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**产品规格书**  
 (Product specification)  
**RK3588.3\_004**


型 号 (Type) :                     RK3588.3\_004                    

日 期 (Date) :                     2022-10-21                    

版 本 (Ver.) :                     Ver 1.3                    

确认者 (Approver) :                     LUMQ                    

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签章 signature:	签章 signature:	签章 signature:
日期 date:	日期 date:	日期 date:


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### 更改履历 ( Change history )

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## 1. 概述 (Summary)

RK3588.3\_004为新一代安卓-12系统板卡,板载Rockchip最新最高阶平板商业显示RK3588平台, 基于深度定制, 它具备以下特色使它更加适合教育, 会议电子白板及商业显示领域:

支持各种触摸屏连接, 主板配合触摸屏实现windows系统与安卓系统各种书写功能, 各系统间触摸自动切换;

支持一些传感器: 温度传感器能实时监测机内温度, 环境光传感器, NFC近场无线通信;

支持OPS电脑, 提供必要连接, 如HDMI显示, 控制/O通信及USB3.0;

提供8 lane VByOne接口能支持液晶面板到3840\*2160\*10bit/60HZ ;

板载1000M 以太网及支持OPS 1000M以太网连接; 板载WIFI 5模组及M.2 E key 标准座方便支持最新WIFI 6 模组;

提供1路HDMI 输出, 1路TYPE C输出, 它们即可与主屏同显也可与主屏异显;

板载丰富的音视频输入端子, 如USB3.0,USB2.0,多路HDMI in,DP in,TYPE C in,Micro-card等;

支持多路输入 (HDMI1+ HDMI2 or HDMI3 or DP or type-c +USB+网络) 同时实时显示在主屏功能 ;

RK3588.3\_004 is a new generation of Android-12 system board. RK3588 Chip on board which is a highly integrated and high performance smart display solution. The board has some characteristic function suitable for educational electronic whiteboard , **meeting and Public information display**.

Provide multiple touch screen connection; Because of mainboard combined with infrared touch screen, the writing function and other shortcut function is realized on the android and touch automatic switching between different systems. (e.g. Windows to windows, windows to android)

Support ambient light sensor and temperature sensor, so they bring some special features: Temperature sensor can real-time monitoring of internal temperature for your equipment, and ambient light sensor can change backlight brightness based on the intensity of ambient light.


Provide common interface linked OPS: HDMI in; 3 I/O ports; USB 3.0.

Provide 8 lane VByOne interface, so it drives TFT\_LCD panel resolution up to 3840\*2160/60Hz . 1000M Ethernet on board. It also offers 1000M Ethernet for OPS; Wifi5 module is on board, WIFI6 is M.2 E key connector;

Provide a HDMI out and a TYPE C out , They can be same as mainboard display and be different;

Provide various audio and video input terminals: e.g. USB3.0, USB2.0, HDMI in, TYPE C in,DP in,micro-card; USB slot can be used for updating software and playing multimedia. USB3.0 is public USB which can follow source skipping.


Multiple input sources are dynamically displayed on the same screen at the same time;

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## 2. 产品关键特性(Key Feature)

项目 Item	内容 Content	
系统参数 System parameter	芯片 Chip	RK3588
	中央处理器 CPU	Quad-core Cortex-A76+Quad-core Cortex-A55
	图像处理器 GPU	ARM Mali-G610 MC4
	NPU	computing power is up to 6TOPs
	内存 RAM	(4+4) 8G Bytes LPDDR4X-3733Mbps
	闪存 Flash	128 GBytes-EMMC5.1 flash on board
	安卓版本 Android version	12.0.0
面板类型 panel	类型 type	TFT-LCD
	分辨率 resolution	3840*2160_60Hz
	屏电压 voltage	12V
	屏接口 interface	VByOne (8 lanes) ---note1
多媒体 Multimedia	视频 video	解码 decode: MPEG-1, MPEG-2, MPEG-4, H.263, H.264, H.265, VC-1, VP9, VP8, MVC, AV1 ---其中 H.265,VP9 支持 8K/60Hz 解码; 编码 encode: H.265,H.264
高清输入 HDMI in+DP in+TYPE C in	分辨率 resolution	HDMI1 in: MAX: 3840*2160@30Hz 其他: MAX: 3840*2160@60Hz
高清输出 HDMI2.1 out+TYPE C out(DP1.2)	分辨率 resolution	TYPE C out(DP1.2)→MAX: 3840*2160@60Hz HDMI2.1 out→MAX: 7680*4320@60Hz ---note2
端子 Socket	HDMI in&out	X3 HDMI in , x1 HDMI out A 型标准插座 (HDMI type A)
	DP1.2 in	X1 DP in 标准插座 (DP socket)
	PUBLIC USB3.0	X2 USB3.0 A 型标准插座/蓝色舌头(USB3.0 blue type A)---note3
	MIC IN	X1 3.5mm 耳机标准插座 (3.5mm standard earphone )
	ANDROID USB3.0	X1 USB3.0 A 型标准插座/蓝色舌头(USB3.0 white type A)
	Ethernet(1Gb)	X2 RJ45 标准插座 (RJ45 standard socket)
	Earphone out	x1 3.5mm 耳机标准插座(3.5mm standard earphone socket)
	PUBLIC USB2.0	x1 USB2.0 A 型标准插座(USB2.0 white type A)
	RS232	x1 DB9 标准母座 (DB9 standard socket)
	SPDIF out	x1 光纤插座 (Optical fiber socket)

	USB3.0(TOUCH)	X1 标准 B 型插座/蓝色色舌头 (USB3.0 black type B)
	Micro-SD card	x1 标准小卡插座 (standard micro-card socket)
	TYPE C IN/OUT	x1 标准 C 型插座 (standard Type c socket )
电源 power	主板电源需求 Main-board Power demand	<b>建议 12V/4A</b> (Recommend 4A): 主板(1.5A) +Panel TCON(2.5A) / MB(1.5A) and panel Tcon demand=2.5A ; <b>建议 5V_IN/3A</b> (Recommend 3A) <b>建议 5V_STB/1A</b> (Recommend 1A); <b>建议 18V/1.2A</b> (Recommend 1.2A) :给 USB 接口供电 3.5A/5V; <b>功放供电</b> (18V~24V): 取决 2.1 声道实际功率需求(默认:10W*2+15W) <b>TYPE C 供电</b> (18V~24V): 功率需求取决于对外充电功率(MAX:20V/5A)
	工作模式 Working mode	正常状态, 低功耗待机状态和快速唤醒状态(normal, standby,STR) Standby 待机功耗<0.15 W (仅主板)(standby power<0.15W,board only)
OSD 语言 OSD language	英文, 简体中文等等.(English, Simplified Chinese and so on)--具体其他语言需求, 视客户需求与固件定。	
声音输出/输出 Audio out/in	Earphone out	支持 16Ω/32Ω 耳机 ;
	S/PDIF out	IEC 60958 TYPE 2 (Optical);
	PDM in	最多支持 6*MICs PDM 数据输入
	功放功率 AMP power/ 功放频率响应 Freq. response	默认(L+R )2*10W(8Ω/0.5Vrms)+(Bass)15W((4Ω/0.5Vrms) 输入/失真度 (distortion) <1%/18V 供电); 150Hz~15KHz@+/-2dB(参考信号: 0.5Vrms/1K_Sine, with EQ disable)
特别功能及可拓展 接口 Characteristic function and Expandable interface	传感器与模块支持 Sensor and modules	板载温度传感器; 外接环境光传感器支持; 外接 NFC/指纹/PM2.5 模块支持; 自带 PDM 接口; 外挂矩阵 MIC 模组支持 (USB2.0+音频回采); Temperature-sensor on board; Light Sensor module support ; NFC/Fingerprint/PM2.5 module support ;PDM;MIC module support; -- <b>-note 4</b>
	OPS 接口 /OPS interface	41P FFC cable connector : 1. USB3.0 out(public USB+LAN USB) *1+USB2.0 out*2; 2. HDMI2.0 in*; 3. UART(3.3V)*1; 4. GPIOs*4(Detect , the state, switch on, OPS power on/off);
	前置接口扩展/Front- IO borad	51P FFC cable connector : 1. Public USB3.0 in*1; 2. USB3.0 out (Touch USB+public USB)*1; 3. HDMI2.0 in*; 4. GPIOs*5; 5. TYPE C network,且兼容支持全功能 TYPE C 扩展需求; ---note 4
	遥控/按键/指示灯	1. IR remote*1; 2. KEY ADC Pin*2; 3. LED-IO*2(PWM-IO*1); 4. 2 个

