

K-S905 主板产品规格书

K-S905 Mainboard Specification

| | |
|------------|------------|
| 版本 Version | V1.1 |
| 日期 Date | 2022-08-19 |

敬告：本档版权归内容原创公司所有，并保留一切权力。档内容如有修改更新，请联系提供方获取最新本，恕不另行通知。

Note: This document is copyrighted by the content original company and all rights reserved. If the contents of the document are updated, please contact the provider for the latest version without notice.

修改记录 Changelog

| | | |
|-------|------------|--|
| 1.0.0 | 2021-07-28 | 中英文合并版本。Chinese and English merged version. |
| 1.1.0 | 2021-12-26 | 基于 V3.0 版本硬件更新。Updated based on V3.0 HW. |
| 1.1.1 | 2022-05-14 | 增加 MIPI 屏接口硬件说明。Add MIPI panel HW notice. |
| 1.1.2 | 2022-08-12 | K-S905 主板 CPU 最高频率修正为 1.9GHz。K-S905 CPU maximum freq 1.9GHz. |
| 1.1.3 | 2022-08-19 | 默认配置更改为 1+8 |

目录 Contents

| | | |
|----------|--|-----------|
| 1 | 主芯片简介 SOC BRIEF | 5 |
| 2 | 产品概述 PRODUCT OVERVIEW | 6 |
| 3 | 规格清单 SPECIFICATION LIST | 8 |
| 4 | 接口定义 INTERFACE DEFINITION | 10 |
| ➤ | J1 MICRO-SIM 卡座 MICRO-SIM CARD SOCKET..... | 10 |
| ➤ | J2 DC-12V 插座 DC-12V SOCKET | 10 |
| ➤ | J3 DC-12V 输入接口 DC-12V INPUT HEADER | 10 |
| ➤ | J5 I2C 总线接口 I2C BUS HEADER..... | 10 |
| ➤ | J6 M-PCIE 4G 插座 M-PCIE 4G SOCKET..... | 11 |
| ➤ | J7 HDMI 输出插座 HDMI OUTPUT SOCKET | 11 |
| ➤ | J8 MICROUSB 插座 MICROUSB SOCKET..... | 11 |
| ➤ | J9 喇叭接口 SPEAKER HEADER..... | 11 |
| ➤ | J11 CVBS 输出接口 CVBS OUTPUT HEADER..... | 11 |
| ➤ | J12 USB TYPE A 插座 USB TYPE A SOCKET | 12 |
| ➤ | J13 USB 2.0 接口 USB 2.0 HOST HEADER..... | 12 |
| ➤ | J14 USB 2.0 接口 USB 2.0 HOST HEADER..... | 12 |
| ➤ | J15 USB 2.0 接口 USB 2.0 HOST HEADER..... | 12 |
| ➤ | J16 USB 2.0 接口 USB 2.0 HOST HEADER..... | 13 |
| ➤ | J17 USB 2.0 接口 USB 2.0 HOST HEADER..... | 13 |
| ➤ | J18 USB 3.0 接口 USB 3.0 HOST HEADER..... | 13 |
| ➤ | J19 TF 卡插座 TF CARD SOCKET | 14 |
| ➤ | J20 背光控制接口 BACKLIGHT CONTROL HEADER | 14 |
| ➤ | J21 RJ45 千兆以太网口 RJ45 GBIT ETHERNET JACK | 14 |
| ➤ | J22 数据串口 0 DATA SERIAL PORT 0 | 14 |
| ➤ | J23 MIPI 屏 FPC 接口 MIPI PANEL FPC CONNECTOR..... | 15 |
| ➤ | J24 USB OTG 接口 USB OTG HEADER | 16 |
| ➤ | J25 USB 3.0 TYPE A 插座 USB 3.0 TYPE A SOCKET..... | 16 |
| ➤ | J26 LVDS 电压接口 LVDS VOLTAGE HEADER..... | 16 |
| ➤ | J27 数据串口 3 DATA SERIAL PORT 3 | 17 |
| ➤ | J28 四段式耳麦插座 4-POLE HP/MIC JACK..... | 17 |
| ➤ | J29 LVDS 接口 LVDS HEADER..... | 17 |
| ➤ | J30 音频线路输出 AUDIO LINE OUTPUT | 18 |
| ➤ | J31 遥控-LED 接口 REMOTE CONTROL & LED HEADER | 18 |
| ➤ | J32 数据串口 4 DATA SERIAL PORT 4 | 18 |

| | | |
|----------|--|-----------|
| ➤ | J35 MIPI CSI FPC 接口 MIPI CSI FPC CONNECTOR | 19 |
| ➤ | J38 按键和开关接口 KEYPAD AND SWITCH HEADER | 20 |
| ➤ | J39 线路输入接口 LINE INPUT HEADER..... | 21 |
| ➤ | J40 麦克风输入接口 MICPHONE INPUT HEADER | 21 |
| ➤ | J47 I2C FPC 接口 I2C FPC HEADER..... | 21 |
| ➤ | J48 POE 受电接口 POE PD HEADER | 22 |
| ➤ | J51 ADC 输入接口 ADC INPUT HEADER..... | 22 |
| ➤ | SW1 烧录模式按键 RECOVERY MODE BUTTON..... | 22 |
| ➤ | SW2 USB OTG/HUB 复用开关 USB OTG/HUB MULTIPLEX SWITCH..... | 23 |
| 5 | 物理尺寸 PHYSICAL SIZE..... | 24 |
| 6 | 注意事项 ASSEMBLY PRECAUTIONS | 25 |
| 7 | 软件指南 SOFTWARE GUIDE | 27 |

