS technology	MTK GPS chipset
Frequency	L1,1575.42MHz
C/A Code	1.023MHZ chip rate
Channels	32 channels all in view searching
Sensitivity	Better than -159dBm
Receiver Accuracy	
Position	Without aid:3.0 M 2D-RMS DGPS(WAAS, EGNOS, MSAS, RTCM):2.3m
Velocity	Without aid:0.1M/sec
Time	0.1 microsecond. Sync GPS time
Datum	
Datum	WGS84(Default) total 219 datum's
Time to First Fix (Follow MTK chip specification)	
Hot start	1 sec average
Warm start	33 sec average
Cold start	36 sec average
Reacquisition	< 1sec
Protocol	
GPS Output Data	NMEA0183(v3.1)- GGA, GLL, GSA, GSV, RMC, VTG Support Baud rate 4800/9600/..../57600 bps (default 4800), Data bit:8, Stop bit:1
Update Rate	1Hz(default)
Protocol Support	NMEA-0183
1PPS	Enable(1Hz pulse 10% duty cycle)
Limitations	
Acceleration Limit	< 4G
Altitude Limit	< 18000 meters
Velocity Limit	< 515 M/sec
Jerk Limit	20 M/sec ³
Power	
Operation Current	Acquisition:65 mA@3.3V
Operation Current	Tracking: < 35mA@3.3V
DC Input Range	VCC 3.0~5.0V

	VBAT 3.0~5.0V
Temperature	
Operating	-40°C to 85°C
Storage	-40°C to 125°C
Humidity	≤ 95% , non condensing
Physical	
Dimension	18.5 * 25.45 * 5.8 mm(Not include GND PLANE)
Weight	
Antenna	
Impedance	50Ω
Protection	Build-in short circuit and Over current protection
Output Voltage	2.8VDC
Mounting	
FFC Type	8Pin

3. Mechanical Dimension

3.1 Mechanical Dimension



4 User Interface

CR-105 provides 2-wire digital UART port for communication of GPS position data using NMEA protocol or MTK extension protocol. UART port is capable of 4800 to 115200 baud rate.

4.1 Protocol

CR-105 is default to support standard NMEA-0183 protocol. In addition, a series of MTK extensions (PMTK messages) have been developed that can be used to provide extended capabilities common to many applications.

4.1.1 NMEA Protocol

CR-105 is capable of supporting following NMEA formats:

NMEA RECORD	Description
GGA	GPS fix data
GLL	Geographic
GSA	GNSS DOP and active satellite
GSV	GNSS Satellites in view
RMC	Recommended minimum specific GNSS data
VTG	Course Over Ground and Ground Speed
ZDA	Time&Data

4.1.2 MTK NMEA Packet Format

Preamble	TalkerID	PktType	Data field	*	CHK1	CHK2	CR	LF
----------	----------	---------	------------	---	------	------	----	----

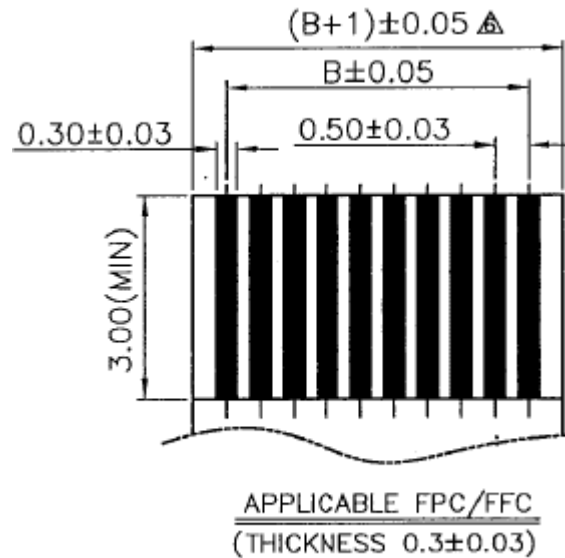
Maximum packet length is restricted to 255 bytes