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IR/KEY/indicator LED	PM-GPIO (待机可用) ; 5. I2C bus *1; 6. OPS 一键还原(需 OPS 支持);
无线网/WIFI	SDIO-WIFI5 模组板载固定; PCIE-WIFI5/6 可插拔更换; 蓝牙 5.0 为 WIFI 模组自带; 支持芯片信息随固件开发更新, 最新以 FAE 提供信息为准;
摄像头/camera	标准 USB3.0 座子 接口/跟随通道/提供 GPIO 控制供电;
触控接口/touch	1.双数据通道 Double touch data channe : USB2.0(android)+USB2.0(others) or UART(android)+USB2.0(others); 2.也可支持单 USB2.0 触摸接口, PC 数据需要系统转发;

NOTE1:为保证 VBYONE 信号传输质量, 请使用带屏蔽层的 FFC 线或者更佳的同轴线, 且线长不超过 900 毫米。

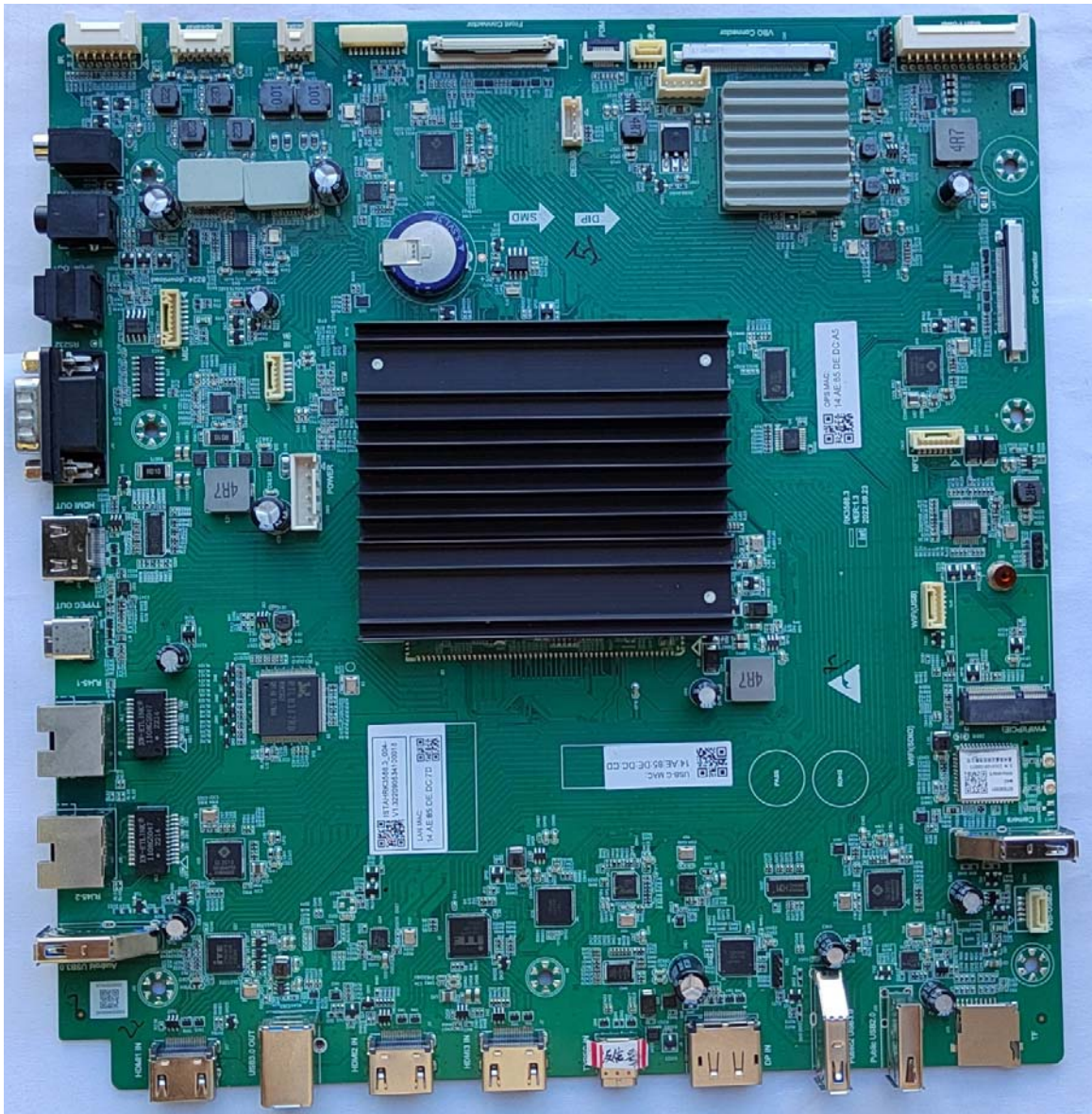
NOTE2: TYPE C out 与 HDMI out 可异显或同显且同时输出分辨率最高 3840\*2160@60Hz; 当 HDMI out 输出 7680\*4320 分辨率时 TYPE C out 不可用(仅 USB 功能可用);

