

ISEE MANUAL

ISEE IGEPv2 EXPANSION Hardware Reference Manual (Revision 01 - 24-Sep-2010)



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CONTENTS

1	COPYRIGHT NOTICE	5
2	WARRANTY	5
3	ISEE IGEP LINKS	6
4	ISEE IGEPv2 EXPANSION FEATURES	7
4.1	INTRODUCTION	7
4.2	GENERAL SPECIFICATIONS	10
5	IGEPv2 CONNECTION.....	16
6	CONNECTORS DESCRIPTION	19
6.1	J201 - POWER JACK.....	20
6.2	J301 - POWERTIP 4.3" DATA CONNECTOR	21
6.3	J302, J303 and J304 - SEIKO 7" CONNECTORS	22
6.4	J405 - MODEM GSM/GPRS SIMCARD CONNECTOR.....	23
6.5	J404 - MODEM GSM/GPRS EXTERNAL ANTENNA CONNECTOR	24
6.6	J501, J502 - VIDEO COMPOSITE INPUTS CONNECTOR	25
6.7	J601 and J602 - UART1 HEADER CONNECTOR.....	26
6.8	J603 - RS232 HEADER CONNECTOR	27
6.9	J604 - RS232 DB9 CONNECTOR	28
6.10	J703 - CAN BUS CONNECTOR	29
6.11	J801 - VGA CONNECTOR	30
6.12	J5 - CAMERA CONNECTOR.....	31
6.13	J990 - IGEPv2 EXPANSION CONNECTOR	32
6.14	J960 - IGEPv2 EXPANSION CONNECTOR	33
6.15	JA41 - IGEPv2 EXPANSION CONNECTOR	34
6.16	JA42 - IGEPv2 EXPANSION CONNECTOR	35
6.17	JC30 - IGEPv2 EXPANSION CONNECTOR	36

7	MECHANICAL SPECIFICATION	37
8	BOARD REFERENCE	38
9	LIST OF FIGURES	39
10	CHANGELOG	41

VERSION CONTROL

REVISION	DATE	ORIGIN	DESCRIPTION
00	15/07/2010	PR	Initial version
01	1/09/2010	PR	Document release

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ISEE shop: <https://shop.igep.es>

ISEE Software Repositories: <http://git.igep.es>

4 ISEE IGEPV2 EXPANSION FEATURES

4.1 INTRODUCTION



Figure 1 ISEE IGEPV2 EXPANSION

	Description
Interfaces	<p>Modem GSM/GPRS based on TELIT GE865 module with SIMCARD connector and external cable Antenna.</p> <p>LCD and touch interface for 7.0 inch SEIKO LCD: 3 connectors (40pin FFC for TFT interface + 4pin FFC for touch + 6pin FFC for LED backlight).</p> <p>LCD and touch interface for 4.3 inch POWER TIP LCD: 40pin FFC for TFT interface, touch and LED backlight).</p> <p>VGA interface on D-SUB15 connector.</p> <p>2 x video composite inputs on RCA connector. Video Decoder based on TEXAS Video Decoder TVP5150.</p>

	<p>Camera interface for e-con Systems e-CAM32_OMAP module.</p> <p>CAN bus interface with 4 pin connector. CAN interface based on MICROCHIP MCP2515 CAN controller.</p> <p>LVDS video serializer (MAX9247) (<i>Optional</i>)</p> <p>Serial port on DB9 connector</p>
Electrical	<p>Supply Voltage from 5 VDC +-10% from IGEPv2 board or 5VDC through Power Jack connector</p> <p>Power consumption: from 260mA to 500mA</p> <p>Note: The electrical design for the Power supply should be made ensuring it will be capable of a peak current output of at least 2 A.</p>
Connectors	<p>1 x DB9 for serial RS232 interface</p> <p>2 x RCA for video composite input</p> <p>1 x DB15 for VGA interface</p> <p>1 x SIMCARD connector for MODEM GSM/GPRS</p> <p>1 x Terminal block 5mm 4 pin</p> <p>4 x Header for IGEPv2 interface</p>
Environmental	<p>-40..+85 C temperature range / -25.. 80°C / 0..70°C</p>
Indicators	<p>1 x bicolor SMD led (green/red) for MODEM status</p> <p>2 x bicolor SMD led (green/red) for CAN interface</p>



WARNING: IGEPv2 EXPANSION CAN ONLY BE POWERED WITH 5VDC THROUGH J201 and J990 CONNECTORS OR THE BOARD WILL BE DAMAGED!

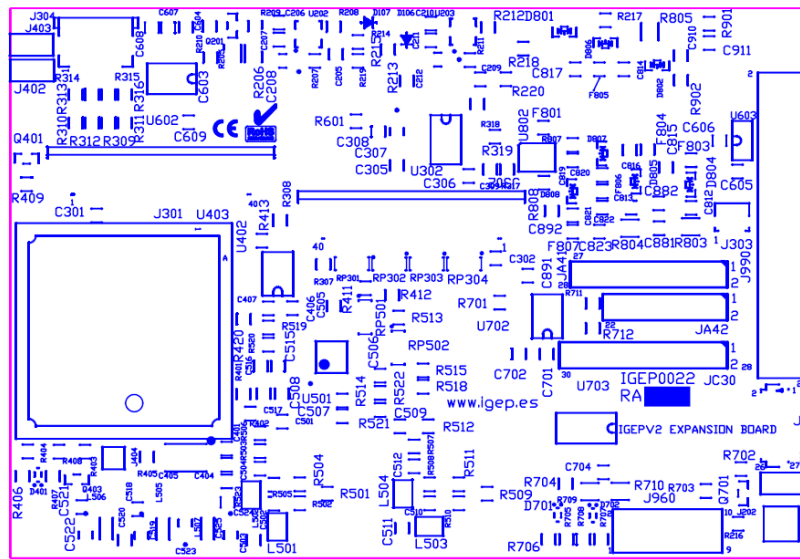


Figure 2 IGEPv2 EXPANSION Top view

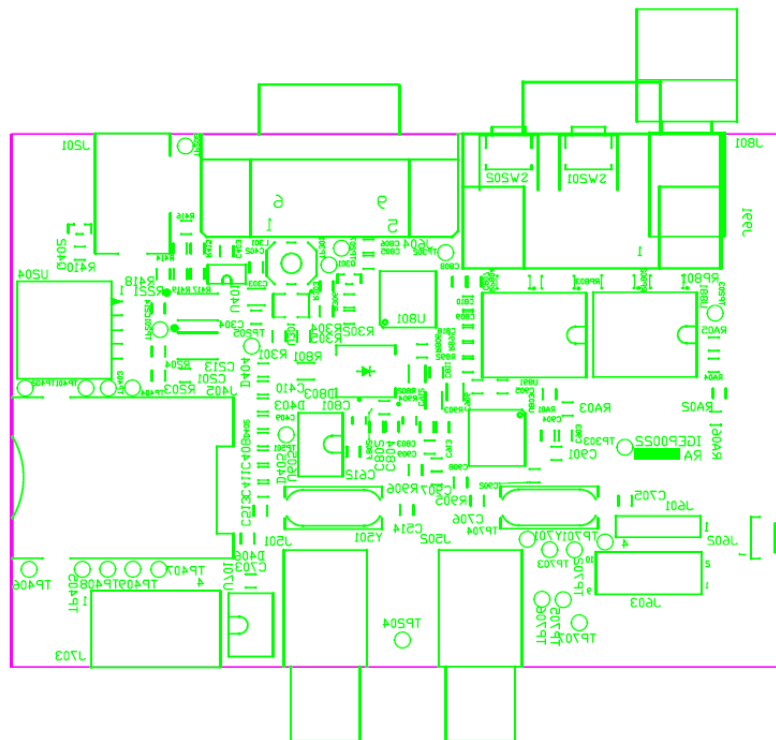


Figure 3 IGEPv2 EXPANSION Bottom view

The following sections provide more detail on each feature and components on the ISEE IGEPV2 EXPANSION.

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4.2 GENERAL SPECIFICATIONS

LCD Interface

IGEPv2 EXPANSION board can be directly connected to a SEIKO 7" LCD or to a POWERTIP 4.3" LCD.



Figure 4 LCD view

IGEPv2 EXPANSION board integrates LCD backlight driver (Texas instruments TPS61081) and touch screen controller (Texas instruments TSC2046), 4-wire touch screen controller which supports a low-voltage I/O interface from 1.5V to 5.25V.

POWERTIP 4.3" LCD features:

Item	Standard Value
Display Type	480 * 3 (RGB) * 272 Dots
LCD Type	a-Si TFT , Normally white , Transmissive type
Screen size(inch)	4.3 inch
Viewing Direction	6 O'clock
Color configuration	RGB-Strip
Backlight Type	LED B/L
Interface	Digital 24-bits RGB
Other(controller/driver IC)	HX8257-A (Or Compatible IC)
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web side : http://www.powertip.com.tw/news/LatestNews.asp

SEIKO 7" LCD features:

Module size	165mm(W)x105.8mm(H)x(4.51)mm(t) (except FPC length)
Active area	152.4mm(W)x91.44mm(H)
Dot pitch	0.0635mmx0.1905mm
Weight	(170) g typ.
Display size	7.0 inch
Number of pixels	800RGBx480 dots
Dot layout	Vertical stripes
Interface	24bit Parallel RGB DE interface mode (DCLK,DE) SYNC interface mode (DCLK,HSYNC,VSYSN)
Number of colors	16,194,277 colors (6bit DAC + dithering)
Display mode	TN Mode, Transmissive Mode, Normally White
Viewing angle(U/D/R/L)	55/65/70/70 (@CR· 10)
Drive method	Dot inversion
Back Light Unit	Bottom edge type, 24 LEDs(8Serial x 3)
Touch-Panel	Film/Glass type
Surface treatment	Anti glare type
Operating temperature	From -20 to +70 °C (dry)
Storage temperature	From -30 to +80 °C (dry)

MODEM GSM/GPRS

IGEPv2 EXPANSION board integrates a modem GSM/GPRS for mobile communication.

