

F3 主板产品规格书

F3 Mainboard Specification

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|------------|------------|
| 版本 Version | V5.0 |
| 日期 Date | 2020-04-07 |

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修改记录 Changelog

| | | |
|-------|------------|--|
| 1.0.0 | 2019-06-23 | 本文档第一个版本。 |
| 2.0.0 | 2019-07-18 | 根据 V2.0 主板更新接口定义等内容。 |
| 3.0.0 | 2019-08-12 | 根据 V3.0 主板更新接口定义等内容, 注意 J8 和 J17 定义改变! |
| 3.0.1 | 2019-08-29 | 修正几处文字笔误。 |
| 4.0.0 | 2019-11-21 | 根据 V4.0 主板更新接口定义等内容, 主要是 USB 插座改为 1.25mm 间距。 |
| 4.0.1 | 2019-12-28 | 修正 J20 和 J32 信号顺序定义。 |
| 5.0.0 | 2020-03-16 | 根据 V5.0 主板更新接口定义等内容。 |
| 5.0.1 | 2020-04-07 | MIPI 屏接口接触方式改为上/下接触。 |

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1 产品概述 Product Overview

F3 主板基于瑞芯微 RK3288 高性能四核应用处理器平台，RK3288 主芯片集成四核 Cortex-A17 和 Mali-T764 高性能四核 GPU，主频最高可达 1.8GHz，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 超清解码和 4Kx2K HDMI 超清输出。

