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Product name	Description	Version
MC-1722-T	Datasheet of MC-1722-T L1/L5 GNSS module	1.3

1 Introduction

The MC-1722-T is a high-performance L1 and L5 dual-band, multi-frequency GNSS module that designed for timing applications. The module supports concurrent reception of GPS, GLONASS, BeiDou, GALILEO and QZSS to improve the availability and reliability.

2 Features

- Dual-band, multi-frequency
- Capable of SBAS (WAAS, EGNOS, MSAS, GAGAN)
- GNSS based timing solution for O-RAN (Open Radio Access Network)
- 1PPS stability ±2ns (1σ)
- User can set the PPS accuracy related to a reference time
- Low power consumption
- Fast TTFF at low signal level
- RoHS compliant
- IATF 16949 quality control

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3 System Block Diagram

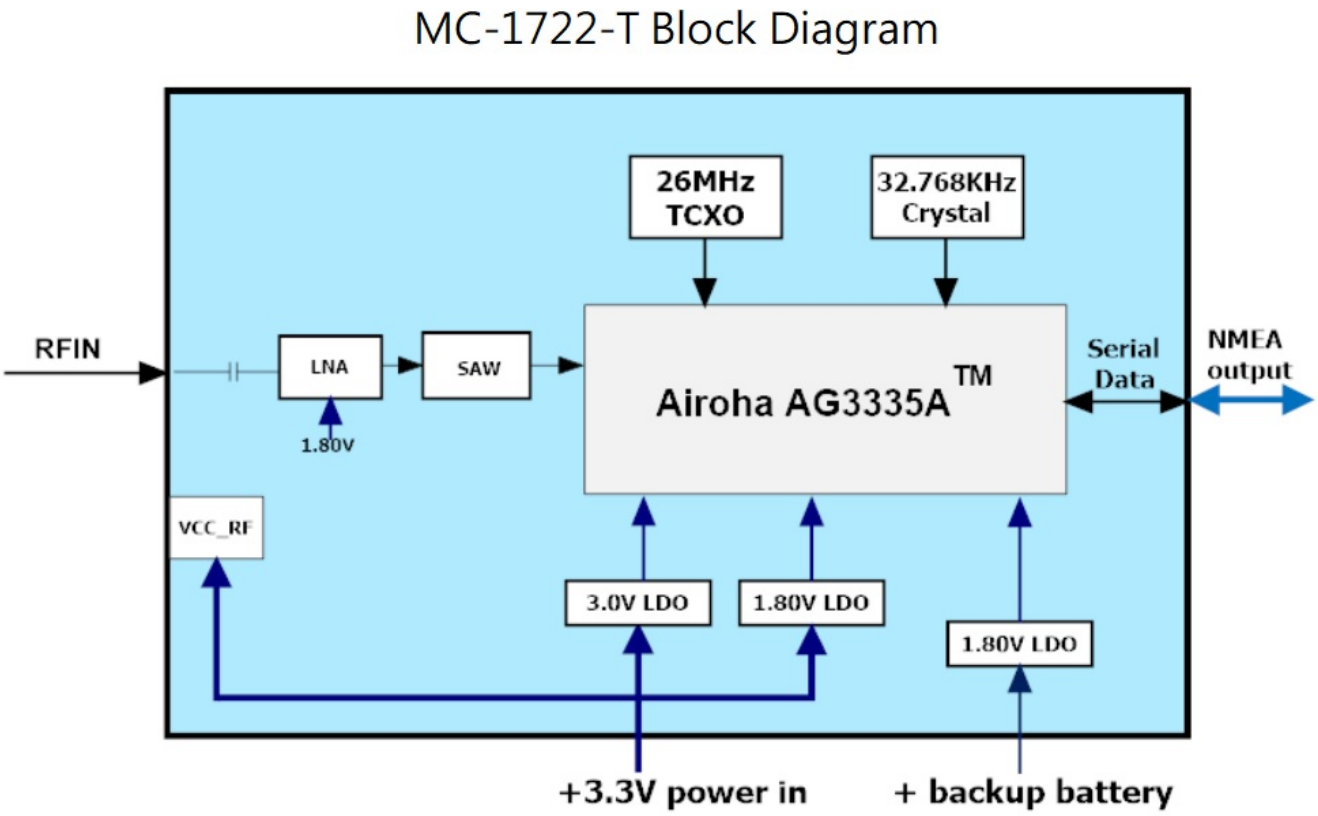

Fig 3-1 System block diagram.

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4 GNSS receiver

4.1 GNSS receiver

Chip	Airoha AG3335A	
Frequency	GPS: L1 C/A, L5C GLONASS: L1OF GALILEO: E1, E5a BEIDOU: B1I, B2a	
Channels	Support 135 channels	
Update rate	1Hz default	
Sensitivity	Tracking	Up to -166dBm
	Cold start	Up to -147dBm
Acquisition Time	Cold Start (Open Sky)	28s (typical)
Position Accuracy	Autonomous(1)	1.5 m CEP
Time Pulse Stability(2)	up to ±2ns(3)(4) 1 σ	
Max. Altitude	< 18,000 m	
Max. Velocity	< 500 m/s	
Protocol Support	NMEA 0183 ver 4.1	115200 bps, 8 data bits, no parity, 1 stop bits 1Hz: GSV, GGA, GLL, GSA, RMC, VTG, GST

Note 1: Depends on the satellite visibility, geometric distribution of satellites in the sky, and received signal quality and characteristics.
Note 2: User can set the pulse accuracy related to a reference time, please refer to Table 8.3-5.
Note 3: Position-hold mode, please refer to Table 8.3-3.
Note 4: Lab test with GNSS simulator.

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5 Pin assignment (Top View)