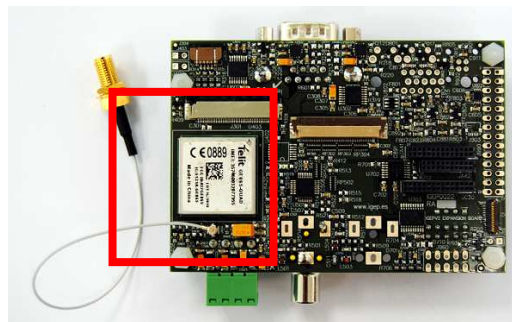


Figure 5 Modem view

GE865 is a small GSM/GPRS Ball-Grid-Array BGA module with next feature:

- Quad-band EGSM 850 / 900 / 1800 / 1900 MHz
- GSM/GPRS protocol stack 3GPP Release 4 compliant
- Output power
 - Class 4 (2W) @ 850 / 900 MHz
 - Class 1 (1W) @ 1800 / 1900 MHz
- Control via AT commands according to 3GPP 27.005, 27.007
- Control via Remote AT commands

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- Power consumption (typical values)
 - Power off: $< 62 \mu\text{A}$
 - Idle (registered, power saving): 1.6 mA @ DRX=9
- Serial port multiplexer 3GPP 27.010
- TCP/IP stack access via AT commands
- Sensitivity:
 - $\leq -107 \text{ dBm (typ.) @ 850 / 900 MHz}$
 - $\leq -106 \text{ dBm (typ.) @ 1800 / 1900 MHz}$
- Extended temperature range
 - -40°C to $+85^{\circ}\text{C}$ (operational)
 - -40°C to $+85^{\circ}\text{C}$ (storage temperature)
- RoHS compliant

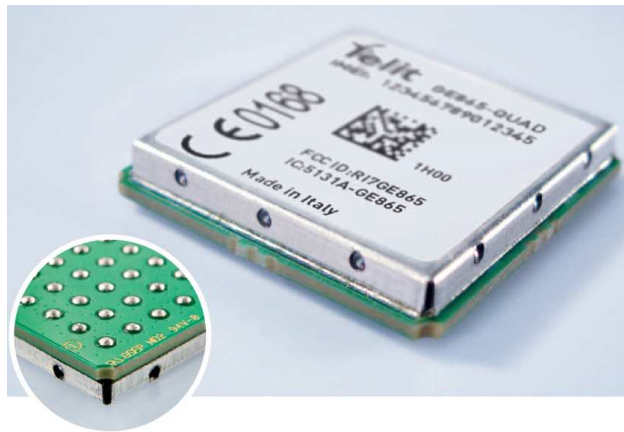


Figure 6 Telit module view

VIDEO COMPOSITE INPUTS

IGEPv2 EXPANSION board integrates a Ultralow-Power NTSC/PAL/SECAM Video Decoder, Texas Instruments TVP5151.

The TVP5151 device is an ultralow-power NTSC/PAL/SECAM video decoder. Available in a space-saving 48-terminal PBGA package or a 32-terminal TQFP package, the TVP5151 decoder converts NTSC, PAL, and SECAM video signals to 8-bit ITU-R BT.656 format. Discrete syncs are also available. The optimized architecture of the TVP5151 decoder allows for ultralow power consumption. The decoder consumes 138-mW power under typical operating conditions and consumes less than 1 mW in power-down mode, considerably increasing battery life in portable applications. The decoder uses just one crystal for all supported standards. The TVP5151 decoder can be programmed using an I2C serial interface.

The TVP5151 decoder converts baseband analog video into digital YCbCr 4:2:2 component video.

Composite and S-video inputs are supported. The TVP5151 decoder includes one 9-bit analog-to-digital converter (ADC) with $2\times$ sampling. Sampling is ITU-R BT.601 (27.0 MHz, generated from the 27.000-MHz crystal or oscillator input) and is line locked. The output formats can be 8-bit 4:2:2 or 8-bit ITU-R BT.656 with embedded synchronization.

The TVP5151 decoder utilizes Texas Instruments patented technology for locking to weak, noisy, or unstable signals. A Genlock/real-time control (RTC) output is generated for synchronizing downstream video encoders.

Complementary four-line adaptive comb filtering is available for both the luminance and chrominance data paths to reduce both cross-luminance and cross-chrominance artifacts; a chrominance trap filter is also available.

Video characteristics including hue, brightness, saturation, and sharpness may be programmed using the industry standard I2C serial interface. The TVP5151 decoder generates synchronization, blanking, lock, and clock signals in addition to digital video outputs. The TVP5151 decoder includes methods for advanced vertical blanking interval (VBI) data retrieval. The VBI data processor slices, parses, and performs error checking on teletext, closed caption, and other data in several formats.

The TVP5151 decoder detects copy-protected input signals according to the Macrovision™ standard and detects Type 1, 2, 3, and colorstripe processes.

The main blocks of the TVP5151 decoder include:

- Robust sync detector
- ADC with analog processor
- Y/C separation using four-line adaptive comb filter
- Chrominance processor
- Luminance processor
- Video clock/timing processor and power-down control
- Output formatter
- I2C interface
- VBI data processor
- Macrovision detection for composite and S-video

CAN BUS

IGEPv2 EXPANSION board integrates a Stand-Alone CAN controller with SPI interface, MICROCHIP MCP2515.

Microchip Technology's MCP2515 is a stand-alone Controller Area Network (CAN) controller that implements the CAN specification, version 2.0B. It is capable of transmitting and receiving both standard and extended data and remote frames. The MCP2515 has two acceptance masks and six acceptance filters that are used to filter out unwanted messages, thereby reducing the host MCUs overhead. The MCP2515 interfaces with microcontrollers (MCUs) via an industry standard Serial Peripheral Interface (SPI).

MCP2515 features:

- Implements CAN V2.0B at 1 Mb/s:
 - 0 – 8 byte length in the data field
 - Standard and extended data and remote frames
- Receive buffers, masks and filters:
 - Two receive buffers with prioritized message storage
 - Six 29-bit filters
 - Two 29-bit masks
- Data byte filtering on the first two data bytes (applies to standard data frames)
- Three transmit buffers with prioritization and abort features
- High-speed SPI Interface (10 MHz):
 - SPI modes 0,0 and 1,1
- One-shot mode ensures message transmission is attempted only one time
- Clock out pin with programmable prescaler:
 - Can be used as a clock source for other device(s)
- Start-of-Frame (SOF) signal is available for monitoring the SOF signal:
- Can be used for time-slot-based protocols and/or bus diagnostics to detect early bus degradation
- Interrupt output pin with selectable enables
- Buffer Full output pins configurable as:

-
- Interrupt output for each receive buffer
 - General purpose output
 - Request-to-Send (RTS) input pins individually configurable as:
 - Control pins to request transmission for each transmit buffer
 - General purpose inputs

5 IGEPv2 CONNECTION

IGEPv2 EXPANSION board is connected to IGEPv2 board by using J990, JA41, JA42, JC30 and J960 headers. Just take a look on the figure below.



Figure 7 IGEPv2 and IGEPv2 EXPANSION bottom entry assembly

IGEPv2 board connectors:

J990: SAMTEC TSW-114-15-F-D

JA41: SAMTEC FTS-114-01-L-D

JA42: SAMTEC FTS-110-01-L-D

JC30: SAMTEC FTS-114-01-L-D

IGEPv2 EXPANSION connector:

J990: SAMTEC HLE-114-92-L-DV-BE

JA41: SAMTEC SFMC-114-01-L-D

JA42: SAMTEC SFMC-111-01-L-D

JC30: SAMTEC SFMC-115-01-L-D

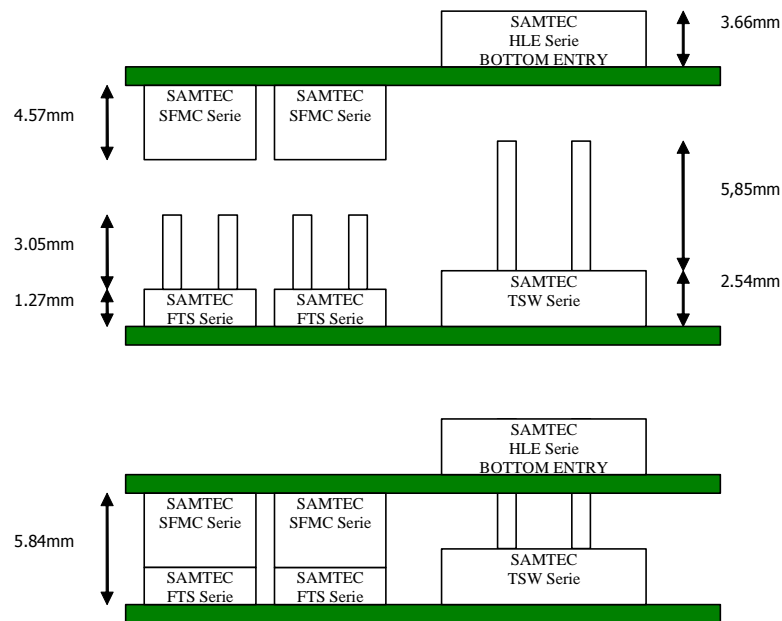


Figure 8 IGEPv2 Bottom entry assembly



Figure 9 IGEPv2 connector detail



Figure 10 IGEPv2 connector detail

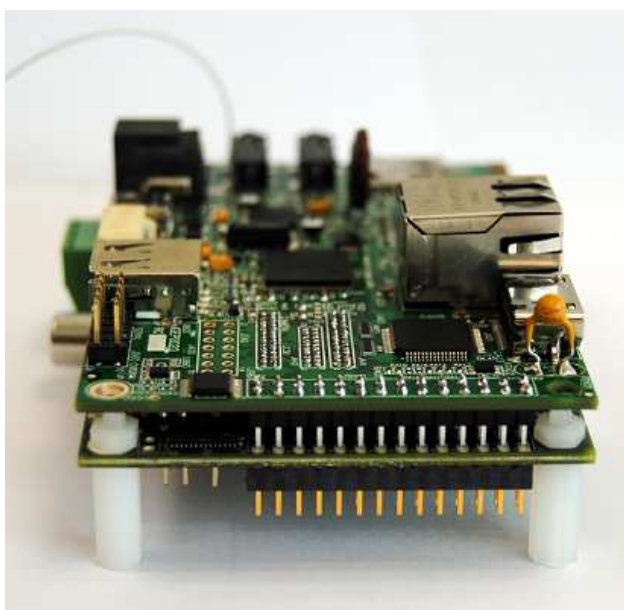


Figure 11 IGEPv2 and IGEPv2 EXPANSION bottom entry assembly

6 CONNECTORS DESCRIPTION

This section will guide you through the IGEPv2 EXPANSION connectors:

- J201 POWER JACK
- J301 POWERTIP 4.3" DATA CONNECTOR
- J302 SEIKO 7" DATA CONNECTOR
- J303 SEIKO 7" BACKLIGHT CONNECTOR
- J304 SEIKO 7" TOUCHSCREEN CONNECTOR
- J405 MODEM GSM/GPRS SIMCARD CONNECTOR
- J404 MODEM GSM/GPRS EXTERNAL ANTENNA CONNECTOR
- J501, J502 VIDEO COMPOSITE INPUTS CONNECTOR
- J601 UART1 HEADER CONNECTOR
- J602 UART1 JST CONNECTOR
- J603 RS232 HEADER CONNECTOR
- J604 RS232 DB9 CONNECTOR
- J703 CAN BUS CONNECTOR
- J801 VGA CONNECTOR
- J991 LVDS CONNECTOR
- J5 CAMERA CONNECTOR
- J990 IGEPv2 EXPANSION CONNECTOR
- J960 IGEPv2 EXPANSION CONNECTOR
- JA41 IGEPv2 EXPANSION CONNECTOR
- JA42 IGEPv2 EXPANSION CONNECTOR
- JC30 IGEPv2 EXPANSION CONNECTOR

6.1 J201 - POWER JACK

The J201 connector is a power jack for main 5 VDC power.

It is a switchcraft connector ref. RASM722, Plug/Mating Plug Diameter 2.1mm ID, 5.5mm OD.

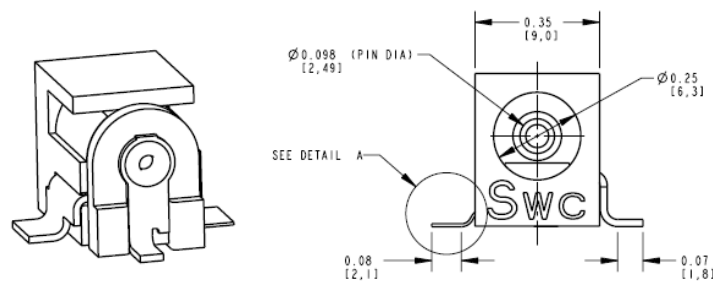


Figure 12 J200 detail



**WARNING: IGEPv2 EXPANSION BOARD CAN ONLY BE
POWERED WITH 5V DC.**

The connector is located as shows the figure below.

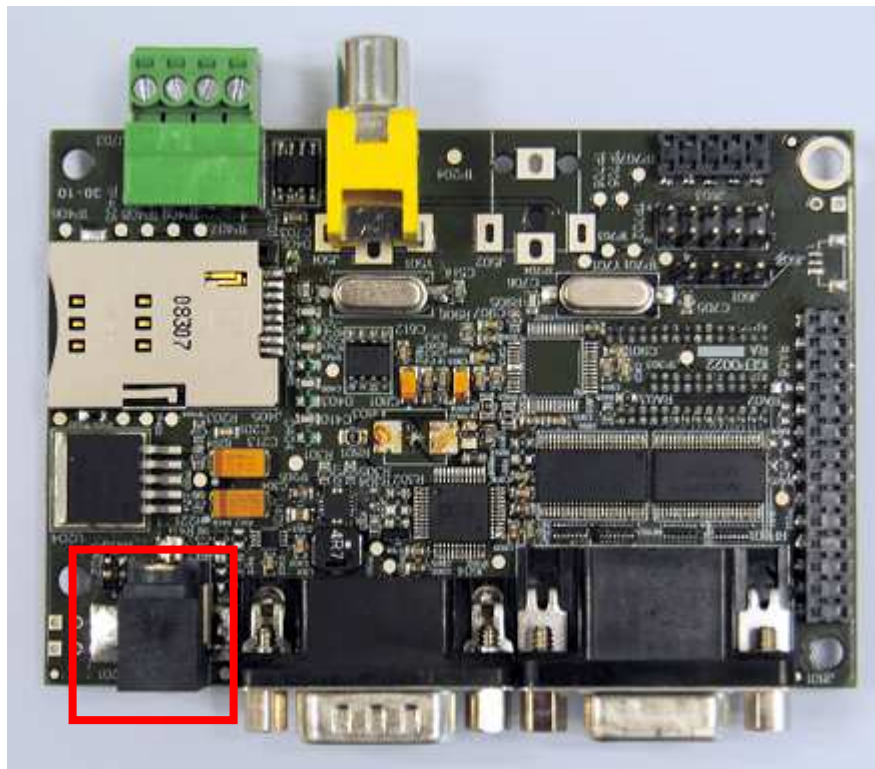


Figure 13 J201 location

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6.2 J301 - POWER TIP 4.3" DATA CONNECTOR

J301 is a FPC connector 40pos 0.5mm pitch upper contact.

The connector is located as shows the figure below.

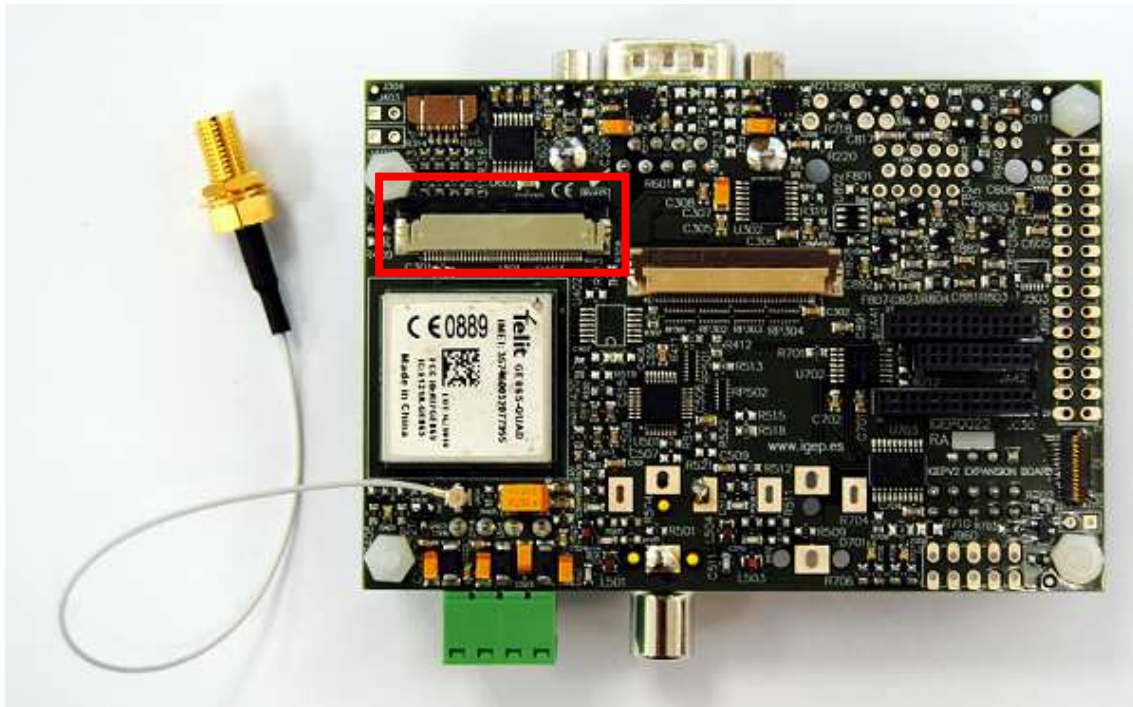


Figure 14 J301 location

6.3 J302, J303 AND J304 - SEIKO 7" CONNECTORS

J302 is a FPC connector 40pos 0.5mm pitch bottom contact.

J303 is a FPC connector 6pos 0.5mm pitch dual sided contact.

J304 is a FPC connector 4pos 1mm pitch dual sided contact.

The connectors are located as shows the figure below.