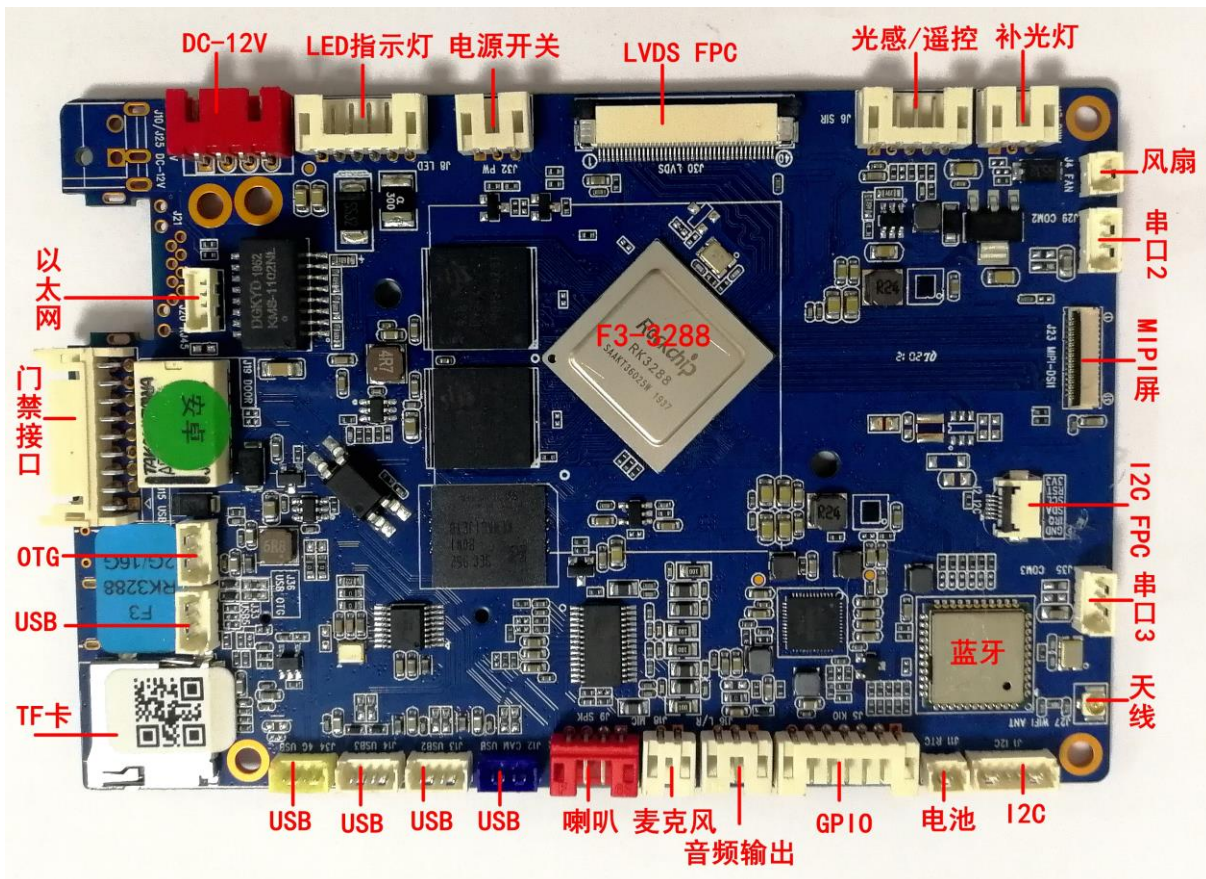
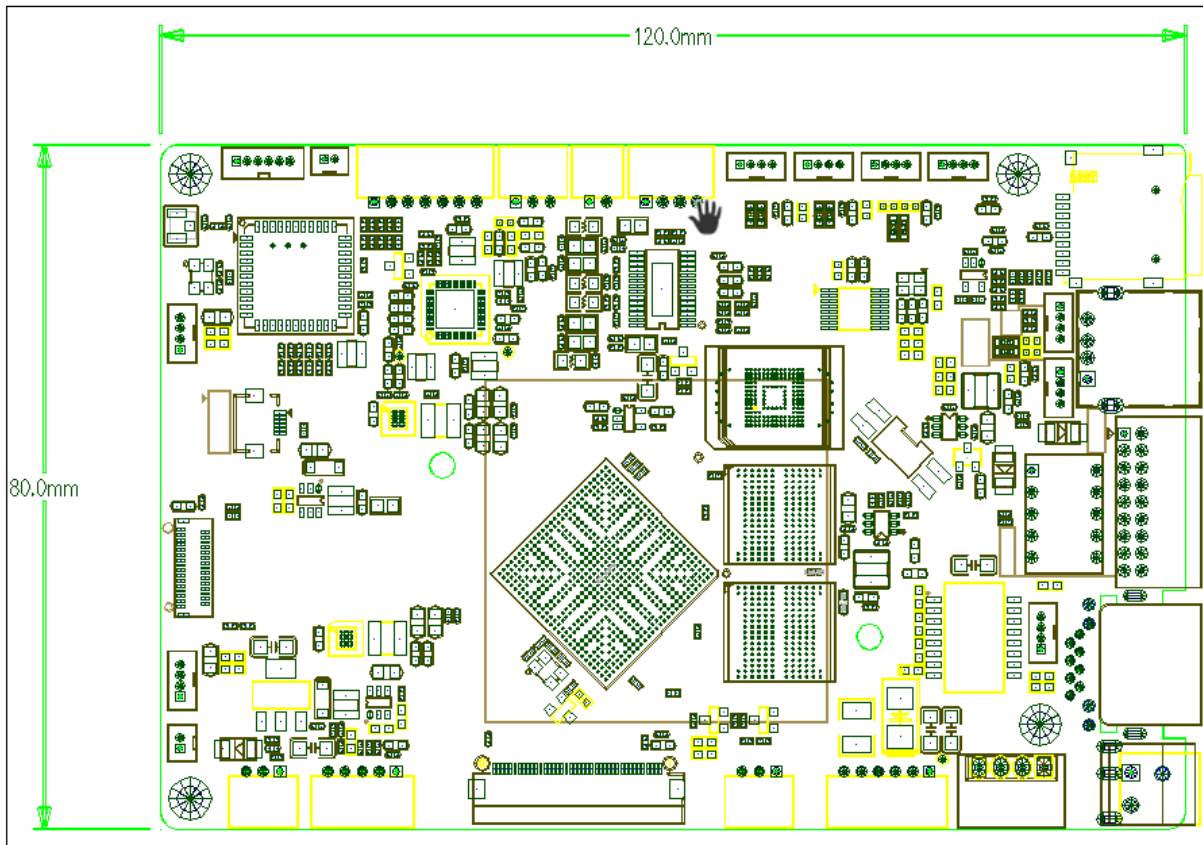
F3 mainboard is based on Rockchip RK3288 high-performance application processor platform. RK3288 SOC chip integrates Cortex-A17 quad-core and Mali-T764 quad-core GPU, clocked at up to 1.6GHz, with superior computing performance, 2D/3D graphics processing capabilities and Full HD video codec capabilities. It perfectly supports 4Kx2K@60fps decoding and 4Kx2K HDMI output.

此款主板专门针对**门禁行业**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。

This mainboard is specially designed for **door control application** 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.

