



QY-IMX6S Hardware Manual

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QIYANG INTELLIGENT TECHNOLOGY CO., LTD
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Version Update

Version	Hardware	Description	Date	Revisor
1.0	QY-IMX6S-V1.1	Launched	2013-12-06	st
2.0	QY-IMX6S-V1.2	Hardware version updated	2014-11-11	wangwx
3.0	QY-IMX6S-V1.3	PHY chipset changed, AR8035 to YT8511	2022-3-7	Masl



Catalogue

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Notice: This manual introduces the hardware interface of the mainboard.

I. Preface

1.1 Company Profile

Zhejiang Qiyang Intelligent Technology Co., Ltd. is located 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.

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.

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1.2 Suggestion for Using QY-IMX6S Single Board Computer

1. Please read the instructions first, before using the single board computer;
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 the SBC, including the hardware resource allocation 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 *QY-IMX6S Linux User Manual*;

II. System Composition

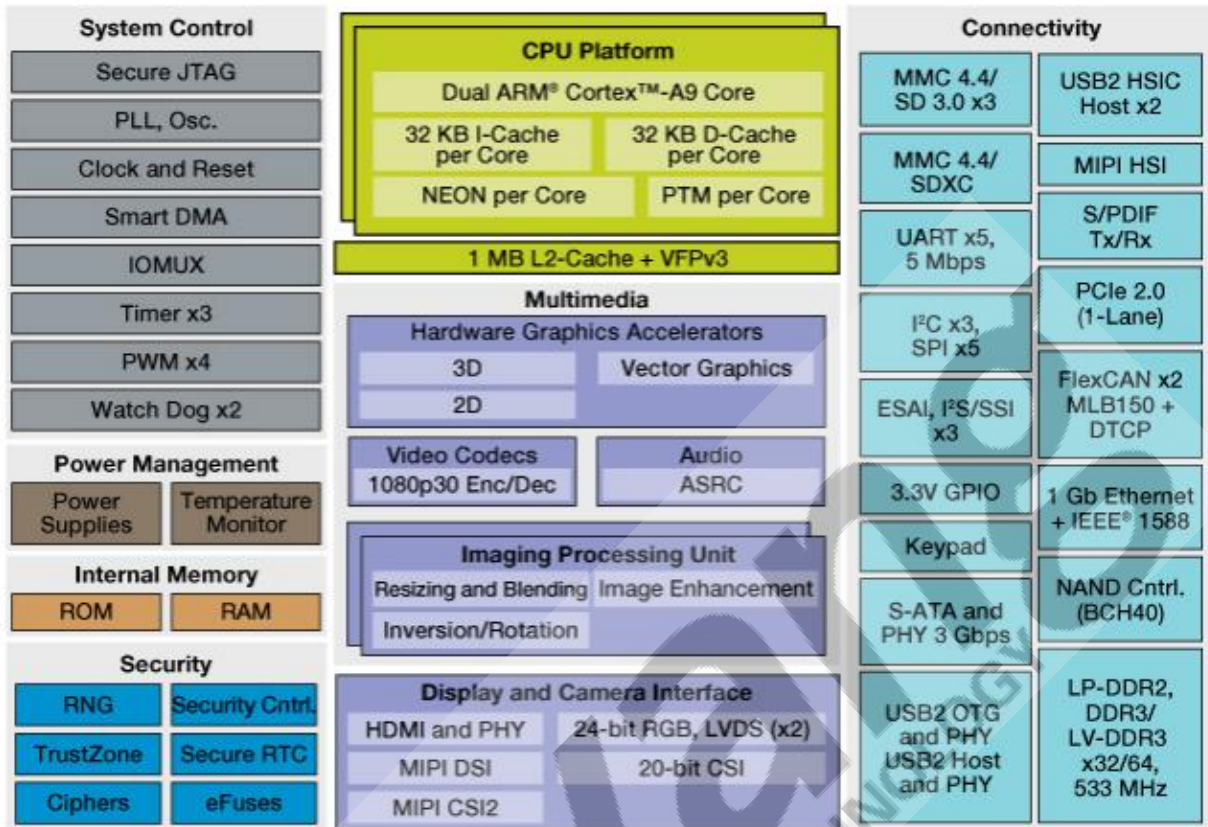
2.1 Chip Summary

QY-IMX6S embedded mainboard, adopts Freescale i.MX6 processor, Cortex-A9 core with 1G Hz and can be compatible with solo/dual /quad micro processor for upgrade. This mainboard is with standard i.MX6 Dual series:

