

**KNCTEK GNSS 1PPS Smart Antenna module
MGL-7670 Specification**

Version 1.0
2019/03/11

This product is ODM product for ENTEC Electric & Electronic CO., LTD.

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MGL-7670 Specification

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Revision History

1. 2019-03-11 : Initiated Version 1.0

MGL-7670 Operational Manual

INTRODUCTION

The **MGL-7670** is the newest generation of KNCTEK GNSS 1PPS Smart Antenna Receiver which was integrated with GPS/GLONASS function and Patch antenna into one module. The GNSS 1PPS Smart Antenna receiver is powered by MediaTek technology and KNCTEK proprietary navigation algorithm that providing you more stable navigation data. The miniature design is the best choice to be embedded in a portable device various Trackers, Vehicles, personal Locators, Trackers and etc. The excellent sensitivity of **MGL-7670** gets the great performance when going through the urban canyon and foliage environmental condition.

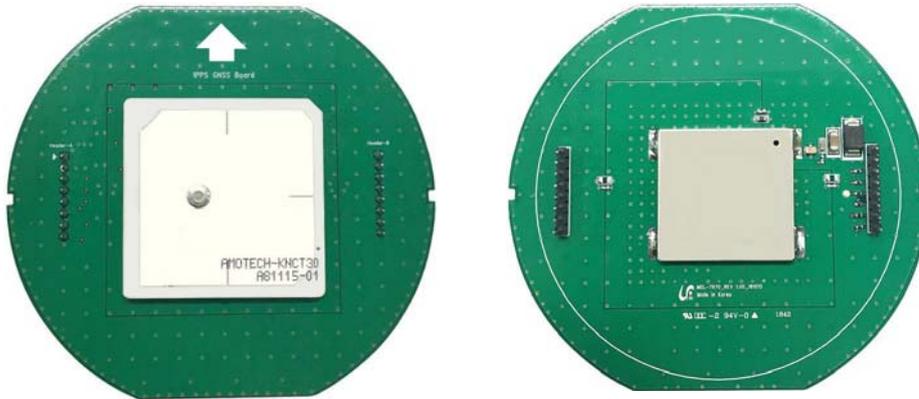
PRODUCT FEATURES

- ✧ GPS, GLONASS, Galileo, QZSS, SBAS(WAAS, MSAS, EGNOS, GAGAN) supported
- ✧ MEDIATEK MT3333 All-in-one Solution
- ✧ 99 Acquisition/ 33 Tracking Channels and 210PRN Channels
- ✧ +/- 15ns 1PPS Deviation Accuracy
- ✧ Operable from 3.3V/ 48mA for Acquisition and 40mA for Tracking Mode
- ✧ Signal Detection better than -165dBm in Ultra High Tracking Sensitivity
- ✧ Enhanced Cold Acquisition Sensitivity at -148dBm and Reacquisition at -160dBm
- ✧ Indoor and outdoor Multipath detection and compensation
- ✧ EASY(Embedded Assist System) self generated orbit prediction
- ✧ Excellent Sensitive for Urban Canyon and Foliage Environmental condition
- ✧ NMEA-0183 compliant protocol
- ✧ Automotive-grade Quality GNSS solution
- ✧ 76.0X70.0X9.0mm(without Antenna feed height_0.8mm max)
- ✧ RoHS compliant

