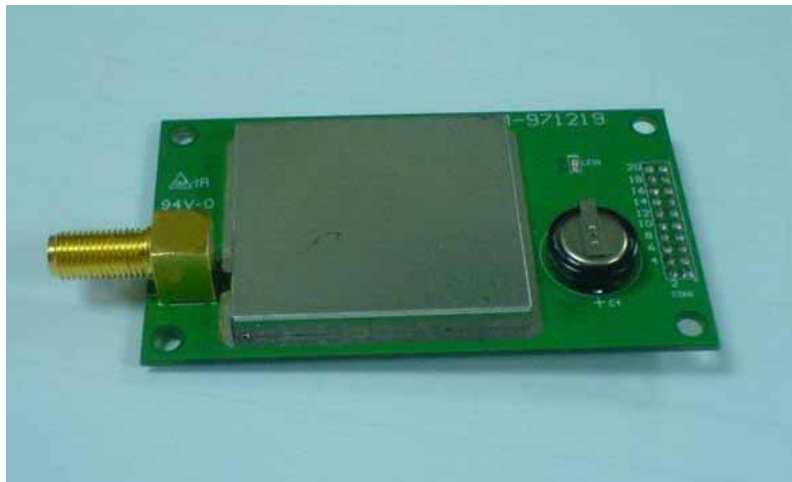


A360-U

U-blox GPS Module



Introduction

A-360U GPS Module consists of Ublox LEA5 u-blox5 module
A-360U contains LNA, SAW Filter, Reset IC, RTC X-tal, TCXO and Regulator.

Product Features

- * Fully self-contained GPS receiver.
- * Fully shield.
- * Full implement of u-blox5 GPS architecture.

- u-blox (GPS Engine with integrated Processor and Flash)
- GRF3w (A Highly Integrated GPS RF)
- Low noise amplifier
- SAW filter
- TCXO
- 32.768KHz RTC X-tal
- Reset & Regulator, etc.
- Fast time-to-first-fix

Product applications

- Automotive applications
- Personal positioning and navigation
- Mobile and PDA applications, etc

