User Manual

Fastrack Supreme IESM-GPS+USB

Reference: **WA_DEV_Fastrk_UGD_002**

Revision: **001**

Date: **October 3, 2007**

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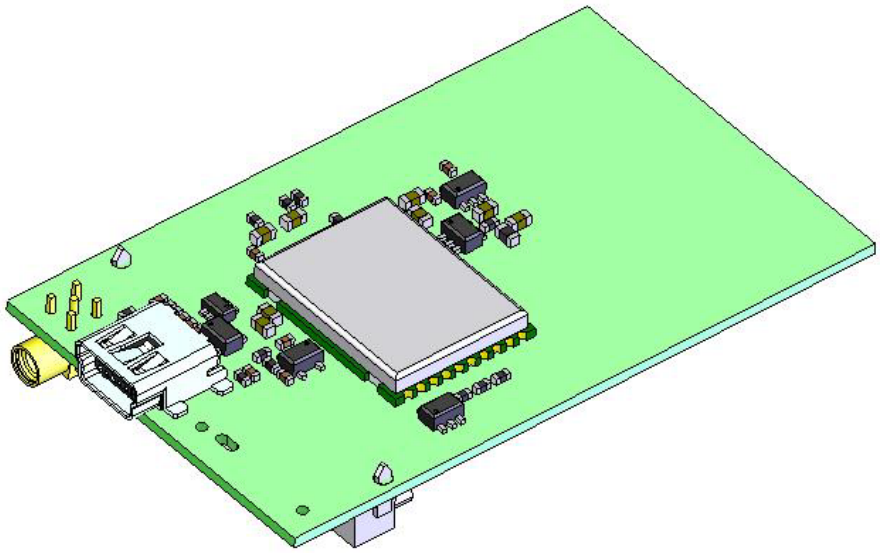
Plug and Play Fastrack Supreme Wireless CPU®

IESM-GPS+USB User Guide

Reference: WA_DEV_Fastrk_UGD_002
Revision: 001
Date: 3 October, 2007



Document History

Revision	Date	List of revisions	
001	16 April, 07	First Issue	
	03 October, 07	Update	

Overview

The Internal Expansion Socket Module (IESM) is a Plug & Play device to expand the functionality of a standard Fastrack Supreme 10 and Supreme 20 into a state of the art GPS + USB device for machine to machine applications.

With the IESM it is possible to utilize the Internal Expansion Socket (IES) which opens wide applications for Fastrack Supreme 10 and Supreme 20 by simply plugging in.

Fastrack Supreme with IESM-GPS+USB plugged-in may utilize one or more AT Plug-Ins of the powerful Open AT® software suite. Open AT® is the world's most comprehensive cellular development environment, which allows embedded standard ANSI C applications to be natively executed directly on the Wireless CPU®.

Topics covered by this document;

- General description
- Functional description
- Basic services available
- Technical characteristics
- Installing and using the IESM-GPS+USB
- User-level troubleshooting
- Recommended accessories to be used with the product

Note 1:

This document covers the IESM-GPS+USB Plug & Play alone and does not include;

- The programmable capabilities provided via the use of Open AT® Software Suites.
- The development guide for IESM for expanding the application feature through the IES interface.

For details, please refer to the documents shown in the "Reference documents" section.

Note 2:

To use the IESM GPS+USB for Fastrack Supreme, the GPS Feature must be activated first. This activation is specific to GPS application which is made during Fastrack Supreme production.

To verify, enter "AT+WCFM=5". If Fastrack Supreme responds "+WCFM: 00000031, 0", this means it is not activated. Please contact your nearest distributor for assistance before installing IESM-GPS+USB.

RoHS Directive

The Fastrack Supreme and IESM-GPS+USB are now compliant with RoHS Directive 2002/95/EC, which sets limits for the use of certain restricted hazardous substances. This directive states that "from 1st July 2006, new electrical and electronic equipment put on the market does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE)".

Plug & Plays which are compliant with this directive are identified by the RoHS logo on their label.

Disposing of the product

This electronic product is subject to the EU Directive 2002/96/EC for Waste Electrical and Electronic Equipment (WEEE). As such, this product must not be disposed off at a municipal waste collection point. Please refer to local regulations for directions on how to dispose off this product in an environmental friendly manner.

Cautions

Information furnished herein by WAVECOM is accurate and reliable. However, no responsibility is assumed for its use. Please read carefully the safety recommendations given in Chapter 11 for an application based on Fastrack Supreme Plug & Play.

IESM are ESD sensitive, it is recommended to use standard ESD precautions, as described in the following norm:

JEDEC standard JESD625-A, Requirements for Handling Electrostatic Discharge-Sensitive (ESDS) Devices.

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Web Site Support

General information about Wavecom and its range of products:	www.wavecom.com
Specific support is available for the Fastrack Supreme Plug & Play Wireless CPU®:	www.wavecom.com/fastracksupreme
Carrier/Operator approvals:	www.wavecom.com/approvals
Open AT® Introduction:	www.wavecom.com/OpenAT
Developer support for software and hardware:	www.wavecom.com/forum

Contents

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1 References

1.1 Reference Documents

For more details, several reference documents may be consulted. The Wavecom reference documents are provided in the Wavecom documents package contrary to the general reference documents, which are not Wavecom owned.

1.1.1 Open AT® Software Documentation

[1] Getting started with Open AT® SDK v4.22 (Ref.WM_DEV_OAT_UGD_048)

[2] Tutorial for Open AT® IDE V1.04 (Ref. WM_DEV_OAT_UGD_044)

[3] Tools Manual for Open AT® IDE V1.04 (Ref. WM_DEV_OAT_UGD_045)

[4] Basic Development Guide for Open AT®V4.21
(Ref. WM_DEV_OAT_UGD_050)

[5] ADL User Guide for Open AT®V4.21 (Ref. WM_DEV_OAT_UGD_051)

[6] Open AT® v4.22 Official Release Note (Ref. WM_DEV_OAT_DVD_338)

1.1.2 AT Software Documentation (TB Updated with X.61)

[7] AT commands interface Guide for FW v6.63
(Ref. WM_DEV_OAT_UGD_049)

[8] Open AT® Firmware v6.63 Customer Release Note
(Ref.WM_PGM_OAT_CRN_001)

1.1.3 Fastrack Supreme Related Documents

[9] Fastrack Supreme User Guide (Ref. WA_DEV_Fastrk_UGD_001)

1.1.4 IESM Related Documents

[10] IESM Product Technical Specifications
(Ref. WA_DEV_Fastrk_PTS_001)

[11] C-GPS Overview and Usage
(Ref. WA_DEV_C-GPS_APN_001_001)

[12] IESM GPS+USB Installation Guide
(Ref. WA_DEV_Fastrk_UGD_003)

Note:

New versions of software may be available. Wavecom recommends customers to check the web site for the latest documentation.

