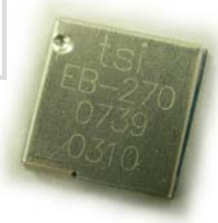
GPS Engine Board

EB-270/ EB-271

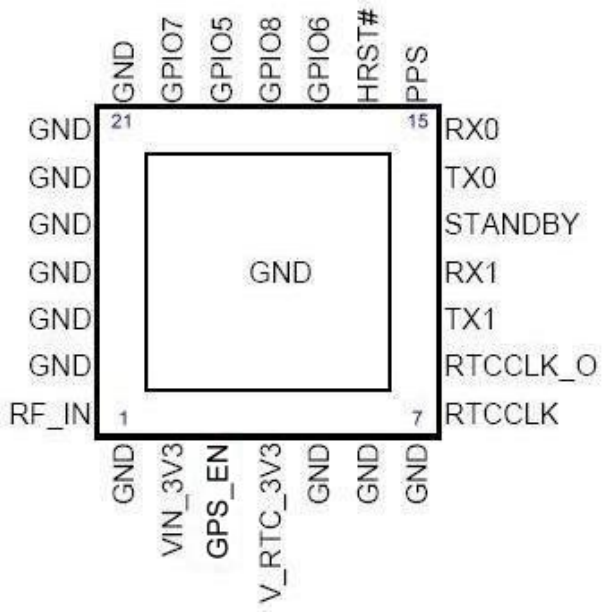
EB-27x is an ultra miniature 10.4 x10.5 mm^2 GPS engine board. It provides superior navigation performance under dynamic conditions in areas with limited sky view like urban canyons. High sensitivity up to **-158dBm** for weak signal operation without compromising accuracy. EB-27x series is your best choice for embedded applications.



Key Features :
- Small form factor: 10.4 x 10.5 x 2.0 mm
- Lead-Free – RoHS/WEEE compliant
- High sensitivity -158dBm
- Tracks 51-Channel of satellites
- Fast Position Fix
- Low power consumption
- Backup Battery :
  EB-270 DC 1.0~1.5V
  EB-271 DC 1.5~6.0V

Applications :
- Handheld devices
- Automotive and Marine Navigation
- Automotive Navigator Tracking
- Emergency Locator
- Geographic Surveying
- Personal Positioning
- Sporting and Recreation
- Embedded applications : PDA, DSC, Smart phone, UMPC, PND, MP4

PIN Definition :



PIN Coordinates Unit:mm

Pin #	X	Y	Pin #	X	Y
1	0.00	0.00	15	6.60	10.40
2	1.10	0.00	16	5.50	10.40
3	2.20	0.00	17	4.40	10.40
4	3.30	0.00	18	3.30	10.40
5	4.40	0.00	19	2.20	10.40
6	5.50	0.00	20	1.10	10.40
7	6.60	0.00	21	0.00	10.40
8	8.55	1.90	22	-1.95	8.50
9	8.55	3.00	23	-1.95	7.40
10	8.55	4.10	24	-1.95	6.30
11	8.55	5.20	25	-1.95	5.20
12	8.55	6.30	26	-1.95	4.10
13	8.55	7.40	27	-1.95	3.00
14	8.55	8.50	28	-1.95	1.90

EB-27x Specifications

Specification	Description
General	L1 frequency, C/A code (SPS) 51 independent tracking channels
Sensitivity	-158dBm /Tracking; -146dBm /Acquisition
Update Rate	Up to 5Hz
Accuracy	Without aid: 3.0m 2D-RMS <3m CEP (50%) without SA (horizontal) DGPS (WAAS, EGNOS, MSAS, RTCM): 2.5m
Acquisition (open sky)	Cold Start: 36sec Warm Start: 33sec Hot Start: 1sec
Reacquisition	< 1sec
Dynamics	Altitude: 18000m (max.) Velocity: 515m/sec (max.) Vibration: 4G (max.)
Supply Voltage	DC 3.0~6 V
Power Consumption	< 27.5mA @ 2.85V (w/o Active ANT) / Tracking
Backup Battery	EB-270: DC 1.0~1.5V EB-271: DC 1.5~6.0V
NMEA Message	NMEA0183 v3.1 baud rate 4800/9600/…/115200, default 115200 Selectable Output: GGA, GLL, GSA, GSV, RMC, and VTG
Datum	Default WGS-84
Antenna	External Active Antenna Output Voltage: 2.85 VDC
Serial Interface	UART
Operating Temperature	-30℃ to 85℃
Storage Temperature	-40℃ to 85℃
Operating Humidity	≦95%, non condensing
Mounting	SMT Type, 28 Pin
Dimension	10.4 x 10.5 x 2.0(H) mm

*Specifications subject to change without prior notice.