F3 V5.0 主板接口示意图如下所示【**v5.0 和 v4.0 的差异请参考本文档第三章**】。

F3 V5.0 mainboard interface diagram as shown below.



2 规格清单 Specification List

F3 的系统功能和接口特性如下表所示。F3'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 | RK3288 Cortex-A17 四核, 最高主频 1.8GHz RK3288 Cortex-A17 quad-core, up to 1.8GHz |
| DDR | LPDDR-III 2GB (4GB 可选) LPDDR-III 2GB (4GB optional) |
| 存储·Storage | 默认标配 16GB EMMC NAND 芯片, 可扩展至最大 128GB The default comes with an 16GB EMMC NAND chip that can scale up to 128GB |
| LVDS | 40-Pin FPC 接口, 支持 VESA/JEITA 格式, 最高支持 1366x768 单通道输出, LVDS 和 MIPI 不支持异显 40-Pin FPC supporting VESA/JEITA format up to 1366x768 single channel output |
| MIPI-DSI | 31-Pin FPC MIPI-DSI 显示接口, 最高支持 1920x1200 输出, MIPI 和 LVDS 不支持异显 31-Pin FPC MIPI-DSI display port supporting up to 1920x1200 |
| MIPI-CSI | 一个 30-Pin FPC MIPI-CSI 摄像头接口 One 30-Pin FPC MIPI-CSI camera port |
| 线路输出·Line Output | 支持标准左右声道线路输出 (排针接口) Support standard left and right channel line output (pin header) |
| 功放输出 Amplifier output | 8 欧·10W 双路音频功放输出 8 Ohm 10W Dual Audio Amplifier Output |
| MIC 输入 MIC Input | 单端 MIC 输入 (排针接口) Single-end MIC input (pin header) |
| USB 2.0 接口 USB 2.0 Interface | 1 个外置横插接口 (单层插座), 5 个内置排针, 1 个 MicroUSB 插座+排针 1 horizontal connector (Single Socket), 5 pin headers, 1 MicroUSB+pin header |
| 韦根接口 | 标准双线韦根信号接口 Standard two-line Wiegand port |
| 串口 Serial Port | 1 个 TTL/RS-232/RS-485 兼容, 3 个 TTL/RS-232 兼容 1 TTL/RS-232/RS-485 compatible, 3 TTL/RS-232 compatible |
| 门禁接口 Door Control | 双刀双掷门禁继电器接口 Double-pole double-throw access control relay interface |
| 补光灯 LED Flash | 带 PWM 的 12V 补光灯接口 12V LED flash with PWM signal |
| 光感接口 Light Sensor | 模拟和数字输入环境光感接口 Analog and digital input ambience light sensor port |
| 风扇接口 Fan Port | 12V 风扇供电接口 12V fan power supply port |
| TF 卡 | 自弹式 TF 卡插座, 最高支持 128GB TF 卡 |

| 功能&接口 Function&Interface | 详细描述 Detailed Description |
|-----------------------------|--|
| Micro SD Card | Self-elastic micro SD card socket, up to 128GB capacity |
| 摄像头 Camera | 支持 200 万像素以内 USB 摄像头和 1 路 MIPI 摄像头 Support USB camera within 2 million pixels and one MIPI cameras |
| WiFi | 内置高性能 SDIO 接口 WiFi 模块, 支持 IEEE 802.11 b/g/n Built-in high performance SDIO interface WiFi module, support IEEE 802.11 b/g/n |
| 蓝牙 Bluetooth | 内置高性能串口接口 BT 模块 (选配), 支持 V2.1+EDR/BT v3.0/BT v3.0+HS/BT v4.0 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 | 10/100M 自适应以太网 RJ45 网口 10/100M Adaptive Ethernet RJ45 connector |
| MiniPCI-E 4G | 行业标准 MiniPCI-E 4G 模块接口, 支持 Nano-SIM 卡插槽 Industry standard MiniPCI-E 4G module interface with Nano-SIM card socket |
| 背光控制 Backlight Control | 行业标准液晶屏背光控制接口, 支持背光开关和亮度调节 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 | 5 路 GPIO 信号, 可扩展 GPIO 按键和/或 3.3V 输入/输出 5-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 | 待机/网络/运行三色指示灯 Three-color LED indicator for standby, network and running |
| 按键 Buttons | 烧录键 (RECOVERY) 和电源/复位排针排接口 Recovery mode button and power/reset pin header |
| 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 (120mm*80mm*9mm), PCB 正面高度 7mm Length*Width*Height (120mm*80mm*9mm), PCB top side height 7mm |
| 安卓系统 Android Version | 推荐 Android 5.1, 可选 Android 6.0 和 7.1 Recommended Android 5.1, Optional Android 6.0 and 7.1 |