1.2 Abbreviations

Abbreviation	Definition
AC	Alternating Current
ACM	Accumulated Call Meter
AT	ATtention (prefix for Wireless CPU® commands)
CLK	CLocK
CMOS	Complementary Metal Oxide Semiconductor
CS	Coding Scheme
CTS	Clear To Send
dB	Decibel
dBc	Decibel relative to the Carrier power
dBi	Decibel relative to an Isotropic radiator
dBm	Decibel relative to one milliwatt
DC	Direct Current
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DCS	Digital Cellular System
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi-Frequency
DTR	Data Terminal Ready
EEPROM	Electrically Erasable Programmable Read-Only Memory
EFR	Enhanced Full Rate
E-GSM	Extended GSM
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
ESD	ElectroStatic Discharges
ETSI	European Telecommunications Standards Institute
FIT	Series of connectors (micro-FIT)
FR	Full Rate
FTA	Full Type Approval
GCF	Global Certification Forum
GND	GrouND
GPIO	General Purpose Input Output
GPRS	General Packet Radio Service

Abbreviation	Definition
GPS	Global Positioning System
GSM	Global System for Mobile communications
HR	Half Rate
I	Input
IEC	International Electrotechnical Commission
IES	Internal Expansion Socket
IESM	Internal Expansion Socket Module
IMEI	International Mobile Equipment Identification
I/O	Input / Output
LED	Light Emitting Diode
MAX	MAXimum
ME	Mobile Equipment
MIC	MICrophone
Micro-Fit	Family of connectors from Molex
MIN	MINimum
MNP	Microcom Networking Protocol
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
NOM	NOMinal
O	Output
Pa	Pascal (for speaker sound pressure measurements)
PBCCH	Packet Broadcast Control CHannel
PC	Personal Computer
PCL	Power Control Level
PDP	Packet Data Protocol
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PUK	Personal Unblocking Key
RF	Radio Frequency
RFI	Radio Frequency Interference
RI	Ring Indicator
RMS	Root Mean Square
RTS	Request To Send
RX	Receive

Abbreviation	Definition
SIM	Subscriber Identification Module
SMA	SubMiniature version A RF connector
SMS	Short Message Service
SNR	Signal-to-Noise Ratio
SPL	Sound Pressure Level
SPK	SpeaKer
SRAM	Static RAM
TCP/IP	Transmission Control Protocol / Internet Protocol
TDMA	Time Division Multiple Access
TU	Typical Urban fading profile
TUHigh	Typical Urban, High speed fading profile
TX	Transmit
TYP	TYPical
USB	Universal Serial Bus
VSWR	Voltage Stationary Wave Ratio

2 Packaging

2.1 Contents

The complete package contents of the Fastrack IESM-GPS+USB consists of the following:

- 1 piece packaging box (**A**)
- 100 pieces IESM-GPS+USB (**B**)
- 100 pieces Backplate and Contact Spring (**C**)
- 3 pieces Extraction Tool (D)
- Installation Guide (**E**)

	
Packaging Box (A)	Backplate Box Opened

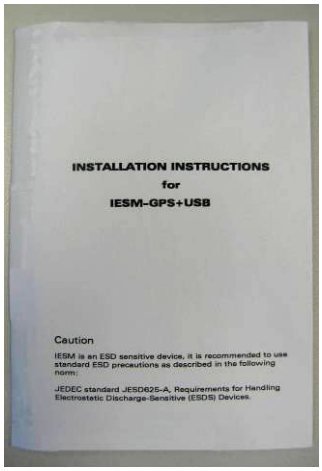
			
IESM-GPS+USB (B)	Backplate and Contact Spring (C)	Extraction Tool (D)	Installation Manual (E)

Figure 1: Complete package contents

2.2 Packaging Box

The packaging box external dimensions:

- width: 290 mm
- height: 65 mm
- length: 455 mm

Label placed indicates:

- WAVECOM logo
- Product reference (IESM-GPS+USB)
- CE mark
- RoHS Logo

Figure 2: Packaging box

The packaging label dimensions are:

- height: [TBD] mm
- length: [TBD] mm

2.3 Production Sticker

A production sticker (see

Figure 3) located at the back side with the following information:

- product reference (IESM GPS+USB)
- Marketing Name (FSUE01)
- Bar Code
- 17 Digit Serial Number

Figure 3: Production sticker

3 General Information

3.1 Description

The IESM-GPS+USB description is shown below.