1 主芯片简介 SOC Brief

S905D3 芯片具备高性能、高扩展应用特点，其主要特性如下：

- CPU：四核 64 位 Cortex-A55 架构，主频最高 1.9GHz；ARMv8-A 体系结构带 Neon 和 Crypto 扩展
- GPU：ARM Mali-G31 MP2，支持 OpenGL ES 1.1/2.0/3.2，OpenCL 2.0，Vulkan 1.0，内嵌高性能 2D 加速硬件
- NPU：支持 1.2Tops 算力
- 多媒体：支持 4K 60fps H.265/H.264/VP9 视频解码；支持 1080P 100fps H.265/H.264 视频编码；支持 2-lane MIPI CSI

2 产品概述 Product Overview

K-S905 主板基于 Amlogic S903D3 高性能大小核架构应用处理器平台。**S905D3** 主芯片集成四核 Cortex-A55、Mali-G31 2MP 高性能 GPU，主频最高可达 1.9GHz，具备超强的计算性能、2D/3D 图形处理能力和全高清视频编解码能力，完美支持 4Kx2K@60fps 超清解码。

K-S905 mainboard is based on Amlogic S903D3 high-performance application processor platform. **S905D3** is a low power, high performance processor for computing, personal mobile internet devices and other smart device applications. It integrates quad-core Cortex-A55 clocked at up to 1.8GHz, with superior computing performance, 2D/3D graphics processing capabilities and Full HD video codec capabilities. It perfectly supports 4Kx2K@60fps decoding.

此款主板专门针对**超薄**应用进行严格选材和设计，紧凑的尺寸和丰富的接口方便其集成到整机中，为最终的产品带来流畅的体验和超强的性能，可应用于数字标牌、触摸互动、消费电子、娱乐系统等行业。

This mainboard is specially designed for **ultra-thin** applications with strict material selection and design. The compact size and rich interface facilitate its integration into the complete machine, bringing a smooth experience and superior performance to the final product. It can be applied to digital signage, touch interactive, consumer electronics, entertainment systems and other industries.

K- S905 V3.0 主板实物照片接口示意图如下所示。

K- S905 V3.0 mainboard actual interface diagram as shown below.

3 规格清单 Specification List

K-S905 的系统功能和接口特性如下表所示。K-S905's system functions and interface features are shown in the following table.

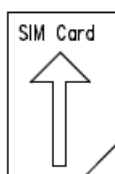
| 功能&接口 Function&Interface | 详细描述 Detailed Description |
|-----------------------------|---|
| CPU | Amlogic S905D3 Cortex-A55 四核，最高主频 1.9GHz S905D3 Cortex-A55 quad-core, up to 1.9GHz |
| DDR | LPDDR4 1GB (2GB 4GB 可选) LPDDR4 1GB (2GB 4GB optional) |
| 存储·Storage | 默认标配 8GB EMMC NAND 芯片，可扩展至最大 128GB The default comes with an 8GB EMMC NAND chip that can scale up to 128GB |
| LVDS LCD | 30 针行业标准双路 LVDS 屏接口，支持 VESA/JEITA 格式，最高支持 1080P 输出 30-pin industry-standard dual LVDS LCD supporting VESA/JEITA format up to 1080P output |
| MIPI LCD | 30P FPC MIPI LCD 屏 (注意：MIP 和 LVDS LCD 二选一) 30P FPC MIPI LCD panel (Note: MIPI and LVDS LCD are conflicted) |
| MIPI CSI MIPI CSI | 24P PFC MIPI-CSI 输入接口 24P PFC MIPI CSI input interface |
| 线路输出·Line Output | 支持标准左右声道线路输出 (排针接口+耳机接口) Support standard left and right channel line output (pin header+headphone jack) |
| 功放输出 Amplifier output | 8 欧·6W 双路音频功放输出 8 Ohm 6W Dual Audio Amplifier Output |
| MIC 输入 MIC Input | 差分 MIC 输入 (排针接口) Differential MIC input (pin header) |
| 线路输入·Line Input | 支持标准左右声道线路输入 (排针接口) Support standard left and right channel line input (pin header) |
| USB 接口 USB Interface | 2 个横插接口 (USB 3.0x1 和 USB 2.0 Hubx1) ， 7 个内置排针 (USB 3.0x1 和 USB 2.0 Hubx6) ， 1 个 MicroUSB 插座/USB OTG 排针 2 horizontal connectors (USB 3.0x1 and USB2.0 Hubx1), 7 pin headers (USB 3.0x1 and USB 2.0 Hubx6), 1 Micro USB connector/USB OTG pin header |
| 串口 Serial Port | 1 个 TTL 内置，1 个 TTL/232/485 兼容内置，1 个 TTL/232 内置 1 TTL, 1 TTL/485 compatible, 1 TTL/RS-232 compatible |
| TF 卡 Micro SD Card | 自弹式 TF 卡插座，最高支持 128GB TF 卡 Self-elastic micro SD card socket, up to 128GB capacity |
| 摄像头 Camera | 支持 800 万像素以内 USB 摄像头 Support USB camera within 8 million pixels |
| WiFi | 内置高性能 SDIO 接口 WiFi 模块，支持 IEEE 802.11 b/g/n/ac，默认配置单频 2.4GHz Built-in high performance SDIO interface WiFi module, support IEEE 802.11 b/g/n/ac |
| 蓝牙 Bluetooth | 内置高性能串口 BT 模块 (选配) ，支持 V2.1+EDR/BT v3.0/BT v3.0+HS/BT v4.0 |