The i.MX 6Dual family provides dual cores , 1.0 GHz with 1 MB of L2 cache and 64-bit DDR3 or 2-ch., 32-bit LPDDR2 support. Integrated FlexCAN, MLB bus, HD grade NEON SIMD Media Accelerator, Triple Play 3D/2D/VG Accelerator, 1080P video codec, PCI Express[®] and SATA-2 provide excellent connectivity, while integration of LVDS, MIPI display port, MIPI camera port and HDMI v 1.4, the i.MX 6Dual provides a scalable solution for consumer, automotive and industrial applications.

Function diagram is as shown:

i.MX 6Dual Applications Processor Block Diagram



picture 1

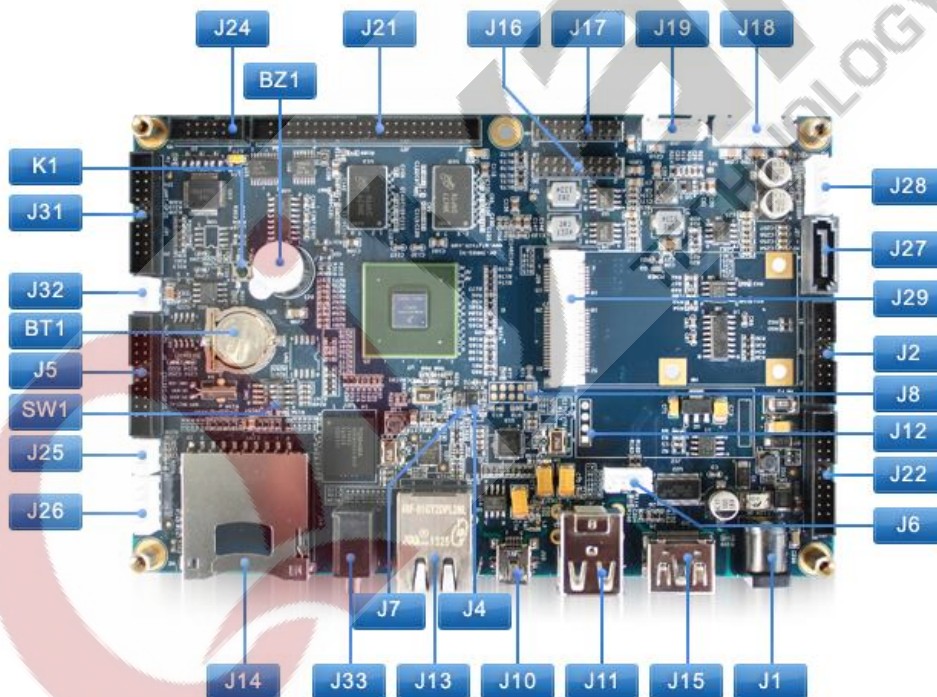
- ◆ ARM® Cortex™-A9, 1.0 GHz, compatible with solo/dual/quad core;
- ◆ 1MB L2 Cache, 32 KB instruction and data caches, NEON SIMD Media Accelerator;
- ◆ 2D/3D/VG Accelerator, 1080P h.264 video hardware codec, support dual 720P video encoding;
- ◆ 1x 20-bit parallel, MIPI-CSI2 (4-channel), three simultaneous inputs;
- ◆ 2-ch HOST USB HSIC, 1-ch OTG and 1-ch HOST USB integrated PHY;
- ◆ 1 industrial gigabit Ethernet MAC(10/100/1000MHZ);
- ◆ 2-ch CAN ports, each channel can up to 1 Mbps, support CAN2.0;
- ◆ 3 SD/MMC 4.4 and 1 SDXC;
- ◆ 5 SPI, 5 UART, 3 I2C, 4 PWM;
- ◆ Integrated MIPI-HSI interface, 1-ch PCIe2.0 interface;
- ◆ Dual LVDS interface, support resolution up to 2048*1536;
- ◆ Freescale PF100 PMU;
- ◆ High Assurance Boot, cryptographic cipher engines, random number generator, and tamper detection

