



**STAMP-IMX6ULL (Stamp Module) Core Board**  
**Hardware Manual**

Ver. : 2.0  
2020.02

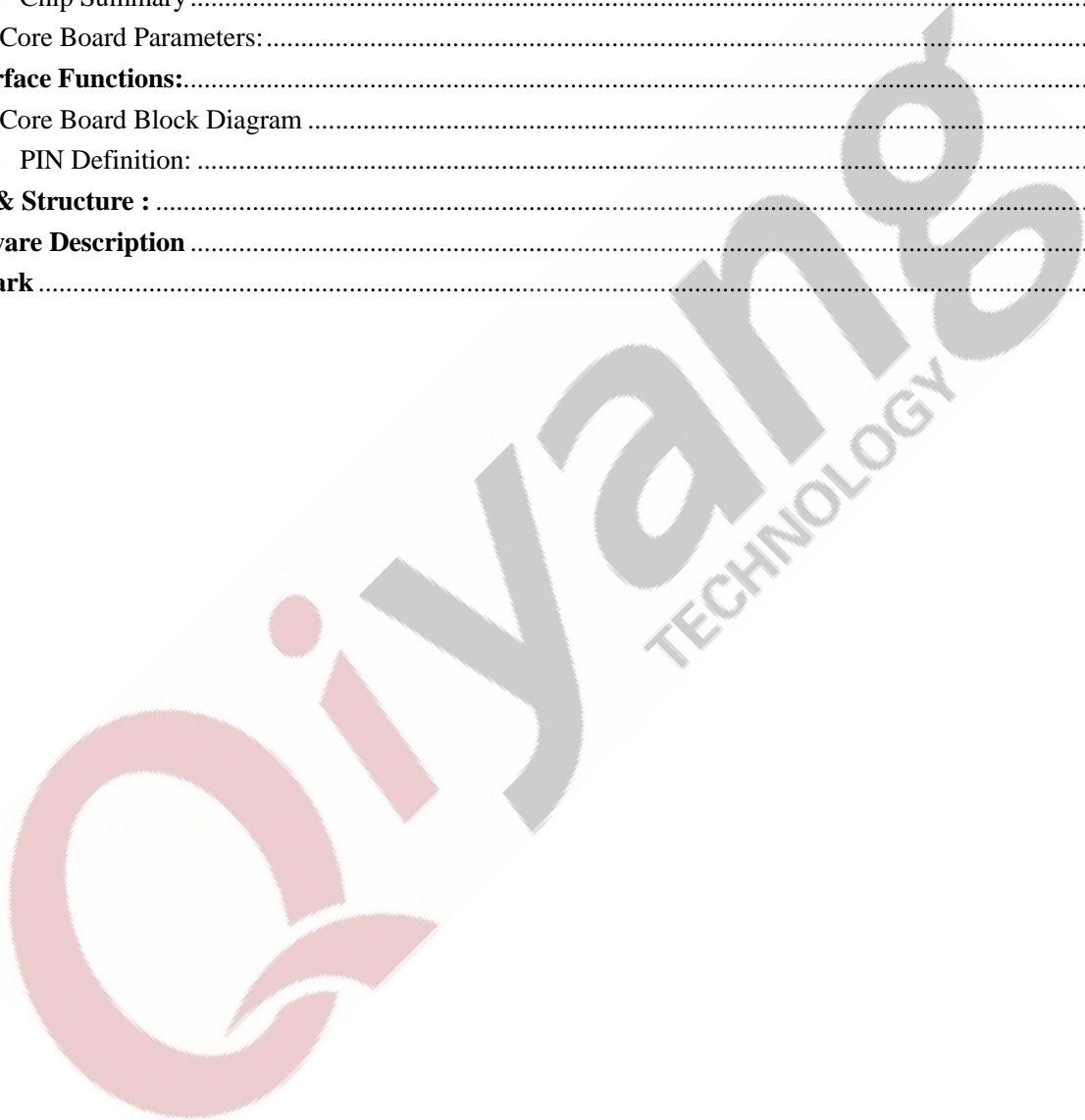
## Version Record

Ver.	Hardware Version	Description	Date	Reviser
1.0	STAMP-IMX6ULL	Initial Version, First Release	2019-01	wangwx
2.0	STAMP-IMX6ULL		2020-02	wangwx



## Catalogue

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**"Notice": This manual mainly introduce hardware interface of this Core Board**

## I .Preface:

### 1.1. Company Profile

Zhejiang Qiyang Intelligent Technology Co., Ltd. locates at the bank of the beautiful West Lake. It is a high and new technology enterprise which is specializing in R&D, manufacture and sell embedded computer main board with high performance, low power consumption, low cost, small volume, and provides embedded hardware solutions.

Over the years we focused on the development and services of embedded ARM industrial control products, which provides an easy-to-use development tools, reference design platform, product solutions of volume production for embedded development engineers. It helps customers to shorten the time from embedded board to products, and improves product quality. Our company is dedicated to become a leading embedded hardware and software supplier.

We Offer:

◆ Research & develop, manufacture and sell embedded module products which have independent intellectual property rights, and cooperate with TI, ATMEL, Cirrus Logic, Freescale, and other famous processor manufacturers. It has launched a series of hardware products, such as ARM development board, ARM core module, ARM industrial board, sound/video decoding transmission platform, supporting tools and

software resources which support user for their next embedded design.

