A10 Development Board

User Manual

V1.2

2011.9.15

Revision History

Version	Date	Description	Remarks
V1.0	2011-6-7	Initial Version	
V1.1	2011-8-24	Modification and completion in accordance with EVB-V1-2	
V1.2	2011-9-15	Images modification	

Table of Contents

1. A10 Development Board Introduction

1.1. A10 Overview

The connected smart HD SoC processor A10, developed on the basis of ARM Cortex-A8by Allwinner Technology CO., Ltd in Zhuhai, aims to remarkably promote the application of connected HD SoC, which will eventually greatly enhance user experience of consume electronic multimedia products. This new-generation highly integrated processor, boasting of its premium internet video performance, cost-efficiency and low power consumption, is bound to be popular in such applications as MID, family connected smart HD player, auto multimedia controller, safety monitor, as well as various portable multimedia entertainment products.

H.264 High Profile 1080P encoding technique is integrated in A10 by Allwinner Tech to facilitate the development of the connected HD video codec application. The multi-channel 1080P decoding application can be achieved with the presence of full-format HD decoding technique.

The ARM Mali400 2D/3D processor is introduced into the currently high-efficient image accelerator framework of A10 to better support popular smart OS such as Android 2.3/3.0, and to greatly improve the Android product performance and user experience.

Note：Refer to *A10 Datasheet* for more details.

1.2. Development Board Function Introduction

The A10-exclusive development board, which is compact, fully-featured and flexible, is designed to provide enterprises with guidance on product software/hardware development, debugging or product design reference in

MID, family connected smart HD player, auto multimedia controller, safety monitor, as well as various portable multimedia entertainment products.

Robust Video Codec

● Support full HD（1920*1080P）video decoding: H.264, H.263, VC-1, MPEG-1/2/4, DIVX-3/4/5/ 6, XVID, WMV7/8, VP8,VP6, AVS jizun

● Support all popular HD video package formats and almost all HD video formats

● Support JPEG and H.264 encoding（1080P@60fps/720P@100fps）

Powerful Audio Codec

● Playback of all popular audio formats: MP3，WMA，OGG，FLAC，APE，AAC， ATRA, etc.

Strong Image Browsing

● Support high definition image formats such as JPEG、GIF、BMP

● Support image size up to 16384x16384(for 4:4:4 color formats)

E-Book

● Support E-Book formats: EPUB,PDF, FB2, PDB, CHM, HTML, TXT, etc；

● Support encoding formats: ANSI/ASCII, UTF-8, UTF16-BE, UTF16-LE, GB2312, EUC-KR, SHIFT-JIS, Windows-1250/1251, etc；

● Support language: English, Chinese (Simplified/Traditional), French, Italian, Spanish, Dutch, Japanese, Korean, etc.

Memory

- 1GB 32-bit DDR3, 4GB NAND，expandable to 8GB

- ECC 64-bit

- Support NAND of Samsung, Toshiba, Hynix, Microm, Intel…

- Support NAND of 5xnm, 4xnm, 3xnm, 2xnm…

Rich Peripherals

- USB2.0 OTG、USB2.0 HOST、HDMI1.3/1.4.、LCD、CVBS-OUT、VGA-OUT、SATA,、Line-In、Headphone、

10/100M Ethernet、Camera Sensor Interface (2)、SDIO WIFI、GPS、Gyroscope、Light Sensor、Bluetooth、Compass

Multiple Boot Devices

- Boot mode: NAND FLASH, SD/MMC Card, USB

Operation System

- Support multiple popular OS: Android 2.3.4, Linux2.6, WinCE6.0

1.3. Development Board Configuration

Standard Configuration

1. Mother board of A10 development board (1)

2. USB to TTL Cable (1)

3. 1 2V@2A power adaptor (1)

4. 5 " LCD with TP (1)（TFT 800*480 HD，4-wire Resistive TP）

A10 Development Board   USB to TLL Cable   Power Adaptor

Selectable Configuration

5.   Camera Daughter Board

6.   SDIO WIFI Daughter Board

7.   7 " LCD with Capacitive Touch Panel（TFT 800*480 HD，TTL Interface）

SDIO WIFI Daughter Board   Camera Daughter Board

1.4. Development Board Functional Block Diagram

BLOCK

CVBS OUT

VGA OUT

HDMI/1080P

LCD/LVDS

UART0 — RS232

JTAG

TV IN

CIS0 SOCKET TWI1

CIS1 SOCKET TWI1

TWI1 — EEPROM

EMAC

USB0 OTG

USB1 HOST

USB2 HOST

EXTEND SOCKET1 — WIFI COMPASS GYROSCOPE LIGHT SENSOR TWI1

EXTEND SOCKET2 — GPS TP TWI2

EXTEND SOCKET3 — BLUETOOTH GPIO

PMU AXP209   TWI0

A10 Cortex-A8

256MB X 4 DDR3 (1024MB)   4GB NANDFLASH

SD0 FOR BOOT

SD1

WIFI(SD3)

SATA

IR

KEY

Gsensor

CTP

LINEIN

MIC   MIC

HEADPHONE

1.5. Development Board Power Block Diagram

POWER TREE
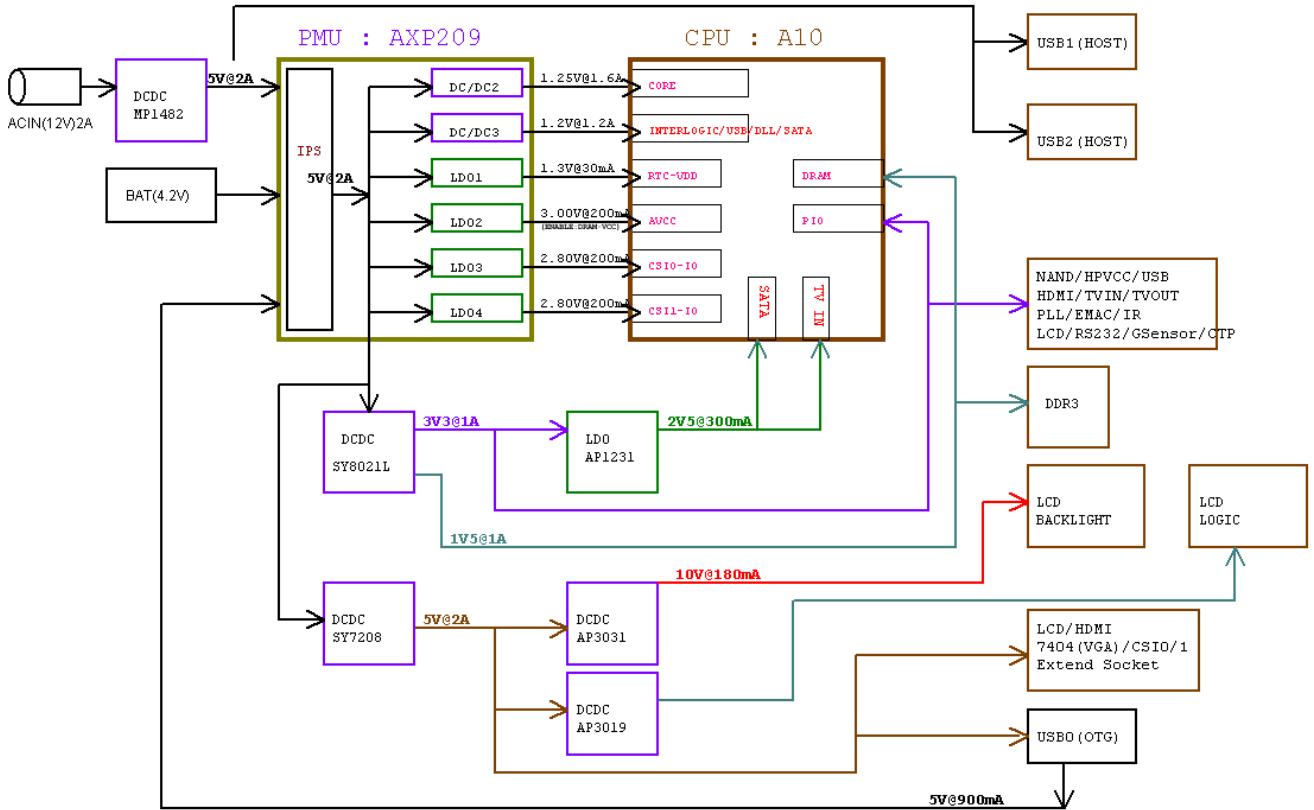
1.6. Typical Application

- MID

- Smart Phone

- Smart TV

- Video Monitor, Driver Camcorder, DV

- Smart Player, Sound Bar, Speaker

- Video Game Machine, Ad Machine, Industrial PC

- GPS, Automobile Entertainment System

1.7. Relative Documentations

- *A10 Development Board Hardware User Manual*
- *A10 Development Board Android User Manual*
- *A10 Development Board Linux User Manual*
- *A10 Development Board WinCE6.0 User Manual*
- *A10 Development Board Schematic*
- *A10 Brief*
- *A10 Datasheet*
- *A10 User manual*
- *AXP209 Datasheet*