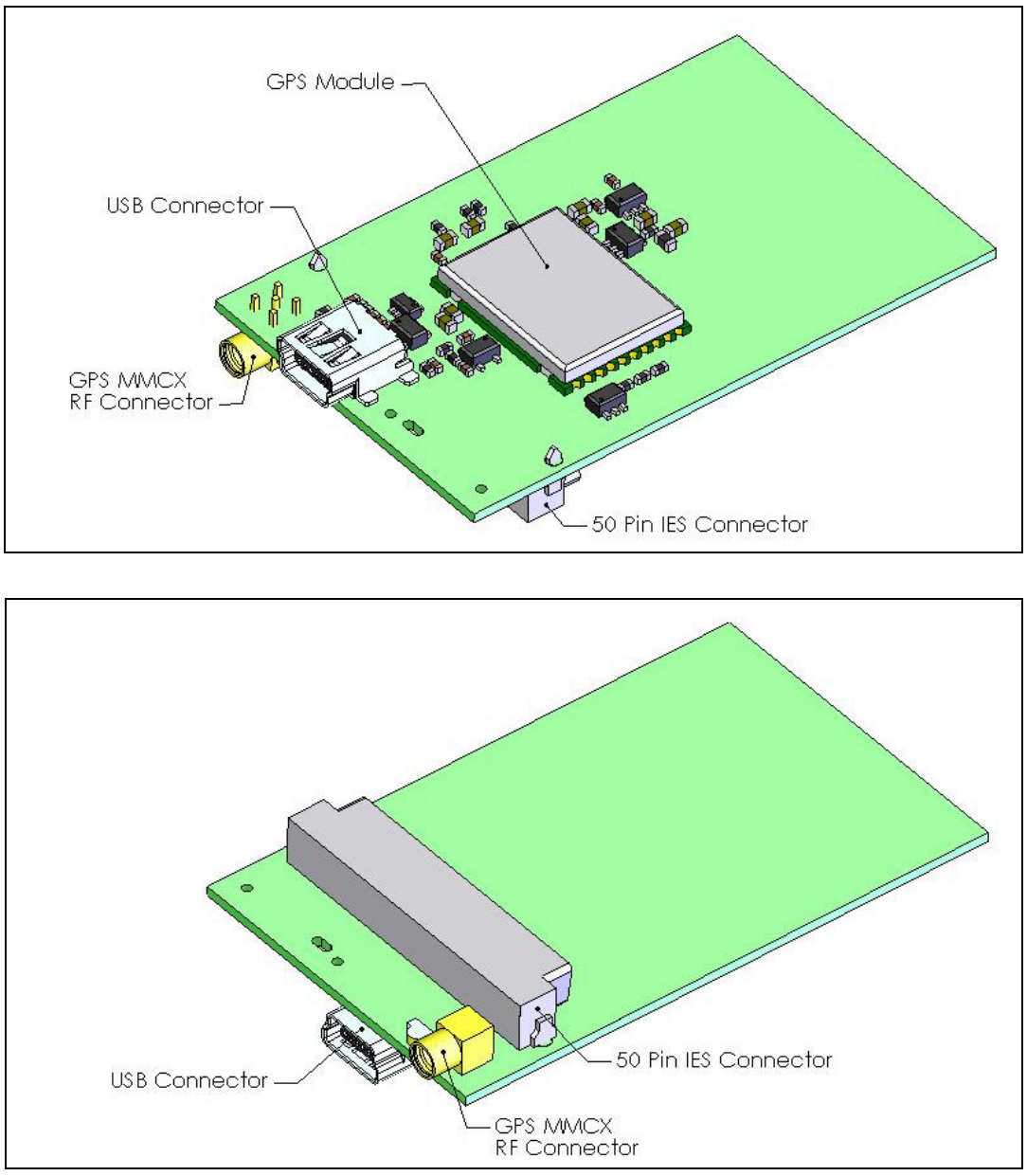


Figure 4: IESM general description

3.2 External Connections

3.2.1 GPS Antenna Connector

The GPS antenna connector is an MMCX type connector for a 50 Ω RF connection. 3.3VDC is available on this connector for supplying GPS active antennas. This supply can be turned ON or OFF using AT Command.

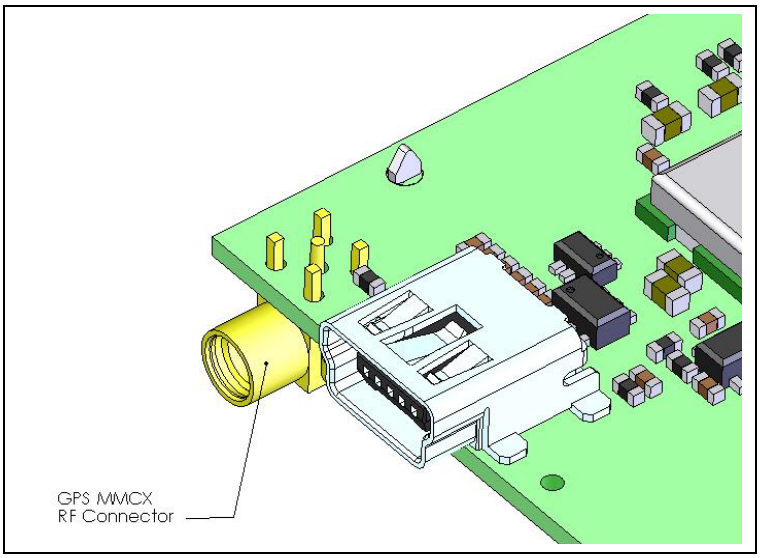


Figure 5: MMCX connector for antenna connection

3.2.2 Mini-B USB Connector

Standard Mini-B USB connector for communicating with:

- Wireless CPU

This port is USB 2.0 compliant.

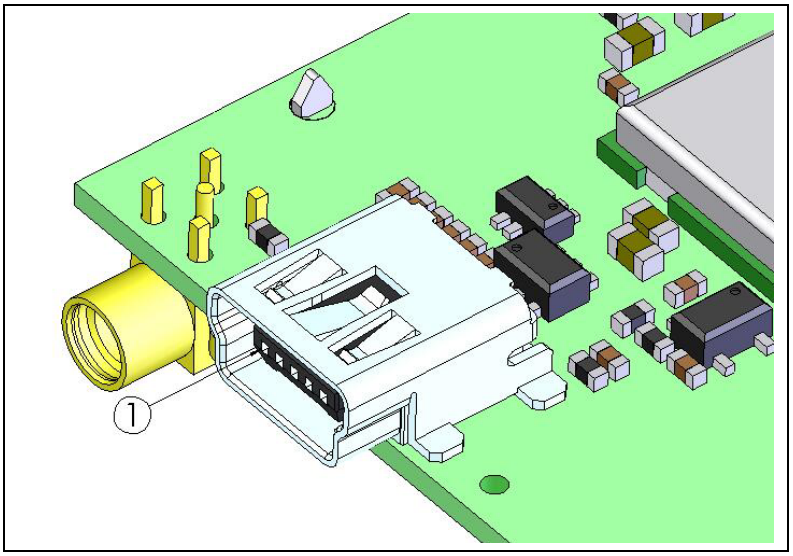


Figure 6: USB connector

For USB connector specifications please refer to Chapter 10, "Connector and Peripheral Devices References".

Table 1: USB Pin Description

Pin #	Pin Description
1	VBUS
2	D-
3	D+
4	NC
5	GND

3.2.3 IES 50-pin Connector

IESM high density 50-pin connector is used for:

- IESM Interface with Fastrack Supreme motherboard

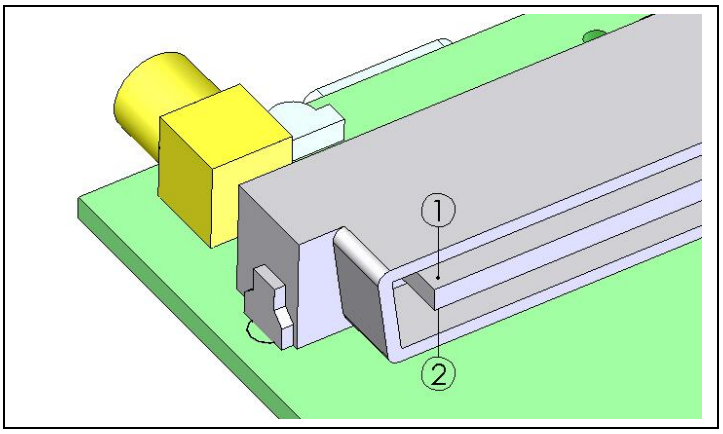


Figure 7: IESM 50-pin connector

For IESM 50-Pin connector specifications please refer to Chapter 10, "Connector and Peripheral Devices References".