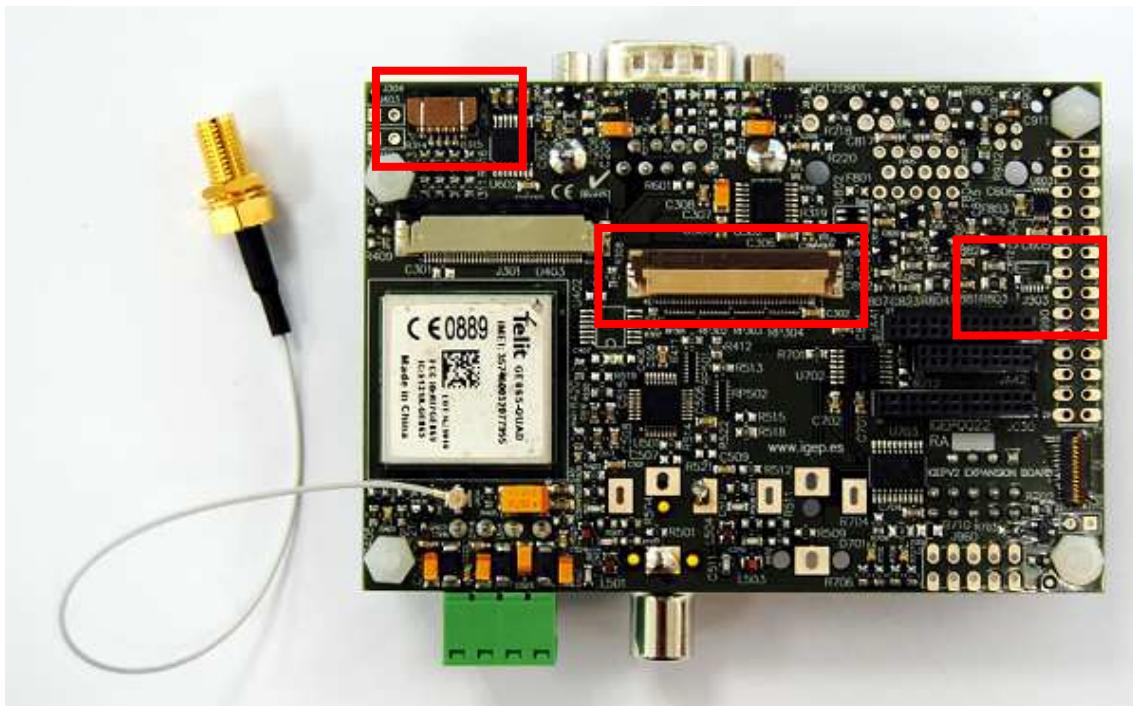


Figure 15 J302, J303 and J304 location

6.4 J405 - MODEM GSM/GPRS SIMCARD CONNECTOR

The connector is located as shows the figure below.

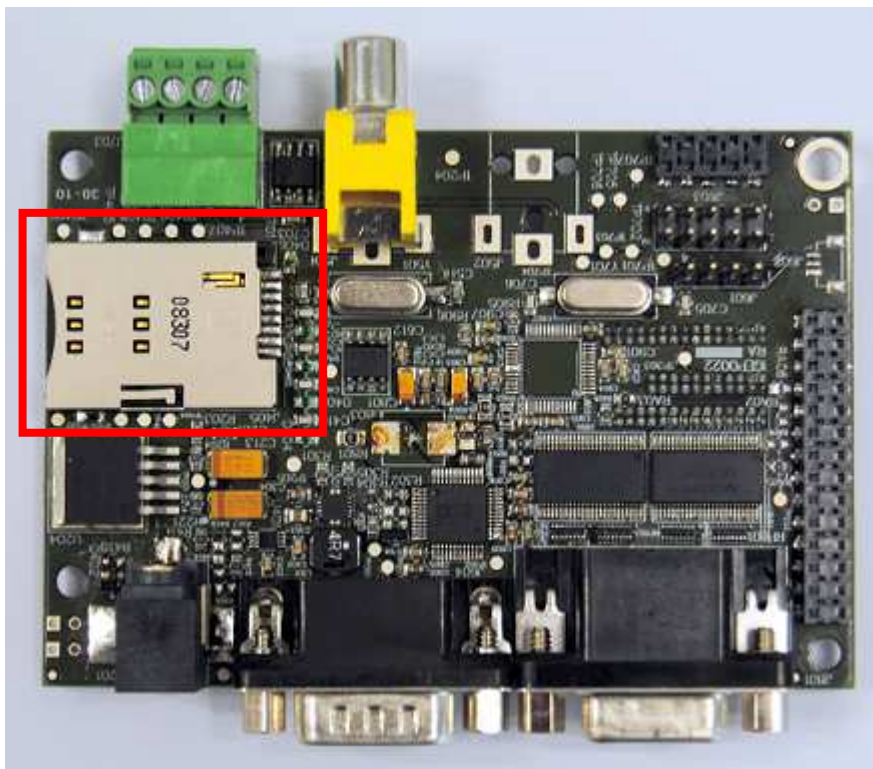


Figure 16 J405 location

6.5 J404 - MODEM GSM/GPRS EXTERNAL ANTENNA CONNECTOR

J404 is a GSC connector for the external GSM/GPRS antenna. It is a MURATA GSC connector, Part number MM9329-2700RA1.

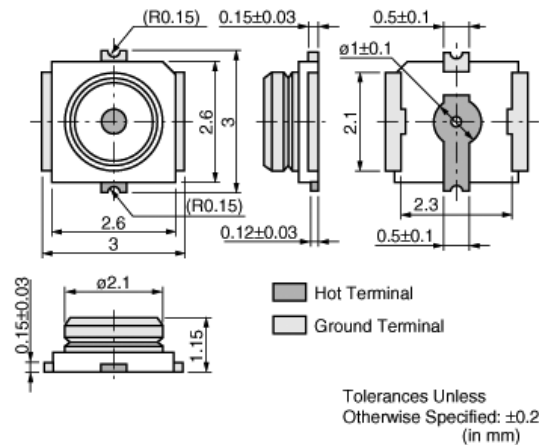


Figure 17 J404 specification

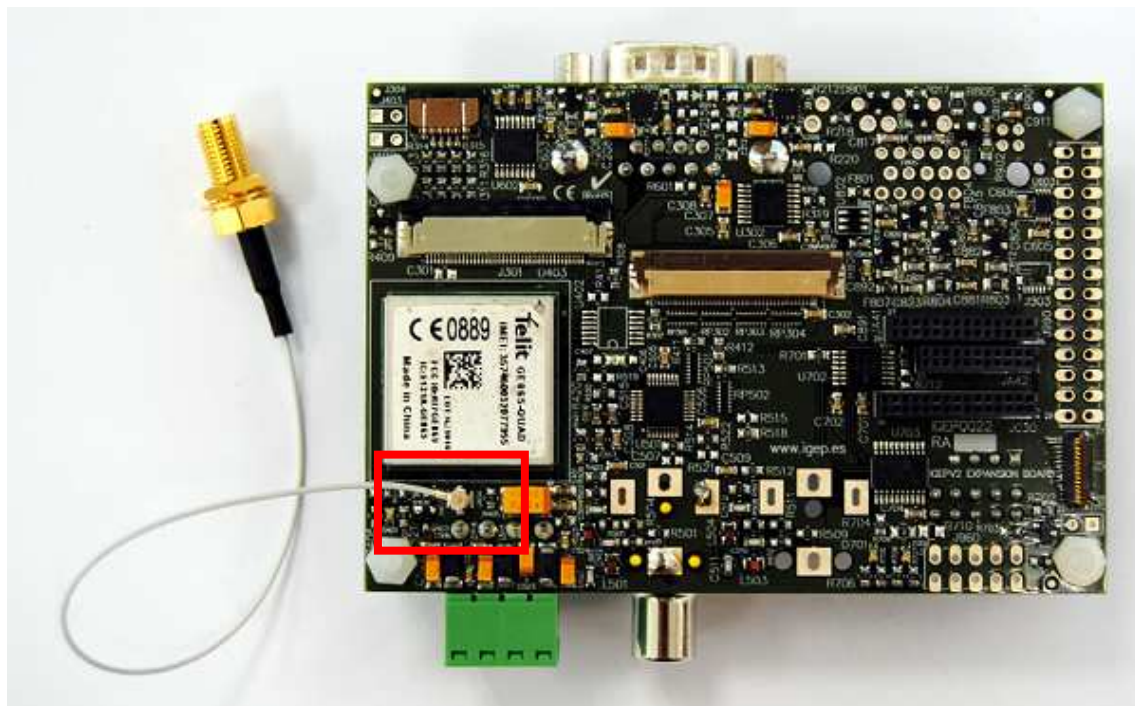


Figure 18 J404 location

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6.6 J501, J502 - VIDEO COMPOSITE INPUTS CONNECTOR

The connectors are located as shows the figure below.

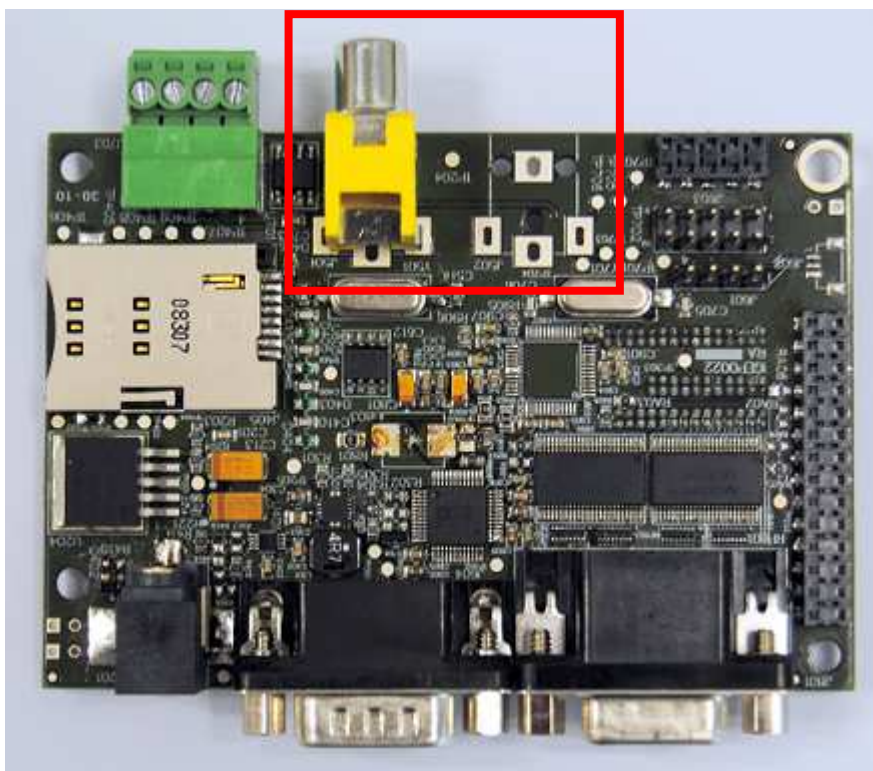


Figure 19 J501 and J502 location

6.7 J601 AND J602 - UART1 HEADER CONNECTOR

The connectors are located as shows the figure below.

