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HARDWARE REFERENCE MANUAL

GFF910

A TELIT CINTERION xE910 CELLULAR MODULE ON A PLUGGABLE INTERFACE BOARD

September 2, 2025

Revision 2.3

Revision	Date	Notes
1.0	22/11/2012	Initial release
1.1	08/04/2014	Update to current production settings
1.2	28/04/2014	Change colour coding for function shared pin 63
1.3	28/01/2015	Fixed data sheet, highest IO level is VBATT, not 5V
1.4	02/02/2015	RF connector description changed
1.5	21/05/2015	Updated part number description
1.6	09/07/2015	Updated top view for new PCB revision
1.7	30/07/2015	Add option in part number to order with Diversity antenna
1.8	18/03/2016	Remove GSC connector offering due to EOL. Change Diversity option to DIV in part number section, added LE910 V2 & LE910 Cat1 options
1.9	26/07/2017	Updated part numbering system, added new ME910, LE910, and UE910 options, changed u.FL active connector part number
2.0	27/07/2018	Updated layout, small description changes
2.1	07/02/2019	Updated section, grammar corrected
2.2	22/01/2020	Added FAQ section, Part Number Convention, updated connectors and added in footer/header
2.3	11/08/2025	Updated 1. Introduction Updated 2.2. Removed obsolete part numbers Updated 2.2.3. Attend PN Moved 3. to 3.2. Part number breakdown Removed 3. SigFox and LoRa options Updated 3.2 Part number breakdown Updated 4.1. Pinout added 1PPS & USB_BOOT pins for revision 'N' PCB Updated 4.1. Notes removed python note, minor grammatical changes Updated 4.2. Antenna connector PN, minor changes to wording Updated 4.3. Power supply range in line with current recommended modules

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Contents

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1   Introduction

The GFF910 module has been designed to allow the user ease of use with plug &
play options available for all current cellular technologies, including Cat-M1, NB-
IoT, Cat-1/4 LTE, Cat-1bis, and 5G Redcap.

With plug & play options via the Glyn GFF(Global Form Factor) carrier board,
the entire range of Telit Cinterion xE910 family is supported. Options such as GPS
and Voice can easily be fulfilled on supported modules without the need for you to
re-work or re-design your board.

In many cases, your design needs to provide flexibility depending on which region
the product is to be deployed and/or certified. The GFF carrier board takes the
guess work out of this decision.

By providing the 80-Way connector, the GFF board interface allows the user
the option to mount the module which best fits each and every application of their
product, no matter where it is rolled out world wide.

Full electrical and software compatibility(AT Command) is maintained between
each type of module, be it, Cat-M1 (ME910G1-WW), Cat-1 LTE (LE910C1-WWXD),
Cat-1bis (LE910Q1-WW/G), or 5G Redcap (FE910C04-WWD).

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2   Mechanical Specifications

2.1   Dimensions

GFF module physical size -

- Length: 36.2mm

- Width: 30mm

- Thickness: 5.6mm

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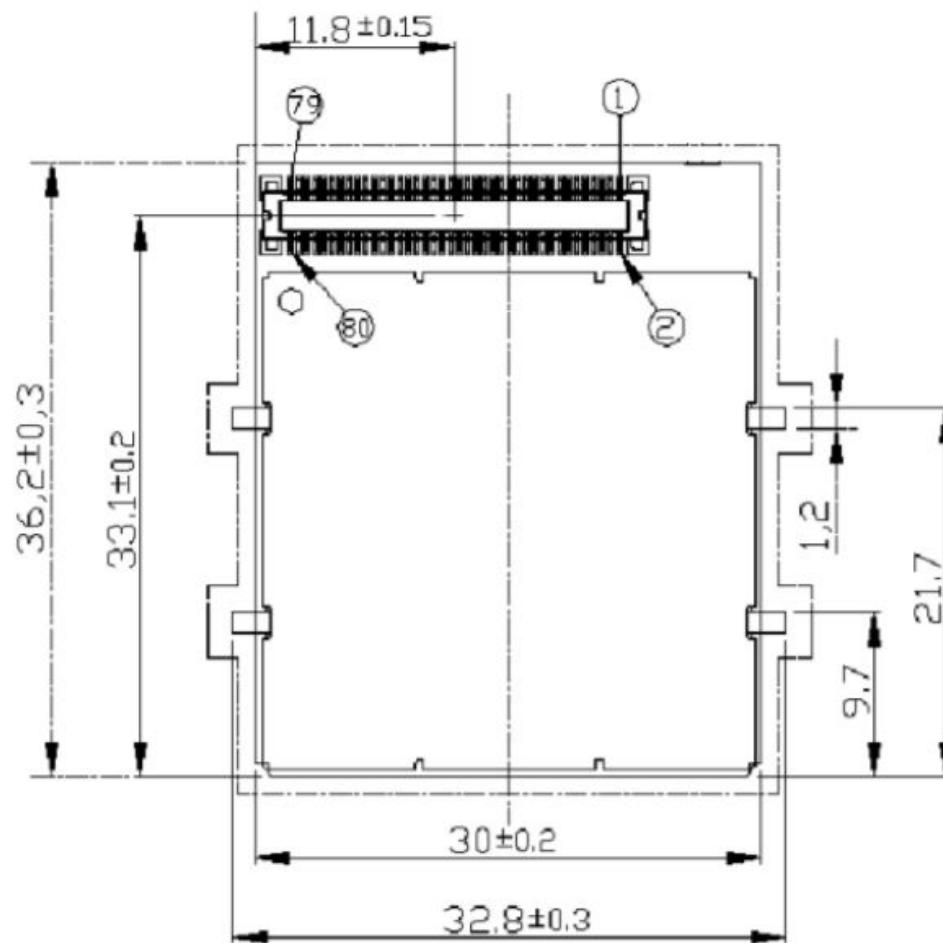
2.2 Connectors on Board

