EMB-2610

Technical Specification Manual

Version: R1.00

Revisions

Version	Description of Version	Date Completed
R1.00	Release	11/15/2017

Preface

This Technical Specification Manual (TSM) specifies the board layout, components, connectors, and the I/O connection ports, motherboards features.

Intended Audience

The TSM is intended to provide detailed, technical information about the EMB-2610 and its components to the vendors, system integrators, and other engineers and technicians who need this level of information. It is specifically not intended for general audiences.

What This Document Contains

Chapter	Description
1	Introduction
2	Product Description
3	Technical Reference
4	Operating System

1. Introduction

1.1 Product introduction

The EMB-2610 is a Pico-ITX (100x 72mm) industrial motherboard based on Intel Atom x5-Z8350 Processor. The board features a Power over Ethernet (PoE) ready Gigabit Ethernet port, on-board WiFi/BT, multiple LCD panel display interfaces support, and full set of I/Os including RS-232/485, digital IO and more.

1.2 Form Factor

The EMB-2610 is based on Pico-ITX .It is a small Single Board Computer Form factor with 100 x 72 mm (3.9” x 2,8”).

2. Product Description

2.1 Specification

Table 1 summarizes the major features of the board.

Table 1. Specification

Platform	Cherry Trail
Form Factor	Pico-ITX
Processor	Intel Quad-core Atom x5-Z8350 Processor @1.92GHz
System Memory	Onboard 2GB or 4G DDR3L
Ethernet	RTL8111F onboard Gigabit Ethernet with POE power option
Wireless	RTL8188EUS WiFi or RTL8723AS 1 x 802.11 b/g/n + Bluetooth V4.0
Audio	2 (R/L) x Speak out ,up to 6W/Channel stereo ,Class D AMP, 2 (R/L) x Line out or Headphone out header, 1 x Mic in header
Storage	32 or 64G GB eMMC Flash
Graphic Controller	Intel HD Graphics 400, 12 EUs @ 200 - 500 MHz
Display Interface	1x micro HDMI
LCD Interface	1 x 2 channel 24bit LVDS or eDP + I2C 40-pin FPC header, 1 x MIPI DSI + I2C 40-pin FPC header, shared with 1 x MIPI CSI
Display Resolution	HDMI/eDP/LVDS - 1920 x 1080, MIPI DSI - 1920 x 1200
SD Card Socket	1 x micro SD Socket (not support hot plug)
USB	1 x 4-pin 2.0 mm pitch USB 2.0 pin header, 1 x USB 2.0 Type A, 1 x USB 3.0 Type A, 1 x USB 2.0 OTG
Boot Switch	1 x DIP switch for power on with or without power button
Power Switch	1 x on-board power switch
I/O Terminal Block	5-pin header with two combination of RS-232, RS-485, and 2 x GPIO
RTC	1 x CMOS battery input, 2-pin wafe heder,1.25mm
Power Input	1 x 12V or 19 DC power 2-pin 2.54 header
Expansion	2x 20-pin 2.0mm expansion header offers: x1 PCIe PHY, 1 x RS-232 (Rx, Tx) , 1x UART, 6x GPIO. 1x 40-pin FPC shared with MIPI CSI, I2C and GPIOs
Operating Temperature	-10 ~ 50° C (14 ~ 122° F)
Storage Temperature	-40 ~ 85° C (-40 ~ 185° F)
Operating Humidity	5% ~ 95%, 40ºC, non-condensing
Dimensions	100 x 72 mm (3.94" x 2.84")

2.2 Board Layout

Figure 1 shows the location of the major components on the top and bottom-side of the EMB-2610.

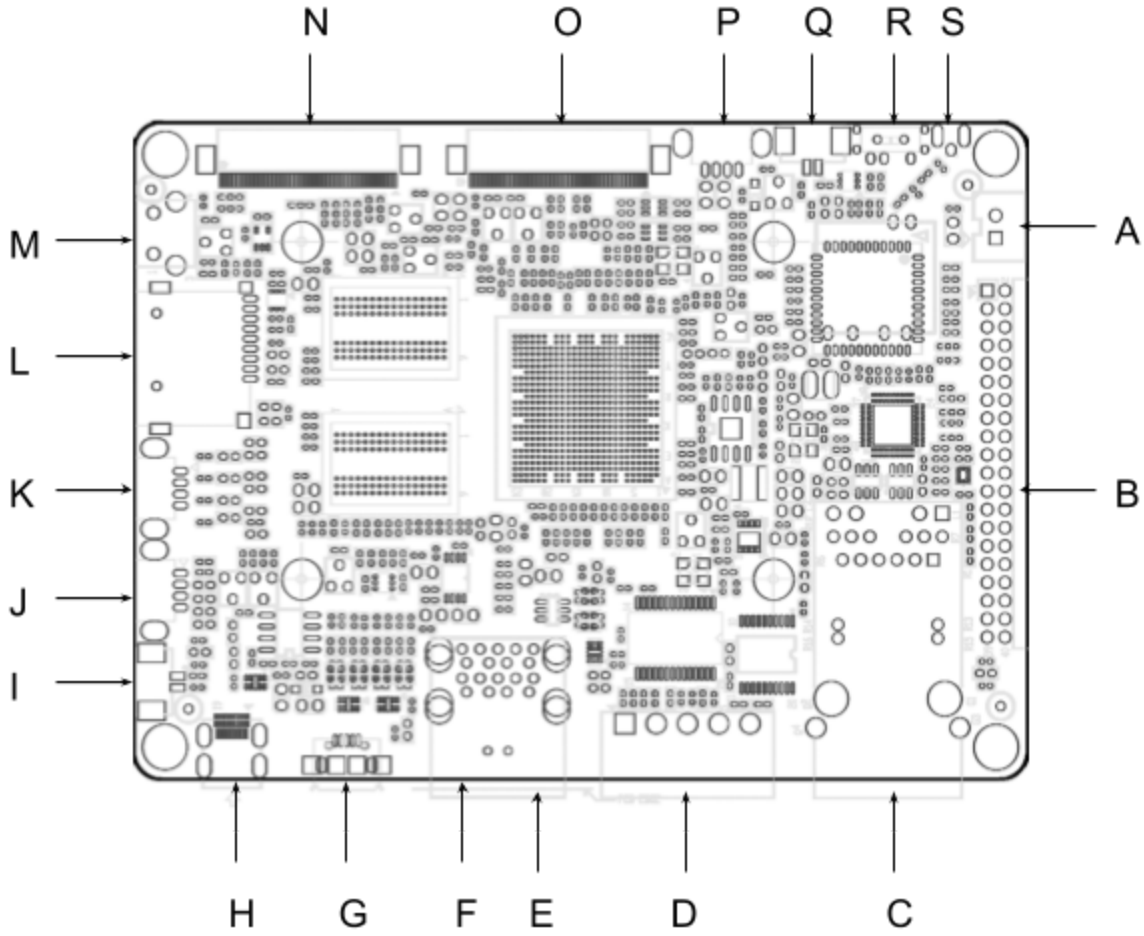


Table 2 lists the components identified in Figure 1

Table 2. Components Show in Figure 1

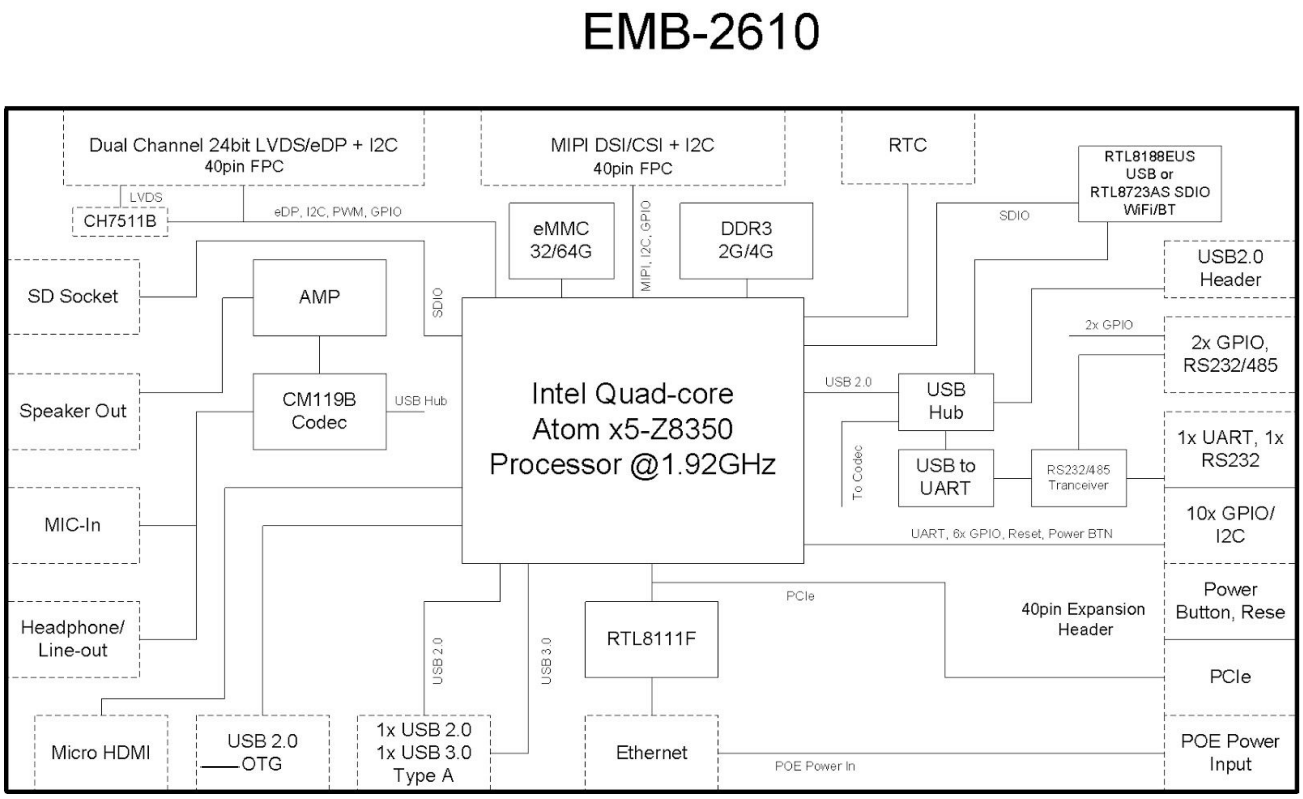
Item from Figure 1	Connector	Description
A	12V_IN	12V DC Input
B	H1	12V DC in,3.3V out, PCIe signals, GPIOs, UART, RS-232, power button, reset, POE power signals
C	RJ1	RJ45 connector for 1000M Ethernet with POE
D	COM1	RS232 or RS485 plus GPIOs
E	USB_A1	USB Type A for 1x USB 2.0 + 1x USB 3.0
F	JCOMS1	Clear CMOS button
G	USB2	Micro USB for 1 x OTG USB 2.0
H	HDMI1	Micro HDMI connector for HDMI port
I	MIC1	Mic in
J	LINE_OUT1	L/R Line out or L/R Headphone out with mic in
K	SPK1	L/R Speaker out
L	READER1	micro SD socket
M	PWRBTN1	System Power On/Off

N	LVDS1	FPC connector for LVDS signals or eDP, I2C GPIOs VCC
O	MDS	FPC connector for MIPI DSI or CSI signals, I2C I2S GPIOs VCC
P	USB	USB 2.0 header
Q	BAT_CON1	CMOS battery header
R	AUTO_PWON1	Power on with or without power button selection
S	ANT1	Wireless module antenna U.FL connector
LED	PWLED1	Power LED light

2.3 Block Diagram

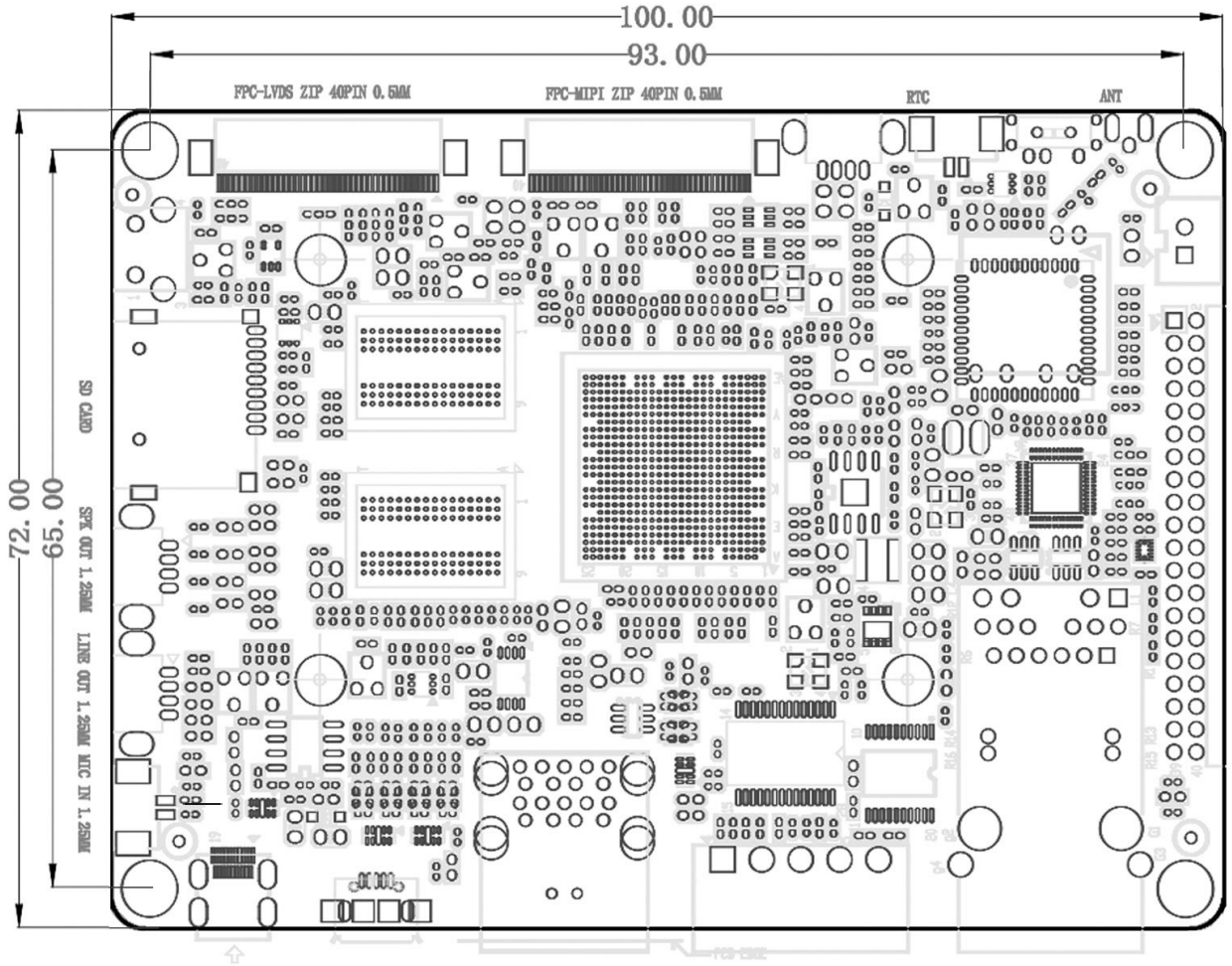
Figure 4 is a block diagram of the major functional areas of the board.

Figure 4. Block Diagram



2.4 Dimensions

Figure 5 is board layout dimensions (unit: mm).



3. Technical Reference

3.1 Connectors and Headers

Table 4. 12V_IN Header (Figure. 1. A)

Pin	Signal Name
1	+12V DC power input
2	GND

Table 5. J4 40-pin Expansion Header (Figure. 1. B)

Pin	Signal Name	Pin	Signal Name
1	GND	21	ISH_GPIO00 (3.3V)
2	+12V IN	22	ISH_GPIO02 (3.3V)
3	PCIeCLK_N_0	23	ISH_GPIO01 (3.3V)
4	+12V IN	24	GPIO_N02 (3.3V)
5	PCIeCLK_P_0	25	NC
6	+12V_IN	26	GPIO_N08 (3.3V)
7	GND	27	NC
8	+3.3V OUT	28	ISH_GPIO03 (3.3V)
9	PCIeTX_N_1	29	NC
10	PWR_BTN	30	PCIERST2_IO/Power LED
11	PCIeTX_P_1	31	GND
12	Reset_BTN	32	GND
13	GND	33	VC1+ (POE Power In)
14	GND	34	VC2+ (POE Power In)
15	PCIeRX_N_1	35	VC1- (POE Power In)
16	Debug_TXD (UART1_GPS_TXD)	36	VC2- (POE Power In)
17	PCIeRX_P_1	37	GND
18	Debug_RXD (UART1_GPS_RXD)	38	GND
19	GND	39	RS232_TXD
20	GND	40	RS232_RXD

Table 6. COM1 I/O Port (Figure. 1. D)

Zero ohm resistor populated option	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
1: R242, R248, R662, R663 (default)	RS232_RX	RS232_TX	GND	GPIO_1	GPIO_2
2: R243, R246, R662, R663	RS485-	RS485+	GND	GPIO_1	GPIO_2

Table 7. USB2 OTG Port (Figure. 1. G)

Pin	Signal Name
1	USB_OTG_VBUS
2	USB_DN0
3	USB_DP0
4	USB_OTG_ID

5	GND

Table 8. HDMI1 Micro HDMI Port (Figure. 1. H)

Pin	Signal Name
1	HPD_OUT
2	Utility
3	HDMI_D2P
4	GND
5	HDMI_D2N
6	HDMI_D1P
7	GND
8	HDMI_D1N
9	HDMI_D0P
10	GND
11	HDMI_D0N
12	HDMI_CLKP
13	GND
14	HDMI_CLKN
15	HDMI_CEC_OUT
16	GND
17	HDMI_DDC_CLK_OUT
18	HDMI_DDC_DAT_OUT
19	HDMI_5V_OUT

Table 9. MIC1 MIC In Header (Figure. 1. I)

Pin	Signal Name	Pin	Signal Name
1	MIC_IN	2	GND

Table 10. LINE_OUT1 Line Out or Headphone Out (Figure. 1. J)

Pin	Signal Name (Default)	Signal Name (Option)
1	Line-out (L)	Headphone_out (L)
2	Line-out (R)	Headphone_out (R)
3	GND	GND
4	AMP_EN_N	AMP_EN_N

Table 11. SPK1 Speaker out (Figure. 1. K)

Pin	Signal Name
1	Speaker_out R-
2	Speaker_out R+
3	Speaker_out L-
4	Speaker_out L+

Table 12. LVDS1 LVDS/eDP and I2C TP Header (Figure. 1. N)

Pin	Signal Name	Pin	Signal Name

1	+5V_LCD	21	LVDS1_TX0_N
2	5V_LCD	22	GND
3	PWM_OUT0 / PWM_OUT1 / EDP_BKLCTRL (3.3V)	23	LVDS1_TX1_P
4	GND	24	LVDS1_TX1_N
5	LVDS0_TX0_P / L_EDP_TX0_DP	25	GND
6	LVDS0_TX0_N / L_EDP_TX0_DN	26	LVDS1_TX2_P
7	GND	27	LVDS1_TX2_N
8	LVDS0_TX1_P / L_EDP_TX1_DP	28	GND
9	LVDS0_TX1_N / L_EDP_TX1_DN	29	LVDS1_CLK_P
10	GND	30	LVDS1_CLK_N
11	LVDS0_TX2_P	31	GND
12	LVDS0_TX2_N	32	LVDS1_TX3_P
13	GND	33	LVDS1_TX3_N
14	LVDS0_CLK_P / L_EDP_AUX_DP	34	GND
15	LVDS0_CLK_N / L_EDP_AUX_DN	35	I2C5_SCL (3.3V)
16	GND	36	I2C5_SDA (3.3V)
17	LVDS0_TX3_P	37	INVT_BKL_ON / EDP_BKLT_EN (3.3V)
18	LVDS0_TX3_N / DDI0_HPD	38	LVDS_VDD_EN / NC (3.3V)
19	GND	39	LCD_PWR_ON / BKL_UP / DN / NC (3.3V)
20	LVDS1_TX0_P	40	GND

Table 13. MDS MIPI CSI DSI Header (Figure. 1. O)

Pin	Signal Name	Pin	Signal Name
1	+5V_LCD	21	I2C0_SCL
2	5V_LCD	22	I2C0_SDA
3	PMC_PLT_CLK4 (19.2MHz)	23	CAM_RST_N
4	MUX_CAM_PWRDWN (GPIO_CAMERASB08)	24	EDP_BKLT_EN
5	GND	25	MIPI_BKLT_PWM / EDP_BKLCTRL
6	CSI_CLK_P	26	GND
7	CSI_CLK_N	27	MDSI_A_CLK_DP
8	GND	28	MDSI_A_CLK_DN
9	CSI_DP0	29	GND
10	CSI_DM0	30	MDSI_A_DATA0_DP
11	GND	31	MDSI_A_DATA0_DN
12	CSI_DP1	32	GND
13	CSI_DM1	33	MDSI_A_DATA1_DP
14	GND	34	MDSI_A_DATA1_DN
15	CSI_DP2	35	GND
16	CSI_DM2	36	MDSI_A_DATA2_DP
17	GND	37	MDSI_A_DATA2_DN
18	CSI_DP3	38	MDSI_A_DATA3_DP
19	CSI_DM3	39	MDSI_A_DATA3_DN
20	GND	40	3.3V_VDDIO

Table 14. USB Header (Figure. 1. P)

Pin	Signal Name

1	+5V
2	HUB_USB1N
3	HUB_USB1P
4	GND

Table 15. BAT_CON1 CMOS Battery Header (Figure. 1. Q)

Pin	Signal Name	Pin	Signal Name
1	CMOS Battery +	2	CMOS Battery -

3.2 Signal and Power Considerations

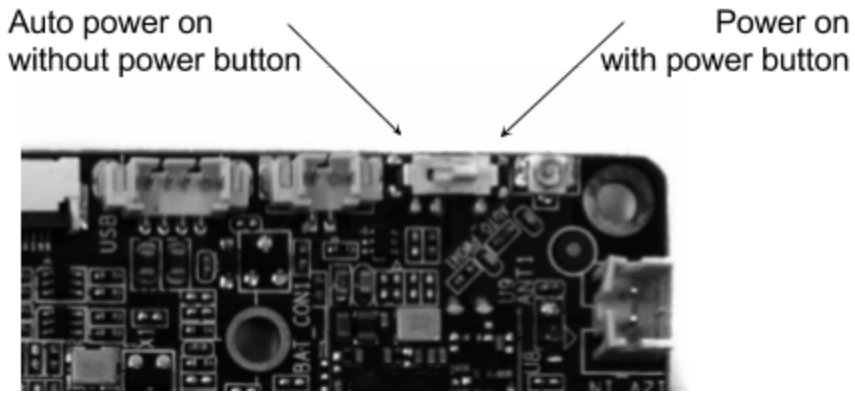
1. When providing power from the extension board via the expansion 40pin headers, not required connect the 12V DC power input header(12V_IN) on the mainboard at the same time.
2. The USB_5V output current from the USB headers has a limit of 1A
3. When providing power from the expansion board via the expansion 40-pin headers, make sure to provide enough current (2A or more) to the mainboard
4. Speaker amplifier output: 12W/CH Into 4ohm 6W /CH Into 8ohm .

3.3 Boot Options

The board can be selected to boot up from with or without pressing the power button. See Table 16.

Table 16. AUTO_PWON1 Auto Power On Switch (Figure. 1. R)

1-2	Auto power on without power button)	2-3	Power on with power button (default)



4. Operating System

4.1 OS Support

a. Windows 10
b. Windows 10 IOT
c. Ubuntu 14.04 or newer
d. Android 5.1(ODM)

Note: When install Linux/Android, need to set the BIOS OS IMAGE ID to Android:

4. 2 Default LCD and Touch Panel Support

a. Support 7", 10.1" LCD panel models: INNOLUX P070BAG-CM1 (1024 x 600 LVDS), INNOLUX EJ101IA-01G (1280 x 800 LVDS), AUO B101UAN01.7 (1920 x 1200 MIPI)
b. Support 7” and 10” I2C capacitive touch panel