Table 2: IESM 50-pin connector description

Pin #	Pin Description	Pin #	Pin Description
1	GND	26	RTS2
2	GND	27	SHTDN
3	Reserved	28	GPIO26
4	Reserved	29	GPIO19
5	Reserved	30	GPIO27
6	Reserved	31	GPIO20
7	VPAD-USB	32	INT0/GPIO3
8	USB-DP	33	GPIO23
9	USB-DM	34	GPIO22
10	GSM-1V8	35	DTR1-CT108/2
11	GSM-2V8	36	PCM-SYNC
12	BOOT	37	PCM-IN
13	RESET	38	PCM-CLLK
14	AUX-ADC	39	PCM-OUT
15	SPI1-CS	40	AUX-DAC

16	SPI1-CLK	41	VCC-2V8
17	SPI1-I	42	GND
18	SPI1-IO	43	DC-IN
19	SPI2-CLK	44	DC-IN
20	SPI2-IO	45	GND
21	SPI2-CS	46	4V
22	SPI2-I	47	4V
23	RXD2	48	GND
24	TXD2	49	GND
25	CTS2	50	GND

4 IESM GPS+USB Basic Requirements

IESM GPS+USB require the necessary environment to function properly.

4.1 GPS Requirements

- GPS feature must first be activated on the Fastrack Supreme, please consult your distributor regarding this matter.
- Companion GPS (C-GPS) library must be loaded to Fastrack Supreme. This can be found on the Open AT SDK V4.11 or later versions.
- Wavecom's sample Open AT GPS application must be running on the Fastrack Supreme. or customer's own developed application.

4.2 USB Requirements

- USB driver for Fastrack Supreme

5 Features and Services

5.1 Basic Features and Services

Basic features of the IESM-GPS+USB are summarized in the table below.

Table 3: Basic features of IESM-GPS+USB

Features	Description
Open AT®	Open AT® programmable: Native execution of embedded standard ANSI C applications, Custom AT command creation, Custom application library creation, Standalone operation.
GPS Standard	GPS L-Band (1575.42MHz) C/A Code
Interfaces	USB 2.0 Compliant AT command set based on V.25ter and GSM 07.05 & 07.07. Open AT® interface for embedded application.

6 Technical Characteristics

6.1 Mechanical Characteristics

Table 4: Mechanical characteristics

PCB Dimensions	58mm x 35.7mm x 1mm
Overall Dimension	59.5 x 35.7 x 10.01mm (including connectors)
Weight	< 10 grams

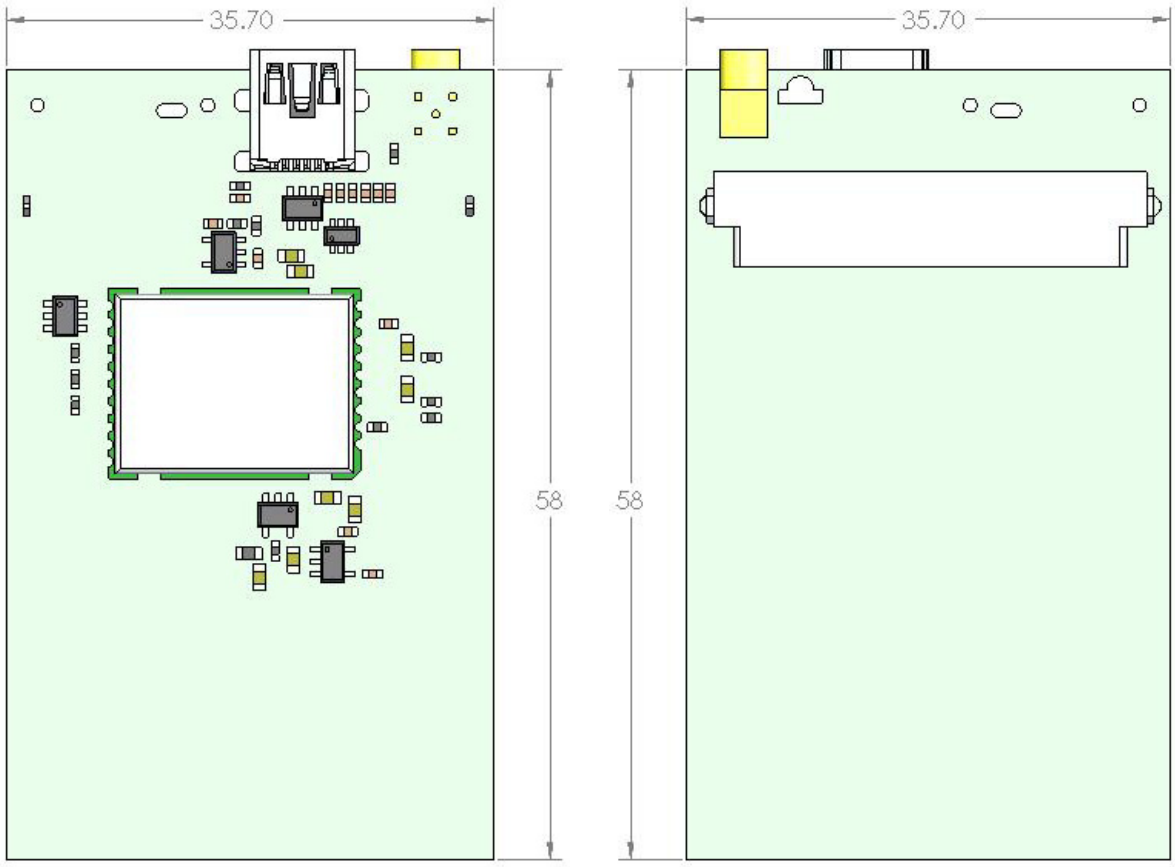


Figure 8: IESM-GPS+USB Dimensions

7 Using Fastrack Supreme IESM-GPS+USB

7.1 Getting Started

7.1.1 Installing IESM-GPS+USB

To install the IESM-GPS+USB please follow the procedures below. It is important to remove the power to Fastrack Supreme when performing this installation;

1. Remove the screws and the original backplate cover of the Fastrack Supreme
2. Insert the IESM-GPS+USB board. Replace the original backplate with the IESM-GPS+USB backplate provided and place back the screws.

