CM1126B-P
Reference User Manual

V2. 20250422

Boardcon Embedded Design

www. armdesigner. com

1. Introduction

1.1. About this Manual

This manual is intended to provide the user with an overview of the board and benefits, complete features specifications, and set up procedures. It contains important safety information as well.

1.2. Feedback and Update to this Manual

To help our customers make the most of our products, we are continually making additional and updated resources available on the Boardcon website (www.boardcon.com , www.armdesigner.com).

These include manuals, application notes, programming examples, and updated software and hardware. Check in periodically to see what's new!

When we are prioritizing work on these updated resources, feedback from customers is the number one influence, If you have questions, comments, or concerns about your product or project, please no hesitate to contact us at support@armdesigner.com.

1.3. Limited Warranty

Boardcon warrants this product to be free of defects in material and workmanship for a period of one year from date of buy. During this warranty period Boardcon will repair or replace the defective unit in accordance with the following process:

A copy of the original invoice must be included when returning the defective unit to Boardcon. This limited warranty does not cover damages resulting from lighting or other power surges, misuse, abuse, abnormal conditions of operation, or attempts to alter or modify the function of the product.

This warranty is limited to the repair or replacement of the defective unit. In no event shall Boardcon be liable or responsible for any loss or damages, including but not limited to any lost profits, incidental or consequential damages, loss of business, or anticipatory profits arising from the use or inability to use this product.

Repairs make after the expiration of the warranty period are subject to a repair charge and the cost of return shipping. Please contact Boardcon to arrange for any repair service and to obtain repair charge information.

Content

1 CM1126B-P Introduction

1.1 Summary

The CM1126B-P system-on-module is equipped with Rockchip's RV1126B-P build in quad-core Cortex-A53, 3.0 TOPs NPU and RISC-V MCU.

It is designed specifically for the IPC/CVR devices, AI Camera devices, intelligent interactive devices, and mini robots. The high performance and low power solution can help customers to introduce new technologies more quickly and enhance the overall solution efficiency.

The least size can put on 38board.

Following the hardware revision from CM1126 (V1) to CM1126B-P (V2), where the SoC is updated to the RV1126B-P, the Reset & OTG_VBUS signals and WIFI/BT module's GPIO voltage must operate at a **3.3V** logic level.

1.2 Features

- **Microprocessor**
  - Quad-core Cortex-A53 up to 1.6GHz
  - 32KB I-cache and 32KB D-cache for each core, 512KB L3 cache
  - 3.0 TOPS Neural Process Unit
  - RISC-V MCU to support 250mS fast boot
  - Max 12M ISP

  Memory Organization
  - LPDDR4 RAM up to 4GB
  - eMMC up to 256GB
  - SPI Flash up to 8MB
- **Video Decoder/Encoder**
  - Supports video decode/encode up to 4K@30fps
  - Supports real-time decoding of H.264/265
  - Supports real-time UHD H.264/265 video encoding
  - Picture size up to 8192x8192
- **Display Subsystem**
  - **Video Output**