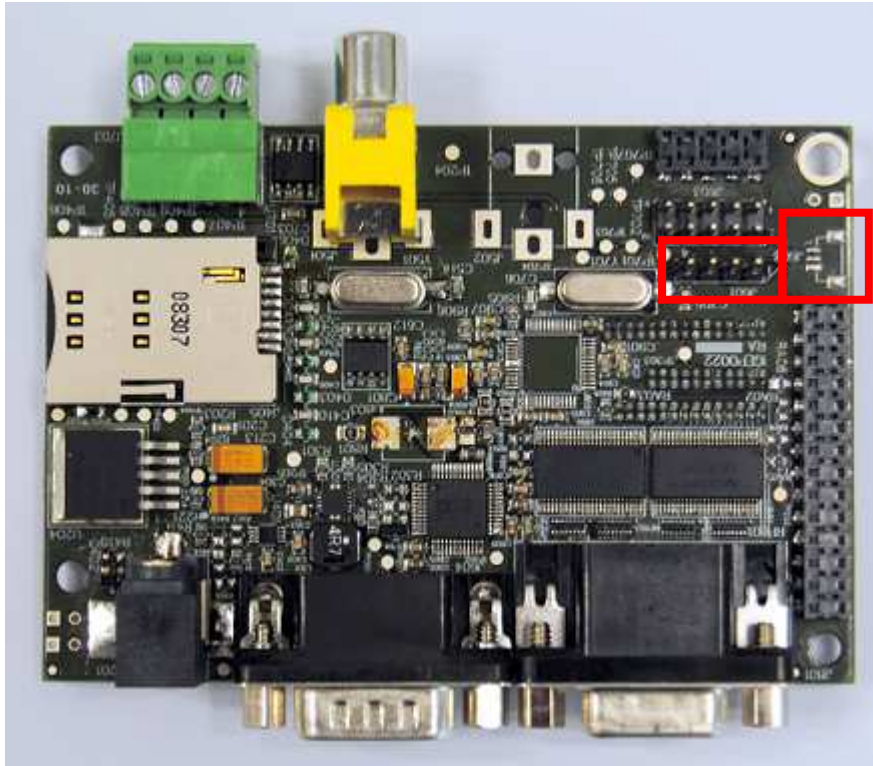


Figure 20 J601 and J602 location

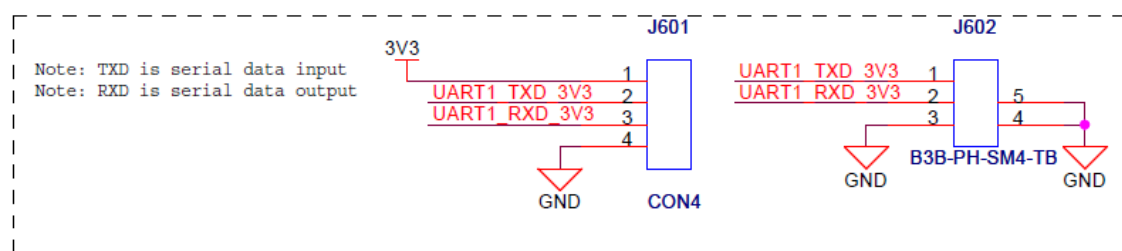


Figure 21 J601 and J602 schematic

6.8 J603 - RS232 HEADER CONNECTOR

The connector is located as shows the figure below.

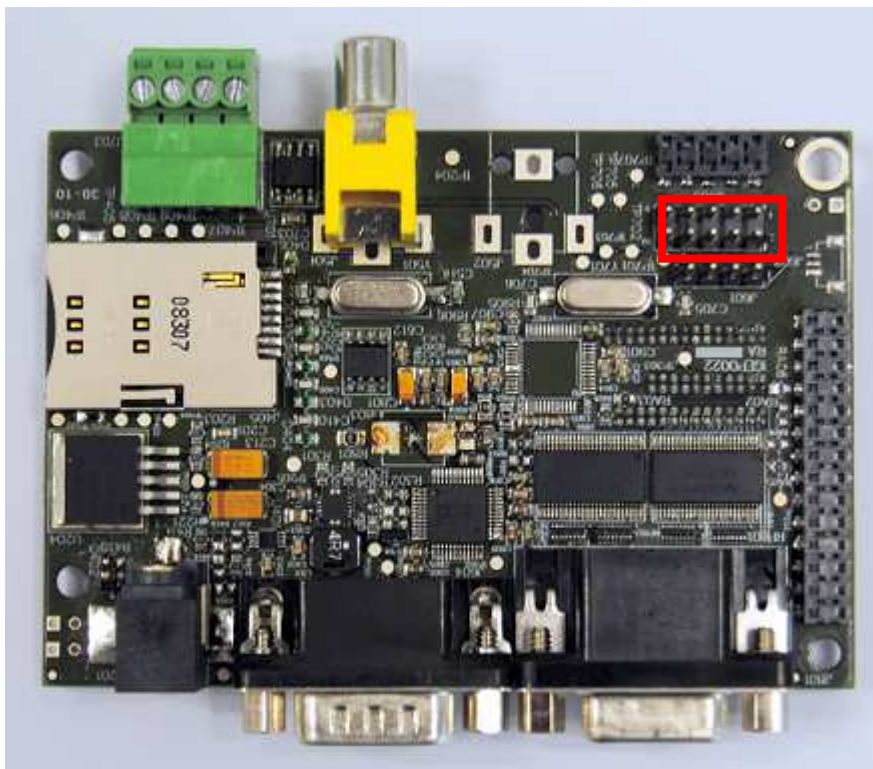


Figure 22 J603 location

6.9 J604 - RS232 DB9 CONNECTOR

The connector is located as shows the figure below.

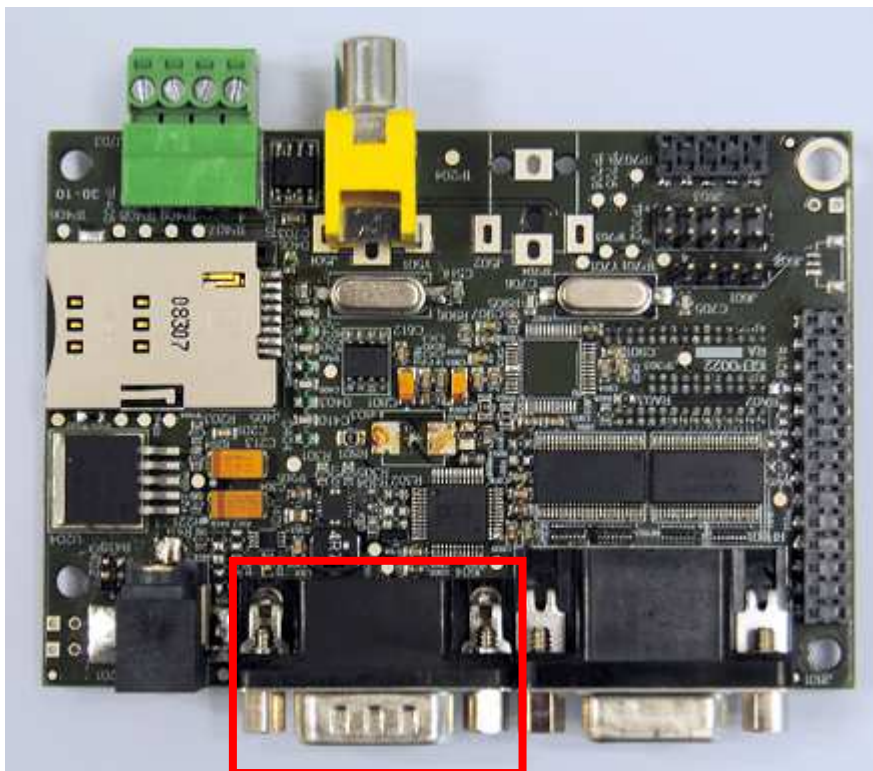


Figure 23 J604 location

6.10J703 - CAN BUS CONNECTOR

The connector is located as shows the figure below.

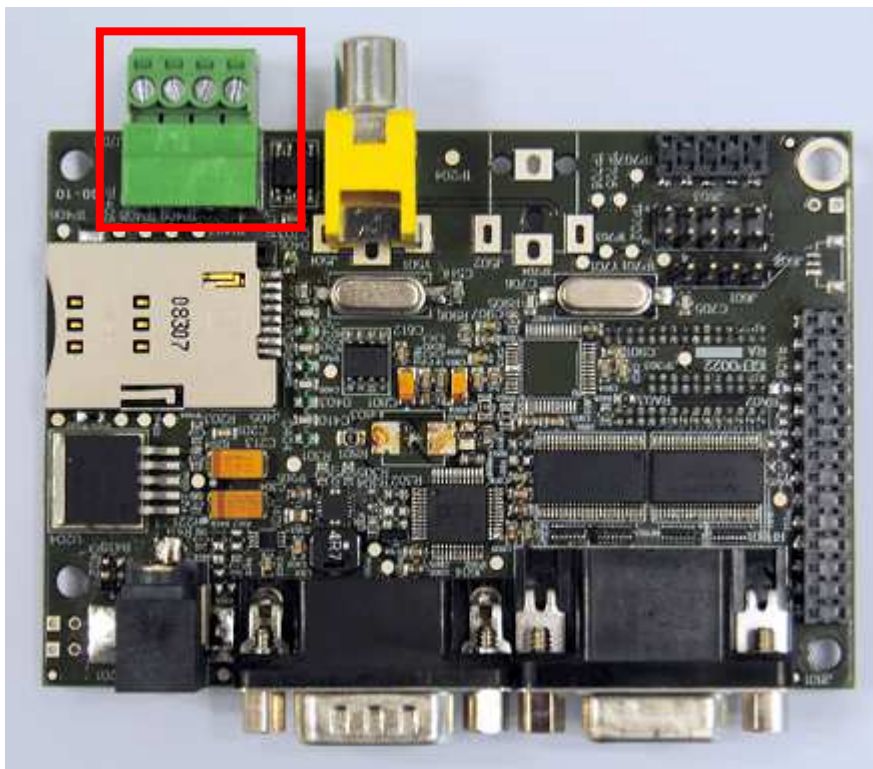


Figure 24 J703 location

6.11 J801 - VGA CONNECTOR

The connector is located as shows the figure below.

