M-X6ULL-B

Linux-Ready Cortex-A7
System on Module

Hardware Guide

Version: 1.01

2021 Sep.

Artila

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Document Amendment History

Revision	Date	Remark
V 1.0	2021 Jan	Initial
V1.01	2021 Sep.	CN18 definition

Table of Contents

1. Introduction

M-X6ULL-B is highly integrated, compact, low power consumption, the Linux-Ready arm Cortex-A7 System-on-Module.
It provides an ideal building block that easily integrates with a wide range of target markets, such as industrial control, automation gateway and other applications.

Linux Kernel 5.4.x with Boot Loader & File system is pre-installed in the flash disk of M-X6ULL-B and many powerful utility programs are also included. M-X6ULL-B is ready to drop in your design to save your time in software porting and hardware debug.

1.1 Features

- NXP i.MX6ULL, a single arm Cortex-A7 core, 800MHz Industrial grade Processor,
- 512MB DDR3/LvDDR3 SDRAM
- 16GB eMMC Flash
- Linux Kernel 5.4.x with Boot Loader & File system
- 24bits RGB display interface, 4-wired resistive touch interface
- 1 x 10/100Mbps Ethernet interface with MAC/PHY and transformer
- One USB 2.0 Hi-speed (480Mbps) Host Ports and One USB Client port
- Four UARTs
- I^2C / I^2S
- 15 Programmable Digital I/O Port (GPIO)
- One Serial Peripheral Interface (SPI) Ports
- Compact size: 50 x 80mm
- Single +3.3VDC Power-in

1.2 Specifications (Hardware)

- **CPU / Memory**
  - CPU: NXP i.MX6ULL
  - Featuring NXP’s advanced single ARM Cortex®-A7 core
  - Operates at speeds: 800MHz
  - SDRAM: 512MB DDR3/LvDDR3 SDRAM
  - Flash: 16G eMMC

- **Network**
  - 1x 10/100Mbps Ethernet with PHY
  - Signal: EXT+, EXT-, ERX+, ERX-
  - Protection: 1.5 KV Magnetic isolated

- **USB Port**
  - 1x USB 2.0 Hi speed (480Mbps) Host
    Signal: USB Host Data+, USB Host Data-
  - 1 x USB 2.0 Client
    Device: DDP (data+), DDM (data-), UDIO (I/O)

- **UART**
  - 4x Universal Asynchronous Receiver and Transmitter (UART)
  - UART 1~4: TXD, RXD, RTS, CTS (Software configurable RS-232/485 mode)
  - Signal level: 3.3VDC
  - Baud Rate: Up to 921.6 Kbps
  - Parity: None, Even, Odd, Mark, Space
  - Data Bits: 5, 6, 7, 8
  - Stop Bits: 1, 1.5, 2
  - Flow Control: RTS/CTS, XON/XOFF, None
  - RS-485 Bi-Direction Control Signal: RTS for UART1~4

- **Programmable DIO (GPIO)**
  - 15Pins General Purpose I/O can be programmable as digital input or output
  - Signal Level: TTL Compatible
  - Digital Input:
    - Low level: 0V min / +0.99V max
    - High level: +2.31V min / +3.3V max
  - Digital Output:
    - Low level: +0.15V max @ 1mA
    - High level: +3.15V min @ 1mA

- **SPI (Serial Peripheral Interface)**
  - One SPI port
  - Three wires signals: MISO, MOSI and CLK
  - Signal: *MISO, MOSI, CLK, SD data 0~3*

- **Debug Port**
  - Signal: Connector: J1 (4-pins Wafer)

- **Power**
  - Input: +3.3VDC
  - Consumption: 0.75W

- **Predefine Pins**
  - H/W Reset Button (CN1, pin#11) , input
  - System Reset (CN1, pin#13), input
  - Buzzer (CN1, pin#22), output
  - System Ready LED (CN1, pin#1), output
  - LAN Activity LED (CN1, pin#3), output
  - GPIO 15pins (CN1, pin#10/12/14~21/23 & CN3, pin#31/33/35/37)

1.3 Specifications (Software)

- **Operation System**
  - Linux kernel 5.4.x
  - Supports bootup from eMMC or SD card
  - Boot Loader: Barebox
  - File System: EXT4
  - GUI Engine: X11

- **Software Development**
  - Toolchain: gcc 9.3.0 + glibc 2.31
  - Supports in-place C/C++ code compilation

- **Package Management**
  - Package repository: Artila self-maintained repository
  - Command: Using standard apt-get command

- **Popular Packages**
  - Web server: Apache/Nginx/Lighttpd
  - Database: MySQL/SQLite3/PostgreSQL
  - Script Language: PHP/Python/Perl/NodeJS
  - Text editor: vim/nano/sed
  - Administration: Webmin

- **Utilities**
  - Bash: Shell Command
  - Telnet: Telnet client program
  - Busybox: Linux utility collection
  - FTP: FTP client program

- **Protocol Stacks**
  - IPV4, ICMP, ARP, DHCP, NTP, TCP, UDP, FTP, HTTP, PPP, PPPoE, CHAP, PAP, SNMP V1/V3, SSL, SSH 1/2

- **Daemon**
  - pppd: Dial In/out over serial port and PPPoE
  - snmpd: SNMP agent program
  - ftpd: FTP server program
  - nginx: Web server program
  - sshd: secured shell server
  - iptables: Firewall service manager

- **Standard Device Drivers**
  - ttymxc0: serial console port (CORTEX-A7 SERIES debug port)
  - ttymxc1~ttymxc4: serial ports (CORTEX-A7 SERIES UART0~UART3)
  - gpio: General Purpose I/O
  - mmc: SD/MMC:
  - rtc: Real Time Clock
  - sda: USB flash memory disk
  - ttyACM: USB Modem
  - ttyUSB: USB RS-232 adaptor
  - spi: spi bus

- **I/O devices Control**

  Use standard I/O device control to access following devices:
  - Ethernet: eth1
  - Serial Ports: ttymxc1, ttymxc2, ttymxc3, ttymxc4
  - Serial Console Port: ttymxc0
  - Real time clock: rtc0
  - USB Flash Disk: sda, sda1, sdb, sdb1
  - SD memory Card: mmc0
  - USB Serial Cable: ttyUSB0, ttyUSB1
  - SPI bus: spi0

- **Default Setting**
  - IP Default setting:
    - eth1: 192.168.2.127 (Netmask: 255.255.255.0)
  - ssh Login: root
  - Password: root
  - Terminal type: VT100

1.4 Packing List

- M-X6ULL-B: Linux-ready Cortex-A7 800MHz SoM (System on Module) with 512MBSDRAM, 16GB eMMC Flash

1.5 Optional

- Starter Kit (detail information refer to 6. Starter Kit (M-X6ULL-B))
- 91-PHDF9-050: Console Cable (4Pin header to DB9 Female, 50cm)

