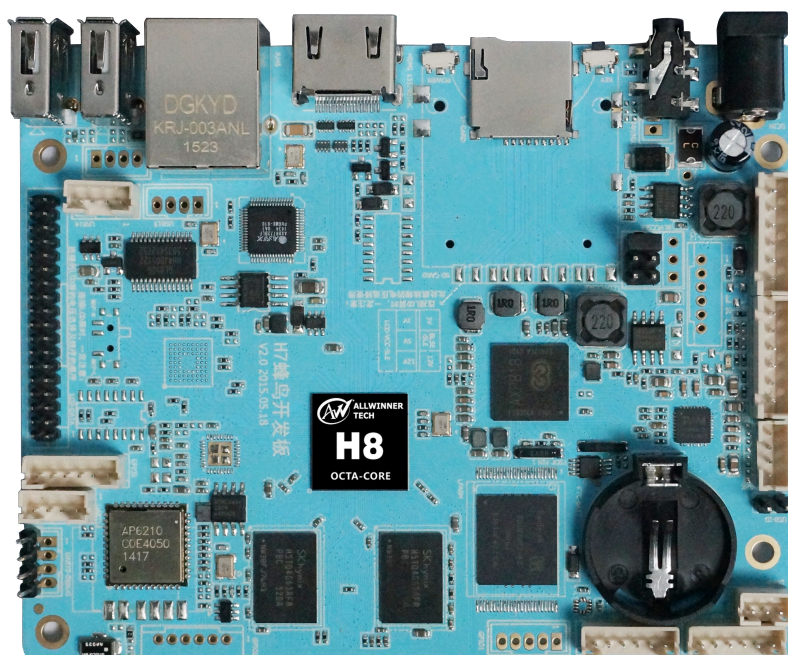


H7 Hummingbird Development Kit Brief Introduction

H7 Hummingbird board is based on Allwinner H8 SoC released by Merrii, we can provide users with Android 4.4.2 and inux3.4 /QT to develop.

H7 Hummingbird board is a mini board based on H8 , there are two USB hosts, an 3.0 OTG, a MB fast Ethernet , and have a TV-IN (optional)as well as HDMI HD video output interface .Besides, it supports CPU/LVDS/RGB screen. All the above parts integrated in a motherboard only slightly bigger than a credit card. It has all the basic functions of a PC when connect TV and keyboard, such as preadsheets, word processing, play games and HD videos etc.



Hardware Specifications

Main Hardware Indicators	
CPU	AllWinner H8,8 ARM Cortex-A7 Kernels , Frequency as high as 2.0GHz
GPU	Integrated PowerVR SGX544GPU. Working frequency: 700M
DRAM	DDR3 1G
Flash	EMMC FLASH 4G
Memory expansion	Support up to 32GB SD/TF card memory
WiFi	Built-in USB WIFI & WIFI/BT module (optional) , support 802.11b/g/n+BT4.0
File System	
Operate System	Android 4.4
Network Function	
Browser	UCWeb , Google, etc.
Online Entertainment	Support online video, TV, movies, music, radio

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Office software	WORD,EXCEL,POWERPOINT,PDF,TXT
Scalability	As many as 20,000 excellent Google market software download for free
Video Playback	
Decoding resolution	The highest resolution : 1920*1080
Video output	Support up to HDMI1080P full HD output
Audio Playback	
Supported formats	Support MP3,WMA,MP2,OGG,AAC,M4A,MA4,FLAC,APE,3GP,WAV format audio playback, Support the song list function
Recording function	Support MP3,WMA recording format
Additional Functions	
Image browsing	Support all sorts of image formats of JPG、BMP、PNG、GIF and rotation/slides, support up to 4096 * 4096 resolution
Text reading	Support TXT,PDF,HTML,HTM,CHM,UMD
Basic Interfaces	
USB2.0	2*USB HOST (With a built-in) ,1*OTG
UART	2*RS232 out put or 2*TTL (with a TTL+Flow control and 1*Debug UART)
MIPI DSI output	1* MIPI DSI output.Support MIPI LCD
LCD socket	1* LCD socket.Support RGB/CPU/LVDS LCD
LCD back-light	1* Standard 6 pin socket (Power input between 12V/5V)
MIPI CSI output	1* MIPI CAMERA
HDMI output	1* HDMI output
Headset/Microphone	1* External headset audio output
Audio speaker output	1* built-in output socket,maximum drive 2*10W/8Ω horn directly
SD/TF card	1* standard SD & TF card slot (alternative to mount)
LAN	RJ45 standard interface
RTC Real time clock	1* Clock battery holder
DC	1* External socket, 1* built-in 6P socket (with STB function) DC 12V input
Double LED light	1* built-in double color LED light (Boot and system operation instructions can external by extension line)
Infrared remote receiving	1* Built-in infrared remote control receiving Chose to straight welded on the PCB or through extension external according to the structure)
Keys	1* built-in 6P socket can external by extension line RECOVERY. KEY. RESET. POWEN. UBOOT)
I/O Socket 1	1* built-in 6P socket (support 5 GPIO expansion)
I/O Socket 2	1* built-in 5P socket (support 5 GPIO expansion)
Touch screen socket	1* built-in 6P socket , Support capacitive touch screen
Other functions	
Touch screen	Support USB capacitive、Infrared touch screen
Other input devices	Support USB Keyboard、mouse
Video function	Support USB camera