1.8. Contact Us

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2. Hardware Resources

2.1. Dimensions

2.2.Top View

2.3. Bottom View

2.4. Hardware Resources
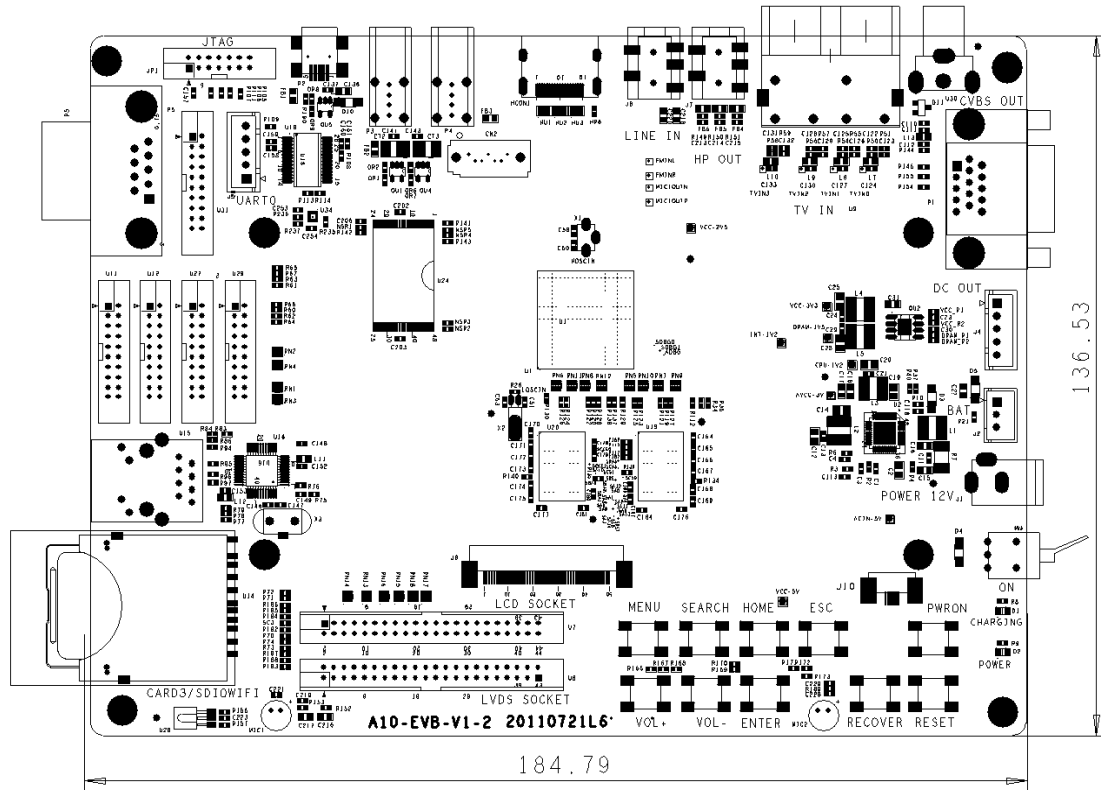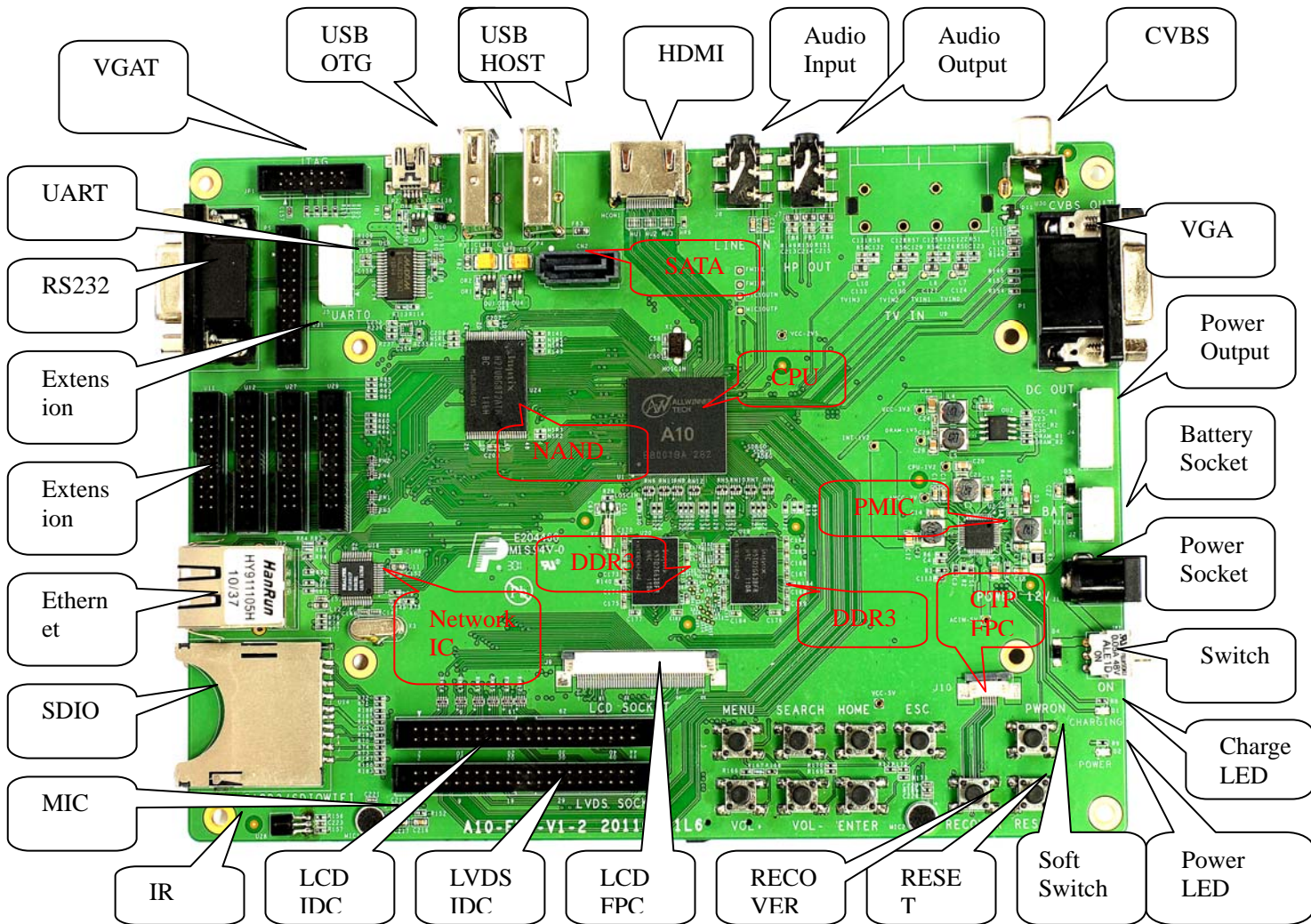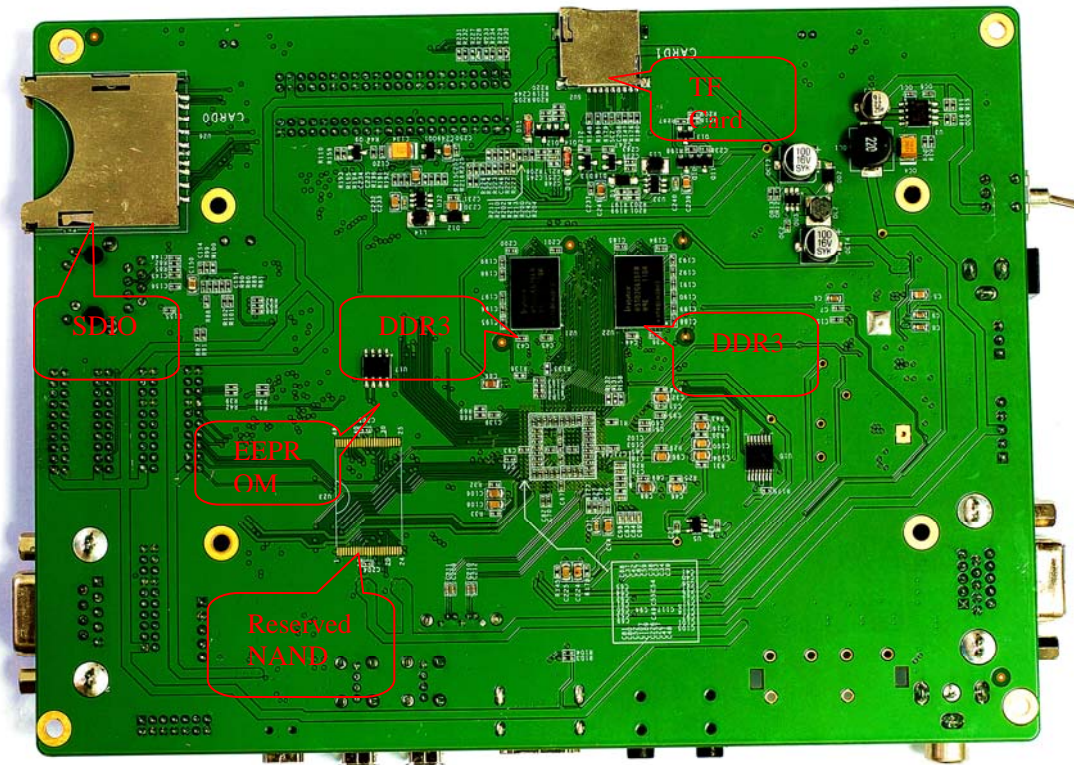
Name	Description
CPU	Cortex-A8 32KB I-Cashe, 32KB D-Cache and 256KB L2 Cache Trustzone Technique
PMU	X-Power AXP209, 1.8A PWM switch charging, Intelligent Power Select (IPS ^{TM}), support 3 channels power input (5V adaptor, battery, USB 5V) and 7 channels power output
DRAM	Four 2G 16-bit DDR3，forming 32-bit 1024M Bytes DRAM。
NAND Flash	Hynix H27UBG8T2A, 4G Bytes MLC 64-bit ECC NAND Flash, two chips up to 8G Bytes expandable; can be used as system boot device
TF Card Interface	Support up to 32G card memory; support card test
SD/MMC Card Interface	Support SD/MMC card read and write; Capable of system booting; Support card boot
SDIO WIFI Card Interface	For SDIO WIFI card
Ethernet	10M/100M IEEE802.3; adopt Realtek RTL8201CP; RJ45 interface
USB Host	2 USB Host interfaces (EHCI)
USB OTG	1 USB2.0
TV-OUT Interface	Support CVBS (AV) output
VGA Interface	VGA output up to 1920*1080
HDMI Output	HDMI V.1.3, support up to 1080P@50/60fpts
LCD	One 50-pin FPC interface, one 44-pin IDC interface for LCD extension ; support screens of all sizes: CPU screen below 3 " ;

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	RGB screen above 3 " ; LVDS screen above 8 "
Touch Panel	Support 4-wire resistive TP and TWI interface capacitive TP
Camera Sensor Interface	Provide two camera sensor interface signals; support NTSC and PAL CCIR656 protocol; support 8-bit data input
Microphone	Support two MIC input
Headphone	Support stereo earphone output
Line-in	Two audio input
TWI	Provide 2 TWIs
UART	Provide one UART: TTL level or RS232 level
JTAG	JTAG debugging
Key	Provide five definable keys, RESET key and POWER_ON key, etc.
IR	Support IR control only
Battery Interface	Support single cell Li-battery 4.1V/4.15V/4.2V/4.36V, etc.; chargeable
AC Adaptor Interface	Support 12V DC power

3. Hardware Details

This section will detail every hardware module and interface parameter, pin definition, relative configuration and application notice of A10 development board.

