GPS

locate, communicate, accelerate

TIM-5H

u-blox 5 GPS Module

Data Sheet

Abstract

Technical data sheet describing the cost effective, high-performance u-blox 5 based TIM-5H GPS and GALILEO module.
Features include A-GPS support, low power consumption, SuperSense® Indoor GPS providing best-in-class acquisition and tracking sensitivity, precision timing and an innovative jamming-resistant RF architecture. The 25.4 x 25.4 mm form factor of the highly successful TIM-4 series is maintained, enabling easy migration. The TIM-5H supports passive and active antennas, and provides 2 serial ports.

25.4 x 25.4mm

Document Information	
Title	TIM-5H
Subtitle	u-blox 5 GPS Module
Document type	Data Sheet
Document number	GPS.G5-MS5-07014-B2
Document status	

This document applies to the following products:

Name	Type number	ROM/FLASH version	PCN reference
TIM-5H	TIM-5H-0-004	FW6.02	UBX-TN-09017
	TIM-5H-0-003	FW6.00	UBX-TN-09001-A

Contents

1 Functional description

1.1 Overview

The TIM-5H is a high performance stand-alone GPS and GALILEO receiver module designed to allow easy, straightforward migration from its TIM-4 predecessors and featuring u-blox' KickStart weak signal acquisition technology. The TIM-5H comes with a built-in Flash EEPROM enabling firmware updates and the storage of specific configuration settings in non-volatile RAM. The built-in antenna supervisor supports external and active antennas, such as u-blox' ANN high performance GPS antenna.

u-blox KickStart provides accelerated startup at weak signals, and our featured SuperSense® Indoor GPS is capable of acquiring and tracking even extremely weak signals. This makes the TIM-5H suitable for solutions using small or covert antennas.

The 50-channel u-blox 5 positioning engine boasts a Time-To-First-Fix (TTFF) of under 1 second. The dedicated acquisition engine, with over 1 million correlators, is capable of massive parallel time/frequency space searches, enabling it to find satellites instantly. Innovative design and technology suppresses jamming sources and mitigates multipath effects, giving the TIM-5H GPS receiver excellent navigation performance even in the most challenging environments.

TIM-5H modules are not designed for life saving or supporting devices or for aviation and should not be used in products that could in any way negatively impact the security or health of the user or third parties or that could cause damage to goods.

1.2 Product features

Serie	Power	Size	Memory	Function					Antenna		Input / Output						
	Voltage range [V]	Thickness [mm]	Programmable (Flash) FW update	Power save mode	KickStart	Dead Reckoning	Raw data	Precision Timing	Antenna supply	Antenna supervisor	UART	USB	SPI	DDC (I²C compliant)	Reset input	Configuration pin
TIM-5H	2.7 - 3.6	3	•	S	•				•	•	2				•	

S= Supported by TIM-5H-0-003 and above

Table 1: Features of the TIM-5H Module

1.3 GPS performance

Parameter	Specification	
Receiver type	50 Channels GPS L1 frequency, C/A Code GALILEO Open Service L1 frequency	
Time-To-First-Fix[1]	Cold Start (Autonomous)	29 s
	Warm Start (Autonomous)	29 s
	Hot Start (Autonomous)	<1 s
	Aided Starts[2]	<1 s
Sensitivity[3]	Tracking & Navigation	-160 dBm
	Reacquisition	-160 dBm
	Cold Start (Autonomous)	-144 dBm
Horizontal position accuracy[4]	Autonomous	< 2.5 m
	SBAS	< 2.0 m
Accuracy of Timepulse signal	RMS 99% Time Pulse	30 ns <60 ns Configurable f = 0.25 … 999 Hz (Tp = 1/f – 1ms)
Max navigation update rate		2Hz
Velocity accuracy[5]		0.1m/s
Heading accuracy[6]		0.5 degrees
Dynamics		≤ 4 g
Operational limits[7]	Altitude	50000 m
	Velocity	500 m/s

Table 2: TIM-5H GPS performance

[1] All satellites at -130 dBm
[2] Dependent on aiding data connection speed and latency
[3] Demonstrated with a good active antenna
[4] CEP, 50%, 24 hours static, -130dBm, SEP: <3.5m
[5] 50% @ 30 m/s
[6] 50% @ 30 m/s
[7] Assuming Airborne <4g platform

