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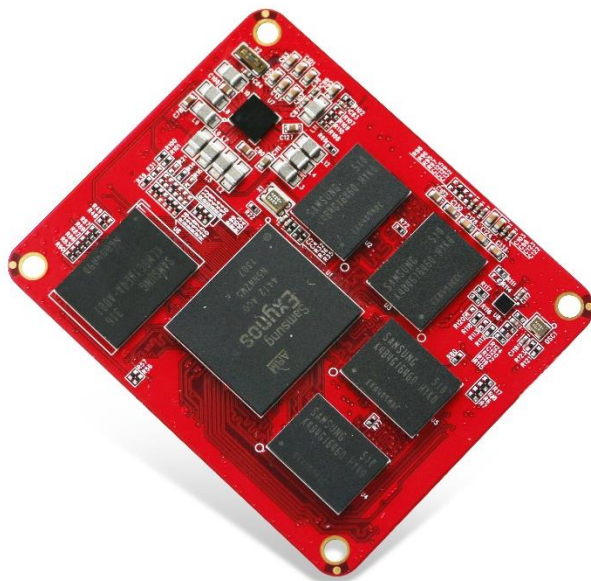
CES-4412S-CORE

产品手册

SAMSUNG ARM 核心板

Rev. V1.0

Date: 2017-06-02



简介

CES-4412S 核心板基于 Samsung Cortex-A9 系列 Exynos4412 四核应用处理器，采用 SCP 封装，板上集成了 2GB DDR3，8GB eMMC，提供专用的三星电源管理芯片，系统更加稳定可靠。

CES-4412S 核心板尺寸仅为 53.5*65mm，核心板与扩展板之间通过高可靠性的松下连接器连接，四个固定孔，400 个功能引脚，可满足不同环境下产品的应用。提供丰富的功能接口，提供多种显示接口。提供 USB、UART、I2C、I2S、SPI、以及可扩展的 GPIO 及其他外设接口。

CES-4412S 核心板为极佳的 Android ARM 主板系统，定位于不同的产品应用，包括医疗设备、汽车电子、POS 一体机、触摸一体机、工业控制设备、加油机自动终端设备、手持 PDA 及其他行业产品。

特点

- 搭载三星高性能四核处理器，Cortex™-A9 架构，三星 Exynos4412，1.4~1.6GHz 的主频运行速度。
- 集成 2GB 大容量 DDR3，8GB eMMC
- 选用 SCP 封装，硬件运行可靠、稳定，工艺相对简单
- 最新 32nm 制程工艺，极大的降低了系统功耗，可应用于更广的领域
- 支持 2D/3D 图像加速
- 支持 MPEG-4/H.263/H.264 格式编解码，可达 1080p@30fps
- 支持 10M/100M 以太网功能
- 支持 USB2.0、USB OTG2.0、UART、SD CARD、GPIO、Camera
- 支持操作系统 Android4.4.4、Linux 3.0

规格

| | |
|----------------|---|
| 处理器 | |
| CPU | 基于 Samsung ARM Cortex™-A9 Exynos4412 四核处理器，主频 1.4-1.6GHz，封装：FCFBGA-786，0.65mm pitch |
| 缓存 | 32KB (Instruction) /32KB (Data) Cache and 1MB L2 Cache |
| 存储 | |
| 容量 | 板载 2GB DDR3 |
| Flash | 板载 8GB eMMC |
| PMIC | |
| 芯片组 | S5M8767A |
| B2B 连接器 | |
| 连接类型 | 精密松下 0.5mm 双排 2*50PIN 连接器，4 个 |
| 管脚数 | 共计 400PIN |
| B2B 固定孔 | |
| 固定孔 | 4 个 |
| 操作系统 | |
| 操作系统 | 可选 Android 4.4.4、Embedded Linux 3.0 |
| 环境 | |
| 工作环境 | 温度：-10~60°C 自然对流，湿度：5%~95%RH@31°C 无冷凝 |
| 存储环境 | 温度：-40~85°C，湿度：5%~95%RH@39°C 无冷凝 |
| 尺寸 | |
| 尺寸(mm) | 53.5*65mm |

管脚定义

| J1 | | | | |
|---------|---------------------------|-----------------|--------------------------------|--------|
| PIN NO. | Signal Name | CPU Ball Number | CPU Ball Name | Remark |
| 1 | XURXD2/UART_AUD IO_RXD | AC20 | XuRXD2/UART_AUDIO_RXD/GPA1_0 | UART |
| 2 | XURXD3/UART_AUD IO_RXD | AC24 | XuRXD3/UART_AUDIO_RXD/GPA1_4 | UART |
| 3 | XUTXD2/UART_AUD IO_TXD | AD25 | XuTXD2/UART_AUDIO_TXD/GPA1_1 | UART |
| 4 | XUTXD3/UART_AUDI O_TXD | AD26 | XuTXD3/UART_AUDIO_TXD/GPA1_5 | UART |
| 5 | XUCTSN2/I2C_3_SDA | AE27 | XuCTSn2/I2C_3_SDA/GPA1_2 | UART |
| 6 | XURXD1 | AF22 | XuRXD1/GPA0_4 | UART |
| 7 | XURTSN2/I2C_3_SCL | AB18 | XuRTSn2/I2C_3_SCL/GPA1_3 | UART |
| 8 | XUTXD1 | AC18 | XuTXD1/GPA0_5 | UART |
| 9 | XURXD0 | AD22 | XuRXD0/GPA0_0 | UART |
| 10 | XUCTSN1 | AD19 | XuCTSn1/I2C_2_SDA/GPA0_6 | UART |
| 11 | XUTXD0 | AE25 | XuTXD0/GPA0_1 | UART |
| 12 | XURTSN1 | AG25 | XuRTSn1/I2C_2_SCL/GPA0_7 | UART |
| 13 | XUCTSN0 | AF25 | XuCTSn0/GPA0_2 | UART |
| 14 | GND | | | 电源地 |
| 15 | XURTSN0 | AF23 | XuRTSn0/GPA0_3 | UART |
| 16 | GND | | | 电源地 |
| 17 | I2C_SDA7 | AC19 | XpwmTOUT2/I2C_7_SDA/GPD0_2 | I2C |
| 18 | XPWMTOUT0/LCD_F RM | AE24 | XpwmTOUT0/LCD_FRM/GPD0_0 | PWM |
| 19 | I2C_SCL7 | AC17 | XpwmTOUT3/I2C_7_SCL/GPD0_3 | I2C |
| 20 | XPWMTOUT1/LCD_P WM | AD24 | XpwmTOUT1/LCD_PWM/GPD0_1 | PWM |
| 21 | I2C_SDA1 | AF26 | Xi2c1SDA/GPD1_2 | I2C |
| 22 | I2C_SDA0 | AF27 | Xi2c0SDA/MIPI0_BYTE_CLK/GPD1_0 | I2C |
| 23 | I2C_SCL1 | AG26 | Xi2c1SCL/GPD1_3 | I2C |
| 24 | I2C_SCL0 | AG27 | Xi2c0SCL/MIPI0_ESC_CLK/GPD1_1 | I2C |
| 25 | GND | | | 电源地 |
| 26 | XSPICLK1/IEM_SCL K | AE23 | XspiCLK1/IEM_SCLK/GPB_4 | SPI |
| 27 | I2C_SDA5 | AH27 | XspiMISO0/I2C_5_SDA/GPB_2 | I2C |
| 28 | XSPICLK0/I2C_4_SD A | AD20 | XspiCLK0/I2C_4_SDA/GPB_0 | SPI |
| 29 | I2C_SCL5 | AF21 | XspiMOSI0/I2C_5_SCL/GPB_3 | I2C |
| 30 | XSPICSN0/I2C_4_SCL | AE21 | XspiCSn0/I2C_4_SCL/GPB_1 | SPI |