3.1.CPU

The CPU adopted is Allwinner Tech's A10, a connected smart HD SoC processor for video application and general application and featuring cost efficiency, high integration, high performance and low power consumption. Based on Cortex-A8 (32KB instruction caches, 32KB data caches and 256K L2 caches), A10 integrates multiple functions to reduce total system cost and development complexity. Besides, F20 is available in 441-pin 0.8mm pitch BGA package, which boasts of its small size, low power consumption and low heat.
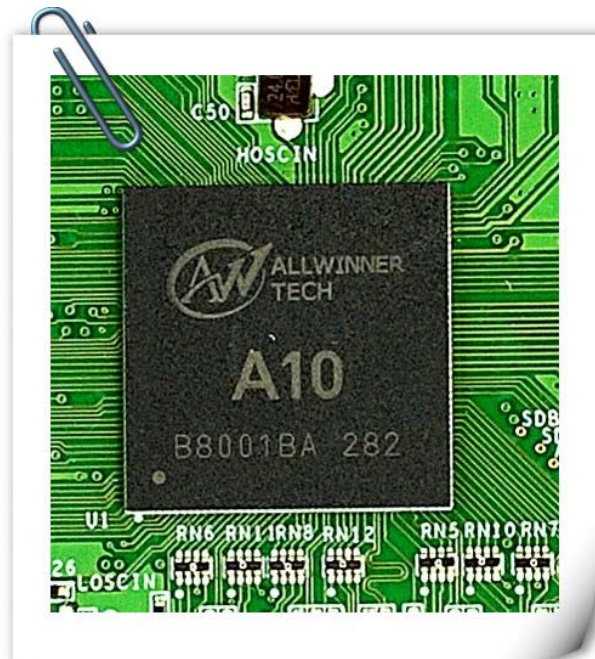
3.2. Power

3.2.1. Power Input

A10 development board provides three kinds of power input: 12V adaptor, battery and USB,

which can be simultaneously available and be selected by PMU automatically:

1.   12V Adaptor:

●   Input from J1 socket, with current up to 2A

●   Go through one DCDC IC MP1482D to provide 5V@2A for PMU, and provide power to two USB HOST interfaces   (USB1, USB2) as well;

2.   Battery:

●   Input from J2 socket

●   Support 4.1V/4.15V/4.2/4.36V single cell Li-battery (lithium ion or lithium polymer)

●   Default charge target voltage (Vtrgt) : 4.2V , which can be set in PMU register

●   Automatic recharge voltage: (Vtrgt – 0.1)V

3.   USB:

●   Input 5V from USB OTG interface P2;
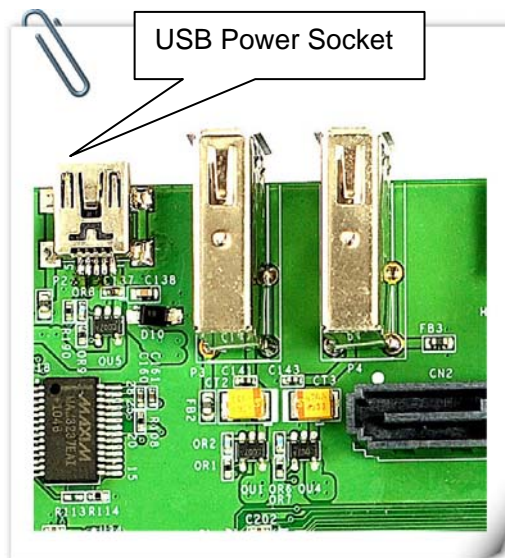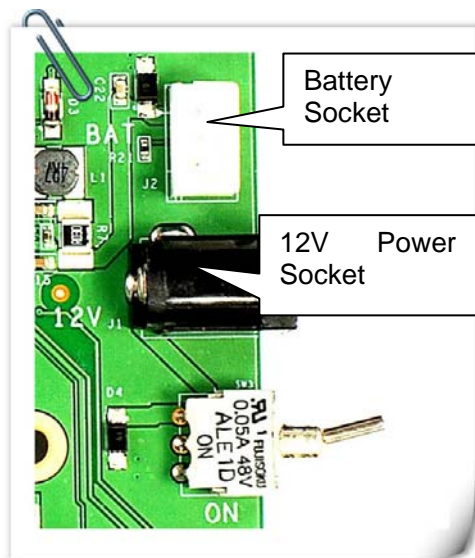
3.2.2. Power Output

To output DC12V/5V/3.3V/GND for user extension from J12 socket.

Power Output Socket

3.2.3. PMU

The PMU used is the highly integrated power management IC AXP209, which integrates an adaptive and USB-compatible PWM charger, two step-down converters (Buck DC-DC converter), five LDO regulators, multiple voltage/current/temperature 12-bit ADCs, and four configurable GPIOs. It also features protection circuitry such as over/under-voltage protection (OVP/UV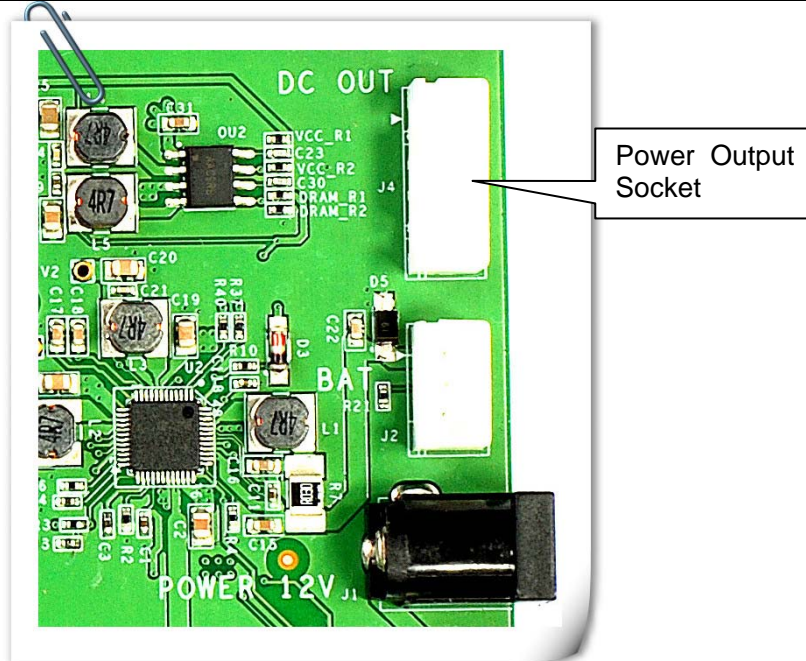P), over-temperature protection (OTP), and over-current protection (OCP) to guarantee the power system security and stability.

AXP209 comes with a Two Wire Serial Interface (TWSI), through which the application processor is capable of enabling/disabling some power outputs, setting the voltage, and visiting internal registers and measurement data (including Fuel Gauge).The high accuracy (1%, depending on the 1% accuracy of BIAS resistors) of power measurement enables consumers to know more about the real-time power consumption.

Additionally, the Intelligent Power Select (Intelligent Power Select, IPS™) of AXP209 can allocate power safely and transparently among USB, external AC adapter, Li-battery, and application loads. It also enables applications to work normally with the presence of only external power input and no batteries (or battery deeply discharged/damage).
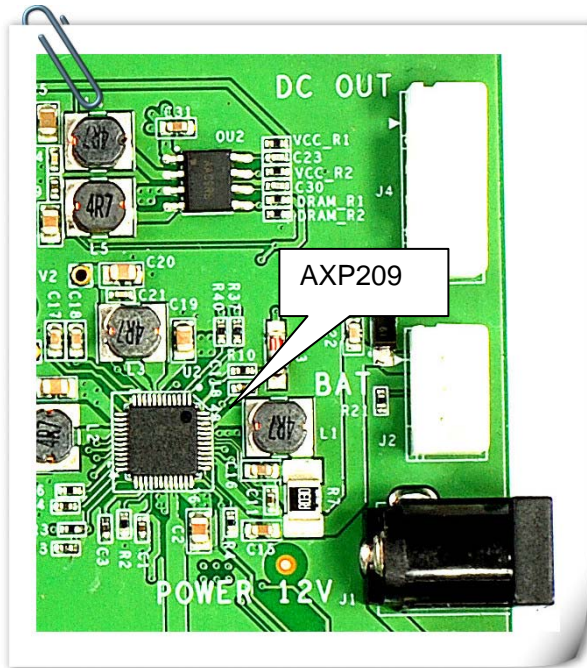
3.2.4. Power LED D2

When PMU works normally, power LED D2 is on, otherwise, D2 is off.
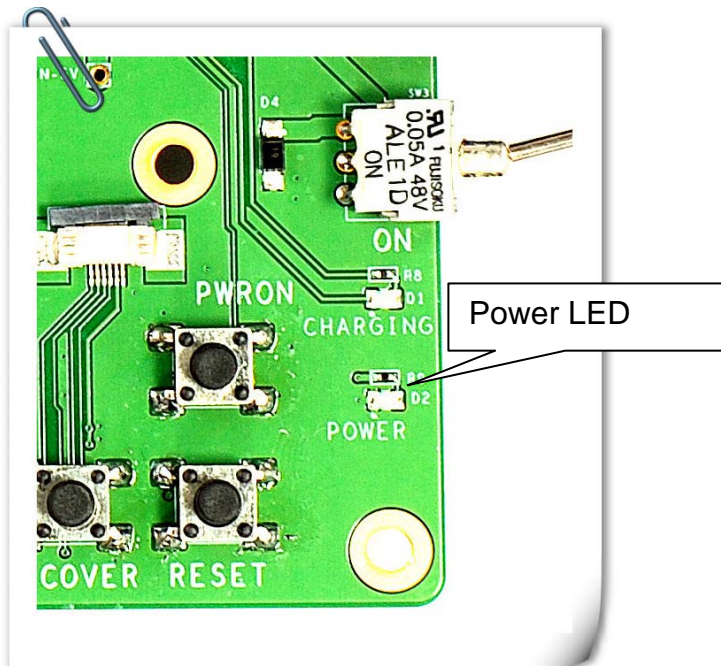
3.2.5. Charging and Warning LED D1