2.2.1 80-Way Plug (GFF910 Side) Specifications

- Manufacturer: Molex Inc.

- Part Number: 5003340800

- Overview: 0.50mm Pitch SlimStack Plug, Surface Mount, Dual Row, Vertical, 2.50mm Stack Height, 80 Circuits

2.2.2 80-Way Socket (Board Side) Specifications

- Manufacturer: Molex Inc.

- Part Number: 0541020804

- Overview: 0.50mm Pitch SlimStack Receptacle, Surface Mount, Dual Row, Vertical, 2.50mm Stacking Height, 80 Circuits

2.2.3 U.FL Connector

- Manufacturer: Attend

- Part Number: 321A-331251

- Micro Coaxial RF Connector 1.25mm Height

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3   Hardware Specifications

3.1   Pinout

Pin	Name	I/O	Function	Range	Notes
1	VBAT	*	Supply	3.4-4.2V	Supply
2	VBAT	*	Supply	3.4-4.2V	Supply
3	VBAT	*	Supply	3.4-4.2V	Supply
4	VBAT	*	Supply	3.4-4.2V	Supply
5	GND	*	Ground	*	
6	GND	*	Ground	*	
7	GND	*	Ground	*	
8	*	*	*	*	
9	NC	*	*	EAR+	Analog audio
10	NC	*	*	EAR-	Analog audio
11	*	*	*	*	
12	*	*	*	*	
13	NC	*	*	MIC+	Analog audio
14	NC	*	*	MIC-	Analog audio
15	*	*	*	*	
16	*	*	*	*	
17	*	*	*	*	
18	SIMVCC	*	SIM	1.8V/3V	SIM Interface
19	SIMRST	O	SIM	1.8V/3V	SIM Interface
20	SIMIO	IO	SIM	1.8V/3V	SIM Interface
21	SIMIN	I	SIM	CMOS 1.8V	SIM Interface
22	SIMCLK	O	SIM	1.8V/3V	SIM Interface
23	RX_TRACE	IO	Trace	CMOS 2.8V	Shared with SPI_RX
24	TX_TRACE	IO	Trace	CMOS 2.8V	Shared with SPI_TX
25	C103/TXD	I	Flow Ctrl	CMOS 2.8V	Serial data in DTE
26	C104/RXD	O	Flow Ctrl	CMOS 2.8V	Serial data out DTE
27	C107/DSR	O	Flow Ctrl	CMOS 2.8V	DSR Signal
28	C106/CTS	O	Flow Ctrl	CMOS 2.8V	CTS Signal
29	C108/DTR	I	Flow Ctrl	CMOS 2.8V	DTR Signal
30	C125/RING	O	Flow Ctrl	CMOS 2.8V	RING Signal