◆ We give full play to the technical accumulation in ARM platform and Windows CE, Linux, Android operating system for many users providing custom service (OEM/ODM), to realize embedded products into the market stably, reliably and quickly.

Thanks for using products made by Qiyang Intelligence technology company, we will try our best to offer you technical assistance! Happy working!

## **1.2 Suggestion for Using STAMP-IMX6ULL (Stamp Module) Core Board**

1. Please read the instructions firstly before using the development board;
2. Before using, please check the packing list and see whether there is a missing file in the CD;
3. Please understand the basic structure and composition of STAMP-IMX6ULL, including the hardware resource allocation, the definition of each pin in core board and baseboard, the definition of expanded pin, etc.;
4. If you need to develop on Linux system and burn program into the development board, in addition to this document, we also suggest reading another document STAMP-IMX6ULL-KIT *Linux User Manual*;
5. STAMP-IMX6ULL accept baseboard customization and development service and core board batch order.

## II .System Composition

### 2.1. Core Board Summary:

STAMP-IMX6ULL is designed by Zhejiang Qiyang Intelligent Technology Co., Ltd, based on NXP IMX6ULL Cortex-A7 Micro processor. It is with NEON and FPU coprocessor, support encryption security algorithms.

It suits for POS , Vehicle-mounted information processing, HMI, IOT Gateway, etc.

It adopts ARM Cortex A7 kernel, the highest frequency reaches up to 900Mhz.

With NEON coprocessor, FPU

With 24-bit LCD controller and touch panel controller, the highest resolution reaches up to 1366\*768

With USB 2.0 OTG integrated with PHY

With 2XMMC5.0/SD 3.0/SDIO

Supports 8/10/16 bit CSI image sensor interface

Supports 8 \*UART

Integrated with 2\*100Mbps Ethernet MAC(10/100MHZ)

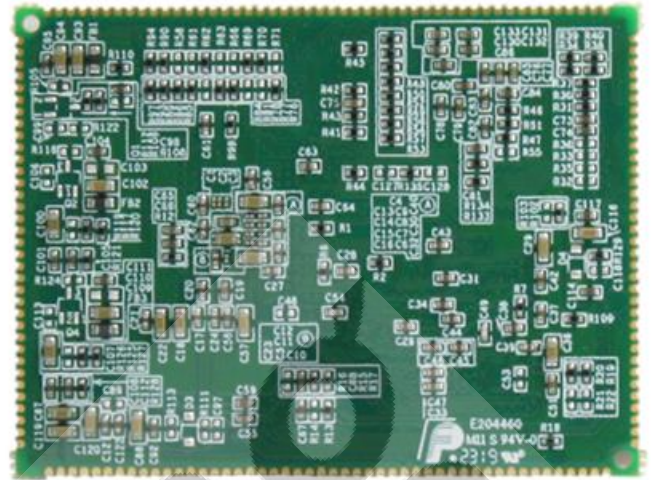
With 2\* controller LAN (CAN) port, support CAN2.0A and CAN2.0B

With 3-ch functional audio channel

With SPI, IIC, Timer, PWM,DMA,RTC, Watchdog etc.



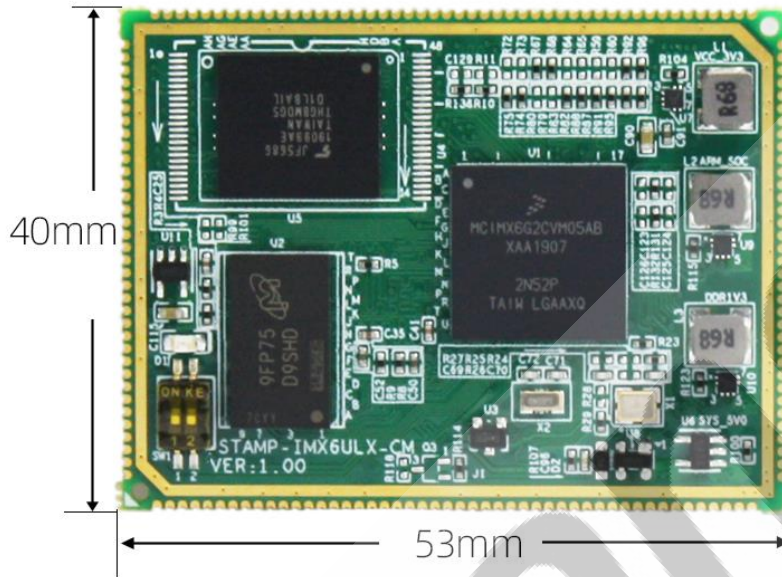
TOP



Bottom

Picture 1

Core Board adopts 6-layer golden immersion technology, high TG material, size:53mmx40mm;



Picture 2

Core Board adopts stamp module connector to lead out the signals. Stable and reliable, it suits for different environments, it supports OS :Linux,Ubuntu etc.