NOTE3: Public USB3.0/2.0 具备跟随通道自动切换功能。

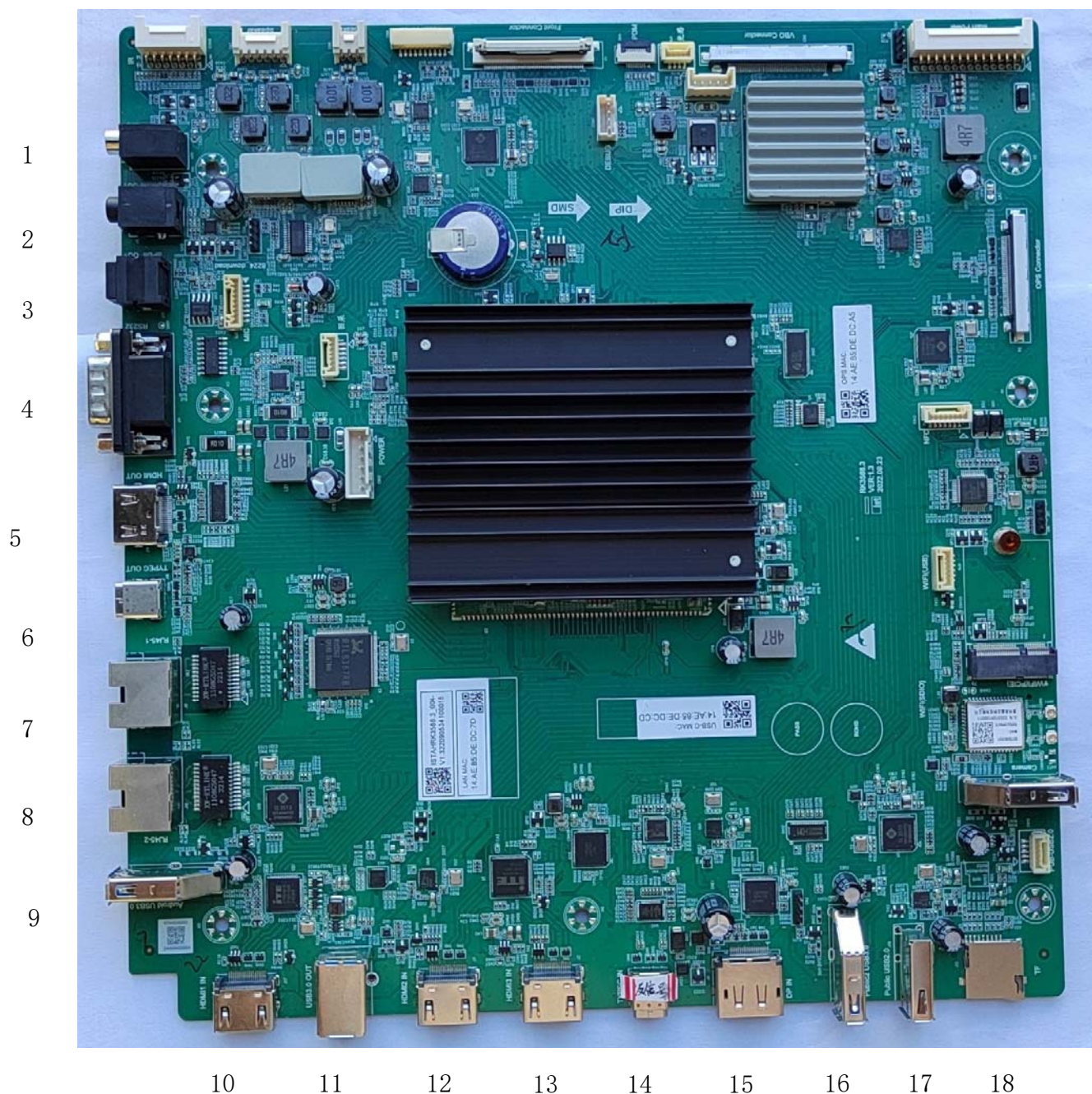
NOTE4: 主板提供相应连接方式及接口, 具体功能实现取决与对接板形态及固件适配状况;

NOTE5: 由于前置接口, OPS 接口均采用 FFC 排线, 实际使用注意尽量缩短线长, 建议使用加了高频膜的排线;

### 3.PCBA 实物图片(PCBA PHOTO)




#### 4.板载端子位置(TERMINAL POSITION)



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端子 TERMINAL	编号 NO.
MIC IN	1
S/PDIF OUT	3
HDMI out	5
RS232 串口(RS232 UART)	4



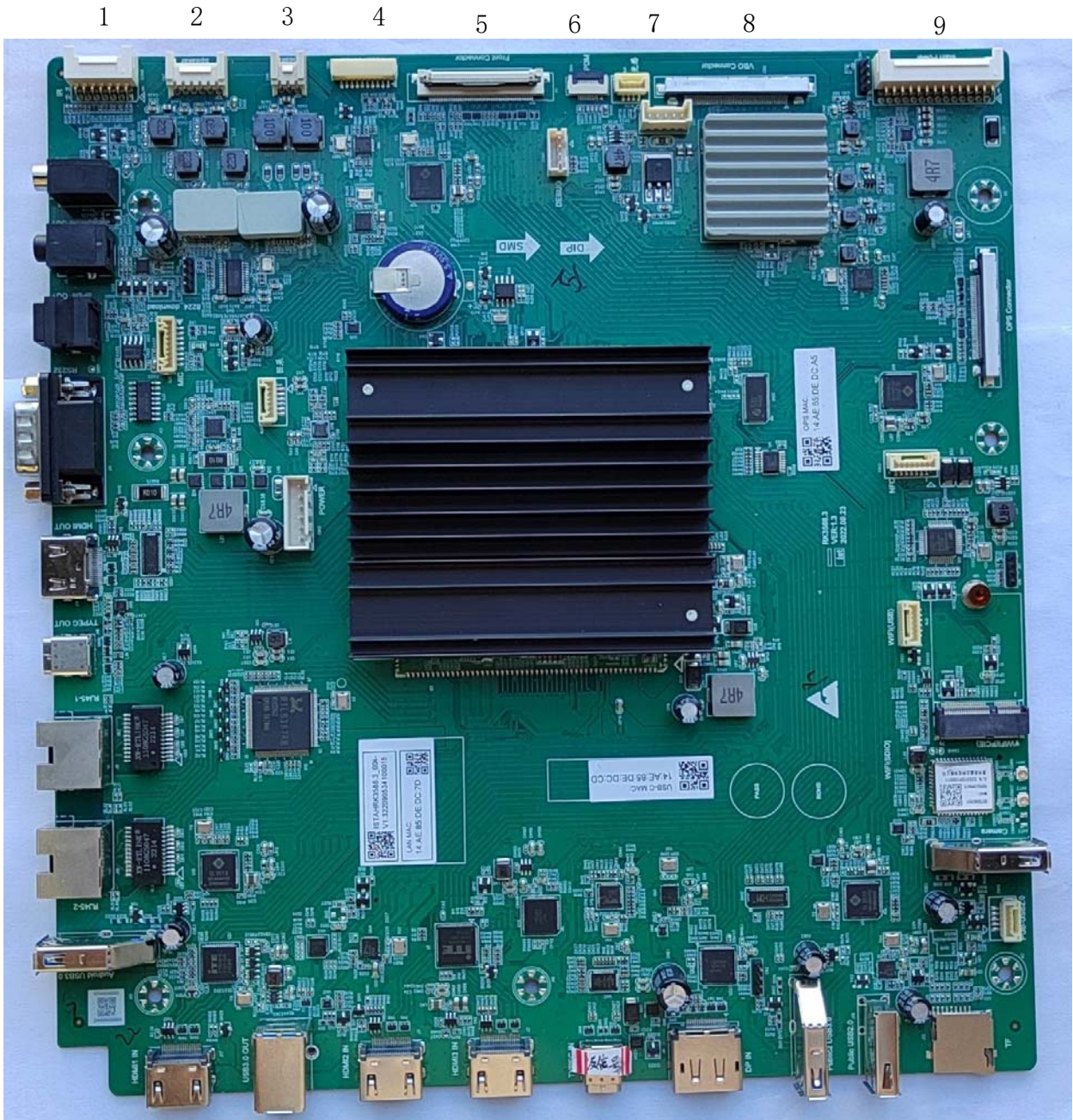
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RJ45 IN--1000M 以太网	7, 8
LINE OUT	2
TYPE C out	6
Android USB3.0	9
HDMI1 IN	10
USB3.0 OUT( face to host)	11
HDMI2,3 in	12,13
TYPE C in	14
DP in	15
Public USB3.0( face to device)	16,19
Public USB2.0( face to device)	17
Micro-SD card	18

