KNCTEK GPS/GLONASS Smart Antenna module

UGL-2528 Specification

Version 1.1
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Revision History

1. 2016-07-25 : Initiated Version 1.0
2. 2018-03-19 : Updated Version 1.1 for change of Company Address.

UGL-2528 Operational Manual

INTRODUCTION

The **UGL-2528** is the newest generation of KNCTEK GPS/GLONASS Smart Antenna Receiver which was integrated with GPS/GLONASS function and Patch antenna into one module. The GPS/GLONASS Smart Antenna receiver is powered by U-Blox technology and KNCTEK proprietary navigation algorithm that provide you more stable navigation data. The miniature design is the best choice to be embedded in a portable devices, various Trackers, Vehicle & Personal Locaters and etc. The excellent sensitivity of **UGL-2528** gets the great performance when going though the urban canyon and foliage environmental condition.

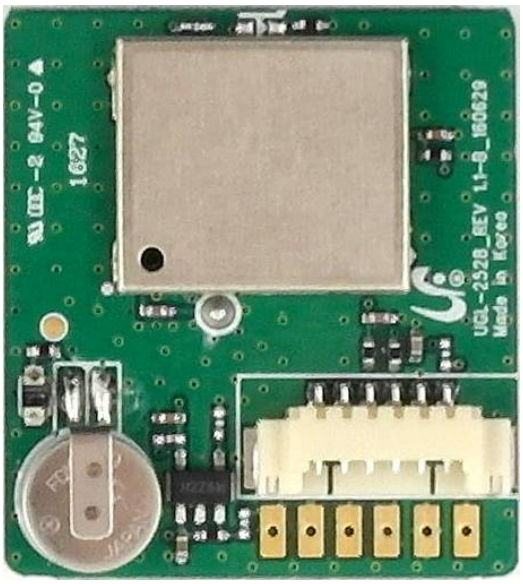
PRODUCT FEATURES

- ✧ GPS, GLONASS, QZSS, SBAS(WAAS, MSAS, EGNOS, GAGAN) supported
- ✧ 72-channel u-blox M8 Engine
- ✧ Operable from 3.3V to 5.5V/ 60mA for Acquisition and 50mA for Tracking Mode
- ✧ Signal Detection better than -167dBm in Ultra High Tracking Sensitivity
- ✧ Enhanced Cold Acquisition Sensitivity at -148dBm and Reacquisition at -160dBm
- ✧ Fast TTFF 26 seconds for Cold start
- ✧ Advanced Multipath detection and suppression
- ✧ Jamming detection and mitigation
- ✧ AssistNow Autonomous 3days
- ✧ Excellent Sensitive for Urban Canyon and Foliage Environmental condition
- ✧ NMEA-0183 compliant protocol
- ✧ Automotive-grade Quality GPS/GLONASS solution
- ✧ Small form factor_25.0X28.0X6.5mm (without Antenna feed height_0.8mm max)
- ✧ ODM/OEM development is fully supported Application Engineering
- ✧ RoHS compliant