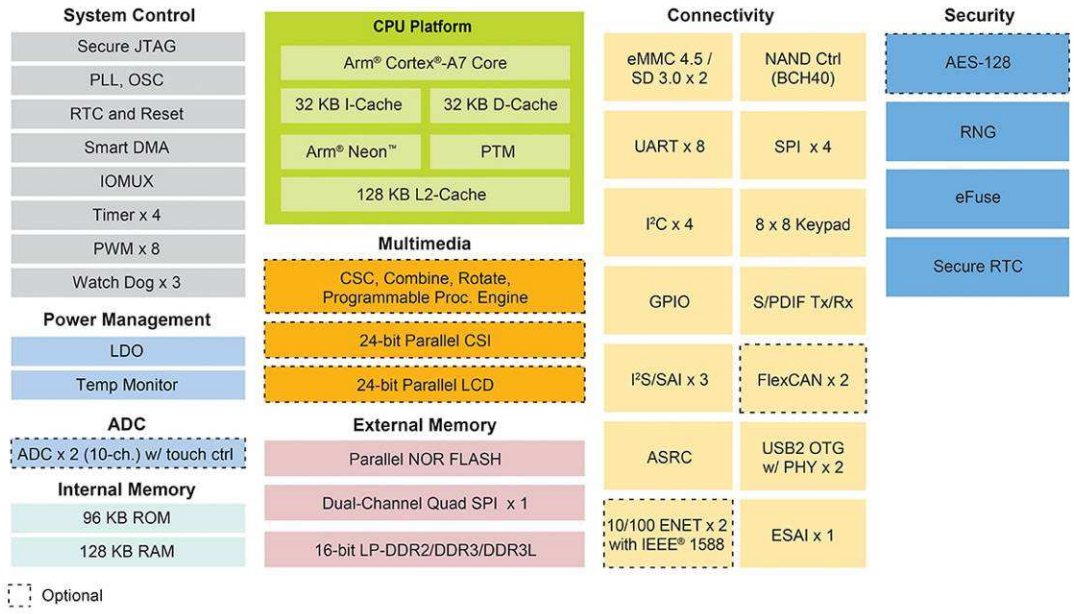
2. i.MX-6ULL: Arm Cortex-A7 MPU

NXP i.MX 6ULL is a power efficient and cost-optimized applications processor family featuring an advanced implementation of a single Arm Cortex-A7 core, which operates at speeds up to 800MHz. The i.MX 6ULL applications processor includes an integrated power management module that reduces the complexity of an external power supply and simplifies power sequencing. Each processor in this family provides various memory interfaces, including 16-bit LPDDR2, DDR3, DDR3L, raw and managed NAND flash, eMMC, SPI and a wide range of other interfaces for connecting peripherals

The device features a floating point unit for high-precision computing and accelerated data processing, and a high data bandwidth architecture. It integrates advanced user interface and connectivity peripherals and security features. Detail information, please refer to NXP website

https://www.nxp.com/products/processors-and-microcontrollers/arm-processors/i-mx-applications-processors/i-mx-6-processors/i-mx-6ull-single-core-processor-with-arm-cortex-a7-core:i.MX6ULL

2.1 NXP i.MX 6ULL Block Diagram



2.2 NXP i.MX-6ULL Features

CPU complex

- Single core arm Cortex-A7 Processor
- CPU Frequency up to 800MHz
- 32 Kbyte L1 Data Cache, 32 Kbyte L1 Instruction Cache, 128K L2 Cache

Display

- Parallel LCD Display up to WXGA (1366x768)
- 8/10/16/24-bit Parallel Camera Sensor Interface
- Electrophoretic display controller support direct-driver for E-Ink EPD panel, with up to 2048x1536 resolution at 106 Hz

Memory

- 16-bit LP-DDR2, DDR3/DDR3L
- 8/16-bit Parallel NOR FLASH / PSRAM
- Dual-channel Quad-SPI NOR FLASH
- 8-bit Raw NAND FLASH with 40-bit ECC

Advance Power Management

- Partial PMU Integration

Connectivity

- MMC 4.5/SD 3.0/SDIO Port
- USB 2.0 OTG, HS/FS, Device or Host with PHY
- Audio Interfaces include 3x I2S/SAI, S/PDIF Tx/Rx
- Ethernet with IEEE 1588
- 12-bit ADC, with resistive touch controller