2.2 Mainboard Resource

Hardware Resources	CPU	Freescle i.MX6D processor,ARM® Cortex™-A9 core, 1.0 GHz,Dual Core (Std.) (Quad Core opt.)
	RAM	DDR3 SDRAM,4*256MB, total 1GB (Std.) (2GB opt.)
	Flash	4GB EMMC (Std.) (8GB,16GB,32GB,64GB opt.)
	Network	YT8511 Network Chip, adopt RGMII mode, support 10M/100M/1000M
	Communication	5-ch RS232, 1 port (com0) as the debug UART, 2-ch RS232 Compatible with RS485
		1-ch High speed OTG,4-ch USB, 1-ch connects to MIN_PCIE Interface
		2-ch CAN, support CAN2.0, 1-ch TTL Output, 1-ch CAN output
	Display	1-ch 10/100/1000Mbps Ethernet port, with ACT/LINK indicator
		18-bit TFT-LCD(Compatible with 16, 24 bits), resolution up to 1920 * 1200
		VGA, can be connected with universal display
	Input Interface	2-ch LCDS Interface, each channel can support resolution up to 1920*1200
		HDMI Interface, support HDMI 1.4
		McASP audio interface; binaural output; MIC audio input
	Expansion Interface	4-wire resistive touch panel
		Standard I2C Capacitive panel
CAMERA Interface, standard interface support OV5642 camera module		
Memory Interface	MINI_PCIE 2.0	
	SIM Card	
	1-ch SD Card interface	
Other	1-ch SATA Hard disk interface, SATAII standard, speed up to 3.0Gbps	
	Reset circuit, Watch dog, RTC, Buzzer, JTAG interface	
	+12V power supply, can support +4.75V~+18V wide range voltage supply	
Resource	Development Tools	Development environment: Virtual Machine VM9.0.2+ubuntu12.04.1
		Application layer development debug tool
		Cross-compiler
		Common terminal development debugging tool
	Image File	OS image file, support multiple resolution display
	Test Program	Interface using demo test program and test program source code
	Source Code	Bootloader, kernel, system source code
	Manual	Mainboard User manual,Device Manual
Schematic	Mainboard structure size chart	

Size	160mm*105mm	
PCB	8-layer high precision immersion gold process	
Power Consumption	≤3W	
Operation Temperature	-20°C ~ +70°C	
Operation Humidity	5% ~ 95%, Non-Condensing	

III.Interface Function



picture 2

3.1 Basic Interface Function Description

Label	Function
J1	+12V Power supply input
J2	UART and CAN
J4	BOOT mode selection
J5	SPI and 2*4GPIO
J6	Debug Port
J7	BOOT mode selection
J8	JTAG
J10	USB OTG
J11	2-ch USB
J12	USB, can connect to external module
J13	Gigabit Ethernet
J14	SD Card
J15	HDMI
J16	LVDS1
J17	LVDS2
J18	LCD Power supply
J19	Capacitive Touch Panel
J21	LCD TTL Interface, integrate 4-wire resistive touch panel interface
J22	CAMERA
J24	VGA
J25	MIC Audio input
J26	Audio output

J27	SATA
J28	SATA Hard Disk power supply interface
J29	MINI_PCIE
J30	SIM Card interface
J31	RS485 and GPIO
J32	+5 Power supply output
J33	Audio output
SW1	Dial switch
BT1	System clock power supply (+3.0V)
BZ1	Buzzer
K1	Reset Button

3.2 Jumper Dial-up Setting

Jumper setting: J4 and J7 jumper choose BOOT MODE

J4	J7	BOOT MODE
0	0	BOOT FROM FUSE
0	1	SERIAL DOWNLOADER
1	0	INTERNAL BOOT
1	1	RESERVED

NOTE: '0' means off, '1' means jumper on

Dial-up setting: SW1 dial-up switch choose BOOT DEVICE

BOOT DEVICE	Dial-up 1	Dial-up 2	Dial-up 3	Dial-up 4
SPI	0	1	0	0
SD	1	0	1	0
EMMC	1	1	0	1

3.3 Pin Definition

J2: UART and CAN

Signal Name	PIN	PIN	Signal Name
J_RXD4	1	2	J_RXD5
J_TXD4	3	4	J_TXD4
GND	5	6	GND
UART4_RXD	7	8	UART5_RXD
UART4_TXD	9	10	UART5_TXD
+5.0V	11	12	+5.0V
CAN2_RXD	13	14	J_CANH1
CAN2_TXD	15	16	J_CANL1