Technique specifications

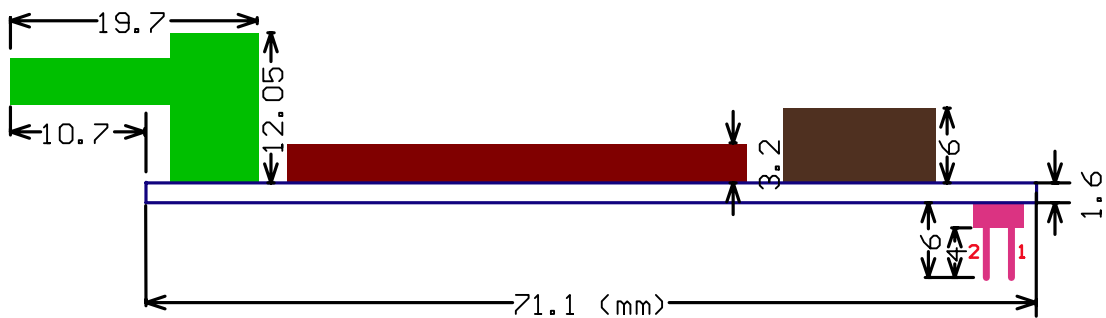
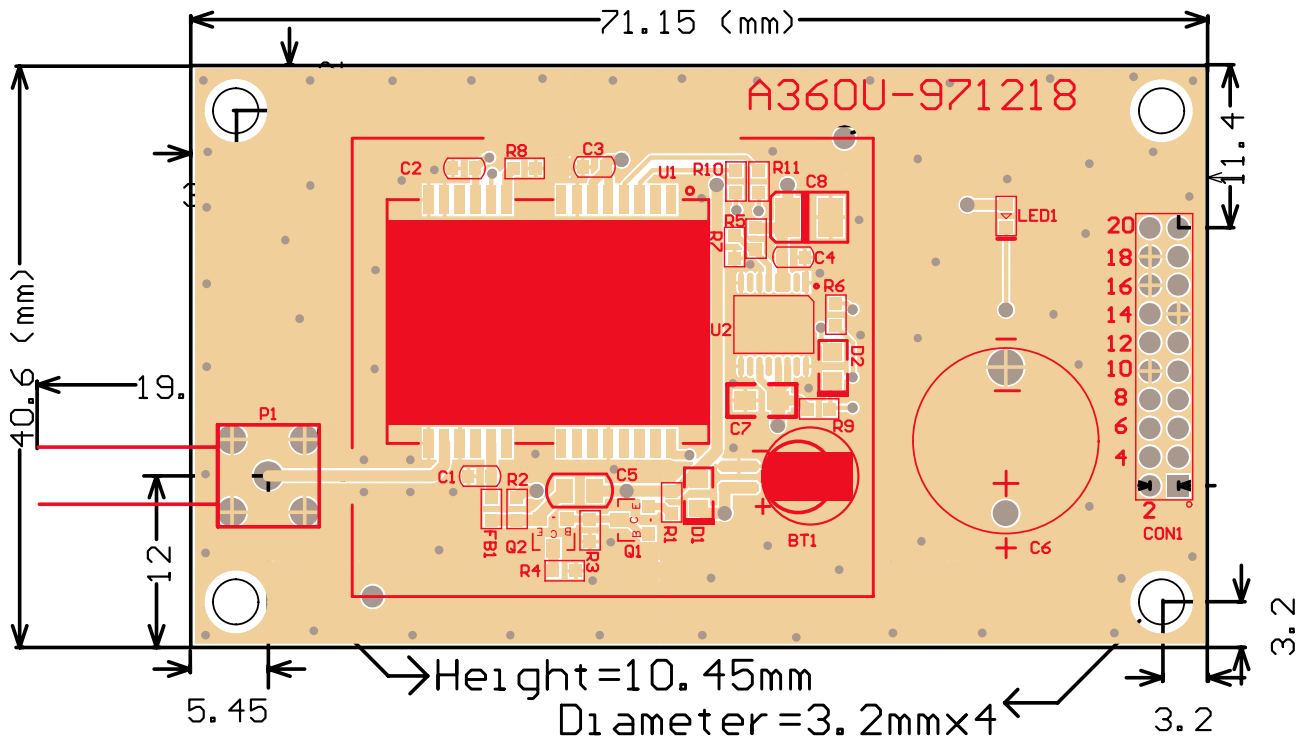
Parameter	Specification
Receiver Type	50 Channels GPS L1 frequency, C/A Code GALILEO Open Service L1 frequency
Time-To-First-Fix ¹	LEA-5H/ LEA-5S/ LEA-5T LEA-5A
	Cold Start (Autonomous) 29 s 32s
	Warm Start (Autonomous) 29 s 32s
	Hot Start (Autonomous) <1 s <1s
Aided Starts ²	<1 s <3s
Sensitivity ³	LEA-5H/ LEA-5S/ LEA-5T/ LEA-5Q LEA-5A/ LEA-5M
	Tracking & Navigation -160 dBm -160 dBm
	Reacquisition -160 dBm -160 dBm
Cold Start (Autonomous)	-144 dBm -143 dBm
Horizontal Position Accuracy ⁴	Autonomous < 2.5 m
	SBAS < 2.0 m
Accuracy of Timepulse Signal	RMS 30 ns
	99% <60 ns
	Compensated ⁵ (LEA-5T) 15 ns ³
Time Pulse	Configurable: 0.25 ... 1000 Hz
Max Navigation Update Rate	4 Hz
Velocity Accuracy ⁶	0.1m/s
Heading Accuracy ⁶	0.5 degrees
Dynamics	≤ 4 g
Operational Limits	Velocity 515 m/s (1000 knots)

Size 70.15mm x 40.6mm x 14.1mm

Mechanical Layout

1) DIMENSION

PCB Layout



Hardware interface

* Pin-out of the 20-pin interface connector

Pin Number	Name	Description	Type
1	NC	(No Used)	Input
2	VDC	3.8V~12V DC Power Input	Input
3	NC	(No Used)	
4	VDC	(Shorted with pin 2)	Input
5	Reset	Reset Input (Active Low)	Input
6	TIME	1pps timemark output	I/O
7	NC	(No Used)	
8	NC	(No Used)	
9	NC	(No Used)	
10	GND	Ground	
11	TXA	Serial Data Output A (GPS Data)	Output
12	RXA	Serial Data Input A (Command)	Input
13	GND	Ground	
14	NC	(No Used)	
15	NC	(No Used)	
16	GND	Ground	
17	NC	(No Used)	
18	GND	Ground	

19	NC	(No Used)	
20	NC	(No Used)	

RESET

An external reset is initiated by pulling RESET low for at least 1 μ s. If not used, RESET can be left unconnected since there is an internal 10k pull-up resistor.