31	C105/RTS	I	Flow Ctrl	CMOS 2.8V	RTS Signal
32	C109/DCD	O	Flow Ctrl	CMOS 2.8V	DCD Signal
33	*	*	*	*	
34	*	*	*	*	
35	*	*	*	*	
36	DVI_CLK	IO	Digital Audio	CMOS 2.8V	Digial audio CLK
37	ADC_IN1	AI	Analog In	0-2.8V	Only on C/HE910
38	*	*	*	*	
39	*	*	*	*	
40	*	*	*	*	
41	SPI_MRDY	IO	SPI	CMOS 2.8V	Only on HE910
42	SPI_SRDY	IO	SPI	CMOS 2.8V	Only on HE910
43	SPI_CLK	IO	SPI	CMOS 2.8V	Only on HE910
44	SPI_CS_N	IO	SPI	CMOS 2.8V	Only on C/DE910
45	STAT_LED	O	Indicator	CMOS 2.8V	Share GPIO1
46	GND	*	*	*	
47	*	*	*	*	
48	USB_VBUS	I	USB	5V	USB Interface
49	PWRMON	O	Supply output	CMOS 2.8V	
50	VAUX	O	Supply output	CMOS 2.8V	Max 50mA
51	*	*	*	*	
52	*	*	*	*	
53	ON/OFF	I	Misc	CMOS 1.8V	Active low
54	RESET	I	Misc	CMOS 1.8V	Active low
55	VRTC	I	Misc	Power	Backup RTC
56	*	*	*	*	
57	1PPS	O	GNNS 1PPS Signal	CMOS 2.8V	**New** revision 'N'
58	*	*	*	*	
59	GPIO_04	IO	GPIO	CMOS 2.8V	
60	*	*	*	*	
61	USB_BOOT	I	Forced USB Boot	CMOS 2.8V	**New** revision 'N'
62	*	*	*	*	
63	GPIO_10	IO	GPIO	CMOS 2.8V	Option DVI_TX
64	*	*	*	*	

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65	DVI_TX	IO	Digital Audio	CMOS 2.8V	
66	GPIO_03	IO	GPIO	CMOS 2.8V	
67	GPIO_08	IO	GPIO	CMOS 2.8V	
68	GPIO_06	IO	GPIO	CMOS 2.8V	
69	*	*	*	*	
70	GPIO_01	IO	GPIO	CMOS 2.8V	Share STAT_LED
71	DVI_WA0	IO	Digital Audio	CMOS 2.8V	
72	*	*	*	*	
73	GPIO_07	IO	GPIO	CMOS 2.8V	
74	GPIO_02	IO	GPIO	CMOS 2.8V	
75	*	*	*	*	
76	GPIO_09	IO	GPIO	CMOS 2.8V	
77	*	*	*	*	
78	GPIO_05	IO	GPIO	CMOS 2.8V	
79	USB_D+	IO	USB	*	Differential Data+
80	USB_D-	IO	USB	*	Differential Data-

NOTES:

1. GPIO_01 on xE910 modem goes to both pin 45 and pin 70 via different level translators(to Pin 45 via a direction fixed level translator that can supply large output current. To pin 70 via a bidirectional level translator, for customers who require the GPIO function). GPIO_01 on the xE910 modem has configurable multifunction, GPIO_01 and STAT_LED. If the STAT_LED function is used to indicate the network status, then it can't be used as GPIO_01. This was done in order to make the GFF910 compatible with the old GC864 and UC864 modems for the STAT_LED and GPIO_01.

2. For a common design, if STAT_LED function is used and GPIO_1 is not used in your application. Please use pin 45 for STAT_LED and leave pin 70 floating. This pin is compatible with other UC864 and GC864 family modems. For other applications where GPIO_1 is required, please use pin 70 and leave pin 45 not connected.

3. ON/OFF pulse (pull down) needs to be held longer than UC864-G especially when USB cable is attached. Please refer to the relevant xE910 Hardware User Guide.

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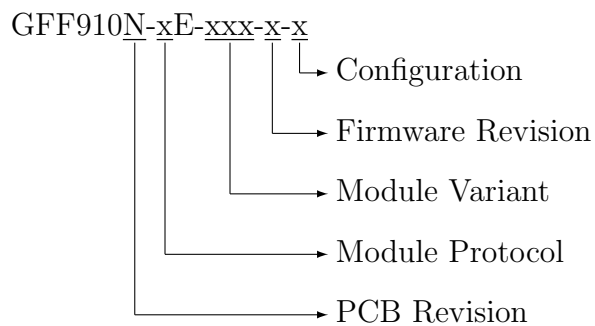www.glyn.com.au
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4. AT command set is not 100% compatible between all xE910 series. e.g. default AUTOBND is 2 in HE910. Please refer to the relevant xE910 Software and AT Command User Guide.

5. GFF910 provides a maximum of 10xGPIO, and GPIO_01 is shared with STAT_LED. Please refer to the GFF910 H/W User guide.

6. GFF910 provides 1xADC while UC864-G provides 2xADC.

7. IP address can no longer have any leading zeroes. For example 169.192.012.2 should be written as 169.192.12.2. IP addresses with leading zeroes are converted to an octet. This is in line with the normal Windows IP addressing.