1.4 Block diagram

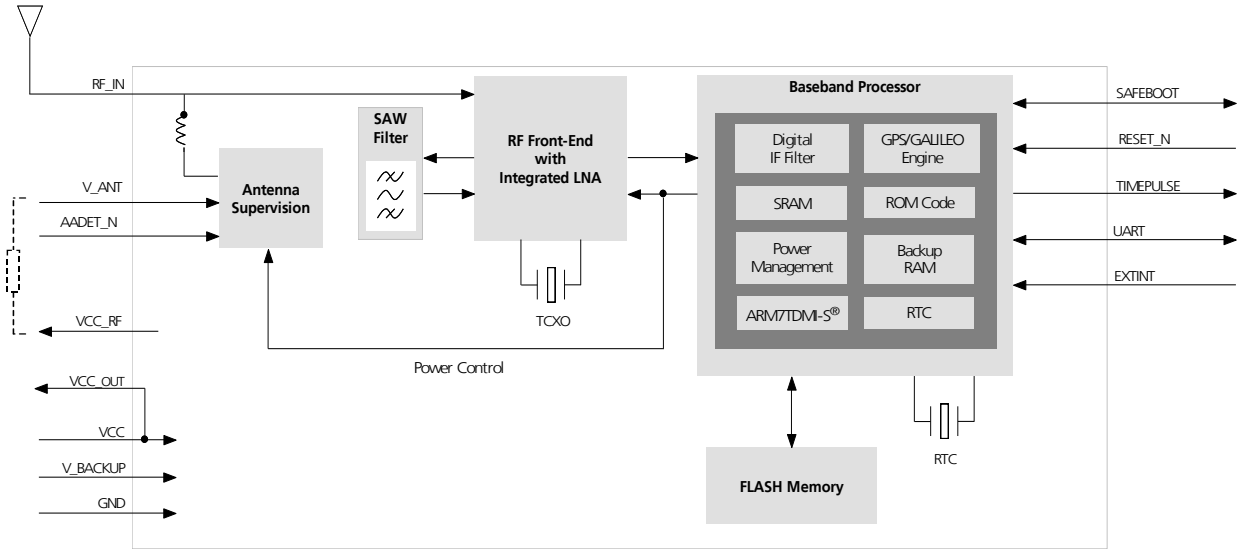


Figure 1: Block diagram

1.5 Assisted GPS (A-GPS)

Supply of aiding information like ephemeris, almanac, rough last position and time and satellite status and an optional time synchronization signal will reduce time to first fix significantly and improve the acquisition sensitivity. The TIM-5H module supports the u-blox AssistNow Online and AssistNow Offline A-GPS services and is OMA SUPL compliant.

1.6 SuperSense Indoor GPS

The TIM-5H module comes with SuperSense, providing ultra-fast acquisition/reacquisition and exceptional tracking sensitivity. SuperSense enables best-in-class tracking and navigation in difficult signal environments such as urban canyons or indoor locations.

1.7 KickStart / Oscillators

TIM-5H modules include the u-blox KickStart feature. This functionality uses the built-in TCXO to accelerate weak signal acquisition, enabling faster start and reacquisition times.

1.8 GALILEO

The u-blox 5 is a GNSS chip that receives and tracks GPS and GALILEO signals simultaneously, enhancing accuracy and coverage. When GALILEO-L1 signals become available, TIM-5H receivers will be capable of receiving and processing them via a simple firmware upgrade. The ability to receive and track GALILEO satellite signals will result in higher coverage, improved reliability and better accuracy.

1.9 Protocols and interfaces

Protocol	Type
NMEA	Input/output, ASCII, 0183, 2.3 (compatible to 3.0)
UBX	Input/output, binary, u-blox proprietary

Table 3: Available protocols

Both protocols are available on UART. For specification of the various protocols see the u-blox 5 Receiver Description including Protocol Specification [2].

1.9.1 UART

TIM-5H modules include two configurable UART interfaces for serial communication (for information about configuration see section 1.12).

1.10 Antenna

TIM-5H modules are designed for use with passive and active antennas.

An antenna supervisor is available with the TIM-5H. In the default operation mode the antenna supervisor is activated and enables the receiver to detect short circuits to the active antenna by checking the bias voltage level and can shut down the voltage bias immediately. A series resistor is needed in front of the **V_ANT** input. UBX and NMEA messages are provided to report the condition of the antenna supply. Open circuit detection can also be supported with an additional external circuit. For details, please refer to the TIM-5H Hardware Integration Manual [1].

Parameter	Specification	
Antenna Type		Passive and active antenna
Active Antenna Recommendations	Minimum gain	15 – 20 dB (to compensate signal loss in RF cable)
	Maximum noise figure	1.5 dB
	Maximum gain	50 dB

Table 4: Antenna Specifications

Parameter	Specification	
Antenna Supply		Using **VCC_RF** or external voltage source
Antenna Supervisor	Short circuit detection	Built-in
	Open circuit detection	Enabled with external circuit

Table 5: Antenna supervisor specifications

1.11 Power management

☞ For more information about power management strategies, see the u-blox 5 Receiver Description including Protocol Specification [2].