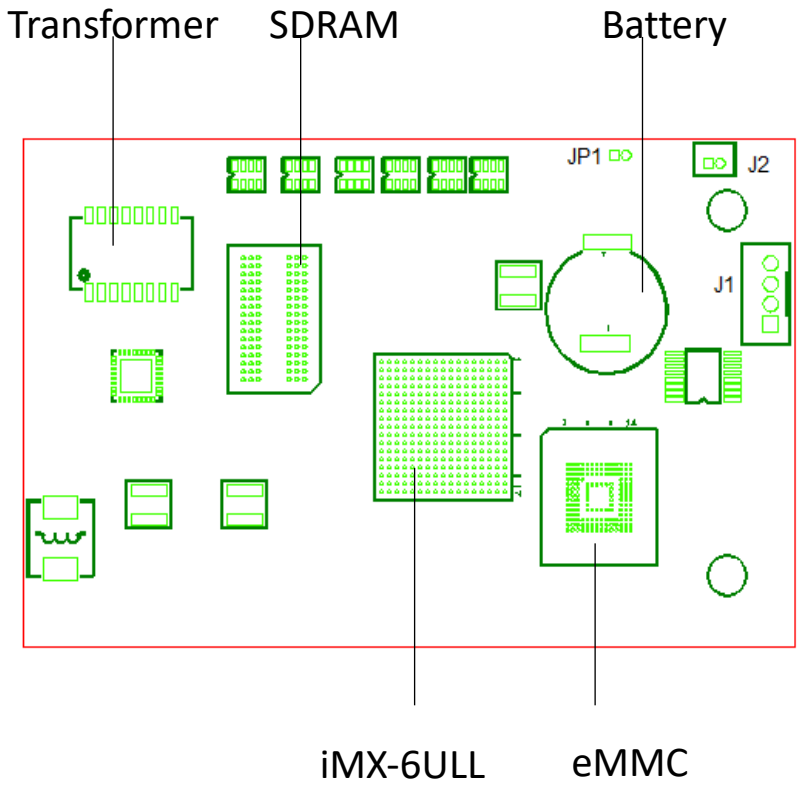
Package

- 14x14 289 MAPBGA 0.8mm pitch

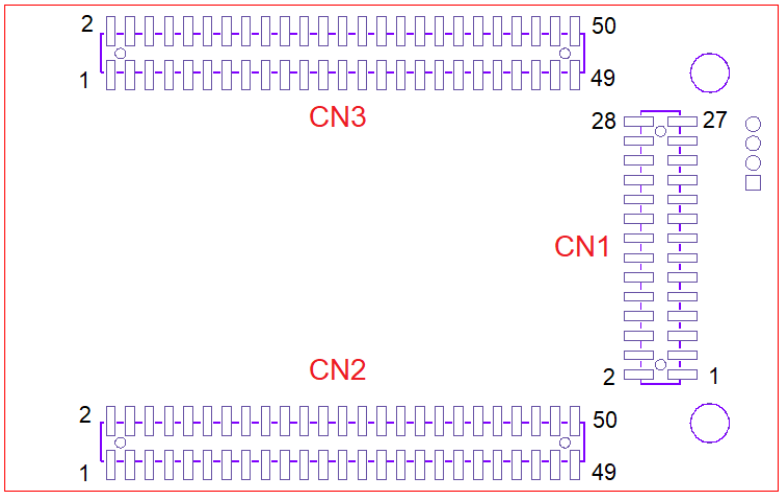
3. Layout & Dimensions

3.1 Outlook

Top View



Bottom View



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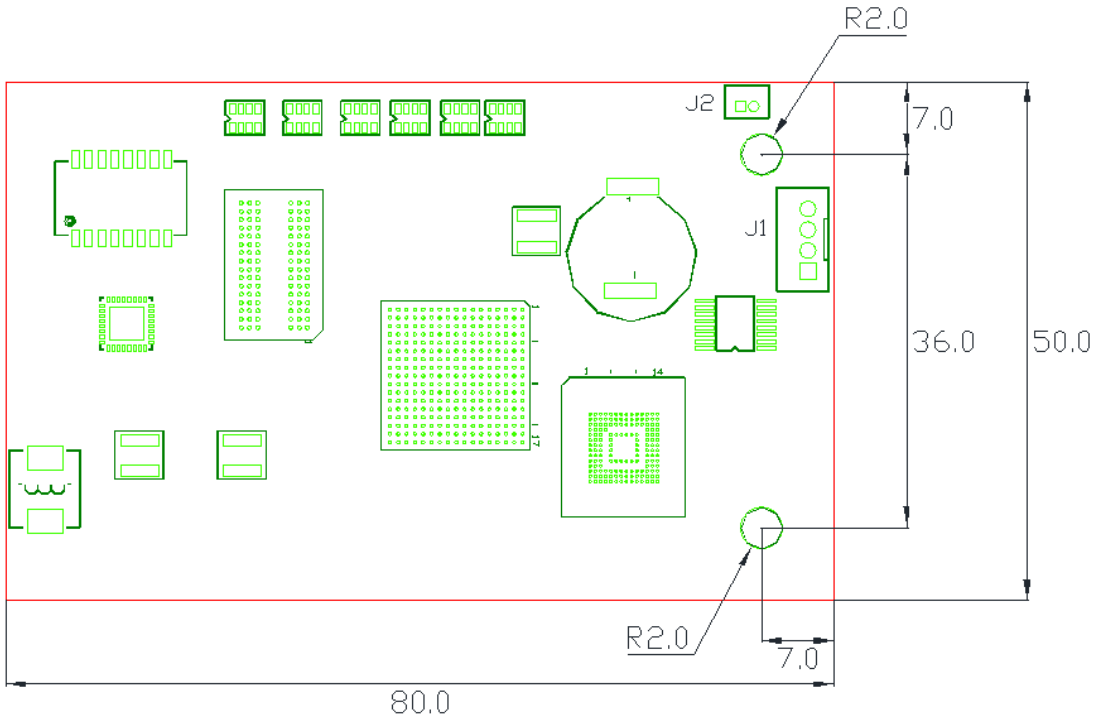
3.2 Dimensions

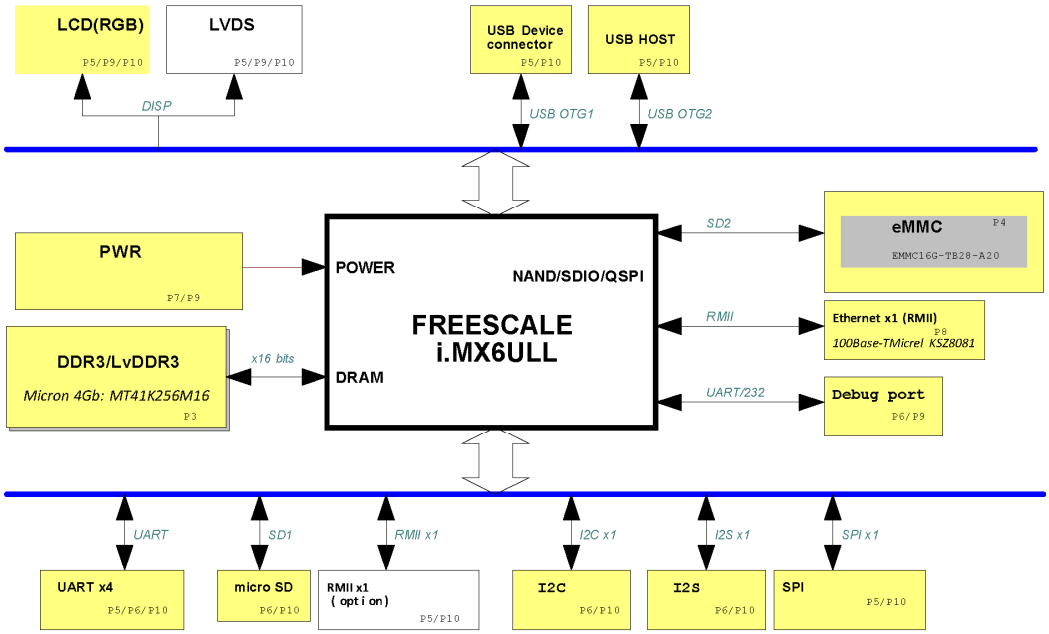
(unit:mm)



Board Size: 80mm x 50mm

Screw Radius: 2.0mm

4. Block Diagram

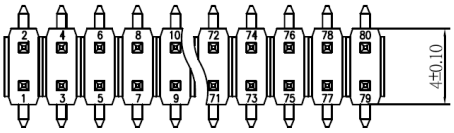


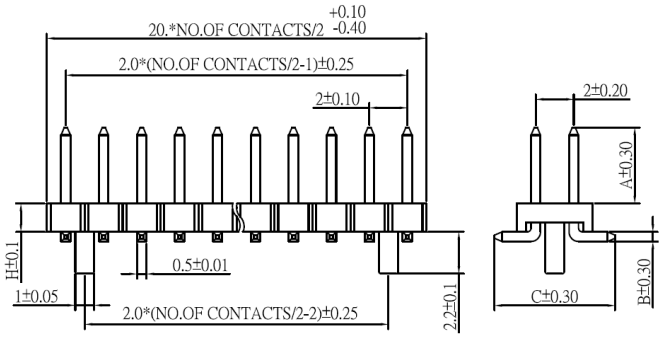
5. Pin Assignment and Definitions

The M-X6ULL-B exposes three connectors at bottom side that provide I/Os to design carrier board for versatile application.

