



F_AVL

GSM/GPRS/GPS module

HARDWARE DESCRIPTION

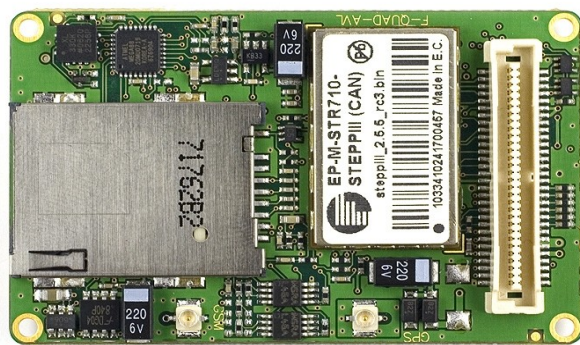


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VERSION HISTORY:

This table provides a summary of the document revisions.

Version	Author	Changes	Changed date
1.0.0	F. Beqiri	- Initial release	03/12/2007
1.0.1	F. Beqiri	- Added mechanical dimensions of the GSM and GPS antenna connectors – see chapter 3.2 and 3.3. - Added mechanical dimensions of the module – see chapter 3.4	04/12/2007
1.0.2	F. Beqiri	- Corrected the type of the board to board connector (from Hirose to Tyco) - Added Figure 5.1 - detailed mechanical dimensions	08/19/2008

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1 INTRODUCTION

This product manual is only addressed to qualified personnel which is well skilled in electronical/electrical installation and not addressed to private consumers/end users. The installation, implementing or setting into operation of the product can only be performed by this qualified personnel.

1.1 General

The aim of this document is the description of some hardware solutions useful for developing a product with the F_AVL module as well as an application circuit diagram.

1.2 Circuit concept

The F_AVL architecture includes the following major functional components:

❖ *Architecture integrates:*

- ✓ *Telit GE864 -High-performance Quad-Band GSM/GPRS core*
- ✓ *JP13-S - High sensitivity 20 parallel channel SiRFStarIII*
- ✓ *ARM7TDMI processor that controls all functions of the system*
- ✓ *CAN bus interface*
- ✓ *3D motion detection*
- ✓ *Audio interface - 2 x Audio channels*
- ✓ *Power Control circuitry*
- ✓ *Combo-Memory (2MB - 512KB) for loading software.*

❖ *Physical interfaces:*

- ✓ *60pin board-to-board connector - Tyco connector (Type: 5177986-2, and counterpart is AMP 0-0177985-2) serves as physical interface to the host application.*
- ✓ *GSM antenna connector (Type: Connector 50 Ω U.FL-R-SMT male -supplied from Hirose Ltd.)*
- ✓ *GPS antenna connector (Type: Connector 50 Ω Fakra/Radiall SMB-male)*
- ✓ *SIM card reader*