8. Pin 63 is shared between GPIO_10 and DVI_TX. This is done via the hardware setup, so only 1 function is available based on the loaded configuration. The default configuration is connected to GPIO_10. If DVI_TX is required, hardware modification is required.

9. DVI port is configured to either DVI master or DVI slave as specified.

10.

Colour Coding	Notes
	100% compatible with UC864-G. GFF910 is drop-in replaceable
	Function shared pins. Pins 45/70 are coming out from GPIO_01 on xE910 via different level translators. Pin 63 can be configured as DVI_TX as option if digital voice is required
	Directly from xE910. Refer to relevant Telit Cinterion xE910 user manual for more details
	Special function pins only available of some xE910 modules
	Analog audio pins. Not available on all xE910 modules. Refer to relevant Telit Cinterion xE910 user manual for more details

11. RTS must be connected to the GND (on the module side) if flow control is not used

12. Most pins that are unused must be left disconnected. The only exceptions are the following:

   If unused, pins can be left disconnected. With the exception of the following:

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Pin	Name	Function
1	VBATT	Main Power Supply
2	VBATT	Main Power Supply
3	VBATT	Main Power Supply
4	VBATT	Main Power Supply
5	GND	Ground
6	GND	Ground
7	GND	Ground
46	GND	Ground
25	C103/TXD	Serial data input from DTE (TXD)
26	C104/RXD	Serial data output to DTE (RXD)
31	C105/RTS	Input for request to send signal from DTE (RTS)
53	ON/OFF	Input command for switching ON or OFF(toggle command)
54	RESET	Reset input

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3.2   Part Number Breakdown

GFF910<u>N</u>-<u>x</u>E-<u>xxx</u>-<u>x</u>-<u>x</u>

        → Configuration

      → Firmware Revision

    → Module Variant

  → Module Protocol

→ PCB Revision

Board	Signifier	Option	Notes	
GFF910	N	PCB Revision		
	xE	Module Protocol	Refer to module	
	xxx	Module Variant	Refer to module	
	x	Module Firmware	Refer to module	
	x	Configuration	-G	GPIO10 support (Default)
			-M	DVI master
			-S	DVI slave

E.g. GFF910N-LE-C1WW-3-G would indicate the board comes with the LE910C1-WW module, revision 3 firmware, and GPIO10 support(default).

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3.3   Antenna Connectors

The GFF910 module is equipped with a 50 Ohm RF connector from Attend, P/N: 321A-331251, for Cellular, Diversity (where applicable), and GNSS (where applicable) antenna connections. These connectors are located on top side of the board.

Interface cables with various configurations are available from Glyn, to suit your needs: Glynstore Interface Cable Range

3.4   Power Supply

GFF910 interface supports 3.4-4.2V.
Please see the relevant Telit Cinterion xE910 Hardware user guide for recommended power supply requirements for new designs. The document can be found at the Telit Cinterion website.

3.5   Power Consumption

Please see the relevant Telit Cinterion xE910 Hardware user guide for recommended power supply requirements for new designs. The document can be found at the Telit Cinterion website.

4   Software Commands

Please see the relevant Telit Cinterion xE910 Software and AT command user guides for more details. The document can be found at the Telit Cinterion website.

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5   Recommended Module Summary

The GFF910 supports all current xE910 modules from Telit Cinterion. Here are our recommended module options currently available:

Part Number	Region	Technologies	Band Support	GPS
ME910G1-WW	Global	Cat-M1 & NB-IoT	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B71, B85	Embedded
LE910Q1-WW	Global	Cat-1 Bis	B1, B2, B3, B4, B5, B7, B8, B12, B13, B18, B19, B20, B25, B26, B28, B34, B38, B39, B40, B41, B66	
LE910Q1-WWG	Global	Cat-1 Bis	B1, B2, B3, B4, B5, B7, B8, B12, B13, B18, B19, B20, B25, B26, B28, B34, B38, B39, B40, B41, B66	Embedded
LE910C1-WWXD	Global	Cat-1 LTE (3G&2G Fallback)	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B71, B85	Embedded
LE910C1-APX	APAC	Cat-1 LTE	B1, B3, B5, B8, B9, B18, B19, B26, B28	Embedded
FE910C04-WWD	Global	5G FR1 (Cat-4 LTE Fallback)	n1, n2, n3, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n30, n38, n40, n41, n48, n66, n70, n71, n77, n78, n79	Embedded

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6 Frequently Asked Questions (FAQ)

6.1 GPIO

6.1.1 Can GPIO1-10 be used as inputs?

Yes, all GPIO1-10 can be configured as inputs via AT commands. For more information please see the AT command user manual.