    Supports 4 lanes MIPI DSI up to 2560x1440@60fps

    Supports 24bit RGB parallel output
  - **Image in**

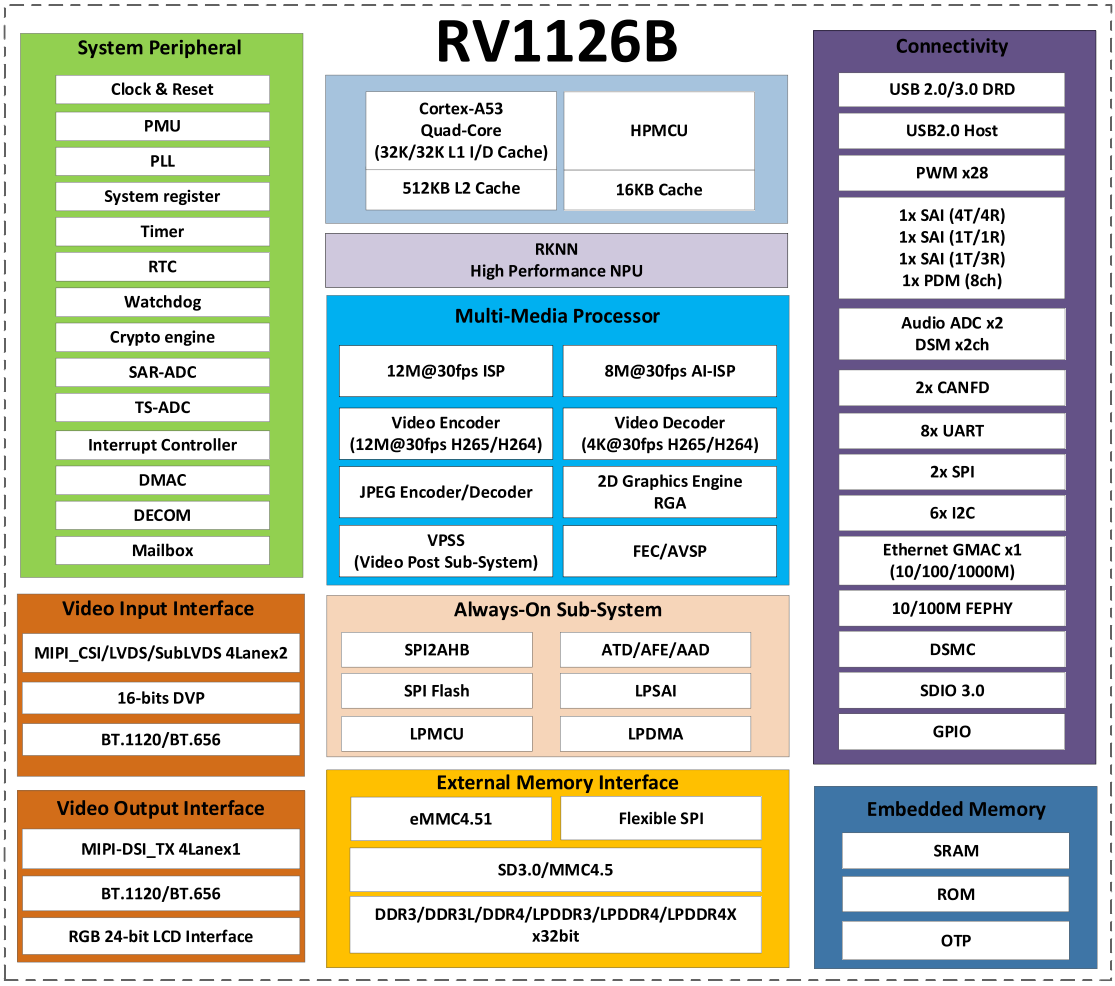
    Supports up to 16bit DVP interface

    Supports 2ch MIPI CSI 4lanes interface
- **I2S/PCM/ AC97**
  - Three I2S/PCM interface
  - Support Mic array Up to 8ch PDM/TDM interface
  - Support PWM audio output

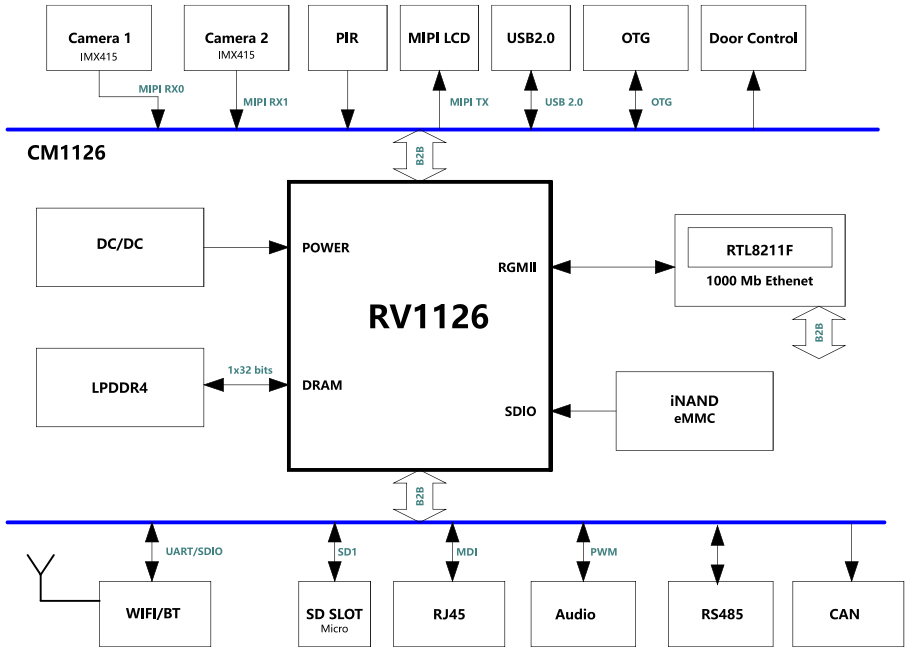
- **USB and PCIE**
  - Two 2.0 USB interfaces
  - One USB 2.0 OTG, and one 2.0 USB hosts
- **Ethernet**
  - RTL8211F onboard
  - Support 10/100/1000M
- **I2C**
  - Up to five I2Cs
  - Support standard mode and fast mode(up to 400kbit/s)
- **SDIO**
  - Support 2CH SDIO 3.0 protocol
- **SPI**
  - Up to two SPI controllers,
  - Full-duplex synchronous serial interface
- **UART**
  - Support up to 6 UARTs
  - UART2 with 2 wires for debug tools
  - Embedded two 64byte FIFO
  - Support auto flow control mode for UART0/1/3/4/5
- **ADC**
  - Up to four ADC channels
  - 12-bit resolution
  - Voltage input range between 0V to 1.8V
  - Support up to 1MS/s sampling rate
- **PWM**
  - 11 on-chip PWMs with interrupt-based operation
  - Support 32bit time/counter facility
  - IR option on PWM3/7
- **Power unit**
  - Discrete Power on board
  - Single 3.3V input