必要说明:

1. MIC IN 耳机座仅支持本地模拟麦克风扩音功能 ；
2. 标号为 10 HDMI1 IN 为 HDMI1.4B 版本，另外 2 路 HDMI IN 为 HDMI2.0；此 HDMI1 IN 可以与其他视频同时输入在主屏幕做多窗口异显；HDMI1 也可通过固件指定输出到(HDMI OUT 或 TYPE C OUT)；所有外接 HDMI IN 均支持 CEC 功能；
3. TYPE C IN 功能：DP IN+USB3.0 HOST+USB2.0 DEVICE+PD3.0 对外充电(最高 20V\*5A) ；
4. TYPE C OUT 功能：DP OUT+USB3.0 HOST +对外供电(最高 5V/1A) ；
5. TYPE C OUT 与 HDMI OUT 视频输出时，可以与主屏同显，也可以各自显示不同画面 ；
6. 本板支持 RTC 实时时钟，掉电储能为超级电容，充电完毕情况下电量维持 RTC 芯片正常工作>=12 天
7. 本规格书仅基于硬件性基本功能描述，基于软件开发展现特色功能请参考本公司其他文档 ；

### 5.连接器位置(Connector position)




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编号 NO.	连接器 CONNECTOR	功能描述 FUNCTION
1	CON3	按键遥控指示灯插座(IR+KEY+LED connector)
2	CN7	L+R 喇叭插座 (L+R loudspeaker connector)
3	CN8	低音喇叭插座 ( BASS loudspeaker connector)
4	CN9	触摸屏接口插座(infrared touch connector)
5	P1	前置板接口插座 (Front-io board connector)
6	CN14	PDM 接口 (PDM connector)
7	NJ1	环境光传感器接口插座 (light sensor connector)
8	CN4	液晶面板 VbyOne 接线插座(AUO/LG/INNOLUX TFL_LCD panel VbyOne connector)
9	CON2	电源输入插座(board power in connector)
10	P2	接 OPS (涉及 USB3.0/HDMI/IO) 插座 (To ops:USB3.0,HDMI,I/O)
11	UN1	PCIE-WIFI 插座 (PCIE-WIFI connector) --M.2_E-KEY
12	CN10	PUB-USB2.0 connector
13	CN5	面板 TCON 供电插座(panel TCON board power supply connector )
14	NJ5	外接 MIC 模组接口 (Ext-MIC module connector)
15	NJ4	音频回采接口
16	CN12	TYPE-C 供电接口(TYPE-C supply connector)
17	CN13	NFC 接口 (NFC connector)
18	NJ9	Android USB2.0 接口 ( )

说明 1: UN1 为 PCIE2.1 M.2 A KEY/E KEY 标准接口, 通常用于扩展 WIFI5/6 模组;

说明 2: 板内其他未标注的连接器, 均为内部内部调试接口, 不清楚作用的情况下, 请不要接线; 否则可能对主板或者设备有损伤。

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## 6. 插座定义(CONNECTOR DEFINITION)

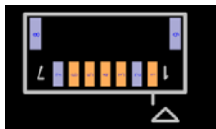
注意: 以下所有连接器涉及的 GPIO 无特殊说明, 均为 3.3V 耐压。

### §NJ1 (卧式 4PIN/1.25MM) 环境光传感器插座 (Light sensor connector)




脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	3.3V_out (<50mA)	3	SDA--(I2C 数据线)
2	GND	4	SCL--(I2C 时钟线)

### §CN13 (7PIN/1.25MM) NFC/指纹模组插座 (NFC CONNECTOR)

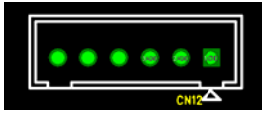


脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	GND	5	CTL (3.3V/out,控制模组)
2	RX--(接收)	6	GND
3	TX--(发送)	7	3.3V_out (待机可用-150mA)
4	WAKE/IRQ(IN/3.3V,模组反馈)		

注: 默认 UART 连接, 3.3V\_OUT 电路已经受 CTL 控制, 无必要 CTL 可不接线;

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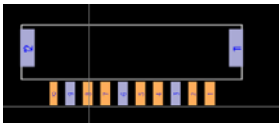
§CN12 (立式 6PIN/2.54MM) 板载 TYPE-C 供电插座 (TYPE-C power supply CONNECTOR)



脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	GND	4	VCC_IN
2	GND	5	VCC_IN
3	GND	6	VCC_IN

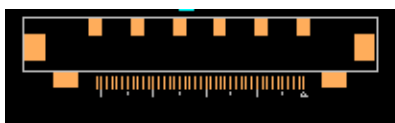
注: 仅作为板载 TYPE- C 对外充电的电源, 可以支持输入电压范围 12V~24V, 超过 65W 及以上建议使用 18V 及以上电压;

§CN9 (10P/1.25MM) 触摸接口插座 (TOUCH IN connector)




脚序 Pin NO.	功能 function	脚序 Pin NO.	功能 function
1	TX	6	GND
2	RX	7	PC_D+
3	GND	8	PC_D-
4	AD_D+	9	GND
5	AD_D-	10	5V_out (<1A)

§ P2 (41PIN/0.5MM) 接 OPS (涉及 HDMI, USB, IO 及串口) (TO OPS: HDMI, USB, I/O , UART CONNECTOR)



脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	GND	22	GND
2	OPS-HPD	23	OPS-PW-EN(GPIO)


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3	OPS-H-5V	24	OPS-ON(GPIO)
4	GND	25	OPS-OK(GPIO)
5	OPS-H-SDA	26	OPS-DET(GPIO)
6	OPS-H-SCL	27	OPS-U-RX
7	GND	28	OPS-U-TX
8	CEC	29	NC.
9	OPS-RST	30	TP-OPS-D+
10	GND	31	TP-OPS-D-
11	OPS-HD-CLKN	32	GND
12	OPS-HD-CLKP	33	OPS-D+
13	GND	34	OPS-D-
14	OPS-HD-D0N	35	GND
15	OPS-HD-D0P	36	OPS-SS-RX-
16	GND	37	OPS-SS-RX+
17	OPS-HD-D1N	38	GND
18	OPS-HD-D1P	39	OPS-SS-TX-
19	GND	40	OPS-SS-TX+
20	OPS-HD-D2N	41	GND
21	OPS-HD-D2P		