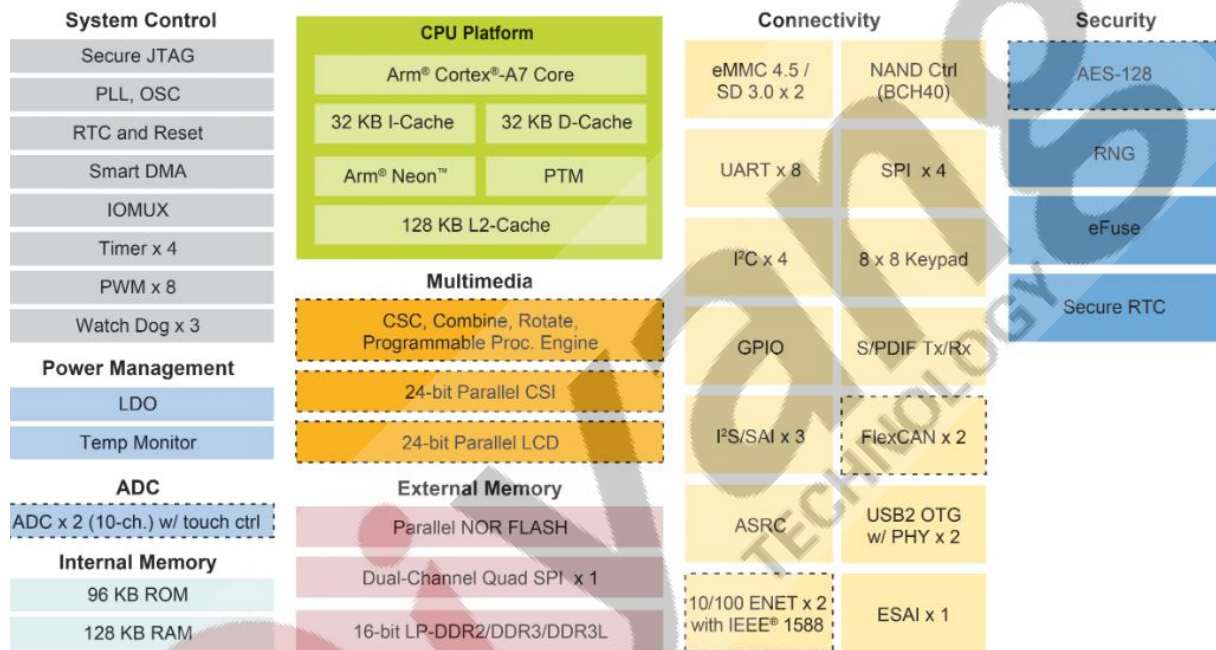
Picture 3

## 2.2. Chip Summary

I. MX 6ULL is a family of processors for high-efficiency, cost-effective applications, powered by a single ARM Cortex-A7 kernel and running up to 900 MHz in normal commercial grade. The I.MX6ULL application processor includes an integrated power management module that reduces the complexity of external power connections and simplifies power-on timing. Each processor in this family provides a variety of memory interfaces, including 16-bit LPDDR2, DDR3, DDR3L, Raw and

Managed NAND Flash, NOR Flash, eMMC, Quad SPI and various other interfaces for connecting peripherals, Such as WLAN, Bluetooth®, GPS, display and camera sensors.

**IMX6ULL Processor Block Diagram:**



**Picture 4**

◆ Cortex-A7 kernel, 900Mhz, 128KB L2 cache

◆ Abundant display connector

Parallel LCD display, the resolution reaches up to WXGA(1366\*768)

8/10/16/24 bits parallel camera image sensor connector

Electrophoretic display controller supports direct drive of E-Ink EPD panel with resolution up to 2048x1536 and operating frequency 106 Hz

◆ Memory

Support 16-bit LP-DDR2, DDR3/DDR3L

Support 8/16 bits parallel NOR FLASH / PSRAM

Support dual channel Quad-SPI NOR FLASH

Support 8-bit original NAND FLASH and 40-bit ECC

- ◆ 2\*MMC/SD 3.0/SDIO port
- ◆ 2\*USB 2.0 OTG, HS/FS, device or host, with PHY port
- ◆ Audio Port: 3\*I2S/SAI,S/PDIF Tx/Rx
- ◆ 2\*10/100Mbps Ethernet, support IEEE 1588 protocol
- ◆ 2\*12-bit ADC, up to 10 input channel, and resistive touch controller (4-wire/5-wire)
- ◆ Advanced power management: partial PMU integrated
- ◆ Security module: TRGN, encryption engine (AED with DPA, TDES/SHA/RSA),secure boot
- ◆ Footprint: 14x14 289 MAPBGA 0.8mm spacing and 9x9 272 MAPBGA 0.5 mm spacing