D1 is used to indicate the four states of charging and warning: on charge, not on charge, battery malfunction warning and external power over-voltage warning, as shown below:

LED Status	Indication
Always On	On Charge
OFF	Not On Charge
Flicker at 1Hz	The charger enters battery activate mode, or the battery temperature is too high/low.
Flicker at 4Hz	Over-voltage input by PMU

3.2.6. Reset Key

The development board provides a RESET key to allow development board resetting.
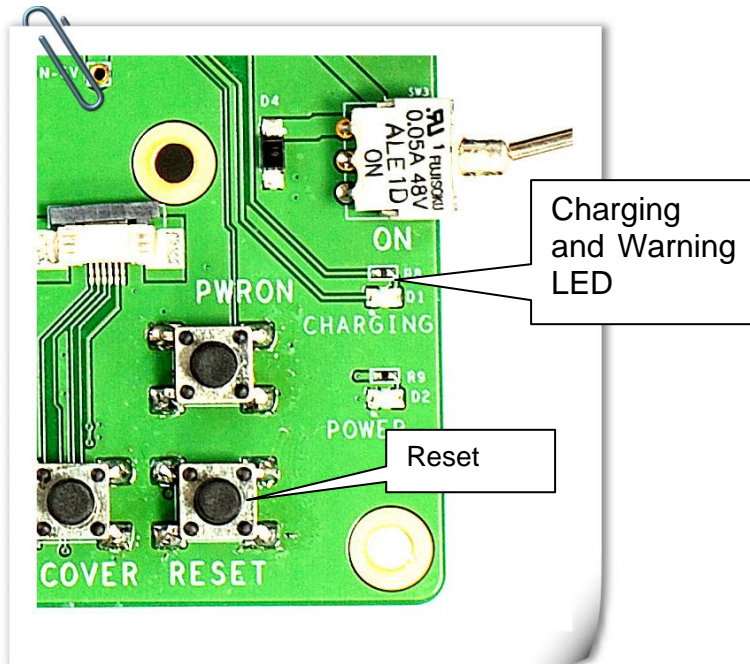
3.2.7. Power Soft Switch Key

The development board provides a power soft switch key, which is connected to the PMU POWON signal.

By default, long-press (6s) of the key can disable all power output switches (except RTC power LDO1).

Besides, PMU can identify the "long-press" and "short-press" of the key, and then send IRQ to CPU. Therefore, the "long-press" and "short press" of the key are definable by users. See AXP209 Datasheet for details.
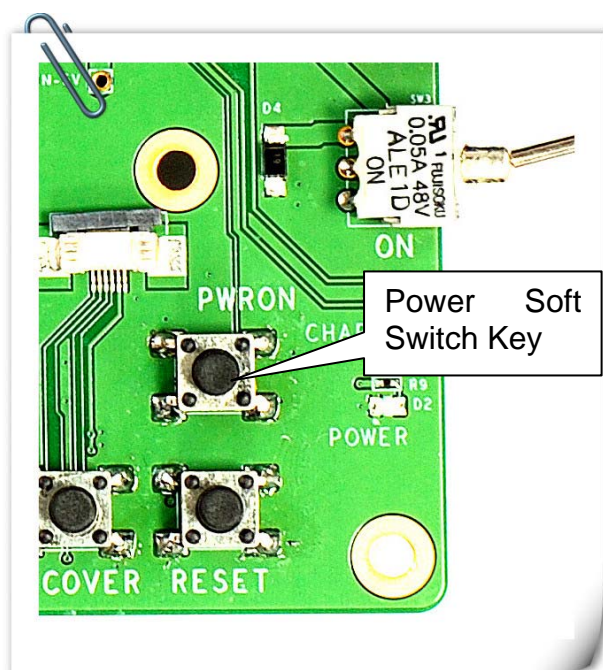
3.3. DRAM

Use four 2G Bit 16-bit DDR3 for a 32-bit1024M Bytes DRAM to guarantee the system high speed.

Front two 2GBit DDR3

Bottom two 2GBit DDR3
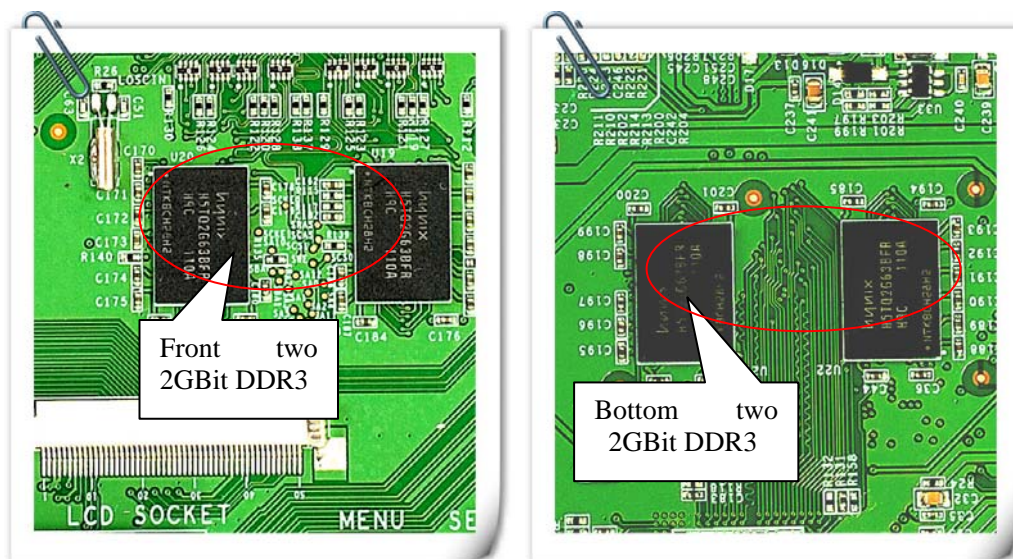
3.4.Boot Device

3.4.1. RECOVER Key

A10 development board provides RECOVER key for system boot or one-key upgrade.

A10 development board supports multiple devices booting: After the system is powered or reset, if the RECOVER is checked to be pressed, system will skip all booting devices and directly download firmware from USB0; if the RECOVER is checked to be released, system will sequentially boot from SD/MMC card (U26), NAND Flash, and USB0 till the system boot success.

RECOVER Key
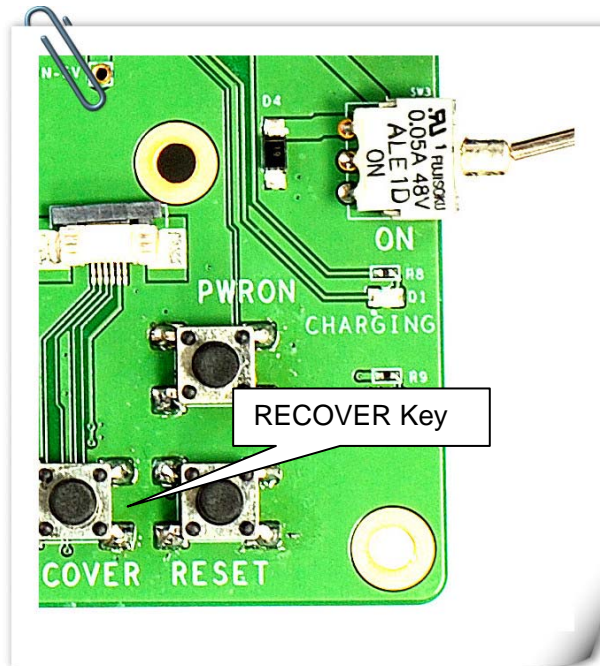
3.4.2. SD/MMC Card Socket

The development board provide one SD/MMC card interface and A10 SD CARD0 interface is used. It features:

● Support SD/MMC card read and write; compatible with Secure Digital memory (up to SD3.0), Secure Digital I/O and Multimedia Card (up to MMC4.3)

● Card capacity up to 32G

● Support 3.3V voltage and card testing（Interrupt IO）

SD/MMC Card Socket (Card0)
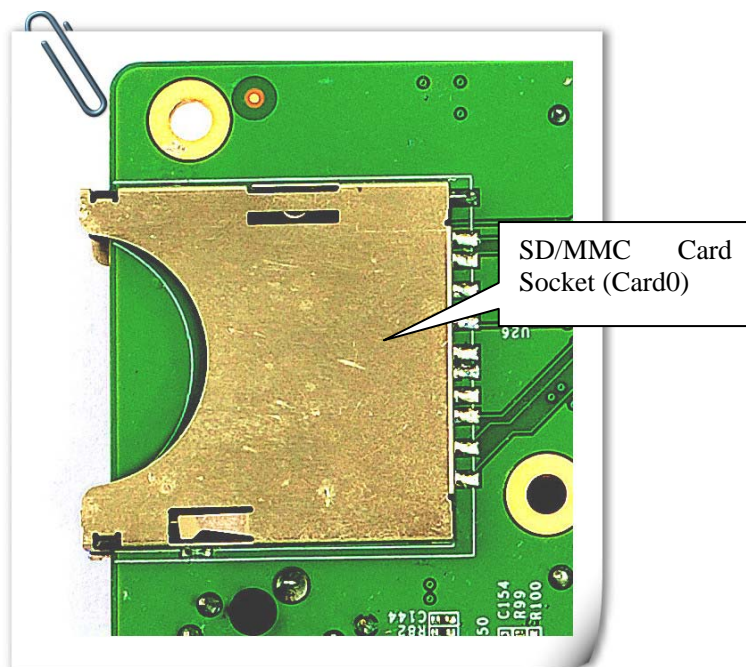
3.4.3. NAND Flash

The board provides one Hynix H27UBG8T2ATB，4G Bytes MLC, and 64bit ECC NAND Flash。
Four CE signals and two RB signals are used.

The board reserves one NAND Flash, supporting at most two single chip-select or two double
chip-select NAND, with capacity up to 16G.