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1 Introduction

EB-27x is an ultra miniature 10.4 x10.5mm^2 GPS engine board. It provides superior navigation performance under dynamic conditions in areas with limited sky view like urban canyons. High sensitivity up to -158dBm for weak signal operation without compromising accuracy. EB-27x is your best choice for embedded applications.

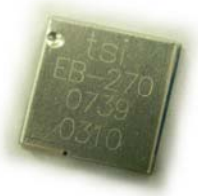
1.1 Key Features

- Small form factor: 10.4 x 10.5 x 2.0 mm
- Lead-Free – RoHS/WEEE compliant
- High sensitivity -158dBm
- Tracks 51-Channel of satellites
- Fast Position Fix, 36/ 33/ 1s for Cold/ Warm/ Hot start
- Low power consumption

1.2 Applications

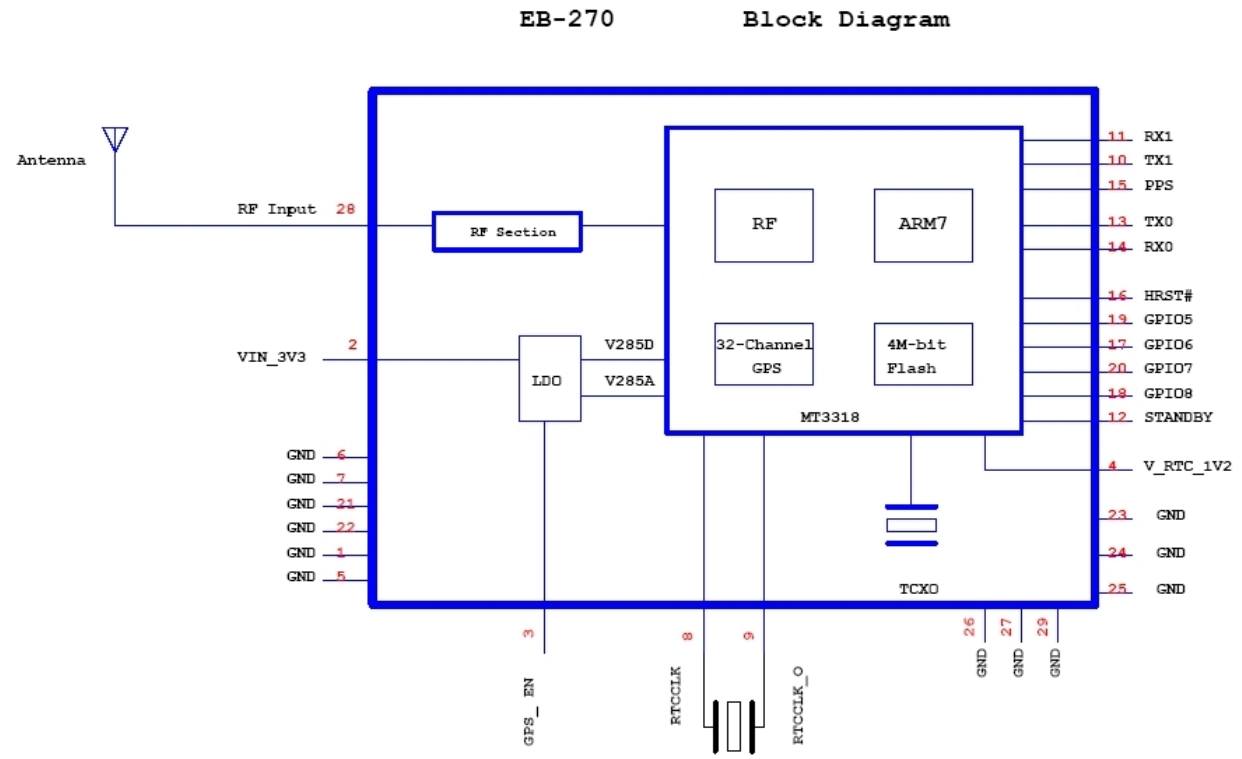
- Handheld devices
- Automotive and Marine Navigation
- Automotive Navigator Tracking
- Emergency Locator
- Geographic Surveying
- Personal Positioning
- Sporting and Recreation
- Embedded applications such as: PDA, DSC, Smart phone, UMPC, PND, MP4