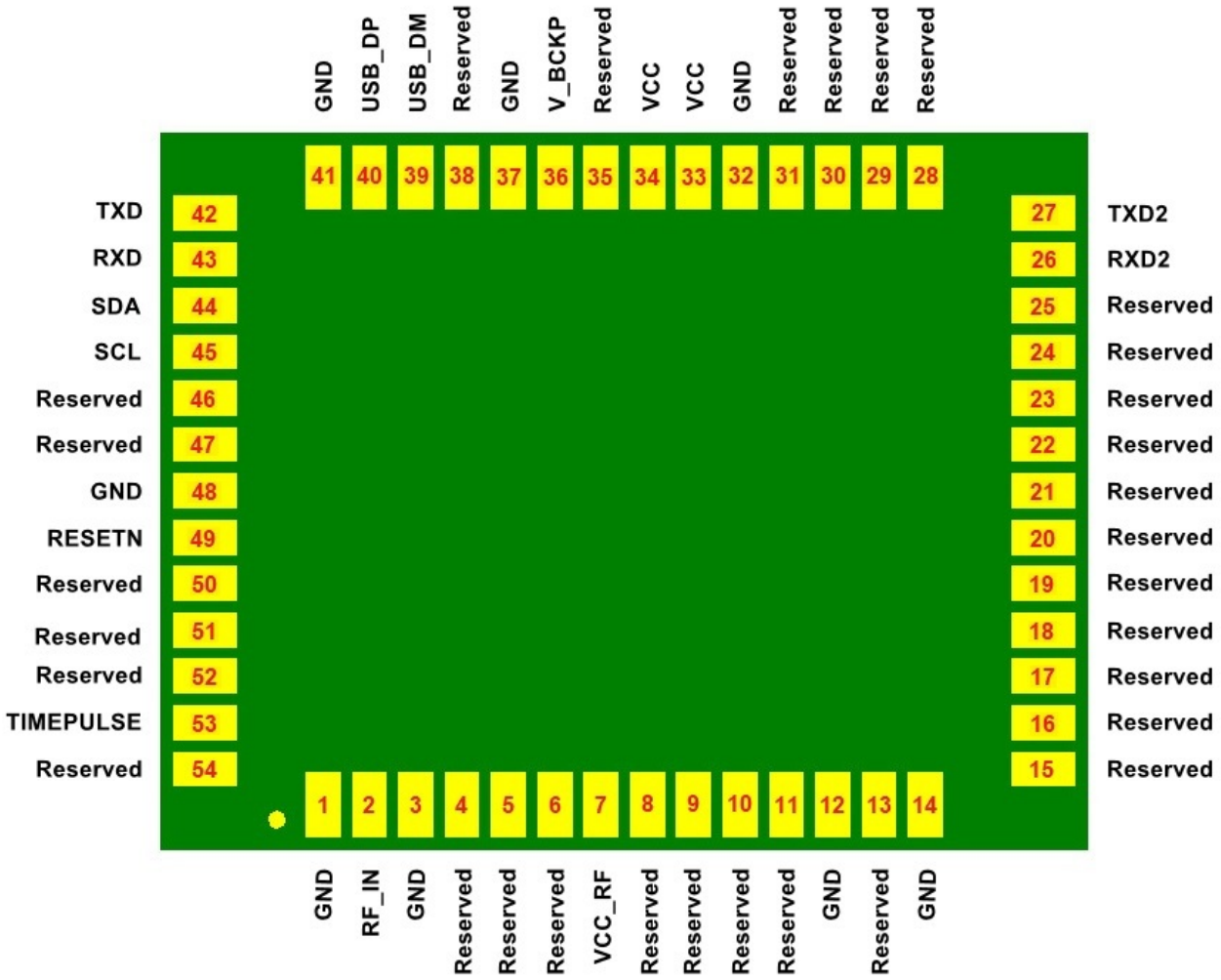

Table 5-1 Pin descriptions

Pin no.	Name	Type	Description	Note
1	GND		Ground	
2	RF_IN	I	GNSS RF signal input	1
3	GND		Ground	
4	Reserved		Reserved, keep floating.	
5	Reserved		Reserved, keep floating.	
6	Reserved		Reserved, keep floating.	
7	VCC_RF	O	Output voltage (same as VCC) for active antenna	2
8	Reserved		Reserved, keep floating.	
9	Reserved		Reserved, keep floating.	

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10	Reserved		Reserved, keep floating.	
11	Reserved		Reserved, keep floating.	
12	GND		Ground	
13	Reserved		Reserved, keep floating.	
14	GND		Ground	
15	Reserved		Reserved, keep floating	
16	Reserved		Reserved, keep floating.	
17	Reserved		Reserved, keep floating.	
18	Reserved		Reserved, keep floating.	
19	Reserved		Reserved, keep floating.	
20	Reserved		Reserved, keep floating.	
21	Reserved		Reserved, keep floating.	
22	Reserved		Reserved, keep floating.	
23	Reserved		Reserved, keep floating.	
24	Reserved		Reserved, keep floating.	
25	Reserved		Reserved, keep floating.	
26	RXD2	I	UART, asynchronous input, keep floating if not used.	
27	TXD2	O	UART, asynchronous output, keep floating if not used.	
28	Reserved		Reserved, keep floating.	
29	Reserved		Reserved, keep floating.	
30	Reserved		Reserved, keep floating.	
31	Reserved		Reserved, keep floating.	
32	GND		Ground	
33	VCC	I	DC supply voltage	
34	VCC	I	DC supply voltage	
35	Reserved		Reserved, keep floating.	
36	V_BCKP	I	Backup supply voltage	3
37	GND		Ground	
38	Reserved		Reserved, keep floating.	
39	USB_DM	I/O	USB 2.0 signal DM (Optional)	4
40	USB_DP	I/O	USB 2.0 signal DP (Optional)	4
41	GND		Ground	
42	TXD	O	UART, asynchronous output (default NMEA output)	

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43	RXD	I	UART, asynchronous input	
44	SDA	I/O	Slave I2C data, internal pull up to 3.0V with 10K resistor.	
45	SCL	I/O	Slave I2C clock, internal pull up to 3.0V with 10K resistor.	
46	Reserved		Reserved, keep floating.	
47	Reserved		Reserved, keep floating.	
48	GND		Ground	
49	RESETN	I	Reset,1.8V level, active low, keep floating if not used.	
50	Reserved		Reserved, keep floating.	
51	Reserved		Reserved, keep floating.	
52	Reserved		Reserved, keep floating.	
53	TIMEPULSE	O	Time pulse, 1 pps output.	
54	Reserved		Reserved, keep floating.	

Note 1: The overall gain of the active antenna must be smaller than 18dB.
Note 2: Please refer the antenna's specification to provide proper voltage.
Note 3: Not support HW RTC.
Note 4: No WHQL certification.

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6 DC & Temperature characteristics

6.1 Absolute maximum ratings

Parameter	Symbol	Ratings	Units
Input Voltage	VCC	3.6	V
Input Backup Battery Voltage	V_BCKP	3.6	V
Operating Temperature Range	Topr	-40 ~ 85	℃
Storage Temperature Range	Tstg	-40 ~ 85	℃

6.2 DC Electrical characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Input Voltage	VCC		3.3	3.3	3.6	V
Input Backup Battery Voltage	V_BCKP		3.0		3.6	V
VCC_RF Output Voltage	VCC_RF			VCC		V
Supply Current (VCC = 3.3V, w/o active antenna)	Iss	Tracking		73		mA
Backup Battery Current	Ibat	VCC = 0V		90		uA
VCC_RF Output Current	I_{out}	VIN = 3.3V			25	mA
High Level Input Voltage	V_{IH}		2.3		3.6	V
Low Level Input Voltage	V_{IL}		-0.3		0.8	V
High Level Output Voltage	V_{OH}		2.3			V
Low Level Output Voltage	V_{OL}				0.4	V

Note : All values are measured at 25℃ ambient temperature.

6.3 Temperature characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Operating Temperature	Topr	-40	-	85	℃
Storage Temperature	Tstg	-40	25	85	℃

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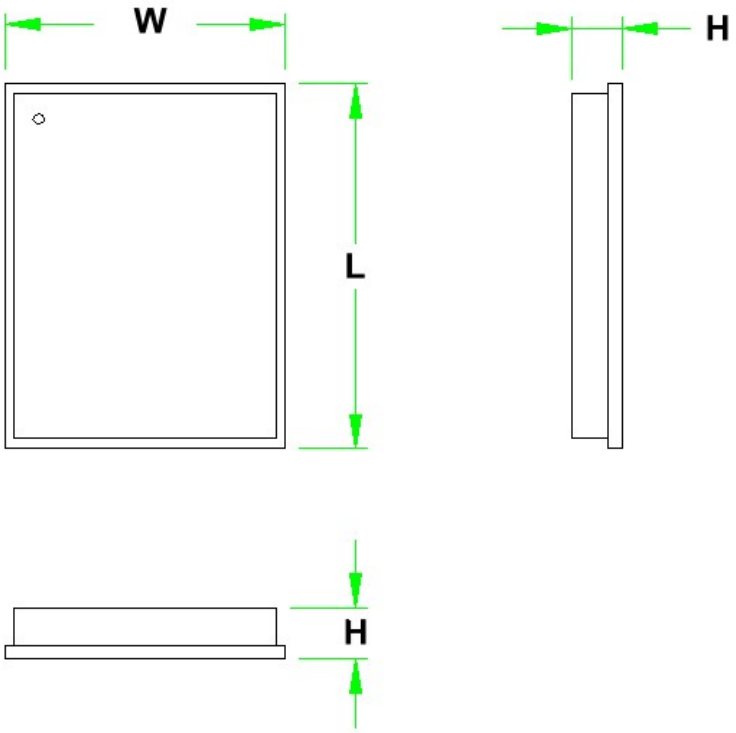
7 Mechanical specification