1.3 Related documents

1. *SteppIII_fox_bolero_It_PFAL_Configuration_Command_Set.pdf*

2 DESCRIPTION OF THE 60-PIN DOUBLE-ROW CONNECTOR

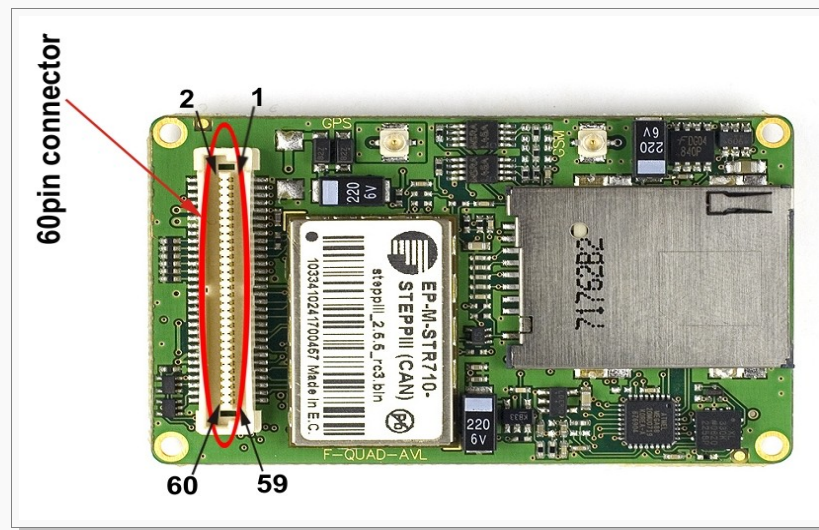


Figure 1: View of the 60-pin board-to-board connector

As a reference how to use these pins, see "[Application circuit diagram](#)" attached at the end of this manual.

PIN	NAME	I/O	DISCRIPTION	LEVEL
1	GND	-	Ground	-
2	GND	-	Ground	-
3	RX1	O	Serial data output (intently used for GSM)	3.3 V
4	VC5	-	Power input	$V_{in} = 5 V \pm 5\%$; $I_{max} = 2 A$
5	TX1	I	Serial data input (intently used for GSM)	3.3 V
6	VC5	-	Main power supply	$V_{in} = 5 V \pm 5\%$; $I_{max} = 2 A$
7	RX_AT	O	Transmit Data. (not used, leave it open)	
8	VC5	-	Main power supply	$V_{in} = 5 V \pm 5\%$; $I_{max} = 2 A$
9	MIC1N	I(-)	Microphone signal input; phase-. Suited for hands -free function (car kit). If not used leave it open.	See chapter 2.1
10	VC5	-	Main power supply	$V_{in} = 5 V \pm 5\%$; $I_{max} = 2 A$
11	MIC1P	I(+)	Microphone signal input; phase+. If not used leave it open.	See chapter 2.1
12	VB	-	Supplies a Lithium battery with power	$V = 4.2 V$; $I \geq 500 mA$
13	SPK1N	O	Earphone signal output, phase -. Suited for hands -free function (car kit). If not used leave it open.	See chapter 2.1
14	VB	-	Supplies a Lithium battery with power	$V = 4.2 V$; $I \geq 500 mA$
15	SPK1P	O	Earphone signal output, phase +. Suited for hands -free function (car kit). If not used leave it open.	See chapter 2.1
16	A_TMP	I	Input to measure the battery temperature over NTC resistor. Connect NTC with $R_{NTC} \approx 10 k\Omega @ 25 ^\circ C$ to ground.	$V_{max} = 5.0 V$
17	J1-12	-	Reserved. Leave it open	3.3 V