PRODUCT APPLICATION

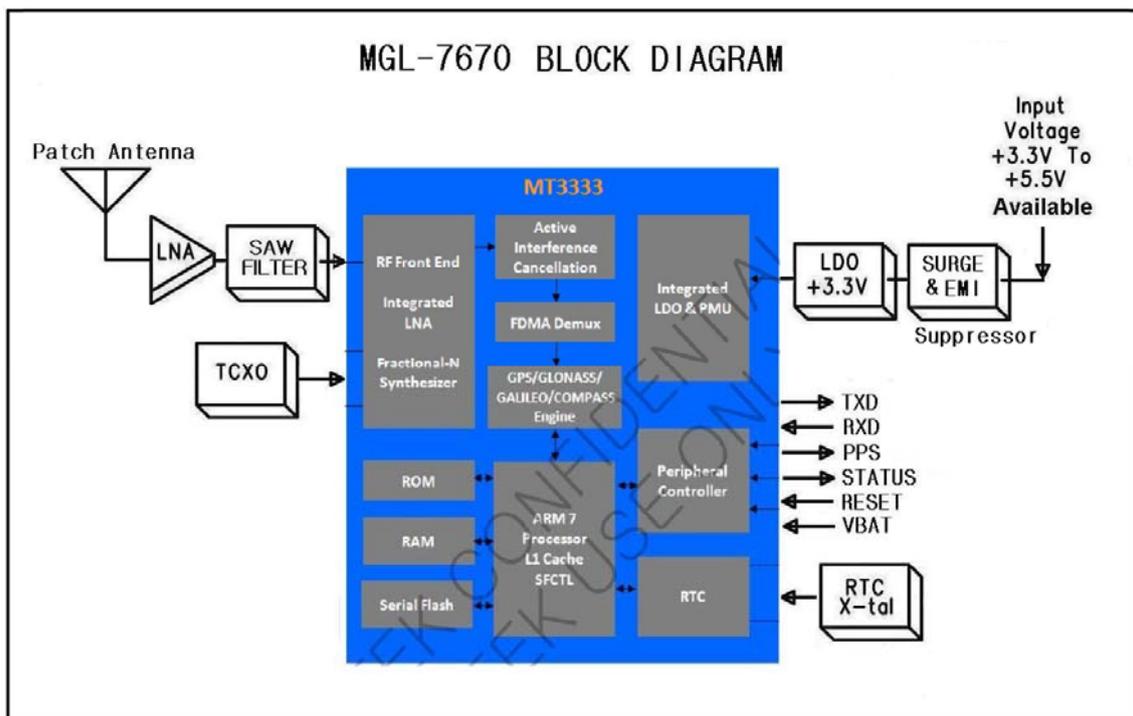
- ✧ Timing application and the others
- ✧ Automotive applications
- ✧ Personal and Car navigation
- ✧ Marine navigation

PRODUCT PICTURE



MGL-7670 SYSTEM BLOCK DIAGRAM

The MGL-7670 consists of MEDIATEK MT3333 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	6.0	V
Input Pins				
Input Pin Voltage I/O	RX	-0.3	3.6	V
Backup Battery	Vbat	-0.3	3.6	V
Environment				
Operating Temperature	Topr	-30	80	°C
Storage Temperature	Tstg	-40	85	°C
Humidity			95	%