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|----|---|------|---|--------------------|
| 31 | GND | | | 电源地 |
| 32 | XI2S1SCLK/PCM_1_SCLK/AC97BITCLK | AE20 | Xi2s1SCLK/PCM_1_SCLK/AC97BITCLK/GPC0_0 | I2S/PCM/AC97 |
| 33 | XI2S1LRCK/PCM_1_FSYNC/AC97SYNC | AH26 | Xi2s1LRCK/PCM_1_FSYNC/AC97SYNC/GPC0_2 | I2S/PCM/AC97 |
| 34 | XI2S1CDCLK/PCM_1_EXTCLK/AC97RESETn | AG23 | Xi2s1CDCLK/PCM_1_EXTCLK/AC97RESETn/GPC0_1 | I2S/PCM/AC97 |
| 35 | XI2S1SDO/PCM_1_SOUT/AC97SDO | AH23 | Xi2s1SDO/PCM_1_SOUT/AC97SDO/GPC0_4 | I2S/PCM/AC97 |
| 36 | XI2S1SDI/PCM_1_SIN/AC97SDI | AJ26 | Xi2s1SDI/PCM_1_SIN/AC97SDI/GPC0_3 | I2S/PCM/AC97/SPDIF |
| 37 | GND | | | 电源地 |
| 38 | XI2S2SCLK/PCM_2_SCLK/SPDIF_0_OUT | AH24 | Xi2s2SCLK/PCM_2_SCLK/SPDIF_0_OUT/GPC1_0 | I2S/PCM/SPDIF |
| 39 | I2C_SDA6 | AJ25 | Xi2s2SDI/PCM_2_SIN/I2C_6_SDA/SPI_2_MISO/GPC1_3 | I2C |
| 40 | XI2S2CDCLK/PCM_2_EXTCLK/SPDIF_EX_TCLK/SPI_2_CLK | AH25 | Xi2s2CDCLK/PCM_2_EXTCLK/SPDIF_EX_TCLK/SPI_2_CLK/GPC1_ | I2S/PCM/SPDIF/SPI |
| 41 | I2C_SCL6 | AG22 | Xi2s2SDO/PCM_2_SOUT/I2C_6_SCL/SPI_2_MOSI/GPC1_4 | I2C |
| 42 | XI2S2LRCK/PCM_2_FSYNC/SPI_2_NSS | AG24 | Xi2s2LRCK/PCM_2_FSYNC/SPI_2_nSS/GPC1_2 | I2S/PCM/SPI |
| 43 | GND | | | 电源地 |
| 44 | GND | | | 电源地 |
| 45 | XHDMITX1P | AJ21 | XHDMITX1P | HDMI |
| 46 | XHDMITX2P | AJ22 | XHDMITX2P | HDMI |
| 47 | XHDMITX1N | AK21 | XHDMITX1N | HDMI |
| 48 | XHDMITX2N | AK22 | XHDMITX2N | HDMI |
| 49 | XHDMITXCP | AJ19 | XHDMITXCP | HDMI |
| 50 | XHDMITX0P | AJ20 | XHDMITX0P | HDMI |
| 51 | XHDMITXCN | AK19 | XHDMITXCN | HDMI |
| 52 | XHDMITX0N | AK20 | XHDMITX0N | HDMI |
| 53 | GND | | | 电源地 |
| 54 | GND | | | 电源地 |
| 55 | XVVSYNCLCD_VSYN | AG18 | XvVSYNCGPF0_1 | LCD |
| 56 | XVHSYNCLCD_HSYN | AG17 | XvHSYNCGPF0_0 | LCD |
| 57 | XVVCLK/LCD_VCLK | AH16 | XvVCLK/GPF0_3 | LCD |
| 58 | XVVDEN/LCD_VDEN | AF17 | XvVDEN/GPF0_2 | LCD |
| 59 | XVVD1 | AB14 | XvVD1/GPF0_5 | LCD |
| 60 | XVVD0 | AG19 | XvVD0/GPF0_4 | LCD |