1.3 CM1126B-P Block Diagram

1.3.1 RV1126B-P Block Diagram



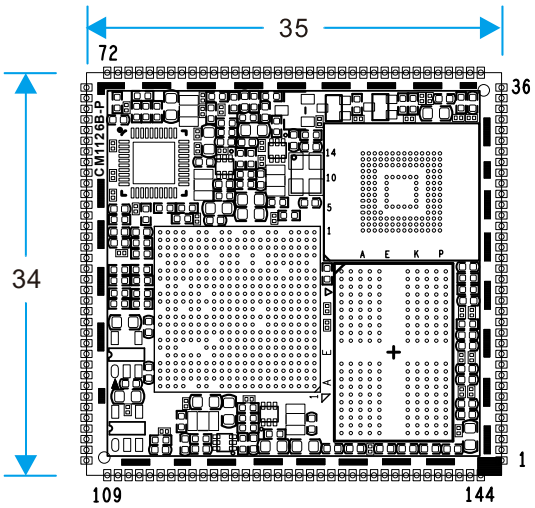
1.3.2 Development board (Idea1126) Block Diagram



1.4 CM1126B-P Specifications

Feature	Specifications
CPU	Quad-core Cortex-A53
DDR	2GB LPDDR4 (up to 4GB)
eMMC FLASH	8GB (up to 256GB)
Power	DC 3.3V
MIPI DSI	4-Lane
I2S	4-CH
MIPI CSI	2-CH 4-Lane
RGB LCD	24bit
Camera	1-CH(DVP) and 2-CH(CSI)
USB	2-CH (USB HOST2.0 and OTG 2.0)
Ethernet	1000M GMAC
SDMMC	2-CH
I2C	5-CH
SPI	2-CH
UART	5-CH, 1-CH(DEBUG)
PWM	11-CH
ADC IN	4-CH
Board Dimension	34 x 35mm