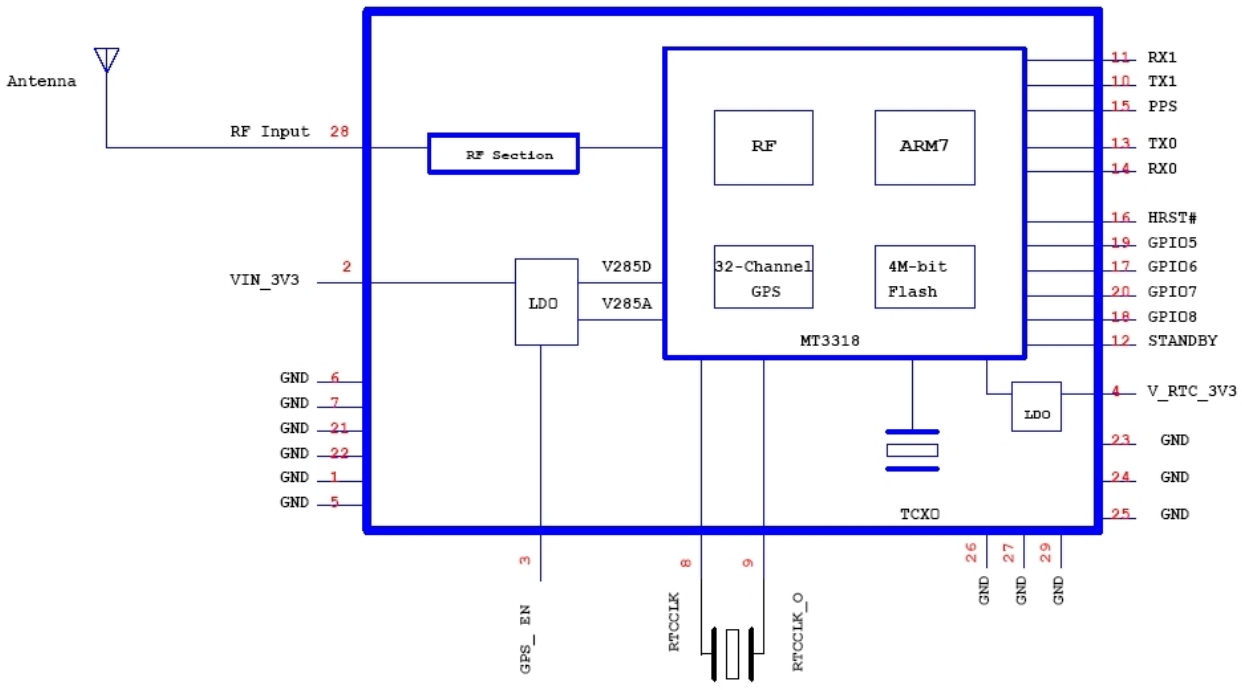
1.3 Look & Feel



2 Technical Description

2.1 Block Diagram





【Note】: EB-271 is with V_RTC LDO, EB-270 is not

2.2 Pin Definition

Pin#	Signal Name	Type	Description
1	GND	P	Ground
2	VIN_3V3	P	Power Supply 3.0~6V DC
3	GPS_EN	I	Low to disable module; High to enable module
4	V_RTC_1V2; V_RTC_3V3	P	RTC power 1.0~1.5V DC; RTC power 1.5~6.0V DC (EB-271 with on-module LDO to 1.2V)
5	GND	P	Ground
6	GND	P	Ground
7	GND	P	Ground
8	RTCCLK	I	(Analog/ Input) RTC Xtal connection
9	RTCCLK_O	O	(Analog/ Output) RTC Xtal connection
10	TX1	O	GPS TX1
11	RX1	I	GPS RX1
12	STANDBY	I	STANDBY/ Interrupt, active low STANDBY is a function not ready for prime time
13	TX0	O	GPS TX0
14	RX0	I	GPS RX0
15	PPS	O	PPS
16	HRST#	I	GPS reset, active low. Internal pull high
17	GPIO6	I/O*	GIO or SO
18	GPIO8	I/O*	GIO or SCK
19	GPIO5	I/O*	GIO or SCS0#
20	GPIO7	I/O*	GIO or SIN
21	GND	P	Ground
22	GND	P	Ground
23	GND	P	Ground
24	GND	P	Ground
25	GND	P	Ground
26	GND	P	Ground
27	GND	P	Ground
28	RF_IN	I	(Analog) 50-ohm RF signal in, with DC bias to off-module

