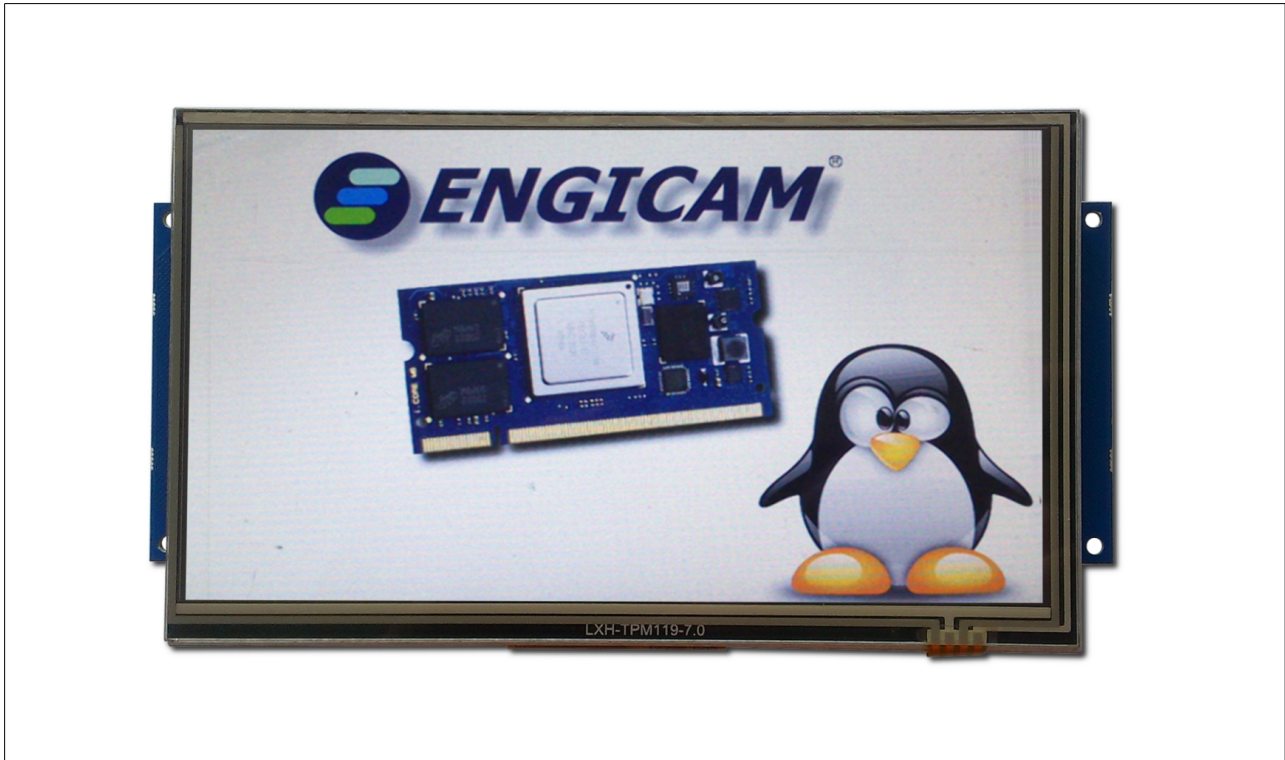


# Openframe LOW COST 7 USR Manual 1.0.4



\*\*\*\*\* REV 1.0.4 \*\*\*\*\*

DATE	REVISION	CHANGE DESCRIPTION
26/05/14	1.0.0	Release
24/03/16	1.0.1	Added Display specifications
20/05/16	1.0.2	General enhancements
18/07/19	1.0.3	General enhancements
03/05/17	1.0.4	Added "Product Compliance" chapter

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# 1. Cable Map Overview

This document is an overview about cable connecting map of Open-Frame system. It describes the connector and the interface unit available to user, and it specifies the electrical characteristic of signals.

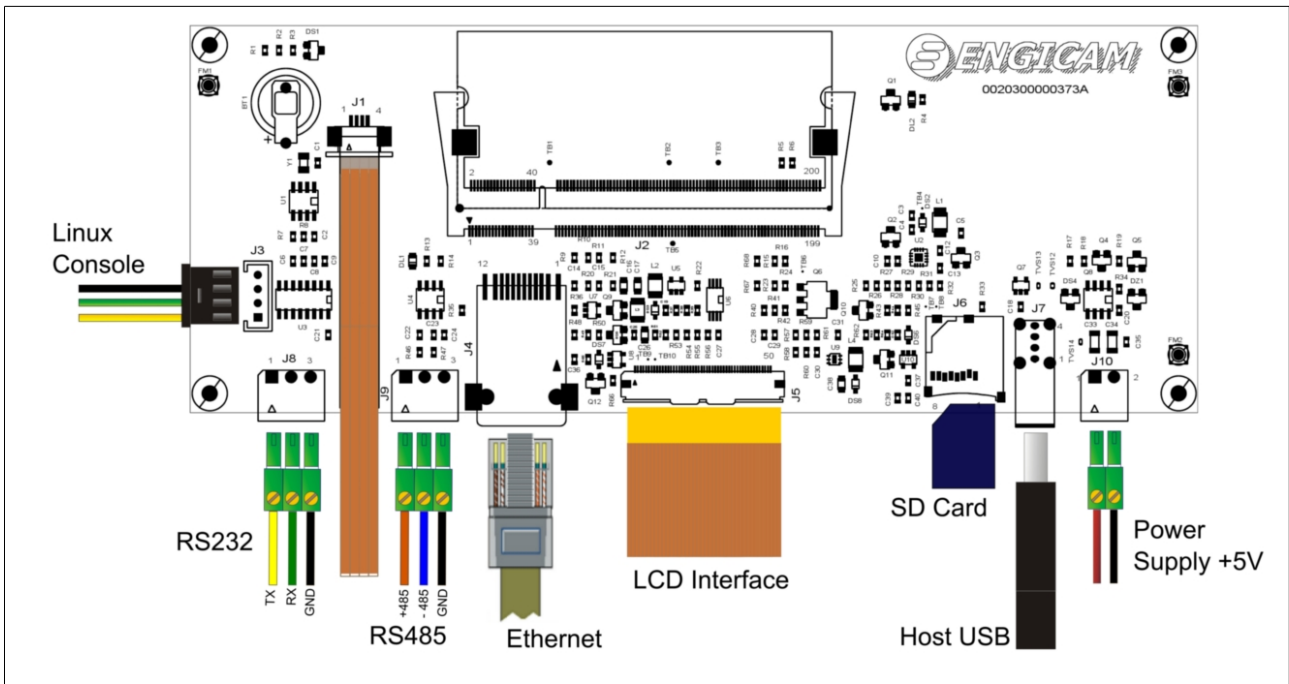


fig1

The figure1 shows the whole wiring map and its join connectors. This document will try to analyse all type of used connections to help the user's start up.

