

# SPECIFICATION OF APPROVAL

## 规格承认书

CUSTOMER /客户	
PRODUCT NAME/产品类别	GPS Module
CUSTOMER PRODUCT NO./客户产品编号	
MODEL No./产品型号	<b>CDT-U17RV2A-9600</b>
DATE/日期	2015-12-7
EDITION/版本	V:0A

SUPPLIER/供应者签署	ACCEPTANCE/承认者签署
深圳市荣泰电子有限公司	

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Prepared/制作	甘工

# Functional Overview

The CDT-U17RV2A-9600 designed by RongTai basing on the U7020-KT is a new generation of GPS receiving module. It's up to 66 acquisition and 22 simultaneously tracking channel, ultra-high sensitive GPS receiving module. Based on new highly integrated Ublox chips and meticulously integration key parts of RongTai.. In the same chip specifications, this product has faster GPS signals ability to capture, lower power consumption, more strong anti-jamming performance and more wide working voltage range.

CDT-U17RV2A-9600 module designed with industrial requirements, using stamps package, can adapt to wet high temperature, electromagnetic interference etc. odiously working environment. It is widely used in monitoring, positioning, mapping, navigation, security applications.

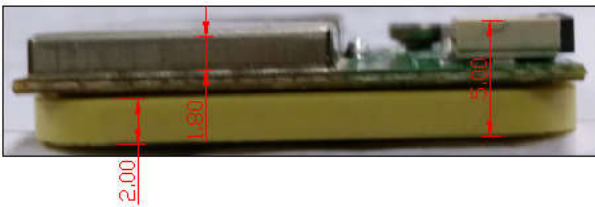
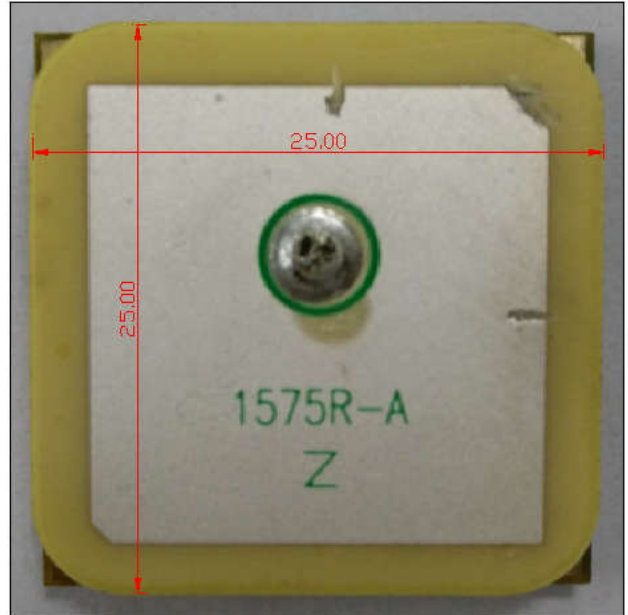
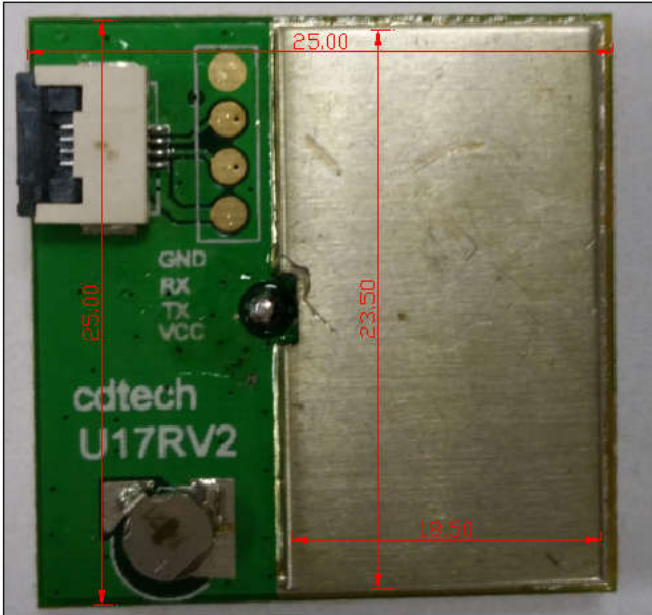
## Applications