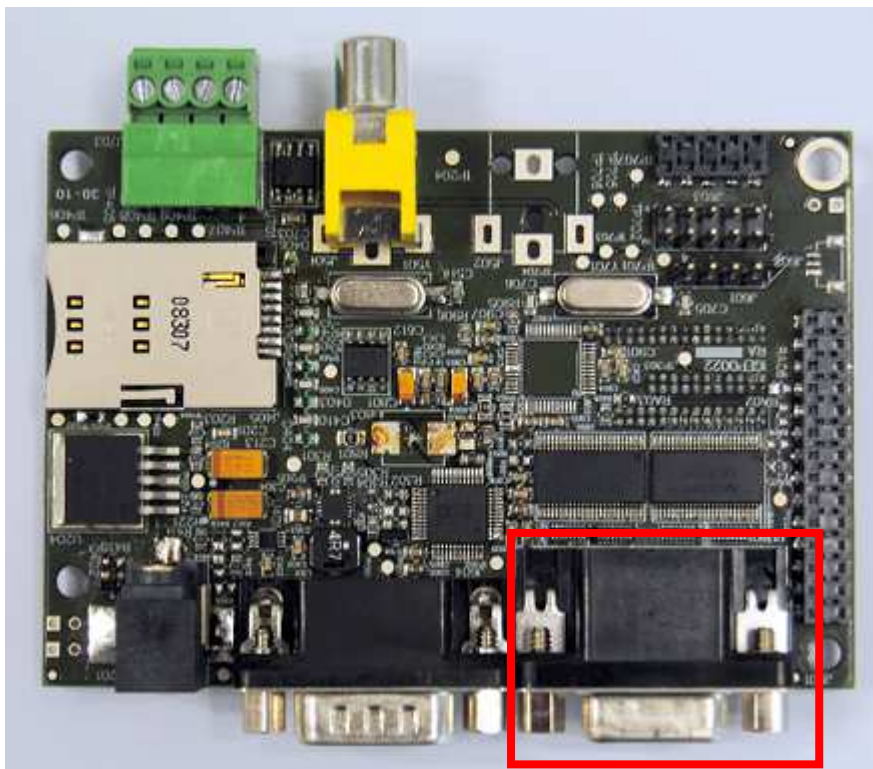


Figure 25 J801 location

6.12 J5 - CAMERA CONNECTOR

The connector is located as shows the figure below.

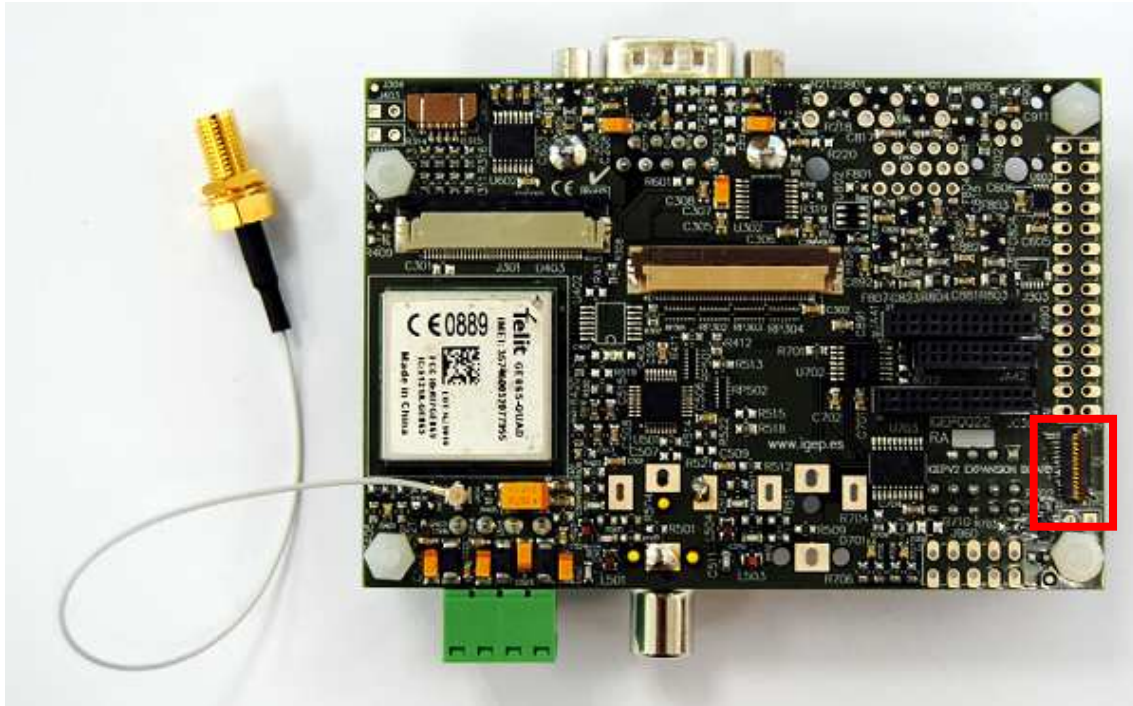


Figure 26 J5 location

6.13 J990 - IGEPV2 EXPANSION CONNECTOR

J990 is used for IGEPv2 board connection.

The J960 connector is a 14x2 pins double row 2.54mm pitch.

The connectors is located as shows the figure below.

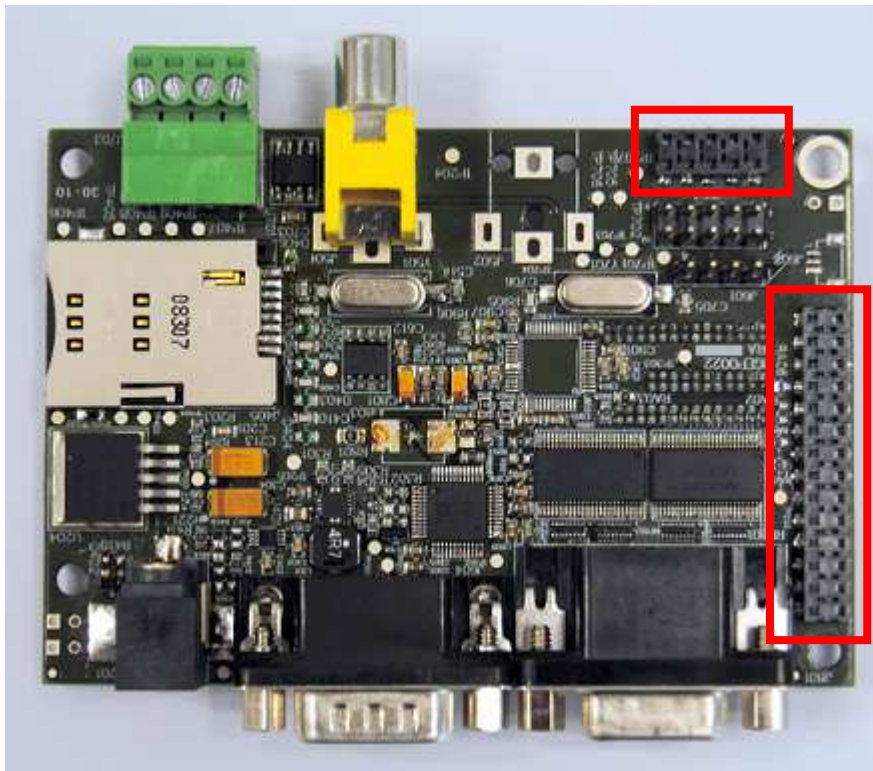


Figure 27 J990 location

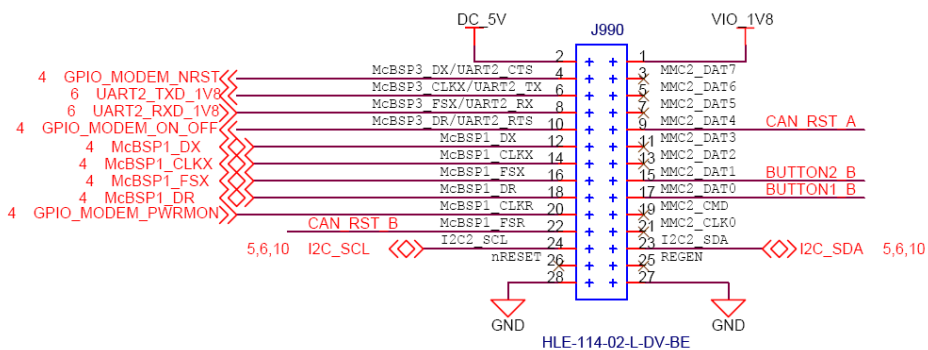


Figure 28 J990 schematic detail

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6.14 J960 - IGEPV2 EXPANSION CONNECTOR

J960 is used for IGEPv2 board connection.

The J960 connector is a 5x2 pins double row 2.54mm pitch.

The connector is located as shows the figure below.