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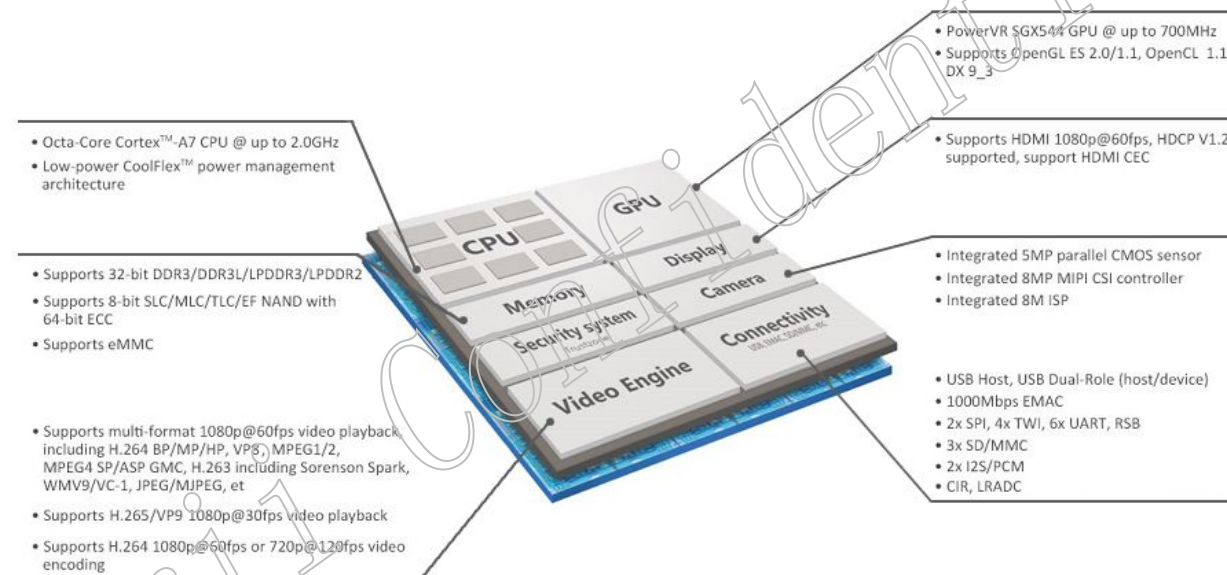
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System features	Watchdog,timer switch machine (custom)
3G Module	USB 3G Module, external PCI_E 3G Module
Electrical indicators	
DC input	power supply (12V)
Consumption	≤2.5W, Disconnect the horn/LCD back-light inverter/USB device
Work environment	
Working temperature	-30°C ~ 70°C
Working humidity	10% ~ 90% , No Ion
Storage temperature	-40°C ~ 90°C , 5°C ~ 35°C recommended

●Specifications Of H8 SoC

H7 Hummingbird Board is based on Allwinner H8 processor, H8 processor enriched with interfaces, including HDMI , EDP , LVDS/RGB LCD , USB & GMAC. And the most important thing is the development board customization can shorten the project cycle that makes finished product on market more faster.Please inform us to do the business conversation in advance if you need to do some customization base on this board. H8processor applies the Octa core ARM Cortex-A7 structure, containing all features of Cortex-A15 , which is the energy saving application processor on ARM platform at the moment. Equipped with PowerVR SGX544GPU and working frequency 700MGPU , which is not only improves the system performance, but also satisfy the excellent game compatibility. In addition, H8 supports 1080P video decoding and coding.