## 2. Micro SD Connections

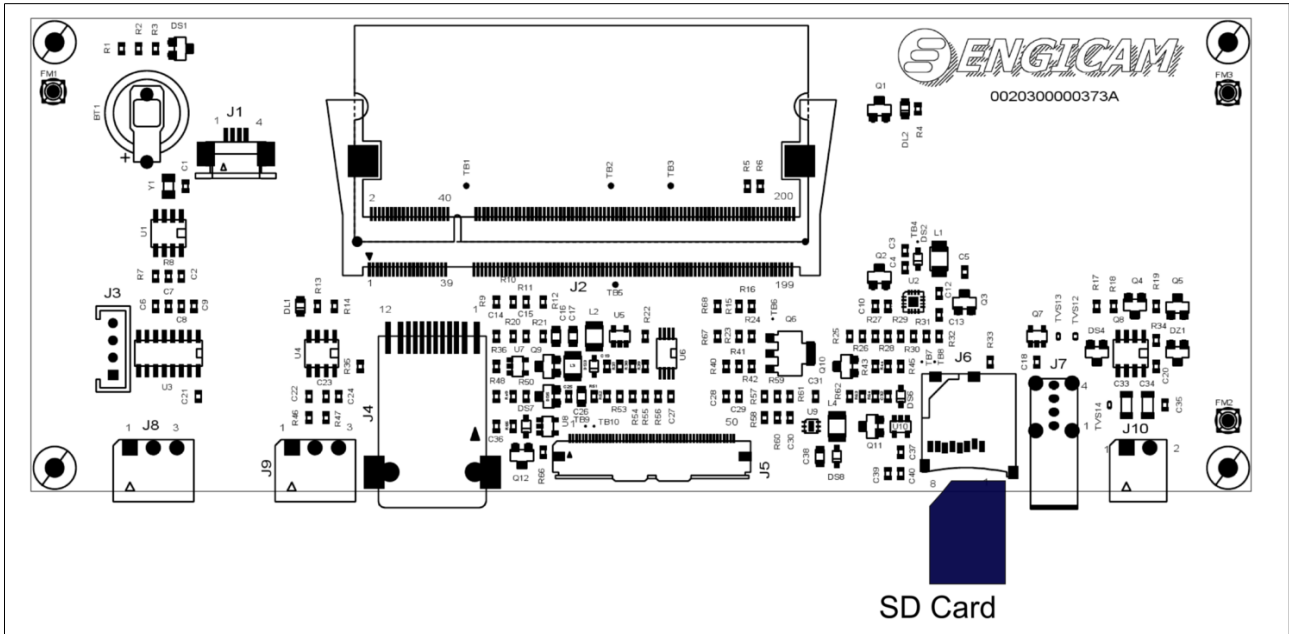


fig2

The Open-Frame board has a Micro SD switch detected connector (J6). It uses both SD standard type card and SD High Capacity type card

Micro SD card features are:

- Capacity: variable from 32 MB to 32 GB
- Length: 15 mm
- Depth: 11 mm
- Height: 1 mm
- Voltage supply 2,7 V 3,6 V
- Slot: TransFlash
- MTBF: 1.000.000 h/e
- Operating temperature min.: -25 °C
- Operating temperature max: 85 °C

### 3. RS 485 & RS 232 Connections

The following figure represents the connections of the RS485 and RS232 signals. Both RS485, and RS232 are connected through a terminal male connector (Phoenix code MC 1.5/3-G-3.5 - 1844223 90° or compliant) mounted on PCB and referenced J8, J9.

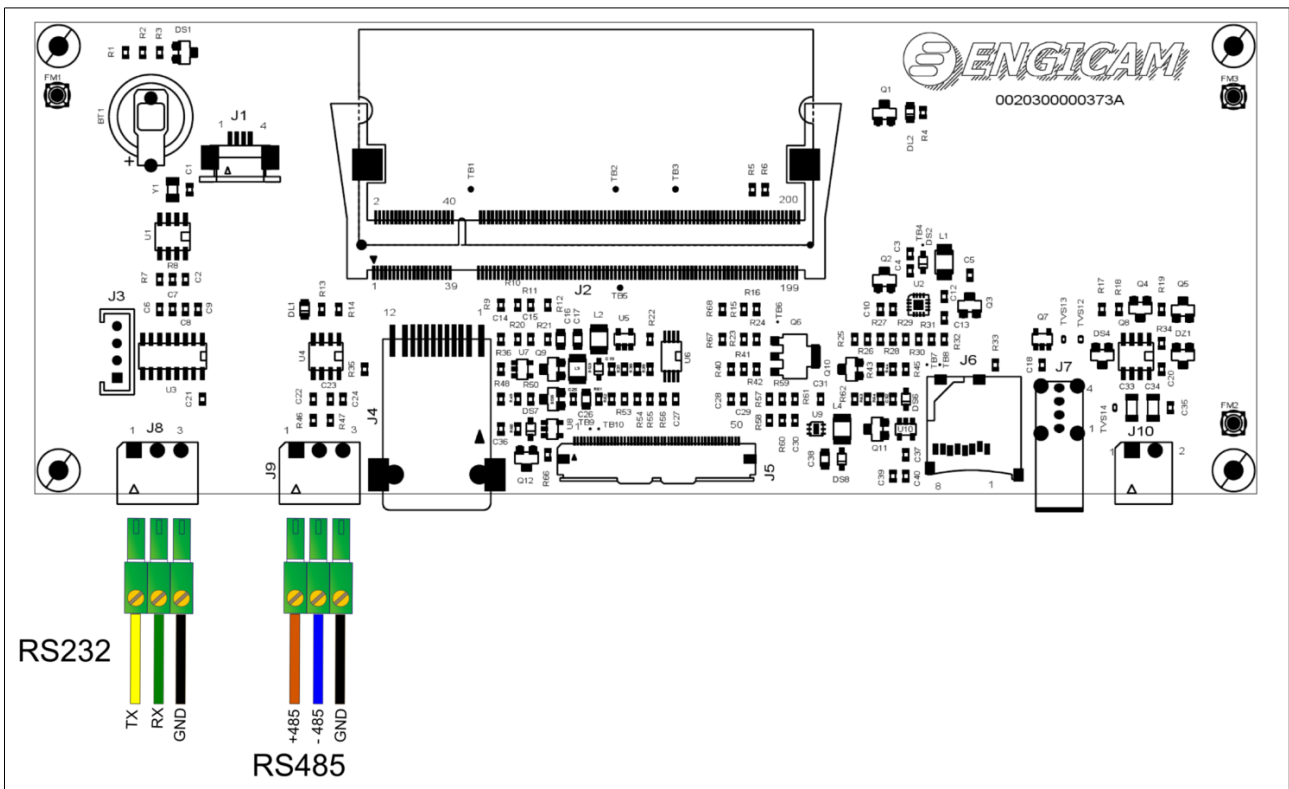


fig3

The wiring map of female connector (Phoenix code MC 1.5/3-ST-3.5-1840379) used for UART RS232 is shown in the following table.