1.5 CM1126B-P PCB Dimension



1.6 CM1126B-P Pin Definition

Pin	Signal	Description or functions	GPIO serial	IO Voltage
1	LCDC_D19_3V3	I2S1_MCLK_M2/CIF_D15_M1	GPIO2_C7_d	3.3V
2	LCDC_D20_3V3	I2S1_SDO_M2/CIF_VS_M1	GPIO2_D0_d	3.3V
3	LCDC_D21_3V3	I2S1_SCLK_M2/CIF_CLKO_M1	GPIO2_D1_d	3.3V
4	LCDC_D22_3V3	I2S1_LRCK_M2/CIF_CKIN_M1	GPIO2_D2_d	3.3V
5	LCDC_D23_3V3	I2S1_SDI_M2/CIF_HS_M1	GPIO2_D3_d	3.3V
6	GND	Ground		0V
7	GPIO1_D1	UART1_RX_M1/I2C5_SDA_M2	GPIO1_D1_d	3.3V(V2)
8	BT_WAKE	SPI0_CS1n_M0	GPIO0_A4_u	3.3V(V2)
9	WIFI_REG_ON	SPI0_MOSI_M0	GPIO0_A6_d	3.3V(V2)
10	BT_RST	SPI0_MISO_M0	GPIO0_A7_d	3.3V(V2)
11	WIFI_WAKE_HOST	SPI0_CLK_M0	GPIO0_B0_d	3.3V(V2)
12	BT_WAKE_HOST	SPI0_CS0n_M0	GPIO0_A5_u	3.3V(V2)
13	PWM7_IR_M0_3V3		GPIO0_B1_d	3.3V
14	PWM6_M0_3V3	TSADC_SHUT_M1	GPIO0_B2_d	3.3V
15	UART2_TX_3V3	For debug	GPIO3_A2_u	3.3V
16	UART2_RX_3V3	For debug	GPIO3_A3_u	3.3V
17	I2S0_MCLK_M0_3V3		GPIO3_D2_d	3.3V
18	I2S0_SCLK_TX_M0_3V3	ACODEC_DAC_CLK	GPIO3_D0_d	3.3V
19	I2S0_SDI3_M0_3V3	PDM_SDI3_M0 / ACODEC_ADC_DATA	GPIO3_D7_d	3.3V
20	I2S0_SDO0_M0_3V3	ACODEC_DAC_DATAR /APWM_R_M1/ADSM_LP	GPIO3_D5_d	3.3V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
21	I2S0_LRCK_TX_M0 _3V3	ACODEC_DAC_SYNC /APWM_L_M1/ADSM_LN	GPIO3_D3_d	3.3V
22	PDM_SDI1_3V3	I2S0_SDO3_SDI1_M0/I2C4SDA	GPIO4_A1_d	3.3V
23	PDM_CLK1_3V3	I2S0_SCK_RX_M0	GPIO3_D1_d	3.3V
24	PDM_SDI2_3V3	I2S0_SDO2_SDI2_M0/I2C4SCL	GPIO4_A0_d	3.3V
25	PDM_SDI0_3V3	I2S0_SDI0_M0	GPIO3_D6_d	3.3V
26	PDM_CLK_3V3	I2S0_LRCK_RX_M0	GPIO3_D4_d	3.3V
27	I2C2_SDA_3V3	PWM5_M0	GPIO0_C3_d	3.3V
28	I2C2_SCL_3V3	PWM4_M0	GPIO0_C2_d	3.3V
29	USB_HOST_DP			1.8V
30	USB_HOST_DM			1.8V
31	GND	Ground		0V
32	OTG_DP	Can use for download		1.8V
33	OTG_DM	Can use for download		1.8V
34	OTG_DET(V2)	OTG VBUS DET IN		3.3V(V2)
35	OTG_ID			1.8V
36	SPI0_CS1n_M1	I2S1_MCK_M1/UART4_TX_M2	GPIO1_D5_d	1.8V
37	VCC3V3_SYS	3.3V Main Power input		3.3V
38	VCC3V3_SYS	3.3V Main Power input		3.3V
39	USB_CTRL_3V3		GPIO0_C1_d	3.3V
40	SDMMC0_DET	Must be used for SD Card	GPIO0_A3_u	3.3V(V2)
41	CLKO_32K	RTC clock output	GPIO0_A2_u	3.3V(V2)
42	nRESET	Reset key input		3.3V(V2)
43	MIPI_CSI_RX0_CL KP	MIPI CSI0 or LVDS0 input		1.8V
44	MIPI_CSI_RX0_CL KN	MIPI CSI0 or LVDS0 input		1.8V
45	MIPI_CSI_RX0_D2 P	MIPI CSI0 or LVDS0 input		1.8V
46	MIPI_CSI_RX0_D2 N	MIPI CSI0 or LVDS0 input		1.8V
47	MIPI_CSI_RX0_D3 P	MIPI CSI0 or LVDS0 input		1.8V
48	MIPI_CSI_RX0_D3 N	MIPI CSI0 or LVDS0 input		1.8V
49	MIPI_CSI_RX0_D1 P	MIPI CSI0 or LVDS0 input		1.8V
50	MIPI_CSI_RX0_D1 N	MIPI CSI0 or LVDS0 input		1.8V
51	MIPI_CSI_RX0_D0 P	MIPI CSI0 or LVDS0 input		1.8V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
52	MIPI_CSI_RX0_D0N	MIPI CSI0 or LVDS0 input		1.8V
53	GND	Ground		0V
54	MIPI_CSI_RX1_D3P	MIPI CSI1 or LVDS1 input		1.8V
55	MIPI_CSI_RX1_D3N	MIPI CSI1 or LVDS1 input		1.8V