4G NAND Flash

Reserved NAND Flash
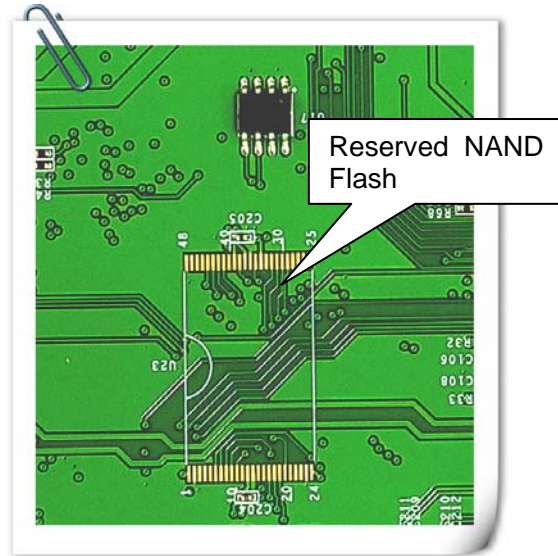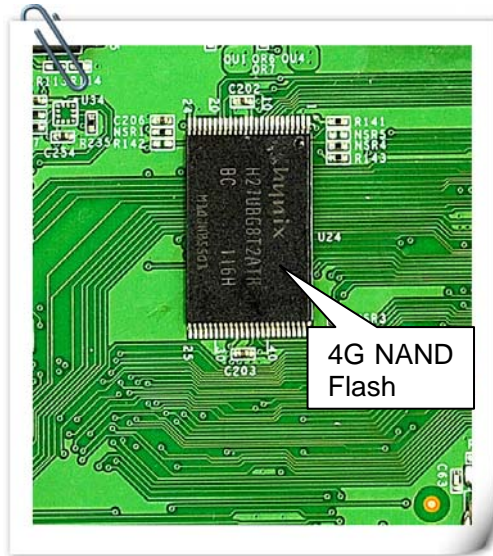
3.5.TF Card Socket

The board provides one TF card interface, and A10 SD CARD1 interface is used. It features:

● Support TF card read and write, and compatible with Secure Digital memory (up to SD3.0)

● Support card capacity up to 32G

● Provide 3.3V voltage and card testing（Interrupt IO）

TF card socket (Card1)

3.6.SDIO WIFI Interface

The board provides one SDIO WIFI card interface and A10 SD CARD3 interface is used. It features:

● Mainly used for SDIO WIFI card development, supporting SDIO 1-bit and 4-bit interrupt module; support suspension and recovery; support read wait；

● Usable by SD/MMC card, compatible with Secure Digital memory (up to SD3.0), Secure Digital I/O , and Multimedia Card (up to MMC4.3)

● Support card capacity up to 32G

● Provide 3.3V voltage and card testing（Interrupt IO）

3.7.JTAG Interface

The JTAG interface provides 14-pin 2.0mm IDC socket to facilitate the system debugging.

JTAG interface

3.8.Ethernet

The board provides network function and REALTEK RTL8201CP is adopted. It features:

● Adopt RJ45, which features Link/Active indicator and insulating transformer

● Compatible with IEEE802.3 standard，and support full duplex and half duplex

● Support 10/100M data rate

Network IC

Ethernet RJ45

3.9.EEPROM

An on-board 2Mbytes EEPROM AT24C16B, which communicates via the TWI1 interface, is provided for MAC address save and other applications.

2M Bytes EEPROM
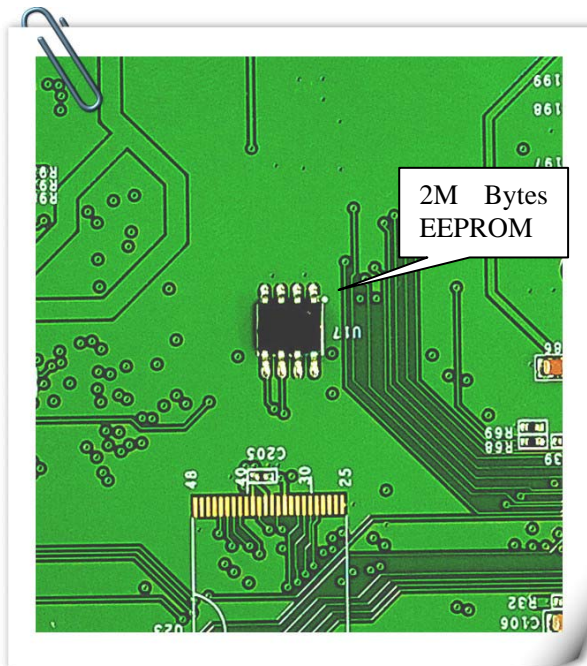
3.10.USB OTG

The board provides one USB OTG interface, and A10 USB0 interface is used. It features:

● Completely compatible with USB OTG 2.0

● Can be configured as standalone USB HOST or USB DEVICE ，which is fully compatible with USB 2.0

● Host mode: support high-speed (480-Mbps)，full-speed (12-Mbps) and low-speed (1.5-Mbps) data transfer

● Device mode: support high-speed (480-Mbps) and full-speed (12-Mbps) data transfer

● VBUS insert detection and ID testing

● VBUS output enabling，and VBUS output is limited to1A

● Adopt standard MINI-USB socket

Socket No.	Interface Signal	VBUS Output Enable	VBUS Detection	ID Testing
P2	DM0/DP0(USB0)	GPIOB9	GPIOH5	GPIOH4

USB OTG (USB0)

3.11.USB HOST

The board provides two USB HOST interfaces, and A10 USB1 and USB2 are used. They feature:

● Completely compatible with USB 2.0 standard

● Support high-speed (480-Mbps)

● Provide VBUS output enabling separately

● Adopt standard A-type USB socket

Socket No.	Interface Signal	VBUS Output Enabling
P3	DM1/DP1(USB1)	GPIOH6
P4	DM2/DP2(USB2)	GPIOH3

USB HOST (USB1)

USB HOST (USB2)

3.12.SATA

The board provides one SATA interface, which features:

● Support SATA 1.5Gb/s, and SATA 3.0Gb/s

● Compliant to SATA Spec. 2.6, and AHCI Revision 1.3 Specifications

● Support industry-standard AMBA High-Performance Bus (AHB) and fully compliant to the AMBA Specification, Revision 2.0; Support 32-bit Little Endian

● OOB signaling detection and generation

● SATA 1.5Gb/s and SATA 3.0Gb/s speed negotiation when Tx OOB signaling is selected

● Support device hot-plugging

● Support power management features including automatic Partial to Slumber transition

● Internal DMA Engine for Command and Data Transactions

● Support hardware-assisted Native Command Queuing (NCQ) for up to 32-entries

● Support external SATA (eSATA)

SATA
Socket

3.13. TV IN
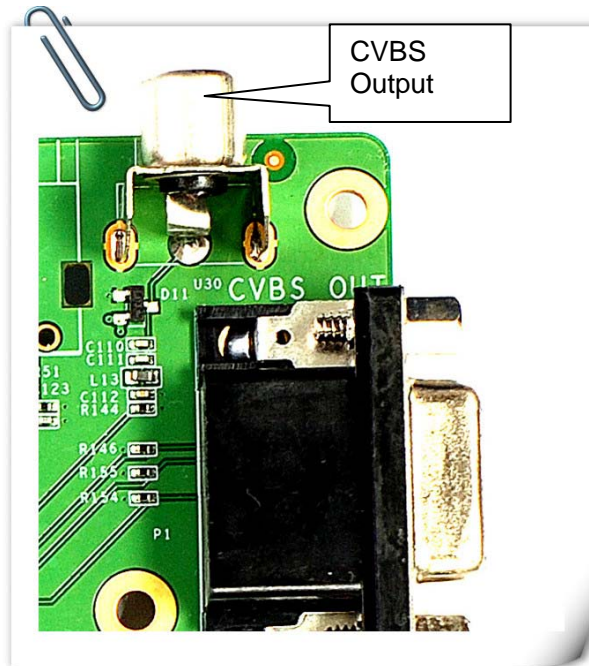
- Support three TV-In
- Support CCIR-656 4:2:2 8-bit parallel input format
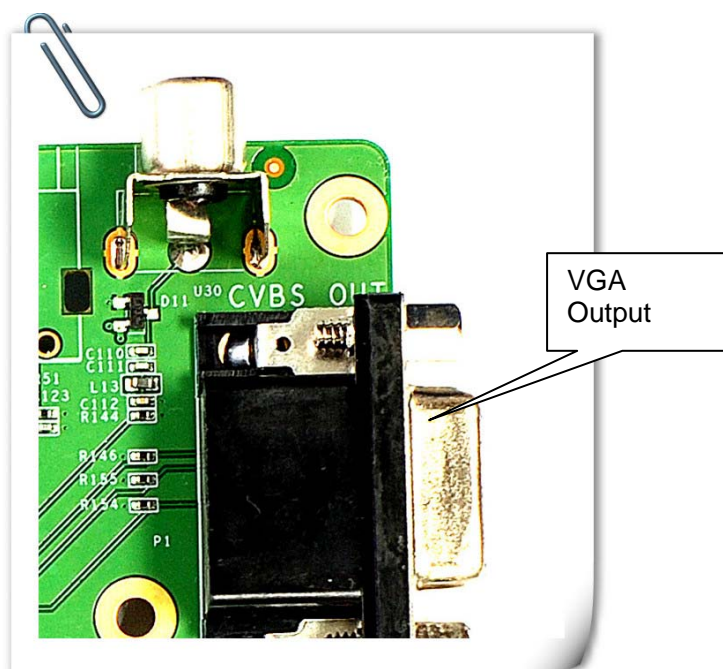- Adopt RCA

3.14. CVBS OUT

- Support one CVBS output
- Support 4 X12-bit DAC data output
- Adopt RCA

CVBS Output

3.15.VGA OUT

● Support RGB

● Support 4 X12-bit DAC data output

● Adopt DB15 socket，which can directly output to PC monitor, and thus facilitates video exploration via monitors

VGA Output

3.16.TTL LCD

A10 LCD controller features:

● Support HV-DE-Sync(digital parallel RGB) input LCD panels(Max 1024*1024 resolution，24-bit color)

● Support HV-DE-Sync(digital serial RGB，both delta and stripe panel) input LCD panels (Max 680*1024 resolution, up to true color)

● Support TTL(digital RGB) input LCD panels(Max 1024*1024 resolution，18-bit color)