J8

Pin Number	Signal Name	Function Description	Voltage
1	TX	Transmit Signal Output	RS232 Standard
2	RX	Receive Signal Input	RS232 Standard
3	GND	Power Signal	-

Table 1

The wiring map of female connector (Phoenix code MC 1.5/3-ST-3.5-1840379) used for UART RS485 is shown in the following table.

J9

<b>Pin Number</b>	<b>Signal Name</b>	<b>Function Description</b>	<b>Voltage</b>
1	RS485 P	Non Inverting Receiver In/Driver Out	RS485 Standard
2	RS485 N	Inverting Receiver In/Driver Out	RS485 Standard
3	GND	Power Signal	-

Table 2

**Note: Do NOT use the UART on connector J8 as Linux console**

## 4. USB Connections

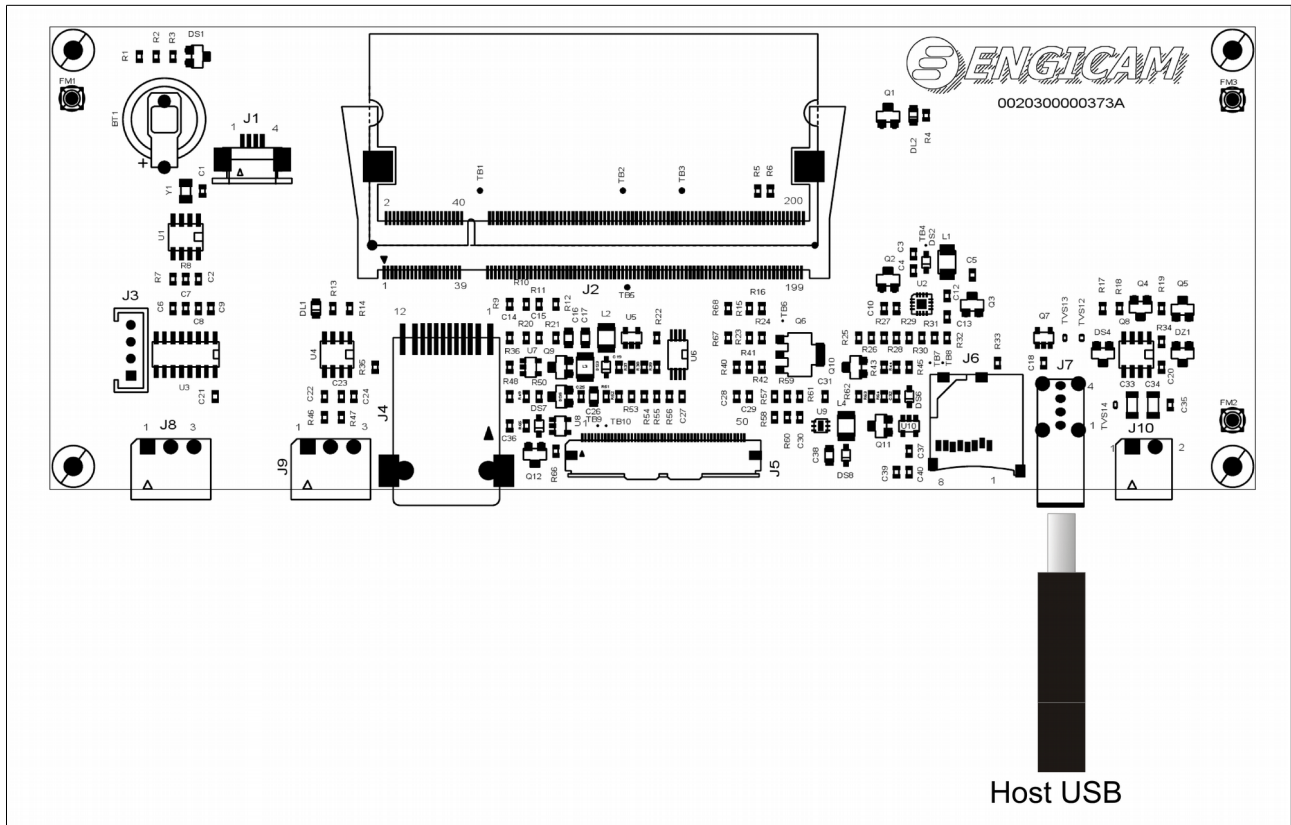


fig4

In the following tables are represented the electrical connection of the USB standard interface connections (USB type A plug)

Pin Number	Signal Name	Function Description	Voltage
1	VBUS	Power Signal	Standard USB
2	DM	Data N	Standard USB
3	DP	Data P	Standard USB
4	GND	Power Signal	Standard USB