PRODUCT APPLICATION

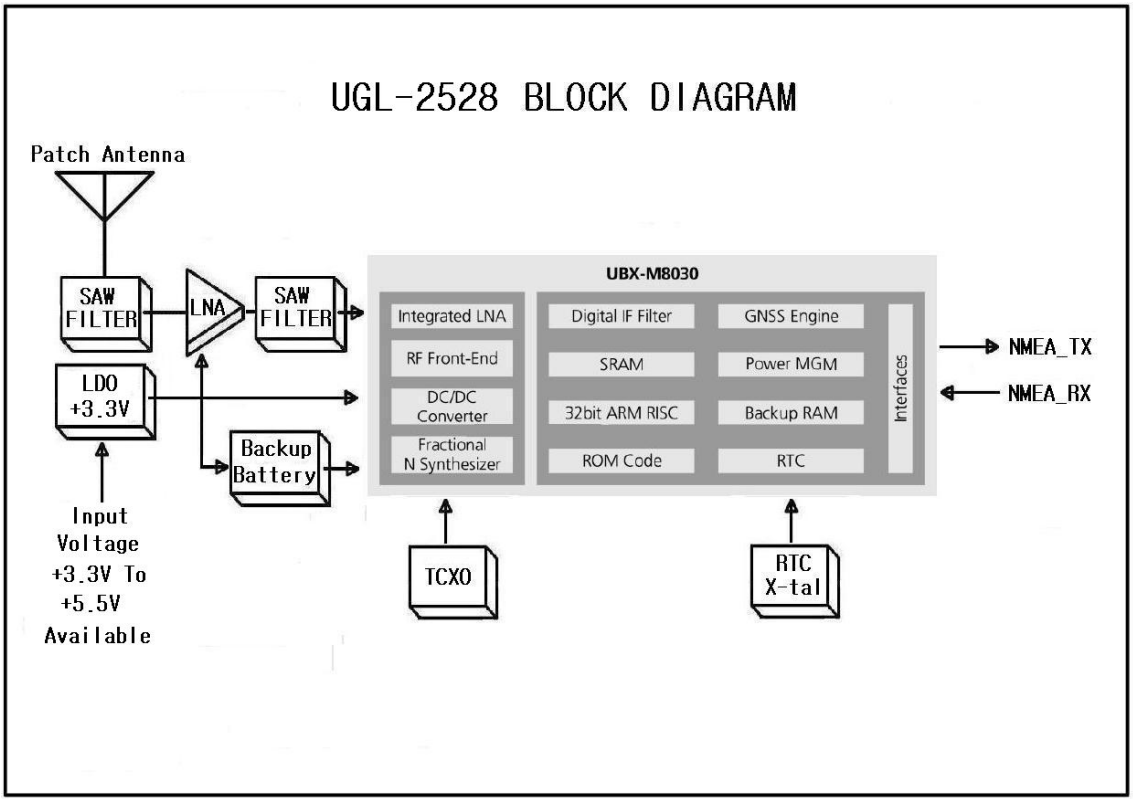
- ✧ Automotive applications
- ✧ Speed camera detector
- ✧ Personal and Car navigation
- ✧ Marine navigation
- ✧ Timing application and the others

PRODUCT PICTURE



UGL-2528 SYSTEM BLOCK DIAGRAM

The UGL-2528 consists of U-Blox8 chipsets Technology, KNCTEK LNA and proprietary software. The system is described as follows.



TECHNICAL SPECIFICATION

1. Electrical Characteristics

1.1 Absolute Maximum Rating

Parameter	Symbol	Min	Max	Units
Power Supply				
Power Supply Volt.	VCC	-0.3	6	V
Input Pins				
Input Pin Voltage I/O	RX	-0.3	3.6	V
Backup Battery	Vbat	1.6	3.6	V
Environment				
Operating Temperature	Topr	-30	85	℃
Storage Temperature	Tstg	-40	85	℃
Backup Battery operating temperature[1]	Tbat	-20	60	℃
Humidity			95	%

** [1] Backup Battery operating temperature depends on Battery characteristics

Note : Absolute maximum ratings are stress ratings only, and functional operation at the maximums 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, please refer to the operating conditions tables as follow.