7.1 Outline dimensions



Symbol	Min. (mm)	Typ. (mm)	Max. (mm)
W	17.10	17.20	17.30
L	22.20	22.40	22.70
H	2.30	2.50	2.70

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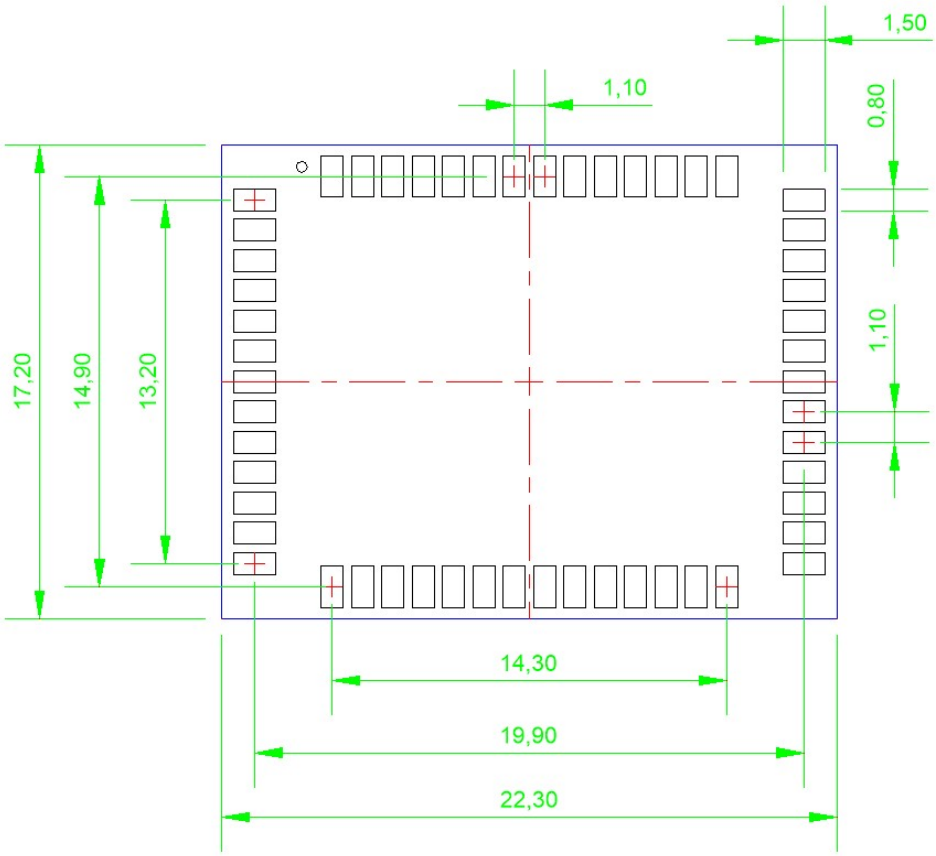
7.2 Mechanical dimensions (Bottom View)



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8 Software interface

8.1 NMEA output message

Table 8.1-1 NMEA output message

NMEA record	Description
GGA	Global positioning system fixed data
GLL	Geographic position - latitude/longitude
GSA	GNSS DOP and active satellites
GSV	GNSS satellites in view
RMC	Recommended minimum specific GNSS data
VTG	Course over ground and ground speed
GST	Estimated error in position solution

- **GGA--- Global Positioning System Fixed Data**

Table 8.1-2 contains the values for the following example:

$GNGGA,013654.000,2503.71447,N,12138.74593,E,1,16,0.7,130.00,M,15.3,M,,*72

Table 8.1- 2 GGA Data Format

Name	Example	Units	Description
Message ID	$GNGGA		GGA protocol header
UTC Time	013654.000		hhmmss.sss
Latitude	2503.71447		ddmm.mmmmm
N/S indicator	N		Latitude Direction: North or South
Longitude	12138.74593		dddmm.mmmmm
E/W Indicator	E		Longitude Direction: East or West
Position Fix Indicator	1		See Table 8.1-3
Satellites Used	16		Satellites in use
HDOP	0.7		Horizontal Dilution of Precision,max:99.0
MSL Altitude	130.00	meters	Height above mean sea level
Units	M	meters	Reference Unit for Altitude (“M” = meters)
Geoidal Separation	15.3	meters	Geoidal Separation measure in “M” = meters
Units	M	meters	Reference Unit for Geoidal Separation (“M” = meters)
DGPS Age			Not supported
DGPS Reference			Not supported
Checksum	*72		
<CR> <LF>			End of message termination

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Table 8.1-3 Position Fix Indicators

Value	Description
0	Fix not available or invalid
1	GNSS fix valid
2	Differential GNSS fix valid
4	RTK fixed
6	Estimated (Dead Reckoning) Mode

● GLL--- Geographic Position – Latitude/Longitude

Table 8.1-4 contains the values for the following example:

$GNGLL,2503.71447,N,12138.74593,E,013654.000,A,A*42

Table 8.1-4 GLL Data Format

Name	Example	Units	Description
Message ID	$GNGLL		GLL protocol header
Latitude	2503.71447		ddmm.mmmmm
N/S indicator	N		Latitude Direction: North or South
Longitude	12138.74593		dddmm.mmmmm
E/W indicator	E		Longitude Direction: East or West
UTC Time	013654.000		hhmmss.sss
Status	A		Validity of Data; A=data valid or V=data invalid
Mode	A		A = Autonomous mode, D = Differential mode, E = Estimated (Dead Reckoning) Mode, N=Data invalid,
Checksum	*42		
<CR> <LF>			End of message termination

● GSA---GNSS DOP and Active Satellites

Table 8.1-5 contains the values for the following example:

$GNGSA,A,3,11,195,194,199,08,07,01,27,16,09,23,,1.19,0.64,1.00,1*3F

$GNGSA,A,3,87,81,76,,,,,,,,,1.19,0.64,1.00,2*0F

$GNGSA,A,3,,,,,,,,,,,,,1.19,0.64,1.00,3*09

$GNGSA,A,3,34,24,12,07,11,10,08,38,25,09,13,16,1.19,0.64,1.00,4*02

Table 8.1-5 GSA Data Format

Name	Example	Units	Description
Message ID	$GNGSA		GSA protocol header
Mode 1	A		See Table 8.1-6
Mode 2	3		See Table 8.1-7

ID of satellite used	11		SV on Channel 1
ID of satellite used	195		SV on Channel 2
….			….
ID of satellite used			SV on Channel 12
PDOP	1.19		Position Dilution of Precision
HDOP	0.64		Horizontal Dilution of Precision
VDOP	1.00		Vertical Dilution of Precision
GNSS system ID	1		See Table 8.1-8
Checksum	*3F		