Table 3

## 5. Ethernet Connections

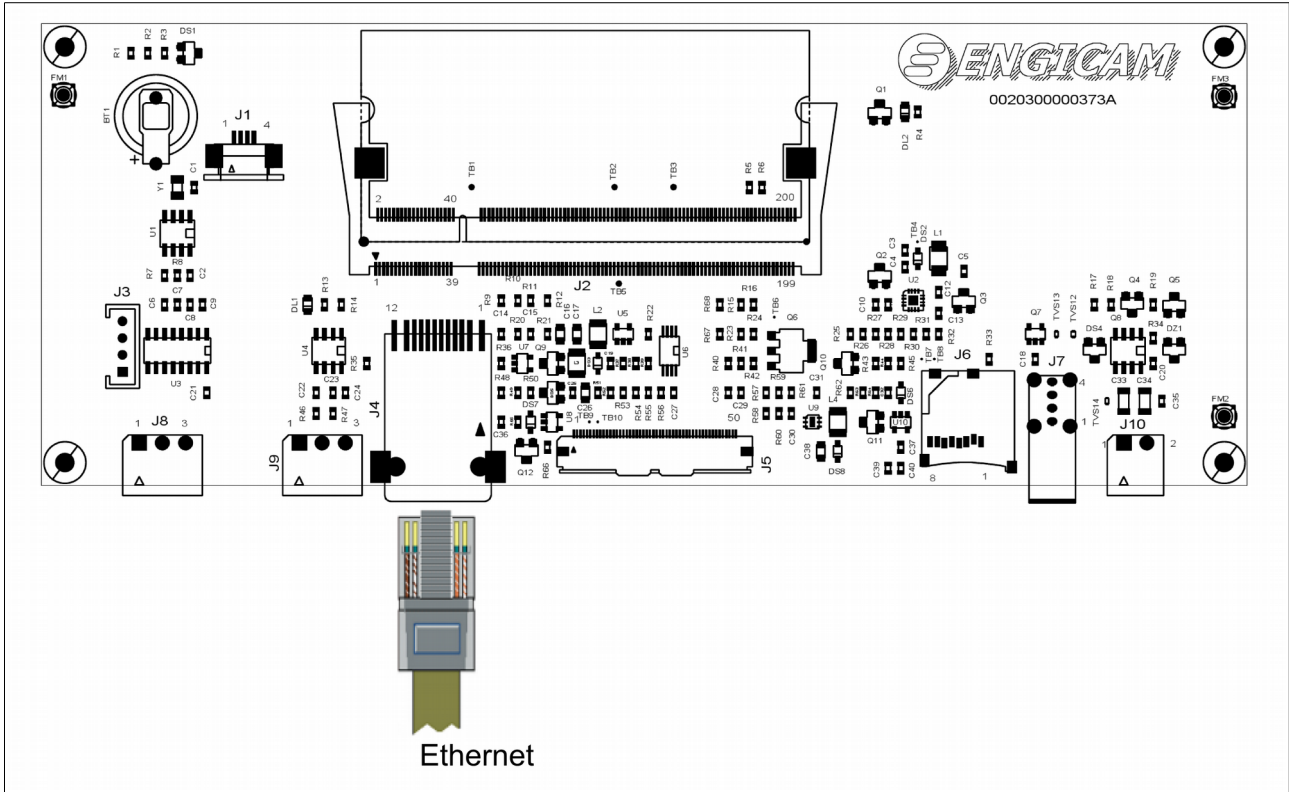


fig5

The figure5 represents the Ethernet 10/100 connection. This connection uses a RJ45 standard plug (8 wires) and the following table shows the wiring map.

Pin Number	Signal Name	Function Description	Voltage
1	TX-	Transmit positive signal	Standard Ethernet
2	TX+	Transmit negative signal	Standard Ethernet
3	RX+	Receive positive signal	Standard Ethernet
4	NC	-	-
5	NC	-	-
6	RX-	Receive negative signal	Standard Ethernet
7	NC	-	-
8	NC	-	-

Table 4



## 6. Power Supply Connections

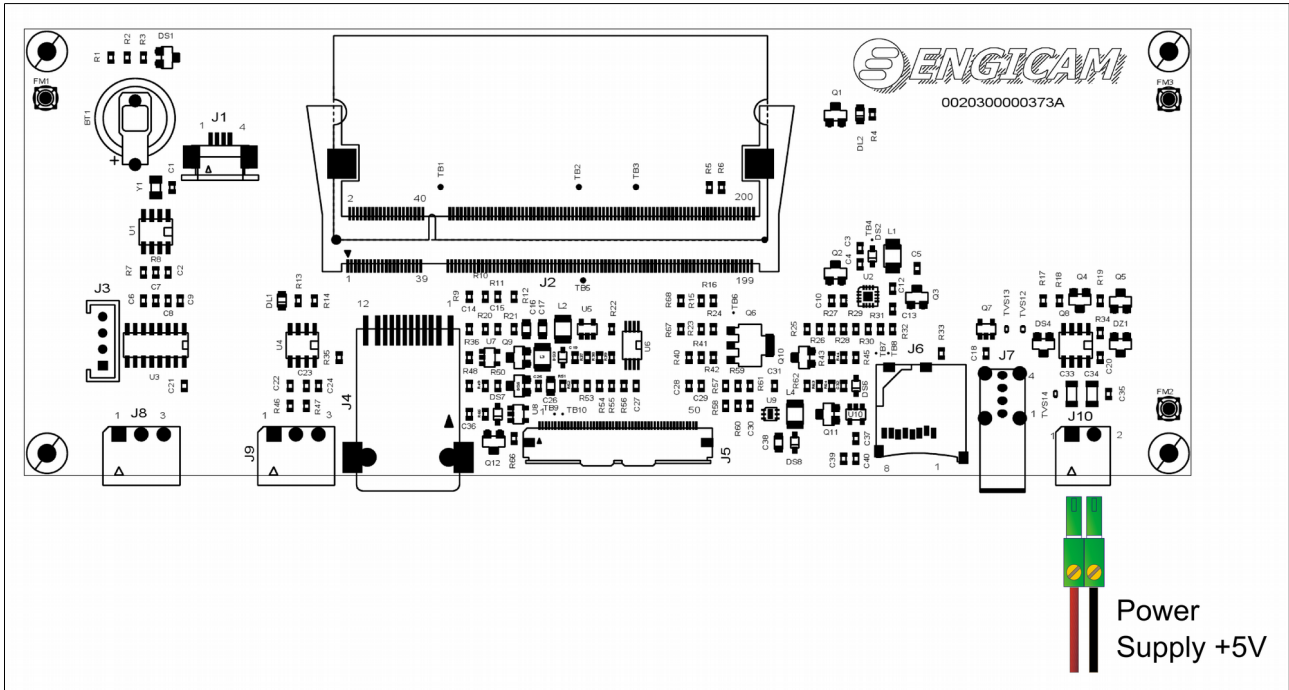


fig6

**WARNING:**  
the Open-Frame LOCO is powered by a voltage of +5V DC

The figure shows the power supply connection. The Open-Frame receives an input DC voltage, of **+5V**. J10 is Phoenix MC 1.5/2-G-3.5 1844210 90° positions p.3.5mm male connector, connected as follows:

Pin Number	Signal Name	Function Description	Voltage
1	+VIN	Power Signal	<b>+5V DC</b>
2	GND	Power Signal	-

Table 5

## 7. Current consumption

The following table shows the system's current consumption measured at **+5V**

<b>Open-Frame 7" LOCO Gea6428 on Board</b>	
<b>Current @ +5V DC</b>	~ 800 mA

Table 6

The measure is done during the standard operating mode, the LCD switched on.