- Automotive navigation
- Personal positioning
- Fleet management
- Marine navigation

## Product Features

- U7020-KT high performance GPS Chipset
- Very high sensitivity(Tracking Sensitivity:-165 d B m)
- Extremely fast TTFF(Time To First Fix) at low signal level
- Support UART interface
- Built-in LNA
- Compact size(25mmx25mmx5mm)suitable for space-sensitive application
- One size component, easy to mount on another PCB board
- Support NMEA0183 V3.0(GGA,GSA, GSV,RMC)
- Support OSP protocol
- MEMS Support: 3-axis Magnetometer for compass heading for “Point and Tell” feature
- Micro Power Mode (MPM) :Reduce MPM current consumption from<500uA
- Support SBAS (WASS, EGNOS,MSAS,GAGAN)
- Battery on board
- antenna on board
- 200mm±2mm3.5 audio connector

# Pin Assignment



单位: mm

## Electrical Characteristics

**Absolute      Maximum  
Rating            Rating**

Parameter	Symbol	Min	Max	Units
Power Supply				
Power Supply Volt.	VCC	3.3	5.5	V
Input Pins				
Input Pin Voltage I/O	RXA	-0.3	3.63	V
Environment				
Storage Temperature	Tstg	-40	125	°C
Peak Reflow Soldering Temperature	Tneak		260	°C
Humidity			95	%

Note: Absolute maximum ratings are stress ratings only, and functional operation at the maxims is not guaranteed. Stress beyond the limits specified in this table may affect device reliability or cause permanent damage to the device. For functional operating conditions, refer to the operating conditions tables as follow.

## Product Specifications

Parameter	Specification
Chip	U7020-KT
Receiver Type	L1 frequency band 1575.42 MHz, C/A code, 80 Channels
Sensitivity	Tracking -165dBm Acquisition -148dBm(cold)/-163dBm(hot)
Accuracy	Position < 5 M (Typical Open Sky) Velocity 0.1m/s
Acquisition Time	Cold Start 25s (Typical Open Sky) Warm Start 22s Hot Start 1s
Power Consumption	Tracking 45mA @3.3V Typical Acquisition 40mA @3.3V
Navigation Data Update Rate	1Hz
Operational Limits	Altitude Max 18,000m Velocity Max 515m/s Acceleration Less than 4g
Protocol Support	NMEA 0183 Ver.3.0 9600bps 1Hz: GGA,GSA,GSV,RMC,VTG,GLL

# SOFTWARE COMMAND

## NMEA Output Command

### NMEA 0183 Protocol

The NMEA protocol is an ASCII-based protocol, Records start with a \$ and with carriage return/line feed. GPS specific messages all start with \$GP xxx where xxx is a three-letter identifier of the message data that follows. NMEA messages have a checksum, which allows detection of corrupted data transfers.

The **CDT-U17RV2A-9600** supports the following NMEA-0183 messages: GGA, GSA, RMC. The module default NMEA-0183 output is set up GGA, GSA, GSV, RMC and default baud rate is set up 9600bps. Table 1: NMEA-0183 Output Messages

NMEA Record	DESCRIPTION
GGA	Global positioning system fixed data
GSA	GNSS DOP and active satellites
GSV	GNSS satellites in view
RMC	Recommended minimum specific GNSS data

### GGA-Global .Positioning System Fixed Data

Table 2 contains the values of the following example:

\$GPGGA, 025438.000, 2232.8557,N, 11 3 5 5 . 7 4 3 8 ,E, 1,04,1.0, 65.5,M, ,M, ,0000\*75

Table 2: GGA Data Format

Name	Example	Units	Description
Message ID	\$GPGGA		GGA protocol header
UTC Time	025438.000		hhmmss.sss
Latitude	2232.8557		ddmm.mmmm
N/S indicator	N		N=north or S=south
Longitude	11 3 5 5 . 7 4 3 8		ddmm.mmmm
E/W Indicator	E		E=east or W=west
Position Fix Indicator	1		See Table 2-1
Satellites Used	04		Range 00 to 12
HDOP	1.0		Horizontal Dilution of Precision
MSL Altitude	65.5	meters	Altitude above mean seal level
Units	M	meters	
Geoids Separation		meters	Separation from Geoids can be bank
Units	M	meters	
Age of Diff.Corr.		second	Null fields when DGPS is not Used
Diff.Ref.Station ID	0000		Null fields when DGPS is not Used
Checksum	*75		
<CR> <LF>			End of message termination(ASCII 13, ASCII 10)