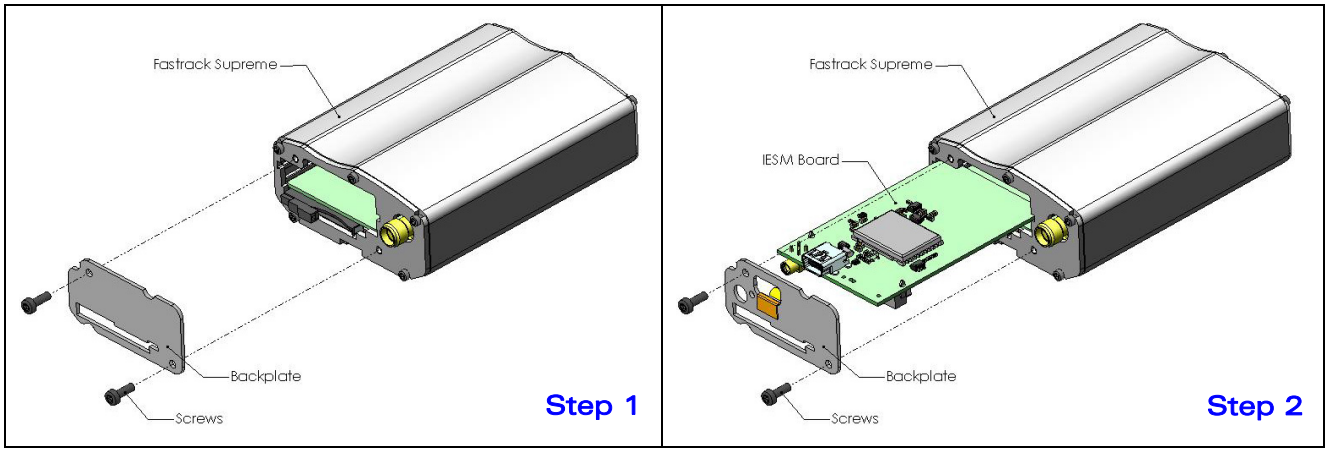


Figure 9: IESM-GPS+USB Mounting

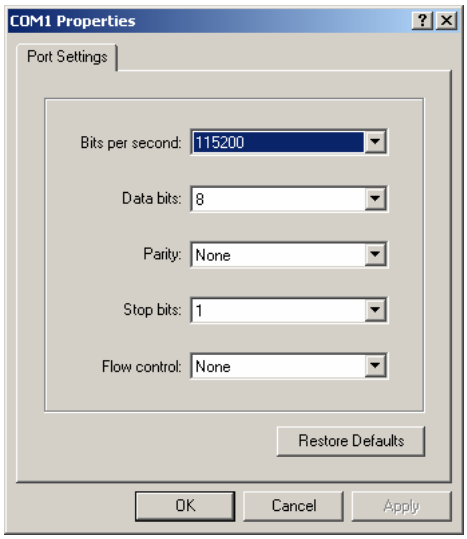
7.1.2 Quick Check

To check if the installation of the IESM-GPS+USB with Fastrack Supreme is ok, please perform a simple test on USB.

1 Connect a serial cable between Fastrack Supreme and PC COM port

2 Apply power on Fastrack Supreme

3 Open communication software (Hyperterminal), if COM port not configured yet please enter as follows;



4 Activate the USB port, enter AT command shown below;

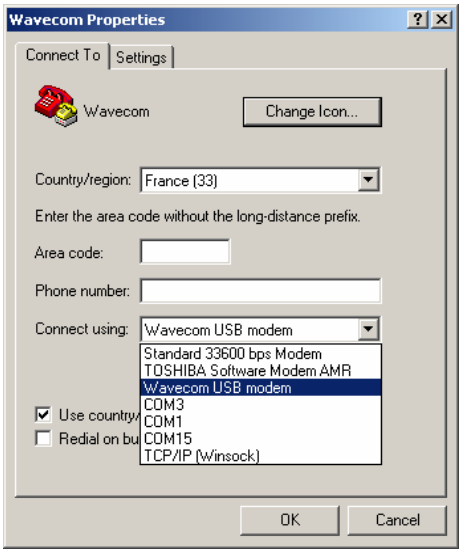
AT+WMFM=0,1,3

5 Connect USB cable between IESM and PC

6 PC running Windows should detect the new USB device. It will prompt to install the USB driver.

7 Install the USB driver on Fastrack Supreme, driver could be found on SDK V4.22.

8 Once USB driver is installed open a new connection, this time configure it to use the USB port



9 On the new communication window type the AT command shown below. This will echo on the screen what is being typed;

ATE1➔ Fastrack Supreme responds "OK"

10 Enter the AT command as indicated below to check the manufacturer identification;

AT+CGMI ➔ Fastrack Supreme responds "WAVECOM MODEM"

IESM is now properly installed. For further information on these AT commands and their associated parameters, refer to "AT Commands Interface Guide" **Error! Reference source not found.**.

7.1.3 GPS Check

Make sure the necessary GPS environment is already set-up in Fastrack Supreme.

- GPS feature must be activated
- C-GPS library is loaded
- Companion GPS sample code or customer Open AT application is loaded
- Apply power to Fastrack Supreme

AT Command	Response	Remarks
AT+WOPEN=1	OK	Activates the C-GPS Sample Code
AT+NMEA=1	OK	Specifies that the NMEA frames sent in standard format
AT+CGPS=2	OK	Specifies the UART2 is used by GPS module
AT+CONFIG=1	OK	Saves the configuration

If everything is followed carefully the Fastrack Supreme should start sending the NMEA frames to the PC COM port.

7.1.4 GPS Active Antenna Supply Activation

GPS Active Antenna power supply by default is disabled. This can be activated with the following AT Commands.

The power enable is controlled by GPIO8.

Enabling the active antenna power supply

AT Command	Response	Remarks
AT+WHCNF=0,0	OK	Deactivates the Keypad feature of Fastrack Supreme
AT+WIOM=8,1,0	OK	Activates GPIO8 as an output and low at initial state
AT+WIOW=8,0	OK	Sends a low to GPIO8 and enables the 3.3V supply output

Note:

Once the power is removed from Fastrack Supreme at the next power ON the GPS active antenna supply will be activated automatically in a condition where the Open AT® C-GPS is also running.

If Open AT® C-GPS is turned OFF, the active antenna power supply will also power OFF.

Turning ON/OFF the active antenna power supply

AT Command	Response	Remarks
AT+WIOW=8,1	OK	Sends a high to GPIO8 and disables the 3.3V supply output
AT+WIOW=8,0	OK	Sends a low to GPIO8 and enables the 3.3V supply output

Note:

If AT+WIOM=8,1,0 is entered initially, regardless of the status of GPIO8 before power OFF at next power ON the GPIO8 will always be at low level at initial state.

Changing to AT+WIOM=8,1,1 will alter the initial state of GPIO8 to high, at the next power ON GPIO8 will always be at high level at initial state.

7.2 IESM-GPS+USB Operational Status

The IESM-GPS+USB operational status could be interpreted by the green LED status located near the GPS RF connector.

LED Status	LED light activity	Fastrack Supreme Plug & Play status
ON	LED ON	GPS fix has not been achieved
	LED Blinking	GPS Fix has been achieved
OFF	LED OFF	Fastrack Supreme is switched OFF or GPS feature is not activated

Table 5: IESM-GPS+USB operational status

8 Troubleshooting

This section describes possible problems might be encountered when using the Fastrack Supreme IESM-GPS+USB.

To review other troubleshooting information, refer the 'FAQs' (Frequently Asked Questions) page at www.wavecom.com/fastracksupreme

8.1 No Communication with IESM–GPS+USB through the Serial Link

If the Fastrack Supreme IES-GPS+USB do not responds to AT commands through the USB or serial link, refer to the table below for possible causes and solutions.

Table 6: Solutions for no connection with Supreme through serial link

Symptoms	Check if	Action
Fastrack Supreme UART no response	• Serial cable is connected on both sides?	• Check the serial cable connection • Fastrack Supreme UART factory setting is: ▪ Data bits = 8 ▪ Parity = none ▪ Stop bits = 1 ▪ Baud = 115 200 bps ▪ Flow control = hardware
	• Power is applied?	• Check Power Cable • Check Fuse
	• There is another program interfering with the communication program (i.e. Conflict on communication port access)	• Close the interfering program
USB not detected	• USB cable properly inserted?	• Unplug cable from PC. Then plug back again if possible on another USB port on the PC.
	• IESM powered properly?	• Make sure the IESM is plugged securely to the Fastrack Supreme
USB does not respond	• USB port activated?	• Send AT+WMFM=0,1,3 to activate USB
	• USB driver installed?	• Install USB driver (from SDK V4.22)
GPS not sending data	• Open AT® application running?	• Run the Open AT® and GPS AT Plug-In

9 Functional Description

The ESM-GPS+USB interfaces to the Fastrack Supreme mother board through the 50 pin connector. All the DC supplies are applied through this connector so no external supply is necessary.

With the Open AT® application running, the Fastrack Supreme motherboard communicates to IESM-GPS+USB on UART2. GPS module communicates on UART2 with the following configuration;

- baud rate: 57600 bps
- character framing: 8 Data bits
- parity: 1 stop bit and Odd Parity
- Flow Control: No Flow control

Open AT® application controls the following;

- Enables/disables the internal LDOs of the IESM to power-up the GPS
- Enables/disables the RF block of the GPS
- Enables a trigger to reset the GPS module
- GPS status indicator output which is connected to an LED driver
- Enables/disable the GPS antenna bias voltage at 3.3V

USB is a four wire slave interface that complies with USB 2.0 protocol signaling. This can be used to communicate with the Wireless CPU or GPS module.

9.1 Architecture

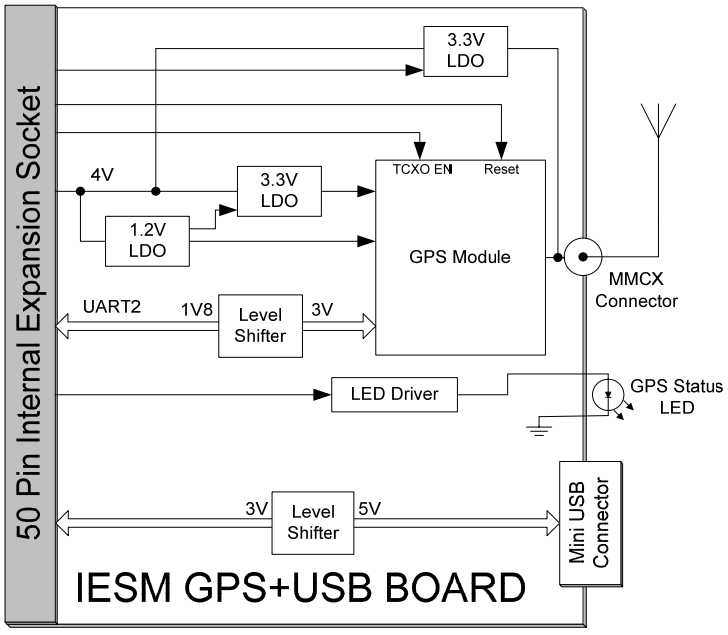


Figure 10: Functional architecture

9.2 Electrical Characteristics

9.2.1 Power Supply

Table 7: Electrical characteristics

Operating Voltage	4VDC

Note:

The IESM-GPS+USB board is powered once the power enable pins are activated by the Open AT® application. The following table describes the consumption at the 4VDC IES interface based on operating conditions.

Table 8: Power consumption

Mode	Typ	Unit
GPS Powered ON	96	mA

9.2.2 Extra Current Consumption from the DC-IN Source

Depending on various DC-IN voltage of Fastrack Supreme, the extra current consumption drawn by the GPS feature and the GPS active antenna will be different.

Table 9: Extra Current Consumption from DC-IN Source

Condition		Extra current consumption for additional feature (mA)		
Mode	GPS Feature	@5.5VDC	@13.2VDC	@32VDC
Connected	GPS Enable with GPS antenna bias ON	111	42	22
Non-Connected	GPS Enable with GPS antenna bias ON	106.7	46.3	22.6
	GPS Enable with GPS antenna bias OFF	86.8	37.8	18.7
	GPS antenna bias ON	19.8	8.5	3.8

9.2.3 RF Characteristics

9.2.3.1 GPS Receiver Frequency

Table 10: GPS Receiver Frequency

Characteristic	GPS
Frequency RX	1575.42 MHz

9.2.3.2 GPS RF Performance

The GPS RF performance for receiver is given in the table below.