Field	Length	Type	D
Preamble	1 byte	Character	“\$”
TalkerID	4 byte	Character string	“PMTK”
PktType	3 byte	Character string	“000” to “999”, an identifier used to tell the decoder how to decode the packet
Data Field	Variable		“,” must be inserted ahead each data field to help the decoder process the Data Field
*	1 byte	Character	The star symbol is used to mark the end of Data Field
CHK1 CHK2	2 byte	Character string	checksum of the data between Preamble “\$,” and “*”
CR, LF	2 byte	Binary data	used to identify the end of a packet

5. Customer design recommendation

5.1 Recommend Layout Pattern

5.1.1 FFC Connector Layout



5.1.2 FFC connector cable

Pitch 0.5mm 8pin Flat Flexible cable

- ※ Reference connector cable: ENTERY INDUSTRIAL CO.,LTD
- ※ Product No:A08020C3344NB

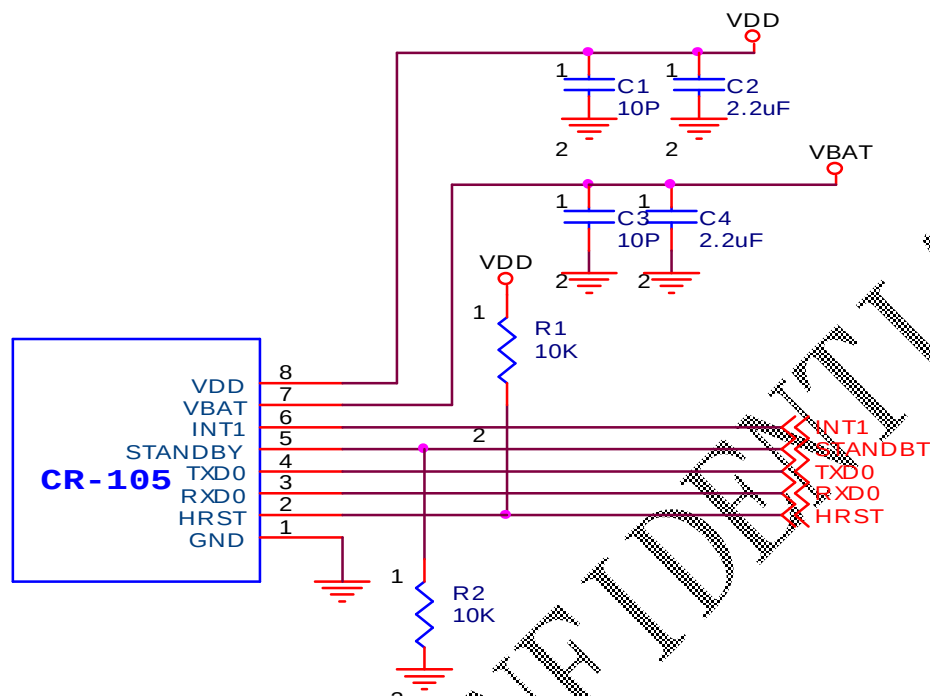
5.2 Recommend H/W specification

- Active antenna connector: MMCX connector
- Interface connector: FFC connector
- GND PLANE could connect different ANT size, change GND PLANE size

5.2.1 Antenna

- Use active antenna that work with 2.8V power supply
- Receiving frequency $1.57542\text{GHz} \pm 1.032\text{MHz}$
- Polarization RHCP (right hand circular polarized)
- Output impedance = 50Ω
- Noise figure $\leq 2.0\text{dB}$
- $15\text{dB} \leq \text{LNA Gain} \leq 20\text{dB}$

5.2.2 Recommend circuit



Note1: VDD (pin8) could connect to 3~5Vdc power supply

Note2: VBAT (pin7) could connect to 3~5Vdc power supply

Note3: HRST (pin2) active LOW

Note4: STANDBY (pin5) active HIGH, enter standby mode