Table 8.1-6 Mode 1

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

Table 8.1-7 Mode 2

Value	Description
1	No position fixed
2	2D fixed
3	3D fixed

Table 8.1-8 GNSS system ID

Value	Description
1	GPS
2	GLONASS
3	GALILEO
4	BEIDOU
6	IRNSS

● GSV---GNSS Satellites in View

Table 8.1-9 contains the values for the following example:

$GPGSV,3,1,09,8,71,268,47,27,63,18,49,11,44,191,46,4,41,237,46,1*54

$GPGSV,3,2,09,16,38,42,42,9,32,279,39,26,22,70,38,31,15,131,36,1*56

$GPGSV,3,3,09,7,15,320,40,1*6B

$GPGSV,1,1,04,8,71,268,50,27,63,18,49,9,32,279,43,26,22,70,42,8*6C

$GLGSV,2,1,05,82,63,47,47,83,56,182,36,80,47,9,42,79,33,85,45,1*71

$GLGSV,2,2,05,81,15,27,37,1*71

$GAGSV,1,1,04,08,48,300,43,03,47,025,45,13,36,309,42,05,06,061,34,7*79

$GAGSV,1,1,04,08,48,300,43,03,47,025,47,13,36,309,43,05,06,061,33,1*7B

$GBGSV,5,1,17,12,80,182,47,24,64,5,51,7,58,355,44,3,57,205,45,1*7C

$GBGSV,5,2,17,1,54,141,44,34,52,211,49,9,48,230,45,10,47,316,42,1*79

$GBGSV,5,3,17,26,44,100,47,16,39,207,43,4,38,117,41,2,37,240,41,1*77

$GBGSV,5,4,17,39,37,210,43,6,36,198,41,38,27,173,41,25,18,317,42,1*4E

$GBGSV,5,5,17,35,16,39,40,1*7F

$GBGSV,1,1,02,24,64,5,50,26,44,100,43,4*77

Table 8.1-9 GSV Data Format

Name	Example	Units	Description
Message ID	$GPGSV		GSV protocol header GP=GPS/QZSS,GL=GLONSS,GA=GALILEO, GB=BEIDOU, GI=IRNSS.
Total number of messages	3		Range 1 to 9
Message number	1		Range 1 to 9
Satellites in view	09		
Satellite ID	8		Channel 1
Elevation	71	degrees	Channel 1 (Range 00 to 90)
Azimuth	268	degrees	Channel 1 (Range 000 to 359)
SNR (C/No)	47	dB-Hz	Channel 1 (Range 00 to 99, null when not tracking)
….			….
Satellite ID	4		Channel 4 (Range 01 to 196)
Elevation	41	degrees	Channel 4 (Range 00 to 90)
Azimuth	237	degrees	Channel 4 (Range 000 to 359)
SNR (C/No)	46	dB-Hz	Channel 4 (Range 00 to 99, null when not tracking)
Signal ID	1		GPS/QZSS: L1 C/A=1, L5Q=8 GLONASS: L1 C/A=1 GALILEO: E1=7, E5a=1 BEIDOU: B1=1, B2a=4 IRNSS: L6=1
Checksum	*54		

- **RMC---Recommended Minimum Specific GNSS Data**

Table 8.1-10 contains the values for the following example:

$GNRMC,015924.000,A,2503.71417,N,12138.74623,E,0.1,0.0,230217,,,D*77

Table 8.1-10 RMC Data Format

Name	Example	Units	Description
Message ID	$GNRMC		RMC protocol header
UTC Time	015924.000		hhmmss.sss
Status	A		A=data valid, D=differential data, V=data invalid
Latitude	2503.71417		ddmm.mmmmm
N/S Indicator	N		Latitude Direction: North or South

Longitude	12138.74623		dddmm.mmmmm
E/W Indicator	E		Longitude Direction: East or West
Speed over ground	0.1	knots	Speed over ground in knots
Course over ground	0.0	degrees	
Date	230217		ddmmyy
Magnetic variation		degrees	
Variation sense			Magnetic Variation Direction: East or West
Mode	D		A = Autonomous mode, D = Differential mode, E = Estimated (Dead Reckoning) mode, N=Data invalid
Checksum	*77		
<CR> <LF>			End of message termination

- **VTG---Course Over Ground and Ground Speed**

Table 8.1-11 contains the values for the following example:

$GNVTG,0.0,T,,M,0.1,N,0.1,K,D*16

Table 8.1-11 VTG Data Format

Name	Example	Units	Description
Message ID	$GNVTG		VTG protocol header
Course over ground	0.0	degrees	Reference to “true” earth poles
Reference	T		Indicates “terrestrial”
Course over ground		degrees	Reference to “magnetic” earth poles
Reference	M		Indicates “Magnetic”
Speed over ground	0.1	knots	Speed over ground in knots
Units	N		Indicates “Knots”
Speed over ground	0.1	km/h	Speed over ground in kilometers per hour
Units	K		Indicates “Kilometers per hour”
Mode	D		A = Autonomous mode, D = Differential mode, E = Estimated (Dead Reckoning)mode
Checksum	*16		
<CR> <LF>			End of message termination

- **GST---Estimated error in position solution**

Table 8.1-12 contains the values for the following example:

$GNGST,081621.000,4.0,1.9,1.6,88.2,1.6,1.9,7.2*46

Table 8.1-12 GST Data Format

Name	Example	Units	Description

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Message ID	$GNGST		GST protocol header
UTC Time	081621.000		hhmmss.sss
RangeRMS	4.0	meters	RMS value of the standard deviation of the ranges
stdMajor	1.9	meters	Standard deviation of semi-major axis of error ellipse
stdMinor	1.6	meters	Standard deviation of semi-minor axis of error ellipse
Orient	88.2	degrees	Orientation of semi-major axis of error ellipse
stdLat	1.6	meters	Standard deviation of latitude error
stdLong	1.9	meters	Standard deviation of longitude error
stdAlt	7.2	meters	Standard deviation of altitude error
Checksum	*46		
<CR> <LF>			End of message termination

8.2 Proprietary input/output message

- **$PAIR006*3C:** Perform a COLD start.

  Command: $PAIR006*3C<CR><LF>

  Success Response: $PAIR001,006,0*3D<CR><LF>
- **$PAIR005*3F:** Perform a WARM start

  Command: $PAIR005*3F<CR><LF>

  Success Response: $PAIR001,005,0*3E<CR><LF>
- **$PAIR004*3E:** Perform a HOT start

  Command: $PAIR004*3E<CR><LF>

  Success Response: $PAIR001,004,0*3F<CR><LF>
- **$PAIR023*3B:** Reboot directly, without response.

  Command: $PAIR023*3B<CR><LF>

8.3 Precise timing mode command

Table 8.3-1 The table below summarizes the set of proprietary command is used for precise timing

Software command	**Description**
$PAIR753,2,<Param1>,<Param2>*CS<CR><LF>	Survey-in mode command
$PAIR753,3,0,<Param1>,<Param2>,<Param3>*CS<CR><LF>	Position-mode ECEF command
$PAIR753,3,1,<Param1>,<Param2>,<Param3>*CS<CR><LF>	Position-mode LLH command
$PAIR753,4,<Param1>*CS<CR><LF>	PPS delay adjustment command
$PAIR754*3C<CR><LF>	Get precise timing information

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Table 8.3-2 Survey-in mode command Data Format
*Ex: $PAIR753,2,180,5*29<CR><LF>*

Name	Example	Units	Description
Command ID	$PAIR753		Command ID
Type	2		Survey-in mode
Param1	180	sec	survey-in time; 1sec ~ 2592000sec
Param2	5	meters	survey-in standard threshold; 0m ~ 100m
Checksum	*29		
<CR> <LF>			End of command

Note: This example is factory default command when module power on.