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|-----|-------------|------|--------------------|----------|
| 61 | XVVD3 | AE14 | XvVD3/GPF0_7 | LCD |
| 62 | XVVD2 | AD18 | XvVD2/GPF0_6 | LCD |
| 63 | XVVD5 | AB15 | XvVD5/GPF1_1 | LCD |
| 64 | XVVD4 | AF19 | XvVD4/GPF1_0 | LCD |
| 65 | XVVD7 | AB13 | XvVD7/GPF1_3 | LCD |
| 66 | XVVD6 | AD14 | XvVD6/GPF1_2 | LCD |
| 67 | XVVD9 | AG20 | XvVD9/GPF1_5 | LCD |
| 68 | XVVD8 | AD16 | XvVD8/GPF1_4 | LCD |
| 69 | XVVD11 | AG16 | XvVD11/GPF1_7 | LCD |
| 70 | XVVD10 | AE19 | XvVD10/GPF1_6 | LCD |
| 71 | XVVD13 | AC15 | XvVD13/GPF2_1 | LCD |
| 72 | XVVD12 | AF15 | XvVD12/GPF2_0 | LCD |
| 73 | XVVD15 | AF16 | XvVD15/GPF2_3 | LCD |
| 74 | XVVD14 | AF18 | XvVD14/GPF2_2 | LCD |
| 75 | XVVD17 | AF13 | XvVD17/GPF2_5 | LCD |
| 76 | XVVD16 | AC13 | XvVD16/GPF2_4 | LCD |
| 77 | XVVD19 | AE18 | XvVD19/GPF2_7 | LCD |
| 78 | XVVD18 | AD15 | XvVD18/GPF2_6 | LCD |
| 79 | XVVD21 | AE16 | XvVD21/GPF3_1 | LCD |
| 80 | XVVD20 | AE17 | XvVD20/GPF3_0 | LCD |
| 81 | XVVD23 | AF14 | XvVD23/GPF3_3 | LCD |
| 82 | XVVD22 | AG12 | XvVD22/GPF3_2 | LCD |
| 83 | XVSYS_OE | AC14 | XvSYS_OE/GPF3_5 | LCD |
| 84 | XVVSYNC_LDI | AC16 | XvVSYNC_LDI/GPF3_4 | LCD |
| 85 | GND | | | 电源地 |
| 86 | GND | | | 电源地 |
| 87 | XMIPIMDP1 | AJ16 | XMIPIMDP1 | MIPI DSI |
| 88 | XMIPIMDP0 | AJ17 | XMIPIMDP0 | MIPI DSI |
| 89 | XMIPIMDN1 | AK16 | XMIPIMDN1 | MIPI DSI |
| 90 | XMIPIMDN0 | AK17 | XMIPIMDN0 | MIPI DSI |
| 91 | XMIPIMDP2 | AJ14 | XMIPIMDP2 | MIPI DSI |
| 92 | XMIPIMDPCLK | AJ15 | XMIPIMDPCLK | MIPI DSI |
| 93 | XMIPIMDN2 | AK14 | XMIPIMDN2 | MIPI DSI |
| 94 | XMIPIMDNCLK | AK15 | XMIPIMDNCLK | MIPI DSI |
| 95 | GND | | | 电源地 |
| 96 | XMIPIMDP3 | AJ13 | XMIPIMDP3 | MIPI DSI |
| 97 | GND | | | 电源地 |
| 98 | XMIPIMDN3 | AK13 | XMIPIMDN3 | MIPI DSI |
| 99 | GND | | | 电源地 |
| 100 | GND | | | 电源地 |

| J2 | | | | |
|---------|----------------------------|-----------------|-----------------------------------|-----------------|
| PIN NO. | Signal Name | CPU Ball Number | CPU Ball Name | Remark |
| 1 | XEINT10/KP_COL2/ALV_DBG6 | H6 | XEINT10/KP_COL2/ALV_DBG6/GPX1_2 | XEINT/KEY/GPIO |
| 2 | XEINT9/KP_COL1/ALV_DBG5 | B5 | XEINT9/KP_COL1/ALV_DBG5/GPX1_1 | XEINT/KEY/GPIO |
| 3 | XEINT12/KP_COL4/ALV_DBG8 | H7 | XEINT12/KP_COL4/ALV_DBG8/GPX1_4 | XEINT/KEY/GPIO |
| 4 | XEINT11/KP_COL3/ALV_DBG7 | D7 | XEINT11/KP_COL3/ALV_DBG7/GPX1_3 | XEINT/KEY/GPIO |
| 5 | XEINT14/KP_COL6/ALV_DBG10 | D1 | XEINT14/KP_COL6/ALV_DBG10/GPX1_6 | XEINT/KEY/GPIO |
| 6 | XEINT13/KP_COL5/ALV_DBG9 | E2 | XEINT13/KP_COL5/ALV_DBG9/GPX1_5 | XEINT/KEY/GPIO |
| 7 | XEINT17/KP_ROW1/ALV_DBG13 | F9 | XEINT17/KP_ROW1/ALV_DBG13/GPX2_1 | XEINT/KEY/GPIO |
| 8 | XEINT16/KP_ROW0/ALV_DBG12 | F8 | XEINT16/KP_ROW0/ALV_DBG12/GPX2_0 | XEINT/KEY/GPIO |
| 9 | XEINT20/KP_ROW4/ALV_DBG16 | C4 | XEINT20/KP_ROW4/ALV_DBG16/GPX2_4 | XEINT/KEY/GPIO |
| 10 | XEINT18/KP_ROW2/ALV_DBG14 | G5 | XEINT18/KP_ROW2/ALV_DBG14/GPX2_2 | XEINT/KEY/GPIO |
| 11 | XEINT22/KP_ROW6/ALV_DBG18 | E9 | XEINT22/KP_ROW6/ALV_DBG18/GPX2_6 | XEINT/KEY/GPIO |
| 12 | XEINT21/KP_ROW5/ALV_DBG17 | E6 | XEINT21/KP_ROW5/ALV_DBG17/GPX2_5 | XEINT/KEY/GPIO |
| 13 | XEINT24/KP_ROW8/ALV_DBG20 | C3 | XEINT24/KP_ROW8/ALV_DBG20/GPX3_0 | XEINT/KEY/GPIO |
| 14 | XEINT23/KP_ROW7/ALV_DBG19 | E7 | XEINT23/KP_ROW7/ALV_DBG19/GPX2_7 | XEINT/KEY/GPIO |
| 15 | XEINT26/KP_ROW10/ALV_DBG22 | G9 | XEINT26/KP_ROW10/ALV_DBG22/GPX3_2 | XEINT/KEY/GPIO |
| 16 | XEINT25/KP_ROW9/ALV_DBG21 | B4 | XEINT25/KP_ROW9/ALV_DBG21/GPX3_1 | XEINT/KEY/GPIO |
| 17 | XEINT28/KP_ROW12/ALV_DBG24 | H9 | XEINT28/KP_ROW12/ALV_DBG24/GPX3_4 | XEINT/KEY/GPIO |
| 18 | XEINT27/KP_ROW11/ALV_DBG23 | B6 | XEINT27/KP_ROW11/ALV_DBG23/GPX3_3 | XEINT/KEY/GPIO |
| 19 | XEINT30/HDMI_CEC/ALV_DBG26 | G6 | XEINT30/HDMI_CEC/ALV_DBG26/GPX3_6 | XEINT/HDMI/GPIO |
| 20 | XEINT29/KP_ROW13/ALV_DBG25 | C7 | XEINT29/KP_ROW13/ALV_DBG25/GPX3_5 | XEINT/KEY/GPIO |