P: Power I: Input O: Output I/O*: Input or Output, Open if not used

2.3 Specification

EB-27x Specifications

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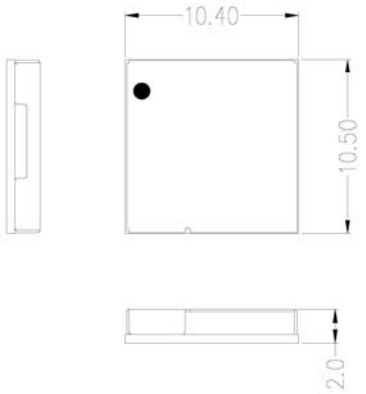
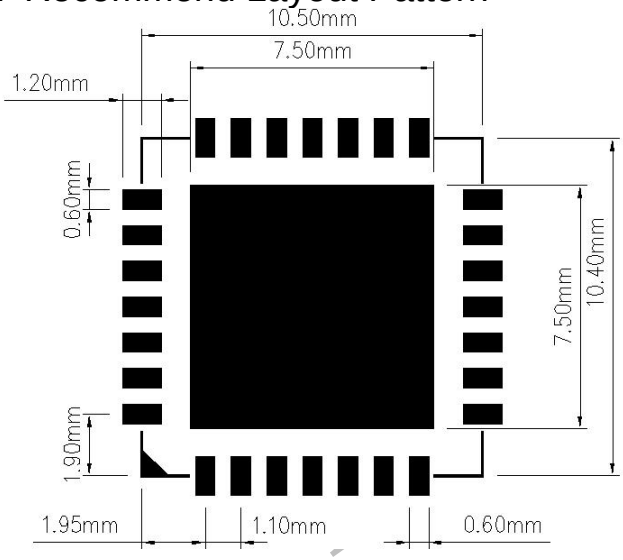
Datum	Default WGS-84
Antenna	External Active Antenna Output Voltage: 2.85 VDC
Serial Interface	TTL
Operating Temperature	-30℃ to 85℃
Storage Temperature	-40℃ to 85℃
Operating Humidity	≦95%, non condensing
Mounting	SMT Type, 28 Pin
Dimension	10.4 x 10.5 x 2.0(H) mm