RESET is also used in Push-to-Fix mode in order to wake up the unit and request a position fix. Minimum pulse width is 1 μ s.

RF IN

The line on the PCB from the antenna (or antenna connector) has to be a controlled impedance line (Microstrip at 50 Ω). 3.3V

V_BCKP

This is the battery backup supply that powers the SRAM and RTC when power is removed. 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.

Serial Interface

The A-360U GPS receivers provide one serial ports. All serial interface signals (operate on 3.3V CMOS)

LEA-5A and LEA-5S include only **CFG_COM1** and can be configured as seen in Table 6.

CFG_COM1	Protocol	Messages	UART Baud rate
1	NMEA	GSV, RMC, GSA, GGA, GLL, VTG, TXT	9600
0		GSV ² , RMC, GSA, GGA, VTG, TXT	4800

Table 6: Supported CFG_COM1 settings (LEA-5A, LEA-5S)

LEA-5Q and LEA-5M include both **CFG_COM0** and **CFG_COM1** pins and can be configured as seen in Table 7.

CFG_COM1	CFG_COM0	Protocol	Messages	UART Baud rate	USB Power
1	1	NMEA	GSV, RMC, GSA, GGA, GLL, VTG, TXT	9600	BUS Powered ⁸
1	0			38400	Self Powered
0	1		GSV ² , RMC, GSA, GGA, VTG, TXT	4800	BUS Powered ⁸
0	0	UBX	NAV-SOL, NAV-STATUS, NAV-SVINFO, NAV-CLOCK, INF, MON-EXCEPT	57600	BUS Powered ⁸

Table 7: Supported COM settings (LEA-5Q, LEA-5M)

Electrical Specification

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Power supply voltage (VCC)	Vcc	-0.5	3.6	V
Backup battery voltage (V_BCKP)	Vbckp	-0.5	4.8	V
Input pin voltage	Vin	-0.5	3.6	V
	Vin_usb	-0.5	Vddusb +0.5	V
VCC_RF output current	Iccrf		100	mA
Antenna bias voltage	Vant		6	V
Antenna bias current ¹¹	Iant		100	mA
Storage temperature	Tstg	-40	85	°C

Warning – Stressing the device beyond the “Absolute Maximum Ratings” may cause permanent damage. These are stress ratings only. Operation beyond “Operating conditions” is not recommended and extended exposure beyond the “Operating condition” may affect device reliability. This module is not protected against over voltage, reversed voltage or short current of RF_IN port.

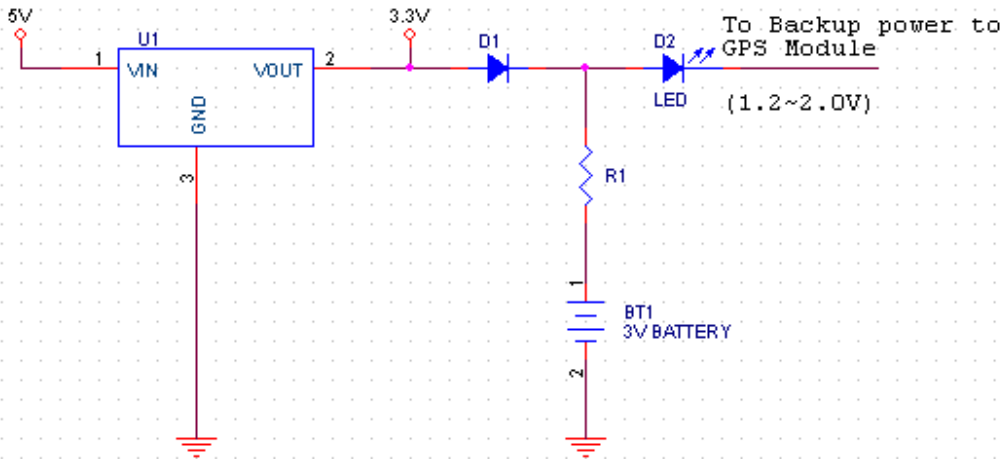
Operating Conditions

(Test Temperature : 25)