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

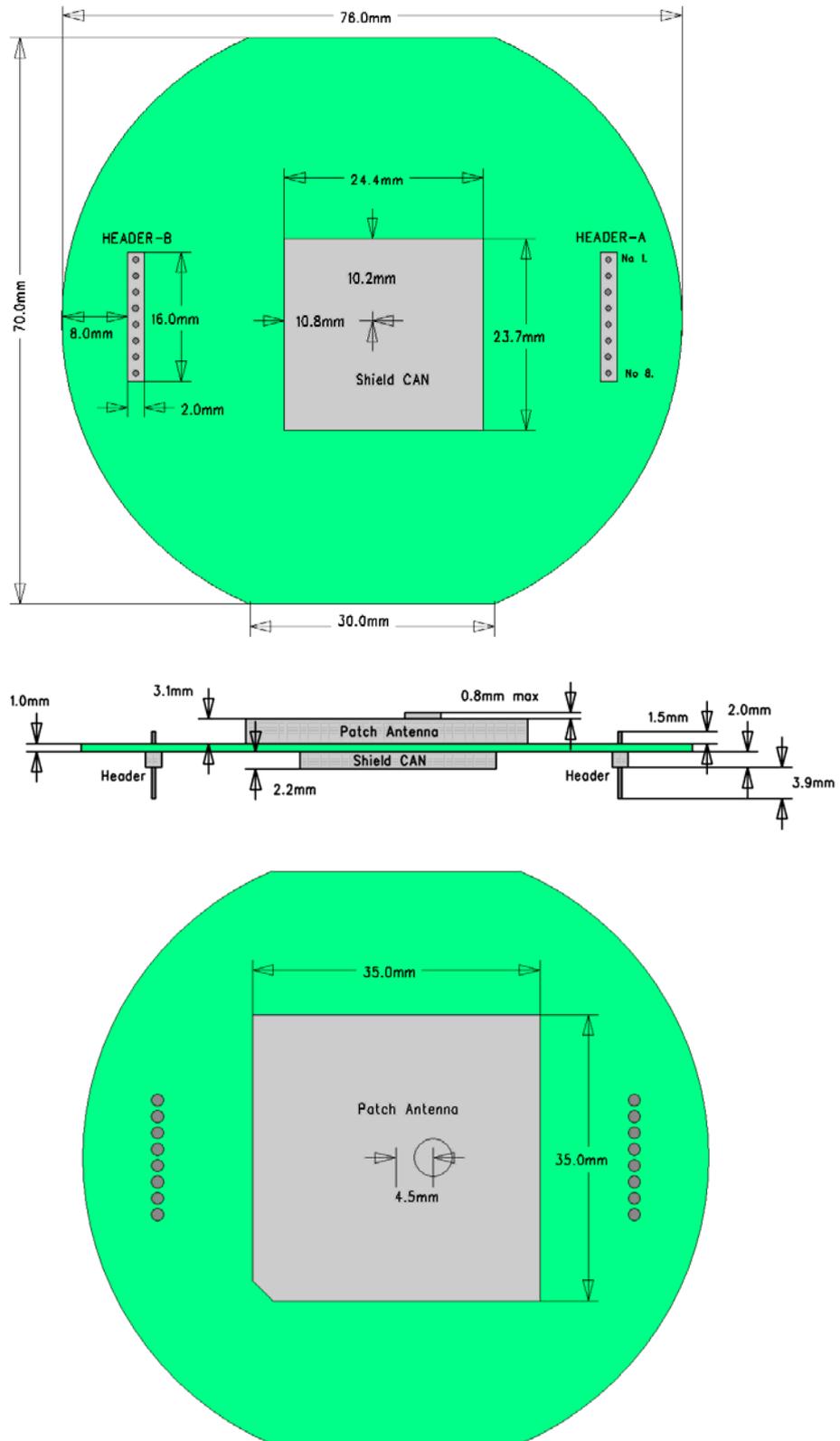
Parameter	Symbol	Condition	Min	Typ	Max	Units
Power supply voltage	Vcc		3.3	5.0	5.5	V
Power Supply voltage ripple	Vcc_PP	Vcc = 5V			50	mV
Acquisition current	IccA	Vcc = 5V		48		mA
Tracking current	IccT	Vcc = 5V		40		mA
Input high voltage	V _{IH}	V _{i/o} = 3.3V	0.7*V _{i/o}			V
Input low voltage	V _{IL}	V _{i/o} = 3.3V			0.2*V _{i/o}	V
Output high voltage	V _{OH}	V _{i/o} = 3.3V	V _{i/o} - 0.4			V
Output low voltage	V _{OL}	V _{i/o} = 3.3V			0.4	V

2. General & Performance Specification

Parameter	Specification	
Receiver Type	GPS/GLONASS & Galileo, 99 Acquisition & 33 Tracking Channels MEDIATEK MT3333	
Sensitivity	Tracking	-165dBm
	Re-acquisition	-160dBm
	Cold Start	-148dBm
Accuracy	PPS	+/- 15ns deviation
	Position	5.0m CEP @ -140dBm
	Velocity	0.1m/s
Acquisition Time	Cold Start	35 sec. typical (Open sky ¹)
	Warm Start	30 sec. typical (Open sky)
	Hot Start	1 sec. typical (Open sky)
	EASY Self-generated orbit prediction : 15 ~ 20 sec. avg	
Power Consumption	Tracking	40mA @ 5.0V
	Acquisition	48mA
	Back-up	10uA @ 3V
Navigation Data Update Rate	1Hz_Default	Max update rate up to 10Hz
Operational Limits	Velocity	Max 500 m/s
	Altitude	Max 10,000m
	Acceleration	Less than 4g(39.2m/sec ²)
Mechanical data	Dimension	76.0X70.0X9.0mm +/- 0.3mm (without Antenna feed height_0.8mm max)
	Weight	28.1 grams ±5%
Protocol	NMEA-0183 V3.01	GNGGA 1Hz(one time per sec) GPGSA 1Hz GLGSA 1Hz GAGSA 1Hz GPGSV 1Hz GLGSV 1Hz GAGSV 1Hz GNRMC 1Hz GNVTG 1Hz GNZDA 1Hz