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|----|--------------------------------|-----|---------------------------------------|---------------------------|
| 21 | GND | | | 电源地 |
| 22 | XEINT31/HDMI_HPD/ ALV_DBG27 | B3 | XEINT31/HDMI_HPD/ALV_DBG27/GPX3 _7 | XEINT/HDMI/GPIO |
| 23 | XUHOSTOVERCUR | AE1 | XuhostOVERCUR/ETC6_7 | USB HSIC |
| 24 | XUHOSTPWREN | AE4 | XuhostPWREN/ETC6_6 | USB HSIC |
| 25 | XHSICSTROBE1 | D8 | XhsicSTROBE1 | USB HSIC |
| 26 | XHSICSTROBE0 | A6 | XhsicSTROBE0 | USB HSIC |
| 27 | XHSICDATA1 | E8 | XhsicDATA1 | USB HSIC |
| 28 | XHSICDATA0 | A7 | XhsicDATA0 | USB HSIC |
| 29 | GND | | | 电源地 |
| 30 | GND | | | 电源地 |
| 31 | XUOTGVBUS | B8 | XuotgVBUS | USB OTG 2.0 |
| 32 | XUOTGDRVBUS | AD3 | XuotgDRVVBUS/ETC6_5 | USB OTG 2.0 |
| 33 | GND | | | 电源地 |
| 34 | XUOTGDM | A8 | XuotgDM | USB OTG 2.0 |
| 35 | XUOTGID | D9 | XuotgID | USB OTG 2.0 |
| 36 | XUOTGDP | A9 | XuotgDP | USB OTG 2.0 |
| 37 | GND | | | 电源地 |
| 38 | GND | | | 电源地 |
| 39 | UH_DP2 | | | USB HOST PORT2 |
| 40 | UH_DP3 | | | USB HOST PORT3 |
| 41 | UH_DM2 | | | USB HOST PORT2 |
| 42 | UH_DM3 | | | USB HOST PORT3 |
| 43 | GND | | | 电源地 |
| 44 | UH_DP1 | | | USB HOST PORT1 |
| 45 | VSYS | | | DC 5V 电源 (输入) |
| 46 | UH_DM1 | | | USB HOST PORT1 |
| 47 | VSYS | | | DC 5V 电源 (输入) |
| 48 | GND | | | 电源地 |
| 49 | VSYS | | | DC 5V 电源 (输入) |
| 50 | VSYS | | | DC 5V 电源 (输入) |
| 51 | VSYS | | | DC 5V 电源 (输入) |
| 52 | VSYS | | | DC 5V 电源 (输入) |
| 53 | VSYS | | | DC 5V 电源 (输入) |
| 54 | VSYS | | | DC 5V 电源 (输入) |
| 55 | GND | | | 电源地 |
| 56 | GND | | | 电源地 |
| 57 | GND | | | 电源地 |
| 58 | GND | | | 电源地 |
| 59 | VDD12_5M | | | PMU 电源 BUCK6(输出)1.2V 1.5A |

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|----|---------------|--|--|---------------------------|
| 60 | VDD12_5M | | | PMU 电源 BUCK6(输出)1.2V 1.5A |
| 61 | VDD12_5M | | | PMU 电源 BUCK6(输出)1.2V 1.5A |
| 62 | VDD12_5M | | | PMU 电源 BUCK6(输出)1.2V 1.5A |
| 63 | VDD12_5M | | | PMU 电源 BUCK6(输出)1.2V 1.5A |
| 64 | VDD12_5M | | | PMU 电源 BUCK6(输出) |
| 65 | GND | | | 电源地 |
| 66 | GND | | | 电源地 |
| 67 | CHG_DOK | | | PMU F9 JIGONB |
| 68 | ACOKB_CHARGER | | | PMU D6 ACOKB |
| 69 | GPS_32K | | | PMU C8 CP32K |
| 70 | PWRON | | | PMU E7 PWRON |
| 71 | GND | | | 电源地 |
| 72 | V_BKCOIN | | | PMU C7 BKCOIN(RTC 电源,输入) |
| 73 | VDD18_A31 | | | PMU VLDO26(输出) |
| 74 | VDD18_A31 | | | PMU VLDO26(输出) |
| 75 | VDDIOPERI_18 | | | PMU VLDO13(输出) |
| 76 | VDDIOPERI_18 | | | PMU VLDO13(输出) |
| 77 | GND | | | 电源地 |
| 78 | GND | | | 电源地 |
| 79 | VDD18_CAM | | | PMU VLDO25(输出) |
| 80 | VDD18_CAM | | | PMU VLDO25(输出) |
| 81 | GND | | | 电源地 |
| 82 | GND | | | 电源地 |
| 83 | VDD33_LCD | | | PMU VLDO9(输出) |
| 84 | VDD33_LCD | | | PMU VLDO9(输出) |
| 85 | GND | | | 电源地 |
| 86 | GND | | | 电源地 |
| 87 | VDD_TF | | | PMU VLDO23(输出) |
| 88 | VDD_TF | | | PMU VLDO23(输出) |
| 89 | VDD33_A31 | | | PMU VLDO24(输出) |
| 90 | VDD33_A31 | | | PMU VLDO24(输出) |
| 91 | GND | | | 电源地 |
| 92 | GND | | | 电源地 |
| 93 | VDD15_CAM | | | PMU VLDO21(输出) |
| 94 | VDD15_CAM | | | PMU VLDO21(输出) |
| 95 | VDD28_CAM | | | PMU VLDO20(输出) |
| 96 | VDD28_CAM | | | PMU VLDO20(输出) |
| 97 | GND | | | 电源地 |