J5: SPI and 2*4 GPIO

Signal Name	PIN	PIN	Signal Name
+3.3VD	1	2	+3.3VD
SPI5_MISO	3	4	SPI5_MOSI
SPI5_SCLK	5	6	SPI5_CS0
SPI5_CS1	7	8	SPI5_CS2
GND	9	10	GND
GPIO2_0	11	12	GPIO2_1
GPIO2_2	13	14	GPIO2_3
GPIO2_4	15	16	GPIO2_5
GPIO2_6	17	18	GPIO2_7
GND	19	20	GND

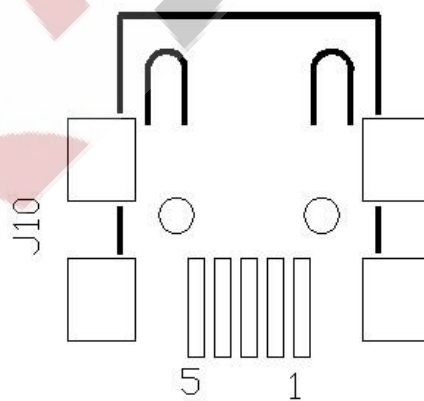
J6: Debug Port

PIN	Signal Name
1	J_TXD
2	J_RXD
3	GND

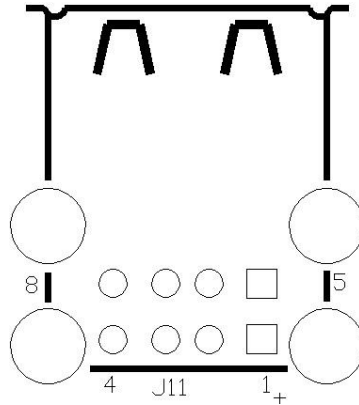
J8: JTAG Debugging Interface

Signal Name	PIN	PIN	Signal Name
+3.3VD pull-up	1	2	JTAG_TMS
GND	3	4	JTAG_TCK
GND	5	6	JTAG_TDO
JTAG_TRSTn	7	8	JTAG_TDI
pull-down	9	10	+3.3VD pull-up

J10: USB OTG



picture 3



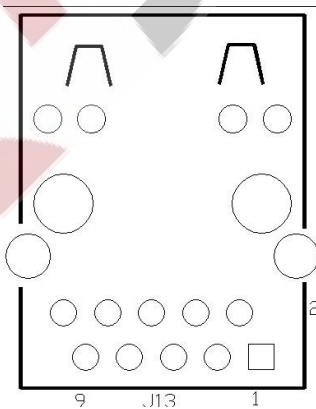
picture 4

J11: Dual USB HOST: Top is USB1, Below is USB2

J12: USB2.0 Contact Pin interface, can connect to external USB module.

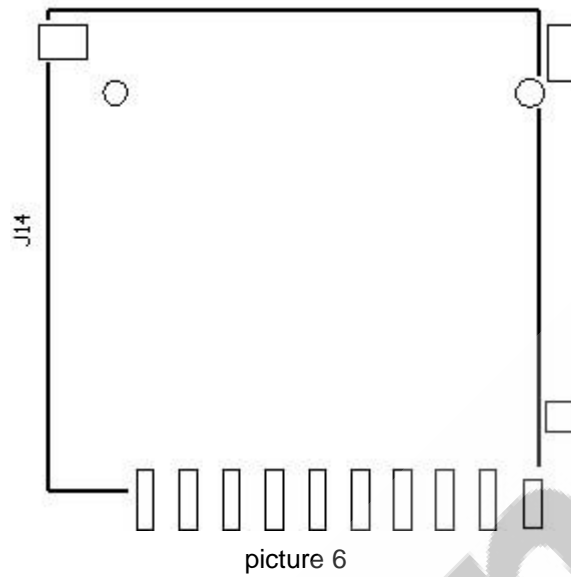
PIN	Signal Name
1	GND
2	USBDN_DP4
3	USBDN_DM4
4	+5.0VD

J13: Standard 10M/100M/1000M RJ45 Ethernet port, integrated LAN transformer and network indicator