**I.MX6ULL Family: Qiyang selects MCIMX6Y2**

Feature	MCIMX6Y0	MCIMX6Y1	MCIMX6Y2
Core	Arm® Cortex®-A7	Arm Cortex-A7	Arm Cortex-A7
Speed	528 MHz	528 MHz	528, 800, 900 MHz
Cache	32 KB-I, 32 KB-D	32 KB-I, 32 KB-D 128 KB L2	32 KB-I, 32 KB-D 128 KB L2
OCRAM	128 KB	128 KB	128 KB
DRAM	16-bit LP-DDR2, DDR3/DDR3L	16-bit LP-DDR2, DDR3/DDR3L	16-bit LP-DDR2, DDR3/DDR3L
eFuse for customer	256-bit	256-bit	256-bit
NAND (BCH40)	Yes	Yes	Yes
Parallel Nor/EBI	Yes	Yes	Yes
Ethernet	10/100 MB x 1	10/100 MB x 1	10/100 MB x 2
USB with PHY	OTG, HS/FS x 1	OTG, HS/FS x 2	OTG, HS/FS x 2
CAN	0	1	2
Graphic	None	None	PxP
CSI	None	None	16-bit Parallel CSI
LCD	None	None	24-bit Parallel LCD
QSPI	1	1	1
SDIO	2	2	2
UART	4	8	8
IIC	2	4	4
SPI	2	4	4
I <sup>2</sup> S/SAI	1	3	3
ESAI	1	1	1
S/PDIF	1	1	1
Timer/PWM	Timer x 2, PWM x 4	Timer x 4, PWM x 8	Timer x 4, PWM x 8
12-bit ADC	1 x 10-ch.	1 x 10-ch.	2 x 10-ch.
Security	None	AES-128, HAB	AES-128, HAB
Temperature	0 °C to 95 °C (Tj) -40 °C to 105 °C (Tj)	0 °C to 95 °C (Tj) -40 °C to 105 °C (Tj)	0 °C to 95 °C (Tj) -40 °C to 105 °C (Tj)

Picture 5

### 2.3.Core Board Parameters:

Core Board	CPU	NXP i.MX6ULL (MCIMX6Y2C), ARM Cortex A7, 800MHZ; (To be compatible with i.MX6UL (MCIMX6YGC) )
	RAM	512MB DDR3; (256MB DDR3 optional)
	Flash	4GB EMMC (8GB EMMC optional;256MB Nandflash optional)
	Power Input	DC5V

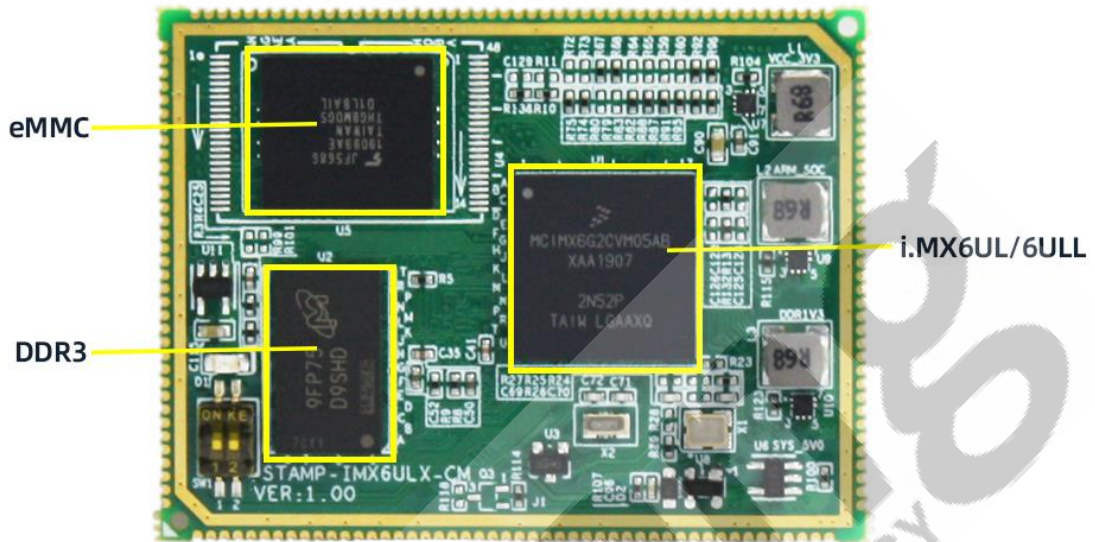
Interfaces	Display	Parallel LCD display (24Bit), resolution up to WXGA(1366x768)
	UART	Support 6*UART
	USB2.0	2* USB -Host
	USB-OTG	1*USB-OTG
	Ethernet	2* 100Mbps
	CAN	2*CAN ( Can be configured to multiplex)
	SDIO	Lead out 1*SDIO signal
	SP	Lead out 3*SPI signal
	I2C	Lead out 2*I2C bus signal
	SAI	Lead out SAI/I2S signal
	CSI	Lead out CSI signal (Can be configured to multiplex)
	GPIO	Several GPIO signal (Can be configured to multiplex)
	Mechanical Parameters	Dimension
Board To Board Connector		Stamp Module
PIN Spacing		1.016mm
Pad Size		1.524mm*0.762mm
Pin Number		166 PINS, to meet various extension requirements.
Craft		Adopts 6-layer PCB golden immersion technology
PCB Material		High TG PCB material
Characteristics		Input Voltage
	Operation Temperature	-20°C ~ +70°C ( Can be extended to industrial grade )
	Storage Temperature	-20°C ~ +70°C

	Humidity	5%-95%,non-condensation
System	OS	Linux4.1.15, Ubuntu18.04
	System Image	To provide the relative system image & system burning tool
	Materials	To provide relative BSP source code , file systemcode.
	Standard Configuration	i.MX6ULL、 512MB DDR3、 4GB EMMC
Others	Alternative Configuration	i.MX6ULL、 256MB DDR3、 256MB Nand flash
	Application Areas	IoT, Data Collection, Smart Factory, Edge Gateway etc.