§CON2 (卧式 2\*14PIN/2.0MM) 电源及背光控制插座(POWER AND BACKLIGHT CONTROL CONNECTOR)



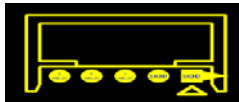
脚序 No.	功能 Function	脚序 No.	功能 Function
1	STB (on/off) (电源板电源输出控制)	15	12V_IN (电源板 12V 输入)
2	BL-ON/OFF (背光开关控制)	16	GND( 接地)
3	BL_PWM (背光亮度控制)	17	AMP VCC (功放供电) -note
4	BL_ADJ (背光亮度控制)	18	GND( 接地)
5	5V_IN (电源板 5V 输入)	19	AMP VCC (功放供电) -note

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6	5V_STB_IN (电源板待机 5V 输入)	20	GND( 接地)
7	5V_IN (电源板 5V 输入)	21	18V_IN (电源板 18V 输入)
8	NC	22	GND( 接地)
9	12V_IN (电源板 12V 输入)	23	18V_IN (电源板 18V 输入)
10	GND( 接地)	24	GND( 接地)
11	12V_IN (电源板 12V 输入)	25	18V_IN (电源板 18V 输入)
12	GND( 接地)	26	GND( 接地)
13	12V_IN (电源板 12V 输入)	27	18V_IN (电源板 18V 输入)
14	GND( 接地)	28	GND( 接地)

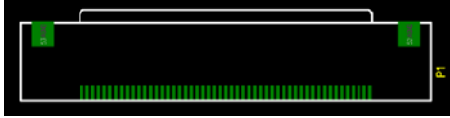
注: AMP\_VCC 功放供电支持 18V~24V; BL-ADJ 与 BL-PWM 都是同一个 IO 输出的信号, 区别在于 BL-ADJ 体现直流电压高低变化, BL-PWM 输出的是频率固定占空比变化的信号, 客户可根据背光需求接其中的一个脚;

#### §CN5(立式 5PIN/2.0MM) 面板供电插座 (Panel TCON power connector)



脚序 pin NO.	功能 function
1	GND (接地)
2	GND (接地)
3	LVDSVDD (12V out for TCON) --屏 TCON 供电, 输出
4	LVDSVDD (12V out for TCON) --屏 TCON 供电, 输出
5	LVDSVDD (12V out for TCON) --屏 TCON 供电, 输出

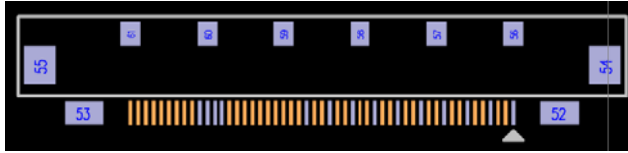
### §P1 (51PIN/1.25MM) 前置板连接插座 (Front board connector)



脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	FRT-PUB-D-	27	GND
2	FRT-PUB-D+	28	FHDMI_D0N
3	GND	29	FHDMI_D0P
4	FRT-PUB-RX-	30	GND
5	FRT-PUB-RX+	31	FHDMI_D1N
6	GND	32	FHDMI_D1P
7	FRT-PUB-TX-	33	GND
8	FRT-PUB-TX+	34	FHDMI_D2N
9	GND	35	FHDMI_D2P
10	FRT-MIX-D-	36	GND
11	FRT-MIX-D+	37	TP_SEL
12	GND	38	FHUB_RST
13	FRT-MIX-RX-	39	FHDMI_DET
14	FRT-MIX-RX+	40	NET-USB-D-
15	GND	41	NET-USB-D+
16	FRT-MIX-TX-	42	GND
17	FRT-MIX-TX+	43	I2C_SDA
18	GND	44	I2C_SCL
19	FHDMI_HPD	45	FUSB_EN
20	FHDMI_5V	46	5V_PD
21	FHDMI_SDA	47	FTYPE-C_DET
22	FHDMI_SCL	48	GND
23	CEC	49	OPS-RST
24	GND	50	SWITCH-CN
25	FHDMI_CLKN	51	5V_PD
26	FHDMI_CLKP		




### §CN13 (51PIN/0.25MM) 液晶面板接口插座 (Panel TCON connector)

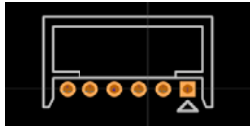


脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	GND	27	VB1_HTPN
2	VB1_7P	28	GND
3	VB1_7N	29	NC
4	GND	30	NC
5	VB1_6P	31	OPTION1 (默认悬空)
6	VB1_6N	32	NC
7	GND	33	I <sup>2</sup> C_SCL (默认悬空)
8	VB1_5P	34	I <sup>2</sup> C_SDA (默认悬空)
9	VB1_5N	35	VB1_FORMAT (默认悬空)
10	GND	36	NC
11	VB1_4P	37	NC
12	VB1_4N	38	NC
13	GND	39	GND
14	VB1_3P	40	GND
15	VB1_3N	41	GND
16	GND	42	GND
17	VB1_2P	43	NC
18	VB1_2N	44	NC
19	GND	45	PVCC(12V)
20	VB1_1P	46	PVCC(12V)
21	VB1_1N	47	PVCC(12V)
22	GND	48	PVCC(12V)
23	VB1_0P	49	PVCC(12V)
24	VB1_0N	50	PVCC(12V)
25	GND	51	PVCC(12V)
26	VB1_LOCKN		

注: 45~51P 输出电源等同于 CN5

	文件编号: QT-RD-014	总页数:18 / 34
	文件名称: 产品规格书	版 次:1.2

§CN7(卧式 6PIN/2.0MM) 喇叭插座 (Loudspeaker connector)



脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	NC.	4	NC
2	R+ (右喇叭正极)	5	L+ (左喇叭正极)
3	R- (右喇叭负极)	6	L- (左喇叭负极)

§CN7(立式 3PIN/2.0MM) 喇叭插座 (BASS Loudspeaker connector)




脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	NC	3	BASS+ (低音喇叭正极)
2	BASS- (低音喇叭负极)		

§ CON3 (2\*7PIN/2.0MM) 按键+遥控+指示灯插座



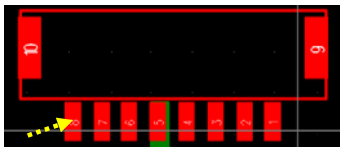
脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	IR-IN	8	OPS-RST
2	3.3V-STB	9	KEY1-IN

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3	SDA	10	KEY0-IN
4	LED-PWM	11	PM-IO1
5	SCL	12	GND
6	LED-R	13	PM-IO2
7	GND	14	GND

注: KEY1 仅支持采集电压范围为 1.8V; KEY0 支持采集电压范围为 3.3V,可支持按键唤醒;