| 功能&接口 Function&Interface | 详细描述 Detailed Description |
|------------------------------------|---|
| | Built-in high performance serial interface BT module (optional) with support for V2.1+EDR/BT v3.0/BT v3.0+HS/BT v4.0 |
| 以太网口 Ethernet | 1 路 10/100/1000M 自适应以太网 RJ45 网口+POE 受电 1 port 10/100/1000M Adaptive Ethernet RJ45 connector with POE PD |
| MiniPCI-E 4G | 行业标准 MiniPCI-E 4G 模块接口 Industry standard MiniPCI-E 4G module interface |
| 背光控制 Backlight Control | 1 路行业标准液晶屏背光控制接口，支持背光开关和亮度调节 1 port Industry standard LCD backlight control header, support for backlight switch and brightness adjustment |
| 红外遥控 Infrared RC | 标准红外遥控接收头和红外接收排针接口 Standard infrared remote control receiver and infrared receiver pin header |
| GPIO 信号 GPIO Signals | 8 路 GPIO 信号，可扩展 GPIO 按键和/或 3.3V 输入/输出 8-way GPIO signals for such as GPIO buttons and/or 3.3V digital input/output |
| I2C 总线 I2C Bus | I2C 排针和 FPC 接口，可扩展 I2C 电容屏等 I2C pin header and FPC for I2C capacitive screen and etc |
| 实时时钟 Real Time Clock | 超低功耗 RTC 电路（带 CR1220 纽扣电池），并可支持定时开关机 Ultra-low-power RTC circuit (CR1220 battery) with timer and alarm functionalities |
| 指示灯 LED Indicator | 红色待机指示和绿色工作指示灯 Red LED indicator for standby and green LED indicator for running |
| 按键 Buttons | 烧录键（RECOVERY）和电源键 Recovery mode button and power switch button |
| 电源输入 DC Input | 支持 9~15V 宽电压直流电源输入 Supports 9~15V wide voltage DC power input |
| 环境要求 Ambient Requirement | 工作温度 0°~70°，工作湿度 0%~95%（不结露） Working temperature 0°~70°，working humidity 0%~95% (non-condensing) |
| 物理尺寸 Physical Size | 长*宽*高（135.2mm*90mm*9mm），PCB 正面高度 7mm Length*Width*Height (135.2mm*90mm*9mm), PCB top side height 7mm |
| 安卓系统 Android Version | 推荐安卓 9.0 Recommended Android 9.0 |

4 接口定义 Interface definition

➤ J1 Micro-SIM 卡座 Micro-SIM Card Socket

【J1】Micro-SIM 卡座。 [J1] Micro-SIM Card Socket.



注意：SIM 卡座是常规中卡卡槽，插卡时请注意 SIM 卡缺口朝外插入。

➤ J2 DC-12V 插座 DC-12V Socket

【J2】DC-12V 电源插座，内正外负，内芯直径 2.0mm，外圈孔径 5.5mm。 [J2] DC-12V power socket, positive outer and negative inner, inner pin diameter 2.0mm, outer ring diameter 5.5mm.

➤ J3 DC-12V 输入接口 DC-12V Input Header

【J3】DC-12V 输入接口(单排 2.54mm-方孔为 1 脚)。 [J3] DC-12V Input Header (SIP 2.54mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|---|
| 1 | 12V | 直流电源输入 (9~15V) DC Power Input (9~15V) |
| 2 | 12V | 直流电源输入 (9~15V) DC Power Input (9~15V) |
| 3 | GND | 电源地 Power Ground |
| 4 | GND | 电源地 Power Ground |
| 5 | V5S | 5V 待机电源输入 5V Standby Power Input |
| 6 | STB | 待机信号输出 (低电平待机) Standby Enable Output (0V for Standby) |

➤ J5 I2C 总线接口 I2C Bus Header

【J5】I2C 总线接口 (单排 1.25mm-方孔为 1 脚)。 [J5] I2C Bus Header (SIP 1.25mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|------------------------------------|
| 1 | 3.3V | 3.3V 供电输出 Power output supply 3.3V |
| 2 | SCL | I2C 总线时钟信号 I2C Bus clock signal |

| | | |
|---|-----|--|
| 3 | SDA | I2C 总线数据信号 I2C Bus data |
| 4 | IRQ | 中断输入 (3.3V 电平) Interrupt input (3.3V level) |
| 5 | RST | 复位输出 (3.3V 电平) Mainboard reset output (3.3V level) |
| 6 | GND | 数字地 Digital Ground |

➤ J6 m-PCIE 4G 插座 m-PCIE 4G Socket

【J6】标准 m-PCIE 4G 插座。 [J6] Standard m-PCIE 4G Socket.

➤ J7 HDMI 输出插座 HDMI Output Socket

【J7】标准 HDMI 输出插座。 [J7] Standard HDMI Output Socket.

注意：由于主控芯片 HDMI 单独授权的原因，此接口功能可能不焊接或无法使用。

➤ J8 MicroUSB 插座 MicroUSB Socket

【J8】USB 2.0 MicroUSB 插座。 [J8] USB 2.0 MicroUSB Socket.

注意：J8 和 J24 接口为信号复用，只能同时接其中一个。并且此组信号通过 SW2 切换开关和 USB 1x7Hub 的信号源复用。

➤ J9 喇叭接口 Speaker Header

【J9】喇叭接口（单排 2.0mm-方孔为 1 脚）。 [J9] Speaker Header (SIP 2.0mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|--------------------------------|
| 1 | R+ | 喇叭右声道+ Speaker right channel + |
| 2 | R- | 喇叭右声道- Speaker right channel - |
| 3 | L- | 喇叭左声道- Speaker left channel - |
| 4 | L+ | 喇叭左声道+ Speaker left channel + |

➤ J11 CVBS 输出接口 CVBS Output Header

【J11】CVBS 视频信号输出接口（单排 1.25mm-方孔为 1 脚）。 [J11] CVBS video output header (SIP 1.25mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|-------------------|
| 1 | GND | 信号地 Signal Ground |

| | | |
|---|------|-----------------------------|
| 2 | CVBS | CVBS 视频输出 CVBS Video Output |
|---|------|-----------------------------|

➤ J12 USB Type A 插座 USB Type A Socket

【J12】标准 USB 2.0 Hub Type A 插座。 [J12] USB 2.0 Hub Type A Socket.