| | | | | |
|-----|--------------|--|--|----------------|
| 98 | GND | | | 电源地 |
| 99 | VDDIOPERI_28 | | | PMU VLDO18(输出) |
| 100 | VDDIOPERI_28 | | | PMU VLDO18(输出) |

| J3 | | | | |
|-----------|-------------|-----------------|------------------|----------|
| PIN NO. | Signal Name | CPU Ball Number | CPU Ball Name | Remark |
| 1 | XCIVSYNC | AH11 | XciVSYNC/GPJ0_1 | CAMERA |
| 2 | XCIPCLK | AD12 | XciPCLK/GPJ0_0 | CAMERA |
| 3 | XCIDATA0 | AF11 | XciDATA0/GPJ0_3 | CAMERA |
| 4 | XCIHREF | AE12 | XciHREF/GPJ0_2 | CAMERA |
| 5 | XCIDATA2 | AE13 | XciDATA2/GPJ0_5 | CAMERA |
| 6 | XCIDATA1 | AG11 | XciDATA1/GPJ0_4 | CAMERA |
| 7 | XCIDATA4 | AC11 | XciDATA4/GPJ0_7 | CAMERA |
| 8 | XCIDATA3 | AD13 | XciDATA3/GPJ0_6 | CAMERA |
| 9 | XCIDATA6 | AC12 | XciDATA6/GPJ1_1 | CAMERA |
| 10 | XCIDATA5 | AF12 | XciDATA5/GPJ1_0 | CAMERA |
| 11 | XCICLKENB | AG10 | XciCLKenb/GPJ1_3 | CAMERA |
| 12 | XCIDATA7 | AE11 | XciDATA7/GPJ1_2 | CAMERA |
| 13 | GND | | | 电源地 |
| 14 | XCIFIELD | AD11 | XciFIELD/GPJ1_4 | CAMERA |
| 15 | GND | | | 电源地 |
| 16 | GND | | | 电源地 |
| 17 | XMIPISDP1 | AJ11 | XMIPISDP1 | MIPI CSI |
| 18 | XMIPISDP0 | AJ12 | XMIPISDP0 | MIPI CSI |
| 19 | XMIPISDN1 | AK11 | XMIPISDN1 | MIPI CSI |
| 20 | XMIPISDN0 | AK12 | XMIPISDN0 | MIPI CSI |
| 21 | XMIPISDP2 | AJ9 | XMIPISDP2 | MIPI CSI |
| 22 | XMIPISDPCLK | AJ10 | XMIPISDPCLK | MIPI CSI |
| 23 | XMIPISDN2 | AK9 | XMIPISDN2 | MIPI CSI |
| 24 | XMIPISDNCLK | AK10 | XMIPISDNCLK | MIPI CSI |
| 25 | GND | | | 电源地 |
| 26 | XMIPISDP3 | AJ8 | XMIPISDP3 | MIPI CSI |
| 27 | GND | | | 电源地 |
| 28 | XMIPISDN3 | AK8 | XMIPISDN3 | MIPI CSI |
| 29 | GND | | | 电源地 |
| 30 | GND | | | 电源地 |

| | | | | |
|----|-------------|------|---|--------|
| 31 | XADCAIN1 | AE10 | XADCAIN1 | ADC |
| 32 | XADCAIN0 | AF10 | XADCAIN0 | ADC |
| 33 | XADCAIN3 | AB11 | XADCAIN3 | ADC |
| 34 | XADCAIN2 | AD10 | XADCAIN2 | ADC |
| 35 | GND | | | 电源地 |
| 36 | GND | | | 电源地 |
| 37 | CAMB_D1 | AE9 | XispRGB1/CAM_B_DATA1/TS_VAL/T_Data1/GPM0_2 | CAMERA |
| 38 | CAMB_D0 | AC9 | XispRGB0/CAM_B_DATA0/TS_SYNC/T_Data0/GPM0_1 | CAMERA |
| 39 | CAMB_D3 | AG9 | XispRGB3/CAM_B_DATA3/TS_ERROR/T_Data3/GPM0_4 | CAMERA |
| 40 | CAMB_D2 | AD9 | XispRGB2/CAM_B_DATA2/TS_DATA/T_Data2/GPM0_3 | CAMERA |
| 41 | CAMB_D5 | AG8 | XispRGB5/CAM_B_DATA5/XhsiCADATA/T_Data5/GPM0_6 | CAMERA |
| 42 | CAMB_D4 | AF8 | XispRGB4/CAM_B_DATA4/XhsiCAWAKE/T_Data4/GPM0_5 | CAMERA |
| 43 | CAMB_D7 | AE8 | XispRGB7/CAM_B_DATA7/XhsiACREADY/T_Data7/GPM1_0 | CAMERA |
| 44 | CAMB_D6 | AH9 | XispRGB6/CAM_B_DATA6/XhsiCAFLAG/T_Data6/GPM0_7 | CAMERA |
| 45 | GPM1_2 | AD8 | XispRGB9/XhsiACDATA/T_Data8/GPM1_2 | GPIO |
| 46 | CAMB_FIELD | AG7 | XispRGB8/CAM_B_FIELD/XhsiACWAKE/T_Ctl/GPM1_1 | CAMERA |
| 47 | GPM1_4 | AH8 | XispRGB11/XhsiCAREADY/T_Data10/GPM1_4 | GPIO |
| 48 | GPM1_3 | AG4 | XispRGB10/XhsiACFLAG/T_Data9/GPM1_3 | GPIO |
| 49 | GPM1_6 | AG6 | XispRGB13/T_Data12/GPM1_6 | GPIO |
| 50 | GPM1_5 | AF4 | XispRGB12/T_Data11/GPM1_5 | GPIO |
| 51 | CAMB_HREF | AF5 | XispHSYNC/CAM_B_HREF/T_Data14/GPM2_1 | CAMERA |
| 52 | CAMB_VSYNC | AD7 | XispVSYNC/CAM_B_VSYNC/T_Data13/GPM2_0 | CAMERA |
| 53 | CAMB_PCLK | AF9 | XispPCLK/CAM_B_PCLK/TS_CLK/T_Clk/GPM0_0 | CAMERA |
| 54 | CAMB_CLKOUT | AE5 | XispMCLK/CAM_B_CLKOUT/T_Data15/GPM2_2 | CAMERA |
| 55 | GPM3_0 | AH2 | XispGP2/MPWM3_OUT_ISP/GPM3_0 | GPIO |
| 56 | GPM2_3 | AG3 | XispGP0/MPWM1_OUT_ISP/GPM2_3 | GPIO |
| 57 | GPM3_2 | AD6 | XispGP4/MPWM5_OUT_ISP/CAM_SPI1_MISO/GPM3_2 | GPIO |