Structure of H8



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●Highlights Of H8

The main specifications of H8 Octa -core mobile application processor are as following:

- octa-core Cortex®-A7 CPU structure
- PowerVR SGX544 GPU
- 1080P video playback
- H.264 1080p@60fps or 720p@120fps video encoding
- Support HDMI、LVDS、TV decoder etc.
- Support CMOS sensor
- Through Google CTS test
- Support Android 4.4.2 operating system

Specification of H8 Processor

Octa-Core Cortex-A7 CPU @ up to 2.0GHz
Low-power CoolFlex power management architecture

GPU

PowerVR SGX544 GPU @ up to 700MHz
Supports OpenGL ES 2.0/1.1, OpenCL 1.1, DX 9_3

Video

Supports multi-format 1080p@60fps video playback, including H.264 BP/MP/HP, VP8, MPEG1/2, MPEG4 SP/ASP GMC, H.263 including Sorenson Spark, WMV9/VC-1, JPEG/MJPEG, etc
Supports H.265/VP9 1080p@30fps video playback
Supports H.264 1080p@60fps or 720p@120fps video encoding

Camera

Integrated 5MP parallel CMOS sensor
Integrated 8MP MIPI CSI controller
Integrated 8M ISP

Memory

Supports 32-bit DDR3/DDR3L/LPDDR3/LPDDR2
Supports 8-bit SLC/MLC/TLC/EF NAND with 64-bit ECC
Supports eMMC

PMIC

Customized AXP818 PMIC

OS

Android 4.4 and above

Hdmi

Supports HDMI 1080p@60fps, HDCP V1.2 supported, support HDMI CEC

Connectivity

USB Host, USB Dual-Role (host/device)
1000Mbps Ethernet MAC
2x SPI, 4x TWI, 6x UART, RSB
3x SD/MMC