➤ J13 USB 2.0 接口 USB 2.0 Host Header

【J13】USB 2.0 Hub 接口 (单排 2.0mm-方孔为 1 脚)。 [J13] USB 2.0 Hub Header (SIP 2.0mm-Square pad is pin 1)

| Pin# | Definition | Note |
|------|------------|----------------------------------|
| 1 | GND | 数字地 Digital Ground |
| 2 | DP | USB 差分数据+ USB Differential Data+ |
| 3 | DM | USB 差分数据- USB Differential Data- |
| 4 | 5V | 5V 输出 Power output 5V |

➤ J14 USB 2.0 接口 USB 2.0 Host Header

【J14】USB 2.0 Hub 接口 (单排 2.0mm-方孔为 1 脚)。 [J14] USB 2.0 Hub Header (SIP 2.0mm-Square pad is pin 1)

| Pin# | Definition | Note |
|------|------------|----------------------------------|
| 1 | GND | 数字地 Digital Ground |
| 2 | DP | USB 差分数据+ USB Differential Data+ |
| 3 | DM | USB 差分数据- USB Differential Data- |
| 4 | 5V | 5V 输出 Power output 5V |

➤ J15 USB 2.0 接口 USB 2.0 Host Header

【J15】USB 2.0 Hub 接口 (单排 2.0mm-方孔为 1 脚)。 [J15] USB 2.0 Hub Header (SIP 2.0mm-Square pad is pin 1)

| Pin# | Definition | Note |
|------|------------|----------------------------------|
| 1 | GND | 数字地 Digital Ground |
| 2 | DP | USB 差分数据+ USB Differential Data+ |
| 3 | DM | USB 差分数据- USB Differential Data- |
| 4 | 5V | 5V 输出 Power output 5V |

➤ J16 USB 2.0 接口 USB 2.0 Host Header

【J16】USB 2.0 Hub 接口 (单排 1.25mm-方孔为 1 脚)。 [J16] USB 2.0 Hub Header (SIP 1.25mm-Square pad is pin 1)

| Pin# | Definition | Note |
|------|------------|----------------------------------|
| 1 | GND | 数字地 Digital Ground |
| 2 | DP | USB 差分数据+ USB Differential Data+ |
| 3 | DM | USB 差分数据- USB Differential Data- |
| 4 | 5V | 5V 输出 Power output 5V |

➤ J17 USB 2.0 接口 USB 2.0 Host Header

【J17】USB 2.0 Hub 接口 (单排 1.25mm-方孔为 1 脚)。 [J17] USB 2.0 Hub Header (SIP 1.25mm-Square pad is pin 1)

| Pin# | Definition | Note |
|------|------------|----------------------------------|
| 1 | GND | 数字地 Digital Ground |
| 2 | DP | USB 差分数据+ USB Differential Data+ |
| 3 | DM | USB 差分数据- USB Differential Data- |
| 4 | 5V | 5V 输出 Power output 5V |

➤ J18 USB 3.0 接口 USB 3.0 Host Header

【J18】USB 3.0 接口(单排 1.25mm-面对缺口左侧为 1 脚)。 [J18] USB 3.0 Host Header (SIP 1.25mm-Square pad is pin 1)

| Pin# | Definition | Note |
|------|------------|--|
| 1 | TX+ | USB 差分数据 TX+ USB Differential Data TX+ |
| 2 | TX- | USB 差分数据 TX- USB Differential Data TX- |
| 3 | GND | 数字地 Digital Ground |
| 4 | RX+ | USB 差分数据 RX+ USB Differential Data RX+ |
| 5 | RX- | USB 差分数据 RX- USB Differential Data RX- |
| 6 | GND | 数字地 Digital Ground |
| 7 | D+ | USB 差分数据+ USB Differential Data+ |
| 8 | D- | USB 差分数据- USB Differential Data- |
| 9 | 5V | 5V 输出 Power output 5V |

注意：J18 和 J25 接口为信号复用，只能同时接其中一个。

➤ J19 TF 卡插座 TF Card Socket

【J19】标准 TF 卡插座。 [J19] Standard TF Card Socket.

➤ J20 背光控制接口 Backlight Control Header

【J20】背光控制接口(单排 2.0mm-方孔为 1 脚)。 [J20] Backlight Control Header (SIP 2.0mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|--|
| 1 | 12V | If the current exceeds 2A, external 12V is recommended |
| 2 | 12V | 如果电流超过2A 则建议外接12V 供电 |
| 3 | EN | 默认输出5V The default output is 5V |
| 4 | ADJ | 3.3V 方波 (1KHz 频率) 3.3V square wave (1KHz Freq.) |
| 5 | GND | 电源地 Power Ground |
| 6 | GND | 电源地 Power Ground |

➤ J21 RJ45 千兆以太网口 RJ45 Gbit Ethernet Jack

【J21】RJ45 千兆以太网口。 [J21] RJ45 Gbit Ethernet Jack.

➤ J22 数据串口 0 Data Serial Port 0

【J22】内置串口 0 (单排 2.0mm-方孔为 1 脚)，默认为 TTL 电平且可配置为 RS-485 电平 (焊接 U67 则为 RS-485 电平)；**对应的软件编程设备节点为 ttyS0。** [J22] Built-in Serial Port 0 (SIP 2.0mm-Square pad is pin 1). The output level is TTL by default and it could be setup to RS-485 if required (RS-485 if U67 mounted). **The related software device node name is ttyS0.**

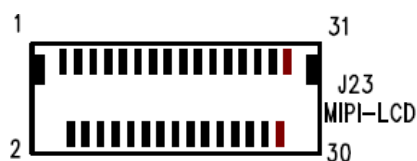
| Pin# | Definition | Note |
|------|------------|---|
| 1 | GND | 数字地 Digital Ground |
| 2 | RX/A | 数据接收 (TTL 或 RS-485) Data receive (TTL or RS-485 level) |
| 3 | TX/B | 数据发送 (TTL 或 RS-485) Data transmit (TTL or RS-485 level) |
| 4 | VCC | 电源输出 (默认3.3V , 可选5V) Power output (Default 3.3V, 5V option) |

注意：如需将调试串口作为数据串口使用 (波特率 115200)，则请联系供应商获取定制版本软件；在上电的前 5 秒此串口会输出启动信息 (上位机或下位机需要处理数据容错)。 Note: If you need to use the debugging serial port as a data serial port (baud rate 115200), please contact the supplier to

obtain the customized software; this serial port will output the startup information in the first 5 seconds of power on (the upper or lower machine should handle this kind of data fault tolerance).