### III. Interface Functions:

#### 3.1.Core Board Block Diagram

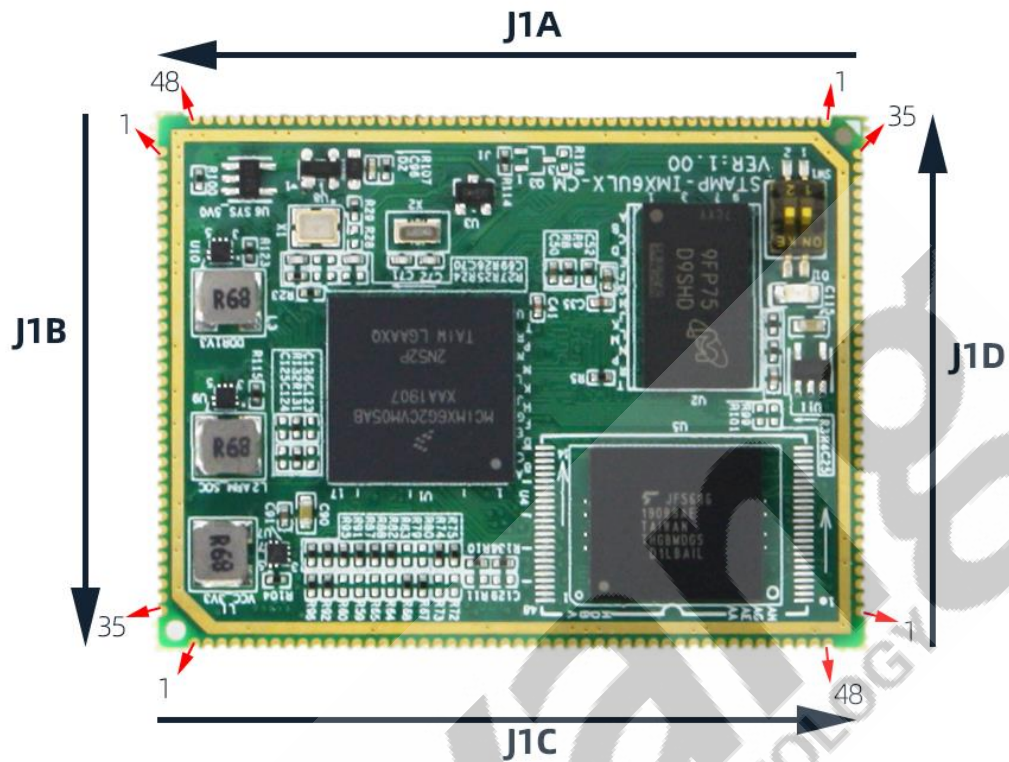
Core Board Block Diagram:



Picture 6

### 3.2. PIN Definition:

Connector Illustration:



Picture 7

J1A:

PIN#	Signal Name	Functional Description	Multiplexed GPIO
------	-------------	------------------------	------------------



A48	GND	5V Power In (Must be connected)	
A47	GND		
A46	VCC_SYS		
A45	VCC_SYS		
A44	VCC_SYS		
A43	VCC_SYS		
A42	GND		
A41	GND		
A40	UART2_RTS_B	UART	GPIO1_IO23
A39	UART2_CTS_B		GPIO1_IO22
A38	UART2_RX_DATA		GPIO1_IO21
A37	UART2_TX_DATA		GPIO1_IO20
A36	GND		
A35	UART1_RTS_B	UART	GPIO1_IO19
A34	UART1_CTS_B		GPIO1_IO18
A33	UART1_TX_DATA		GPIO1_IO16
A32	UART1_RX_DATA		GPIO1_IO17
A31	GND		
A30	GPIO1_IO06		
A29	GPIO1_IO07		
A28	GND		
A27	GPIO1_IO05		
A26	GPIO1_IO03		
A25	GND		
A24	GPIO1_IO01		

A23	GPIO1_IO00		
A22	GPIO1_IO09		
A21	GPIO1_IO04		
A20	GPIO1_IO08		
A19	GPIO1_IO02		
A18	USB_OTG1_VBUS	USB OTG VBUS Power Supply	
A17	GND		
A16	USB_OTG1_DP	USB OTG Signal	
A15	USB_OTG1_DN	USB OTG Signal	
A14	GND		
A13	USB_OTG2_VBUS	USB OTG VBUS Power Supply	
A12	GND		
A11	USB_OTG2_DN	USB OTG Signal	
A10	USB_OTG2_DP	USB OTG Signal	
A9	GND		
A8	CCM_CLK1_P	CCM clock	
A7	CCM_CLK1_N		
A6	JTAG_TDI	JTAG Debug	GPIO1_IO13
A5	JTAG_MOD		GPIO1_IO10
A4	JTAG_TDO		GPIO1_IO12
A3	JTAG_TMS		GPIO1_IO11
A2	JTAG_TRST_B		GPIO1_IO15
A1	JTAG_TCK		GPIO1_IO14

J1B:

B35	LCD_DATA20	LCD signal	GPIO3_IO25
B34	LCD_DATA21		GPIO3_IO26
B33	LCD_DATA22		GPIO3_IO27
B32	LCD_DATA23		GPIO3_IO28
B31	GND		
B30	ENET2_TX_DATA0	Ethernet Signal	GPIO2_IO11
B29	ENET2_TX_EN		GPIO2_IO13
B28	ENET2_TX_DATA1		GPIO2_IO12
B27	ENET2_RX_EN		GPIO2_IO10
B26	ENET2_RX_DATA1		GPIO2_IO09
B25	ENET2_RX_DATA0		GPIO2_IO08
B24	ENET2_RX_ER		GPIO2_IO15
B23	GND		
B22	ENET2_TX_CLK	Ethernet clock signal	GPIO2_IO14
B21	GND		
B20	ENET1_TX_CLK	Ethernet clock signal	GPIO2_IO06
B19	GND		
B18	ENET1_TX_DATA1	Ethernet signal	GPIO2_IO04
B17	ENET1_TX_DATA0		GPIO2_IO03
B16	ENET1_TX_EN		GPIO2_IO05
B15	GND		
B14	ENET1_RX_ER	Ethernet signal	GPIO2_IO07
B13	ENET1_RX_DATA0		GPIO2_IO00
B12	ENET1_RX_EN		GPIO2_IO02

B11	ENET1_RX_DATA1		GPIO2_IO01
B10	GND		
B9	UART5_TX_DATA	UART signal	GPIO1_IO30
B8	UART5_RX_DATA		GPIO1_IO31
B7	UART4_TX_DATA		GPIO1_IO28
B6	UART4_RX_DATA		GPIO1_IO29
B5	GND		
B4	UART3_RTS_B	UART signal	GPIO1_IO27
B3	UART3_CTS_B		GPIO1_IO26
B2	UART3_TX_DATA		GPIO1_IO24
B1	UART3_RX_DATA		GPIO1_IO25

J1C:

C1	LCD_DATA19	LCD signal	GPIO3_IO24
C2	LCD_DATA18		GPIO3_IO23
C3	LCD_DATA17		GPIO3_IO22
C4	LCD_DATA16		GPIO3_IO21
C5	GND		
C6	LCD_DATA15	LCD signal	GPIO3_IO20
C7	LCD_DATA14		GPIO3_IO19
C8	LCD_DATA13		GPIO3_IO18
C9	LCD_DATA12		GPIO3_IO17
C10	LCD_DATA11		GPIO3_IO16
C11	LCD_DATA10		GPIO3_IO15
C12	LCD_DATA09		GPIO3_IO14

C13	LCD_DATA08		GPIO3_IO13	
C14	GND			
C15	LCD_DATA07	LCD signal	GPIO3_IO12	
C16	LCD_DATA06		GPIO3_IO11	
C17	LCD_DATA05		GPIO3_IO10	
C18	LCD_DATA04		GPIO3_IO09	
C19	LCD_DATA03		GPIO3_IO08	
C20	LCD_DATA02		GPIO3_IO07	
C21	LCD_DATA01		GPIO3_IO06	
C22	LCD_DATA00		GPIO3_IO05	
C23	GND			
C24	LCD_VSYNC		LCD vertical synchro signal	GPIO3_IO03
C25	LCD_HSYNC	LCD horizontal synchro signal	GPIO3_IO02	
C26	LCD_RESET	LCD reset	GPIO3_IO04	
C27	LCD_CLK	LCD clock signal	GPIO3_IO00	
C28	LCD_ENABLE	LCD enable signal	GPIO3_IO01	
C29	GND			
C30	GND			
C31	GND			
C32	VCC_3V3			
C33	VCC_3V3			
C34	VCC_3V3			
C35	VCC_3V3			

C36	VCC_3V3		
C37	VCC_3V3		
C38	GND		
C39	GND		
C40	NAND_DQS	NAND Flash signal	GPIO4_IO16
C41	NAND_READY_B		GPIO4_IO12
C42	NAND_CE0_B		GPIO4_IO13
C43	NAND_CE1_B		GPIO4_IO14
C44	NAND_CLE		GPIO4_IO15
C45	NAND_ALE		GPIO4_IO10
C46	NAND_WP_B		GPIO4_IO11
C47	GND		
C48	NVCC_SD		

J1D:

D1	SD1_DATA0	SD1 signal	GPIO2_IO18
D2	SD1_DATA1		GPIO2_IO19
D3	SD1_DATA3		GPIO2_IO21
D4	SD1_DATA2		GPIO2_IO20
D5	SD1_CMD		GPIO2_IO16
D6	SD1_CLK		GPIO2_IO17
D7	GND		
D8	CSI_DATA06		GPIO4_IO27
D9	CSI_DATA02		GPIO4_IO23
D10	CSI_DATA03		GPIO4_IO24