### § NJ5 (8PIN/1.25MM) 外挂音频模组插座



脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	MIC_DN	5	5V(out,0.5A)
2	MIC_DP	6	GND
3	GND	7	MIC-U-RX
4	GND	8	MIC-U-TX


注: USB 接口是随通道切换的; 串口通道备用用来与模组通信或者做其他使用, 串口也可以复用做 GPIO

### § NJ4 (6PIN/1.25MM) 音频回采输出插座



脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	AEC_R-	4	GND
2	AEC_R+	5	AEC_L-
3	GND	6	AEC_L+

注: 作为外接 MIC 处理模组音频回采输出 (信号采集自功放输出端), 主板已做 1/8 分压处理;

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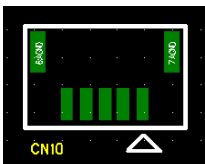
§ CN14 (10PIN/0.5MM) MIC-PDM 采集板插座



脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	3.3V	6	NC
2	GND	7	GND
3	SDA0	8	SCLK
4	SDA1	9	GND
5	SDA2	10	NC

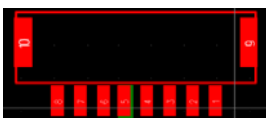
注: 此为 RK3588 内置 MIC 处理模块语音采集 PDM 数据输入, 最多可以支持 6\*DMICs.


§ CN10 (5PIN/1.25MM) PUB-USB2.0 插座



脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	5V_OUT(500mA)	4	GND
2	DATA-	5	GND
3	DATA+		

§ NJ9 (6PIN/1.25MM) ANDROID-USB2.0 插座



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	文件名称: 产品规格书	版 次:1.2

脚序 pin NO.	功能 function	脚序 pin NO.	功能 function
1	5V_OUT(500mA)	4	GND
2	DATA-	5	GND
3	DATA+	6	GPIO

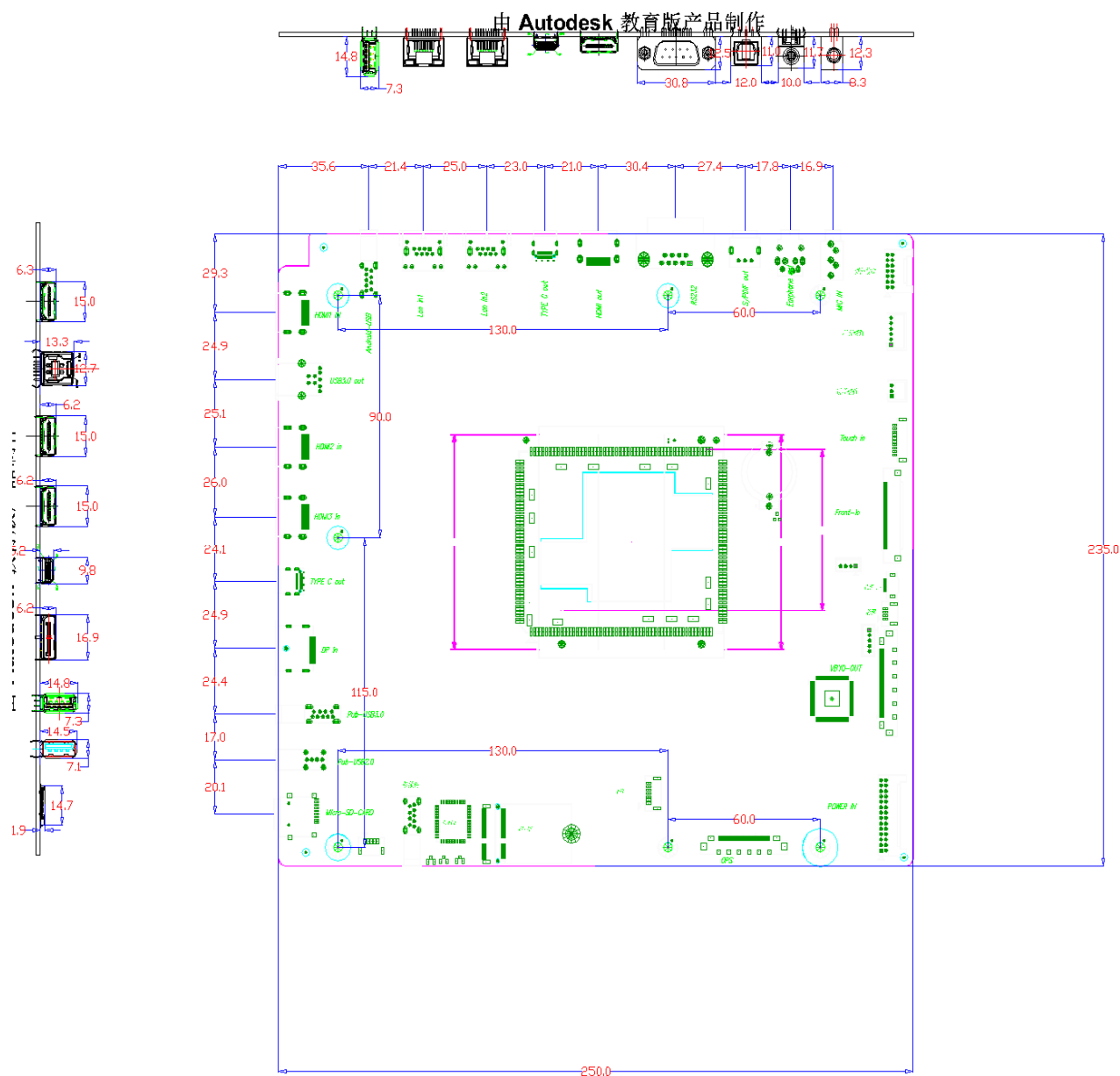
注：以上连接器的具体类型，请联系对应的 FAE 具体规格书；


### 7. PCBA 机械尺寸(更多细节请联系我司销售人员/FAE 提供 DXF 档的图纸)

#### PCBA Mechanical Dimensions(More details, please contact sales to ask for dxf file)

4层板板厚为 1.6mm PCB 长 = 235mm+/-0.5 mm PCB 宽 = 250mm+/-0.5mm, 元件最大高度 顶层≤15mm, 底层≤2.5mm;

4 layers board: thick=1.6mm,long=235mm+/-0.5mm,wide=250mm+/-0.5mm,max height top≤15mm bottom≤2.5mm



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## 8.HDMI 支持的分辨率 (HDMI TIMING)

### HDMI/DP 常用 PC 标准 TIMING (HDMI COMMON PC TIMING)

Format	Resolution	H.Freq(KHz)	V.Freq(Hz)	Standard
VGA	640×480	31.5	60	VESA
		37.9	72	
		37.5	75	
SVGA	800×600	37.9	60	VESA
		48.1	72	
		46.9	75	
XGA	1024×768	48.4	60	VESA
		56.5	70	
	60	75		
	1152×864	67.5	75	
SXGA	1280×1024	64	60	VESA
		80	75	
SXGA	1360×768	37.5	60	
WUXGA	1920×1080	37.5	60	