1.11.1 Operating modes

TIM-5H has 2 continuous operating modes (Maximum Performance and Eco) and 1 intermittent operating mode (Power Save mode). Maximum Performance mode freely uses the acquisition engine, resulting in the best possible TTFF, while Eco mode optimizes the use of the acquisition engine to deliver lower current consumption. At medium to strong signals, there is almost no difference for acquisition and tracking performance in these modes.

1.11.2 Maximum Performance mode

In Maximum Performance mode, u-blox 5 receivers use the acquisition engine at full performance to search for all possible satellites until the Almanac is completely downloaded.

As a consequence, tracking current consumption level will be achieved when:

- A valid GPS position is fixed
- Almanac is entirely downloaded
- Ephemeris for all satellites in view are valid

1.11.3 Eco mode

In Eco mode, u-blox 5 receivers use the acquisition engine to search for new satellites ***only when needed*** for navigation:

- In cold starts, u-blox 5 searches for enough satellites to navigate and optimizes use of the acquisition engine to download their ephemeris.
- In non-cold starts, u-blox 5 focuses on searching for visible satellites whose orbits are known from the Almanac.

In Eco mode, the u-blox 5 acquisition engine limits use of its searching resources to minimize power consumption. As a consequence the time to find some satellites at weakest signal level might be slightly increased in comparison to the Max. performance mode.

u-blox 5 deactivates the acquisition engine as soon as a position is fixed and a sufficient number (at least 4) of satellites are being tracked. The tracking engine continues to search and track new satellites without orbit information.

1.11.4 Power Save mode

TIM-5H comes with power saving options that allow reducing the average tracking current consumption by periodically switching off parts of or the complete GPS receiver and waking it up at configurable intervals from one second to one week. Wake-up can be done by using a hardware interrupt or by sending a serial command. The firmware also offers the option to reduce the peak and acquisition current independently of the power down option.

1.11.5 Power states

TIM-5H allows for a number of operation modes to be implemented that adapt system power consumption to application performance needs. The following power states can be selected by the embedded firmware:

- Suspend state: The entire RF section is shut down, including the TCXO. The baseband core does not receive any clock signal. Power supply to the baseband core remains enabled. Memory and register contents as well as external pin states remain stable. The USB Suspend/Resume signal controls entering and exiting Suspend state. Only a USB "Resume" command can wake the system up.
- Backup state: System is turned off, but backup power supply (V_BCKP) keeps RTC running and keeps data in backup RAM valid. RTC may wake the system up at a certain time or given certain conditions, if the supply voltage is available. Backup state will also be entered if the main battery supply voltage fails. In this case, the RTC has no control over the supply voltage and the system can only wait until the main battery power supply is re-established. Entering and leaving backup state always comes with a full system reset.

1.11.6 Peak current reduction

The peak current during acquisition can be reduced using a software message. This will result in longer receiver start-up times. This setting is independent of the activated operating mode.

1.12 Configuration

With the TIM-5H, configuration settings modified by UBX configuration messages can be saved to the FLASH memory. In this case the modified settings remain effective even after power-down and don't require backup battery supply.

For more information, see the u-blox 5 Receiver Description including Protocol Specification [2].

2 Mechanical specifications

Parameter	Specification	
A	25.4 +0.6/-0.1mm	[1000 +24/-4mil]
B	25.4 ±0.1mm	[1000 ±4mil]
C	3.0 ±0.3mm	[118 ±12mil]
D	1.5 +0.3/-0.1mm	[59 +18/-4mil]
E	1.27 ±0.1mm	[50 ±4mil]
F	2.8 ±0.1mm	[111 ±4mil]
G	1.9 ±0.1mm	[75 ±4mil]
Weight	3 g	