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2x I2S/PCM
CIR, LRADC

Package

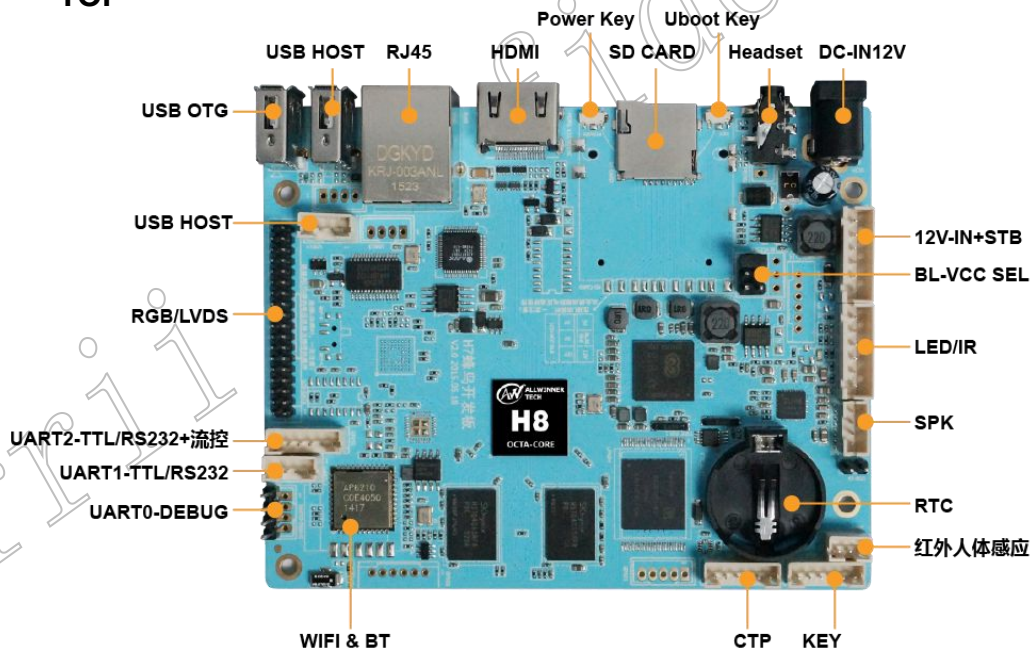
FCBGA 345
14mm x 14mm size

Process

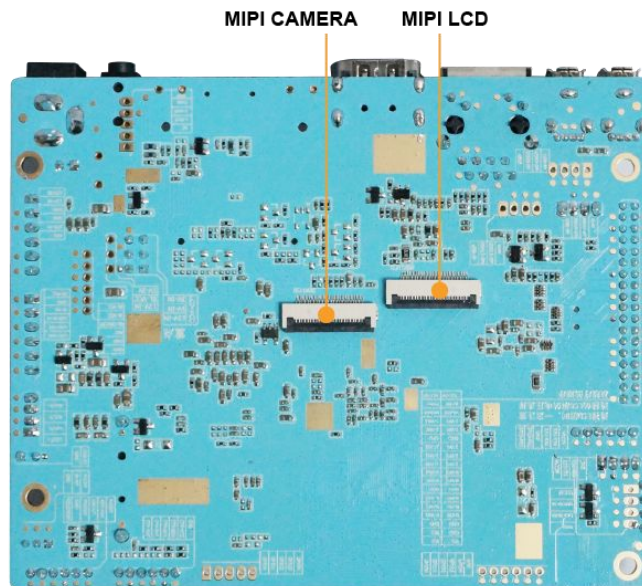
TMSC's 28nm HPC

Product appearance

TOP



Bottom



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- **Software features**

Support from Nand/eMMC Flash, SD card booting guide.

Default Android4.4.2 system, and provide Linux 3.4 source code

- **Linux OS Features:**

Linux version: linux 3.4

Graphics library support : Qt

UI interface under Linux



- **Android OS Features :**

Android Version: android 4.4.2 and above

Support dual system booting

H7 Hummingbird development board supports Linux/Android dual operate system (For details, please see 《H7 Hummingbird board User Manuel 》)

● Description of Extended PIN

CON12 UART0-TTL Interface (2.00MMSocket)

No.	Definition	Attribute	Description
1	VCC-3.0V	Power Output	3.0VOutput
2	UART0_TX	Output	UART0_TX
3	UART0_RX	Input	UART0_RX
4	GND	Earth Wire	Earth Wire

CON11 UART-TTL \ UART RS232 Interface (2.00MMSocket)

No.	Definition	Attribute	Description
1	VCC-3.0V	Power Output	3.0VOutput
4	UART1_TX	Output	Data Output
3	UART1_RX	Input	Data Input
4	GND	Earth Wire	Earth Wire

Remark: This device works of TTL mode by default in the condition of TTL or RS232.

J27 UART-TTL \ UART RS232 Interface (2.00MM Socket)

No.	Definition	Attribute	Description
1	VCC-3.0V	Power Output	3.0VOutput
2	UART2_TX	Output	Data Output
3	UART2_RX	Input	Data Input
4	GND	Earth Wire	Earth Wire
5	UART2_RTS	Input	Data Input
6	UART2_CTS	Output	Data Output

Remark: This device works of TTL mode by default in the condition of using RS232, the flow control PIN foot print can not being use.

J44 Backlight Inverter Power Input Socket (2.54MM Pin)

No.	Definition	Attribute	Description
1	12V_IN	Input	LVDS_LOGIC power Input
2	BL_VCC-SEL	Output	Backlight Inverter Power Output
3	5V_IN	Input	LVDS_LOGIC power Input

Remark: Select power supply according to backlight voltage of your display, and then choose correct power voltage. It' s very important to contact your LCD supplier about the backlight voltage. There is a risk of burning the LCD.

J18 Backlight Inverter Control Interface (2.00MM Socket)

No.	Definition	Attribute	Description
1	BL_IN	Output	Backlight Power Output (12V/ 5V) , 12V can be connected to
2	BL_IN	Output	external adapter which determines current frequency. 5V power supply is connected to internal DCDC transition, the currency of which is up to 2A.
3	ON/OFF	Output	Back Light Unit Switching Signal, 5V Electrical Level, High/Low Level (Optional)
4	ADJ	Output	Back Light Unit DIMMING Control
5	GND	Earth Wire	Earth Wire
6	GND	Earth Wire	Earth Wire

Remark: This Interface is up to support 12V Power Output. If screen backlight need to use 24V power supply. Please take electricity from power plate for use in screen directly.