Table 2-1: Position Fix Indicators

Value	Description
0	Fix not available or invalid
1	GPS SPS Mode, fix valid
2	Differential GPS, SPS Mode, fix valid
3	GPS PPS Mode, fix valid

**GSA-GNSS DOP and Active Satellites**

Table 4 contains the values of the following example:

\$GPGSA , A, 3, 07, 02, 26,27, 09, 04,15, , , , , 1.8,1.0,1.5\*33.

Table 4: GSA Data Format

Name	Example	Units	Description
Message	\$GPGSA		GSA protocol header
Mode 1	A		See Table 4-2
Mode 2	3		See Table 4-1
Satellite Used	07		Sv on Channel 1
Satellite Used	02		Sv on Channel 2
...	...		...
Satellite Used			Sv on Channel 12
PDOP	1.8		Position Dilution of Precision
HDOP	1.0		Horizontal Dilution of Precision
VDOP	1.5		Vertical Dilution of Precision
Checksum	*33		
<CR> <LF>			End of message termination(ASCII 13, ASCII 10)

Table 4-1: Mode 1

Value	Description
1	Fix not available
2	2D
3	3D

Table 4-2: Mode 2

Value	Description
M	Manual-forced to operate in 2D or 3D mode
A	Automatic-allowed to automatically switch 2D/3D

**GSV-GNSS Satellites in View**

Table 5 contains the values of the following example:

\$GPGSV , 2, 1, 07, 07, 79, 048, 42, 02, 51,062, 43, 26, 36,256, 42, 27, 27, 138,42\*71

\$GPGSV , 2, 2, 07, 09, 23,313, 42, 04, 19, 159, 41, 15,12,041, 42\*41.

Table 5: GSV Data Format

Name	Example	Units	Description
Message ID	\$GPGSV		GSV protocol header
Number of Message	2		Range 1 to 3
Message Number	1		Range 1 to 3
Satellites in View	07		
Satellite ID	07		Channel 1(Range 1 to 32)
Elevation	79	degrees	Channel 1(Maximum 90)
Azinmuth	048	degrees	Channel 1(True, Range 0 to 359)
SNR(C/NO)	42	dBHz	Range 0 to 99,null when not tracking
...			...
Satellite ID	27		Channel 4(Range 1 to 32)
Elevation	27	degrees	Channel 4(Maximum 90)
Azimuth	138	degrees	Channel 4(True, Range 0 to 359)
SNR(C/NO)	42	dBHz	Range 0 to 99, null when not tracking
Checksum	*71		
<CR> <LF>			End of message termination(ASCII 13, ASCII 10)

Depending on the number of satellites tracked multiple messages of GSV data may be required.

**RMC-Recommended Minimum Specific GNSS Data**

Table 6 contains the values of the following example:

\$GPRMC, 025439.000, A, 2232.8557, N, 11355.7438, E, 0.13, 309.62, 031209, , \*10

Table 6: RMC Data Format

Name	Example	Units	Description
Message ID	\$GPRMC		RMC protocol header
UTC Time	025439.000		hhmmss.sss
Status	A		A=data valid or V=data not valid
Latitude	2232.8557		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	11355.7438		Ddmm.mmmm
E/W Indicator	E		E=east or W=west
Speed Over Ground	0.13	Knots	
Course Over Ground	309.62	Degrees	True
Date	031209		Dummy
Magnetic variation		Degrees	Not used
E/W indicator			Not used
Mode			Only NMEA0183 version 3.00 output
Checksum	*10	hexadecimal	
<CR> <LF>			End of message termination(ASCII 13, ASCII 10)