## 8. Linux Console Debug Connections

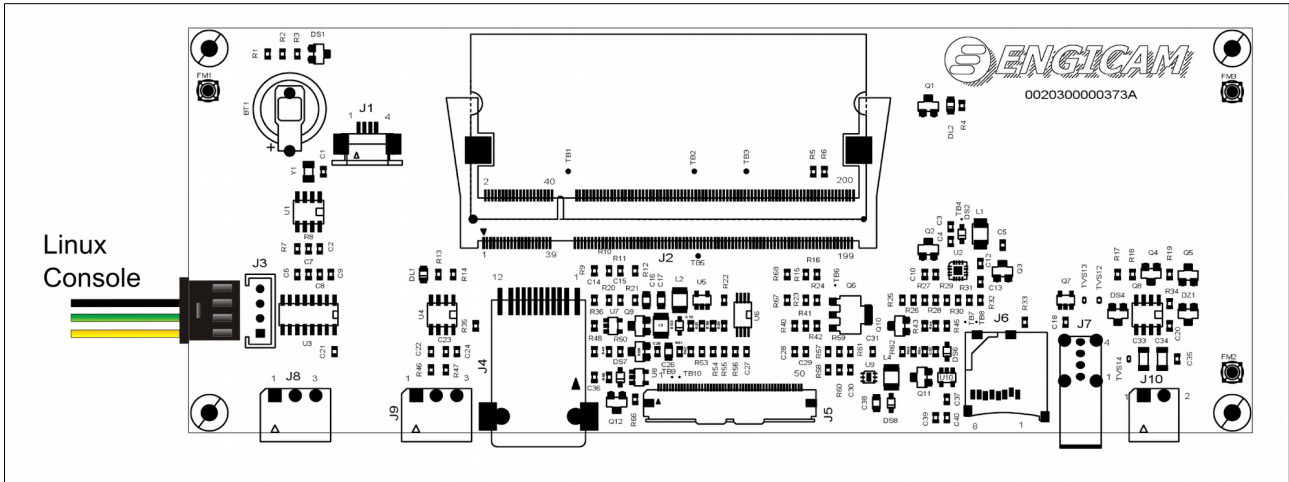


fig7

On the Open-Frame module, UART1 is used like console debug. The connector used is Modu II type; in the following table is shown the electrical features:

Pin Number	Signal Name	Function Description	Voltage
1	TX	Transmit Signal	Standard RS232
2	RX	Receive Signal	Standard RS232
3	GND	Power Signal	-
4	NC	-	-

Table 7

The default communications settings is shown in following table

console default settings	
Baud rate	115200
Data length	8 bit
Parity	none
Stop	1bit

Table 8

## 9. Compiling options of the Modules

When you compile the kernel to use it on the Open-Frame LOCO you have to remember to add the following compiling options

```
system type -->
  Freescale i.MXA implementation -->
    [*] Support GEAM6428 Open-Frame
```

## 10. Configure GEAM6428 to use the RTC

Following the instruction to set RTC driver into the kernel, recompile the kernel and generate the image to use on the module.

- To Insert the driver inside the kernel enter in the directory:

```
/data/GEAM6428/ltib
```

run the command:

```
./ltib -c
```

Select the kernel configuration option:

```
[ ] Configure the kernel
```

then Exit.

Once out of the kernel's **config** will start the from which you can add and remove various components of the kernel.

To include the RTC driver into the kernel:

```
Device Drivers --->
<*> Real Time Clock --->
  <*> Philips PCF8563/Epson RTC8564
```

- Set up the i2c references in the platform file of the kernel:

```
gedit /home/user/Desktop/Linux kernel/arch/arm/mach-mx28/mx28evk.c
```

adding the following code in the file:

```
static struct i2c_board_info __initdata mxs_i2c_device[] = {
    { I2C_BOARD_INFO("sgtl5000-i2c", 0xa), .flags = I2C_M_TEN },
    { I2C_BOARD_INFO("pcf8563-i2c", 0x51), .flags = I2C_M_TEN },
};
```

- Compile the modified kernel and make the kernel image running the script inside the directory:

```
/data/GEAM6428/ltib
```

```
./make_linux
```

- Copy the generated image into the server's tftp directory (/tftp\_boot) as follows:

```
cd /home/user/Desktop/Linux kernel/arch/arm/boot
```

```
cp ulmage /tftp_boot
```

Now you can use the tftp procedure to programming the module

After you have reprogramming the module use the following command to set clock and the RTC:

String format = date MMddHHmmyyyy

e.g.

```
date 060315292013
```

and then use the command

```
hwclock --systohc
```

hwclock is a tool for accessing the Hardware Clock

--systohc: set the Hardware Clock to the current System Time.

***Note: For further details about programming please refer to the GEAM6428 SW manual***

## 11. Bootargs Set up

Following is shown how to set up the bootargs to enable the TFT display used in the Open-Frame LOCO configuration.

Power on the Open-Frame after have connected the serial port and have ran the hyperterminal or similar application. To enter in the shell console pressing any keys on the keyboard before the end of the countdown.

Check which version of u-boot you are using (Version: Engicam U-Boot 1.xx) for earlier versions to 1.03 and with filesystem jffs2 write the following options in the shell using the strings:

```
set bootargs 'console=ttyAM0,115200 root=/dev/mtdblock3 rootfstype=jffs2 gpmi lcd_panel=URT-LVDS  
mtdparts=gpmi-nfc-general-use:8m(kernel),220m(rootfs),-(aux)'
```

For version 1.03 or later is enough to set the following parameter to any type of filesystem used.

```
set lcd_panel 'URT-LVDS'
```

this will then be enough to modified the bootargs:

Use "**print**" command to check the set up of **bootargs**.

*Note: After the set up remember to **save** the configuration.*

**WARNING:**

*After the change of the string of the TFT a calibration of the touch screen may be necessary. To do this type the command in the shell:*

```
ts_calibrate
```

*and then press the centre of the crosses with a pen or finger. After this operation reboot the Open-Frame.*

**Note: For further details about programming please refer to the GEAM6428 SW manual**

## 12. Open-Frame LOCO assembly plan

This chapter provides to guide and to illustrate the method to installing an Open-Frame LOCO in an own system. They'll be specified the methodologies of insertion, of installation and the mechanical dimensions, useful to the user, to determinate the size requirements to design a custom product containing the Open-Frame.

To help to achieve the best results, the size and the dimensions with their tolerances (0,2mm if not specified) will be described, this will allow the integration of the Open-Frame, that will interact with any system through its display and its touch screen.

Therefore the attention will be focus on the possibility of adjust the positioning through the tolerances left on the constraints and the use of appropriate screws.

In this way the user will be able to place the Open-Frame within its system ensuring accuracy and reproducibility of the production process.

### 12.1 Overall Dimensions

In the following pictures are reported the drawing with the size of the Open-Frame LOCO. This can be useful to calculate the encumbrance area to consider during the designing.