Table 6: Dimensions

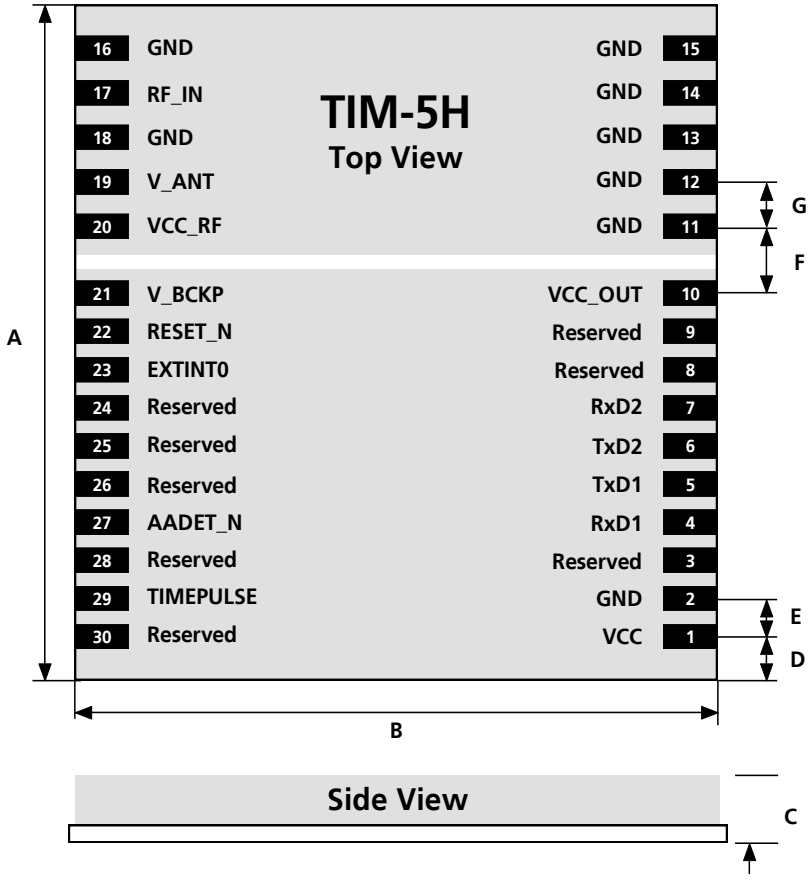


Figure 2: Dimensions

☞ For information regarding the Paste Mask and Footprint see the TIM-5H Hardware Integration Manual [1].

2.1 Pin assignment

No	Name	I/O	Description
1	VCC	I	Supply voltage
2	GND	I	Ground
3	Reserved	I	Reserved
4	RxD1	I	Serial Port 1
5	TxD1	O	Serial Port 1
6	TxD2	O	Serial Port 2
7	RxD2	I	Serial Port 2
8	Reserved	I	Reserved
9	Reserved	I	Reserved
10	VCC_OUT	O	Output Voltage
11-16	GND	I	Ground
17	RF_IN	I	GPS/GALILEO signal input
18	GND	I	Ground
19	V_ANT	I	Antenna Bias voltage
20	VCC_RF	O	Output Voltage RF section
21	V_BCKP	I	Backup Voltage Supply
22	RESET_N	I	Reset (Active low)
23	EXTINT0	I	External Interrupt Pin
24	Reserved	I	Reserved
25	Reserved	I	Reserved
26	Reserved	I	Reserved
27	AADET_N	I	Active Antenna Detect
28	Reserved	I	Reserved
29	TIMEPULSE	O	Timepulse signal
30	Reserved	I	Reserved

Table 7: Pinout

Pins designated Reserved should only be used with caution. For more information about Pinouts see the TIM-5H Hardware Integration Manual [1].

3 Electrical specifications

3.1 Absolute maximum ratings

Parameter	Symbol	Condition	Min	Max	Units
Power supply voltage (VCC)	Vcc		-0.5	3.6	V
Backup battery voltage (V_BCKP)	Vbckp		-0.5	3.6	V
Input pin voltage (RxD1, EXTINT0)	Vin		-0.5	3.6	V
Input pin voltage (all other input pins)	Vin		-0.5	Vcc +0.5	V
VCC_RF output current	Iccrf			100	mA
Input power at RF_IN	Prfin	source impedance = 50 Ω, continuous wave		-5	dBm
Antenna bias voltage	Vant			6	V
Antenna bias current	Iant			100	mA
Storage temperature	Tstg		-40	85	°C
Maximum ESD Stress Level Applied; according to human body model (100pF; 1.5kΩ).	$V_{ESD(HBM)}$	RF pins All other pins		1500 2000	V
Maximum ESD Stress Level Applied; according to machine model; (200pF; 0.75mH).	$V_{ESD(MM)}$	RF pins All other pins		150 200	V

Table 8: Absolute maximum ratings

GPS receivers are Electrostatic Sensitive Devices (ESD) and require special precautions when handling. For more information see the *TIM-5H Hardware Integration Manual* [1].

Stressing the device beyond the "Absolute Maximum Ratings" may cause permanent damage. These are stress ratings only. The product is not protected against overvoltage or reversed voltages. If necessary, voltage spikes exceeding the power supply voltage specification, given in table above, must be limited to values within the specified boundaries by using appropriate protection diodes.

3.2 Operating conditions

☞ All specifications are at an ambient temperature of 25°C.

Parameter	Symbol	Min	Typ	Max	Units	Condition
Power supply voltage (VCC)	Vcc	2.7	3.0	3.6	V	
Peak supply current [8]	Iccp			150	mA	Vcc = 3.6V
Sustained supply current[9]	Icc Acquisition (Max Performance Mode)		61[10]		mA	Vcc = 3.0V
	Icc Tracking (Max Performance Mode)		47[11]		mA	Vcc = 3.0V
	Icc Acquisition (Eco Mode)		56[10]		mA	Vcc = 3.0V
	Icc Tracking (Eco Mode)		45[11]		mA	Vcc = 3.0V
	Icc Acquisition (Power Save Mode)		46[10]		mA	Vcc = 3.0V
	Icc Tracking (Power Save Mode)		23[11]		mA	Vcc = 3.0V
Backup battery voltage	Vbckp	1.4		3.6	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
Antenna gain	Gant			50	dB	
Receiver Chain Noise Figure	Nftot		3.2		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	

Table 9: Operating conditions

☞ Operation beyond the specified operating conditions can affect device reliability.