3 接口定义 Interface definition

【注意】 v5.0 版本和 v4.0 存在以下差异:

- ◆ MIPI 液晶屏接口改为上/下接触并调整了 1 脚位置 (请务必注意 1 脚位置)。
- ◆ I2C FPC 接口插座封装型号更换且信号定义和 V4.0 的相反, 请注意根据丝印定义进行连接。
- ◆ 增加两路内置的串口 4 芯-1.25mm 座子, 可兼容 TTL 或 RS-232 电平。
- ◆ 增加一个内置的 USB OTG 4 芯-1.25mm 座子, 可以单独引出 OTG 调试/烧录口。
- ◆ 增加了一个 DC 兼容插座, 如果不使用 EDGE-3.81 做电源输入则可以选择焊接 DC 插座。

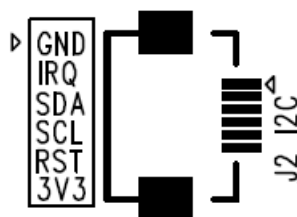
3.1 J1 I2C 总线接口 I2C Bus Header

【J1】 I2C 总线接口 (单排 1.25mm-方孔为 1 脚)。[J1] I2C Bus Header (SIP 1.25mm-Square pad is 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 |

3.2 J2 I2C FPC 接口 I2C FPC Header

【J2】 I2C 总线接口 (FPC-0.5mm 前插后翻盖上下接触-三角为 1 脚)。[J2] 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 |

3.3 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 |

3.4 J4 风扇供电 Fan Supply

【J4】风扇供电接口 (单排 1.25mm-方孔为 1 脚)。[J4] Keypad and Switch header (SIP 1.25mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|-----------------------|
| 1 | 5V | 5V 供电 5V Power Supply |
| 2 | P- | 供电开关 Power Switch |

说明: P-可通过 GPIO 编号 236 进行控制开关 (高电平导通打开风扇供电)。

3.5 J5 按键和 IO Keypad and IO Header

【J5】按键和开关接口 (单排 2.0mm-方孔为 1 脚)。[J5] Keypad and Switch header (SIP 2.0mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|---------------------------|
| 1 | 3V3 | 3.3V 供电 3.3V Supply |
| 2 | K1 | 按键/IO [软件编号226] Keypad/IO |
| 3 | K2 | 按键/IO [软件编号256] Keypad/IO |
| 4 | K3 | 按键/IO [软件编号257] Keypad/IO |
| 5 | K4 | 按键/IO [软件编号258] Keypad/IO |

| | | |
|---|-----|---------------------------|
| 6 | K5 | 按键/IO [软件编号259] Keypad/IO |
| 7 | GND | 数字地 Digital Ground |

说明：注意所有 KIO 信号均可以通过单独的软件版本调整为常规 GPIO 使用（电平为 3.3V）；默认情况下 K1 音量+/K2 音量-/K3 待机/K4 退出/K5 主屏。Note: All KIO signals can be adjusted to regular GPIO via a separated software version (level is 3.3V); by default K1 Volume+/K2 Volume-/K3 Standby/K4 Exit/K5 Home.

3.6 J6 光感和遥控接口 Light Sensor & Remote Control Header

【J6】光感和遥控接口（单排 2.0mm-方孔为 1 脚）。[J6] Light Sensor & Remote Control Header (SIP 2.0mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|--|
| 1 | 5VS | 5V Standby 供电输出 Power output supply 5V standby |
| 2 | GND | 数字地 Digital Ground |
| 3 | IR | 5V 电平遥控/光感输入信号 5V level Irda or sensor input singal |
| 4 | IO | 3.3V 电平 GPIO 输入信号 [软件编号9] 3.3V level GPIO input signal |
| 5 | ADC | 模拟 ADC 信号输入 Analogue ADC signal input |

3.7 J7 USB OTG 插座 USB OTG Jack

【J7】标准 Micro-USB 插座,此接口仅用于进行系统烧录和 ADB 调试。[J7] Standard Micro-USB ADB Header, this port should only be used as system burn or ADB connection.