56	MIPI_CSI_RX1_CLKP	MIPI CSI1 or LVDS1 input		1.8V
57	MIPI_CSI_RX1_CLKN	MIPI CSI1 or LVDS1 input		1.8V
58	MIPI_CSI_RX1_D2P	MIPI CSI1 or LVDS1 input		1.8V
59	MIPI_CSI_RX1_D2N	MIPI CSI1 or LVDS1 input		1.8V
60	MIPI_CSI_RX1_D1P	MIPI CSI1 or LVDS1 input		1.8V
61	MIPI_CSI_RX1_D1N	MIPI CSI1 or LVDS1 input		1.8V
62	MIPI_CSI_RX1_D0P	MIPI CSI1 or LVDS1 input		1.8V
63	MIPI_CSI_RX1_D0N	MIPI CSI1 or LVDS1 input		1.8V
64	SDMMC0_D3_3V3	UART3_TX_M1	GPIO1_A7_u	3.3V
65	SDMMC0_D2_3V3	UART3_RX_M1	GPIO1_A6_u	3.3V
66	SDMMC0_D1_3V3	UART2_TX_M0	GPIO1_A5_u	3.3V
67	SDMMC0_D0_3V3	UART2_RX_M0	GPIO1_A4_u	3.3V
68	SDMMC0_CMD_3V3	UART3_CTSn_M1	GPIO1_B1_u	3.3V
69	SDMMC0_CLK_3V3	UART3_RTSn_M1	GPIO1_B0_u	3.3V
70	GND	Ground		0V
71	LED1/CFG_LDO0	Ethernet LINK LED		3.3V
72	LED2/CFG_LDO1	Ethernet SPEED LED		3.3V
73	MDI0+	Ethernet MDI signal		1.8V
74	MDI0-	Ethernet MDI signal		1.8V
75	MDI1+	Ethernet MDI signal		1.8V
76	MDI1-	Ethernet MDI signal		1.8V
77	MDI2+	Ethernet MDI signal		1.8V
78	MDI2-	Ethernet MDI signal		1.8V
79	MDI3+	Ethernet MDI signal		1.8V
80	MDI3-	Ethernet MDI signal		1.8V
81	I2C1_SCL	UART4_CTSn_M2	GPIO1_D3_u	1.8V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
82	I2C1_SDA	UART4_RTSn_M2	GPIO1_D2_u	1.8V
83	MIPI_CSI_PWDN0	UART4_RX_M2	GPIO1_D4_d	1.8V
84	SPI0_CLK_M1	I2S1_SDO_M1/UART5_RX_M2	GPIO2_A1_d	1.8V
85	SPI0_MOSI_M1	I2S1_SCK_M1/I2C3_SCL_M2	GPIO1_D6_d	1.8V
86	SPI0_CS0n_M1	I2S1_SDI_M1/UART5_TX_M2	GPIO2_A0_d	1.8V
87	SPI0_MISO_M1	I2S1_LRCK_M1/I2C3_SDA_M2	GPIO1_D7_d	1.8V
88	MIPI_CSI_CLK1	UART5_RTSn_M2	GPIO2_A2_d	1.8V
89	MIPI_CSI_CLK0	UART5_CTSn_M2	GPIO2_A3_d	1.8V
90	GND	Ground		0V
91	LCDC_D0_3V3	UART4_RTSn_M1/CIF_D0_M1	GPIO2_A4_d	3.3V
92	LCDC_D1_3V3	UART4_CTSn_M1/CIF_D1_M1	GPIO2_A5_d	3.3V
93	LCDC_D2_3V3	UART4_TX_M1/CIF_D2_M1	GPIO2_A6_d	3.3V
94	LCDC_D3_3V3	UART4_RX_M1/I2S2_SDO_M1	GPIO2_A7_d	3.3V
95	LCDC_D4_3V3	UART5_TX_M1/I2S2_SDI_M1	GPIO2_B0_d	3.3V
96	LCDC_D5_3V3	UART5_RX_M1/I2S2_SCK_M1	GPIO2_B1_d	3.3V
97	LCDC_D6_3V3	UART5_RTSn_M1/I2S2_LRCK_M1	GPIO2_B2_d	3.3V
98	LCDC_D7_3V3	UART5_CTSn_M1/I2S2_MCLK_M1/CIF_D3_M1	GPIO2_B3_d	3.3V
99	CAN_RX_3V3	UART3_TX_M2/I2C4_SCL_M0	GPIO3_A0_u	3.3V
100	CAN_TX_3V3	UART3_RX_M2/I2C4_SDA_M0	GPIO3_A1_u	3.3V
101	LCDC_CLK_3V3	UART3_CTSn_M2/SPI1_MISO_M2/PWM8_M1	GPIO2_D7_d	3.3V
102	LCDC_VSYNC_3V3	UART3_RTSn_M2/SPI1_MOSI	GPIO2_D6_d	3.3V
103	MIPI_DSI_D2P			1.8V
104	MIPI_DSI_D2N			1.8V
105	MIPI_DSI_D1P			1.8V
106	MIPI_DSI_D1N			1.8V
107	MIPI_DSI_D0P			1.8V
108	MIPI_DSI_D0N			1.8V
109	MIPI_DSI_D3P			1.8V
110	MIPI_DSI_D3N			1.8V
111	MIPI_DSI_CLKP			1.8V
112	MIPI_DSI_CLKN			1.8V
113	ADCIN3	ADC input		1.8V
114	ADCIN2	ADC input		1.8V
115	ADCIN1	ADC input		1.8V
116	ADKEY_IN0	Recovery mode set(10K PU)		1.8V
117	GND	Ground		0V
118	SDIO_CLK		GPIO1_B2_d	3.3V(V2)
119	SDIO_CMD		GPIO1_B3_u	3.3V(V2)