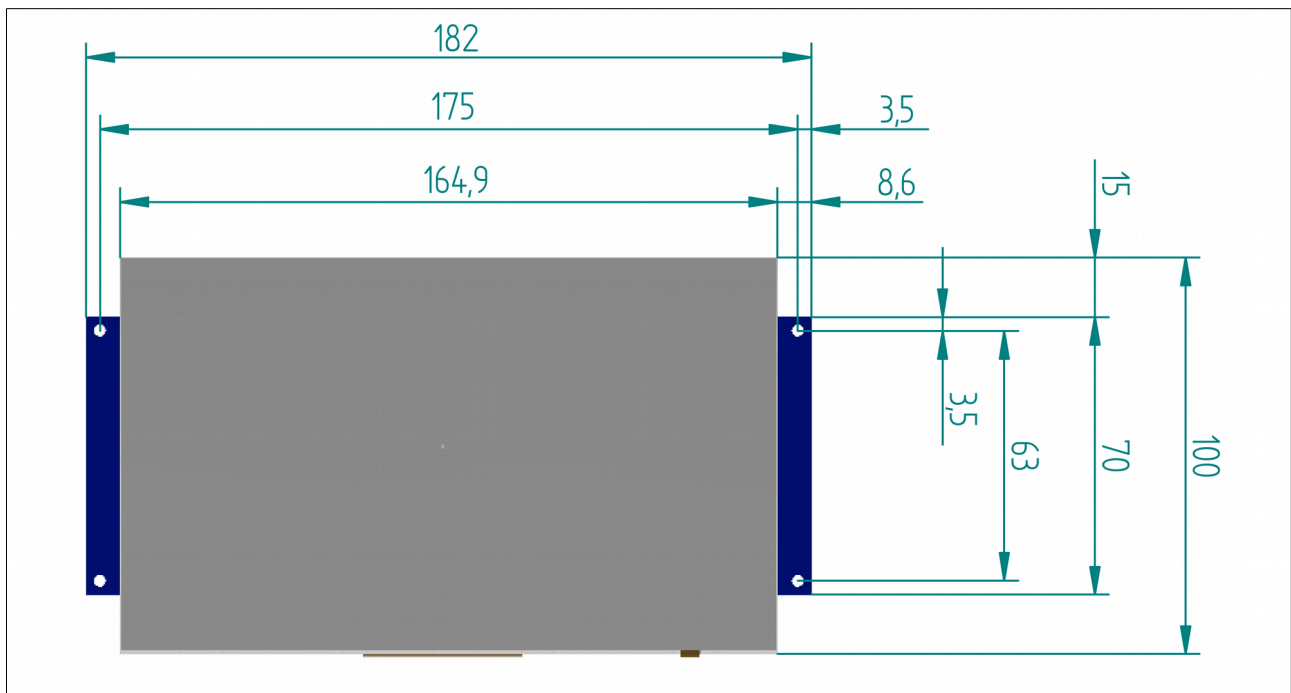


fig8

The figure also underlines the size of the PCB board and of the display. The diameter of the holes is designed for standard screw M3.

In the pictures below are shown the maximum size of the Open-Frame system also in its depth (in which are considered also the dimensions of PCB and the higher components assembled).

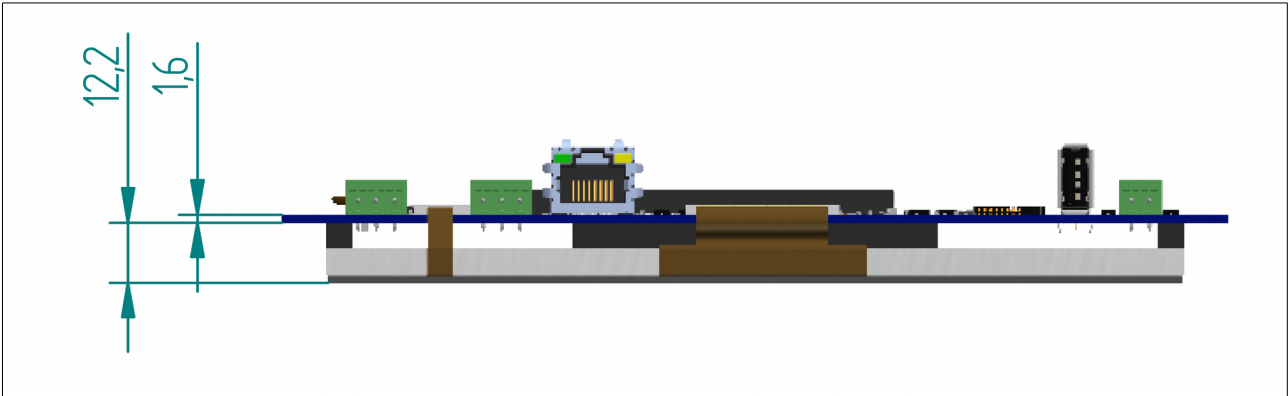


fig9

These can be useful to calculate and consider the volume necessary to place or to integrate the Open-Frame within another system and to design a suitable mounting points.

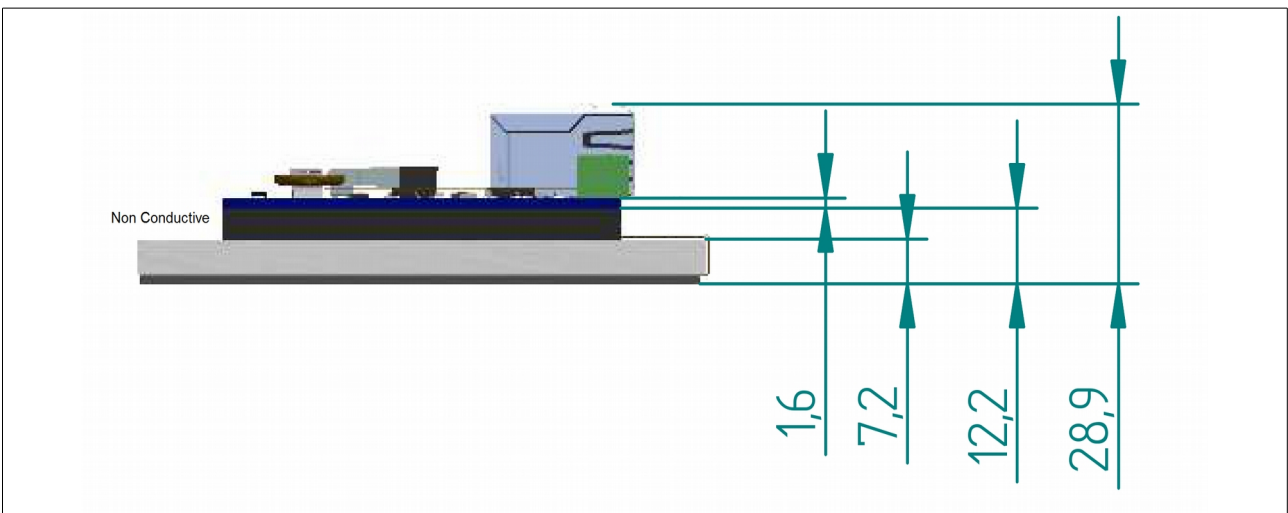


fig10

A bi-adhesive and non-conductive rubber is located between the PCB and the display.