PIN	NAME	I/O	DISCRIPTION	LEVEL
18	IN1	AI	Analog input (<i>software-controlled pin</i>)	3.3 V
19	SV_19_O	-	Reserved. Leave it open	3.3 V
20	IN2	AI	Analog input (<i>software-controlled pin</i>)	3.3 V
21	EN_BAT	O	Enables/Disables battery charging.	
22	IN3	AI	Analog input (<i>software-controlled pin</i>)	3.3 V
23	CANTX	O	CAN: Transmit data output for activating the driver to the bus lines.	3.3 V
24	IN4	AI	Analog input (<i>software-controlled pin</i>)	3.3 V
25	CANRX	I	CAN: Receive data input for reading out the data from the bus lines.	3.3 V
26	DI1	I	Digital input (<i>software-controlled pin</i>)	3.3 V
27	GND	-	Ground	-
28	DI2	I	Digital input (<i>software-controlled pin</i>)	3.3 V
29	VCC	-	Power output for external accessories	3.3 V; I _{max} = 20 mA
30	GND	-	Ground	-
31	STBC7	O	Standby digital control signal output; together with the pin ENCA7 this input determines the state of a CANbus transceiver;	3.3 V
32	B4	-	Reserved. Leave it open	3.3 V
33	ENCA7	O	Enable digital control signal output; together with the pin STBC7 this input determines the state of a CANbus transceiver;	3.3 V
34	OUT1	O	Digital output (<i>software-controlled pin</i>)	3.3 V
35	CANErr	I	Error, wake-up and power-on indication input; active LOW in normal operating mode when a CANbus failure is detected; in standby and sleep mode when a wake-up is detected; in power-on standby when a power-on event is detected	3.3 V
36	OUT2	O	Digital output (<i>software-controlled pin</i>)	3.3 V
37	EnCAN	I	Wake-up indication input signal from a CANbus transceiver.	3.3 V
38	OUT3	O	Digital output (<i>software-controlled pin</i>)	3.3 V
39	-	-	Not connected	-
40	OUT4	O	Digital output (<i>software-controlled pin</i>)	3.3 V
41	LED_R	O	Status indicator led (red) (<i>software-controlled pin</i>)	3.3 V
42	WU	I	Reserved. Leave it open	3.0 V
43	LED_B	O	Status indicator led (blue) (<i>software-controlled pin</i>)	3.3 V
44	AWE	I	AIWU - Wake up pin (<i>software-controlled sleep mode</i>).	3.0 V
45	LED_G	O	Status indicator led (green) (<i>software-controlled pin</i>)	3.3 V
46	VC5	-	Main power supply	V _{in} = 5 V ± 5%; I _{max} = 2 A
47	GND	-	Ground	-
48	VC5	-	Main power supply	V _{in} = 5 V ± 5%; I _{max} = 2 A
49	VIN	I	Measurement. Not used .	0 .. 3 V (optional 0 .. 30 V)
50	VC5	-	Main power supply	V _{in} = 5 V ± 5%; I _{max} = 2 A

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PIN	NAME	I/O	DISCRIPTION	LEVEL
51	RX3	O	Serial data output to DTE (Serial 0)	3.3 V
52	GND	-	Ground	-
53	TX3	I	Serial data input (TX) from DTE (Serial 0)	3.3 V
54	VA	-	Power supply for Atmega88.	3.0 V
55	TX4	I	Serial data input (TX) from DTE (Serial 1)	3.3 V
56	AOO	I	DIWU - Wake up pin (<i>software-controlled sleep mode</i>).	> 2 V ... 32 V
57	RX4	O	Serial data output to DTE (Serial 1)	3.3 V
58	IGN	I	Ignition line (<i>software-controlled pin</i>).	> 2 V ... 32 V
59	GND	-	Ground	-
60	GND	-	Ground	-

Table 1: 60pin connector pinout

2.1 Audio Interface

2.1.1 Microphone characteristics

Microphone type	Electret microphone
Line coupling	AC±
Line type	balanced
Differential input voltage	≤ 65mVpp (23mVrms)
Microphone nominal sensitivity	-45 dBVrms/Pa
Analog gain suggested	+10dB
Microphone voltage	3 V

2.1.2 Speaker characteristics

This audio path is suited for hands-free function (car kit).

Line coupling	DC
Line type	bridged
Output load resistance	≥ 14 Ω
Internal output resistance	4 Ω (>1.7Ω)
Signal bandwidth	150 - 4000 Hz @ -3 dB
Max. differential output voltage	1310 mVrms (typ, open circuit)
Max. single ended output voltage	656 mVrms (typ, open circuit)
SW volume level step	-2 dB
Number of SW volume steps	10

3 INTERFACES OVERVIEW

This chapter describes several interfaces incorporated into the F_AVL module:

- *Application interface (80-pin board-to-board connector)*
- *SIM Card interface,*
- *RF interface*
- *Electrical and mechanical characteristics*
- *Mounting holes*

3.1 60pin board to board connector

The physical interface to the GSM/GPRS and GPS applications is through the 60-pin board-to-board connector. The receptacle assembled on the F_AVL is type Tyco 5177986-2. The counterpart is AMP 0-0177985-2. This connector offers 2 serial interfaces as well as all control pins giving you maximum flexibility for easy integration. The positions of the pins can be seen from the figure below which shows the bottom view of F_AVL.