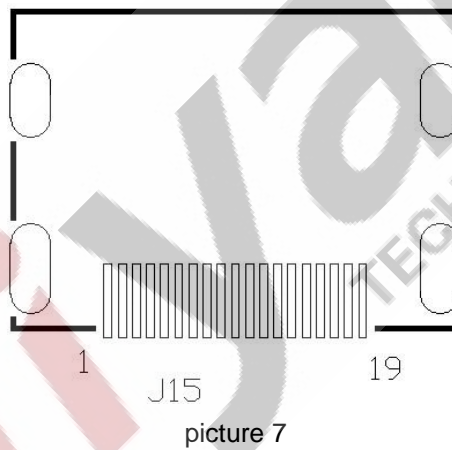


picture 5

J14: Standard SD Card interface, support high-capacity SD Card storage



J15: Standard HDMI



PIN	Signal Name
1	TMDS_DP2
2	GND
3	TMDS_DM2
4	TMDS_DP1
5	GND
6	TMDS_DM1
7	TMDS_DP0

8	GND
9	TMDS_DM0
10	TMDS_CLKP
11	GND
12	TMDS_CLKN
13	HDMI_CEC_OUT
14	NC
15	DDC_CLK
16	DDC_DAT
17	GND
18	HDMI_5VOUT
19	HP_DET

J16: LVDS1

Signal Name	PIN	PIN	Signal Name
+3.3VD	1	2	+3.3VD
GND	3	4	GND
LVDS0_TXN0	5	6	LVDS0_TXP0
GND	7	8	LVDS0_TXN1
LVDS0_TXP1	9	10	GND
LVDS0_TXN2	11	12	LVDS0_TXP2
GND	13	14	LVDS0_CLKN
LVDS0_CLKP	15	16	GND
LVDS0_TXN3	17	18	LVDS0_TXP3
GPIO_1	19	20	GPIO_2

J17: LVDS2

Signal Name	PIN	PIN	Signal Name
+3.3VD	1	2	+3.3VD
GND	3	4	GND
LVDS1_TXN0	5	6	LVDS1_TXP0
GND	7	8	LVDS1_TXN1
LVDS1_TXP1	9	10	GND
LVDS1_TXN2	11	12	LVDS1_TXP2
GND	13	14	LVDS1_CLKN
LVDS1_CLKP	15	16	GND
LVDS1_TXN3	17	18	LVDS1_TXP3
GPIO_3	19	20	GPIO_4

J18: LCD Power supply interface

PIN	Signal Name
1	+12VD
2	GND
3	GND
4	+5.0VD
5	GND
6	+3.3VD

J19: Capacitive touch panel interface

PIN	Signal Name
1	+3.3VD

2	I2C3_SDA
3	I2C3_SCL
4	GPIO_18
5	GPIO_19
6	GND

J21: TTL LCD

Signal Name	PIN	PIN	Signal Name
GND	1	2	DISP0_CLK
DISP0_HS	3	4	DISP0_VS
GND	5	6	DISP0_DAT18
DISP0_DAT19	7	8	DISP0_DAT20
DISP0_DAT21	9	10	DISP0_DAT22
DISP0_DAT23	11	12	GND
DISP0_DAT10	13	14	DISP0_DAT11
DISP0_DAT12	15	16	DISP0_DAT13
DISP0_DAT14	17	18	DISP0_DAT15
GND	19	20	DISP0_DAT2
DISP0_DAT3	21	22	DISP0_DAT4
DISP0_DAT5	23	24	DISP0_DAT6
DISP0_DAT7	25	26	GND
DISP0_DE	27	28	LCD_VDD
LCD_VDD	29	30	LCD_PWR
LCD_MOD	31	32	NC
LCD_CC	33	34	NC

GND	35	36	NC
NC	37	38	NC
NC	39	40	NC
TSC_XP	41	42	TSC_YP
TSC_XM	43	44	TSC_YM

J22: Camera interface

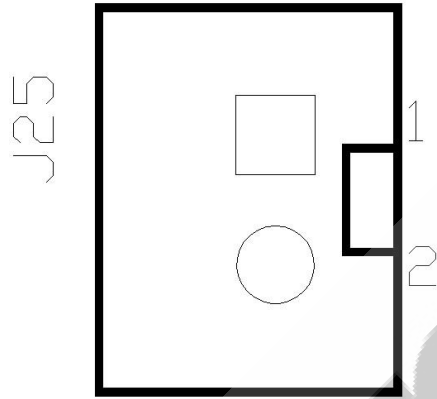
Signal Name	PIN	PIN	Signal Name
+3.3VD	1	2	GND
I2C1_SCL	3	4	I2C1_SDA
CSI0_VS	5	6	CSI0_HS
CSI0_PCLK	7	8	NC
CSI0_DAT19	9	10	CSI0_DAT18
CSI0_DAT17	11	12	CSI0_DAT16
CSI0_DAT15	13	14	CSI0_DAT14
CSI0_DAT13	15	16	CSI0_DAT12
GND	17	18	CSI0_DAT11
CSI0_PWDN	19	20	CSI0_DAT10