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|----|---------------|-----|--|----------|
| 58 | GPM3_1 | AF3 | XispGP3/MPWM4_OUT_ISP/GPM3_1 | GPIO |
| 59 | GND | | | 电源地 |
| 60 | GPM3_4 | AG5 | XispGP6/nRTS_UART_ISP/GPM3_4 | GPIO |
| 61 | XISPI2C1SCL | AE6 | XispI2C1SCL/CAM_GPIO12/CAM_SPI1_C LK/GPM4_2 | I2C |
| 62 | ISP_SCL | AF6 | XispI2C0SCL/CAM_GPIO10/GPM4_0 | I2C |
| 63 | XISPI2C1SDA | AF7 | XispI2C1SDA/CAM_GPIO13/CAM_SPI1_n SS/GPM4_3 | I2C |
| 64 | ISP_SDA | AE7 | XispI2C0SDA/CAM_GPIO11/GPM4_1 | I2C |
| 65 | GND | | | 电源地 |
| 66 | GND | | | 电源地 |
| 67 | XMIPI2LSDPCLK | AJ5 | XMIPI2LSDPCLK | MIPI CSI |
| 68 | XMIPI2LSDP0 | AJ6 | XMIPI2LSDP0 | MIPI CSI |
| 69 | XMIPI2LSDNCLK | AK5 | XMIPI2LSDNCLK | MIPI CSI |
| 70 | XMIPI2LSDN0 | AK6 | XMIPI2LSDN0 | MIPI CSI |
| 71 | GND | | | 电源地 |
| 72 | XMIPI2LSDP1 | AJ4 | XMIPI2LSDP1 | MIPI CSI |
| 73 | GND | | | 电源地 |
| 74 | XMIPI2LSDN1 | AK4 | XMIPI2LSDN1 | MIPI CSI |
| 75 | GND | | | 电源地 |
| 76 | GND | | | 电源地 |
| 77 | XISPSPIMISO | AH3 | XISPSPIMISO | SPI |
| 78 | XISPSPICLK | AH1 | XISPSPICLK | SPI |
| 79 | XISPSPI MOSI | AF1 | XISPSPI MOSI | SPI |
| 80 | XISPSPICSN | AG2 | XISPSPICSN | SPI |
| 81 | GND | | | 电源地 |
| 82 | GND | | | 电源地 |
| 83 | XJTMS | AE2 | XjTMS/ETC0_1 | JTAG |
| 84 | XJTRSTN | AD5 | XjTRSTn/ETC0_0 | JTAG |
| 85 | XJTDI | AD1 | XjTDI/ETC0_3 | JTAG |
| 86 | XJTCK | AE3 | XjTCK/ETC0_2 | JTAG |
| 87 | GND | | | 电源地 |
| 88 | XJTDO | AD2 | XjTDO/ETC0_4 | JTAG |
| 89 | GPL0_2 | AC3 | XGNSS_IMAG/GPL0_2 | GPIO |
| 90 | GPL0_1 | AC2 | XGNSS_ISIGN/GPL0_1 | GPIO |
| 91 | GPL0_4 | AC5 | XGNSS_QMAG/GPL0_4 | GPIO |
| 92 | GPL0_3 | AB1 | XGNSS_QSIGN/GPL0_3 | GPIO |
| 93 | GPL1_0 | AC4 | XGNSS_SCL/GPL1_0 | GPIO |
| 94 | GPL0_6 | AB2 | XGNSS_RF_RSTN/GPL0_6 | GPIO |
| 95 | GPL2_0 | AA4 | XGNSS_GPIO_0/GPL2_0 | GPIO |

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|-----|--------|-----|---------------------|------|
| 96 | GPL1_1 | AA1 | XGNSS_SDA/GPL1_1 | GPIO |
| 97 | GPL2_2 | AB4 | XGNSS_GPIO_2/GPL2_2 | GPIO |
| 98 | GPL2_1 | AB5 | XGNSS_GPIO_1/GPL2_1 | GPIO |
| 99 | GPL2_4 | AA6 | XGNSS_GPIO_4/GPL2_4 | GPIO |
| 100 | GPL2_3 | AB3 | XGNSS_GPIO_3/GPL2_3 | GPIO |