CON7 LVDS_LOGIC Power Input chose Socket (2.54MMPIN)

No.	Definition	Attribute	Description
1	LVDS_VCC	Output	LVDS_LOGIC Power Output
2	LVDS_VCC	Output	LVDS_LOGIC Power Output
3	LVDS_VCC	Output	LVDS_LOGIC Power Output
4	12V_IN	Input	LVDS_LOGIC Power Input
5	5V_IN	Input	LVDS_LOGIC Power Input
6	3V_IN	Input	LVDS_LOGIC Power Input

Remark: Select power supply according to backlight voltage of your display, and then choose correct power voltage. It' s very important to contact your LCD supplier about the backlight voltage. There is a risk of burning the LCD.

J19 LVDS Signal \ RGB Signal Output

No.	Definition	Attribute	Description
1	LCDVCC	Power Output	liquid crystal Power Output , +3.3V /+5V/ +12V optional, chose by CON7
2			
3			
4	GND	Earth Wire	Earth Wire
5			
6			

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7	RXO0- \ LCD-R3	Output	Pixel0 Negative Data (Odd) \ LCD-RGB Data
8	RXO0+ \ LCD-R2	Output	Pixel0 Positive Data (Odd) \ LCD-RGB Data
9	RXO1- \ LCD-R5	Output	Pixel1 Negative Data (Odd) \ LCD-RGB Data
10	RXO1+ \ LCD-R4	Output	Pixel1 Positive Data (Odd) \ LCD-RGB Data
11	RXO2- \ LCD-R7	Output	Pixel2 Negative Data (Odd) \ LCD-RGB Data
12	RXO2+ \ LCD-R6	Output	Pixel2 Positive Data (Odd) \ LCD-RGB Data
13	GND	Earth Wire	Earth Wire
14	GND	Earth Wire	Earth Wire
15	RXOC- \ LCD-DE	Output	Negative Sampling Clock (Odd) \ LCD-RGB Data
16	RXOC+ \ LCD-CLK	Output	Positive Sampling Clock (Odd) \ LCD-RGB Data
17	RXO3- \ LCD-VSYNC	Output	Pixel3 Negative Data (Odd) \ LCD-RGB Data
18	RXO3+ \ LCD-HSYNC	Output	Pixel3 Positive Data (Odd) \ LCD-RGB Data
19	RXE0- \ LCD-B3	Output	Pixel0 Negative Data (Even) \ LCD-RGB Data
20	RXE0+ \ LCD-B2	Output	Pixel0 Positive Data (Even) \ LCD-RGB Data
21	RXE1- \ LCD-B5	Output	Pixel1 Negative Data (Even) \ LCD-RGB Data
22	RXE1+ \ LCD-B4	Output	Pixel1 Positive Data (Even) \ LCD-RGB Data
23	RXE2- \ LCD-B7	Output	Pixel2 Negative Data (Even) \ LCD-RGB Data
24	RXE2+ \ LCD-B6	Output	Pixel2 Positive Data (Even) \ LCD-RGB Data
25	GND	Earth Wire	Earth Wire
26	GND	Earth Wire	Earth Wire
27	RXEC- \ LCD-G3	Output	Negative Sampling Clock (Even) \ LCD-RGB Data
28	RXEC+ \ LCD-G2	Output	Positive Sampling Clock (Even) \ LCD-RGB Data
29	RXE3- \ LCD-G5	Output	Pixel3 Negative Data (Even) \ LCD-RGB Data
30	RXE3+ \ LCD-G4	Output	Pixel3 Positive Data (Even) \ LCD-RGB Data
31	LCD-G6	Output	LCD-RGB Data
32	LCD-G7	Output	LCD-RGB Data
33	LCD-PWM	Output	LCD-PWM Brightness control
34	LCD-BL-EN	Output	LCD-Backlit universal control

*** VESA or JEIDA LVDS Data format is configurable**

*** EVEN/OD pixel Data change is configurable**

*** Interface supports LVDS and LCD-RGB Output , this Interface is optional Output, use the default LVDS Output.**

CON13 SPK-OUT Interface

No.	Definition	Attribute	Description
1	LOUTP	L Output +	LOUTP
2	LOUTN	L Output -	LOUTN
3	ROUTN	R Output -	ROUTN
4	ROUTP	R Output +	ROUTN

Remark: This is for 2 speaker connection; If there is 1 speaker in use, please note that PIN 1 and PIN 2 works as a set, so does PIN 3 and PIN 4. Do connect speaker first, then start the board. Hot plug is not allowed.