J24: VGA

Signal Name	PIN	PIN	Signal Name
RED	1	2	GND
GREEN	3	4	GND
BULE	5	6	GND
VGA_VS	7	8	NC

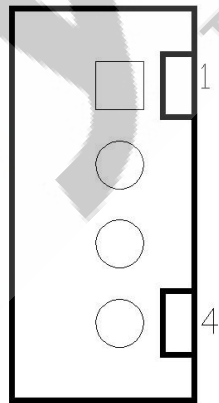
VGA_HS	9	10	NC
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J25: MIC Input Interface



picture 8

PIN	Signal Name
1	MIC_INP
2	MIC_INM



picture 9

J26: Audio Contact PIN Interface

PIN	Signal Name
1	LSPK1
2	LSPK2

3	RSPK1
4	RSPK2

J27: Standard SATA hard disk interface

PIN	Signal Name
1	GND
2	SATA_TXP
3	SATA_TXM
4	GND
5	SATA_RXM
6	SATA_RXP
7	GND

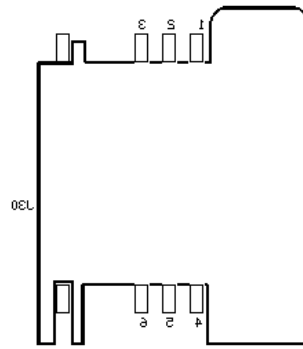
J28:SATA hard disk power supply interface, 2.54 PIN with frame

PIN	Signal Name
1	+5.0VD
2	GND
3	GND
4	+12.0VD

J29: MINI_PCIE

Signal Name	PIN	PIN	Signal Name
Reserved	1	2	PCIE_3V3
Reserved	3	4	GND
Reserved	5	6	PCIE_1V5

Reserved	7	8	UIM_PWR
GND	9	10	UIM_DATA
CLK1_N	11	12	UIM_CLK
CLK1_P	13	14	UIM_RST
GND	15	16	UIM_VPP
Reserved	17	18	GND
Reserved	19	20	PCIE_DISEN
GND	21	22	PCIE_RSTN
PCIE_RXM	23	24	PCIE_3V3
PCIE_RXP	25	26	GND
GND	27	28	PCIE_1V5
GND	29	30	I2C2_SCL
PCIE_TXM	31	32	I2C2_SDA
PCIE_TXP	33	34	GND
GND	35	36	USBDN_DM3
Reserved	37	38	USBDN_DP3
Reserved	39	40	GND
Reserved	41	42	LED_WWAN
Reserved	43	44	LED_WLAN
Reserved	45	46	LED_WPAN
Reserved	47	48	PCIE_1V5
Reserved	49	50	GND
Reserved	51	52	PCIE_3V3



picture 10

J30: SIM Card

Signal Name	PIN	PIN	Signal Name
UIM_PWR	1	4	GND
UIM_RST	2	5	UIM_VPP
UIM_CLK	3	6	UIM_DATA

J31: 2*4GPIO interface 2-ch, 5-wire UART multiplex with 2-ch RS485

Signal Name	PIN	PIN	Signal Name
GPIO2_16	1	2	GPIO2-20
GPIO2-17	3	4	GPIO2-21
GPIO2-18	5	6	GPIO2-22
GPIO2-19	7	8	GPIO2-23
GND	9	10	GND
J_RXD2(RS485-B2)	11	12	J_RXD3(RS485-B3)
J_TXD2(RS485-A2)	13	14	J_TXD3(RS485-A3)
GND	15	16	GND
J_CTS2	17	18	J_CTS3
J_RTS2	19	20	J_RTS3