6.1.2 Why is GPIO1 working differently when STAT_LED is enabled?

STAT_LED and GPIO1 share the same pin on the HE910 module. So when STAT_LED is enabled via AT commands, GPIO1 can't be used as an input or output. If you issue a command to force GPIO1 to work as an input or output then STAT_LED will lose its function.

6.1.3 Why is GPIO10 labelled "Optional for DVI_TX"?

By default, the hardware is configured to connect to GPIO10, this pin can also be configured to be DVI_TX. If your application wants to use DVI interface, please let us know so that we can configure this pin to work as DVI_TX. Otherwise this pin will only work as GPIO.

6.1.4 Will GPIO1-10 work as an output mode?

Yes, all GPIO can be configured to work as output pins via AT commands. Pull up to VAUX1 is required on each GPIO to achieve the 2.8V output. Otherwise you can only achieve 1.8V output by default.

6.2 SPI

6.2.1 How can I use SPI interface?

There are 2 pins shared with TX_TRACE and RX_TRACE. These 2 pins are configured to TX_TRACE and RX_TRACE by default. These 2 signals can be configured to SPI by changing some resistors during production. If your application requires SPI interface, please let us know.

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6.3   DVI

6.3.1   Can DVI work in slave mode?

Yes, DVI interface can work in slave mode. By default, it has hardware configured as master mode. If your application requires the DVI as a slave port, please let us know and we can set up the configuration required for DVI slave mode.

6.4   UART

6.4.1   Why can't I get UART working without hardware flow control?

Please pull RTS to GROUND if the hardware flow control is not being used.

NOTE:
According to "Telit_xE910_Hardware_User_Guide", some signal names are referred to the application side, therefore on the HE910 side these signal are on the opposite direction:

- *TXD on the application side will be connected to the receive line (here named C103/TXD)*

- *RXD on the application side will be connected to the transmit line (here named C104/RXD)*

6.4.2   Why can't I communicate to the modem after I create a socket connection without hardware flow control?

Please use command AT&K0 to disable the hardware flow control before you enable the socket connections.

6.5   UART_TRACE

6.5.1   What is the UART_TRACE interface used for?

Normally this UART will be used for debugging, such as module tracing or Python debugging etc.

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6.6   VAUX1

6.6.1   What is the maximum current that VAUX1 can drive?

VAUX1 is connected to an internal 150mA 2.8V regulator.This power line also supplies the internal level translators. For safe operation, the recommended maximum is 75mA from VAUX1.

6.7   VRTC

6.7.1   How can I use the VRTC pin?

This pin is connected to the xE910 module directly, please see relevant "Telit_x10_RTC_BackUp_Application_note".
Please find the appropriate document at http://www.telit.com for the most up to date information.

6.8   RESET

6.8.1   How can I use the Reset pin?

This pin is connected to the xE910 module directly, please see relevant "Telit_xE910_Hardware_User_Guide".
Please find the appropriate document at http://www.telit.com for the most up to date information.

6.9   ON/OFF

6.9.1   How can I use the ON/OFF pin?

This pin is connected to the xE910 module directly, please see relevant "Telit_xE910_Hardware_User_Guide".
Please find the appropriate document at http://www.telit.com for the most up to date information.

6.10   SIM INTERFACE

6.10.1   How can I use the SIM interface?

SIM interface is connected to the xE910 module directly, please see relevant "Telit_xE910_Hardware_User_Guide".
Please find the appropriate document at http://www.telit.com for the most up to date information.

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6.11   ADC

6.11.1   What is the input resistance on the ADC?

- ADC input range: 0-2.8V.

- ADC input resistance: 220K +/- 2%.

- We have used a voltage divider (resistor network) to meet xE910's input requirements.

6.12   STAT_LED

6.12.1   How can I enable STAT_LED?

STAT_LED and GPIO1 share the same pin on xE910 modules.
To enable/disable STAT_LED, please use commands for HE910 specifically:
"ATGPIO=1,1,2"
"ATSLED=4"
"ATSLEDSAV" to enable STAT_LED
"ATGPIO=1,0,1"
"ATGPIO=1,0,0"
"ATGPIO=1,1,1" or "ATGPIO=1,1,0" will disable STAT_LED.
(Note: Other module series may require a different set of commands, so please check the relevant hardware user guide)

6.13   POWER SUPPLY

6.13.1   What is the power supply requirements?

Power supply pins are connected to the xE910 module directly, so please see relevant "Telit_xE910_Hardware_User_Guide".
Please find the appropriate document at http://www.telit.com for the most up to date information.

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