Table 8.3-3 Position-hold mode ECEF command Data Format
*Ex: $PAIR753,3,0,-3033218.53,4921615.07,2685342.73*2A<CR><LF>*

Name	Example	Units	Description
Command ID	$PAIR753		Command ID
Type	3		Position-hold mode
ECEF	0		Earth-Centered Earth-Fixed
Param1	-3033218.53	meters	ECEF-X
Param2	4921615.07	meters	ECEF-Y
Param3	2685342.73	meters	ECEF-Z
Checksum	*2A		
<CR> <LF>			End of command

Table 8.3-4 Position-hold mode LLH command Data Format
*Ex: $PAIR753,3,1,25.06187584,121.64575733,136.512*0F<CR><LF>*

Name	Example	Units	Description
Command ID	$PAIR753		Command ID
Type	3		Position-hold mode
LLH	1		Latitude, Longitude, Altitude
Param1	25.06187584	degree	Latitude
Param2	121.64575733	degree	Longitude
Param3	136.512	meters	Altitude
Checksum	*0F		
<CR> <LF>			End of command

Note: To improve the accuracy of PPS, Position-hold mode is recommended.

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Table 8.3-5 PPS delay adjustment command Data Format

*Ex: $PAIR753,4,-40*26<CR><LF>*

Name	Example	Units	Description
Command ID	$PAIR753		Command ID
Type	4		PPS delay adjustment so that user can set the pulse accuracy related to a reference time.
Param1	-40	ns	Delay; -100000000ns ~ 100000000ns
Checksum	*26		
<CR> <LF>			End of command

Table 8.3-6 Get precise timing information

*Response: $PAIR754,2,1,180,-3033219.45,4921614.45,2685342.90,1.04,0*1F*

Name	Example	Units	Description
Command ID	$PAIR754		Command ID
Status	2		survey-in mode
Mean position valid	1		0: position has not been valid yet for position-hold used 1: position has been valid and enable to enter position-hold mode
Survey-in time	180	sec	survey-in elapsed time
ECEF-X	-3033219.45	meter	position-hold ECEF coordinate
ECEF-Y	4921614.45	meter	position-hold ECEF coordinate
ECEF-Z	2685342.90	meter	position-hold ECEF coordinate
Position STD	1.04		survey-in calculate current position standard deviation
PPS delay	0	ns	pulse delay adjustment
Checksum	*1F		

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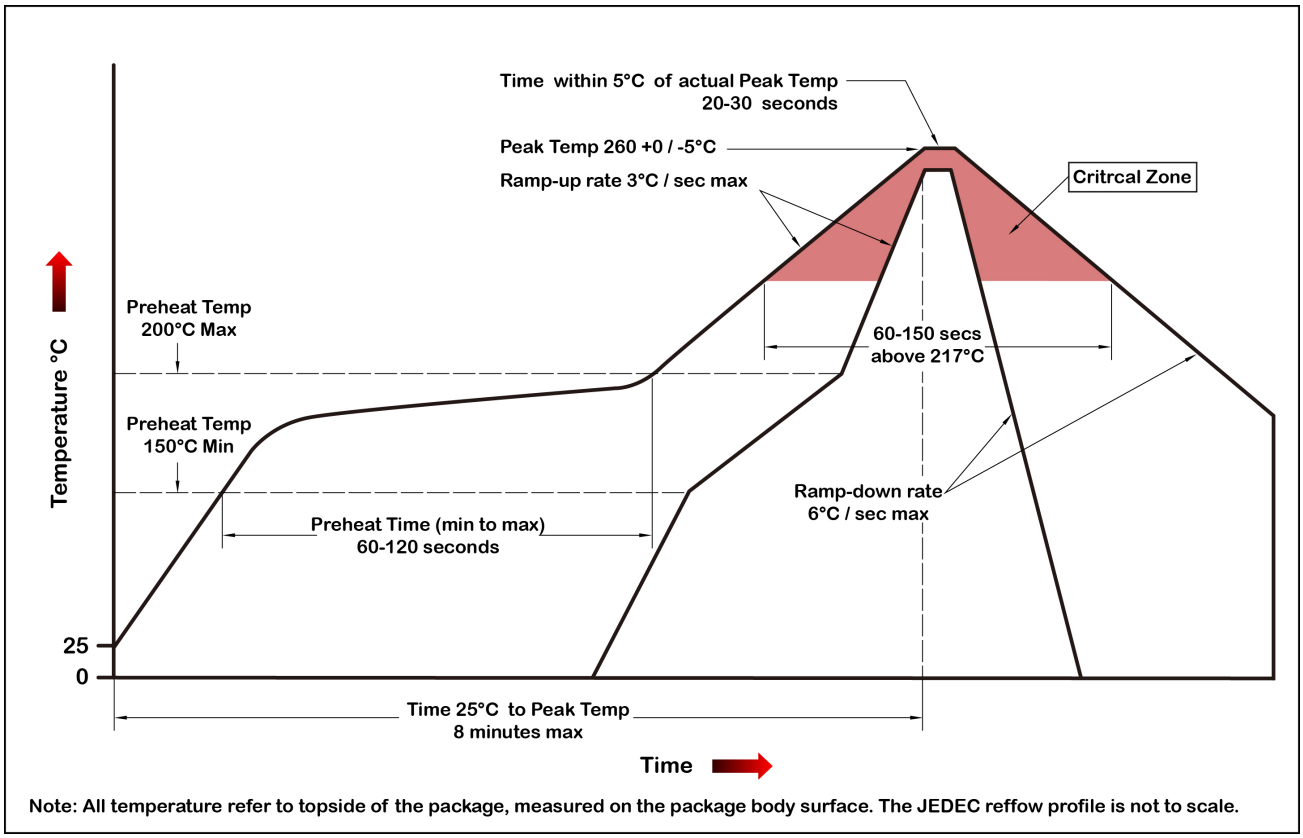
9 Recommended soldering reflow profile



Note: The MC-1722-T module should be soldered on the topside in the soldering process to prevent from falling down.

