



IAC-IMX6UL-CM Core Board
Hardware Manual

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QIYANG INTELLIGENTTECHNOLOGY Co., Ltd

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Version updates

Version	Hardware	Description	Date	Reviser
1.0	IAC-IMX6UL-KIT	Initial Version ,Launched	2015-12-06	st
2.0	IAC-IMX6UL-KIT	Internal Version	2016-06-06	st

Catalogue

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"Notice": This manual mainly introduce hardware interface of this development 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 IAC-IMX6UL-Kit Development Kit

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 IAC-IMX6UL-Kit, 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 *QY-IMX6UL Linux User Manual*;
5. IAC-IMX6UL-KIT accept baseboard customization and development service and core board batch order.

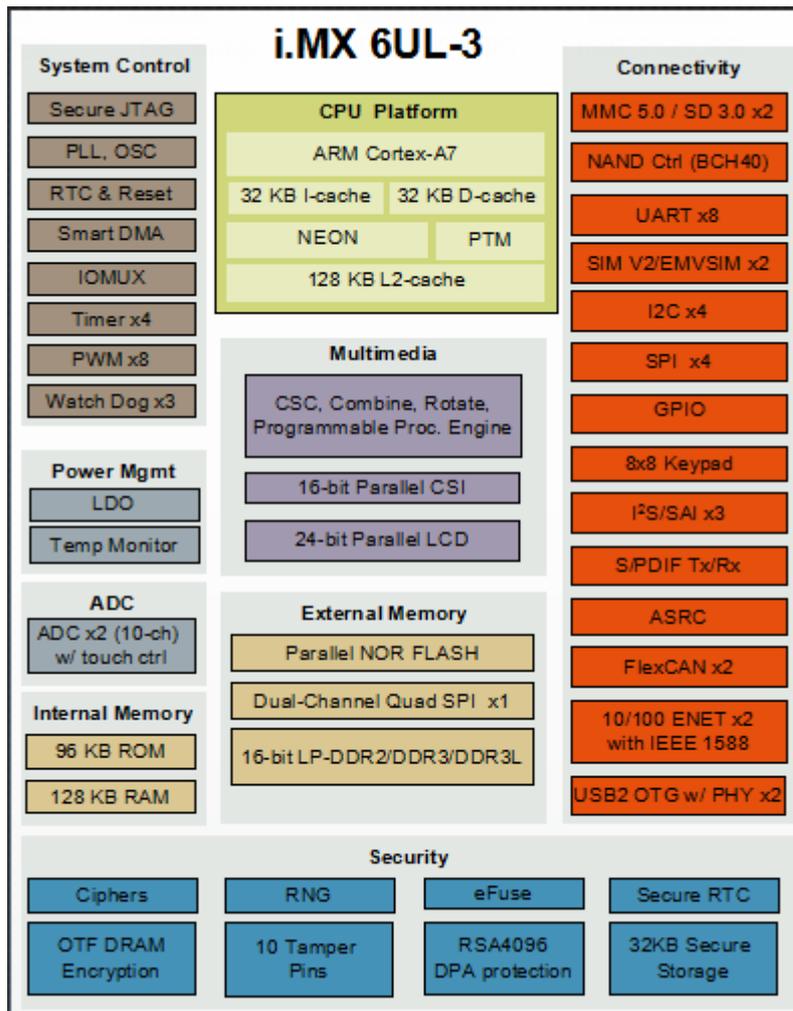
II . System Composition

2.1 Chip Summary

IAC-IMX6UL-KIT development board/evaluation board, adopts Freescale i.MX6U1traLite processor, users could select from various models of processor chip as needed in order to reduce the cost, this model is only suitable for mass production, Qiyang development/evaluation board's standard configuration is i.MX6 UL-2.

i.MX 6UL is the ARM Cortex-A7 microprocessor which American freescale launched. This processor carries NEON and FPU(Floating Point Unit) coprocessor; It has 32KB L1 command cache and 32KB data cache which is with single fault test(odd even check); has 256KB L2 cache which has function of Error Correction Codeword(ECC). Moreover, i.MX6 UL-2 integrates profuse interface resources.