● Support Analog RGB input LCD panels(Max 1024*1024 resolution，3 channel 6-bit DAC output)

● Support 18/16/9/8bit 8080 CPU I/F panels (Max 1024*1024 resolution)

● CCIR-656 output interface

● One on-board 50-pin FPC socket, supporting direct insertion of matching 5" 800*480 HD TP LCD，or other TTL LCDs for exploration

● Provide one 44-pin 2.0mm IDC socket for LCD extension，which can be used to develop LCDs of other sizes

● Support 3 GPIOs for LCD control and one PWM for backlight control

● Support 3.3V/5V power output, and the 3.3V power can be disabled/enabled via GPIO
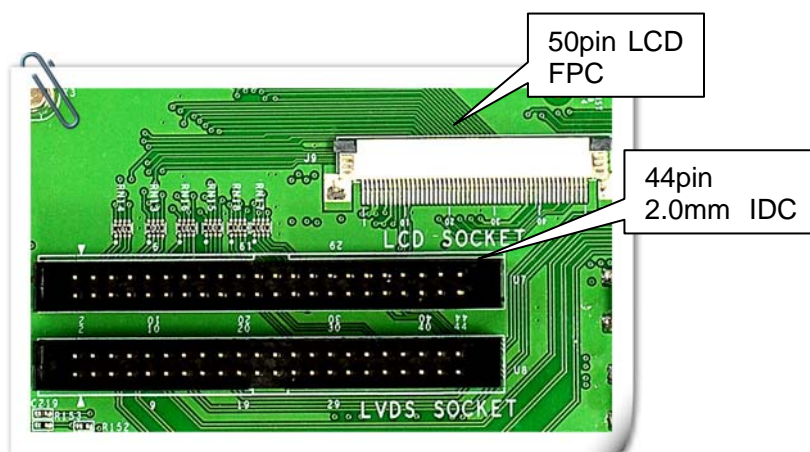
3.17.LVDS LCD Interface

● Provide 4 LVDS output: 3 data signals and 1 clock signal

● Provide 3 GPIO for LCD control and 1 PWM for backlight control

● 3.3V/5V power output, and the 3.3V power can be enabled/disabled via GPIO

● Provide 4-wire resistive TP interface signal

● Provide one 44-pin 2.0mm IDC interface, which supports exploration by inserting LVDS LCD module

Note:

● Since *FPC socket J9, IDC socket U7 and IDC socket U8 multiplex one set of signal, only one interface is usable each time.*

● VGA *and TTL LCD share the HSYNC and VSYNC signals, so VGA and TTL LCD cannot be used at the same time.*

44pin   2.0mm
LVDS LCD IDC
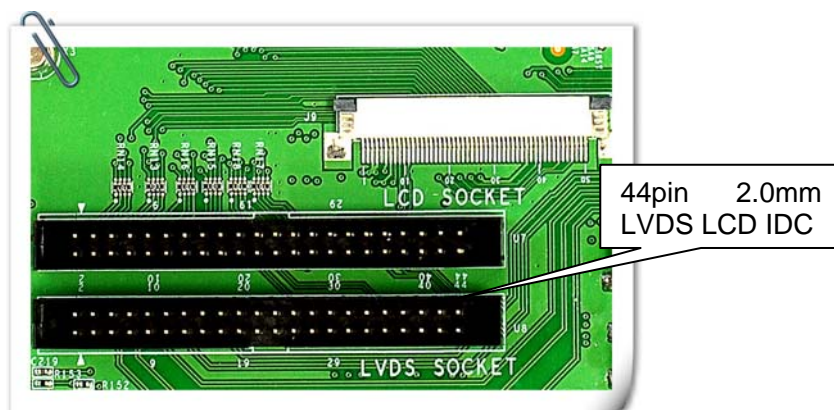
## 3.18.TP Interface

A10 Touch Panel ADC features：

- Support interrupt
- 12-bit ADC
- Voltage input range: 0V~3V
- Sampling rate: up to 128K
- Support 4-wire resistive TP, two-point touch

The board supports TWI-interface capacitive TP, and A10 TWI2 interface signal is used. It also provides a 4-pin FPC TP interface. Besides, TTL LCD IDC and LVDS LCD IDC can be used for capacitive TP extension as well.

4-pin FPC Capacitive TP Interface
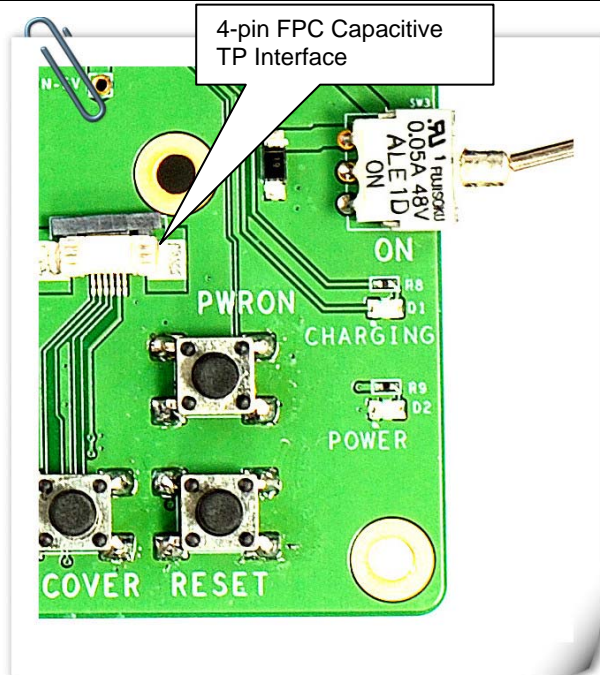
3.19.HDMI

A10 has built-in HDMI interface, which features：

● HDMI V1.3

● Support Max 4K*4K resolution

● Support up to 165M pixel/second

● Support 480I/576I/480P/576P/720P/1080I/1080P at 24/25/30/50/50.9Hz

● Support 24/30/36/48-bit RGB data format, with 2X/4X repeater

● Support up to 8 channel,24-bit PCM

● Support IEC61937 compress audio formats

● Support 1-bit audio

● Support HD audio

● Hardware Receiver active sense and Hot plug detect

● Interrupts for programmers

HDMI
Socket
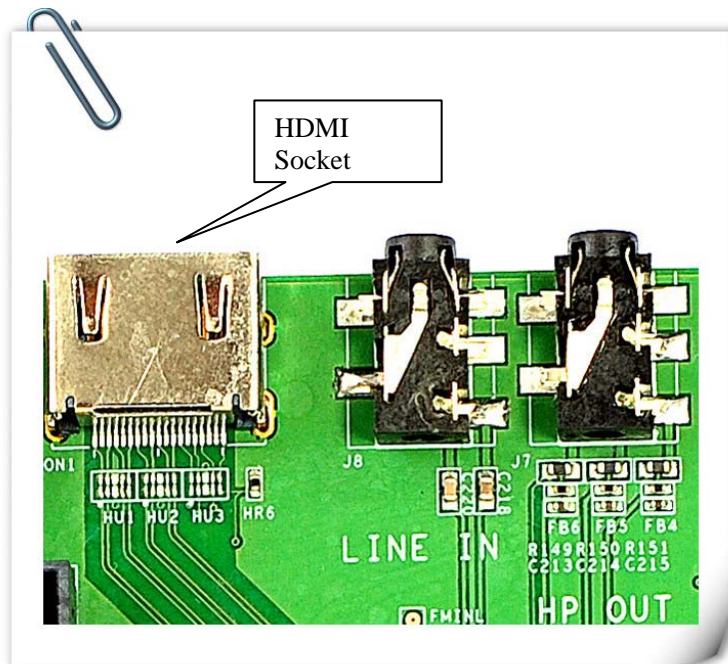
3.20.Analog Audio Output

The development board provides two channels analog audio output, and 3.5mm stereo earphone interface is used.

Adopt DC coupling.

- 24-bit DAC
- Support 48K, 44.1K sample rate
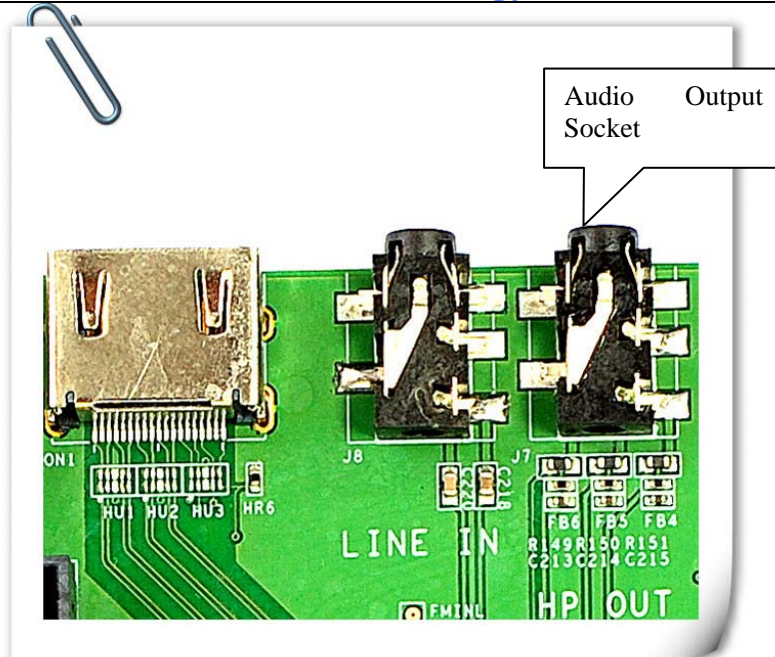- Support 192K,96K sample frequency

Audio   Output Socket

3.21.Analog Audio Input

The development board provides two channels analog audio input, and 3.5mm stereo earphone interface is used.

- Adopt AC coupling.
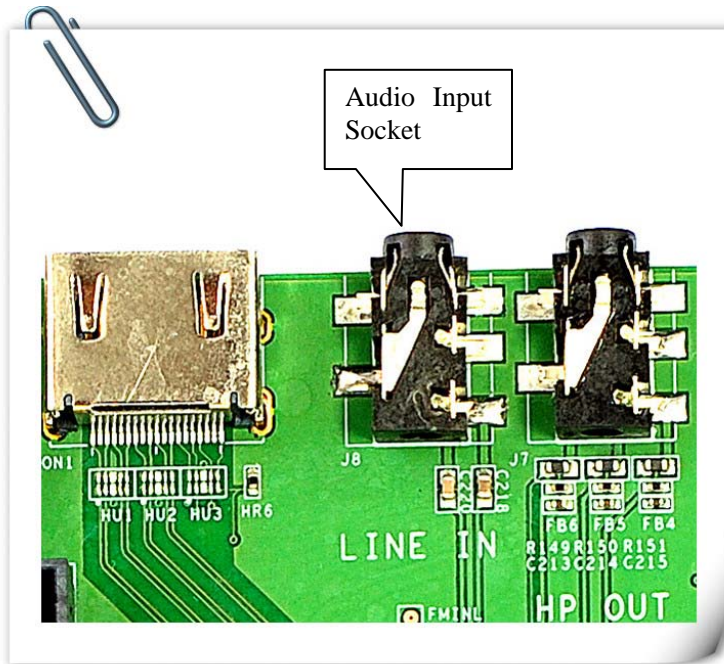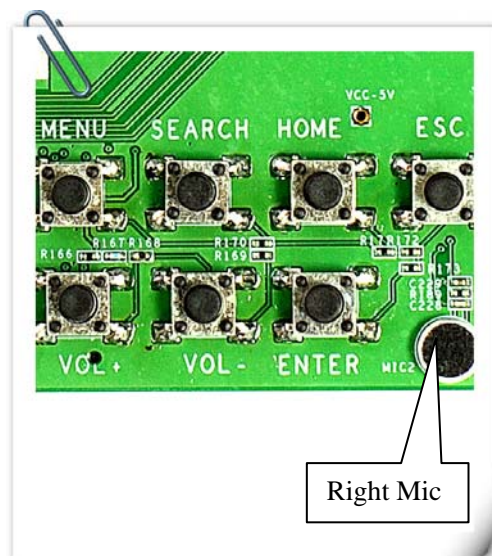- 24-bit DAC

- Support 48K, 44.1K sample recoding

Audio Input Socket

3.22.Microphone

- Support two Microphones，which can be used for stereo recoding exploration
- 24-bit ADC
- Support 48K, 44.1K sample recoding

Left Mic

Right Mic
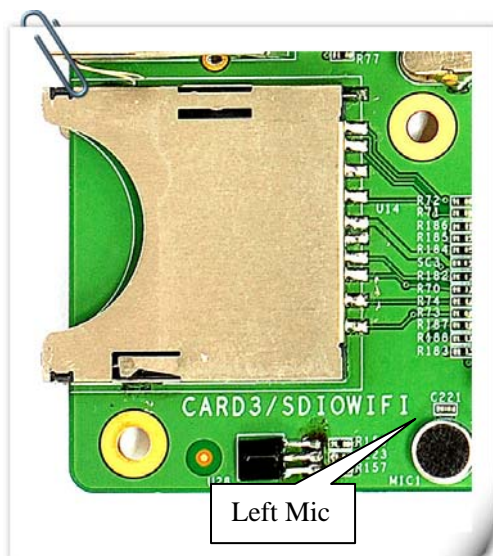
3.23.User Keys & LRADC

A10 provides two Low Resolution ADC input （LRADC0、LRADC1） for key application. It features:

- Support interrupt
- 6-bit resolution
- Voltage input range: 0~2V
- Sampling rate: up to 250Hz

LRADC0 has been connected to the board, and defined as 7 common keys of Android: VOL+, VOL-, MENU, SEARCH, HOME, ESC, ENTER, which can also be defined by users.

A10 provides RECOVER key for system booting or one-key upgrading. See Boot Device for details.

LRADC1, in the form of IDC socket, is there for user extension.

See Extension socket signal definition for details.

3.24.IR Receiver

A10 supports one IR-RX, which features:

- Support CIR remote control or wireless keyboard

IR-RX has been connected to on-board IR receiver, thus can be directly used for remote receiving application

IR-TX, in the form of IDC socket, is there for user extension.

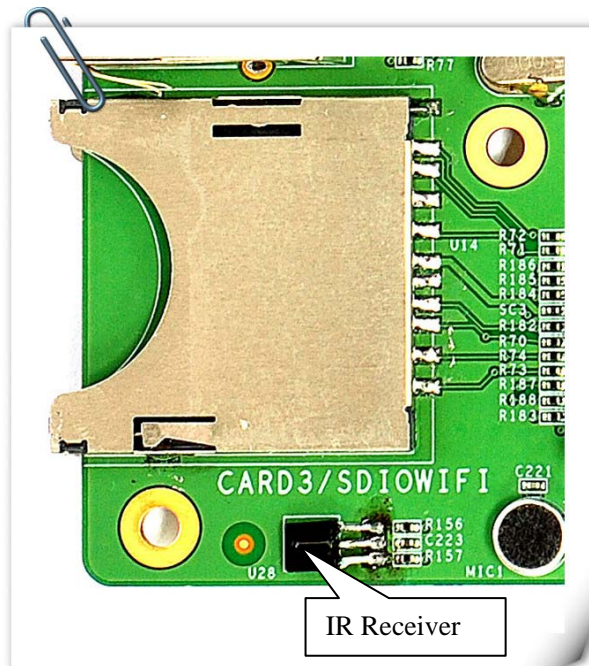See Extension socket signal definition for details.

IR Receiver

3.25.UART

The board provides one UART interface: UART0

UART0 is standard RX, TX two-wire serial interface, which is used as default debug print interface, with default baud rate 115200.

UART0 supports TTL level output, to which matching USB-To-Serial Interface (TTL) cable can be connected for the convenience of debugging and printing on PCs without RS232 interface. Additionally, UART0 supports RS232 level output via the DB9 receptacle socket.
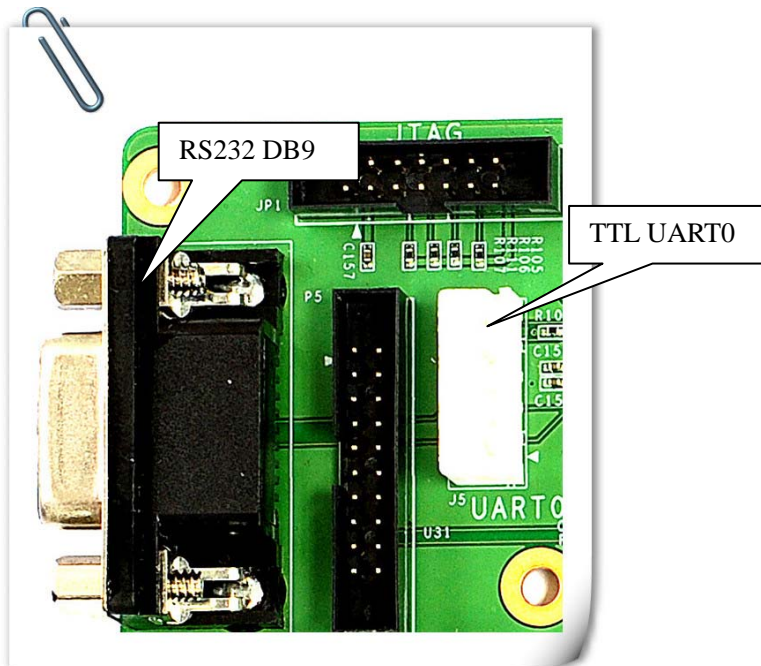
3.26.Camera Sensor Interface

The board provides two Camera Sensor Interface signals, which feature:

- Support NTSC and PAL CCIR656 protocols
- Support 8-bit data input
- Provide one TWI signal and two GPIO signal for camera control
- Provide 2.8V/5V power

CSI, in the form of IDC socket, support user extension.

See Extension socket signal definition for details.

3.27.Transport Stream Interface

A10 Transport Stream controller features:

● One external Synchronous Parallel Interface (SPI) or one external Synchronous Serial Interface (SSI)

● 32 channels PID filter

● Support multiple transport stream packet (188,192, 204) formats

● Configurable SPI and SSI timing parameters

● Hardware packet synchronous byte error detecting

● Hardware PCR packet detecting

● Configurable SPI transport stream generator for streams in DRAM memory

● Support DMA for data transfer

● Support Interrupt

● Support DVB-CSA V1.1 Descrambler

The development board provides two TS signals for mobile TV. TS interface, in the form of IDC socket, can be used for user extension. See Extension socket signal definition for details.

3.28.Two Wire Interface

A10 TWI features：

● Software-programmable for Slave or Master
● Support Repeated START signal

● Support multi-master systems

● Allow 10-bit addressing with 2-Wire bus

● Perform arbitration and clock synchronization

● Own address and General Call address detection

● Interrupt on address detection

● Support speed up to 400Kbits/s ('fast mode')

● Allow operation from a wide range of input clock frequencies

The board provides two TWI interfaces for user extension in the form of IDC socket. See Extension socket signal definition for details.

3.29. Gyroscope Interface

The board provides gyroscope interface for user extension in the form of IDC socket. See Extension socket signal definition for details.

3.30.G-Sensor Interface

The board provides G-sensor interface for user extension in the form of IDC socket. See Extension socket signal definition for details.

3.31.Light-Sensor Interface

The board provides light-sensor interface for user extension in the form of IDC socket. See Extension socket signal definition for details.

3.32.GPS Interface

The board provides GPS interface for user extension in the form of IDC socket. See Extension socket signal definition for details.

3.33.Bluetooth Interface

The board provides Bluetooth interface for user extension in the form of IDC socket. See Extension socket signal definition for details.

3.34.External Interrupt（EINT）

A10 supports up to 32 external interrupts, among which 20 are used for user extension in the form of IDC socket. See Extension Socket Signal Definition for details.

3.35.Extension Socket Signal Definition

The board supports five 2.0mm IDC-20 sockets for user extension based on our matching function daughter boards or other customized daughter boards. This section will describe the PIN signal definition and function of each extension socket in the form of tables.

Application Notice:

● The function of a pin must be identical each time it's used.

● The recommended functions are better software-supported, which brings less development complexity and workload.