5.1 Connector Information

- Pin Header 28pin (CN1) / 50pin (CN2 & CN3) dual raw
- Pitch: 2.0mm
- Current Rating: 1Amp

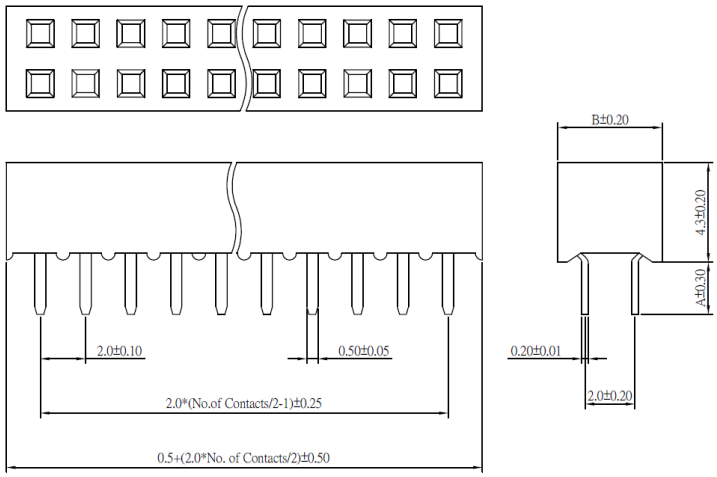




5.2 Matching Connector Information (M-X6ULL-B starter kit)

Here presents matching connector information that is used on M-X6ULL-B starter kit.

- Header (Female) Dual Rows Type Connector matching to CN1/CN2/CN3
- Pitch: 2.0mm
- Current Rating: 1Amp

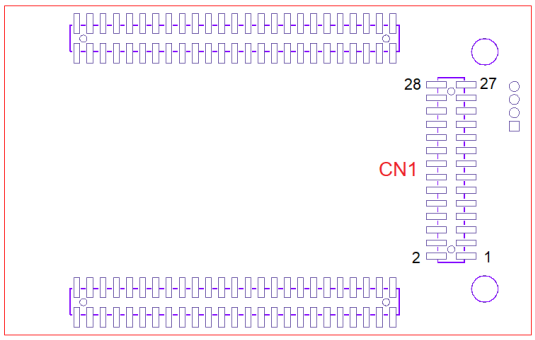


5.3 Connector and PIN definition

Following shows connector information and pin definition.

5.3.1 Connector (CN1)

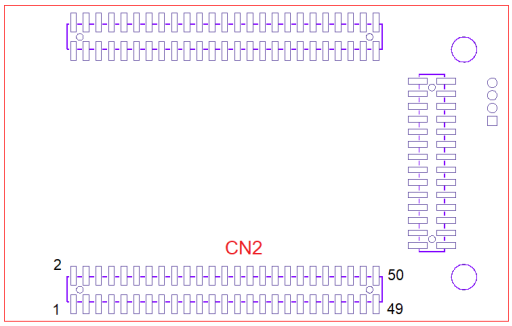
CN1 includes signals: I2C, Touch sensor, Console, Reset, GPIO



(i.MX6ULL)	(Artila)	CN1		(Artila)	(i.MX6ULL)
R10	System Ready LED	1	2	Touch Top channel	L14
	LAN Active LED	3	4	Touch Bottom channel	L15
	Battery IN	5	6	Touch Right channel	L17
G16	I2C Serial Data	7	8	Touch Left channel	M16
G17	I2C Serial Clock	9	10	GPIO2_8	C17
	H/W Reset Signal	11	12	GPIO2_9	C16
	System Reset	13	14	GPIO2_10	B17
A4	GPIO4_15	15	16	GPIO2_11	A15
D5	GPIO4_11	17	18	GPIO2_12	A16
D17	GPIO2_14	19	20	GPIO2_13	B15
D16	GPIO2_15	21	22	GPIO5_1 or Buzzer	R9
M15	GPIO1_9	23	24	GND	
	Console TXD	25	26	Console RXD	
	VCC3V3	27	28	GND	

5.3.2 Connector (CN2)

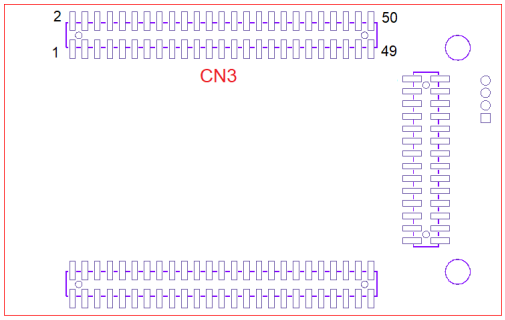
CN2 includes signals: LAN, USB, LCD



(i.MX6ULL)	(Artila)	CN2		(Artila)	(i.MX6ULL)
	LAN Transmit Data-	1	2	LAN Transmit Data+	
	LAN Receive Data-	3	4	LAN Receive Data+	
	A_GND1	5	6	A_GND1	
K13	USB Device ID	7	8	LCD_GREEN0	B11
U15	USB Device Data +	9	10	LCD_GREEN1	A11
T15	USB Device Data -	11	12	LCD_GREEN2	E12
T13	USB Host Data A-	13	14	LCD_GREEN3	D12
U13	USB Host Data A+	15	16	LCD_GREEN4	C12
	GND	17	18	LCD_GREEN5	B12
C13	LCD_RED0	19	20	LCD_GREEN6	A12
B13	LCD_RED1	21	22	LCD_GREEN7	D13
A13	LCD_RED2	23	24	GND	
D14	LCD_RED3	25	26	LCD_BLUE0	B9
C14	LCD_RED4	27	28	LCD_BLUE1	A9
B14	LCD_RED5	29	30	LCD_BLUE2	E10
A14	LCD_RED6	31	32	LCD_BLUE3	D10
B16	LCD_RED7	33	34	LCD_BLUE4	C10
B8	LCD Data Enablel	35	36	LCD_BLUE5	B10
N17	LCD Contrast Control	37	38	LCD_BLUE6	A10
D9	LCD Horizontal Signal	39	40	LCD_BLUE7	D11
C9	LCD Vertical Signal	41	42	GND	
R6	LCD PWR enable control	43	44	LCD Dot Clock	A8
	GND	45	46	GND	
	GND	47	48	GND	
	VCC3V3	49	50	VCC3V3	