D11	CSI_DATA07	CSI signal	GPIO4_IO28
D12	CSI_DATA05		GPIO4_IO26
D13	CSI_DATA04		GPIO4_IO25
D14	CSI_DATA00		GPIO4_IO21
D15	CSI_DATA01		GPIO4_IO22
D16	GND		
D17	CSI_VSYNC		GPIO4_IO19
D18	CSI_HSYNC		GPIO4_IO20
D19	CSI_PIXCLK		GPIO4_IO18
D20	CSI_MCLK		GPIO4_IO17
D21	GND		
D22	NVCC_CSI		CSI Power
D23	ON/OFF		
D24	SYS_RST	System Reset	
D25	POR_B		
D26	SNVS_TAMPER5		GPIO5_IO05
D27	SNVS_TAMPER9		GPIO5_IO09
D28	SNVS_TAMPER8		GPIO5_IO08
D29	SNVS_TAMPER7		GPIO5_IO07
D30	SNVS_TAMPER4		GPIO5_IO04
D31	SNVS_TAMPER1		GPIO5_IO01
D32	SNVS_TAMPER6		GPIO5_IO06
D33	SNVS_TAMPER0		GPIO5_IO00
D34	SNVS_TAMPER3		GPIO5_IO03
D35	SNVS_TAMPER2		GPIO5_IO02

Including : Boot configuration option have to lead out and need to be designed on carrier board (Refer to Qiyang's design drawing)

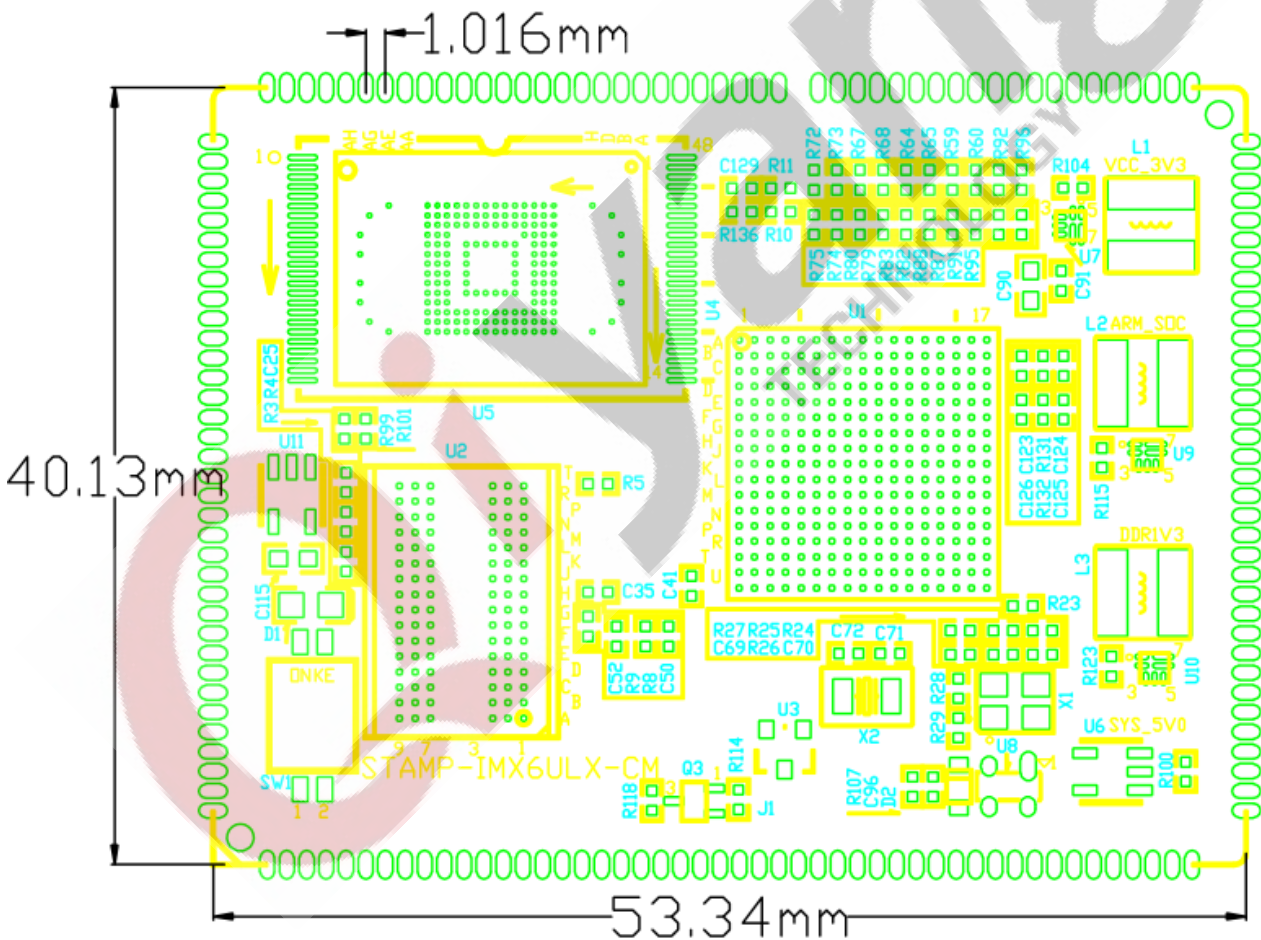
PIN#	Signal Name	Functional Description
C22	LCD_DATA00	
C18	LCD_DATA04	
C17	LCD_DATA05	
C16	LCD_DATA06	
C15	LCD_DATA07	
C11	LCD_DATA11	



#### IV. Size & Structure:

Unit:mm, if needs connector's dimension, please send email to [supports@qiyangtech.com](mailto:supports@qiyangtech.com);

Core Board Structural Diagram, please refer :



Picture 8



## VI. Software Description

*STAMP-IMX6ULL* system on module provides the software support for Linux 4.1.15 & Ubuntu.