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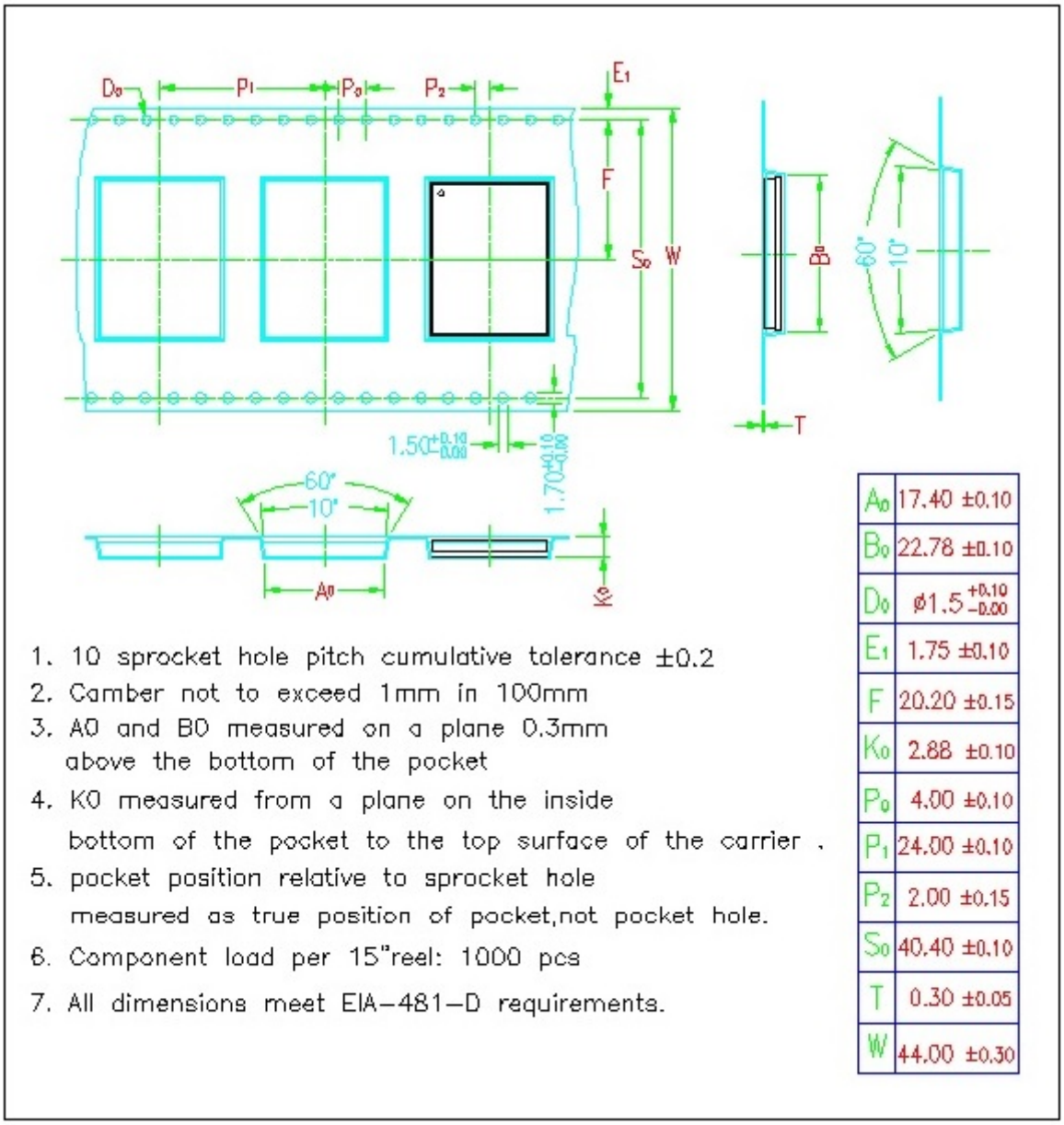
10 Reel Packing information



1. 10 sprocket hole pitch cumulative tolerance ±0.2
2. Camber not to exceed 1mm in 100mm
3. A0 and B0 measured on a plane 0.3mm above the bottom of the pocket
4. K0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier .
5. pocket position relative to sprocket hole measured as true position of pocket,not pocket hole.
6. Component load per 15"reel: 1000 pcs
7. All dimensions meet EIA-481-D requirements.

A_0	17.40 ±0.10
B_0	22.78 ±0.10
D_0	$\phi 1.5^{+0.10}_{-0.00}$
E_1	1.75 ±0.10
F	20.20 ±0.15
K_0	2.88 ±0.10
P_0	4.00 ±0.10
P_1	24.00 ±0.10
P_2	2.00 ±0.15
S_0	40.40 ±0.10
T	0.30 ±0.05
W	44.00 ±0.30

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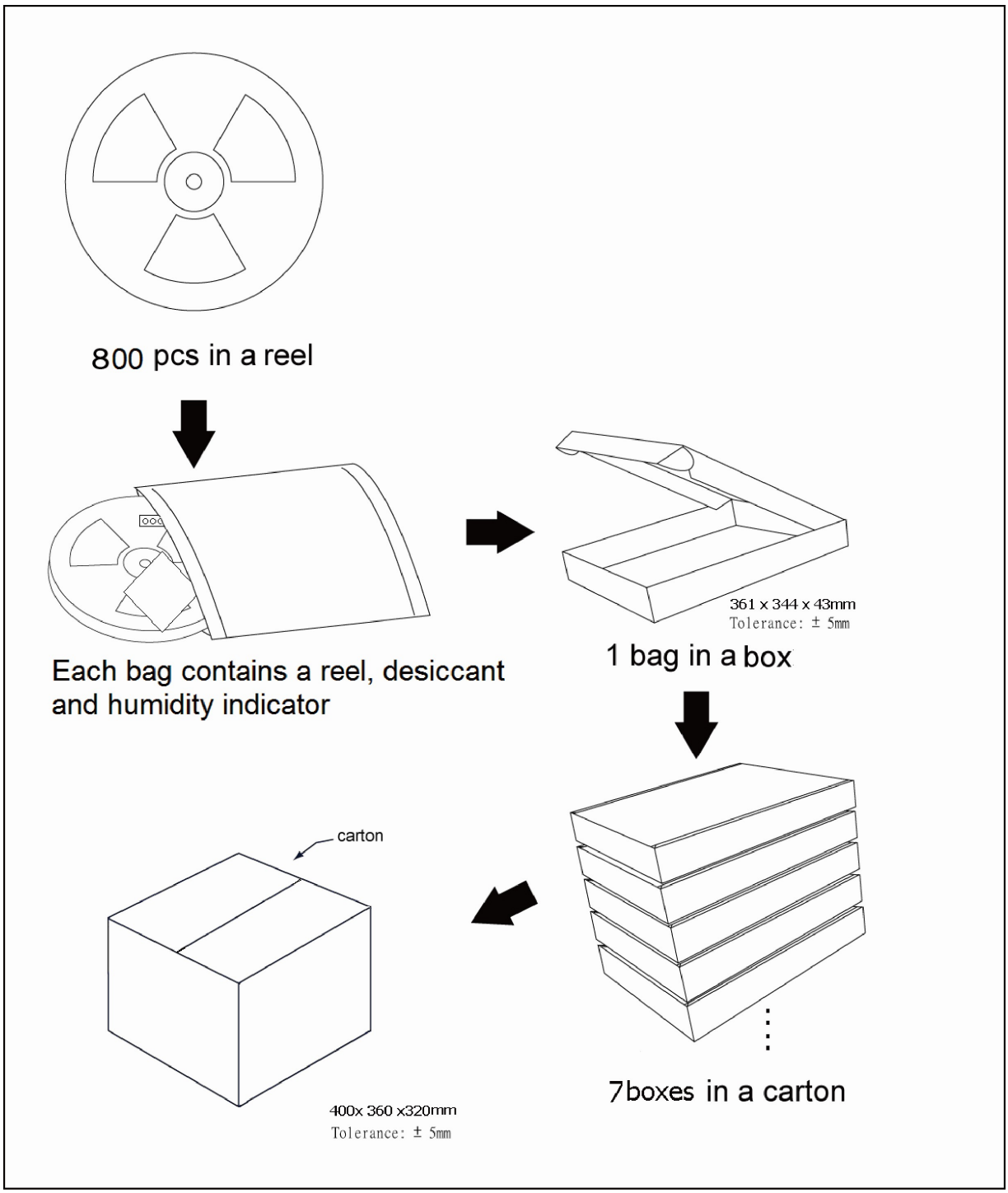
11 Packing and Handling

GNSS modules, like any other SMD devices, are sensitive to moisture, electrostatic discharge, and temperature. By following the description sketched in the document for LOCOSYS GNSS module storage and handling, it is possible to reduce the chances of them being damaged during production.