1.2 Operating Condition

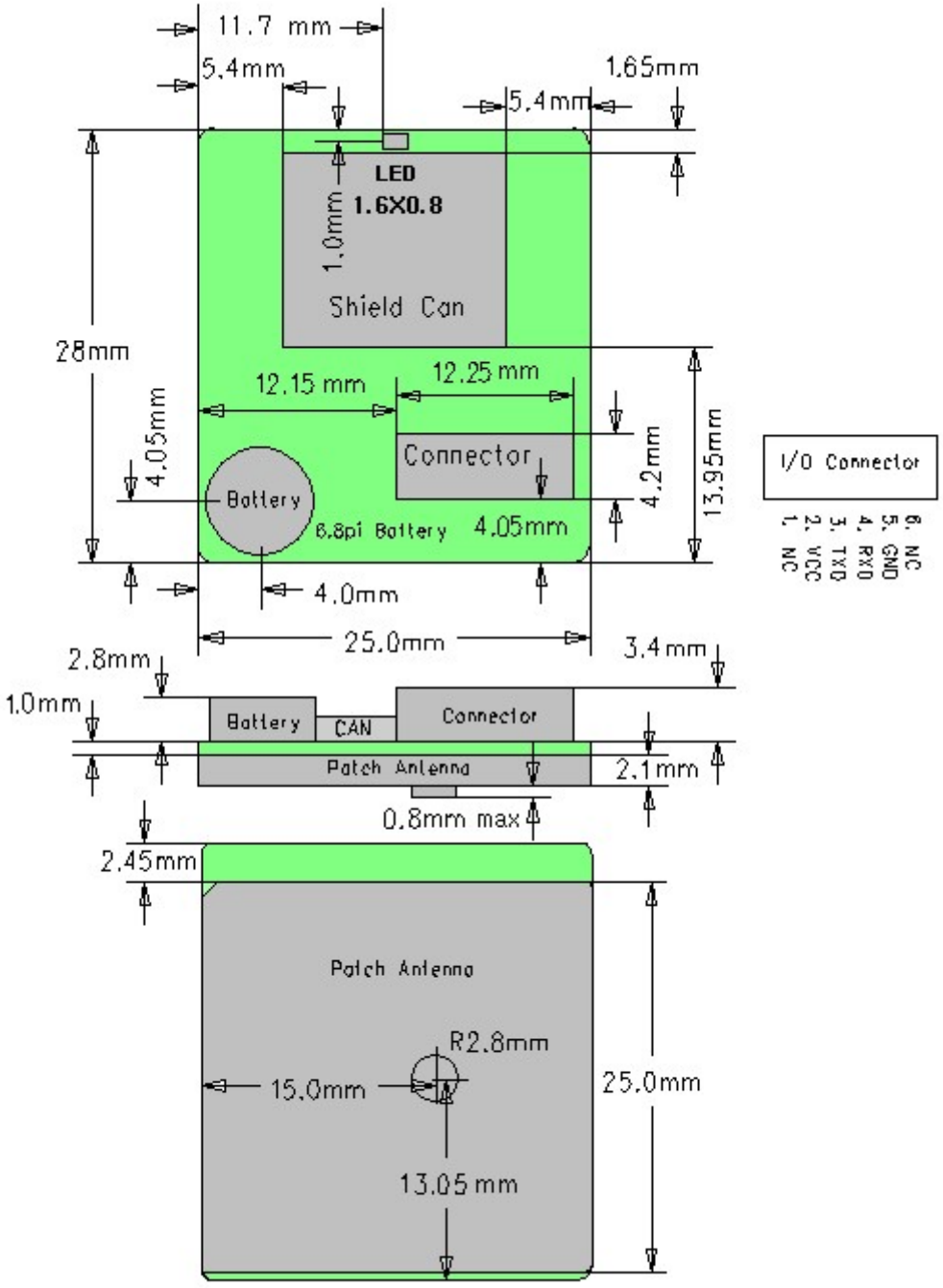
Parameter	Symbol	Condition	Min	Typ	Max	Units
Power supply voltage	Vcc		3.3	5.0	5.5	V
Power Supply voltage ripple	Vcc_PP	Vcc = 3.3 ~ 5.5V			50	mV
Acquisition current	IccA	Vcc = 3.3 ~ 5.5V		60		mA
Tracking current	IccT	Vcc = 3.3 ~ 5.5V		50		mA
Input high voltage	V_{IH}		0.7*Vcc			V
Input low voltage	V_{IL}				0.2*Vcc	V
Output high voltage	V_{OH}		Vcc-0.4			V
Output low voltage	V_{OL}				0.4	V