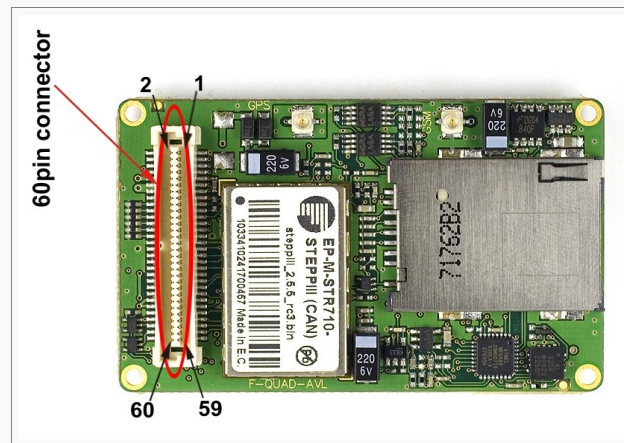


Figure 2: View of the 60-pin board-to-board connector

3.2 GSM antenna connector

The F_AVL uses two ultra-miniature SMT antenna connectors supplied from *Hirose Ltd.* One of them (see attached figure below), is provided for GSM RF connection. The GSM RF connector has impedance $50\ \Omega$. A GSM antenna can be directly connected to this connector. The figure below shows the position of the GSM antenna connector as well as its general mechanical dimensions. Mating plugs and cables can be chosen from the *Hirose U.FL* series.

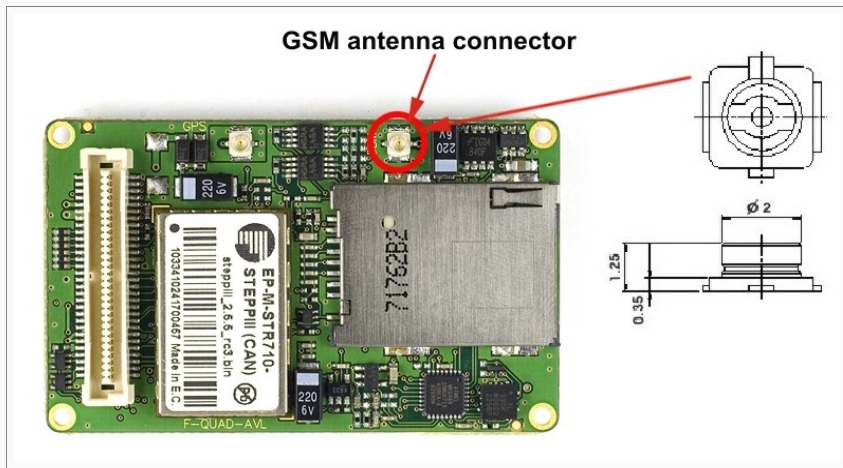


Figure 3: View of the GSM antenna connector

3.3 GPS antenna connector

The GPS RF connector has impedance $50\ \Omega$. The SMT connector is provided for a GPS active antenna connection. Active antennas have an integrated low-noise amplifier. They can be directly connected to this connector. The figure below shows the position of the GPS antenna connector as well as its general mechanical dimensions. Mating plugs and cables can be chosen from the *Hirose U.FL* series.

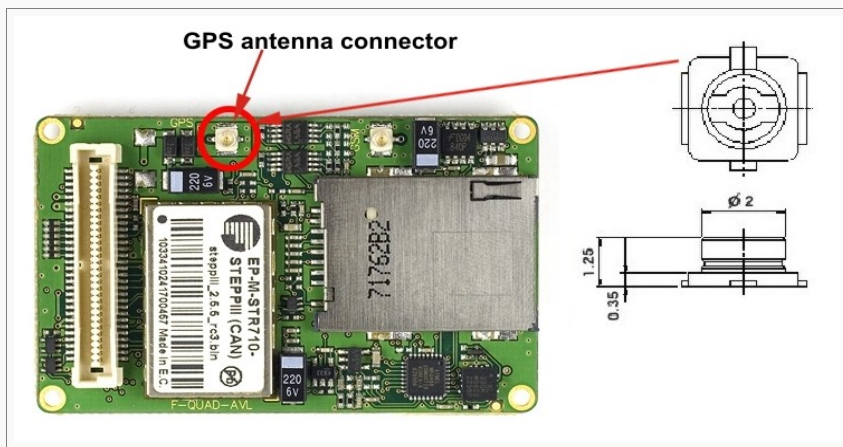


Figure 4: View of the GSM antenna connector

3.4 Mechanical Dimensions

The FALCOM F_AVL module has the following dimensions:

Length	59.0 mm
Width	37.0 mm
Thicknees	7.3 mm without connector height (connector height = 5 mm)

Table 2: Mechanical dimensions

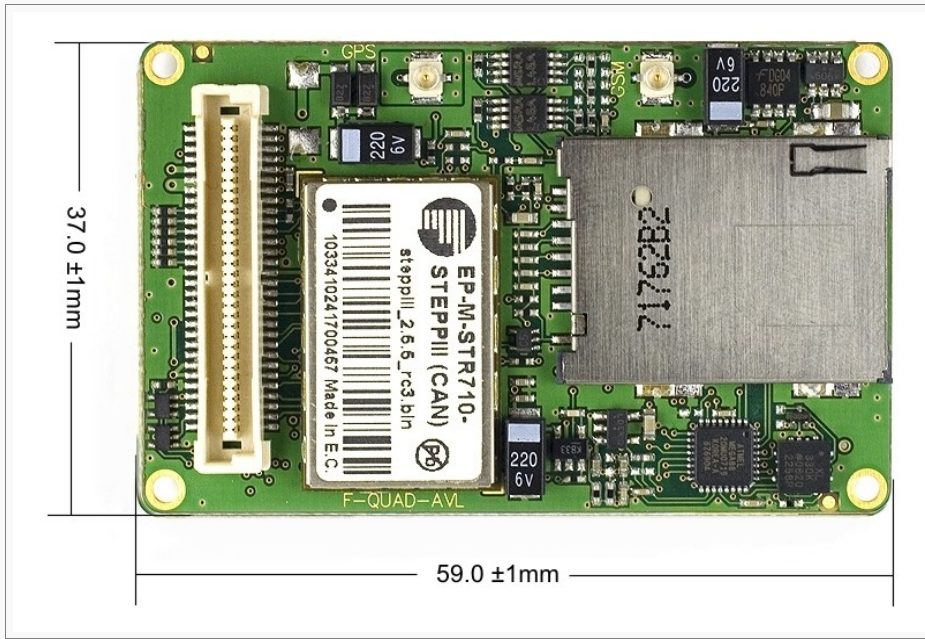


Figure 5: Overall mechanical dimensions

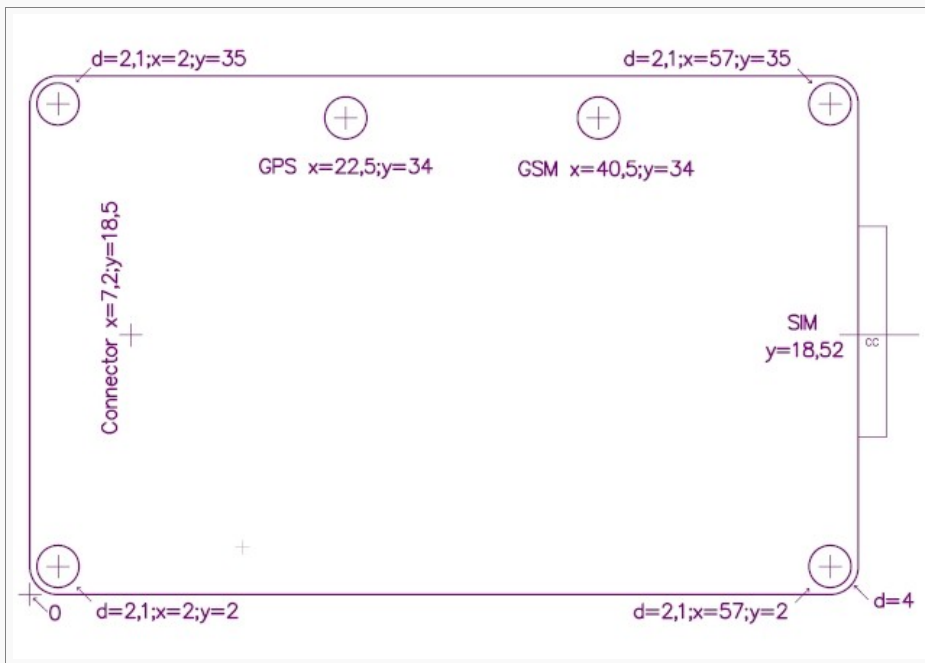


Figure 5.1: Detailed mechanical dimensions

3.5 SIM card reader

The figure below shows the SIM card reader interface with a Push/Pop mechanism.

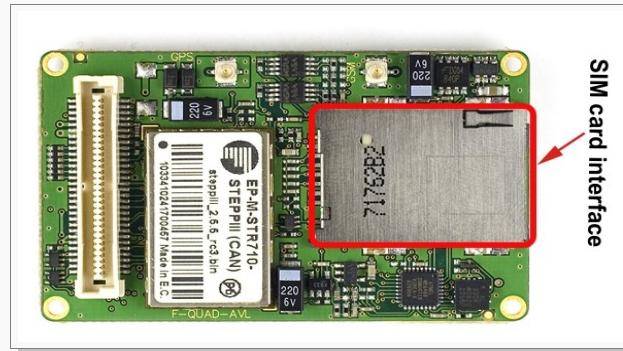


Figure 6: View of the SIM card interface

The SIM interface (the upper slot) controls an internal small 1.8/3 V SIM card. This interface is fully compliant with GSM 11.11 recommendations concerning SIM functions.

Note: The SIM card should not be removed, while the module is powered on. The SIM card can only be removed when the F_AVL is shut down. To remove the SIM card push the SIM card then pull out the SIM card holder.

3.6 Mounting holes

The F_AVL module provides 4 holes for attaching into a host device. As a reference for mounting holes use figure attached below.

An efficient approach is to mount the F_AVL PCB to a frame, plate, rack or chassis. In order to avoid any damage during mounting the module is required to choose properly the attachment screws. Fasteners can be M1.6 or M1.8 screws plus suitable washers, circuit board spacers, or customized screws, clamps, or brackets. To avoid short circuits ensure that the remaining sections of the F_AVL PCB do not come into contact with the host device.

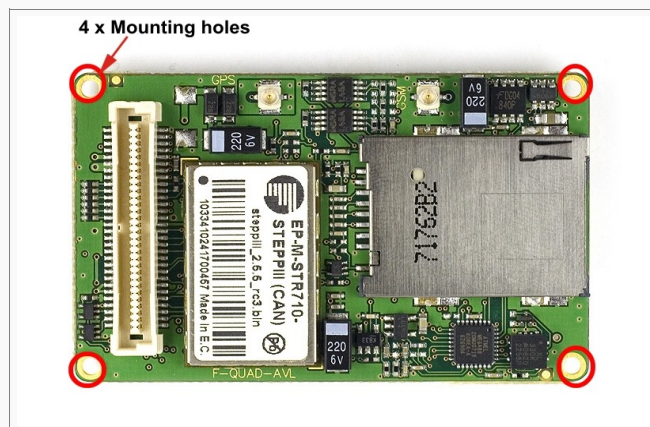


Figure 7: View of the mounting holes