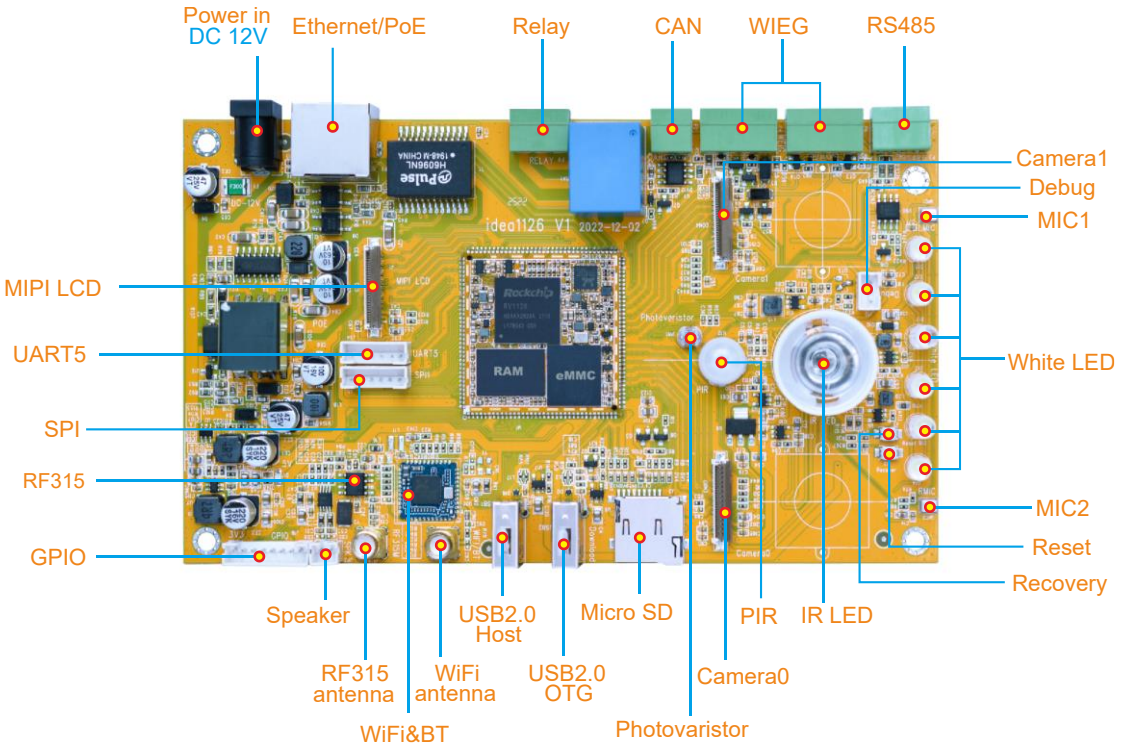
Pin	Signal	Description or functions	GPIO serial	IO Voltage
120	SDIO_D0		GPIO1_B4_u	3.3V(V2)
121	SDIO_D1		GPIO1_B5_u	3.3V(V2)
122	SDIO_D2		GPIO1_B6_u	3.3V(V2)
123	SDIO_D3		GPIO1_B7_u	3.3V(V2)
124	UART0_RX		GPIO1_C2_u	3.3V(V2)
125	UART0_TX		GPIO1_C3_u	3.3V(V2)
126	UART0_CTSN		GPIO1_C1_u	3.3V(V2)
127	UART0_RTSN		GPIO1_C0_u	3.3V(V2)
128	PCM_TX	I2S2_SDO_M0/SPI1_MOSI_M1	GPIO1_C4_d	3.3V(V2)
129	PCM_SYNC	I2S2_LRCK_M0/SPI1_CSn0_M1/UART1_CTSn_M1	GPIO1_C7_d	3.3V(V2)
130	PCM_CLK	I2S2_SCLK_M0/SPI1_CLK_M1/UART1_RTSn_M1	GPIO1_C6_d	3.3V(V2)
131	PCM_RX	I2S2_SDI_M0/SPI1_MISO_M1	GPIO1_C5_d	3.3V(V2)
132	LCDC_D15_3V3	CIF_D11_M1	GPIO2_C3_d	3.3V
133	LCDC_D14_3V3	CIF_D10_M1	GPIO2_C2_d	3.3V
134	LCDC_D13_3V3	CIF_D9_M1	GPIO2_C1_d	3.3V
135	LCDC_D12_3V3	CIF_D8_M1	GPIO2_C0_d	3.3V
136	LCDC_DEN_3V3	I2C3_SCL_M1/SPI1_CS0n_M2	GPIO2_D4_d	3.3V
137	LCDC_D10_3V3	CIF_D6_M1	GPIO2_B6_d	3.3V
138	LCDC_D9_3V3	CIF_D5_M1	GPIO2_B5_d	3.3V
139	LCDC_D8_3V3	CIF_D4_M1	GPIO2_B4_d	3.3V
140	LCDC_D11_3V3	CIF_D7_M1	GPIO2_B7_d	3.3V
141	LCDC_HSYNC_3V3	I2C3_SDA_M1/SPI1_CLK_M2	GPIO2_D5_d	3.3V
142	LCDC_D16_3V3	CIF_D12_M1	GPIO2_C4_d	3.3V
143	LCDC_D17_3V3	CIF_D13_M1	GPIO2_C5_d	3.3V
144	LCDC_D18_3V3	CIF_D14_M1	GPIO2_C6_d	3.3V