** ¹Open 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 5V ± 10%
2	GND	P	Digital Reference Ground	Digital Reference Ground
3	TXD	O	NMEA TXD	3.3V LVTTTL
4	RXD	I	NMEA RXD	3.3V LVTTTL
5	PPS	O	One pulse per one second	3.3V LVTTTL
6	STATUS	O	Output About GPS fixed status, High for position fix	3.3V LVTTTL
7	RESET	I	Reset for MGL-7670	Active Low
8	VBAT	I	Backup Battery Supply	2.0 ~ 3.6V

VCC DC Power Input

This is the main power supply for the Engine board. The power range is **DC 5.0V ±10%**(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

NMEA_TX, UART Interface TX for serial communication to a host CPU. This is the main transmit channel and is used to output navigation. The default setup is NMEA Output, 38400bps, 8 data bits, no parity, 1 stop bit. The default sentences are GNGGA, GNGSA, GLGSA, GAGSA, GPGSV, GLGSV, GAGSV, GNRMC, GNVTG, GNZDA.

RXD

NMEA_RX, UART Interface RX for serial communication to a host CPU. This is the main receiving channel and is used to receive software commands to the Engine board from user written software.

1PPS

This pin is 1 pulse per second time-mark output and active after 3D position fix. This goes high for about 100msec and 3.3V LVTTTL.

A pulse per second(1PPS) is electrical signal that very precisely indicates the start of second. Depending on the source, properly operating PPS signals have an accuracy ranging +/- 15ns deviation.

1 PPS signals are used for timekeeping and time measurement. One increasingly common use is in computer timekeeping, including the NTP protocol.

STATUS : GPS STATUS

This pin indicates GPS fixed status, 3.3V LVTTTL. This is active low for not fixed status, active high after position fixed.

RESET

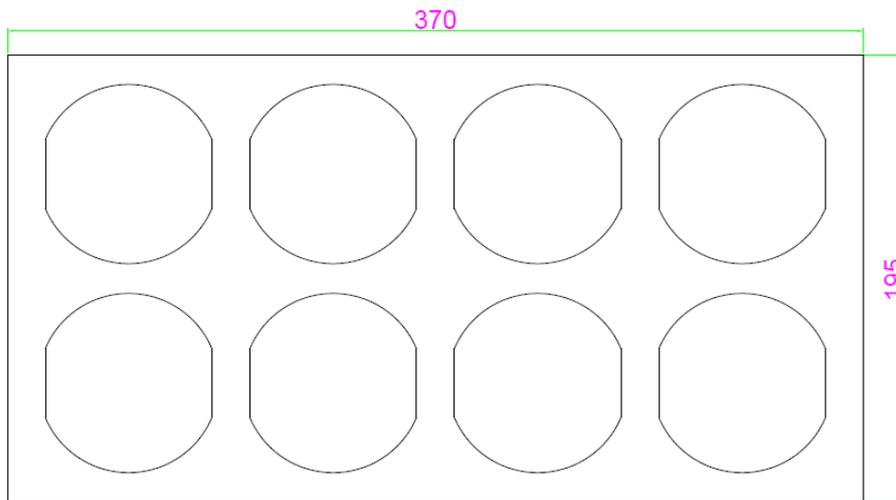
This is the function to restart the system, If the pin is lied to low. Leave unconnected if not used.

VBAT

This is the battery backup supply that powers the SRAM and RTC when main power is removed. The input voltage level is from 2.0V ~ 3.6V, typical 3.0V. Without an external backup battery or on board battery, engine board will execute a cold start after every turn on. To achieve the faster start-up offered by a hot or warm start, either a backup battery must be connected or battery installed on board.

Packing Information

1. Packing Method



<p>Foam Tray Size : 370mm X 195mm X 17mm Quantity : 8pcs Material : PE-Foam Anti-static</p>
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<p>Inner Box Size : 400mm X 200mm X 190 mm Quantity : 80pcs(8pcs X 10tray) Material : DW SK SSSK</p>	<p>Carton Box Size : 420mm X 410mm X 400mm Quantity : 320pcs(80pcs X 4box) Material : DW SK SSSK</p>
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GNSS(GPS/GLONASS) Receiver User's Tip

1. GPS/GLONASS signal will be affected by weather and environment conditions, thus suggest to use the GPS/GLONASS 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 can't 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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