3.8 J8 LED 指示灯 LED Indicators

【J8】LED 指示灯（单排 2.0mm-方孔为 1 脚）。[J8] LED Indicators (SIP 2.0mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|-------------------------------------|
| 1 | 12V | 板载12V 输出 On-board 12V Power Output |
| 2 | LED1 | LED1控制开关 [软件 GPIO 编号13] LED1 Switch |
| 3 | LED2 | LED2控制开关 [软件 GPIO 编号11] LED2 Switch |
| 4 | LED3 | LED3控制开关 [软件 GPIO 编号1] LED3 Switch |
| 5 | 5V | 板载5V 输出 On-board 5V Power Output |
| 6 | GND | 电源地 Power Ground |

说明：将 LED 灯板正极接电源 12V 或 5V、负极接 LED1~3 的某个针脚，可通过 GPIO 编号进行控制开关（高电平导通则点亮 LED 灯）。此接口如果 12V 供电每个 LED 信号最大可提供约 1A 的电流；如果用 5V 供电则每个 LED 信号最大电流不超过 100mA。

3.9 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 | OUTP_R | 喇叭右声道+ Speaker right channel + |
| 2 | OUTN_R | 喇叭右声道- Speaker right channel - |
| 3 | OUTN_L | 喇叭左声道- Speaker left channel - |
| 4 | OUTP_L | 喇叭左声道+ Speaker left channel + |

3.10 J10 DC-12V 输入插座 DC-12V Input Socket

【J10】DC-12V 输入接口（2EDG-3.81mm 方孔 1 脚）。[J10] DC-12V Input Socket (2EDG-3.81mm-Square pad pin 1).

| Pin# | Definition | Note |
|------|------------|-------------------------------------|
| 1 | GND | 电源地 Power Ground |
| 2 | 12V | 直流电源输入（9~15V）DC Power Input (9~15V) |

3.11 J11 RTC 电池座 RTC Battery Header

【J11】RTC 电池座（单排-1.25mm 方孔为 1 脚）。[J11] RTC Battery Header (SIP-1.25mm Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|------------------------------------|
| 1 | BAT+ | 3V 纽扣电池正极 3V Coin Battery Positive |
| 2 | BAT- | 3V 纽扣电池负极 3V Coin Battery Negative |

3.12 J12 USB 2.0 接口 USB 2.0 Host Header

【J12】USB 2.0 接口（单排 1.25mm-方孔为 1 脚）。[J12] USB 2.0 Host 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 |

说明：此 USB 接口为独立的高性能 USB 2.0 接口，USB 摄像头建议使用此接口。

3.13 J13 USB 2.0 接口 USB 2.0 Host Header

【J13】USB 2.0 接口（单排 1.25mm-方孔为 1 脚）。[J13] USB 2.0 Host 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 |

3.14 J14 USB 2.0 接口 USB 2.0 Host Header

【J14】USB 2.0 接口（单 1.25mm-方孔为 1 脚）。[J14] USB 2.0 Host 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 |

3.15 J15 USB Type A 插座 USB Type A Socket

【J15】标准 USB 2.0 Type A 插座。[J15] USB Type A Socket.

3.16 J16 音频线路输出 Audio Line Output

【J16】音频线路输出（单排 2.0mm-方孔为 1 脚）。[J16] Audio Line Output (SIP 2.0mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|--------------------------------------|
| 1 | AR | 立体声输出右声道 Stereo output right channel |
| 2 | GND | 音频地 Audio Ground |

| | | |
|---|----|-------------------------------------|
| 3 | AL | 立体声输出左声道 Stereo output left channel |
|---|----|-------------------------------------|

3.17 J17 补光灯开关 Flash Light Switch

【J17】补光灯开关（单排 2.0mm-方孔为 1 脚）。[J17] Flash Light Switch (SIP 2.0mm-Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|----------------------------|
| 1 | P-12V | 12V LED 阳极端 12V LED Anode |
| 2 | LED | LED 阴极端 LED Cathode |
| 3 | PWM | PWM 输出信号 PWM Output Signal |

说明：P-12V 可通过 GPIO 编号 70 进行控制开关（高电平打开 12V 供电）。

3.18 J18 麦克风输入接口 Mic Input Header

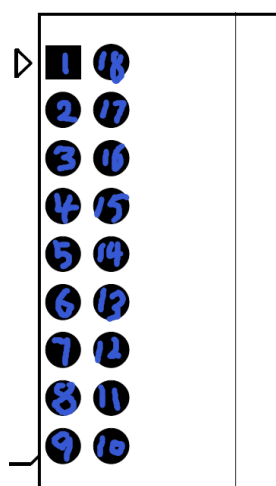
【J18】音频输入接口（单排 2.0mm-方孔为 1 脚）。[J18] Audio input header (SIP 2.0mm-Square pad is pin 1).