3 Dimension and Package

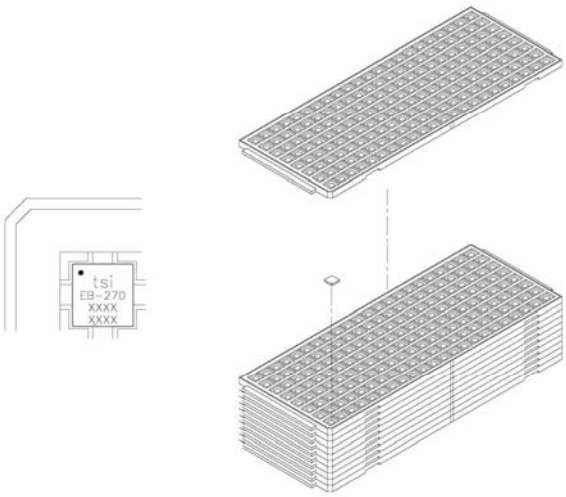
3.1 Mechanical Dimension



3.2 Recommend Layout Pattern



3.3 Package



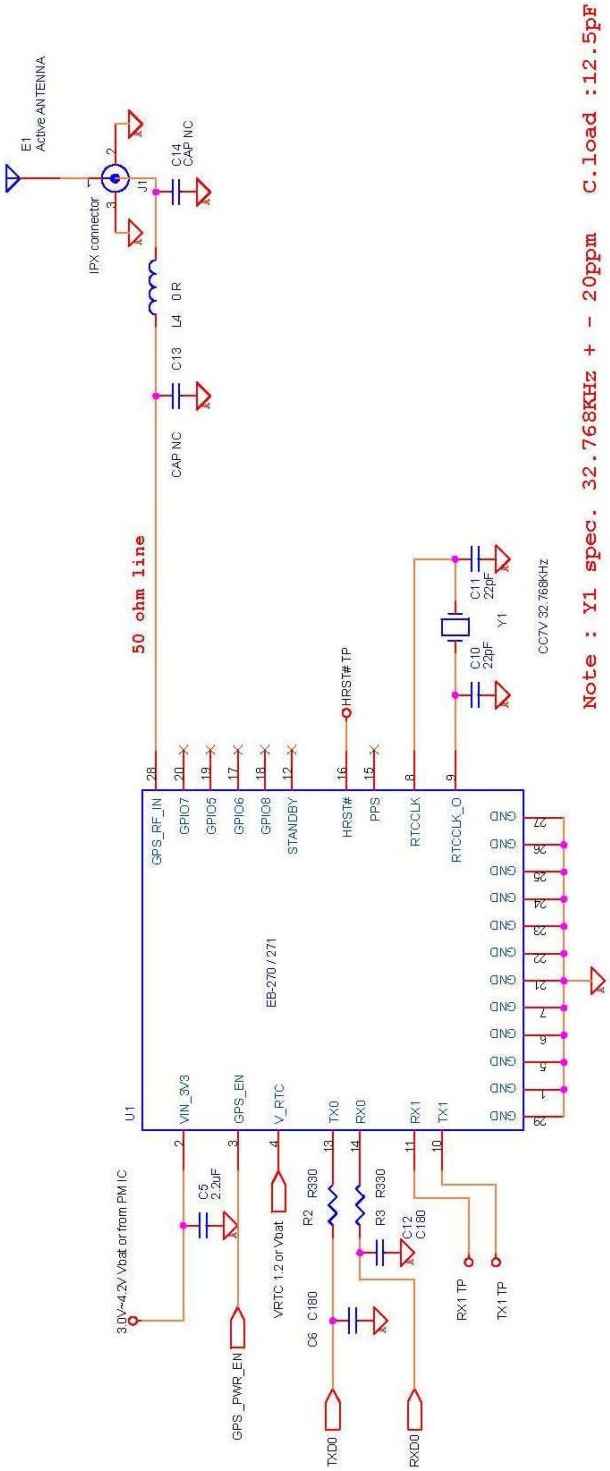
4 Application Information

4.1 GPS Antenna Recommendations

Follow below recommendations when choosing GPS antenna for EB-27x for best system performance. Transystem also offers active antenna products for optimal performance with EB-27x. For details, please contact your Transystem sales contact directly.

- Use active antenna that works with 3V power supply
- Receiving frequency 1575.42 ± 1.032MHz
- Polarization RHCP (right hand circular polarized)
- Output impedance = 50 Ohm
- 15dB ≦ LNA Gain ≦ 20dB
- Noise figure ≦ 2.0dB
- Connector: surface mounted on main PCB, Ipex or MMCX

4.2 Application Circuit



【Note 1】 Y1 spec. 32.768KHz + - 20ppm C.load :12.5pF
【Note 2】: V_RTC_1V2 (pin#4) could connect to 1.2V DC power supply or battery directly. (EB-270)
【Note 3】: V_RTC_3V3 (pin#4) could connect to 3.3V DC power supply or battery directly. (EB-271)

4.3 General GPS Receiver User's Tips

- If the satellite signals can not be locked or experiencing receiving problem (while in urban area), following steps are suggested:
  a) Please plug the external active antenna into GPS receiver and put the antenna outdoor or on the roof of the vehicle for better receiving performance.
  b) Move to another open space or reposition GPS receiver toward the direction with least blockage.
  c) Move the GPS receiver away from the interference sources.
  d) Wait until the weather condition is improved.
- Some vehicles having heavy metallic sun protecting coating on windshields may affect signal receptions
- Driving in and around high buildings may affect signal reception.
- Driving under tunnels or in buildings may affect signal reception.
- In general, GPS receiver performs best in open space where it can see clean sky. Weather will affect GPS reception – rain & snow contribute to worsen sensitivity.
- When GPS receiver is moving, it will take longer time to get position fix. Wait for satellite signals to be locked at a fixed point when first power-on the GPS receiver to ensure quick GPS position fix.

4.4 How to avoid ESD damage to module

- Any person handling the module should be grounded either with a wrist strap or ESD-protective footwear used in conjunction with a conductive or static-dissipative floor or floor mat.
- The work surface where devices are placed for handling, processing, testing, etc., must, be made of static-dissipative material and be grounded to ESD ground.
- All insulator materials must either be removed from the work area or must be neutralized with an ionizer. Static-generating clothing must be covered with an ESD-protective smock.
- When module are being stored, transferred between operations or workstations, or shipped, they must be kept in a Faraday shield container with inside surfaces (surfaces touching the module) that are static-dissipative.

Contact Information

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