### HDMI/DP 常用 DTV 标准 TIMING (HDMI COMMON DTV TIMING)

Format	Resolution	V.Freq(Hz)
480i	720×480	60
480p	720×480	60
576i	720×576	50
576p	720×576	50
720p	1280×720	50
		60
1080i	1920×1080	50
		60
1080p	1920×1080	50
		60

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## HDMI IN/DP IN 4K TIMING

像素时钟 (PIXEL CLOCK)=300MHZ	3840*2160	29.97HZ/R444
	40*2160	HZ/R444
	40*2160	HZ/R444
	40*2160	98HZ/R444
	40*2160	HZ/R444
	4096*2160	24HZ/R444
	3840*2160	50HZ/Y420
	3840*2160	59HZ/Y420
	3840*2160	60HZ/Y420
像素时钟 (PIXEL CLOCK)=600MHZ	3840*2160	50HZ/R444
	3840*2160	59HZ/R444
	3840*2160	60HZ/R444
	4096*2160	50HZ/R444
	4096*2160	59HZ/R444
	4096*2160	60HZ/R444


## HDMI2.1 OUT 可支持常规 TIMING

480p	640×480	60HZ
	720x480	60HZ
720p	1280×720	60HZ/50HZ
1080p	1920×1080	60HZ/50HZ
4K	3840x2160	60HZ/50HZ
8K	7680X4320	60HZ/50HZ

注 1: 主板所有 HDMI(除 HDMI1 外)支持像素时钟 600MHZ 的分辨率;

注 2: HDMI 接口具备 HDCP1.4/2.3;



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注 3: 针对所有 4K2K 及以上 TIMING 信号, 为了保证显示质量及设备兼容性, 建议使用正规厂家符合高速 HDMI 标准的线材;


注 4: 以上列举的 TIMING 均为常用的, 更多具体细节查阅协会 EIA/CEA-816-X 等相关资料

Note1: PIXEL CLOCK=600MHz(HDMI1 only300MHz) all HDMI port on board is HDMI2.0 full speed;

Note2: PIXEL CLOCK=600MHz signal support HDCP 2.2, but HDCP function need licenses;

Note3: When input image is 4K2K, please use hight speed cable(HDMI2.0);


Note4: All of the above mentioned TIMING are commonly used, if you need to know more, please refer to EIA/CEA-816 timing list.

	文件编号: QT-RD-014	总页数:26 / 34
	文件名称: 产品规格书	版 次:1.2

## 9. 多媒体解码支持列表 (MULTI-MEDIA SUPPORT LIST)

### 视频解码(VIDEO DECODE)

MPEG-1/2	
Video Codec	MPEG-1/2
Supported Image Size	48x48 pixels to 1920x1088 pixels
Maximum Frame Rate	30fps
Maximum Bit Rate <sup>1</sup>	80Mbps
File Format	DAT, MPG, VOB, TS
Remarks	<ul style="list-style-type: none"> <li>Support Field Coding</li> </ul>
MPEG-4	
Video Codec	MPEG4
Supported Image Size	48x48 pixels to 1920x1088 pixels
Maximum Frame Rate	30fps
Maximum Bit Rate	38.4Mbps
File Format	AVI, MKV, MP4, MOV, 3GP
Remarks	<ul style="list-style-type: none"> <li>Not support MS MPEG4 v1/v2/v3</li> <li>Not support GMC</li> </ul>
H.264/AVC	
Video Codec	H.264
Supported Image Size	16x16 pixels to 8192x4608 pixels
Maximum Frame Rate	7680x4320@30fps (60fps for simple stream)
Maximum Bit Rate	80Mbps
File Format	AVI, MKV, MP4, MOV, 3GP, TS, FLV
Remarks	<ul style="list-style-type: none"> <li>Support Field Coding;</li> <li>Support MBAFF</li> <li>Support High and High10 Profile</li> </ul>
MVC	
Video Codec	H.264 MVC
Supported Image Size	16x16 pixels to 8192x4608 pixels
Maximum Frame Rate	7680x4320@30fps
Maximum Bit Rate	100Mbps
File Format	MKV, TS
Remarks	<ul style="list-style-type: none"> <li>Support Stereo High Profile only</li> </ul>
H.265/HEVC	
Video Codec	H.265/HEVC
Supported Image Size	64x64 pixels to 8192x4608 pixels
Maximum Frame Rate	7680x4320@60fps
Maximum Bit Rate	100Mbps
File Format	MKV, MP4, MOV, TS
Remarks	<ul style="list-style-type: none"> <li>Support Main Profile &amp; Main10 Profile</li> <li>Support Tile &amp; Slice</li> </ul>

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GOOGLE VP8	
Video Codec	VP8
Supported Image Size	48x48 pixels to 1920x1088 pixels
Maximum Frame Rate	30fps
Maximum Bit Rate	38.4 Mbps
File Format	WEBM,MKV
Remarks	

GOOGLE VP9	
Video Codec	VP9
Supported Image Size	64x64 pixels to 8192x4608 pixels
Maximum Frame Rate	7680x4320@60fps
Maximum Bit Rate	80 Mbps
File Format	WEBM,MKV
Remarks	

AV1	
Video Codec	AV1
Supported Image Size	64x64 pixels to 8192x4608 pixels
Maximum Frame Rate	3840x2160@60fps
Maximum Bit Rate	80 Mbps
File Format	WEBM,MKV
Remarks	


AVS2	
Video Codec	AVS2
Supported Image Size	64x64 pixels to 8192x4608 pixels
Maximum Frame Rate	7680x4320@30fps
Maximum Bit Rate	80 Mbps
File Format	TS
Remarks	

H.263	
Video Codec	H.263
Supported Image Size	SQCIF(128x96), QCIF(176x144), CIF(352x288),4CIF(704x576)
Maximum Frame Rate	30fps
Maximum Bit Rate	38.4Mbps
File Format	3GP, MOV, MP4
Remarks	● Not support H.263+

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VC-1	
<b>Video Codec</b>	VC-1
<b>Supported Image Size</b>	48x48 pixels to 1920x1088 pixels
<b>Maximum Frame Rate</b>	30fps
<b>Maximum Bit Rate</b>	45Mbps
<b>File Format</b>	WMV, ASF, TS, MKV, AVI
<b>Remarks</b>	

MOTION JPEG	
<b>Video Codec</b>	MJPEG
<b>Supported Image Size</b>	48x48 pixels to 65536x65536 pixels
<b>Maximum Frame Rate</b>	1920x1080@280fps (YUV420) 560M pixels/Second
<b>Maximum Bit Rate</b>	60Mbps
<b>File Format</b>	AVI
<b>Remarks</b>	

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## 音频解码(AUDIO DECODE)