The *STAMP-IMX6ULL Linux User Manual* will introduce the STAMP-IMX6ULL development kit's setting up and using in Linux . The detailed content could refer to the relative documentation.

## VII. Remark

1. Before connect to LCD, confirm LCD power specification.
2. Please use the original connecting accessories, avoid damaging the main board.
3. We ensure offering communication technology support through E-mail, telephone for lifelong technical support service.
4. We ensure offering 6 months repair service for free, if malfunction occurs in warranty because of quality problem, contact our retailer or our company with purchase receipt in warranty period, we will repair or replace it.
5. Under these circumstances, we do not offer repair for free:
  - Over warranty time;
  - Do not have purchase receipt;
  - Liquid inlet, Damp or Mold;

- Malfunction and damage is not due to product quality but drops, intense sharking, arbitrarily modify, disoperation after purchase;

- Damage of force majeure.

6. We reserve intellectual property for the software and hardware technical data of QY-IMX6S; users can only use them for teaching, testing, researching. Shall not be engaged in any commercial purpose. Shall not distribute them on the Internet. Shall not intercept, modify them to tamper copyright.

7. We accept batch order; we can offer technical support and service.

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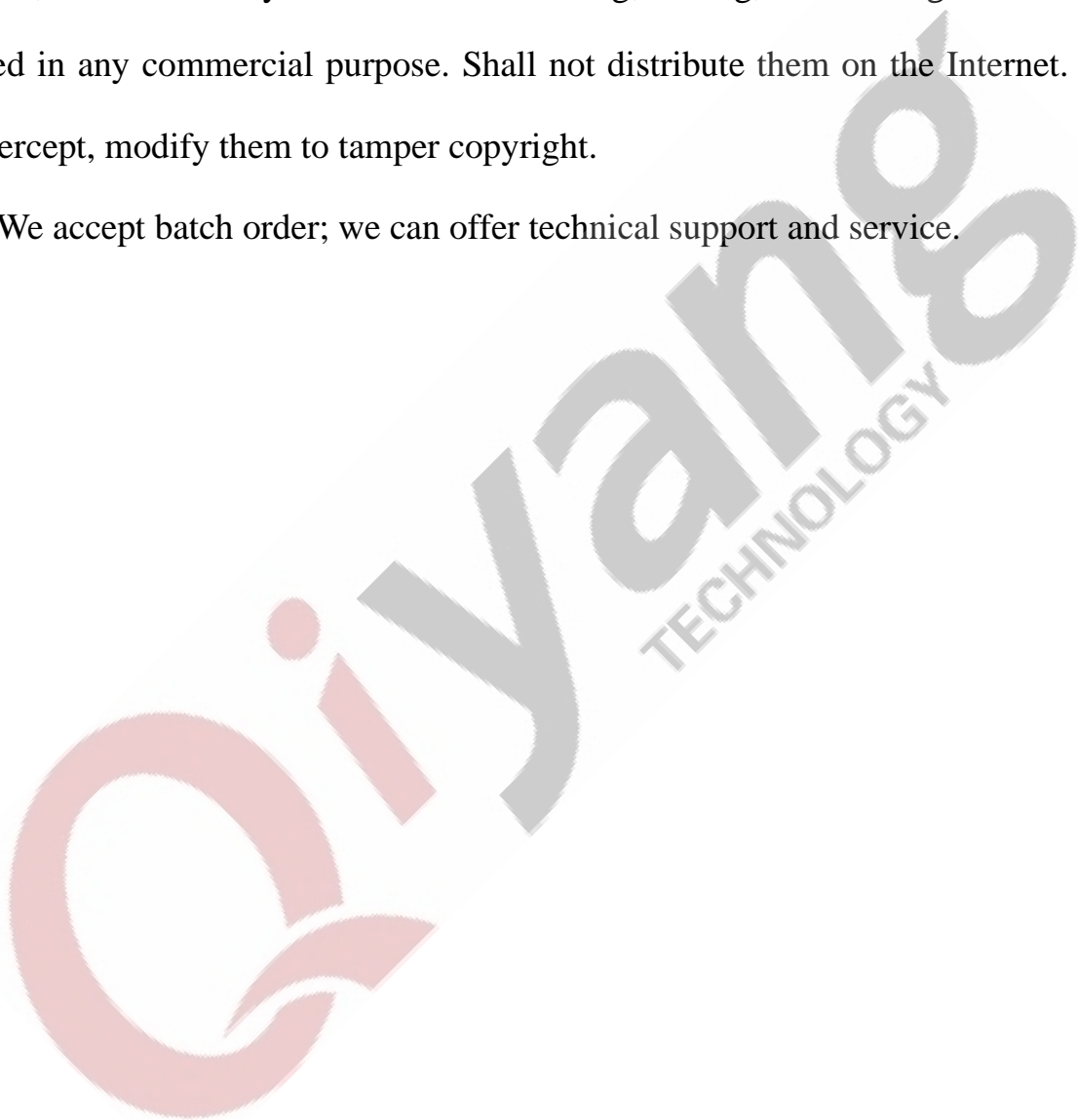
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