11.1 Packing



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11.2 Moisture Sensitivity

The module belongs to moisture sensitive device (IPC/JEDEC J-STD-020C Level III). If it is not used by then, we strong recommended storing the GNSS modules in dry places such as dry cabinet. The approximate shelf life for LOCOSYS GNSS modules packages is 6 months from the bag seal date, when store in a non-condensing storage environment (<30°C/60% RH)

11.3 ESD Handling

Please carefully follow the following precautions to prevent severe damage to GNSS modules.

LOCOSYS GNSS modules are sensitive to electrostatic discharges, and thus are Electrostatic Sensitive Devices (ESD). Careful handling of the GNSS modules and in particular RFIN pin must follow the standard ESD safety protections:

- Unless there is a galvanic coupling between the local GND and the PCB GND, then the first point of contact when handling the PCB shall always be between the local GND and PCB GND.
- Before working with RFIN pin, please make sure the GND is connected.
- When working with RFIN pin, do not contact any charges capacitors or materials that can easily develop or store charges such as patch antenna, coax cable, soldering iron.
- When soldering RFIN pin, please make sure to use an ESD safe soldering iron (tip).

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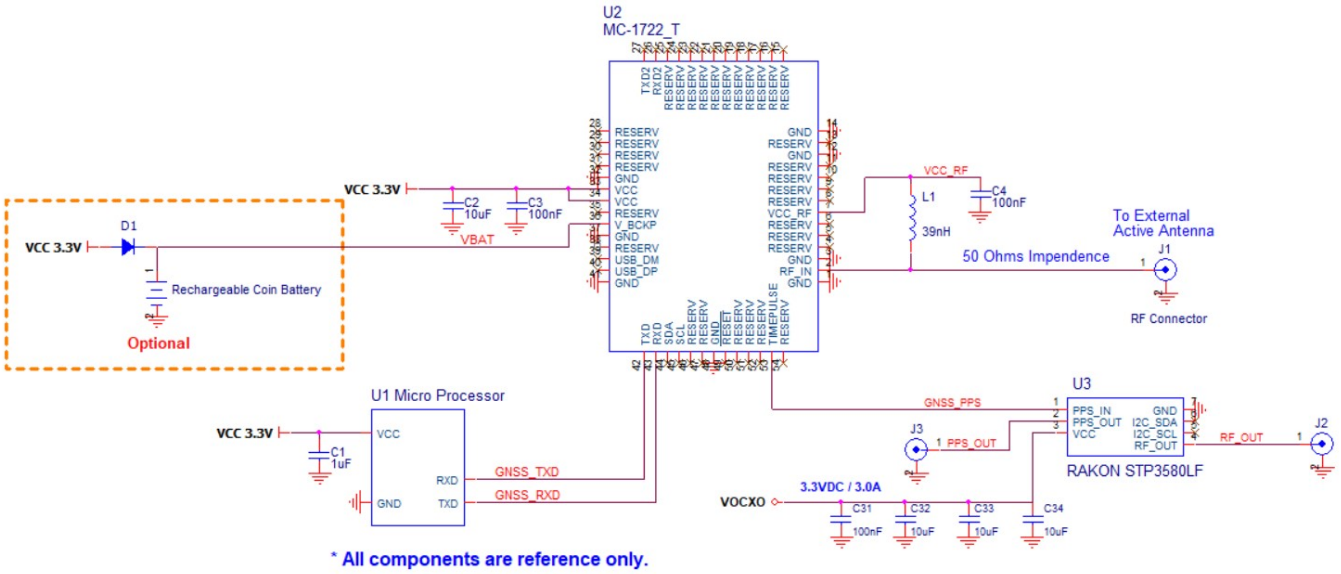
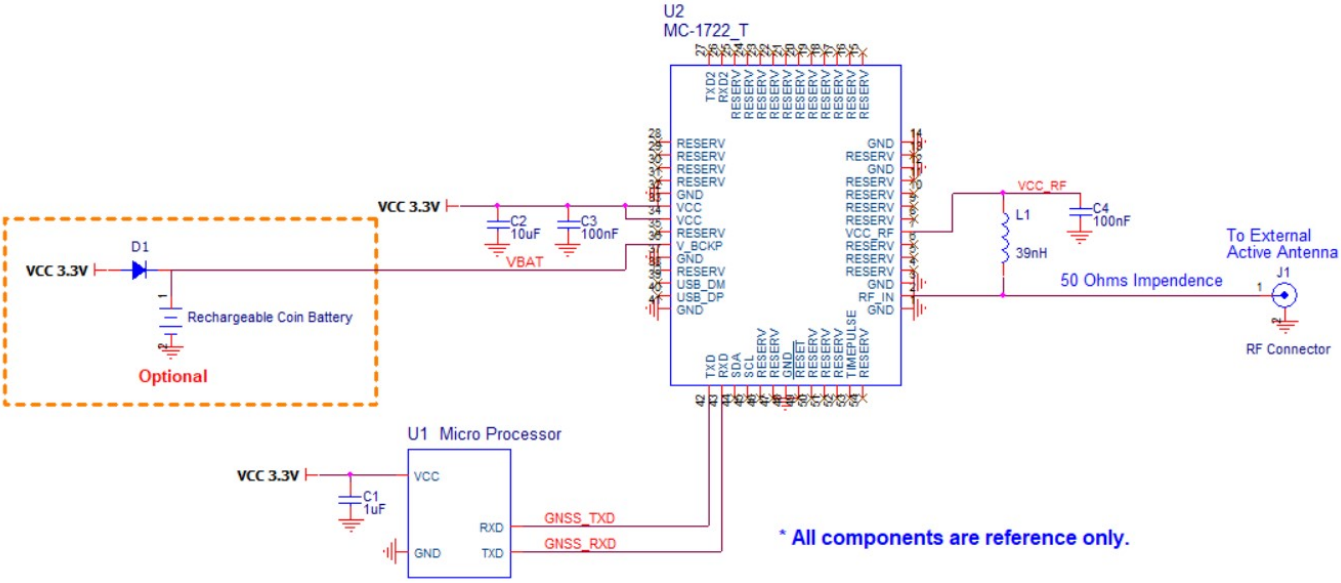
12 Reference Circuits

- GNSS based timing solution for O-RAN



- External active antenna supply power from MC-1722_T pin 7 (VCC_RF)