5.3.3 Connector (CN3)

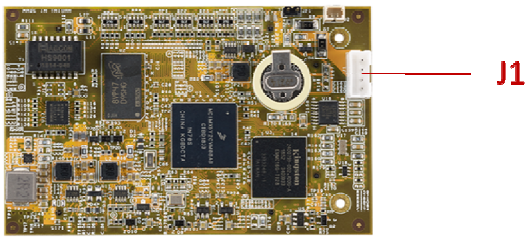
CN3 includes signals: COM, SD card, I2S, SPI, GPIO



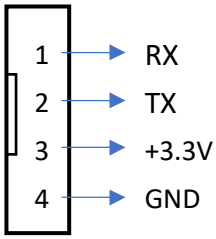
(i.MX6ULL)	(Artila)		**CN3**		(Artila)	(i.MX6ULL)
	VCC3V3	1		2	VCC3V3	
	GND	3		4	GND	
	GND	5		6	GND	
H17	COM2 TXD	7		8	COM1 CTS	H14
H16	COM2 RXD	9		10	COM1 RTS	J15
H15	COM2 RTS	11		12	COM1 RXD	J16
G14	COM2 CTS	13		14	COM1 TXD	J17
E4	COM3 TXD	15		16	GPIO5_2	P11
E3	COM3 RXD	17		18	GPIO5_7	N10
E1	COM3 RTS	19		20	GPIO5_8	N9
E2	COM3 CTS	21		22	GND	
F5	COM4 TXD	23		24	SD Card Data 0	B3
E5	COM4 RXD	25		26	SD Card Data 1	B2
F3	COM4 RTS	27		28	SD Card Data 2	B1
F2	COM4 CTS	29		30	SD Card Data 3	A2
F17	GPIO1_30	31		32	SD Card Clock	C1
G13	GPIO1_31	33		34	SD Card Command	C2
C5	GPIO4_13	35		36	SD Card Detect	J14
B5	GPIO4_14	37		38	GPIO4_16	E6
N16	I2S Transmit Clock	39		40	SPI MISO	D1
N15	I2S Transmit Sync	41		42	SPI MOSI	D2
N14	I2S Transmit Data	43		44	SPI Serial Clock	D4
M14	I2S Receive Data	45		46	SPI Chip Select	D3
	N/A	47		48	GPIO4_12	A3
P9	GPIO5_4 or AUD_INT	49		50	I2S Master clock	P14

Remark: PIN16,18,20,38,48 (GPIO) reserved for User define

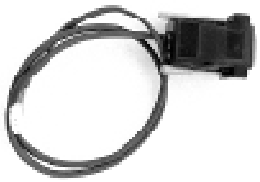
5.3.4 Connector (J1): Console port



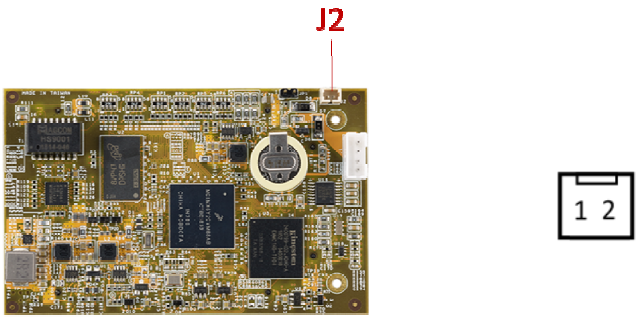
Pin assignment is: RX, TX, +3.3V, GND.



Therefore, you need to open the upper metal case and prepare or purchase a serial console cable to use the serial console port.
Or, it can be purchased “Console Cable” from Artila, P/N is CB-PHDF9-050.



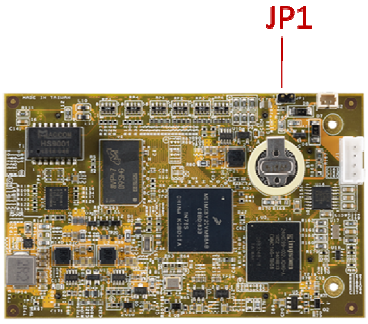
5.3.5 Connector (J2): External Battery Connection



Pin	Pin1	Pin2
Signal	BAT_IN	GND

5.3.6 Connector (JP1): Boot Selection

M-X6ULL-B can boot from eMMC or SD card by setting JP1



Boot from SD card	
Boot from eMMC (Default)	

6. Starter Kit (M-X6ULL-B)

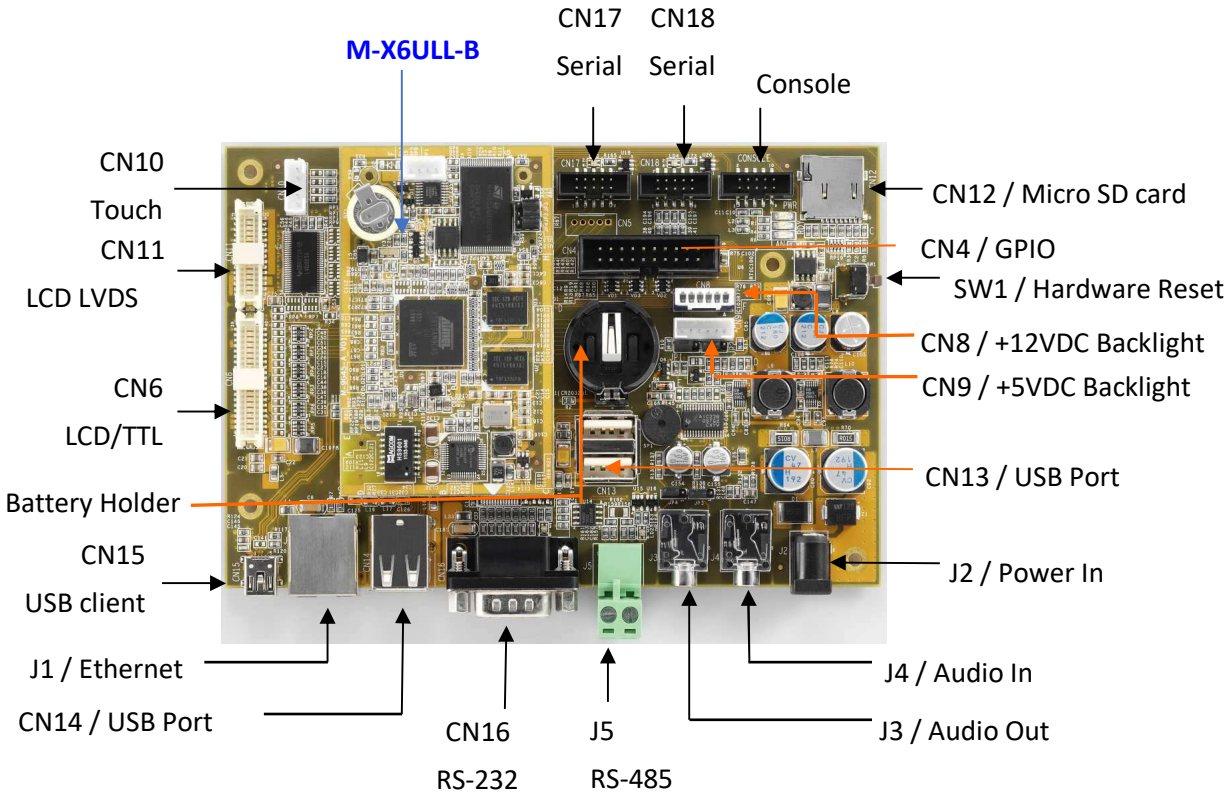
EV-9G45-A is an evaluation board for M-X6ULL-B. It serves as a complete development kit for evaluation and application development purposes.