J4

| PIN NO. | Signal Name | CPU Ball Number | CPU Ball Name | Remark |
|---------|--------------------------|-----------------|---------------------------------|-----------|
| 1 | GND | | | 电源地 |
| 2 | GPL2_5 | AA5 | XGNSS_GPIO_5/GPL2_5 | GPIO |
| 3 | XI2S0CDCLK/PCM_0_EXTCLK | AA3 | Xi2s0CDCLK/PCM_0_EXTCLK/GPZ1 | I2S/PCM |
| 4 | XI2S0SCLK/PCM_0_SCLK | AA2 | Xi2s0SCLK/PCM_0_SCLK/GPZ0 | I2S/PCM |
| 5 | XI2S0SDI/PCM_0_SIN | Y4 | Xi2s0SDI/PCM_0_SIN/GPZ3 | I2S/PCM |
| 6 | XI2S0LRCK/PCM_0_FSYNC | Y2 | Xi2s0LRCK/PCM_0_FSYNC/GPZ2 | I2S/PCM |
| 7 | XI2S0SDO_1/ST_TICK | W4 | Xi2s0SDO_1/ST_TICK/GPZ5 | I2S/PCM |
| 8 | XI2S0SDO_0/PCM_0_SOUT | Y3 | Xi2s0SDO_0/PCM_0_SOUT/GPZ4 | I2S/PCM |
| 9 | GND | | | 电源地 |
| 10 | XI2S0SDO_2/ST_INT | Y1 | Xi2s0SDO_2/ST_INT/GPZ6 | I2S |
| 11 | GND | | | 电源地 |
| 12 | GND | | | 电源地 |
| 13 | XM0CSN1/NF_CSN3 | R4 | Xm0CSn1/NF_CSn3/MP00_1 | EBI (XM0) |
| 14 | XM0CSN0/NF_CSN2 | Y5 | Xm0CSn0/NF_CSn2/MP00_0 | EBI (XM0) |
| 15 | XM0CSN3/NF_CSN1/OND_CSN1 | W5 | Xm0CSn3/NF_CSn1/OND_CSn1/MP00_3 | EBI (XM0) |
| 16 | XM0CSN2/NF_CSN0/OND_CSN0 | Y7 | Xm0CSn2/NF_CSn0/OND_CSn0/MP00_2 | EBI (XM0) |
| 17 | XM0WEN | Y6 | Xm0WEn/MP00_5 | EBI (XM0) |
| 18 | XM0OEN | W7 | Xm0OEn/MP00_4 | EBI (XM0) |
| 19 | XM0BEN1 | V6 | Xm0BEn1/MP01_1 | EBI (XM0) |
| 20 | XM0BEN0 | H4 | Xm0BEn0/MP01_0 | EBI (XM0) |
| 21 | XM0DATA_RDN | R3 | Xm0DATA_RDn/MP01_3 | EBI (XM0) |
| 22 | XM0WAITN | V7 | Xm0WAITn/MP01_2 | EBI (XM0) |

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|----|------------------------------|----|------------------------------|-----------|
| 23 | XM0FALE/NF_ALE/OND_SMCLK | P3 | Xm0FALE/OND_SMCLK/MP02_1 | EBI (XM0) |
| 24 | XM0FCLE/NF_CLE/OND_ADDRVALID | T5 | Xm0FCLE/OND_ADDRVALID/MP02_0 | EBI (XM0) |
| 25 | XM0FRNB1/NF_RNB1/OND_INT1 | V5 | Xm0FRnB1/OND_INT1/MP02_3 | EBI (XM0) |
| 26 | XM0FRNB0/NF_RNB0/OND_INT0 | W6 | Xm0FRnB0/OND_INT0/MP02_2 | EBI (XM0) |
| 27 | XM0FRNB3/NF_RNB3 | U8 | Xm0FRnB3/MP02_5 | EBI (XM0) |
| 28 | XM0FRNB2/NF_RNB2/OND_RPN | U7 | Xm0FRnB2/OND_RPN/MP02_4 | EBI (XM0) |
| 29 | XM0DATA1 | L3 | Xm0DATA1/MP05_1 | EBI (XM0) |
| 30 | XM0DATA0 | K3 | Xm0DATA0/MP05_0 | EBI (XM0) |
| 31 | XM0DATA3 | U3 | Xm0DATA3/MP05_3 | EBI (XM0) |
| 32 | XM0DATA2 | U2 | Xm0DATA2/MP05_2 | EBI (XM0) |
| 33 | XM0DATA5 | V2 | Xm0DATA5/MP05_5 | EBI (XM0) |
| 34 | XM0DATA4 | T1 | Xm0DATA4/MP05_4 | EBI (XM0) |
| 35 | XM0DATA7 | W1 | Xm0DATA7/MP05_7 | EBI (XM0) |
| 36 | XM0DATA6 | W2 | Xm0DATA6/MP05_6 | EBI (XM0) |
| 37 | XM0DATA9 | N3 | Xm0DATA9/MP06_1 | EBI (XM0) |
| 38 | XM0DATA8 | M3 | Xm0DATA8/MP06_0 | EBI (XM0) |
| 39 | XM0DATA11 | U1 | Xm0DATA11/MP06_3 | EBI (XM0) |
| 40 | XM0DATA10 | T2 | Xm0DATA10/MP06_2 | EBI (XM0) |
| 41 | XM0DATA13 | V1 | Xm0DATA13/MP06_5 | EBI (XM0) |
| 42 | XM0DATA12 | V3 | Xm0DATA12/MP06_4 | EBI (XM0) |
| 43 | XM0DATA15 | W3 | Xm0DATA15/MP06_7 | EBI (XM0) |
| 44 | XM0DATA14 | J3 | Xm0DATA14/MP06_6 | EBI (XM0) |
| 45 | XM0ADDR1 | T3 | Xm0ADDR1/MP03_1 | EBI (XM0) |
| 46 | XM0ADDR0 | T6 | Xm0ADDR0/MP03_0 | EBI (XM0) |
| 47 | XM0ADDR3 | U4 | Xm0ADDR3/MP03_3 | EBI (XM0) |
| 48 | XM0ADDR2 | U6 | Xm0ADDR2/MP03_2 | EBI (XM0) |
| 49 | XM0ADDR5 | P4 | Xm0ADDR5/MP03_5 | EBI (XM0) |
| 50 | XM0ADDR4 | T8 | Xm0ADDR4/MP03_4 | EBI (XM0) |
| 51 | XM0ADDR7 | T4 | Xm0ADDR7/MP03_7 | EBI (XM0) |
| 52 | XM0ADDR6 | T7 | Xm0ADDR6/MP03_6 | EBI (XM0) |
| 53 | XM0ADDR9_XHSICA DATA | P5 | Xm0ADDR9/XhsiCADATA/MP04_1 | EBI (XM0) |
| 54 | XM0ADDR8_XHSICA WAKE | U5 | Xm0ADDR8/XhsiCAWAKE/MP04_0 | EBI (XM0) |