Function diagram is as shown:



- ◆ ARM Cortex A7 core, 528MHZ;
- ◆ Be with NEON and FPU(Floating Point Unit) coprocessor;
- ◆ Be with 24-bit LCD controller and touch screen controller, the resolution ratio reaches up to 1366*768;
- ◆ 2-ch USB2.0 high speed OTG;
- ◆ 2-ch HOST USB HSIC, 1-ch OTG and 1-ch HOST USB integrated PHY;
- ◆ 2-CH MMC5.0/SD2.0/SDIO;
- ◆ Supports 8/10/16 -Bit CSI Image Sensor interfaces;
- ◆ Supports 8-CH UART;
- ◆ 2-ch Ethernet port MAC (10/100/1000MHZ);;
- ◆ Up to 2 Controller Area Network(CAN) ports, support CAN2,0 A and B;
- ◆ 3-ch multifunctional audio channels;
- ◆ Common peripherals like Multi-channels SPI, IIC, timer, PWM, DWA, RTC, watchdog, etc.

i.MX6UL Series Chips

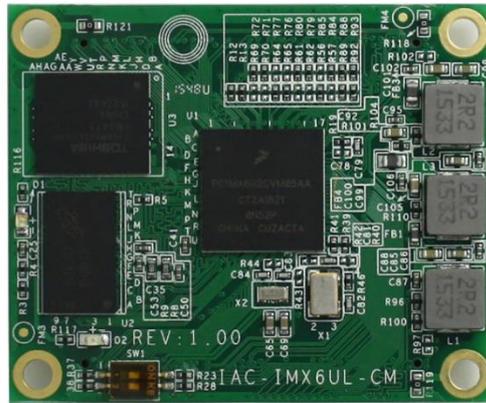
i.MX 6UltraLite Device Options

Red indicates change from column to the left

Feature	6UL-0	6UL-1	6UL-2	6UL-3
Sub Family	6UL Base	6UL General Purpose 1	6UL General Purpose 2	6UL Security
Core	ARM Cortex-A7	ARM Cortex-A7	ARM Cortex-A7	ARM Cortex-A7
Speed	528 MHz	528 MHz	528 MHz	528 MHz
Cache	32 KB-I, 32KB-D	32 KB-I, 32KB-D	32 KB-I, 32KB-D	32 KB-I, 32KB-D
OCRAM	128 KB	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	16-bit LP-DDR2, DDR3/DDR3L
eFuse for Customer	512-bit	1024-bit	1536-bit	2048-bit
NAND (BCH40)	Yes	Yes	Yes	Yes
Parallel Nor/EBI	Yes	Yes	Yes	Yes
Ethernet	10/100 MB x 1	10/100 MB x 1	10/100 MB x 2	10/100 MB x 2
USB with PHY	OTG, HS/FS x 1	OTG, HS/FS x 2	OTG, HS/FS x 2	OTG, HS/FS x 2
CAN	0	1	2	2
Security	None	TRNG, Crypto Engine (AES/TDES/SHA), Secure Boot	TRNG, Crypto Engine (AES/TDES/SHA), Secure Boot	TRNG, Crypto Engine (AES/TDES/SHA/RSA with DPA), Secure Boot, Tamper Monitor, PCI4.0 pre-certification, OTF DRAM Encryption
Graphic	None	None	PxP	PxP
CSI	None	None	16-bit Parallel CSI	16-bit Parallel CSI
LCD	None	None	24-bit Parallel LCD	24-bit Parallel LCD
QSPI	1	1	1	1
SDIO	2	2	2	2
UART	4	8	8	8
ISO7816-3	0	2	2	2
IIC	2	4	4	4
SPI	2	4	4	4
I2S/SAI	1	3	3	3
S/PDIF	1	1	1	1
Timer/PWM	Timer x2, PWM x4	Timer x4, PWM x8	Timer x4, PWM x8	Timer x4, PWM x8
12-bit ADC	1x8ch	1x8ch	2x8ch	2x8ch
Keyboard (8x8)	Yes	Yes	Yes	Yes
Temperature	0C to 70C (Tj)	-40C to 105C (Tj)	-40C to 105C (Tj)	-40C to 105C (Tj)

2.2 Core Board Resources

IAC-IMX6UL-KIT core board adopts 4-layer PCB high precision technology, and be of the top electrical and anti-jamming performance. It integrates CPU, EMMC, RAM, power, crystal oscillator ,etc, draw up to more than 160 pins, fully expand the hardware resources of i.MX6UL-2, users could combine different interface functions by multiplexing pins and redesign the most personalized baseboard.



- ◆ Onboard freescale i.MX 6UL-2 CPU, basic frequency: 528MHz;
- ◆ Onboard 256M DDR3 SDRAM (**512MB RAM,1GBRAM optional**) 4GB EMMC Flash ;
- ◆ Board card specification: 55mm * 46mm, it can be suitable for many kinds of embedded situation;
- ◆ By using 2*50PIN connectors bring out all signals from Core Board, so it is convenient for users to do hardware pruning and multi-platform using;
- ◆ Power: 5V power supply, extra low power consumption, mainboard power<2W.