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

3.19 J19 门禁控制接口 Door Control Header

【J19】门禁控制接口（双排 2.0mm-方孔为 1 脚序号逆时针递增）。[J19] Door Control header (DIP 2.0mm-Square pad is pin 1 and counter clockwise sequenced).

| Pin# | Definition | Pin# | Definition |
|------|-------------|------|------------|
| 1 | GPIO1 | 18 | GPIO2 |
| 2 | WG1 | 17 | 5V |
| 3 | WG0 | 16 | 3V3 |
| 4 | GND | 15 | GND |
| 5 | 232/TTL-TX1 | 14 | 485/TTL-B |
| 6 | 232/TTL-RX1 | 13 | 485/TTL-A |
| 7 | COM1 | 12 | COM2 |
| 8 | NO1 | 11 | NO2 |
| 9 | NC1 | 10 | NC2 |



门禁信号包括 1 组韦根信号、1 组 RS-232/TTL 兼容串口信号、1 组 RS-485/TTL 兼容串口信号和 1 组双刀双掷继电器信号（1 个信号可同时控制两扇门的开关）。

说明：GPIO1 的软件 GPIO 编号为 247；GPIO2 的软件 GPIO 编号为 248。

3.20 J20 以太网接口 Ethernet Jack

【J20】以太网接口（单排 1.25mm-方孔为 1 脚）。[J20] Ethernet Jack (SIP 1.25mm-Square pad is pin 1).

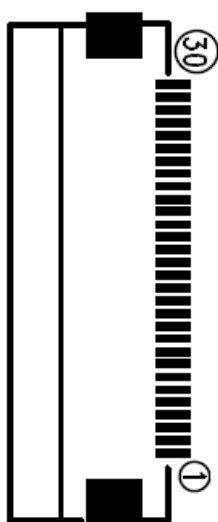
| Pin# | Definition | Note |
|------|------------|---------|
| 1 | RX- | 以太网 RX- |
| 2 | RX+ | 以太网 RX+ |
| 3 | TX- | 以太网 TX- |
| 4 | TX+ | 以太网 TX+ |

3.21 J21 RJ45 以太网插座 RJ45 Ethernet Jack

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

3.22 J22 MIPI 摄像头 FPC 接口 1 MIPI Camera FPC Connector 1

【J22】MIPI 摄像头 FPC 接口（FPC-0.5mm 30-Pin 下接触圆圈为 1 脚）。[J22] MIPI Camera FPC Connector (FPC-0.5mm 32-Pin Bottom Contact Circle Pin-1).

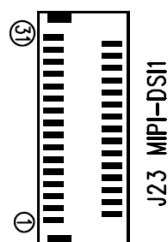


| Pin# | Definition | Note |
|------|------------|-----------------------------|
| 1 | NC | 未连接 No Connection |
| 2 | VDD_2V8 | 2.8V 电源供电 2.8V Power Supply |
| 3 | DVDD_1V2 | 1.2V 电源供电 1.2V Power Supply |
| 4 | DOVDD_1V8 | 1.8V 电源供电 1.8V Power Supply |
| 5 | NC | 未连接 No Connection |
| 6 | GND | 数字地 Digital Ground |
| 7 | AVDD_2V8 | 2.8V 电源供电 2.8V Power Supply |
| 8 | GND | 数字地 Digital Ground |
| 9 | I2C_SDA | I2C 数据线 I2C Data |
| 10 | I2C_SCL | I2C 时钟线 I2C Clock |
| 11 | MIPI_RST | 摄像头复位 Camera Reset |
| 12 | PWDN | 摄像头使能 Camera Enable |
| 13 | GND | 数字地 Digital Ground |
| 14 | MCLK | 主时钟 Main Clock |
| 15 | GND | 数字地 Digital Ground |
| 16 | MD3P | MIPI Data 3 Positive |
| 17 | MD3N | MIPI Data 3 Negative |
| 18 | GND | 数字地 Digital Ground |
| 19 | MD2P | MIPI Data 2 Positive |
| 20 | MD2N | MIPI Data2 Negative |
| 21 | GND | 数字地 Digital Ground |
| 22 | MD1P | MIPI Data 1 Positive |
| 23 | MD1N | MIPI Data 1 Negative |
| 24 | GND | 数字地 Digital Ground |
| 25 | MCLKP | MIPI Clock Positive |
| 26 | MCLKN | MIPI Clock Negative |
| 27 | GND | 数字地 Digital Ground |
| 28 | MD0P | MIPI Data 0 Positive |

| | | |
|----|------|----------------------|
| 29 | MD0N | MIPI Data 0 Negative |
| 30 | GND | 数字地 Digital Ground |