Note:

1. Most GPIO voltage is 1.8V, but some pins marked 3.3V.

2. GPIO voltage change to 3.3V for marked (V2).

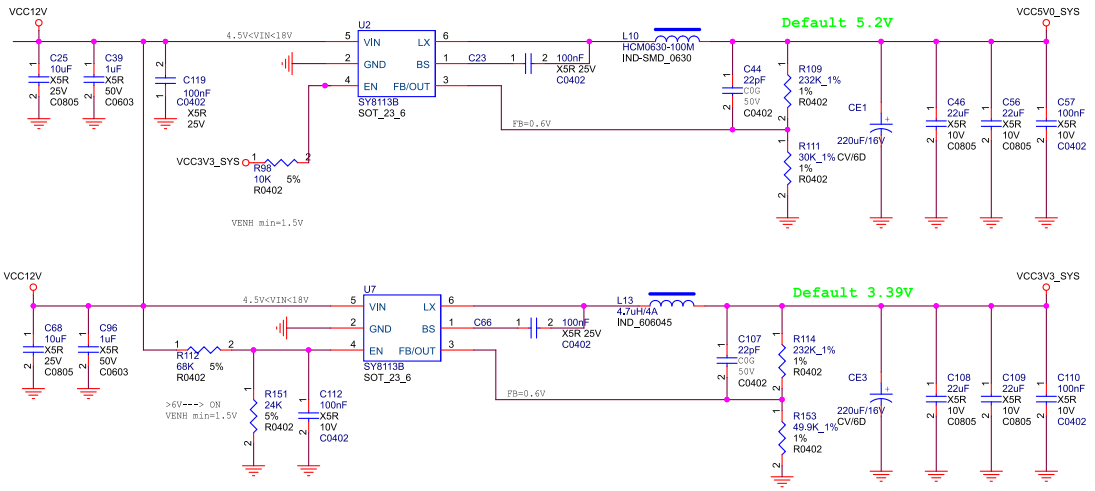
1.7 Development Kit (Idea1126)