Parameter ¹²	Symbol	Min	Typ	Max	Units	Condition
Power supply voltage (VCC)	Vcc	2.7		3.6	V	
Peak supply current ¹³	Iccp			150	mA	Vcc = 3.6 V
Sustained supply current ¹⁴	Maximum Performance Mode	Icc Acquisition	102		mA	Vcc = 3.0 V
		Icc Tracking	55 ¹⁵			
	Eco Mode	Icc Acquisition	67			
		Icc Tracking	42 ¹⁶			
Backup battery voltage	Vbckp	1.3		4.8	V	
Backup battery current	Ibckp		25		μA	Vbckp = 1.8V
Input pin voltage range	Vin			Vcc +0.5	V	
Input pin low voltage	Vin_low_1			0.2x Vcc	V	
Input pin high voltage	Vin_high_1	0.7x Vcc			V	
Input pin low voltage for EXTINT0 and RxD1	Vin_low_2			0.22	V	
Input pin high voltage for EXTINT0 and RxD1	Vin_high_2	0.91			V	
Output pin low voltage	Vout_low			0.4	V	Iout = 4 mA
Output pin high voltage	Vout_high	Vcc - 0.4			V	Iout = -4 mA
VDDUSB (Pin 24) for USB operation	Vddusb1	3.0 ¹⁷		3.6	V	
USB_DM, USB_DP	VinU	Compatible with USB with 27 Ohms series resistance				
Antenna gain	Gant			30	dB	
V_ANT antenna bias voltage	Vant	2.7		5.5	V	I _{ANT} < -50 mA
Antenna bias voltage drop	Vant_drop		0.1		V	Iccrf=50mA
VCC_RF voltage	Vccrf		Vcc-0.1		V	
VCC_RF output current	Iccrf			50	mA	
Operating temperature	Topr	-40		85	°C	

[Appendix A: Reference Design](#)

Backup Battery reference design :
 (rechargeable Lithium battery)

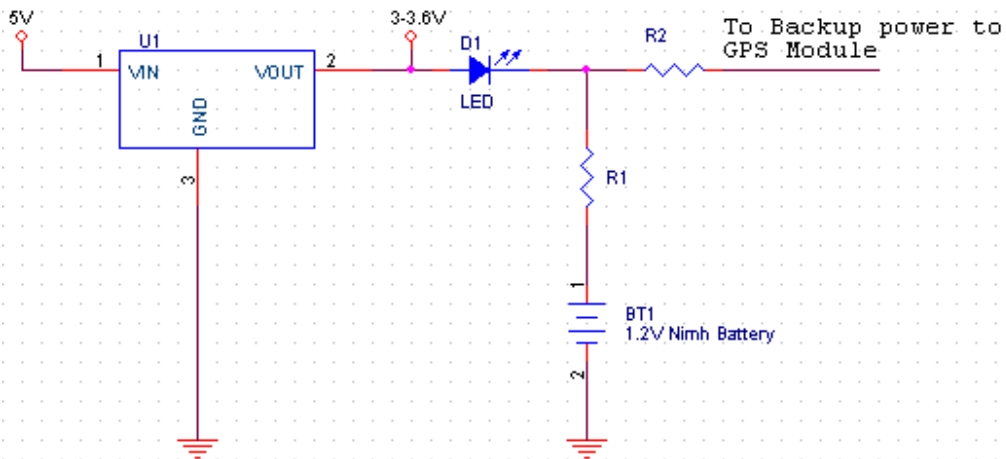


U1 constant voltage element
 D1 select a shotkey diode of small inverse current
 R1 selected depend on charge voltage of battery

for example :

U1 : RT9167-33CB (RICHTEK)
 D1 : BAT54 (FAIRCHILD)
 R1 : 100 Ohm
 D2 : LED
 Battery : ML414S (Panasonic)

Backup Battery reference design :
(rechargeable Nimh battery)



U1 constant voltage element
D1 select a led to drop voltage
R1& R2 selected depend on charge voltage of battery
Wonde-X Charging rate (0.05C-0.1C)

for example :
U1 : RT9167-33CB (RICHTEK)
D1 : LED
Battery : 1.2V Nimh Battery