3.23 J23 MIPI 屏 FPC 接口 MIPI Panel FPC Connector

【J23】MIPI 屏 FPC 接口 (FPC-0.3mm 31-Pin 上接触)。[J23] MIPI Panel FPC Connector (FPC-0.3mm 31-Pin Bottom Contact)。【注意：v5.0 的 1 脚位置和之前相反，请注意调整屏线接法】



| 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 +MIPI differential lane2 |
| 12 | MIPI_D2N | -MIPI 差分数据输出 -MIPI differential lane2 |
| 13 | GND | 数字地 Digital Ground |
| 14 | MIPI_D1P | +MIPI 差分数据输出 +MIPI differential lane1 |
| 15 | MIPI_D1N | -MIPI 差分数据输出 -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 +MIPI differential lane0 |
| 21 | MIPI_D0N | -MIPI 差分数据输出 -MIPI differential lane0 |
| 22 | GND | 数字地 Digital Ground |
| 23 | MIPI_D3P | +MIPI 差分数据输出 +MIPI differential lane3 |
| 24 | MIPI_D3N | -MIPI 差分数据输出 -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 |

3.24 J24 m-PCIE 卡座 m-PCIE Card Jack

【J24】移动通信模块 m-PCIE 卡座。 [J24] Mobile 4G Module m-PCIE Card Jack.

3.25 J26 Nano-SIM 卡座 Nano-SIM Jack

【J26】Nano-SIM 卡座。 [J26] Nano-SIM Jack.

3.26 J28 TF 卡座 TF Card Jack

【J28】TF 卡座。 [J28] TF Card Jack.

3.27 J29 内置串口 2 Built-in Serial Port 2

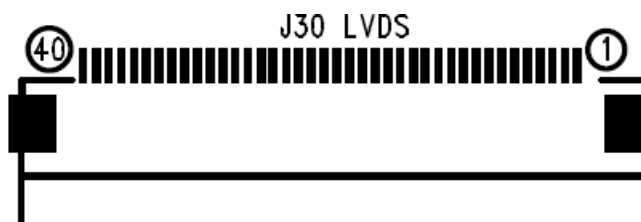
【J29】内置数据串口 2 (单排 1.25mm-方孔为 1 脚), U9017 焊接则为 RS-232 电平, 否则为 TTL 电平。 [J29] Built-in Serial Port 2 (SIP 1.25mm-Square pad is pin 1). It is RS-232 voltage level if U9017 mounted.

| Pin# | Definition | Note |
|------|------------|---|
| 1 | GND | 数字地 Digital Ground |
| 2 | RX | 数据接收 (TTL 3.3V 或 RS-232电平) Data receive (TTL 3.3V or RS-232 level) |
| 3 | TX | 数据发送 (TTL 3.3V 或 RS-232电平) Data transmit (TTL 3.3V or RS-232 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 COM2 调试串口作为数据串口使用, 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, 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).

3.28 J30 LVDS FPC 接口 LVDS FPC Connector

【J30】LVDS FPC 接口 (FPC-0.5mm 40-Pin 上接触右起 1 脚)。[J30] LVDS FPC Connector (FPC-0.5mm 40-Pin Top Contact Right Pin-1).