2. General & Performance Specification

Parameter	Specification	
Receiver Type	GPS/GLONASS, 72 Channel u-blox M8 engine	
Sensitivity	Tracking	-167dBm
	Re-acquisition	-160dBm
	Cold Start	-148dBm
Accuracy	Position	2.5m CEP
	Velocity	0.05m/s
Acquisition Time	Cold Start	26 sec. typical (Open sky[1])
	Hot Start	1 sec. typical (Open sky)
	Reacquisition Time	1 sec(Open sky, re-appear after some seconds)
	AssistNow Autonomous	Self-aided ephemeris estimation : 15 ~ 20 sec. avg
Power Consumption	Tracking	50mA @ 3.3 ~ 5.5V
	Acquisition	60mA @ 3.3 ~ 5.5V
	Back-up	15uA @ 3V
Navigation Data Update Rate	1Hz_Default	In case of using Binary input : Max 10Hz
Operational Limits	Velocity	Max 500 m/s
	Altitude	Max 50,000m
	Acceleration	Less than 4g(39.2m/sec^2)
Mechanical data	Dimension	25.0X28.0X6.5mm +/- 0.3mm (without Antenna feed height_0.8mm max)
	Weight	7.9 grams ±5%
Protocol	NMEA-0183 V4.0	GNRMC 1Hz(one time per sec)
		GNVTG 1Hz
		GNGGA 1Hz
		GNGSA 1Hz
		GPGSV 1Hz
		GLGSV 1Hz
		GNGLL 1Hz

** [1]Open Sky means no obstructions in the sky

MECHANICAL LAYOUT



HARDWARE INTERFACE

Pin Description

PIN	SIGNAL NAME	I/O	DESCRIPTION	CHARACTER
1	VCC	P	DC Power Supply Voltage input	DC 3.3V to 5.5V Acceptable
2	TXD	O	UART Serial Data Output : NMEA TX OUT	3.3V LVTTL
3	RXD	I	UART Serial Data Input	3.3V LVTTL
4	GND	P	Digital Reference Ground	Digital Reference Ground

VCC DC Power Input

This is the main power supply for the Engine board. The power range is **DC 3.3V to 5.5V Acceptable.** Suitable decoupling must be provided by external decoupling circuitry.

GND

GND provides the ground for the Engine board. Connect all grounds.

TXD

UART Interface TX for serial communication to a host CPU. This is the main transmit channel and used to output standard NMEA_0183 sentence or response to input binary command.. The default setup is NMEA Output, 9600bps, 8 data bits, no parity, 1 stop bit. The default sentences are GNRMC, GNVTG, GNGGA, GNGSA, GPGSV, GLGSV, GNGLL.

RXD

UART Interface RX for serial communication to a host CPU. This is the main receiving channel and is used to input binary commands to the Engine board from host CPU.

Packing Information

1. **Packing Method**

   TBD : To be determined

GPS/GLONASS Receiver User's Tip

1. GPS/GLONASS signal will be affected by weather and environment conditions, thus suggest to use the GPS/GLONSS receiver under less shielding environments to ensure GPS/GLONASS receiver has better receiving performance.
2. When GPS/GLONASS receiver is moving, it will prolong the time to fix the position, so suggest to wait for the satellite signals to be locked at a fixed point when first power-on the GPS/GLONASS receiver to ensure to lock the GPS/GLONASS signal at the shortest time.
3. The following situation will affect the GPS/GLONASS receiving performance:
   a. Solar control filmed windows.
   b. Metal shielded, such as umbrella, or in vehicle.
   c. Among high buildings.
   d. Under bridges or tunnels.
   e. Under high voltage cables or nearby radio wave sources, such as mobile phone base stations.
   f. Bad or heavy cloudy weather.
4. If the satellite signals cannot be locked or encounter receiving problem (while in the urban area), the following steps are suggested:
   a. Move to another open space or reposition GPS/GLONASS receiver toward the direction with fewer blockages.
   b. Move the GPS/GLONASS receiver away from the interference resources.
   c. Wait until the weather condition is improved.

While a GPS/GLONASS with a backup battery, the GPS/GLONASS receiver can fix a position immediately at next power-on if the build-in backup battery is full-recharged.

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