2 Hardware Design Guide

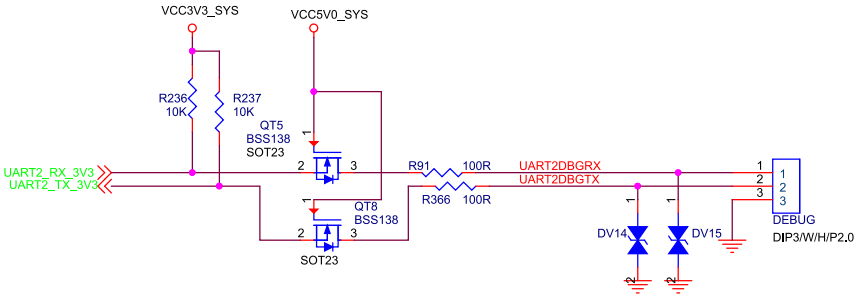
2.1 Peripheral Circuit Reference

2.1.1 Main Power Circuit

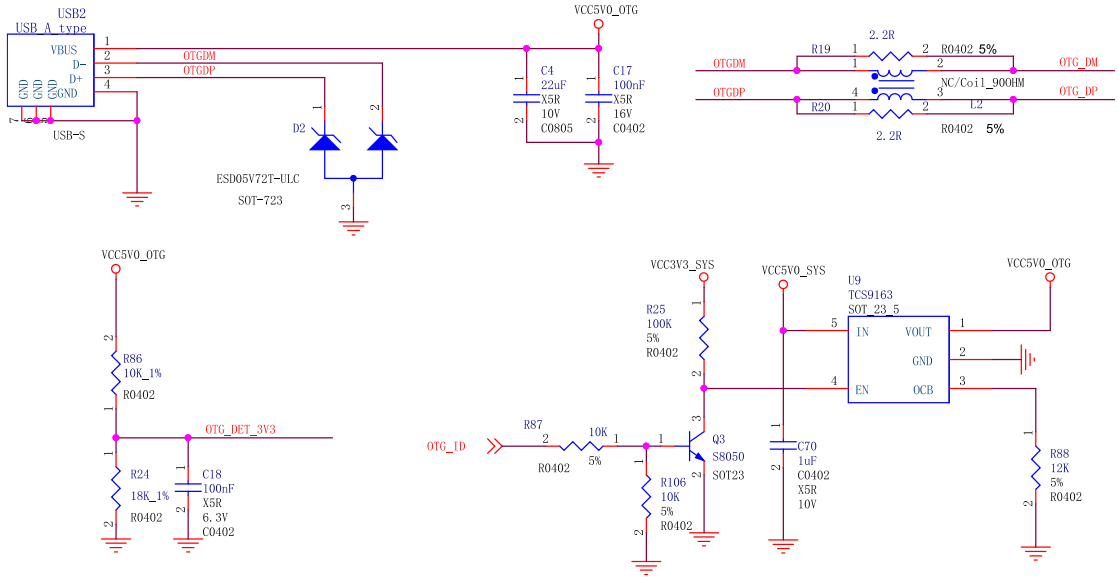


Vout=0.6*(1+R114/R153)

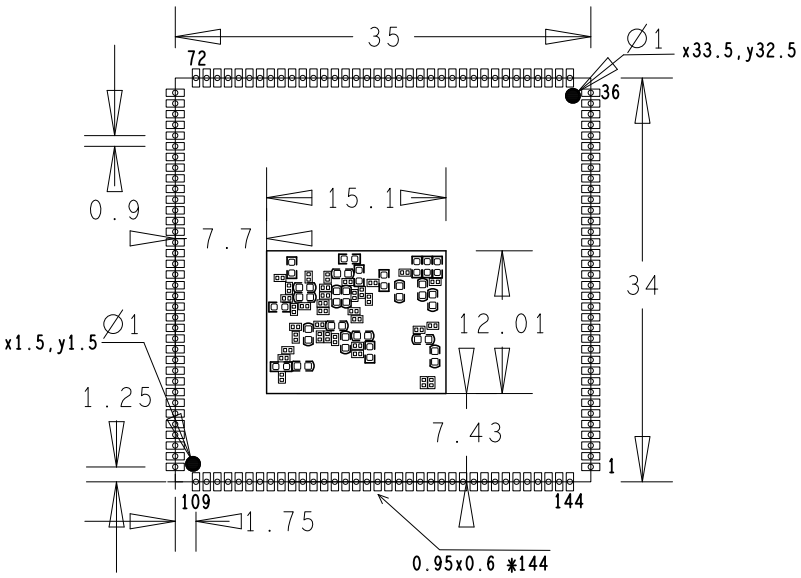
2.1.2 Debug Circuit



2.1.3 USB OTG Interface Circuit



2.2 PCB Footprint



3 Product Electrical Characteristics

3.1 Dissipation and Temperature

Symbol	Parameter	Min	Typ	Max	Unit
VCC3V3_SYS	System IO Voltage	3.3-5%	3.3	3.3+5%	V
Isys_in	VCC3V3_SYS input Current		850		mA
Ta	Operating Temperature	-20		70	°C
Tstg	Storage Temperature	-40		85	°C

3.2 Reliability of Test

High Temperature Operating Test		
Contents	Operating 8h in high temperature	55°C±2°C
Result	TBD	

Operating Life Test		
Contents	Operating in room	120h
Result	TBD	