4 Design-in

In order to obtain the necessary information to conduct a proper design-in, u-blox strongly recommends consulting the TIM-5H Hardware Integration Manual [1].

[8] Use this figure to dimension maximum current capability of power supply.
[9] Use this figure to determine required battery capacity.
[10] FW 6.00, >8 SVs in view, CNo >40 dBHz, current average of 30 sec after cold start.
[11] FW 6.00, with strong signals, all orbits available. For Cold Starts typical 12 min after First Fix. For Hot Starts typical 15 sec after First Fix.

5 Reliability tests and approvals

5.1 Reliability tests

Tests for product family qualifications according to ISO 16750.

5.2 Approvals

Products marked with this lead-free symbol on the product label comply with the "Directive 2002/95/EC of the European Parliament and the Council on the Restriction of Use of certain Hazardous Substances in Electrical and Electronic Equipment" (RoHS).

All u-blox 5 GPS modules are RoHS compliant.

6 Product handling

6.1 Packaging

TIM-5H modules are delivered as hermetically sealed, reeled tapes in order to enable efficient production, production lot set-up and tear-down.

Figure 3: Reeled u-blox 5 modules

6.1.1 Reels

TIM-5H GPS modules are deliverable in quantities of 250pcs on a reel. The dimensions of the reel are shown in Figure 4.

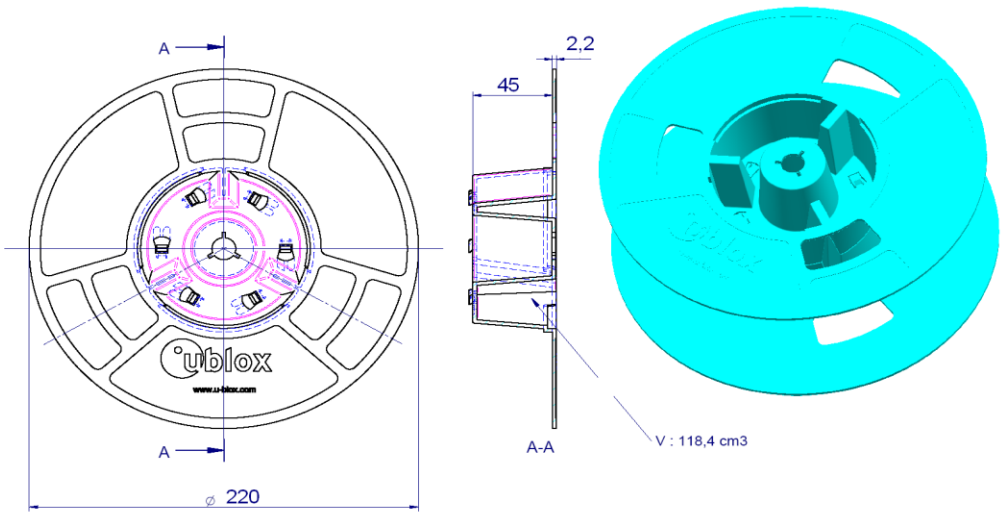


Figure 4: Dimension of reel for 250 pieces (dimensions unless otherwise specified in mm)

6.1.2 Tapes

The dimensions and orientations of the tapes for TIM-5H modules are specified in Figure 5.

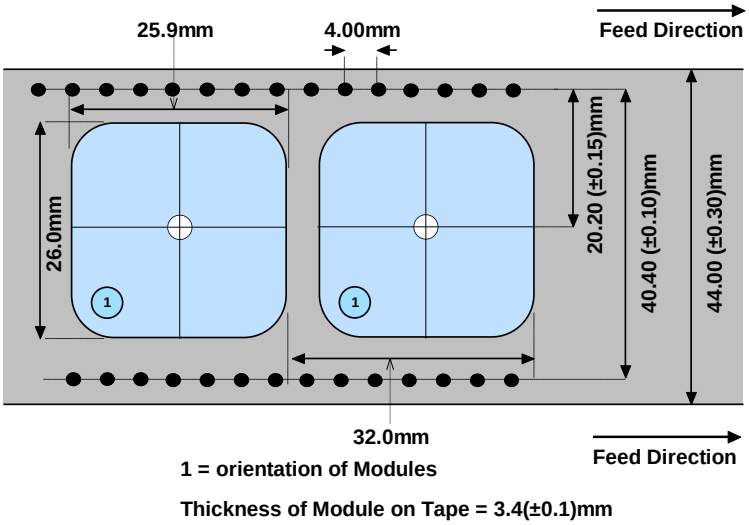


Figure 5: Dimensions and orientation for TIM-5H modules on tape

6.2 Shipment, storage and handling

TIM-5H modules are designed and packaged to be processed in an automatic assembly line, and are shipped in Tape-and-Reel.