➤ J23 MIPI 屏 FPC 接口 MIPI Panel FPC Connector

【J23】MIPI 屏 FPC 接口 (FPC-0.3mm 31-Pin 上/下接触)。 [J23] MIPI Panel FPC Connector (FPC-0.3mm 31-Pin Top/Bottom Contact).



注意：J23 MIPI 屏接口和 J29 LVDS 接口内部复用同一个 MIPI 通道，如需使用 J23 则请调整硬件拆

除 U9026 芯片、加焊 8R60,8R61,8R68,8R67,8R66,8R65,8R64,8R19,8R70,8R69 共 10 个 0R-0402 电阻。

| Pin# | Definition | Note |
|------|------------|--|
| 1 | LED+ | LED 阳极 LED Anode |
| 2 | LED+ | LED 阳极 LED Anode |
| 3 | LED+ | LED 阳极 LED Anode |
| 4 | NC | 未连接 Not Connected |
| 5 | LED- | LED 阴极 LED Cathode |
| 6 | LED- | LED 阴极 LED Cathode |
| 7 | LED- | LED 阴极 LED Cathode |
| 8 | LED- | LED 阴极 LED Cathode |
| 9 | GND | 数字地 Digital Ground |
| 10 | GND | 数字地 Digital Ground |
| 11 | MIPI_D2P | +MIPI 差分数据输出2 +MIPI differential lane2 |
| 12 | MIPI_D2N | -MIPI 差分数据输出2 -MIPI differential lane2 |
| 13 | GND | 数字地 Digital Ground |
| 14 | MIPI_D1P | +MIPI 差分数据输出1 +MIPI differential lane1 |
| 15 | MIPI_D1N | -MIPI 差分数据输出1 -MIPI differential lane1 |
| 16 | GND | 数字地 Digital Ground |
| 17 | MIPI_CKP | +MIPI 差分时钟输出 +MIPI differential clock output |
| 18 | MIPI_CKN | -MIPI 差分时钟输出 -MIPI differential clock output |
| 19 | GND | 数字地 Digital Ground |
| 20 | MIPI_D0P | +MIPI 差分数据输出0 +MIPI differential lane0 |
| 21 | MIPI_D0N | -MIPI 差分数据输出0 -MIPI differential lane0 |
| 22 | GND | 数字地 Digital Ground |
| 23 | MIPI_D3P | +MIPI 差分数据输出3 +MIPI differential lane3 |

| | | |
|----|----------|--|
| 24 | MIPI_D3N | -MIPI 差分数据输出3 -MIPI differential lane3 |
| 25 | GND | 数字地 Digital Ground |
| 26 | VDD-1V8 | 供电输出1.8V Power Supply 1.8V (默认不连接, 需加焊 R9232 0R) |
| 27 | RESET | 复位信号 (1.8V 电平) Reset Signal in 1.8V |
| 28 | GND | 数字地 Digital Ground |
| 29 | VDD-1V8 | 供电输出1.8V Power Supply 1.8V |
| 30 | VDD-3V3 | 供电输出3.3V Power Supply 3.3V |
| 31 | VDD-3V3 | 供电输出3.3V Power Supply 3.3V |

➤ J24 USB OTG 接口 USB OTG Header

【J24】USB 调试接口(单排 2.0mm-方孔为 1 脚),此接口仅用于进行系统烧录和 ADB 调试。[J24] USB ADB Header (SIP 2.0mm-Square pad is pin 1), this port should only be used as system burn or ADB connection.

| Pin# | Definition | Note |
|------|------------|-------------------------------------|
| 1 | GND | 数字地 Digital Ground |
| 2 | DP | USB 差分数据+ USB Differential Data+ |
| 3 | DM | USB 差分数据- USB Differential Data- |
| 4 | V5S | PC 端提供5V 供电 5V power supply from PC |

注意：此端口为主芯片 USB OTG 口直通端口，信号和 J8 是同一组，两个不能同时接。并且此组信号通过 SW2 切换开关和 USB 1x7Hub 的信号源复用。

➤ J25 USB 3.0 Type A 插座 USB 3.0 Type A Socket

【J25】标准 USB 3.0 Type A 插座。[J25] USB 3.0 Type A Socket.

注意：J25 和 J18 接口为信号复用，只能同时接其中一个。

➤ J26 LVDS 电压接口 LVDS Voltage Header

【J26】LVDS 驱屏跳线接口(双排 2.0mm-方孔为 1 脚)。1 和 2 脚跳线帽短接则 J29 的 VLCD 为 12V, 3 和 4 脚跳线帽短接则 J29 的 VLCD 为 5V, 5 和 6 脚跳线帽短接则 J29 的 VLCD 为 3.3V。请根据实际使用的液晶屏的逻辑电压调整跳线帽位置，注意不要跳错位置否则会造成液晶屏和主板电路的损坏。

[J26] LVDS Voltage Header (DIP 2.0mm-Square pad is pin 1). If pin 1 and 2 are jumper shorted, the VLCD of J29 is 12V. If pin 3 and 4 are jumper shorted, the VLCD of J29 is 5V. If pin 5 and 6 are jumper shorted, the VLCD of J29 is 3.3V. Please adjust the jumper position according to the actual logic voltage of the LCD screen.

Be careful not to jumper to the wrong position or it may damage the LCD screen and the motherboard circuit.