| Pin# | Definition | Note |
|------|------------|--|
| 1 | VCOM | 共模电压 Common Voltage |
| 2 | VDD | 3.3V 数字电路供电 3.3V Power voltage for digital circuit |
| 3 | VDD | 3.3V 数字电路供电 3.3V Power voltage for digital circuit |
| 4 | NC | 未连接 No Connection |
| 5 | RESET | 逻辑复位 Logic reset |
| 6 | STBYB | 待机控制 (直接拉高) Standby control (Directly pull high) |
| 7 | GND | 数字地 Digital Ground |
| 8 | RX00- | -LVDS 差分数据输出 -LVDS differential data output |
| 9 | RX00+ | +LVDS 差分数据输出 +LVDS differential data output |
| 10 | GND | 数字地 Digital Ground |
| 11 | RX01- | -LVDS 差分数据输出 -LVDS differential data output |
| 12 | RX01+ | +LVDS 差分数据输出 +LVDS differential data output |
| 13 | GND | 数字地 Digital Ground |
| 14 | RX02- | -LVDS 差分数据输出 -LVDS differential data output |
| 15 | RX02+ | +LVDS 差分数据输出 +LVDS differential data output |
| 16 | GND | 数字地 Digital Ground |
| 17 | RXOC- | -LVDS 差分数据输出 -LVDS differential clock output |
| 18 | RXOC+ | +LVDS 差分数据输出 +LVDS differential clock output |
| 19 | GND | 数字地 Digital Ground |
| 20 | RX03- | -LVDS 差分数据输出 -LVDS differential data output |
| 21 | RX03+ | +LVDS 差分数据输出 +LVDS differential data output |
| 22 | GND | 数字地 Digital Ground |
| 23 | NC | 未连接 No Connection |
| 24 | NC | 未连接 No Connection |
| 25 | GND | 数字地 Digital Ground |
| 26 | NC | 未连接 No Connection |
| 27 | NC | 未连接 No Connection |
| 28 | SELB | 6bit/8bit 模式选择 6bit/8bit mode select |
| 29 | AVDD | 模拟电路供电 |

| | | |
|----|------|---------------------------|
| 30 | GND | 数字地 Digital Ground |
| 31 | LED- | LED 阴极 LED Cathode |
| 32 | LED- | LED 阴极 LED Cathode |
| 33 | L/R | 水平翻转 Horizontal inversion |
| 34 | U/D | 垂直翻转 Vertical inversion |
| 35 | VGL | Gate Off Voltage |
| 36 | NC | 未连接 No Connection |
| 37 | NC | 未连接 No Connection |
| 38 | VGH | Gate On Voltage |
| 39 | LED+ | LED 阳极 LED Anode |
| 40 | LED+ | LED 阳极 LED Anode |

3.29 J32 开关机插座 Power Switch Header

【J32】开关机插座（单排-2.0mm 方孔为 1 脚）。[J32] Power Switch Header (SIP-2.0mm Square pad is pin 1).

| Pin# | Definition | Note |
|------|------------|---------------------------|
| 1 | RST | 复位信号 Reset Signal |
| 2 | GND | 数字地 Digital Ground |
| 3 | PW+ | 开关机信号 Power Switch Signal |

说明：PW+键可实现一键开关屏/长按关机，结合特定的单片机版本可实现长按开机。

3.30 J33 USB 2.0 接口 USB 2.0 Host Header

【J33】USB 2.0 接口（单 1.25mm-方孔为 1 脚）。[J33] USB 2.0 Host 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 |

注意：此接口和外置的 J15 横插 USB 插座信号复用，J33 和 J15 无法同时使用。

3.31 J34 USB 2.0 接口 USB 2.0 Host Header

【J34】USB 2.0 接口 (单 1.25mm-方孔为 1 脚)。[J34] USB 2.0 Host 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 |

注意：此接口和外置的 J24 mPCIe 模块信号复用，J34 和 J24 无法同时使用。

3.32 J35 内置串口 3 Built-in Serial Port 3

【J35】内置数据串口 3 (单排 1.25mm-方孔为 1 脚)，U9017 焊接则为 RS-232 电平，否则为 TTL 电平。[J35] Built-in Serial Port 3 (SIP 1.25mm-Square pad is pin 1). It is RS-232 voltage level if U9017 mounted.

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

3.33 J36 USB OTG 接口 USB OTG Header

【J36】USB 2.0 接口 (单 1.25mm-方孔为 1 脚)。[J34] USB 2.0 Host 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 | VBUS | 5V 输入或输出 Power input/output 5V |

注意：此接口和 J7 MicroUSB 插座信号复用，J36 和 J7 无法同时使用。

3.34 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.

4 物理尺寸 Physical Size

PCB 大小为 120mm*80mm, 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 120mm*80mm 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.

5 注意事项 Precautions

F3 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 F3 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、HDMI 等）外接设备时，注意外设的 IO 电平和电流是否符合要求。**使用主板插件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, HDMI, 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.

6 软件指南 Software Guide

F3 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 |
|-----------|-----------------------------|
| J19-5/6 | /dev/ttyS1 |
| J29 | /dev/ttyS2 |
| J35 | /dev/ttyS3 |
| J19-13/14 | /dev/ttyS4 |
| | |