TIM-5H modules are Moisture Sensitive Devices (MSD) in accordance to the IPC/JEDEC specification. Appropriate MSD handling instructions and precautions are summarized in Sections 6.2.1 to 6.2.3. Read them carefully to prevent permanent damage due to moisture intake.

GPS receivers contain highly sensitive electronic circuitry and are Electrostatic Sensitive Devices (ESD). Handling TIM-5H modules without proper ESD protection may destroy or damage them permanently. See Section 0 for ESD handling instructions.

6.2.1 Moisture Sensitivity Levels

The Moisture Sensitivity Level (MSL) relates to the packaging and handling precautions required. TIM-5H modules are rated at MSL level 4.

For MSL standard see IPC/JEDEC J-STD-020, which can be downloaded from www.jedec.org.

6.2.2 Shipment

Table 10 summarizes the dry pack requirements for different MSL levels in the IPC/JEDEC specification.

MSL Level	Dry Pack Requirement
1	Optional
2	Required
2a	Required
3	Required
4	Required

Table 10: JEDEC specification of dry pack requirements

According to IPC/JEDEC specification J-STD-020, if a device passes MSL level 1, it is classified as not moisture sensitive and does not require dry pack. If a device fails level 1 but passes a higher numerical level, it is classified as moisture sensitive and must be dry packed in accordance with J-STD-033.

TIM-5H modules are delivered on Tape-and-Reels in a hermetically sealed package ("dry bag") to prevent moisture intake and protect against electrostatic discharge. For protection from physical damage, the reels are individually packed in cartons.

Carrier materials such as trays, tubes, reels, etc., that are placed in the Moisture Barrier Bag (MBB) can affect the moisture level within the MBB. Therefore, the effect of these materials is compensated by adding additional desiccant in the MBB to ensure the shelf life of the SMD packages.

The dry bag provides an IPC/JEDEC compliant MSD label describing the handling requirements to prevent humidity intake. IPC/JEDEC specifications require that MSD sensitive devices be packaged together with a Humidity Indicator Card (HIC) and desiccant to absorb humidity. If no moisture has been absorbed, the three fields in the HIC indicate blue color. Figure 6 shows examples of an MSD label and HIC.

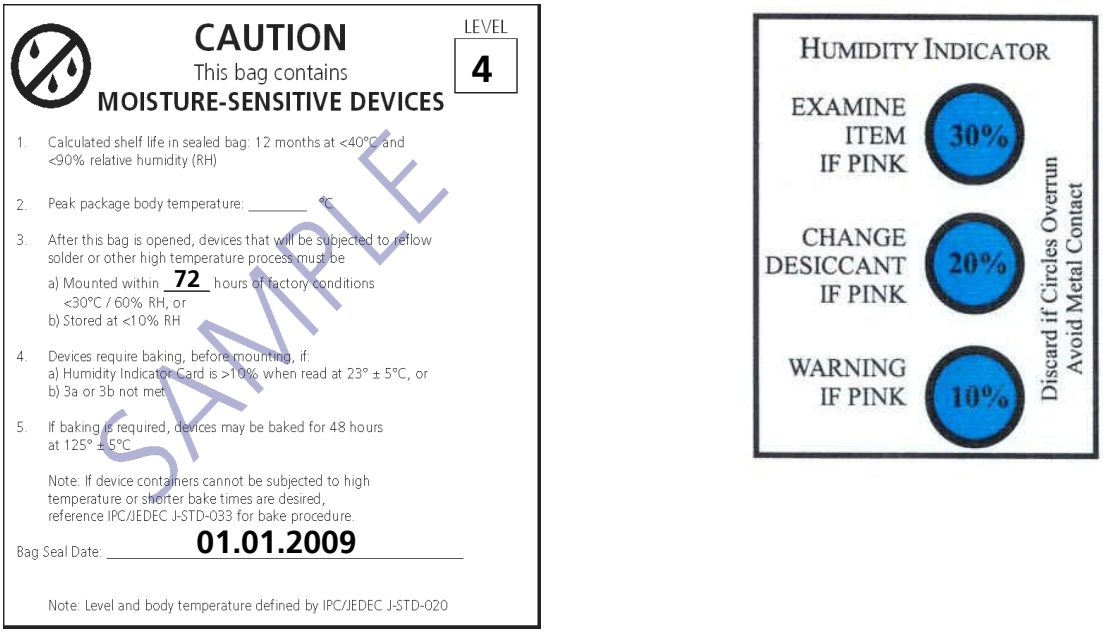


Figure 6: Examples of MSD label and Humidity Indicator Card

6.2.3 Storage and floor life

The calculated shelf life for dry packed SMD packages is a minimum of 12 months from the bag seal date, when stored in a noncondensing atmospheric environment of <40°C/90% RH.