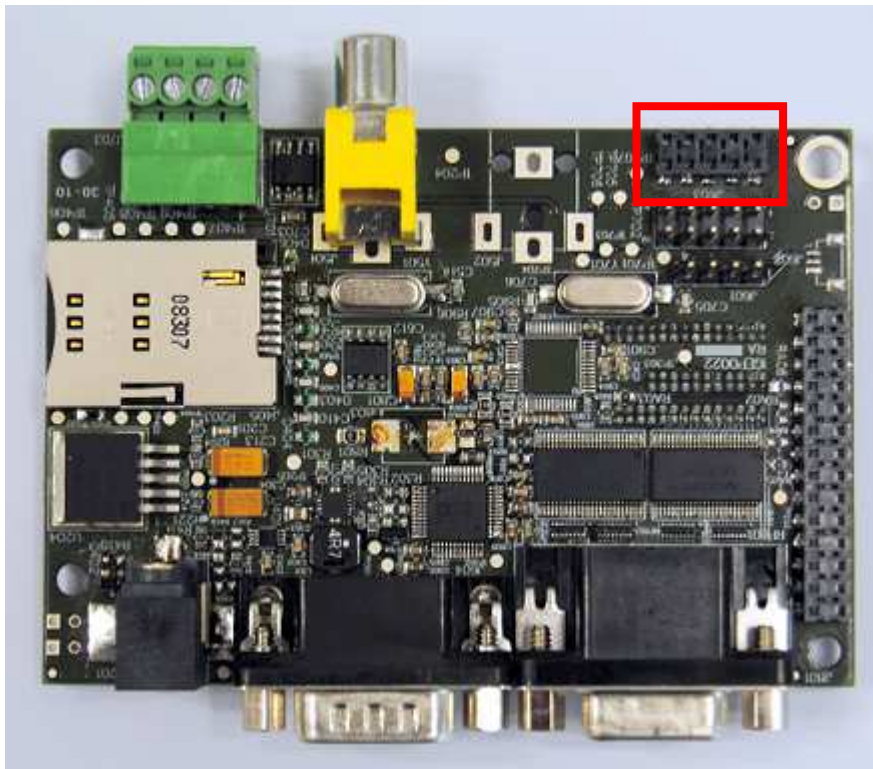


Figure 29 J960 location

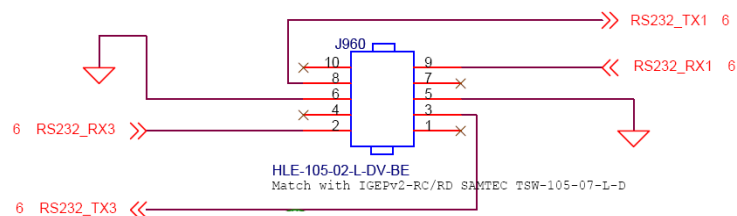


Figure 30 J960 schematic detail

6.15JA41 - IGEPV2 EXPANSION CONNECTOR

JA41 is used for IGEPv2 board connection.

The JA41 connector is a 14x2 pins double row 1.27mm pitch.

The connector is located as shows the figure below.

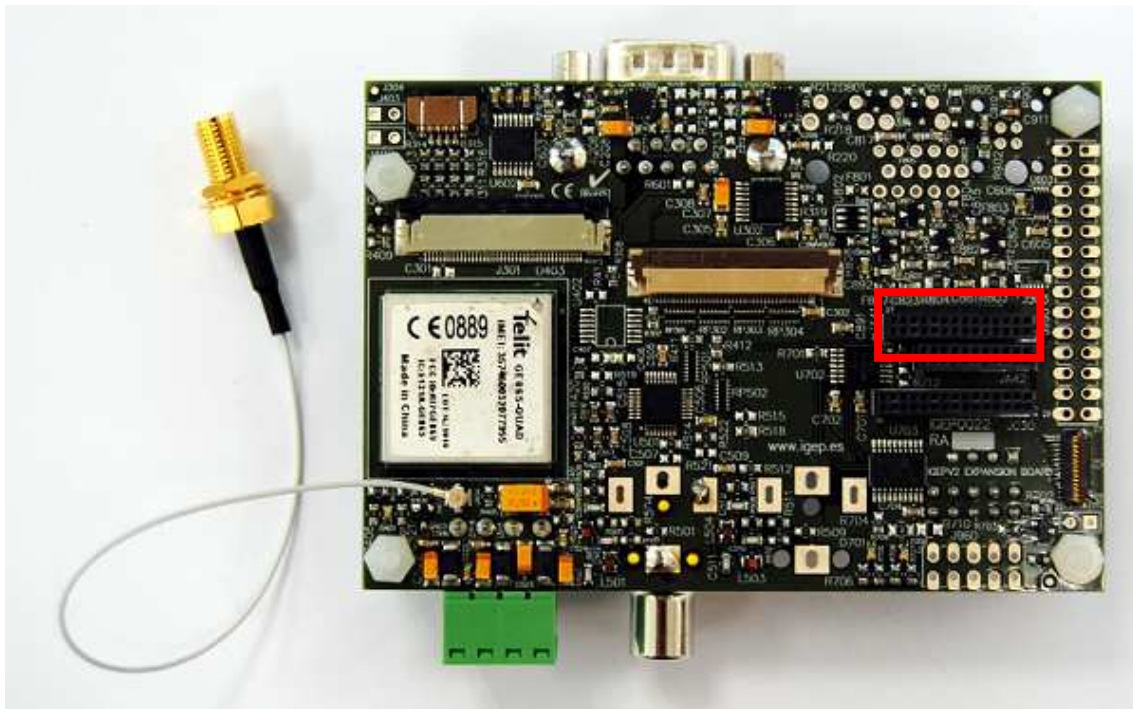


Figure 31 JA41 location

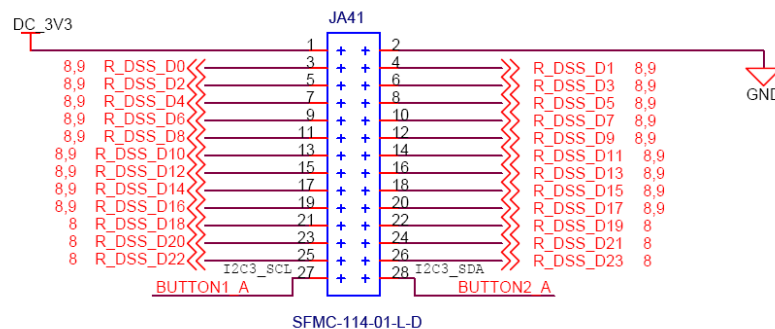


Figure 32 JA41 schematic detail

6.16JA42 - IGEPV2 EXPANSION CONNECTOR

JA42 is used for IGEPv2 board connection.

The JA42 connector is a 11x2 pins double row 1.27mm pitch.

The connector is located as shows the figure below.

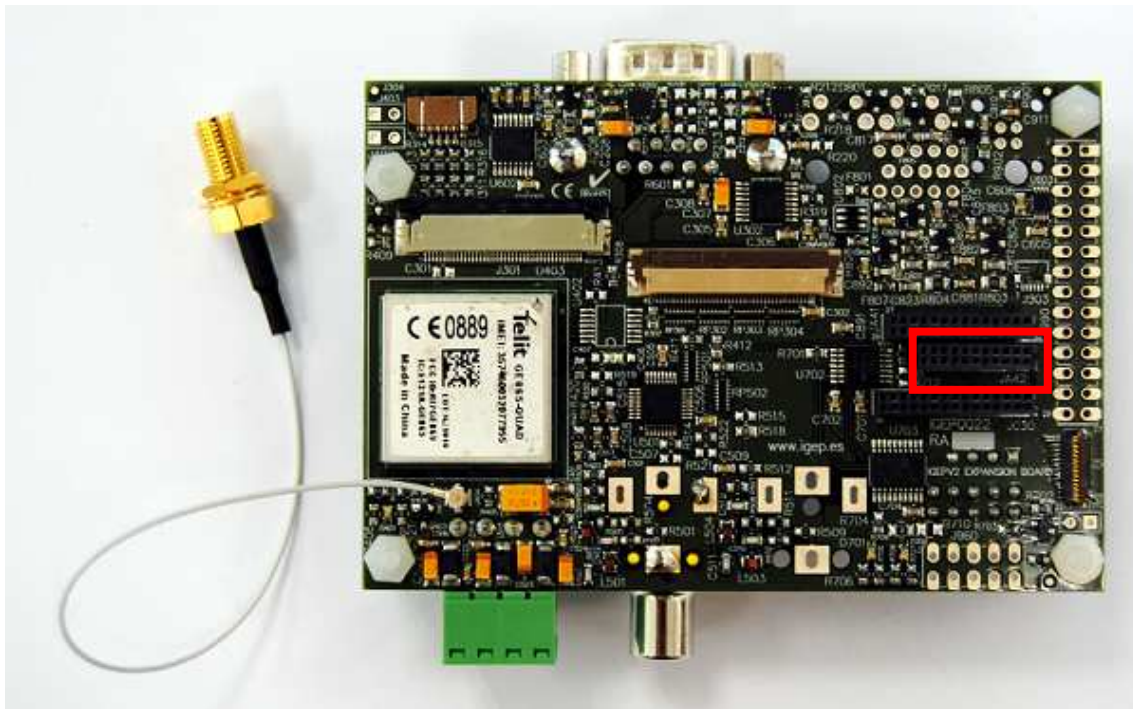


Figure 33 JA42 location

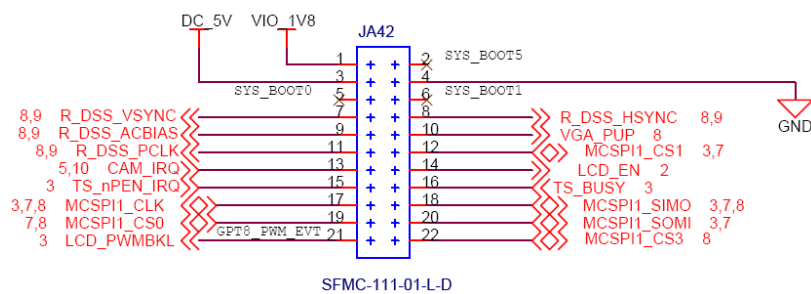


Figure 34 JA42 schematic detail

6.17 JC30 - IGEPV2 EXPANSION CONNECTOR

JC30 is used for IGEPv2 board connection.