Table 11: Receiver performances

Open AT® SDK v 4.11	Conditions	Notes	Value	Remarks
Accuracy	-130 dBm (outdoor) In dynamic mode	50% percentile	3.7 m CEP	
	-130 dBm (outdoor) In dynamic mode	95% percentile	6.8 m CEP	
	-140 dBm In dynamic mode	50% percentile	6.1 m CEP	
	-145 dBm In dynamic mode	50% percentile	13.9 m CEP	
Velocity Accuracy	Static mode	First fix only	0.1 m/s	Typ
	Static mode	Continuous fixes	0 m/s	Typ
TTFF Hot Start		Mean	3.5 s	Typ
TTFF Warm Start		Mean	30s	Typ
TTFF Cold Start	Clear Sky conditions	Mean	38 s	Typ
	Clear Sky conditions	95% percentile	45 s	Typ
Update Rate	-130 dBm	Continuous fixes	1 Hz	Typ

9.2.3.3 External Antenna

The external antenna is connected to the IESM's GPS via the MMCX connector.

The external antenna must fulfill the characteristics listed in the table below.

Table 12: External antenna characteristics

Antenna frequency range	1.57542GHz ± 1.023MHz (L1-Band)
Impedance	50 Ohms nominal
Voltage Supply	3.3V ± 0.5VDC
Gain (antenna + cable)	2dBi

9.3 USB 2.0 Interface

Is a 4-wire Mini USB slave interface that complies with USB 2.0.

The USB interface signals are VPAD-USB, USB-DP, USB-DM and GND.

USB interface features:

- 12Mbit/s full-speed transfer rate
- 5V typ compatible
- USB Softconnect feature
- Download feature is not supported by USB
- CDC 1.1 – ACM compliant

Pin description of the USB interface

Signal	Mini USB Pin number	I/O	I/O type USB Standard	Description
VPAD-USB	1	I	VBUS	+5V USB Power Supply
USB-DM	2	I/O	D-	Differential data interface negative
USB-DP	3	I/O	D+	Differential data interface positive
ID	4	-	-	NC
GND	5	-	GND	Ground

9.4 Environmental Characteristics

The IESM-GPS+USB is compliant with the following operating class. To ensure the proper operation of the IESM-GPS+USB, the temperature of the environment must be within a specific range as described in the table below.

Table 13: Ranges of temperature

Conditions	Temperature range
Operating / Class A	-20°C to +55°C
Operating / Class B	-30°C to +65°C
Storage	-40°C to +85°C

Function Status Classification:

Class A:

The IESM-GPS+USB remain fully functional across the specified temperature range.

Class B:

The IESM-GPS+USB remain fully functional, across the specified temperature range. Some parameters may occasionally deviate from the specified requirements and this deviation does not affect the ability of the IESM-GPS+USB to be fully functional.

Table 14: Environmental standard constraints

Environmental Tests (IEC TR 60721-4)		Environmental Classes (IEC 60721-3)			
Tests	Standards	Storage (IEC 60721-3-1) Class IE13	Transportation (IEC 60721-3-2) Class IE23	Operation	
				Stationary (IEC 60721-3-3) Class IE35	Non-Stationary (IEC 60721-3-7) Class IE73
Cold	IEC 60068-2-1 : Ab/Ad	-25°C, 16 h	-40°C, 16 h	-5°C, 16 h	-5°C, 16 h
Dry heat	IEC 60068-2-2 : Bb/Bd	+70°C, 16 h	+70°C, 16 h	+55°C, 16 h	+55°C, 16 h
Change of temperature	IEC 60068-2-14 : Na/Nb	-33°C to ambient 2 cycles, t1=3 h 1 °C.min^{-1}	-40°C to ambient 5 cycles, t1=3 h t2<3 min	-5°C to ambient 2 cycles, t1=3 h 0,5 °C.min^{-1}	-5°C to ambient 5 cycles, t1=3 h t2<3 min
Damp heat	IEC 60068-2-56 : Cb	+30°C, 93% RH 96 h	+40°C, 93% RH 96 h minimum	+30°C, 93% RH, 96 h	+30°C, 93% RH, 96 h
Damp heat, cyclic	60068-2-30 : Db Variant 1 or 2	+40°C, 90% to 100% RH One cycle Variant 2	+55°C, 90% to 100% RH Two cycles Variant 2	+30°C, 90% to 100% RH Two cycles Variant 2	+40°C, 90% to 100% RH Two cycles Variant 1
Vibration (sinusoidal)	IEC 60068-2-6 : Fc	1-200 Hz 2 m.s^{-2} 0,75 mm 3 axes 10 sweep cycles	1-500 Hz 10 m.s^{-2} 3,5 mm 3 axes 10 sweep cycles	1-150 Hz 2 m.s^{-2} 0,75 mm 3 axes 5 sweep cycles	1-500 Hz 10 m.s^{-2} 3,5 mm 3 axes 10 sweep cycles
Vibration (random)	IEC 60068-2-64 : Fh	-	10-100 Hz / 1,0 m^2.s^{-3} 100-200 Hz / -3 dB.octave^{-1} 200-2000 Hz / 0,5 m^2.s^{-3} 3 axes 30 min	-	-
Shock (half-sine)	IEC 60068-2-27 : Ea	-	-	50 m.s^{-2} 6 ms 3 shocks 6 directions	150 m.s^{-2} 11 ms 3 shocks 6 directions
Bump	IEC 60068-2-29 : Eb	-	250 m.s^{-2} 6 ms 50 bumps vertical direction	-	-
Free fall	ISO 4180-2	-	Two falls in each specified attitude	-	2 falls in each specified attitude 0,025 m (<1kg)
Drop and topple	IEC 60068-2-31 : Ec	-	One drop on relevant corner One topple about each bottom edge	-	One drop on each relevant corner One topple on each of 4 bottom edges

Notes:

Short description of Class IE13 (*For more information see standard IEC 60721-3-1)*

"Locations without controlled temperature and humidity, where heating may be used to raise low temperatures, locations in buildings providing minimal protection against daily variations of external climate, prone to receiving rainfall from carrying wind".

Short description of Class IE23 (*For more information, see standard IEC 60721-3-2)*

"Transportation in unventilated compartments and in conditions without protection against bad weather, in all sorts of trucks and trailers in areas of well developed road network, in trains equipped with buffers specially designed to reduce shocks and by boat".

Short description of Class IE35 (*For more information see standard IEC 60721-3-3)*

"Locations with no control on heat or humidity where heating may be used to raise low temperatures, to places inside a building to avoid extremely high temperatures, to places such as hallways, building staircases, cellars, certain workshops, equipment stations without surveillance".

Short description of Class IE73 (*For more information see standard IEC 60721-3-7)*

"Transfer to places where neither temperature nor humidity are controlled but where heating may be used to raise low temperatures, to places exposed to water droplets, products can be subjected to ice formation, these conditions are found in hallways and building staircases, garages, certain workshops, factory building and places for industrial processes and hardware stations without surveillance".