Table 11 lists floor life for different MSL levels in the IPC/JDEC specification.

MSL level	Floor life (out of bag) at factory ambient ≤30°C/60% RH or as stated
1	Unlimited at ≤30°C/85% RH
2	1 year
2a	4 weeks
3	168 hours
4	72 hours

Table 11: JEDEC specification of floor life

The parts must be processed and soldered within the time specified for the MSL level. If this time is exceeded, or the humidity indicator card in the sealed package indicates that they have been exposed to moisture, the devices need to be pre-baked before the reflow solder process.

6.2.4 Drying

Both encapsulant and substrate materials absorb moisture. IPC/JEDEC specification J-STD-020 must be observed to prevent cracking and delamination associated with the "popcorn" effect during reflow soldering. The popcorn effect can be described as miniature explosions of evaporating moisture. Baking before processing is required in the following cases:

- Humidity indicator card: At least one circular indicator is no longer blue
- Floor life or environmental requirements after opening the seal have been exceeded, e.g. exposure to excessive seasonal humidity.

Refer to Section 4 of IPC/JEDEC J-STD-033 for recommended baking procedures. Table 4-1 of the specification lists the required bake times and conditions for drying. For example, a module that has exceeded its floor life by >72 hours shall be baked at 125°C for 48 hours. (Floor life begins counting at time = 0 after bake).

Do not attempt to bake TIM-5H modules while contained in tape and rolled up in reels. For baking, place parts individually onto oven tray.

Oxidation Risk: Baking SMD packages may cause oxidation and/or intermetallic growth of the terminations, which if excessive can result in solderability problems during board assembly. The temperature and time for baking SMD packages are therefore limited by solderability considerations. The cumulative bake time at a temperature greater than 90°C and up to 125°C shall not exceed 96 hours. If the bake temperature is not greater than 90°C, there is no limit on bake time. Bake temperatures higher than 125°C are not allowed.

6.2.5 Reflow soldering

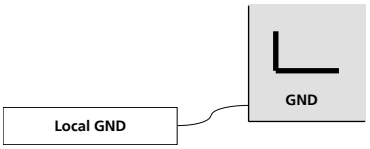
Reflow profiles are to be selected according to u-blox recommendations (see the LEA-5, NEO-5, TIM-5H Hardware Integration Manual [1]).

6.2.6 ESD handling precautions

TIM-5H modules are Electrostatic Sensitive Devices (ESD). Observe precautions for handling! Failure to observe these precautions can result in severe damage to the GPS receiver!

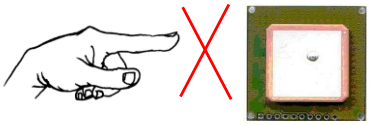
GPS receivers are Electrostatic Sensitive Devices (ESD) and require special precautions when handling. Particular care must be exercised when handling patch antennas, due to the risk of electrostatic charges. In addition to standard ESD safety practices, the following measures should be taken into account whenever handling the receiver:

- Unless there is a galvanic coupling between the local GND (i.e. the work table) and the PCB GND, then the first point of contact when handling the PCB shall always be between the local GND and PCB GND.

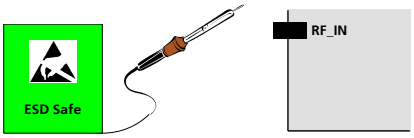


- Before mounting an antenna patch, connect ground of the device
- When handling the RF pin, do not come into contact with any charged capacitors and be careful when contacting materials that can develop charges (e.g. patch antenna ~10pF, coax cable ~50-80pF/m, soldering iron, …)

- To prevent electrostatic discharge through the RF input do not touch the mounted patch antenna.



- When soldering RF connectors and patch antennas to the receiver's RF pin, make sure to use an ESD safe soldering iron (tip).