6.1 Features

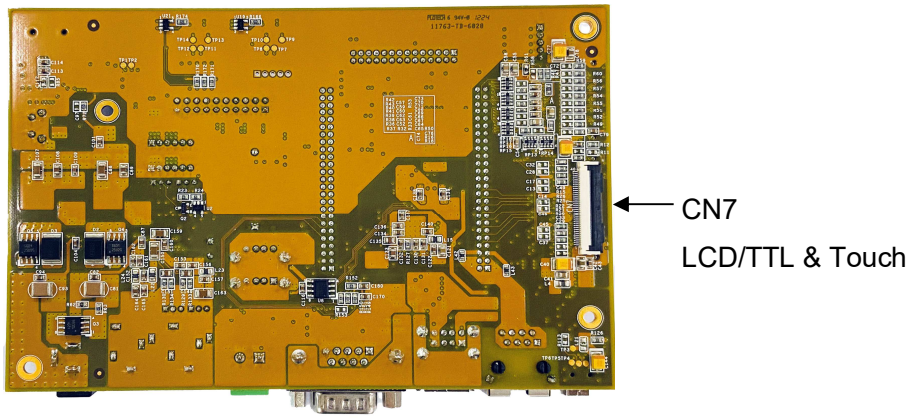
- Support M-X6ULL-B System On Module
- 1x 10/100Mbps Ethernet port (RJ45), Ethernet IP address: 192.168.2.127
- 4x USB 2.0 high speed (480Mbps) Host ports and 1x USB Client
- 4x RS-232/485 serial ports
- 1x Serial console port
- External Battery Socket: Use 3V CR2032 (Battery is not included)
- LCD display interface
- Backlight power 12V/5Vdc
- Touch sensor
- Audio In / Out
- Reset button
- One microSD socket reserved
- Real Time Clock
- GPIO
- Buzzer
- +12VDC power input (DC Jack)

6.2 Layout

(Top View)



(Bottom View)



6.3 Connector and Pin Definition

The following shows connectors on EV-9G45-A

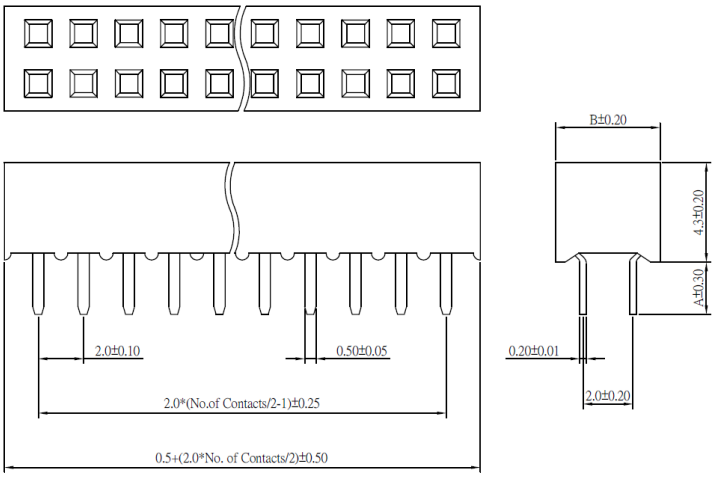
Connector	Descriptions
CN1~CN3	Matching for SOM (M-X6ULL-B)
CN4	GPIO
CN6	LCD / TTL
CN7	LCD / TTL & Touch (rear side)
CN8	LCD Backlight (+12VDC)
CN9	LCD Backlight (+5VDC)
CN10	Touch Sensor
CN11	LCD / LVDS
CN12	Micro-SD card socket
CN13	USB port (Dual)(Type-A)
CN14	USB port (Dual)(Type-A)
CN15	Micro-USB
CN16	RS-232 (D-Sub)(Full)
CN17	RS-232 (4Wire)
CN18	RS-232 (4Wire)

Connector	Descriptions
J1	Ethernet
J2	DC Jack (Power-In)
J3	Audio out
J4	Audio In
J5	RS-485

Console	Serial Console
SW1	Hardware Reset
Battery	Battery Holder

6.3.1 Connector (CN1 ~ CN3)

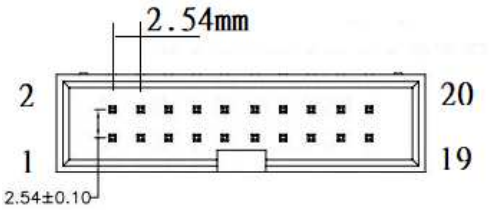
- Header (Female) Dual Rows Type Connector
- Pitch: 2.0mm
- Current Rating: 1Amp



Pin definition is the same as M-X6ULL-B (CN1~CN3)

6.3.2 Connector (CN4): GPIO

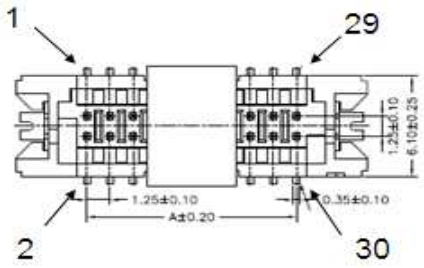
- Box Header connector, 20pos, Dual raw
- Pitch: 2.54mm



Pin	Signal	Pin	Signal
1	GPIO 0	11	GPIO 10
2	GPIO 1	12	GPIO 11
3	GPIO 2	13	GPIO 12
4	GPIO 3	14	GPIO 13
5	GPIO 4	15	GPIO 14
6	GPIO 5	16	N.C
7	GPIO 6	17	GND
8	GPIO 7	18	GND
9	GPIO 8	19	VCC5V
10	GPIO 9	20	VCC3V

6.3.3 Connector (CN6): LCD / TTL

- Wire-to-Board connector, 30pos, Dual Raw
- Pitch: 1.25mm
- Rating Current: 1Amp