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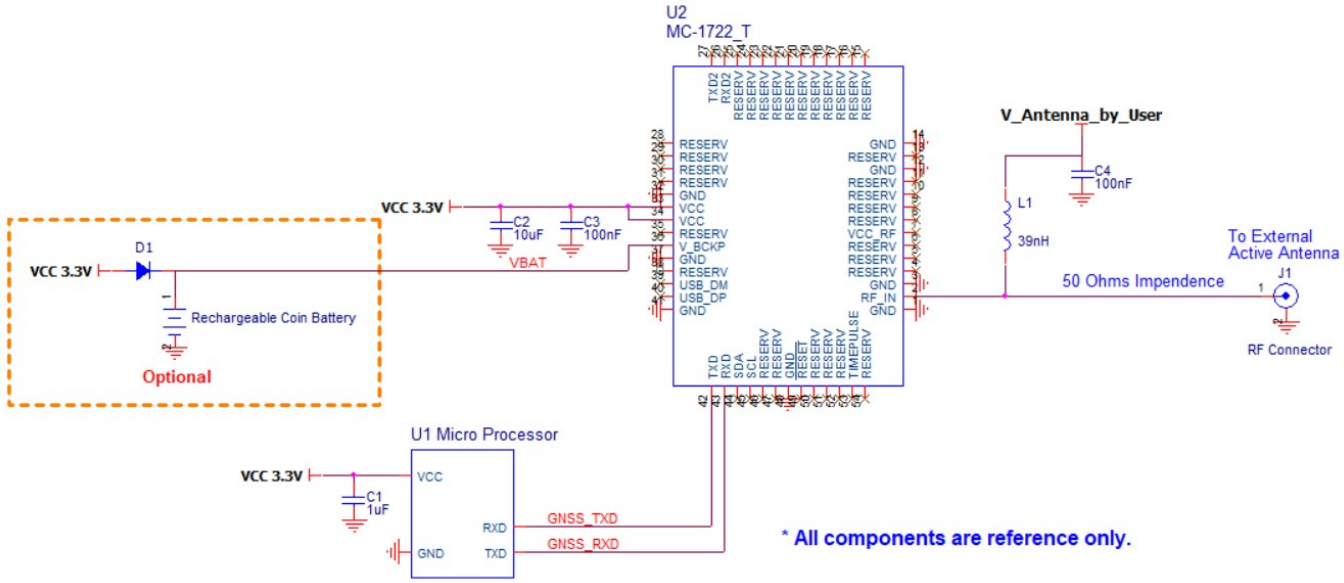
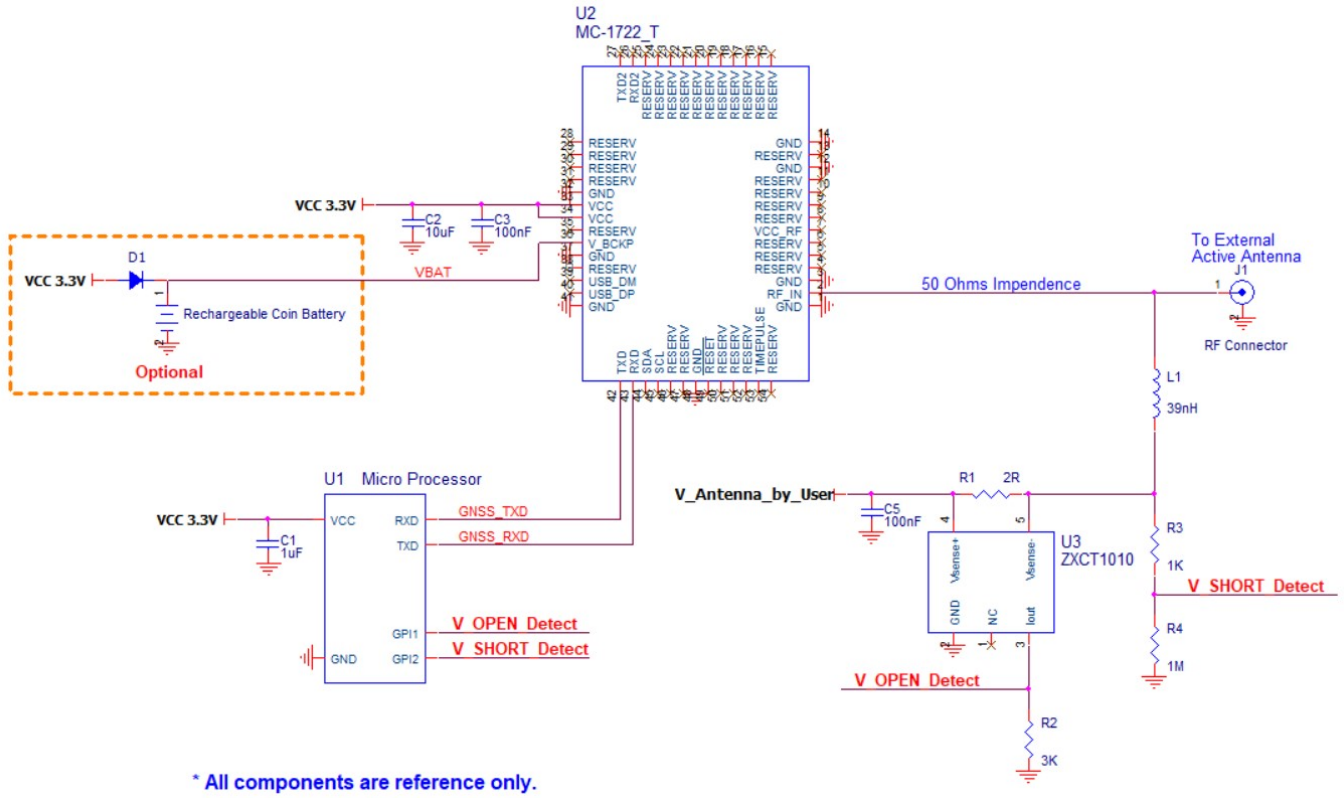
- External active antenna supply power from user



- External active antenna supply power from user with antenna detect circuit



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Document change list

Revision 0.1

- Draft release on March 23, 2022.

Revision 0.2 (June 15th, 2022)

- Added the “1PPS stability ±2ns (1σ)” in section 2.
- Changed position accuracy from TBD to 1.5 m CEP in section 4.
- Changed acquisition time of cold start (Open Sky) from 27s to 28s in section 4.
- Revised that time pulse stability in section 4.
- Changed tracking current (Typ.) from TBD to 73 mA in section 6.2.
- Changed tracking current (Max) from TBD to 88 mA in section 6.2.
- Changed backup battery current from TBD to 90 uA in section 6.2.
- Added the precise timing mode command in section 8.3.
- Added the reference circuit of external active antenna supply power from user with antenna detect in section 12.

Revision 1.0 (July 26th, 2022)

- Changed product name from RTK-1722-T to MC-1722-T.
- Removed hot start (Open Sky) in section 4.
- Removed time Pulse Stability <±5ns in section 4.
- Changed the max. velocity from 515 m/s to 500 m/s in section 4.
- Added GST to default output message in section 4.
- Added note about pin#2 “RI_IN” in section 5.
- Added note about pin#36 “V_BCKP” in section 5.
- Revised pin assignment of pin#38 from “V_USB” to” Reserved” in section 5 and section 12.
- Removed tracking current (Max) in section 6.2.
- Added and revised Mechanical specification in section 7.
- Added the description of GST in section 8.1.

Revision 1.1 (August 15th, 2022)

- Revised pin assignment of pin#39、40 in section 5.

Revision 1.2 (September 13th, 2022)

- Changed packing in the section 11.1.

Revision 1.3 (September 12th, 2023)

- Revised mechanical dimensions (bottom view) in section 7.2.