➤ J27 数据串口 3 Data Serial Port 3

【J27】内置串口 3 (单排 2.0mm-方孔为 1 脚), 默认为 RS-232 电平且可配置为 TTL 电平 (焊接 U35 则为 RS-232 电平); **对应的软件编程设备节点为 ttyS3**。 [J27] Built-in Serial Port 3 (SIP 2.0mm-Square pad is pin 1). The output level is RS-232 by default and it could be setup to TTL if required (RS-232 if U35 mounted). **The related software device node name is ttyS3.**

| Pin# | Definition | Note |
|------|------------|--|
| 1 | GND | 数字地 Digital Ground |
| 2 | RX | 数据接收 (TTL 或 RS-232) Data receive (TTL or RS-232 level) |
| 3 | TX | 数据发送 (TTL 或 RS-232) Data transmit (TTL or RS-232 level) |
| 4 | VCC | 电源输出 (默认3.3V, 可选5V) Power output (Default 3.3V, 5V option) |

➤ J28 四段式耳麦插座 4-Pole HP/Mic Jack

【J28】四段式 3.5mm 耳机/麦克风插座 (CTIA 美标定义-如下图), 信号和 J5/J15 一致, 支持耳机插入喇叭静音。 [J28] 4-Pole 3.5mm Headphone&Micphone Jack (CTIA Standard jack). It is the same signals with J5/J15. It support insert dection for speaker mute.



➤ J29 LVDS 接口 LVDS Header

【J29】双路 LVDS 接口 (双排 2.0mm-方孔为 1 脚)。 [J29] Dual LVDS header [DIP 2.0mm-Square pad is pin 1].

| Pin# | Definition | Pin# | Definition |
|------|------------|------|------------|
| 1 | VLCD | 2 | VLCD |
| 3 | VLCD | 4 | GND |
| 5 | GND | 6 | GND |
| 7 | RX00- | 8 | RX00+ |
| 9 | RX01- | 10 | RX01+ |
| 11 | RX02- | 12 | RX02+ |

| | | | |
|----|-------|----|-------|
| 13 | GND | 14 | GND |
| 15 | RXOC- | 16 | RXOC+ |
| 17 | RXO3- | 18 | RXO3+ |
| 19 | RXE0- | 20 | RXE0+ |
| 21 | RXE1- | 22 | RXE1+ |
| 23 | RXE2- | 24 | RXE2+ |
| 25 | GND | 26 | GND |
| 27 | RXEC- | 28 | RXEC+ |
| 29 | RXE3- | 30 | RXE3+ |

➤ J30 音频线路输出 Audio Line Output

【J30】音频线路输出（单排 1.25mm-方孔为 1 脚）。[J30] Audio Line Output (SIP 1.25mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|---|
| 1 | DET | 耳机检测 ADC 信号 Headphone detect ADC signal |
| 2 | AL | 立体声输出左声道 Stereo output left channel |
| 3 | GND | 音频地 Audio Ground |
| 4 | AR | 立体声输出右声道 Stereo output right channel |

➤ J31 遥控-LED 接口 Remote Control & LED Header

【J31】遥控-LED 接口（单排 2.0mm-方孔为 1 脚）。[J31] Remote Control & LED Header (SIP 2.0mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|---|
| 1 | 5VS | 5V Standby 供电输出 Power output 5V standby |
| 2 | GND | 数字地 Digital Ground |
| 3 | IR | 5V 电平红外遥控输入信号 5V level Irda remote control input signal |
| 4 | IO | 3.3V 电平 GPIO 输入信号 3.3V level GPIO input signal |
| 5 | GREEN | 运行指示灯信号（外接绿灯） Running indicator for external green LED |
| 6 | 5VS | 5V Standby 供电输出 Power output supply 5V standby |
| 7 | RED | 待机指示灯信号（外接红灯） Standby indicator for external red LED |

➤ J32 数据串口 4 Data Serial Port 4

【J32】内置串口 4（单排 2.0mm-方孔为 1 脚），默认为 RS-232 电平且可配置为 TTL 电平（焊接 U35 则为 RS-232 电平）；对应的软件编程设备节点为 **ttyS3**。[J32] Built-in Serial Port 4 (SIP 2.0mm-Square

pad is pin 1). The output level is RS-232 by default and it could be setup to TTL if required (RS-232 if U35 mounted). The related software device node name is **ttyS4**.

| Pin# | Definition | Note |
|------|------------|---|
| 1 | GND | 数字地 Digital Ground |
| 2 | RX | 数据接收 (TTL 或 RS-232) Data receive (TTL or RS-232 level) |
| 3 | TX | 数据发送 (TTL 或 RS-232) Data transmit (TTL or RS-232 level) |
| 4 | VCC | 电源输出 (默认3.3V , 可选5V) Power output (Default 3.3V, 5V option) |

➤ J35 MIPI CSI FPC 接口 MIPI CSI FPC Connector

【J35】MIPI CSI FPC 接口 (FPC-0.5mm 24-Pin 上/下接触)。 [J23] MIPI Panel FPC Connector (FPC-0.5mm 24-Pin Top/Bottom Contact).