J26 Power-DC12V-IN Interface (2.54MM Socket)

No.	Definition	Attribute	Description
1	NC	NC	NC
2	L-OUT	Output	L channel Output
3	R-OUT	Output	R channel Output
4	OUT	Input	MICInput or CVBS Input
5	GND	Earth	GND

J26 The 4th PIN compatible MIC-IN with CVBS-IN two functions.This is optional and the default use MIC function.

CON21 USB-HOST Interface (2.00MM Socket)

No.	Definition	Attribute	Description
1	VCC-5V	Power Output	VCC-5V
2	DM13	Data -	DM
3	DP13	Data+	DP
4	GND	Earth	GND

CON20 USB-HOST Interface (2.00MM Socket)

No.	Definition	Attribute	Description
1	VCC-5V	Power Output	VCC-5V
2	DM14	Data -	DM
3	DP14	Data +	DP
4	GND	Earth	GND

Remark: CON20 can be used as USB HOST on condition that WiFi module (U36) is not used; CON20 cannot be soldered on board if WiFi module is in use.

J45 USB OTG function choose Socket (2.54MMPIN)

No.	Definition	Attribute	Description
1	GND	GND	USB low potential Function Inpu (HSOT function , Select this feature by default)
2	OTG-SEL	Output	USB Feature selection Output

Remark: USB0 works as USB HOST after jump connection; USB0 works as USB DRV without jump connection.

CON16 USB-HOST Interface (2.00MM Socket)

No.	Definition	Attribute	Description
1	VCC-5V	Power Output	VCC-5V
2	DM0	Data-	DM
3	DP0	Data+	DP
4	GND	Earth	GND

Remark: CON16 is compatible with J12 which can be used when J12 is not in use; CON16 can be used as USB HOST on condition that J45 select USB HOST function; J45 is used as HOST for ADB under debugging.

J15 Power-DC12V-IN Interface (2.54MM Socket)

No.	Definition	Attribute	Description
1	+12V	Power Input	+12V
2	+12V	Power Input	+12V
3	GND	Earth Wire	Earth Wire
4	GND	Earth Wire	Earth Wire
5	5VSTB	Input	STB power Input
6	STB	Output	STB signal Output

J23 Bi-Color LED and IR Interface (2.54MM Socket)

No.	Definition	Attribute	Description
1	VCC-3V3	Output	Power 3.3VOutput
2	GND	Earth Wire	Earth Wire
3	IR	Input	IR Signal Input
4	LED_ BLUE	Output	Negative of LED Light indicator light of system operation
5	LED+	Input	Positive of LED Light
6	LED_ RED	Output	Negative of LED Light indicator light of power on

Remark: J23 can be soldered via 6 Pin socket or connected via extension cable

J1 GPIO SocketInterface1 (2.00MM Socket)

No.	Definition	Attribute	Description
1	GPIO1	Input/Output	GPIO1Input/Output PG3
2	GPIO2	Input/Output	GPIO2Input/Output PG2
3	GPIO3	Input/Output	GPIO3Input/Output PG1
4	GPIO4	Input/Output	GPIO4Input/Output PG5
5	GPIO5	Input/Output	GPIO5Input/Output PG4

J8 RTC_BATT Interface (1.25MM Socket)

No.	Definition	Attribute	Description
1	BATT+	power	Positive of Battery
2	BATT-	Earth Wire	Negative of Battery

J46 human body induction Interface (2.00MM Socket)

No.	Definition	Attribute	Description
1	VCC 5V	Input	Power Supply of Human Body Induction
2	IR-DET	Output	Signal Output of Human Body Induction
3	GND	Earth Wire	Earth Wire

J28 GPIO SocketInterface2 (2.00MM Socket)

No.	Definition	Attribute	Description
1	GPIO1	Input/Output	GPIO1Input/Output PL2
2	GPIO2	Input/Output	GPIO2Input/Output PL3
3	GPIO3	Input/Output	GPIO3Input/Output PL5
4	GPIO4	Input/Output	GPIO4Input/Output PL4
5	GPIO5	Input/Output	GPIO5Input/Output PH5
6	GND	Earth Wire	Earth Wire