J32:+5.0VD Power supply output, can supply to peripherals

PIN	Signal Name
1	+5.0VD
2	GND

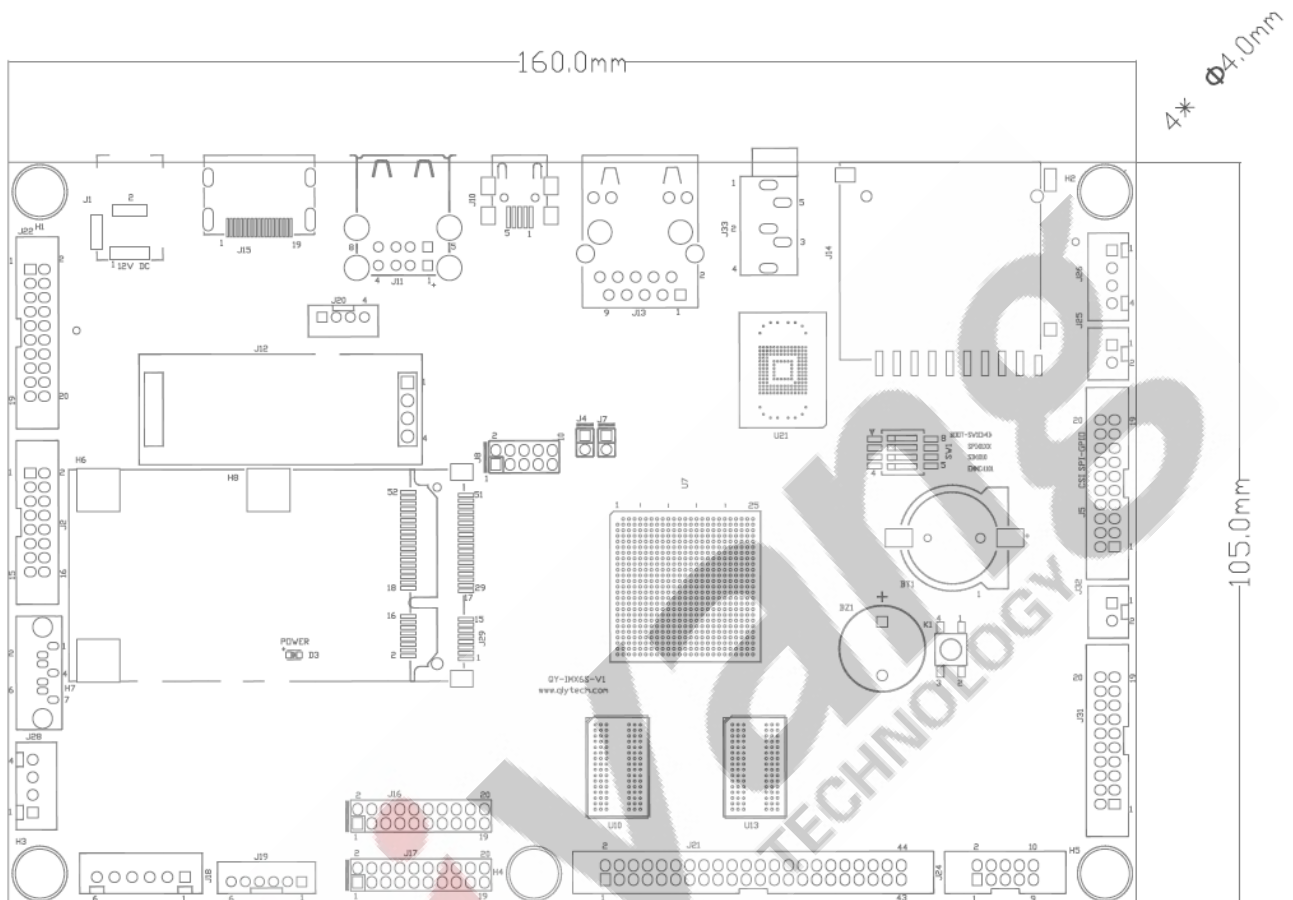
J33:Audio output interface, PJ245 vertical 3.5mm board plug earphone socket

PIN	Signal Name
1	GND
2	NC
3	RSPK1
4	NC
5	LSPK1

IV. Function Illustration

The mainboard's function will be completed in future.

V. Size & Structure Chart



picture 11

VI. Software Description

QY-IMX6S is available for Linux/Android OS.

The detailed Linux development environment setting up and usage, please refer to the *Linux User Manual*.

The detailed Android development environment setting up and usage, please refer to the *Android User Manual*.

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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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