| Pin# | Definition | Note |
|------|------------|---|
| 1 | 5V | 5V 供电输出 5V Power Output |
| 2 | GND | 数字地 Digital Ground |
| 3 | MIPI_D0N | +MIPI 差分数据输入0 +MIPI differential input lane0 |
| 4 | MIPI_D0P | -MIPI 差分数据输入0 -MIPI differential input lane0 |
| 5 | GND | 数字地 Digital Ground |
| 6 | MIPI_D1N | +MIPI 差分数据输入1 +MIPI differential input lane1 |
| 7 | MIPI_D1P | -MIPI 差分数据输入1-MIPI differential input lane1 |
| 8 | GND | 数字地 Digital Ground |
| 9 | MIPI_D2N | +MIPI 差分数据输入2 +MIPI differential input lane2 |
| 10 | MIPI_D2P | -MIPI 差分数据输入2 -MIPI differential input lane2 |
| 11 | GND | 数字地 Digital Ground |
| 12 | MIPI_D3N | +MIPI 差分数据输入3 +MIPI differential input lane3 |
| 13 | MIPI_D3P | -MIPI 差分数据输入3 -MIPI differential input lane3 |
| 14 | GND | 数字地 Digital Ground |
| 15 | MIPI_CKP | +MIPI 差分时钟输入 +MIPI differential clock input |
| 16 | MIPI_CKN | -MIPI 差分时钟输入 -MIPI differential clock input |
| 17 | GND | 数字地 Digital Ground |
| 18 | CM_PWRDN | 电源控制 (GPIOA_10 3.3V TLL IO) Power Down (GPIOA_10 3.3V TLL IO) |
| 19 | CM_RESET | 复位信号 (GPIOA_11 3.3V TLL IO) Reset Signal (GPIOA_11 3.3V TLL IO) |
| 20 | GND | 数字地 Digital Ground |

| | | |
|----|---------|------------------------------------|
| 21 | I2C_SDA | I2C 总线数据信号 I2C Bus data |
| 22 | I2C_SCL | I2C 总线时钟信号 I2C Bus clock signal |
| 23 | GND | 数字地 Digital Ground |
| 24 | MCLK | 24M 主时钟输出 24 MHz Main Clock Output |

➤ J38 按键和开关接口 Keypad and Switch Header

【J38】按键和开关接口（双排 2.0mm-方孔为 1 脚）。[J38] Keypad and Switch header (DIP 2.0mm-Square pad is pin 1).

| Pin# | Definition | Pin# | Definition |
|------|------------|------|------------|
| 1 | 3V3 | 2 | LED+ |
| 3 | GND | 4 | LED- |
| 5 | RES- | 6 | PW+ |
| 7 | RES+ | 8 | PW- |
| 9 | K1 | 10 | K2 |
| 11 | K3 | 12 | K4 |
| 13 | GND | 14 | GND |
| 15 | K5 | 16 | K6 |
| 17 | K7 | 18 | K8 |

如下图所示：6 和 8 脚外接轻触开关，短按开关屏、长按开关机（需软件支持）；5 和 7 脚外接轻触开关可以实现按键复位；2 和 4 脚可以接 LED 灯实现工作指示（LED 信号电压经过了内部分压，如果无法点亮则可用 1 和 3 脚直接做电源指示）。K1 音量+、K2 音量-、K3 休眠/唤醒、K4-返回、K5-HOME（按键功能需软件支持），K6~K8 自定义。

如果将 K1~K8 开放为 GPIO 使用则相应的编号如下表所示（**注意：信号存在复用**）。

| Pin# | Definition | IO# | IO-Net | Muxed |
|------|------------|-----|----------|----------|
| 9 | K1 | 470 | GPIOA_10 | CM_PWRDN |
| 10 | K2 | 471 | GPIOA_11 | CM_RESET |
| 11 | K3 | 498 | GPIOAO_2 | TP_SCL |
| 12 | K4 | 499 | GPIOAO_3 | TP_SDA |
| 15 | K5 | 465 | GPIOA_5 | TP_INT |
| 16 | K6 | 435 | GPIOH_8 | 4G_RST |
| 17 | K7 | 502 | GPIOAO_6 | IR_IO |
| 18 | K8 | 459 | GPIOC_7 | IR_LED |

As shown below: Pin 6 and 8 as short press to turn screen on or off and long press to power down (software support required); Pin 5 and 7 as reboot; Pin 2 and 4 as LED indicator (or use pin1 and 3 directly). K1 as Volume Up, K2 as Volume Down, K3 as Sleep/Wake, K4 as Return, K5 as HOME (software support required), K6 ~ K8 as customized signal.

| | | | | | | | | |
|-------|-------|--------|-------|-------|--------|--------|--------|--------|
| 17-K7 | 15-K5 | 13-GND | 11-K3 | 9-K1 | 7-RES+ | 5-RES- | 3-GND | 1-3V3 |
| 18-K8 | 16-K6 | 14-GND | 12-K4 | 10-K2 | 8-PW- | 6-PW+ | 4-LED- | 2-LED+ |

➤ J39 线路输入接口 Line Input Header

【J39】音频线路输入接口(单排 1.25mm-方孔为 1 脚)。[J39] Audio line input header (SIP 1.25mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|----------------------------------|
| 1 | RIN | 线路输入右声道 Line input right channel |
| 2 | GND | 音频地 Audio Ground |
| 3 | LIN | 线路输入左声道 Line input left channel |

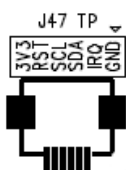
➤ J40 麦克风输入接口 Micphone Input Header

【J40】麦克风输入接口(单排 1.25mm-方孔为 1 脚)。[J40] Microphone input header (SIP 1.25mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|--------------------------------|
| 1 | GND | 音频地 Audio Ground |
| 2 | MIC | 单声道麦克风输入 Mono microphone input |

➤ J47 I2C FPC 接口 I2C FPC Header

【J47】I2C 总线接口 (FPC-0.5mm 前插后翻盖上下接触-三角为 1 脚)。[J47] I2C Bus Header (FPC-0.5mm Bottom Contact Triangle Pin-1).



| Pin# | Definition | Note |
|------|------------|--------------------|
| 1 | GND | 数字地 Digital Ground |

| | | |
|---|-----|--|
| 2 | IRQ | 中断输入 (3.3V 电平) Interrupt input (3.3V level) |
| 3 | SDA | I2C 总线数据信号 I2C Bus data |
| 4 | SCL | I2C 总线时钟信号 I2C Bus clock signal |
| 5 | RST | 复位输出 (3.3V 电平) Mainboard reset output (3.3V level) |
| 6 | 3V3 | 3.3V 供电输出 Power output supply 3.3V |