J22 CTP Socket Interface 2 (2.00MM Socket)

No.	Definition	Attribute	Description
1	GND	Earth Wire	Earth Wire
1	CTP_VCC	Power Output	3.0V power
2	CTP_SDA	Input/Output	Capacitance screen I2C_SDA
3	CTP_SCK	Input/Output	Capacitance screen I2C_SCK
4	CTP_INT	Input/Output	Capacitance screen interrupt
5	CTP_RST	Input/Output	Capacitance screen recovery

J21 KEY external Socket Interface (2.00MM Socket)

No.	Definition	Attribute	Description
1	RESET	Input	Reset signal Interface
2	KEY ADC	Input	KEY expand Interface
3	UBOOT	Input	System upgrade button
4	POWEN	Input	System boot keys
5	GND	Earth Wire	Earth Wire
6	RECOVERY	Input	System restore factory Settings button

▼External Interface Definition

- J3 Standard 12V round pin 6.4MM diameter , 2.5MM internal nail,with positive inside positive outside
- J25 Standard 4 section Definition headphone+MIC Socket Definition
- J14 Standard SD card Interface Definition
- J9 Standard TF card Interface Definition
- CON1 Standard A type HDMI Socket Definition
- J17 Standard Fast Ethernet RJ45 Socket Definition(with light)
- J20 Standard USB2.0 larger interface Socket Definition
- J12 Standard USB2.0 larger interface Socket Definition

Remark: Avoid of hot-line work and be careful of ESD protection while assembling.

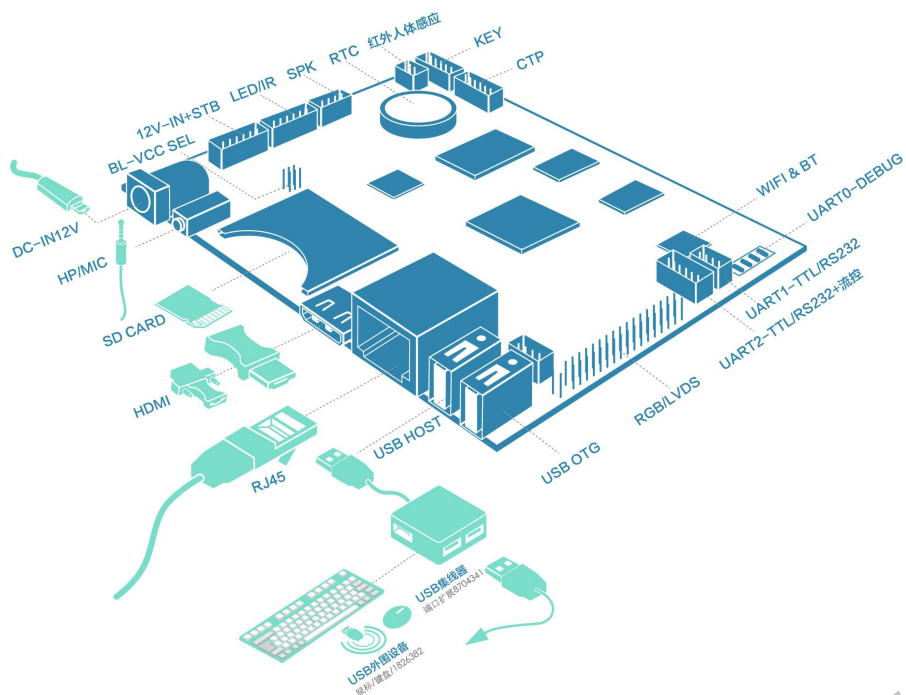
Prospect and Purpose

Due to the expansion interfaces of optimus development system are much more than some other similar products, and it has got global high attention. Thus making it very powerful, rich social environment and market value. The more people participate, the more rapid development, the greater the potential market, followed by the more purposes. Currently, besides the children's education above-mentioned, it also can be used as basic computer, home theater HD player etc.

●Following uses:

- multimedia player
- PlayStation
- IPTV
- Emulation box
- Auto PC
- Car GPS
- smart robot
- Server
- Electronic Album
- remote surveillance
- Home alarm apparatus / automation system

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Purchase

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