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|----|---|----|--|-----------|
| 55 | XM0ADDR11_XHSIA CREADY | R5 | Xm0ADDR11/XhsiACREADY/MP04_3 | EBI (XM0) |
| 56 | XM0ADDR10_XHSIC AFLAG | R7 | Xm0ADDR10/XhsiCAFLAG/MP04_2 | EBI (XM0) |
| 57 | XM0ADDR13_XHSIA CDATA | R8 | Xm0ADDR13/XhsiACDATA/MP04_5 | EBI (XM0) |
| 58 | XM0ADDR12_XHSIA CWAKE | P6 | Xm0ADDR12/XhsiACWAKE/MP04_4 | EBI (XM0) |
| 59 | XM0ADDR15_XHSIC AREADY | R6 | Xm0ADDR15/XhsiCAREADY/MP04_7 | EBI (XM0) |
| 60 | XM0ADDR14_XHSIA CFLAG | P7 | Xm0ADDR14/XhsiACFLAG/MP04_6 | EBI (XM0) |
| 61 | GND | | | 电源地 |
| 62 | GND | | | 电源地 |
| 63 | XMMC1CMD | J2 | Xmmc1CMD/GPK1_1 | SD/MMC |
| 64 | XMMC1CLK | R2 | Xmmc1CLK/GPK1_0 | SD/MMC |
| 65 | GND | | | 电源地 |
| 66 | XMMC1CDN/GNSS_ GPIO9/SD_4_NRESET _OUT | P1 | Xmmc1CDn/GNSS_GPIO9/SD_4_nRESET_ OUT/GPK1_2 | SD/MMC |
| 67 | XMMC2CMD | J4 | Xmmc2CMD/GPK2_1 | SD/MMC |
| 68 | XMMC2CLK | N4 | Xmmc2CLK/GPK2_0 | SD/MMC |
| 69 | XMMC2DATA0 | J5 | Xmmc2DATA0/GPK2_3 | SD/MMC |
| 70 | XMMC2CDN/GNSS_ GPIO10 | M4 | Xmmc2CDn/GNSS_GPIO10/GPK2_2 | SD/MMC |
| 71 | XMMC2DATA2 | K4 | Xmmc2DATA2/GPK2_5 | SD/MMC |
| 72 | XMMC2DATA1 | K5 | Xmmc2DATA1/GPK2_4 | SD/MMC |
| 73 | GND | | | 电源地 |
| 74 | XMMC2DATA3 | N5 | Xmmc2DATA3/GPK2_6 | SD/MMC |
| 75 | XMMC3CMD | N6 | Xmmc3CMD/GPK3_1 | SD/MMC |
| 76 | XMMC3CLK | L6 | Xmmc3CLK/GPK3_0 | SD/MMC |
| 77 | XMMC3DATA0/SD_2_ DATA4 | M6 | Xmmc3DATA0/SD_2_DATA4/GPK3_3 | SD/MMC |
| 78 | XMMC3CDN/GNSS_ GPIO11 | L5 | Xmmc3CDn/GNSS_GPIO11/GPK3_2 | SD/MMC |
| 79 | XMMC3DATA2/SD_2_ DATA6 | N7 | Xmmc3DATA2/SD_2_DATA6/GPK3_5 | SD/MMC |
| 80 | XMMC3DATA1/SD_2_ DATA5 | M7 | Xmmc3DATA1/SD_2_DATA5/GPK3_4 | SD/MMC |
| 81 | GND | | | 电源地 |
| 82 | XMMC3DATA3/SD_2_ DATA7 | M5 | Xmmc3DATA3/SD_2_DATA7/GPK3_6 | SD/MMC |

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|-----|--------------------------------------|----|---|----------------|
| 83 | XOM3 | G3 | XOM3 | SYSTEM OPTION |
| 84 | XOM2 | G1 | XOM2 | SYSTEM OPTION |
| 85 | XNRESET | F7 | XnRESET/ETC6_0 | XNRESET |
| 86 | XOM5 | G2 | XOM5 | SYSTEM OPTION |
| 87 | XNRSTOUT | A4 | XnRSTOUT/ETC6_2 | XNRSTOUT |
| 88 | XCLKOUT | G4 | XCLKOUT/ETC6_1 | XCLKOUT |
| 89 | XPWRRGTON | F1 | XPWRRGTON | XPWRRGTON |
| 90 | XNWRESET | F2 | XnWRESET/ETC6_3 | XNWRESET |
| 91 | GND | | | 电源地 |
| 92 | GND | | | 电源地 |
| 93 | XEINT1/AUD_TMS/GNSS_TMS/ALV_TMS | E5 | XEINT1/AUD_TMS/GNSS_TMS/ALV_TMS/GPX0_1 | XEINT/GPIO |
| 94 | XEINT0/AUD_TCK/GNSS_TCK/ALV_TCK | F4 | XEINT0/AUD_TCK/GNSS_TCK/ALV_TCK/GPX0_0 | XEINT/GPIO |
| 95 | XEINT4/AUD_TRSTN/GNSS_TRSTN/ALV_DBG0 | E1 | XEINT4/AUD_TRSTn/GNSS_TRSTn/ALV_DBG0/GPX0_4 | XEINT/GPIO |
| 96 | XEINT3/AUD_TDO/GNSS_TDO/ALV_TDO | D4 | XEINT3/AUD_TDO/GNSS_TDO/ALV_TDO/GPX0_3 | XEINT/GPIO |
| 97 | XEINT6/ALV_DBG2 | D3 | XEINT6/ALV_DBG2/GPX0_6 | XEINT/GPIO |
| 98 | XEINT5/ALV_DBG1 | E3 | XEINT5/ALV_DBG1/GPX0_5 | XEINT/GPIO |
| 99 | XEINT8/KP_COL0/ALV_DBG4 | A3 | XEINT8/KP_COL0/ALV_DBG4/GPX1_0 | XEINT/KEY/GPIO |
| 100 | XEINT7/ALV_DBG3 | D5 | XEINT7/ALV_DBG3/GPX0_7 | XEINT/GPIO |

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