● Since the default state of GPIO is GPIO input, a pull-up or pull-down resistance (determined by the signal polarity) should be connected to external circuit if the GPIO is used for output.
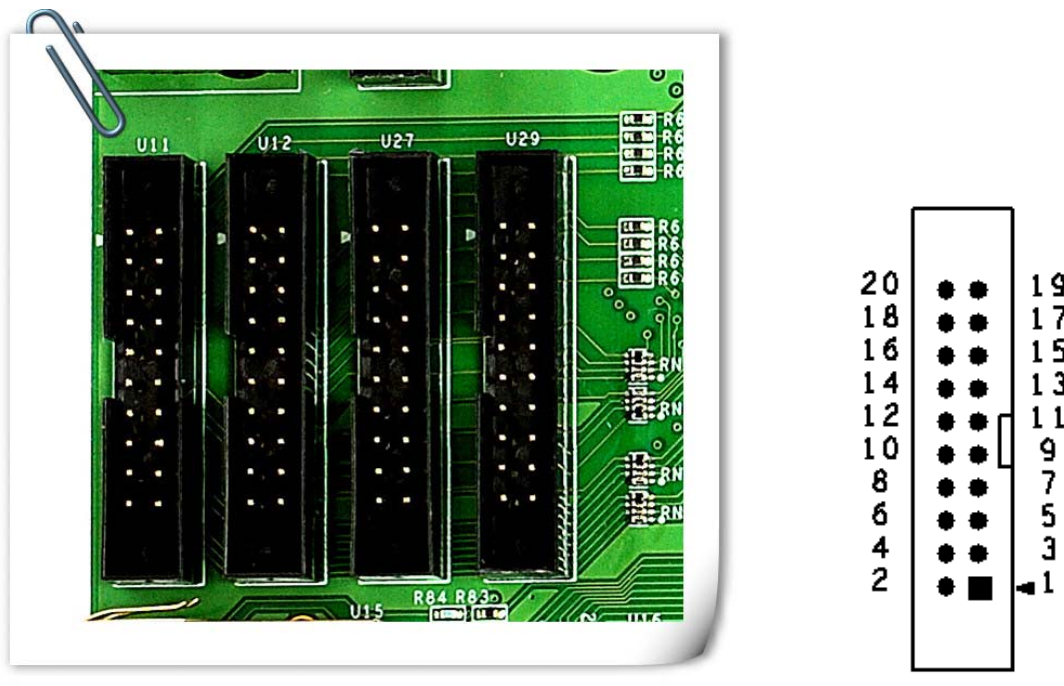
3.35.1. IDC Socket U11

Socket No.	U11			
PIN No.	Function 1	Function 2(Recommended)	Function 3	Function 4

	GPIO	Camera Sensor 0	Transport Stream 0	External interrupt
1	VCC-5V	VCC-5V	VCC-5V	VCC-5V
2	GPIOH16	CSI0-PWR		EINT16
3		CSI-IO-2.8V		
4	GPIOH13	CSI0-RST#		EINT13
5	GPIOE0	CSI0-PCK	TS0-CLK	
6	GPIOB18	TWI1-SCK		
7	GPIOB19	TWI1-SDA		
8	GPIOE3	CSI0_VSYNC	TS0_DVLD	
9	GPIOE2	CSI0_HSYNC	TS0_SYNC	
10	GPIOE1	CSI0_CK	TS0_ERR	
11	GPIOE4	CSI0_D0	TS0_D0	
12	GPIOE5	CSI0_D1	TS0_D1	
13	GPIOE6	CSI0_D2	TS0_D2	
14	GPIOE7	CSI0_D3	TS0_D3	
15	GPIOE8	CSI0_D4	TS0_D4	
16	GPIOE9	CSI0_D5	TS0_D5	
17	GPIOE10	CSI0_D6	TS0_D6	
18	GPIOE11	CSI0_D7	TS0_D7	
19	GND	GND	GND	GND
20	GND	GND	GND	GND

3.35.2. IDC Socket U12

Socket No.	U12					
PIN No.	Function1	Function2 (Recommended)	Function3	Function4	Function5	Function6
	GPIO	Camera Sensor 1	Transport Stream 1	SD Card 1	UART3/4	External interrupt
1	VCC-5V	VCC-5V	VCC-5V	VCC-5V	VCC-5V	VCC-5V
2	GPIOH17	CSI1-PWR				EINT17
3		CSI-IO-2.8V				

4	GPIOH14	CSI1-RST#				EINT14
5	GPIOG0	CSI1-PCK	TS1_CLK	SDC1_CMD		
6	GPIOB18	TWI1-SCK				
7	GPIOB19	TWI1-SDA				
8	GPIOG3	CSI1-VSYNC	TS1_DVLD	SDC1_D1		
9	GPIOG2	CSI1-HSYNC	TS1_SYNC	SDC1_D0		
10	GPIOG1	CSI1-CK	TS1_ERR	SDC1_CLK		
11	GPIOG4	CSI1-D0	TS1_D0	SDC1_D2		
12	GPIOG5	CSI1-D1	TS1_D1	SDC1_D3		
13	GPIOG6	CSI1-D2	TS1_D2		UART3_TX	
14	GPIOG7	CSI1-D3	TS1_D3		UART3_RX	
15	GPIOG8	CSI1-D4	TS1_D4		UART3_RTS	
16	GPIOG9	CSI1-D5	TS1_D5		UART3_CTS	
17	GPIOG10	CSI1-D6	TS1_D6		UART4_TX	
18	GPIOG11	CSI1-D7	TS1_D7		UART4_RX	
19	GND	GND	GND	GND	GND	GND
20	GND	GND	GND	GND	GND	GND

3.35.3. IDC Socket U27

Socket No.	U27			
PIN No.	**Function 1**	**Function 2 (Recommended)**	**Function 3**	**Function 4**
	GPIO	**WIFI/PA/LS/GS/CP/TWI1/GY**	**IR0**	**External interrupt**
1	VCC-5V	VCC-5V	VCC-5V	VCC-5V
2	GPIOH9	WIFI-SHDN# (SDIO WIFI standby control)		EINT9
3	VCC-3.3V	VCC-3.3V	VCC-3.3V	VCC-3.3V
4	GPIOH12	WIFI-PWR (SDIO WIFI power control)		EINT12
5	GPIOI3			
6	GPIOH10	WIFI-WAKEUP (SDIO WIFI wakeup)		EINT10
7				
8	GPIOH15	PA-SHDN#		EINT15

		(Audio PA shutdown control signal)		
9	GPIOH20	LS-INT (Light sensor interrupt input)		EINT20
10	GPIOH0	GS-INT1 (External G-sensor interrupt input signal)		EINT0
11	GPIOB3	CP-RST# (Compass reset signal)	IR0-TX	
12	GPIOI13	CP-INT (Compass interrupt input)		EITN25
13	GND	GND	GND	GND
14	GND	GND	GND	GND
15	GPIOB18	TWI1-SCK		
16	GPIOB19	TWI1-SDA		
17	GPIOH18	GY-INT1 (Gyroscope interrupt input)		EINT18
18	GPIOH19	GY-INT2 (Gyroscope interrupt input)		EINT19
19	GND	GND	GND	GND
20	GND	GND	GND	GND

3.35.4. IDC Socket U29

Socket No.	U29			
PIN No.	**Function 1**	**Function2 (Recommended)**	**Function 3**	**Function 4**
	GPIO	**GPS/TWI1/LRADC1/TP**	**PS2-1**	**External interrupt**
1	VCC-5V	VCC-5V	VCC-5V	VCC-5V
2	GPIOI0	GPS-CLK (GPS clock signal)		
3	VCC-3.3V	VCC-3.3V	VCC-3.3V	VCC-3.3V
4	GPIOI1	GPS-SIGN		

		(GPS data0)		
5	GPIOI14	GPS-OSC-EN (GPS clock control)	PS2-SCK1	EINT26
6	GPIOI2	GPS-MAG (GPS data1)		
7	GPIOC22	GPS-VCC-EN (GPS power control)		
8	GPIOC19	GPS-SCS (GPS SPI chip select)		
9	GPIOI15	GPS-RX-EN (GPS RX enable)	PS2-SDA1	EINT27
10	GPIOC20	GPS-SCLK (GPS SPI serial clock)		
11		LRADC1 (Low Resolution ADC input)		
12	GPIOC21	GPS-MOSI (GPS SPI data output)		
13	GND	GND	GND	GND
14	GND	GND	GND	GND
15	GPIOB20	TWI2-SCK		
16	GPIOB21	TWI2-SDA		
17	GPIOH21	TP-INT (External TP interrupt input)		EINT21
18	GPIOB13	TP-WAKEUP (External TP wake up)		
19	GND	GND	GND	GND
20	GND	GND	GND	GND

3.35.5. IDC Socket U31

Socket No.	U31				
PIN No.	**Function1** **GPIO**	**Function2** **(Recommended)** **Bluetooth**	**Function 3** **UART2**	**Function 4** **PS2-0**	**Function5** **External interrupt**
1	VCC-5V	VCC-5V	VCC-5V		
2	GPIOB5	BT-RST# (Bluetooth reset)			
3	VCC-3.3V	VCC-3.3V	VCC-3.3V		
4	GPIOB6	BT-PCM-CLK(Bluetooth PCM clock signal)			
5	GPIOB12	BT-PCM-IN(Bluetooth PCM data input)			
6	GPIOB7	BT-PCM-SYNC (Bluetooth PCM sync)			
7	GPIOI16	BT-UART-RTS (Bluetooth UART RTS)	UART2-RTS		EINT28
8	GPIOB8	BT-PCM-OUT(Bluetooth PCM data out)			
9	GPIOI18	BT-UART-TX (Bluetooth UART TX)	UART2-TX		EINT30
10	GPIOI17	BT-UART-CTS (Bluetooth UART CTS)	UART2-CTS		EINT29
11	GPIOI20	BT-GPIO0 (Bluetooth GPIO)		PS2-SCK0	
12	GPIOI19	BT-UART-RX (Bluetooth UART RX)	UART2-RX		EINT31
13	GND	GND			
14	GND	GND			
15	GPIOI21	BT-GPIO1		PS2-SDA0	

		(Bluetooth GPIO)			
16	GPIOI12				
17	GPIOI10	GS-INT2			
18	GPIOI11				
19	GND	GND	GND		
20	GND	GND	GND		

4. Declaration

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