7 Default settings

Interface	Settings
Serial Port 1 Output	9600 Baud, 8 bits, no parity bit, 1 stop bit Configured to transmit both NMEA and UBX protocols, but only following NMEA and no UBX messages have been activated at start-up: **GGA, GLL, GSA, GSV, RMC, VTG, TXT**
Serial Port 1 Input	9600 Baud, 8 bits, no parity bit, 1 stop bit, Autobauding disabled Automatically accepts following protocols without need of explicit configuration: **UBX, NMEA** The GPS receiver supports interleaved UBX and NMEA messages.
Serial Port 2 Output	57600 Baud, 8 bits, no parity bit, 1 stop bit Configured to transmit both NMEA and UBX protocols, but only following UBX and no NMEA messages have been activated at start-up: **NAV-SOL, NAV-POSLLH, NAV-SUINFO, NAV-STATUS, INF-WARNING, INF-ERROR, INF-NOTICE** Additional messages can be activated with appropriate input messages.
Serial Port 2 Input	57600 Baud, 8 bits, no parity bit, 1 stop bit, Autobauding disabled Automatically accepts following protocols without need of explicit configuration: **UBX, NMEA** The GPS receiver supports interleaved UBX and NMEA messages.
TIMEPULSE (1Hz Nav)	1 pulse per second, synchronized at rising edge, pulse length 100ms
Power Mode	Maximum Performance Mode

Table 12: Available Protocols.

Refer to the TIM-5H Hardware Integration Manual [1] for information about further settings.

8 Labeling and ordering information

8.1 Product labeling

The labeling of u-blox 5 GPS modules includes important product information. The location of the product type number is shown in Figure 7.

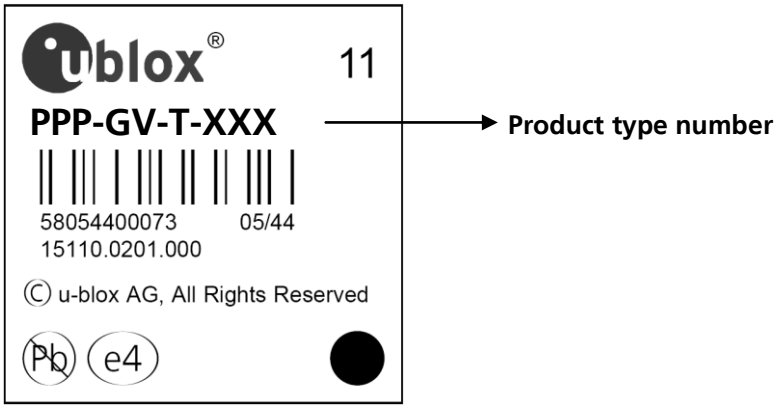


Figure 7: Location of product type number on u-blox 5 module label

8.2 Explanation of codes

3 different product code formats are used. The **Product Name** is used in documentation such as this data sheet and identifies all u-blox 5 products, independent of packaging and quality grade. The **Ordering Code** includes options and quality, while the **Type Number** includes the hardware and firmware versions. Table 13 below details these 3 different formats:

Format	Structure
Product Name	PPP-GV
Ordering Code	PPP-GV-T
Type Number	PPP-GV-T-XXX

Table 13: Product Code Formats

The parts of the product code are explained in Table 14.

Code	Meaning	Example
PPP	Product Family	TIM
G	Product Generation	5 = u-blox5
V	Variant	T = Timing, R = DR, etc.
T	Option / Quality Grade	Describes standardized functional element or quality grade such as different RF connector, FLASH size, automotive grade etc.
XXX	Product Detail	Describes product details or options such as hard- and software revision, cable length, etc.

Table 14: part identification code

8.3 Ordering information

Ordering No.	Product
TIM-5H-0	Progr. U-blox 5 GPS Module with KickStart, 25.4 x 25.4mm, 250 pcs/reel
EVK-5H-0	u-blox 5 Evaluation Kit with KickStart

Table 15: Product Ordering Codes

☞ Product changes affecting form, fit or function are documented by u-blox. For a list of Product Change Notifications (PCNs) see our website at: http://www.u-blox.com/customersupport/pcn/ublox5.html.

Related documents

[1] TIM-5H Hardware Integration Manual, Docu. No GPS.G5-MS5-07015

[2] u-blox 5 Receiver Description including Protocol Specification, Docu. No GPS.G5-X-07036

All these documents are available on our homepage (http://www.u-blox.com).

☞ For regular updates to u-blox documentation and to receive product change notifications please register on our homepage.

Revision history

Revision	Date	Name	Status / Comments
A	7/07/2008	tgri	Vbckp, CI, Power Consumption
A1	12/11/08	tgri	Vddusb, ESD
A2	26/11/2008	tgri	RMS, Antenna Gain, Operational Limits
B	5/25/2009	tgri	New CI, Overview, Product features (SPI), GPS performance (navigation update rate and operational limits), Protocols and interfaces (addition of sections 1.91-1.9.4), Power management (inclusion of sections 1.11.2-1.11.6), Raw data, Pin assignment (SPI), Absolute maximum ratings (ESD ratings), Operating conditions (sustained supply current values), reliability tests and approvals, product handling (new chapter), Labeling and ordering information (inclusion of sections 8.1-8.2)
B1	6/4/2009	tgri	Prfin, product labeling information
B2	20/11/2009	tgri	Update to FW 6.02

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