2.3 PIN Definition

J1 PIN Definition

SIGNAL	PIN	PIN	SIGNAL
GND	1	2	GND
GND	3	4	GND
GND	5	6	GND
I2C1_SCL	7	8	I2C1_SDA

GND	9	10	GND
I2C2_SCL	11	12	I2C2_SDA
GND	13	14	GND
H_WP_W	15	16	H_WP_U
GND	17	18	GND
CSI_DAT4	19	20	CSI_DAT2
CSI_DAT5	21	22	CSI_DAT3
CSI_DAT7	23	24	CSI_DAT6
GND	25	26	GND
SD1_CLK	27	28	SD1_CMD
SD1_DAT1	29	30	SD1_DAT0
SD1_DAT3	31	32	SD1_DAT2
GPIO1_19	33	34	SD1_DAT4
GND	35	36	GND
KEY1_IN	37	38	SPI3_SS0
SPI3_SCLK	39	40	SPI3_MISO
GND	41	42	SPI3_MOSI
GND	43	44	GND
PWM5_OUT	45	46	PWM4_OUT
GND	47	48	GND
LCD_CLK	49	50	BZ_CMD
LCD_VSYNC	51	52	LCD_HSYNC
GND	53	54	LCD_DE
GND	55	56	GND
LCD_DAT1	57	58	LCD_DAT0

LCD_DAT3	59	60	LCD_DAT2
LCD_DAT5	61	62	LCD_DAT4
LCD_DAT7	63	64	LCD_DAT6
GND	65	66	GND
LCD_DAT9	67	68	LCD_DAT8
LCD_DAT11	69	70	LCD_DAT10
LCD_DAT13	71	72	LCD_DAT12
LCD_DAT15	73	74	LCD_DAT14
GND	75	76	GND
LCD_DAT17	77	78	LCD_DAT16
LCD_DAT19	79	80	LCD_DAT18
LCD_DAT21	81	82	LCD_DAT20
LCD_DAT123	83	84	LCD_DAT22
GND	85	86	GND
ENET2_TX_CLK	87	88	ENET2_RXER
GND	89	90	GND
ENET2_TXEN	91	92	ENET2_EXD0
ENET2_TXD0	93	94	ENET2_RXD1
ENET2_TXD1	95	96	ENET2_CRS_DV
GND	97	98	GND
GND	99	100	GND

J2 PIN Definition

信号名	引脚	引脚	信号名
GND	1	2	GND

GND	3	4	GND
GND	5	6	GND
NC	7	8	SYS_RST
RUN_LED	9	10	GND
WDI_CMD	11	12	RST_CMD
PCIE_DISEN	13	14	PCIE_RST
ENET1_INT	15	16	GND
ENET2_INT	17	18	EMMC_LED
GND	19	20	ENET_RST
LCD_PW_EN	21	22	ERROR_LED
5V0_OTG1	23	24	5V0_OTG2
GND	25	26	GND
USB_OTG1_ID	27	28	GPIO1_IO2
GPIO1_IO1	29	30	GPIO1_IO3
GND	31	32	GND
GPIO1_IO4	33	34	USB_OTG2_DP
GND	35	36	USB_OTG2_DN
USB_OTG1_DP	37	38	GND
USB_OTG1_DN	39	40	GND
GND	41	42	GND
GND	43	44	JTAG_TCK
JTAG_TMS	45	46	JTAG_TDO
AUD_RST	47	48	JTAG_nTRST
JTAG_ADI	49	50	GND
GND	51	52	TP1

UART1_TXD	53	54	TP2
UART1_RXD	55	56	GND
UART2_TXD	57	58	CAN2_TXD
UART2_RXD	59	60	CAN2_RXD
UART3_TXD	61	62	GND
UART3_RXD	63	64	CAN1_TXD
UART4_TXD	65	66	CAN1_RXD
UART4_RXD	67	68	GND
UART5_TXD	69	70	UART5_CTS
UART5_RXD	71	72	UART5_RTS
GND	73	74	GND
ENET_MDC	75	76	ENET_MDIO
GND	77	78	GND
ENET1_RXER	79	80	ENET1_TXEN
ENET1_RXD0	81	82	ENET1_TX_CLK
ENET1_RXD1	83	84	ENET1_TXD0
ENET1_CRSDV	85	86	ENET_TXD1
GND	87	88	GND
GND	89	90	GND
5V0_CORE	91	92	5V0_CORE
5V0_CORE	93	94	5V0_CORE
5V0_CORE	95	96	5V0_CORE
5V0_CORE	97	98	5V0_CORE
5V0_CORE	99	100	5V0_CORE

III. 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 IAC-IMX6UL-KIT; 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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