➤ J48 POE 受电接口 POE PD Header

【J48】POE 受电接口 (单排 2.0mm-方孔为 1 脚)。 [J48] POE PD Header (SIP 2.0mm-Square pad is pin 1)

| Pin# | Definition | Note |
|------|------------|---------------------------|
| 1 | CT4 | 中心抽头4 Transformer Center4 |
| 2 | CT3 | 中心抽头3 Transformer Center3 |
| 3 | CT2 | 中心抽头2 Transformer Center2 |
| 4 | CT1 | 中心抽头1 Transformer Center1 |

注意 :POE 受电接口电源来自于 J21 以太网口 ,此接口外接 POE 受电转换板进行 12V 供电转换 , 12V 电源的电流大小受 POE 交换机的供电能力和转接板转换能力影响 , 典型电流在 1~1.5A。此接口支持网线 1/2 线为正、3/6 线为负的 POE 供电设备 ,也可以接网线 4/5 线为正、7/8 线为负的 POE 供电设备。

➤ J51 ADC 输入接口 ADC Input Header

【J51】ADC 输入接口 (单排 1.25mm-方孔为 1 脚)。 [J40] ADC input header (SIP 1.25mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|-------------------------------------|
| 1 | GND | 音频地 Audio Ground |
| 2 | ADC | 1.8V 电平 ADC 输入 1.8V Level ADC input |

➤ SW1 烧录模式按键 Recovery Mode Button

【SW1】直插烧录小按键 ,先按住且保持然后上电约 3 秒后松开则进入烧录模式。 [SW1] On-board recovery mode button. First press and then hold for about 3-second while power on will enter the recovery mode.

➤ SW2 USB OTG/HUB 复用开关 USB OTG/HUB Multiplex Switch

【SW2】USB OTG/Host 复用开关。如图 1 和 4=ON、2 和 3=OFF，选择 OTG 模式（J8 和 J24 可用）；2 和 3=ON、1 和 4=OFF，选择 HUB 模式（J12~J17 可用）；**请不要选择其他组合方式！** [SW2] USB OTG/Hub multiplex switch. As showed below, 1&4=ON and 2&3=OFF for OTG Mode (J8&J24 available), 2&3=ON and 1&4=OFF for HUB mode (J12~J17 available). **Please don't select other combinations.**



5 物理尺寸 Physical Size

PCB 大小为 135.2mm*90mm，固定孔直径 3.0mm，相应的物理尺寸参数如下图所示。如需详细尺寸信息请咨询厂家索取 DXF 档文件。

The PCB size is 135.2mm*90mm and the fixing hole diameter is 3.0mm. The corresponding physical size parameters are shown in the figure below. For detailed size information, please consult the manufacturer for DXF file.

6 注意事项 Assembly Precautions

K-S905 主板组装和使用时请注意以下关键事项：Please note the following key points when using the K-S905 mainboard:

1. 本产品相对湿度：10%~90%，无凝露。Relative humidity of this product: 10% to 90%, no condensation.
2. 本产品工作温度：0°~70°。The working temperature of this product: 0°~70°.
3. 本产品存储温度：-40°~70°。This storage temperature of this product: -40° ~ 70°.
4. 整机装配和运输过程中需做防静电处理。Anti-static treatment is required during assembly and transportation of this product.
5. 本板接口连接线缆不可过长，否则可能会影响信号质量。The board interface connection cable must not be too long. Otherwise, the signal quality may be affected.
6. 整机装配时严禁使板子受到扭曲或重压而变形。Never allow the board to be distorted or heavily stressed during assembly.
7. 严禁裸板与其他外设之间发生短路。Do not short circuit between mainboard and other peripherals.
8. 外接 LVDS 或 eDP 液晶屏时，注意驱屏电压和电流是否符合要求，且注意屏线插座 1 脚方向。When connecting to external LVDS or eDP LCD screen, pay attention to whether the screen voltage and current meet the requirements, and pay attention to the screen connector pin-1 direction.
9. 外接 LVDS 或 eDP 液晶屏时，注意背光电压和电流是否符合要求。**液晶屏背光功率在 20w 以上则建议使用单独的电源板进行背光供电。**When connecting to external LVDS or eDP LCD screen, pay attention to whether the backlight voltage and current meet the requirements.
10. 外接接口（USB、GPIO、串口、I2C、SPI 等）外接设备时，注意外设的 IO 电平和电流是否符合要求。**使用主板接插件上的电源管脚给外设供电时，常规电源脚电流严禁超过 100mA、USB 电源脚电流严禁超过 500mA。**串口连接外设时还需要电平匹配（3.3V TTL 电平、RS-232 电平和 RS-485 电平）。When connecting to peripherals using USB, GPIO, Serial, I2C, SPI, etc., pay attention to whether the IO voltage level and current of the peripheral meet the requirements. When using the power pin on these connectors to supply power to the

external circuit, the regular power pin must not exceed 100mA, and the USB power pin must not exceed 500mA.

11. 主板输入电源请务必接入电源输入接口或插座，并根据总外设评估整板电流是否符合要求；**严禁为了方便操作从背光插座接口直接给主板供电**。Please connect the power to the power input socket or connector, and evaluate whether the current of the whole board meets the requirements according to the total peripherals. It is strictly forbidden to directly supply power from the backlight connector.
12. 通信模块部分距离金属壳体至少 5 毫米 避免信号受到干扰。The communication module should be mounted at least 5mm away from the metal housing to avoid signal interference.

7 软件指南 Software Guide

K-S905 主板内部串口和扩展串口软件端口号如下：

| 端口 Port | 软件设备节点 Software Device Node |
|---------|-----------------------------|
| J22 | /dev/ttyS0 |
| J27 | /dev/ttyS3 |
| J32 | /dev/ttyS4 |