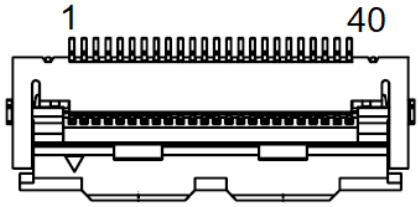


Pin	Signal	Description
1	VCC3	VCC_3.3V
2	VCC3	VCC_3.3V
3	VCC3	VCC_3.3V
4	VCC3	VCC_3.3V
5	D5V	VCC_5V
6	D5V	VCC_5V
7	D5V	VCC_5V
8	D5V	VCC_5V
9	GND	GROUND
10	GND	GROUND
11	Y0P	LVDS channel 0 +
12	Y0M	LVDS channel 0 -
13	GND	GROUND
14	GND	GROUND
15	Y1P	LVDS channel 1 +

Pin	Signal	Description
16	Y1M	LVDS channel 1 -
17	GND	GROUND
18	GND	GROUND
19	Y2P	LVDS channel 2 +
20	Y2M	LVDS channel 2 -
21	GND	GROUND
22	GND	GROUND
23	Y3P	LVDS channel 3 +
24	Y3M	LVDS channel 3 -
25	GND	GROUND
26	GND	GROUND
27	CLKOUTP	LVDS clock +
28	CLKOUTM	LVDS clock -
29	GND	GROUND
30	GND	GROUND

6.3.4 Connector (CN7): LCD / TTL & Touch

- ZIF FFC/FPC connector, 30pos
- Pitch: 0.50mm



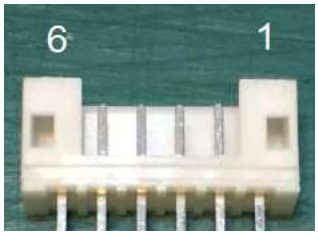
Pin	Signal	Description
1	GND	GROUND
2	GND	GROUND
3	PWM	LED Brightness Adj.
4	LCD_VCC5	VCC_5V
5	LCD_VCC5	VCC_5V
6	LCD_VCC5	VCC_5V
7	LCD_VCC3	VCC_3.3V
8	LCD_VCC3	VCC_3.3V
9	LCDDEN	Data Enable Timing Signal
10	SK/XL	Touch Screen Left channel
11	DO/XR	Touch Screen Right channel
12	DI/YB	Touch Screen Bottom channel
13	B7	LCD_BLUE7
14	B6	LCD_BLUE6
15	B5	LCD_BLUE5
16	GND	GROUND
17	B4	LCD_BLUE4
18	B3	LCD_BLUE3
19	B2	LCD_BLUE2
20	GND	GROUND

Pin	Signal	Description
21	G7	LCD_GREEN7
22	G6	LCD_GREEN6
23	G5	LCD_GREEN5
24	GND	GROUND
25	G4	LCD_GREEN4
26	G3	LCD_GREEN3
27	G2	LCD_GREEN2
28	GND	GROUND
29	R7	LCD_RED7
30	R6	LCD_RED6
31	R5	LCD_RED5
32	GND	GROUND
33	R4	LCD_RED4
34	R3	LCD_RED3
35	R2	LCD_RED2
36	TPCS/YU	Touch Screen Top channel
37	N/C	(NO connection)
38	LCDDOTCK	LCD Dot Clock
39	GND	GROUND
40	GND	GROUND

6.3.5 Connector (CN8): LCD backlight +12Vdc

- Wafer connector, 1x6pin (Blue color)
- Pitch: 2.0mm

Notice: Please Be Check LCD backlight supply voltage in advance before using to avoid LCD display damage.

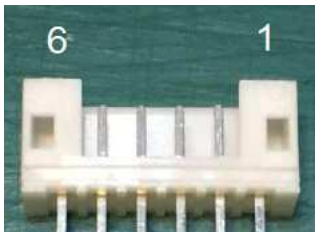


Pin	Signal	Description
1	+12V	Voltage for LCD Backlight
2	+12V	Voltage for LCD Backlight
3	GND	Power Ground
4	GND	Power Ground
5	ON/OFF	LCD B/L ON/OFF Control
6	DIM	Adjust the LCD brightness

6.3.6 Connector (CN9): LCD backlight +5Vdc

- Wafer connector, 1x6pin (White color)
- Pitch: 2.0mm

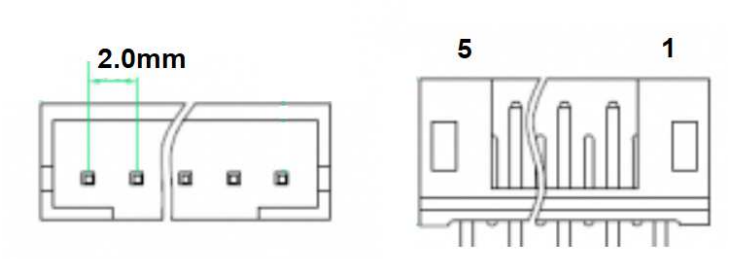
Notice: Please Be Check LCD backlight supply voltage in advance before using to avoid LCD display damage.



Pin	Signal	Description
1	+5V	Voltage for LCD Backlight
2	+5V	Voltage for LCD Backlight
3	GND	Power Ground
4	GND	Power Ground
5	ON/OFF	LCD B/L ON/OFF Control
6	DIM	Adjust the LCD brightness

6.3.7 Connector (CN10): Touch Sensor

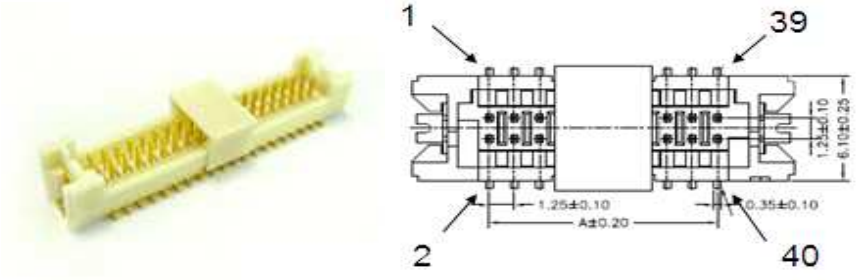
- Wafer connector, 1x5pin (White color)
- Pitch: 2.0mm



Pin	Signal	Description
1	TPCS/YU	Touch Screen Top channel
2	DI/YB	Touch Screen Bottom channel
3	DO/XR	Touch Screen Right channel
4	SK/XL	Touch Screen Left channel
5	GND	GND

6.3.8 Connector (CN11): LCD / LVDS

- Wire-to-Board connector, 40pos, Dual Raw
- Pitch: 1.25mm
- Rating Current: 1Amp

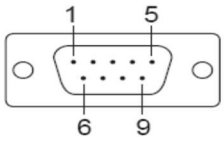


Pin	Signal	Description
1	LCD_VCC5	VCC_5V
2	LCD_VCC5	VCC_5V
3	GND	GROUND
4	GND	GROUND
5	LCD_VCC3	VCC_3.3V
6	LCD_VCC3	VCC_3.3V
7	GND	GROUND
8	GND	GROUND
9	B0	LCD_BLUE0
10	B1	LCD_BLUE1
11	B2	LCD_BLUE2
12	B3	LCD_BLUE3
13	B4	LCD_BLUE4
14	B5	LCD_BLUE5
15	B6	LCD_BLUE6
16	B7	LCD_BLUE7
17	G0	LCD_GREEN0
18	G1	LCD_GREEN1
19	G2	LCD_GREEN2
20	G3	LCD_GREEN3

Pin	Signal	Description
21	G4	LCD_GREEN4
22	G5	LCD_GREEN5
23	G6	LCD_GREEN6
24	G7	LCD_GREEN7
25	R0	LCD_RED0
26	R1	LCD_RED1
27	R2	LCD_RED2
28	R3	LCD_RED3
29	R4	LCD_RED4
30	R5	LCD_RED5
31	R6	LCD_RED6
32	R7	LCD_RED7
33	GND	GROUND
34	GND	GROUND
35	LCDDOTCK	LCD Dot Clock
36	LCDVSYNC	LCD Vertical Sync
37	LCDDEN	LCD Data Enable
38	LCDHSYNC	LCD Horizontal Sync
39	LCDCC	LCD Contrast Control
40	ON/OFF	LCD B/L ON/OFF Control

6.3.9 Connector (CN16): RS-232

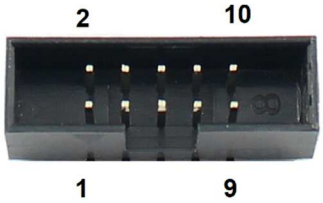
- D-Sub connector, 9pin, Male



Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	---

6.3.10 Connector (CN17: RS-232) & (CN18: UART)

- Box Header connector, 10pos, Dual raw
- Pitch: 2.0mm



Pin	Signal
1	—
2	—
3	RXD
4	RTS
5	TXD
6	CTS
7	—
8	—
9	GND
10	—

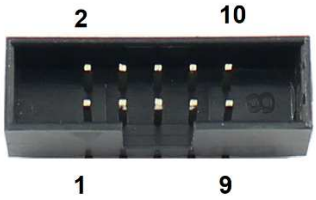
6.3.11 Connector (J5): RS-485

- Terminal Block 2pos

D+ D-

6.3.12 Connector (Console)

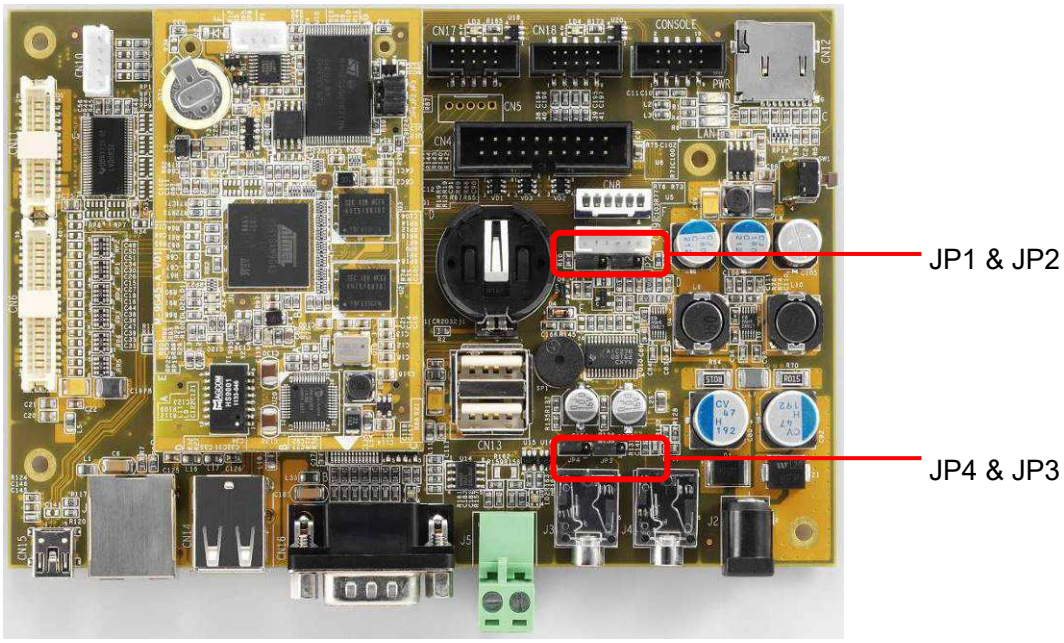
- Box Header connector, 10pos, Dual raw
- Pitch: 2.0mm



Pin	Signal
1	---
2	---
3	RXD
4	---
5	TXD
6	---
7	---
8	---
9	GND
10	---

6.4 Jumper Setting

The following shows Jumpers on EV-9G45-A



Jumper	Descriptions
JP1	LCD PWM Voltage selection
JP2	LCD Backlight On/Off selection
JP3	Audio out Selection
JP4	Audio out Selection

6.4.1 Jumper (JP1): LCD PWM Voltage Selection

- Pin Header, 3pos
- Pitch: 2.0mm

Voltage Selected at +5Vdc	
Voltage Selected at +3.3Vdc (Default)	

6.4.2 Jumper (JP2): LCD Backlight Voltage Selection

- Pin Header, 3pos
- Pitch: 2.0mm

Voltage Selected at +5Vdc	
Voltage Selected at +3.3Vdc (Default)	

6.4.3 Jumper (JP3&JP4): Audio out Selection

- Pin Header, 3pos
- Pitch: 2.0mm

Set up Audio output function to “Line out” or “Earphone” via JP3&JP4

Line out		
Earphone (Default)		

7. Initial Operation

This guide provides initial information about how to use the EV-9G45-A starter kit to start up M-X6ULL-B and initial operation with the supplied boot devices.

7.1 Using Default Linux file system

1. Power on Starter Kit (M-X6ULL-B)
2. Plug the console cable from console port to PC:
   - Console port (J1), 4pin wafer at M-X6ULL-B via “console cable”
     Please refer to **1.5 Optional**
3. Download any PC terminal program. Artila suggests to use “Putty”.
4. The serial communication parameters are: 115200, N81, VT100.
5. The identifier name on PC,
   - On Linux system, the serial port name looks like ttyACM0, ttyACM1, etc.
   - On OSX system, the serial port name looks like tty.usbmodem1421, tty.usbmodem1422, etc.
   - On Windows system, the serial port name looks like COM3, COM4, etc.

7.2 Install Software Package

M-X6ULL-B/EV-9G45-A supports standard **apt** (Advanced Package Tool) package management utility for installation, upgrade and remove software packages.
Artila supports apt configuration file also. You may have software support at http://www.artila.com/download/imx6ul/linux/