## 12.2 Positioning and Balancing

This chapter tries to show to the user how position the Open-Frame and how to centre the display in a "window". In the following figure it's possible to find the spacing between the fixing hole and their sizes. Based on the following measure it's possible to find the position compared to the four fixing hole.

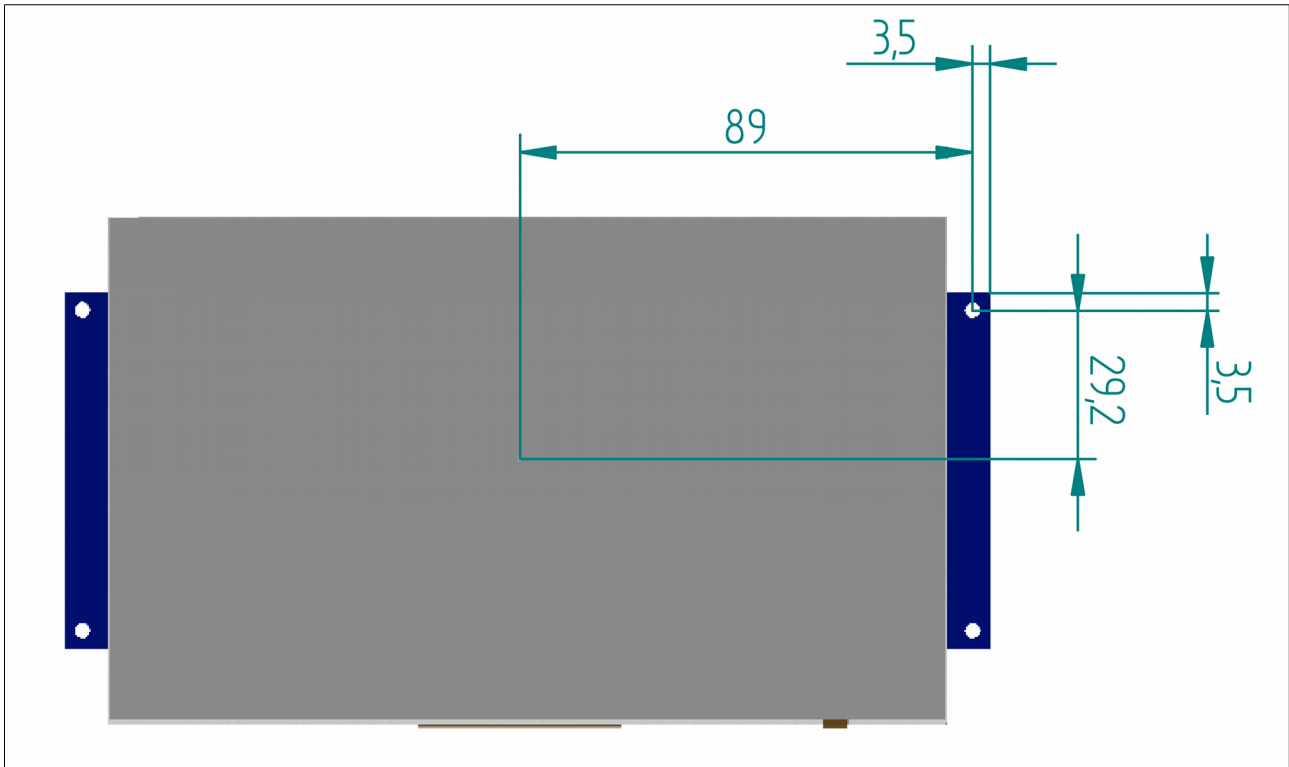


fig11

The type of the screws are M3, to have a more flexible constraint during the centring of the Open-Frame into the system it's possible to use smaller screws; in this way it's possible to have more tolerance on the centring the display visible or active area (also considering drilling tolerances). To achieve the same results using the threaded PEM instead of screws, it's possible to reduce the size of the PEM's diameter (e.g. 2,5 mm).

**Note:** all the unit reported measure are in mm

### 12.3 General specifications for display

In the table are shown the displays' specifications driven by Open-Frame carrier board:

Operating temperature range	-20; +70 °C
Size	7.0 inch
Luminance	320 cd/mq
Colour	262K
Resolution	800 x (RGB) X 480
View Angles	TYP: 50 – 70 Deg
Interface	RGB

Table 9

In the following picture is reported the drawing with the size of the display. This can be useful to determinate the encumbrance viewing area and the multiple active area to consider during the system designing.

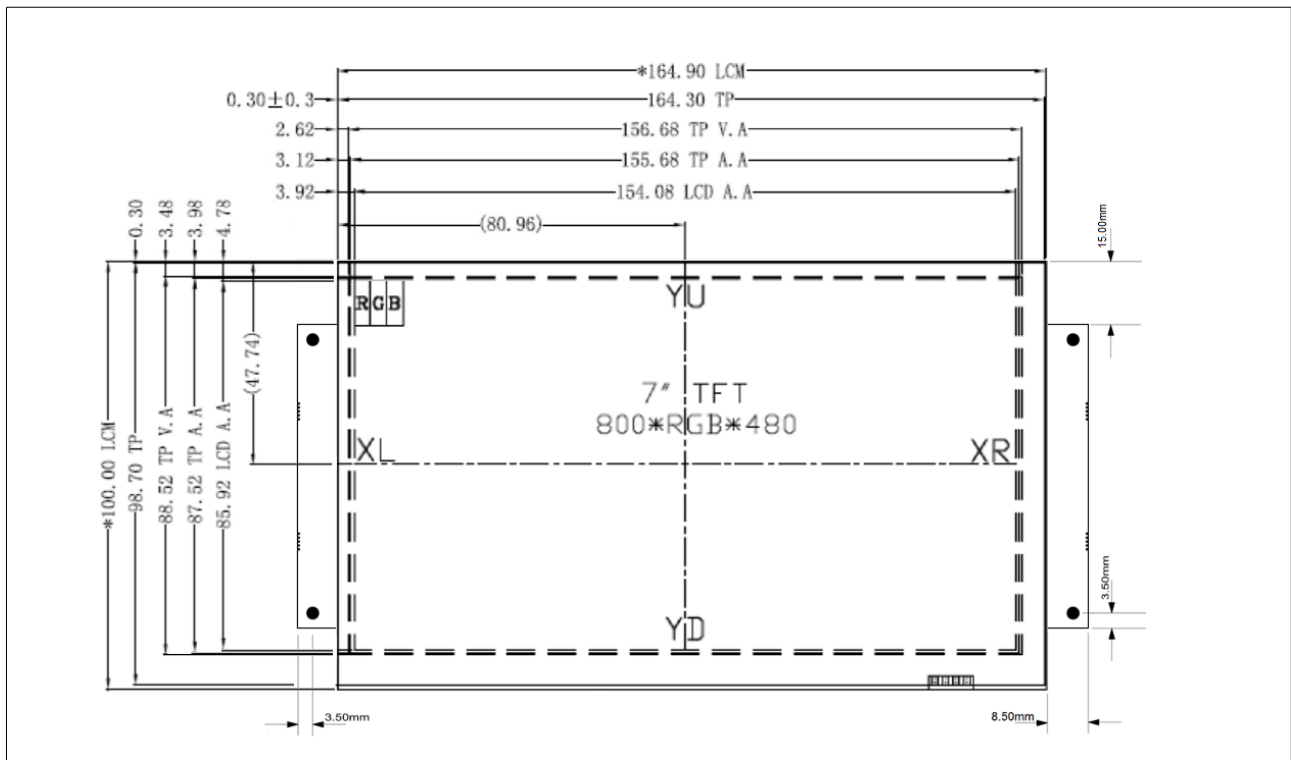


fig12

**Note:** all the unit reported measure are in mm

## 12.4 Centring the active area

Referring to the figure above it's also possible to calculate the positioning of the Open-Frame and it's also possible to hit the centre of the display active area.

In the image are also reported the quotes of the active area relative to the fixing holes and the centre of the display area.

Basing on this measures it's possible to integrate the Open-Frame inside the own system and also design the cover, calculate the tolerances and whatever is needed on the project.

In the following figure is represented the general precautions to take to design the mechanical system.

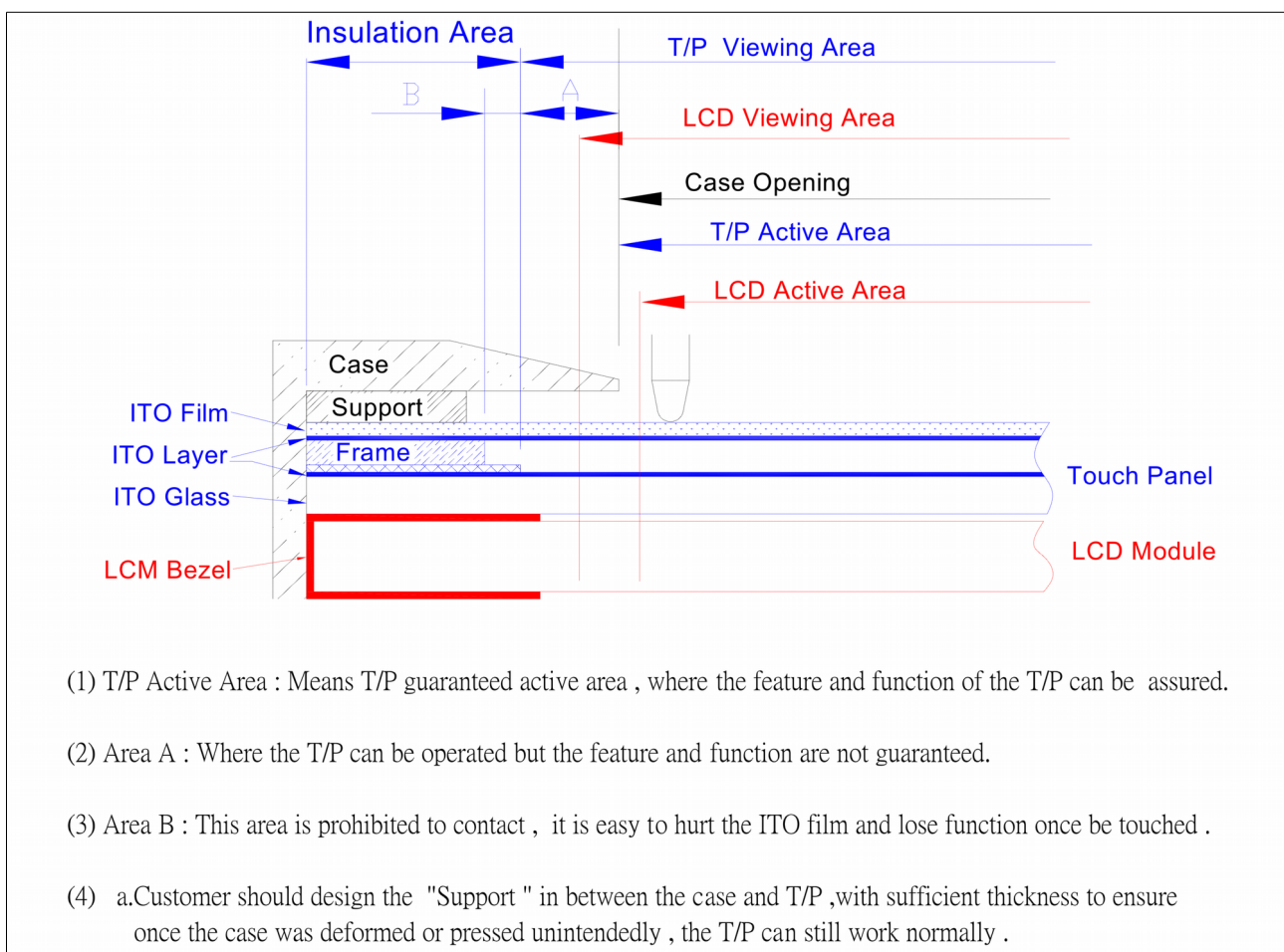


fig13

### WARNING!

During the cover's designing, remember that, the size of the touch active area is bigger than the active area in both horizontal and vertical direction.

## 13. Product Compliance

In order to respect own internal policy regarding the environmental regulations and safety laws, Engicam in this chapter confirms the compliant, when applicable, of its own products to the normatives ROHS and REACH and to the recognized hazards.

### **Warning!**

The current product board mounts a VL-1220/HFN Rechargeable Battery, that has the following elements included into the SVHC list:

- ***1,2-dimethoxyethane, ethylene glycol dimethyl ether (EGDME)***

## 14. Ordering Information

Following the ordering informations and the description for the Basic technical specifications:

Ordering Code	MPQ	Description	Operating temperature range °C
00257000010010	1	Open-Frame Low cost 7" Full	-40 to +85 *
00257000011170	1	Open-Frame Low cost 7" HP	-40 to +85 *

Table 10

\* LCD components excluded

In the table are shown the display specifications:

<b>Operating temperature range</b>	-20; +70 °C
<b>Luminance</b>	320 cd/mq

Table 11

## 15. Technical support

*For help, write an email to:*

[support@engicam.com](mailto:support@engicam.com)

## 16. Useful links

<http://www.imxdev.org/>

<http://www.imxcommunity.org/>

<http://www.nxp.com/>

<http://www.engicam.com/>

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