The JC30 connector is a 15x2 pins double row 1.27mm pitch.

The connector is located as shows the figure below.

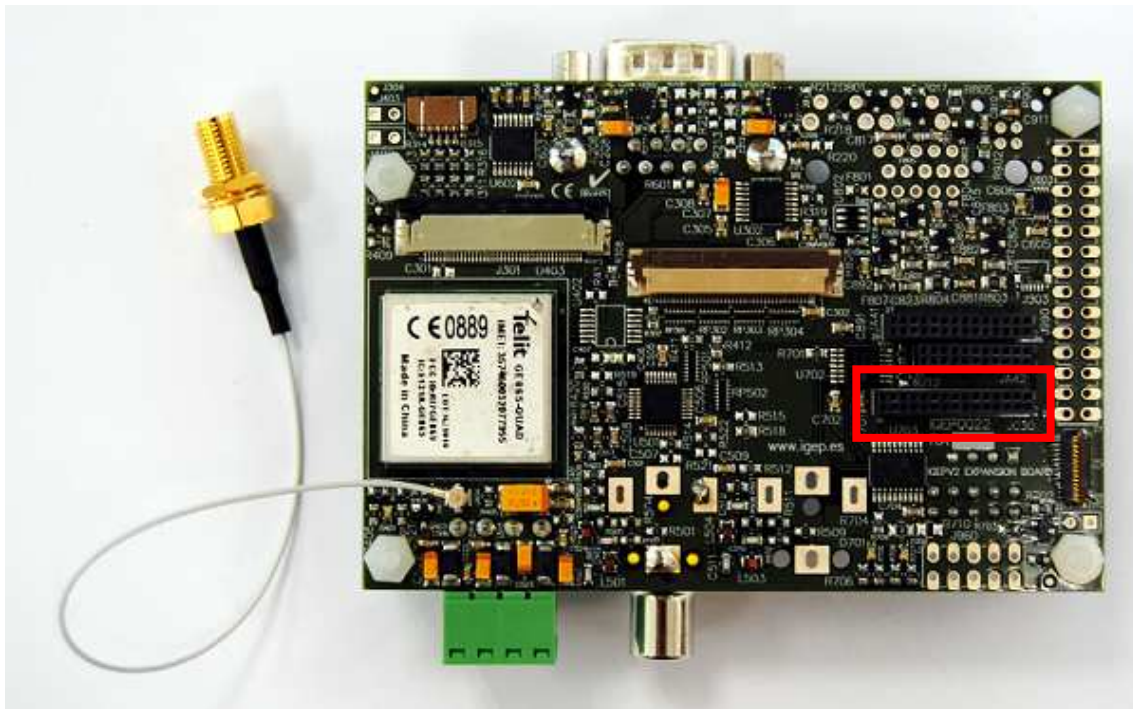


Figure 35 JC30 location

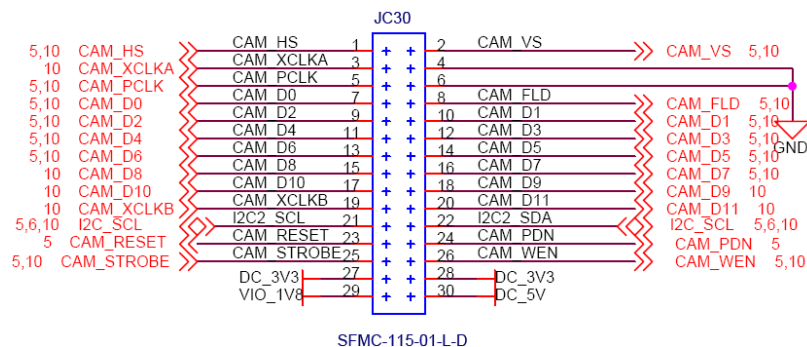


Figure 36 JC30 schematic detail

7 MECHANICAL SPECIFICATION

Board size 93x64mm.

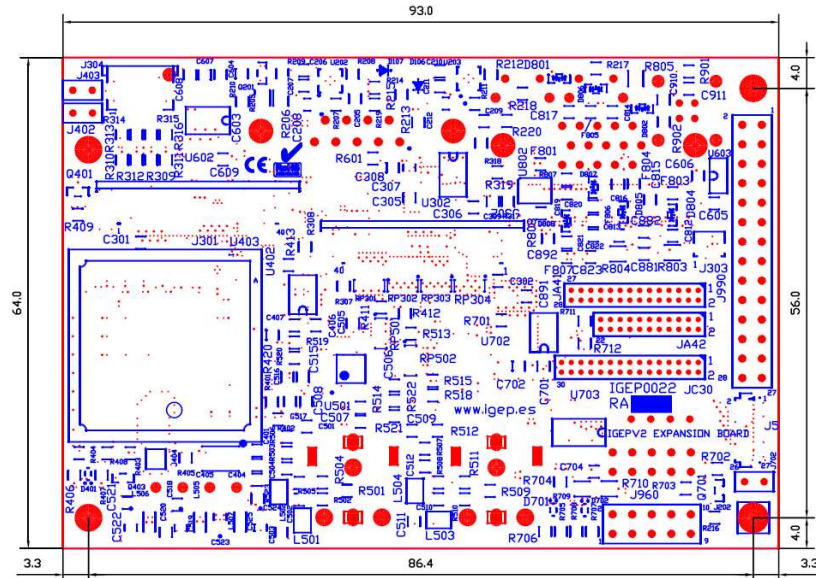


Figure 37 Mechanical drawing Top view

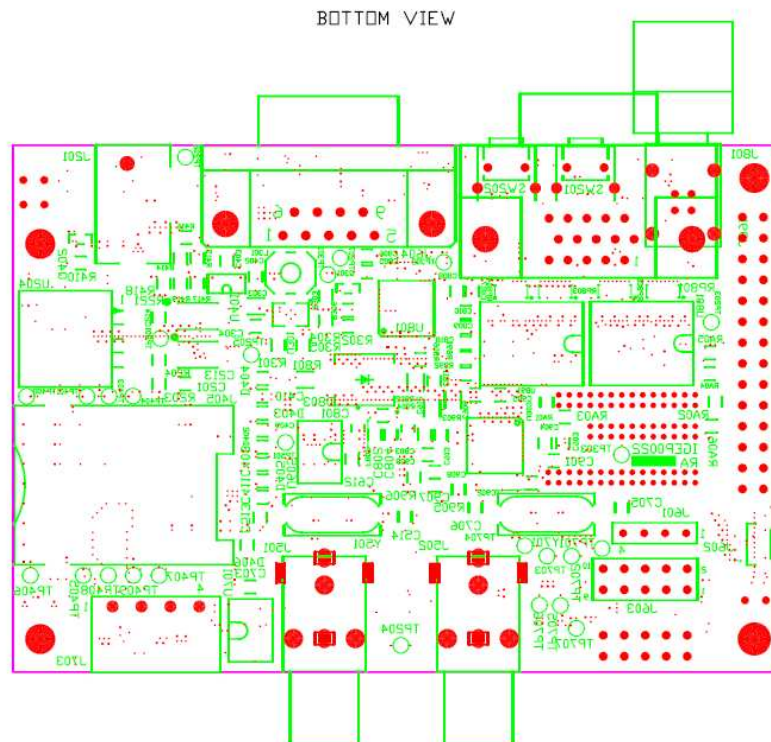


Figure 38 Mechanical drawing bottom view.

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8 BOARD REFERENCE

Product Name: IGEPv2_EXPANSION-Rz-yy

IGEPv2_EXPANSION	Rz	yy
Product Name	Where z is A,B,C,... and details revision family	Where yy is FULL: All features on board.

Example:

IGEPV2_EXPANSION-RA-FULL: All features on board.

9 LIST OF FIGURES

Figure 1 ISEE IGEPV2 EXPANSION	7
Figure 2 IGEPv2 EXPANSION Top view	9
Figure 3 IGEPv2 EXPANSION Bottom view	9
Figure 4 LCD view.....	10
Figure 5 Modem view	11
Figure 6 Telit module view	12
Figure 7 IGEPv2 and IGEPv2 EXPANSION bottom entry assembly	16
Figure 8 IGEPv2 Bottom entry assembly.....	17
Figure 9 IGEPv2 connector detail	17
Figure 10 IGEPv2 connector detail	18
Figure 11 IGEPv2 and IGEPv2 EXPANSION bottom entry assembly	18
Figure 12 J200 detail	20
Figure 13 J201 location	20
Figure 14 J301 location	21
Figure 15 J302, J303 and J304 location	22
Figure 16 J405 location	23
Figure 17 J404 specification	24
Figure 18 J404 location	24
Figure 19 J501 and J502 location.....	25
Figure 20 J601 and J602 location.....	26
Figure 21 J601 and J602 schematic.....	26
Figure 22 J603 location	27
Figure 23 J604 location	28
Figure 24 J703 location	29

Figure 25 J801 location	30
Figure 26 J5 location	31
Figure 27 J990 location	32
Figure 28 J990 schematic detail.....	32
Figure 29 J960 location	33
Figure 30 J960 schematic detail.....	33
Figure 31 JA41 location	34
Figure 32 JA41 schematic detail	34
Figure 33 JA42 location	35
Figure 34 JA42 schematic detail	35
Figure 35 JC30 location	36
Figure 36 JC30 schematic detail	36
Figure 37 Mechanical drawing Top view	37
Figure 38 Mechanical drawing bottom view.	37

10 CHANGELOG

Revision 00

- Initial draft

Revision 01

- Release version