9.5 Conformity

The complete product complies with the essential requirements of article 3 of R&TTE 1999/5/EC Directive and satisfied the following standards:

Domain	Applicable standard
Safety standard	EN 60950 (ed.1999)
Efficient use of the radio frequency spectrum	EN 301 419-(v 4.1.1) EN 301 511 (V 7.0.1)
EMC	EN 301 489–1 (edition 2002) EN 301 489-7 (edition 2002)
Global Certification Forum – Certification Criteria	GCF-CC V3.13.0
FCC	FCC Part 15 FCC Part 22, 24
IC	RSS-132 Issue 2 RSS-133 Issue 3

10 Connector and Peripheral Devices References

10.1 General Purpose Connector References

GPC is a 50-pin plug connector with 0.5mm pitch from Kyocera Elco:

14 5078 050 515 861+

AVX
14-5078-050-515-86:

Mini USB connector with 0.8mm pitch from Molex:

54819-0572

Molex
548190572_sd.pdf

More information is also available from;

http://www.avxcorp.com/

http://www.molex.com/

11 Safety recommendations

11.1 General Safety

It is important to follow any special regulations regarding the use of radio equipment due in particular to the possibility of radio frequency (RF) interference. Please follow the safety advice given below carefully.

Switch OFF your Wireless CPU®:

- When in an aircraft. The use of cellular telephones in an aircraft may endanger the operation of the aircraft, disrupt the cellular network and is illegal. Failure to observe this instruction may lead to suspension or denial of cellular telephone services to the offender, or legal action or both,
- When at a refueling point,
- When in any area with a potentially explosive atmosphere which could cause an explosion or fire,
- In hospitals and any other place where medical equipment may be in use.

Respect restrictions on the use of radio equipment in:

- Fuel depots,
- Chemical plants,
- Places where blasting operations are in progress,
- Any other area where signalization reminds that the use of cellular telephone is forbidden or dangerous.
- Any other area where you would normally be advised to turn off your vehicle engine.

There may be a hazard associated with the operation of your Supreme Plug & Play close to inadequately protected personal medical devices such as hearing aids and pacemakers. Consult the manufacturers of the medical device to determine if it is adequately protected.

Operation of your Supreme Plug & Play close to other electronic equipment may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers' recommendations.

The Supreme Plug & Play is designed for and intended to be used in "*fixed*" and "*mobile*" applications:

- "*Fixed*" means that the device is physically secured at one location and is not able to be easily moved to another location.
- "*Mobile*" means that the device is designed to be used in other than fixed locations and generally in such a way that a separation distance of at least 20 cm (8 inches) is normally maintained between the transmitter's antenna and the body of the user or nearby persons.

The Supreme Plug & Play is not designed for and intended to be used in portable applications (within 20 cm or 8 inches of the body of the user) and such uses are strictly prohibited.

11.2 Vehicle Safety

Do not use your Supreme Plug & Play while driving, unless equipped with a correctly installed vehicle kit allowing 'Hands-Free' Operation.

Respect national regulations on the use of cellular telephones in vehicles. Road safety always comes first.

If incorrectly installed in a vehicle, the operation of Supreme Plug & Play telephone could interfere with the correct functioning of vehicle electronics. To avoid such problems, make sure that the installation has been performed by a qualified personnel. Verification of the protection of vehicle electronics should form part of the installation.

The use of an alert device to operate a vehicle's lights or horn on public roads is not permitted.

11.3 Care and Maintenance

Your Supreme Plug & Play is the product of advanced engineering, design and craftsmanship and should be treated with care. The suggestion below will help you to enjoy this product for many years.

Do not expose the Supreme Plug & Play to any extreme environment where the temperature or humidity is high.

Do not use or store the Supreme Plug & Play in dusty or dirty areas. Its moving parts (SIM holder for example) can be damaged.

Do not attempt to disassemble the Wireless CPU®. There are no user serviceable parts inside.

Do not expose the Supreme Plug & Play to water, rain or spilt beverages. It is not waterproof.

Do not abuse your Supreme Plug & Play by dropping, knocking, or violently shaking it. Rough handling can damage it.

Do not place the Supreme Plug & Play alongside computer discs, credit or travel cards or other magnetic media. The information contained on discs or cards may be affected by the Wireless CPU®.

The use of third party equipment or accessories, not made or authorized by Wavecom may invalidate the warranty of the Wireless CPU®.

Do contact an authorized Service Center in the unlikely event of a fault in the Wireless CPU®.

11.4 Your Responsibility

This Supreme Plug & Play is under your responsibility. Please treat it with care respecting all local regulations. It is not a toy. Therefore, keep it in a safe place at all times and out of the reach of children.

Try to remember your Unlock and PIN codes. Become familiar with and use the security features to block unauthorized use and theft.

12 Recommended Accessories

Accessories recommended by Wavecom for the IESM-GPS+USB are given in the table below.

Table 15: List of recommended accessories

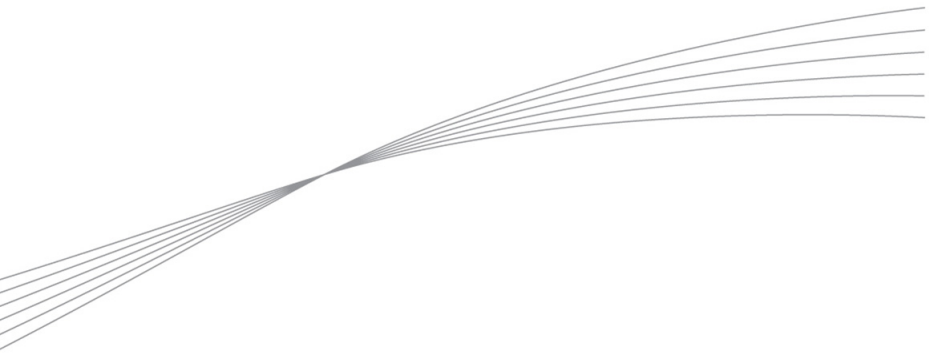
Designation	Part number	Supplier
GPS antenna with MMCX connector		

13 Online Support

Wavecom provides an extensive range on online support which includes the following areas of Wavecom's wireless expertise:

- the latest version of this document
- new versions of our Operating System user guides
- comprehensive support for Open AT®
- regulatory certifications
- carrier certifications
- application notes

To gain access to this support, simply visit our web site at www.wavecom.com/fastracksupreme and click on "Support". Privileged access via user login is provided to Wavecom authorized distributors.



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