MPEG Audio	
Audio Codec	MPEG1/2/2.5 Audio Layer1/2/3
Channel	2
Bit rate	8kbps~320Kbps, CBR and VBR
Sampling rate	8KHZ~48KHz
File Format	MP1, MP2, MP3
Remarks	n.a
Windows Media Audio	
Audio Codec	WMA Version 4,4.1, 7, 8, 9, wmapro
Channel	2
Bit rate	8kbps~320Kbps
Sampling rate	8KHZ~48KHz
File Format	WMA
Remarks	Non-support WMA Pro、lossless and MBR
WAV Audio	
Audio Codec	MS-ADPCM, IMA-ADPCM, PCM
Channel	2
Bit rate	n.a
Sampling rate	8KHZ~48KHz
File Format	WAV
Remarks	Support 4bit MS-ADPCM, IMA-ADPCM
OGG Audio	
Audio Codec	Q1~ Q10
Channel	2
Bit rate	n.a
Sampling rate	8KHZ~48KHz
File Format	OGG, OGA
Remarks	n.a

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### FLAC Audio

<b>Audio Codec</b>	Compress Level 0~8
<b>Channel</b>	2
<b>Bit rate</b>	n.a

<b>Sampling rate</b>	8KHZ~48KHz
<b>File Format</b>	FLAC
<b>Remarks</b>	n.a

### AAC Audio


<b>Audio Codec</b>	ADIF ,ATDS Header AAC-LC and AAC-HE, AAC-ELD
<b>Channel</b>	5.1
<b>Bit rate</b>	n.a
<b>Sampling rate</b>	8KHZ~48KHz
<b>File Format</b>	AAC, M4A
<b>Remarks</b>	n.a

### AMR Audio

<b>Audio Codec</b>	AMR-NB, AMR-WB
<b>Channel</b>	1
<b>Bit rate</b>	AMR-NB 4.75~12.2kbps@8kHz AMR-WB 6.60~23.85kbps@16kHz
<b>Sampling rate</b>	8KHZ, 16KHz
<b>File Format</b>	3GP
<b>Remarks</b>	n.a

### MIDI Audio

<b>Audio Codec</b>	MIDI Type 0 and 1, DLS version 1 and 2, XMF and Mobile XMF, RTTTL/RTX, OTA, iMelody
<b>Channel</b>	2
<b>Bit rate</b>	n.a
<b>Sampling rate</b>	n.a
<b>File Format</b>	XMF, MXMF, RTTTL, RTX, OTA, IMY
<b>Remarks</b>	n.a

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**图像解码 IMAGE DECODER**

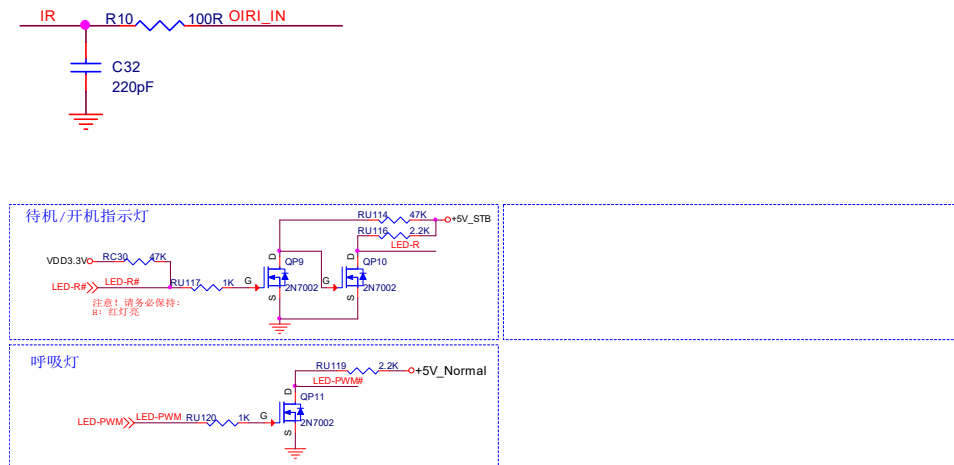
<b>IMAGE CODEC</b>	file format 1.02
<b>SUPPORT IMAGE SIZE</b>	48 pixels to 65536x65536pixels
<b>MAXIMUM DATA RATE</b>	1080x1080@200fps (yuv420) 560m pixels/second
<b>CONTAINER</b>	jpeg
<b>MARKS</b>	not support non-interleaved scan  software support SRGB jpeg  software support adobe RGB jpeg

**注意：具备限制性使用的多媒体格式不在以上之列；**

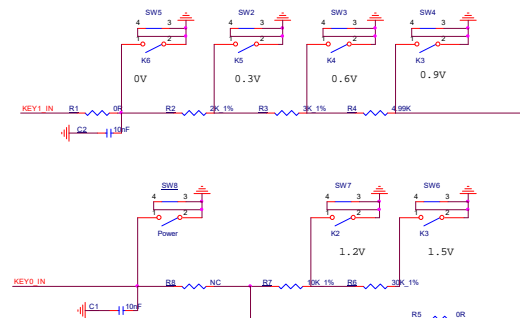
## 10. 红外遥控, 按键及指示灯电路(参考)

### IR,KEY and indicator light circuit(Reference)

主板端电路图:



按键板参考电路图 (分压电阻, 请根据实际情况调整):



使用说明:

1. IR 输入电压范围 3.3V~5V, 大多数 IR 都是 3.3V 的;
2. 指示灯主板输出脚具备 1mA 驱动能力 (红灯必须高电平亮); 如超过, 请另行设计驱动电路, 保持控制逻辑一致即可;
3. 按键注意 KEY0 的识别范围是 3.3V,KEY0 必须做 POWER 键; 其他键可以用 KEY1(1.8V);



## IC warning

- English:


This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

- French:

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1) L'appareil ne doit pas produire de brouillage;
- 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement

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12. 重要 IC 清单

***TBD***

### **FCC STATEMENT**

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.


Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

### **Radiation Exposure Statement**

This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body

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## 11. 使用须知(ATTENTION)

- (1) 湿度要求 $\leq 80\%$ ; 存储温度:  $-10 \sim 60^{\circ}\text{C}$ ; 工作温度:  $0 \sim 45^{\circ}\text{C}$ ;
- (2) 直接接触本 PCBA 时需注意 ESD/EOS 防护;
- (3) 本产品含有 BGA 元件, 装配作业时不要弯曲本板; 双面贴片, 轻放轻拿防止撞件;
- (4) 通电前请检查连线的正确, 尤其是电源线及液晶面板接线;
- (5) 本产品如果适配 OPS 电脑, 不支持 OPS 热插拔, 请在断电情况下装卸 OPS 电脑;
- (6) 本文部分内容理解可能需要相关工程技术人员, 有什么技术上不明白请及时联系 FAE。

(1) humidity  $\leq 80\%$ ; Storage temperature:  $-10 \sim 60^{\circ}\text{C}$ ; working temperature: $0 \sim 45^{\circ}\text{C}$ ;

(2) Direct contact with the PCBA need to pay attention to the protection of ESD/EOS;

(3) This product contains BGA components, so don't bend the board when you assemble the work;

(4) Check the connection's correct before power on;

(5) If this product is suitable for OPS computer, please load and unload OPS computer under power off;

(6) This article part of the understanding of the need for related engineering and technical personnel;What is the technical do not understand, please contact us in time.

### **FCC STATEMENT**

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

### **Radiation Exposure Statement**

This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body

## IC warning

- English:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

- French:

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1) L'appareil ne doit pas produire de brouillage;
- 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement