



ESK32-2x001A Expansion Board User Manual

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Introduction

The ESK32-2x001A Expansion board is designed for the HT32 series microcontrollers. The HT32 series microcontrollers are equipped with a variety of peripherals, such as high speed SAR ADC, I²S, EBI, CRC, CMP, USB, I²C, USART, UART, SPI, GPTM, MCTM, WDT, RTC, SW-DP (Serial Wire), etc.

There are some specific components provided for the device peripheral evaluation, such as the RS232 transceiver, EEPROM, series NOR flash, Microphone, Stereo jack, potentiometer, etc.

Note 1: There are only three components different between the ESK32-21001A and the ESK32-20001A. The CMOS sensor connector, smart card interface and audio in/out interface are only available in the ESK32-21001A.

Note 2: The ESK32-2x001A is the enhanced version of the ESK32-2x001, the difference is that the ESK32-2x001A supports Quad Mode SPI Flash and Monochrome LCD connector.

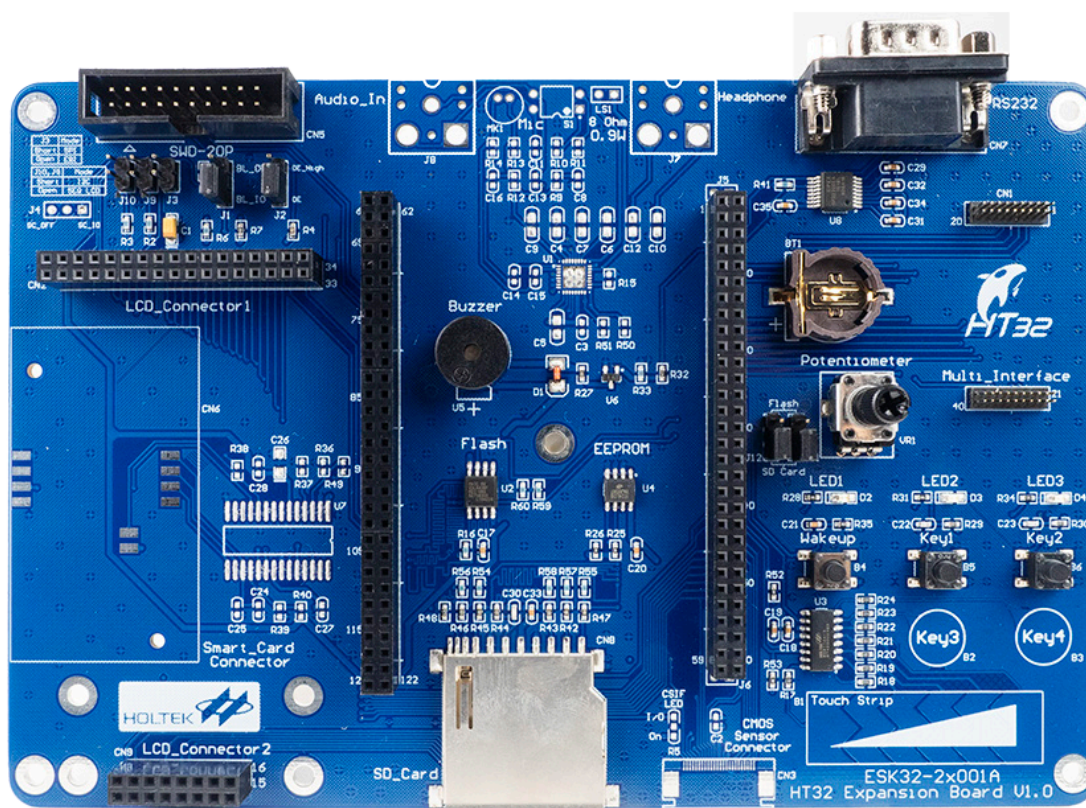


Figure 1. ESK32-2x001A Expansion Board

Features

- RS232 connector
- Wakeup button and two key buttons
- Touch keys
- Three LEDs
- I²C-compatible serial interface EEPROM
- SPI-compatible serial interface Flash – supporting Quad I/O Mode
- SPI and EBI extension interfaces for LCD display applications
- Monochrome LCD connector to connect the ESK32-A3A31 Monochrome LCD
- SD card slot – supporting both SPI mode and SDIO mode
- PWM output for Buzzer driving
- Backup battery
- SWD-20P debug port interface
- Smart card connector
- CMOS sensor connector
- Multiple interfaces including UART, I²C, SPI and GPIO functions for connecting various modules
- Audio input contains microphone and stereo jack
- Audio output contains speaker connector and stereo jack

Hardware Layout

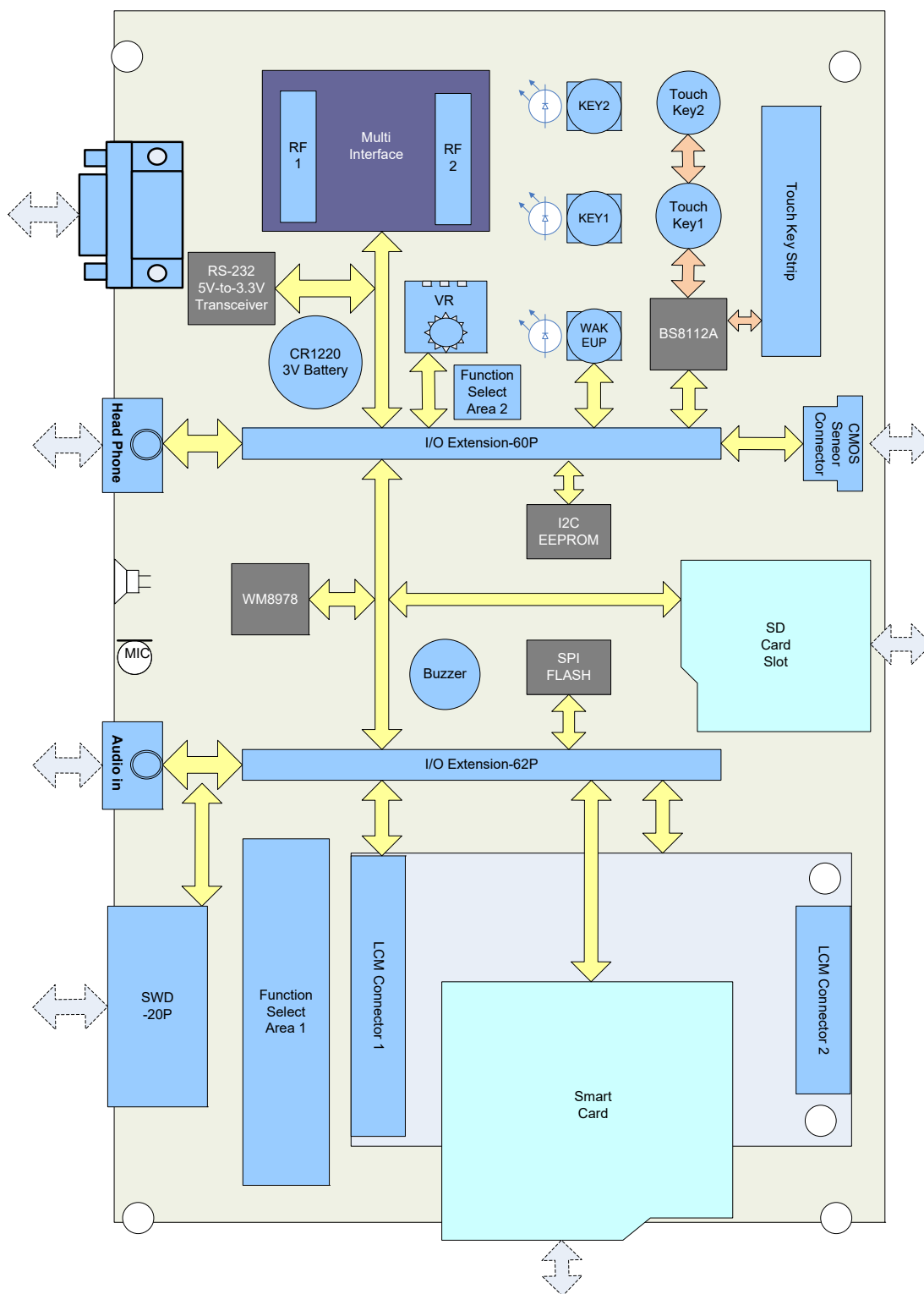


Figure 2. ESK32-2x001A Expansion Board Block Diagram

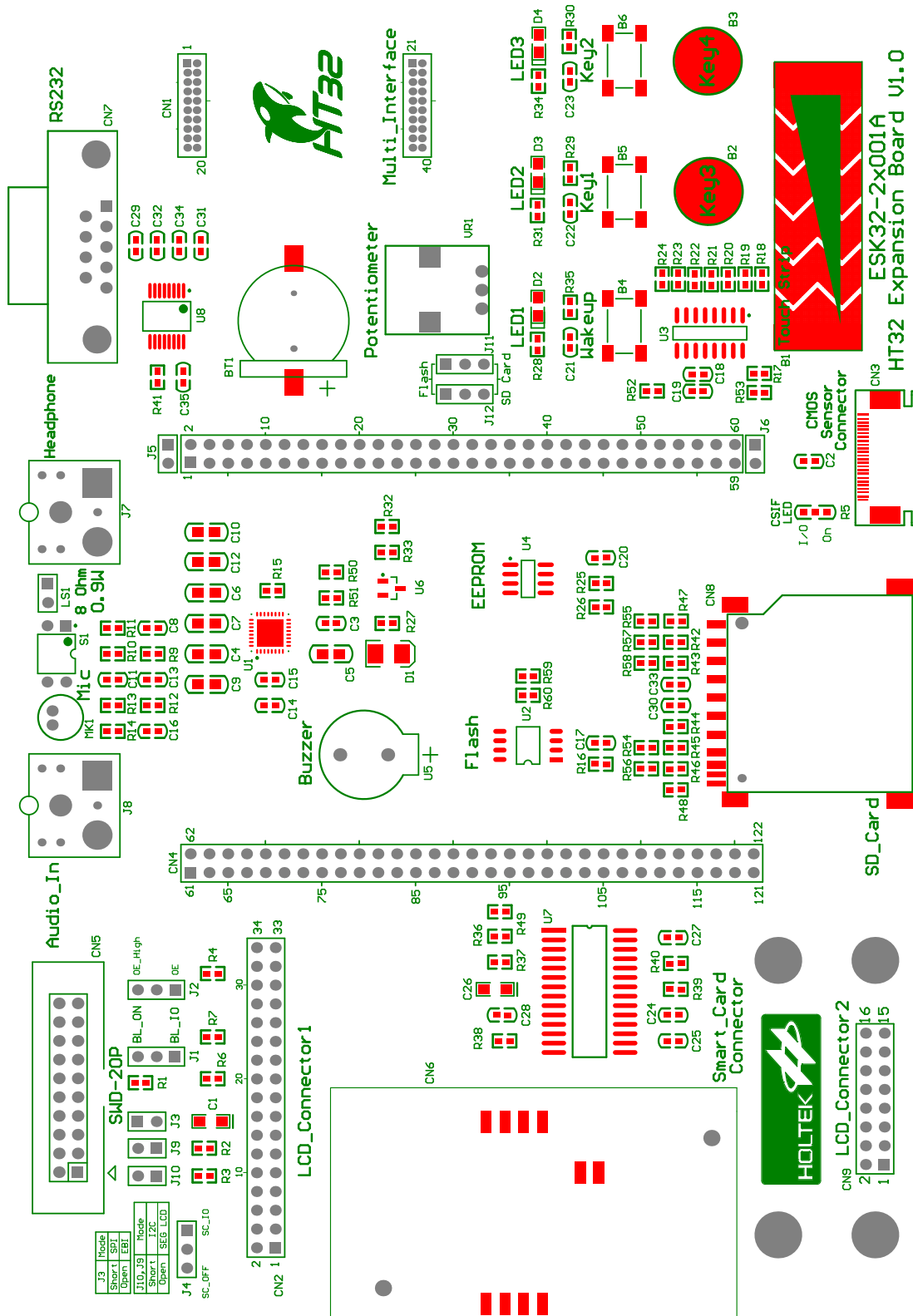


Figure 3. ESK32-2x001A Expansion Board Layout

Expansion Connector CN4

The Expansion connector CN4 is used to connect the Expansion Board and the Starter Kit. The pin definitions of the connector, which are connected to the corresponding functional device on the board, are shown in Table 1. Different models of Starter Kit will have different MCU pin assignments. Users should refer to the schematic diagram of each Starter Kit for the exact pin assignment.

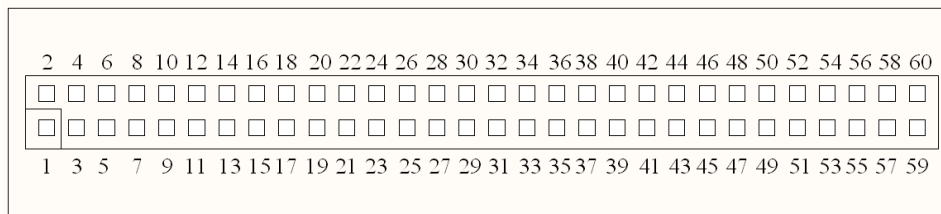


Figure 4. Expansion Connector (CN4 Part 1)

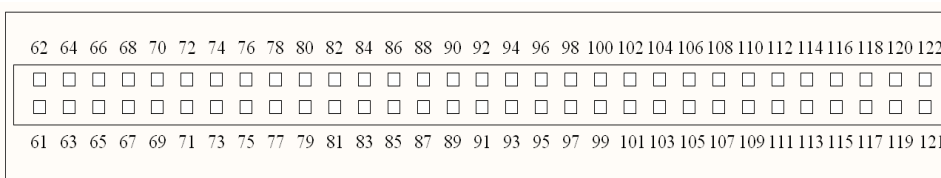


Figure 5. Expansion Connector (CN4 Part 2)

Pin No.	Type	Name	Description
1	Power	GND	Ground
2	Power	GND	Ground
3	Audio	I2S_BCLK	This pin is connected to the BCLK pin of the codec IC WM8978.
4	Audio	I2S_WS	This pin is connected to the LRC pin of the codec IC WM8978.
5	RS232	RS232_RX	This pin is connected to the T1IN pin of the RS232 transceiver IC SP3232. The T1IN is the TTL/COMS driver input. After level conversion, the T1OUT outputs an RS232 level of $\pm 5.5V$.
6	RS232	RS232_TX	This pin is connected to the R2OUT pin of the RS232 transceiver IC SP3232. The R2OUT is the TTL/COMS receiver output. After level conversion on R2IN, the R2OUT outputs a TTL/COMS level depending on its V_{CC} voltage (3.3V).
7	Multi Interface	M_IO4	This pin is connected to the Multi-Interface connector.
8	Buzzer	BUZZER	This pin is connected to the passive buzzer drive circuit input, providing different frequencies and duty cycles for driving.
9	Multi Interface	M_IO2	This pin is connected to the Multi-Interface connector.
10	Multi Interface	M_IO3	This pin is connected to the Multi-Interface connector.
11	Multi Interface	M_IO0	This pin is connected to the Multi-Interface connector.
12	Multi Interface	M_IO1	This pin is connected to the Multi-Interface connector.
13	Multi Interface	M_TX	This pin is connected to the Multi-Interface connector.
14	Multi Interface	M_RX	This pin is connected to the Multi-Interface connector.
15	Multi Interface	M_RTS	This pin is connected to the Multi-Interface connector.
16	Multi Interface	M_CTS	This pin is connected to the Multi-Interface connector.
17	Multi Interface	M_MISO	This pin is connected to the Multi-Interface connector.
18	Multi Interface	M_CS	This pin is connected to the Multi-Interface connector.
19	Multi Interface	M_SCK	This pin is connected to the Multi-Interface connector.
20	Multi Interface	M_MOSI	This pin is connected to the Multi-Interface connector.
21	Multi Interface	M_SDA	This pin is connected to the Multi-Interface connector.

Pin No.	Type	Name	Description
22	Multi Interface	M_SCL	This pin is connected to the Multi-Interface connector.
23	Touch Key	Touch_SDA	This pin is connected to the SDA pin of the Touch Key IC BS8112A.
24	Touch Key	Touch_SCL	This pin is connected to the SCL pin of the Touch Key IC BS8112A.
25	EEPROM	EE_SDA	This pin is connected to the SDA pin of the EEPROM IC 24LC16.
26	EEPROM	EE_SCL	This pin is connected to the SCL pin of the EEPROM IC 24LC16.
27	Button	B0_WAKEUP	This pin is connected to the Wakeup button, which is used to wake up the MCU. The Starter Kit usually assigns the MCU WAKEUP pin to this pin, and the active level is high level.
28	Power	V_BAT	If the battery BT1 is installed, there will be 3V power output on this pin.
29	Potentiometer	VR	The Potentiometer voltage is output on this pin.
30	Power	GND	Ground
31	Unassigned	—	—
32	Touch Key	Touch_IRQ	This pin is connected to the IRQ pin of the Touch Key IC BS8112A.
33	SD Card	SD_D0 / MISO	This pin is connected to SD Card Slot. For SDIO interface mode, it is D0. For SPI interface mode, it is MISO.
34	SD Card / Serial Flash	SD_D1 / Flash_SIO3	Use jumper J12 to select whether the pin is connected to the D1 of the SD Card slot or the SIO3 of the Serial Flash
35	SD Card / Serial Flash	SD_D2 / Flash_SIO2	Use jumper J11 to select whether the pin is connected to the D2 of the SD Card slot or the SIO2 of the Serial Flash
36	SD Card	SD_D3 / CS	This pin is connected to SD Card Slot. For SDIO interface mode, it is D3. For SPI interface mode, it is Chip Select output.
37	SD Card	SD_CLK	This pin is connected to the SD Card Slot, it is Clock output.
38	SD Card	SD_CMD / MOSI	This pin is connected to the SD Card Slot. For SDIO interface mode, it is CMD. For SPI interface mode, it is MOSI.
39	CSIF / LCD	CSIF_LED / LCD_S14	This pin can be connected either to the LED of the CMOS sensor module or to the S14 of LCD connector. Only one function can be selected at a time. For CMOS sensor module, this pin is used to drive the LED on. The R5 Option can select the LED to be either controlled by MCU or always on (the default option is always on). If S14 is selected, the R5 Option must be configured to be always on. If LED is selected, Monochrome LCD cannot be connected.
40	SD Card	SD_CD	Connected to SD Card Slot, it is the Card Detect input.
41	CSIF / LCD	CSIF_SDA / LCD_S15	This pin can be connected either to the SDA of the CSIF connector or to the S15 of the LCD connector. Only one function can be selected at a time. If S15 is selected, CMOS sensor module cannot be connected. If SDA is selected, Monochrome LCD cannot be connected.
42	CSIF / LCD	CSIF_SCL / LCD_S16	This pin can be connected either to the SCL of the CSIF connector or to the S16 of the LCD connector. Only one function can be selected at a time. If S16 is selected, CMOS sensor module cannot be connected. If SCL is selected, Monochrome LCD cannot be connected.
43	CSIF / LCD	CSIF_RESB / LCD_S17	This pin can be connected either to the RESB of the CSIF connector or to the S17 of the LCD connector. Only one function can be selected at a time. If S17 is selected, CMOS sensor module cannot be connected. If RESB is selected, Monochrome LCD cannot be connected.
44	CSIF / LCD	CSIF_PWDN / LCD_S18	This pin can be connected either to the PWDN of the CSIF connector or to the S18 of the LCD connector. Only one function can be selected at a time. If S18 is selected, CMOS sensor module cannot be connected. If PWDN is selected, Monochrome LCD cannot be connected.
45	CSIF / LCD	CSIF_PCLK / LCD_S19	This pin can be connected either to the PCLK of the CSIF connector or to the S19 of the LCD connector. Only one function can be selected at a time. If S19 is selected, CMOS sensor module cannot be connected. If PCLK is selected, Monochrome LCD cannot be connected.

Pin No.	Type	Name	Description
46	CSIF / LCD	CSIF_MCLK / LCD_S20	This pin can be connected either to the MCLK of the CSIF connector or to the S20 of the LCD connector. Only one function can be selected at a time. If S20 is selected, CMOS sensor module cannot be connected. If MCLK is selected, Monochrome LCD cannot be connected.
47	CSIF / LCD	CSIF_HSYNC / LCD_S21	This pin can be connected either to the HSYNC of the CSIF connector or to the S21 of the LCD connector. Only one function can be selected at a time. If S21 is selected, CMOS sensor module cannot be connected. If HSYNC is selected, Monochrome LCD cannot be connected.
48	CSIF / LCD	CSIF_VSYNC / LCD_S22	This pin can be connected either to the VSYNC of the CSIF connector or to the S22 of the LCD connector. Only one function can be selected at a time. If S22 is selected, CMOS sensor module cannot be connected. If VSYNC is selected, Monochrome LCD cannot be connected.
49	CSIF / LCD	CSIF_D6 / LCD_S23	This pin can be connected either to the D6 of the CSIF connector or to the S23 of the LCD connector. Only one function can be selected at a time. If S23 is selected, CMOS sensor module cannot be connected. If D6 is selected, Monochrome LCD cannot be connected.
50	CSIF / LCD	CSIF_D7 / LCD_S24	This pin can be connected either to the D7 of the CSIF connector or to the S24 of the LCD connector. Only one function can be selected at a time. If S24 is selected, CMOS sensor module cannot be connected. If D7 is selected, Monochrome LCD cannot be connected.
51	CSIF / LCD	CSIF_D4 / LCD_S25	This pin can be connected either to the D4 of the CSIF connector or to the S25 of the LCD connector. Only one function can be selected at a time. If S25 is selected, CMOS sensor module cannot be connected. If D4 is selected, Monochrome LCD cannot be connected.
52	CSIF / LCD	CSIF_D5 / LCD_S26	This pin can be connected either to the D5 of the CSIF connector or to the S26 of the LCD connector. Only one function can be selected at a time. If S26 is selected, CMOS sensor module cannot be connected. If D5 is selected, Monochrome LCD cannot be connected.
53	CSIF / LCD	CSIF_D2 / LCD_S27	This pin can be connected either to the D2 of the CSIF connector or to the S27 of the LCD connector. Only one function can be selected at a time. If S27 is selected, CMOS sensor module cannot be connected. If D2 is selected, Monochrome LCD cannot be connected.
54	CSIF / LCD	CSIF_D3 / LCD_S28	This pin can be connected either to the D3 of the CSIF connector or to the S28 of the LCD connector. Only one function can be selected at a time. If S28 is selected, CMOS sensor module cannot be connected. If D3 is selected, Monochrome LCD cannot be connected.
55	CSIF	CSIF_D0	This pin is connected to the D0 of the CSIF connector.
56	CSIF	CSIF_D1	This pin is connected to the D1 of the CSIF connector.
57	Power	GND	Ground
58	Power	GND	Ground
59	Power	VDD33	3.3V power input
60	Power	VDD33	3.3V power input
61	Power	VDD33	3.3V power input
62	Power	VDD33	3.3V power input
63	Power	GND	Ground
64	Power	GND	Ground
65	Audio	I2S_SDA	This pin is connected to the SDIN pin of the codec IC WM8978.
66	Audio	I2S_SCL	This pin is connected to the SCLK pin of the codec IC WM8978.
67	Audio	I2S_SDO	This pin is connected to the DACDAT pin of the codec IC WM8978.
68	Audio	I2S_SDI	This pin is connected to the ADCDAT pin of the codec IC WM8978.
69	BOOT	BOOT1	It is not used on this board.
70	Audio	I2S_MCLK	This pin is connected to the MCLK pin of the codec IC WM8978.
71	SWD	SWO	This pin is connected to the SWO pin of the SWD-20P connector.
72	Reset	nRST	This pin is connected to the RESET pin of the SWD-20P connector.

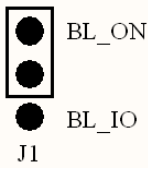
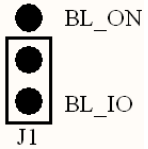
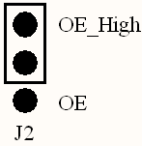
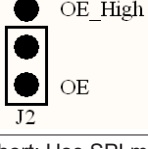


Pin No.	Type	Name	Description
73	SWD	SWCLK	This pin is connected to the SWCLK pin of the SWD-20P connector.
74	SWD	SWDIO	This pin is connected to the SWDIO pin of the SWD-20P connector.
75	LCD	LCD_BL / LCD_C0	This pin can be either the backlight control pin for a TFT-LCD or the COM0 pin for a Monochrome LCD. These two functions cannot be used at the same time. When using this pin function, users need to configure the J1 jumper option to the MCU control mode. Note that if a Monochrome LCD is used, the J1 jumper option cannot be configured to the normally bright mode, otherwise the Monochrome LCD refreshing timing may be affected.
76	LCD	LCD_WE / LCD_C1	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the WR# signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD common drive pins.
77	LCD	LCD_SDA / LCD_C2	This pin can be either the SDA pin for a TFT-LCD with Touch Panel and the COM2 pin for a Monochrome LCD. These two functions cannot be used at the same time. When this pin is used as SDA, the J10 jumper option should be short-circuited to turn on the pull up resistor. When this pin is used for the Monochrome LCD, the J10 jumper option should be open circuit to turn off the pull up resistor, otherwise the Monochrome LCD refreshing timing may be affected.
78	LCD	LCD_SCL / LCD_C3	This pin can be either the SCL pin for a TFT-LCD with Touch Panel and the COM3 pin for a Monochrome LCD. These two functions cannot be used at the same time. When this pin is used as SCL, the J9 jumper option should be short-circuited to turn on the pull up resistor. When this pin is used for the Monochrome LCD, the J9 jumper option should be open circuit to turn off the pull up resistor, otherwise the Monochrome LCD refreshing timing may be affected.
79	LCD	LCD_CS / LCD_C4	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as either the CS# signal of the Intel I80 or the SPI interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD common drive pins.
80	LCD	LCD_MISO	This pin is connected to the MISO pin of the LCD Connector. This pin is used as the MISO signal of the SPI interface protocol to drive the TFT-LCD.
81	LCD	LCD_SCK	This pin is connected to the SCK pin of the LCD Connector. This pin is used as the SCK signal of the SPI interface protocol to drive the TFT-LCD. When using the SPI mode of the ESK32-A2A31 TFT-LCD module, it is necessary to short the J3 jumper option to connect the LCD_SCK and LCD_WE as the WR# signal of the Intel I80 interface and the SCK of the SPI interface share the same I/O pin.
82	LCD	LCD_MOSI	This pin is connected to the MOSI of the LCD Connector. This pin is used as the MOSI signal of the SPI interface protocol to drive TFT-LCD.
83	LCD	LCD_INT / LCD_C5	This pin is connected to the LCD Connector. When a TFT-LCD with Touch Panel is used, this pin is used as the IRQ signal of the Touch Panel. When a Monochrome LCD is used, this pin is used as one of the LCD common drive pins.
84	LCD	LCD_RST / LCD_C6	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the RESET# pin. When a Monochrome LCD is used, this pin is used as one of the LCD common drive pins.
85	LCD	LCD_AD0 / LCD_C7	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D0 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD common drive pins.
86	LCD	LCD_AD1 / LCD_S0	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D1 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.

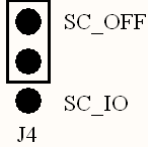
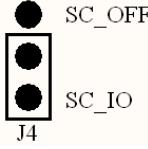




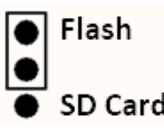
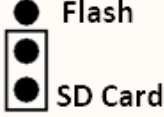
Pin No.	Type	Name	Description
87	LCD	LCD_AD2 / LCD_S1	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D2 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
88	LCD	LCD_AD3 / LCD_S2	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D3 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
89	LCD	LCD_AD4 / LCD_S3	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D4 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
90	LCD	LCD_AD5 / LCD_S4	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D5 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
91	LCD	LCD_AD6 / LCD_S5	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D6 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
92	LCD	LCD_AD7 / LCD_S6	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D7 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
93	LCD	LCD_AD8 / LCD_S7	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D8 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
94	LCD	LCD_AD9 / LCD_S8	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D9 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
95	LCD	LCD_AD10 / LCD_S9	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D10 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
96	LCD	LCD_AC11 / LCD_S10	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D11 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
97	LCD	LCD_AD12 / LCD_S11	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D12 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
98	LCD	LCD_AD13 / LCD_S12	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D13 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
99	LCD	LCD_AD14 / LCD_S13	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D14 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
100	LCD	LCD_AD15 / LCD_S32	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the D15 signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.

Pin No.	Type	Name	Description
101	LCD	LCD_OE / LCD_S31	This pin can be either the RD# signal of the Intel I80 interface protocol or the SEG31 pin for a Monochrome LCD. These two functions cannot be used at the same time. When using this pin function, users need to configure the J2 jumper option to MCU control mode. Note that if a Monochrome LCD is used, the J2 jumper option cannot be configured to the normally inactive mode, otherwise the Monochrome LCD refreshing timing may be affected.
102	LCD	LCD_RS / LCD_S30	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the RS/DC signal of the Intel I80 interface protocol. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
103	LCD	LCD_TS / LCD_S29	This pin is connected to the LCD Connector. When a TFT-LCD is used, this pin is used as the Tear Effect Signal. When a Monochrome LCD is used, this pin is used as one of the LCD segment drive pins.
104	Power	GND	Ground
105	Serial Flash	Flash_SCK	This pin is connected to the SCK pin of the Serial Flash IC MX25L6436F.
106	Serial Flash	Flash_MOSI / SIO0	This pin is connected to the MOSI/SIO0 pin of the Serial Flash IC MX25L6436F.
107	Serial Flash	Flash_MISO / SIO1	This pin is connected to the MISO/SIO2 pin of the Serial Flash IC MX25L6436F.
108	Serial Flash	Flash_CS	This pin is connected to the CS pin of the Serial Flash IC MX25L6436F.
109	Button	Button1	This pin is connected to the KEY1, and the active level is low level.
110	Button	Button2	This pin is connected to the KEY2, and the active level is low level.
111	LED	LED1	This pin is connected to the LED1, and the active level is low level.
112	LED	LED2	This pin is connected to the LED2, and the active level is low level.
113	LED	LED3	This pin is connected to the LED3, and the active level is low level.
114	Smart Card	SCI_CMD	This pin is connected to the CDMVCC# pin of the smart card interface IC DS8313.
115	Smart Card	SCI_RST	This pin is connected to the RSTIN pin of the smart card interface IC DS8313.
116	Smart Card	SCI_CLK	This pin is connected to the CLKIN pin of the smart card interface IC DS8313.
117	Smart Card	SCI_DET	This pin is connected to the OFF# pin of the smart card interface IC DS8313. If this pin is connected to the same MCU pin on the Starter Kit board, as this pin is shared with other functions, the J4 jumper option can be configured to the SC_OFF mode to make this pin be kept at an always pull-high state.
118	Smart Card	SCI_DIO	This pin is connected to the I/OIN pin of the smart card interface IC DS8313.
119	Power	GND	Ground
120	Power	GND	Ground
121	Power	DC5V	5V power input
122	Power	DC5V	5V power input

Table 1. Extension Connector CN4 Pin Definition

Function Option Descriptions

Jumper	Description
J1	<p>The TFT-LCD Backlight will always be on.</p> 
	<p>The TFT-LCD Backlight pin or Monochrome LCD C0 pin is controlled by MCU I/O pin.</p> 
J2	<p>The TFT-LCD RD# pin will always be inactive level.</p> 
	<p>The TFT-LCD RD# pin or Monochrome S31 pin is controlled by MCU I/O pin.</p> 
J3	<p>Short: Use SPI mode of TFT-LCD.</p> 
	<p>Open: Use EBI mode of TFT-LCD.</p> 

Jumper	Description
J4	<p>Smart Card function is off.</p> <p>The R38 will be configured as a pull-up resistor to keep the PRES pin at a high level, as a result the OFF# pin will be kept at a high level via its 24kΩ internal pull-up resistor. Therefore, the MCU pin connected to the OFF# (the same as SCI_DET) pin on the Starter Kit can be reused for other functions.</p> 
	<p>Smart Card function is on.</p> <p>The R38 will be configured as a pull-down resistor. When the Smart Card is not inserted, the PRES pin will be kept at a low level, which will make the OFF# (the same as SCI_DET) pin output low. When a Smart Card is inserted, the PRES pin becomes high level, as a result the OFF# (the same as SCI_DET) pin will be kept at a high level via its 24kΩ internal pull-up resistor.</p> 
J9	<p>Short: Turn on the TFT-LCD Touch Panel SCL pull-up resistor.</p> 
	<p>Open: Turn off the TFT-LCD Touch Panel SCL pull-up resistor.</p> 
J10	<p>Short: Turn on the TFT-LCD Touch Panel SDA pull-up resistor.</p> 
	<p>Open: Turn off the TFT-LCD Touch Panel SDA pull-up resistor.</p> 
J11	<p>Serial Flash SIO2 is selected.</p> 
	<p>SD Card D2 is selected.</p> 


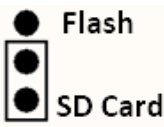
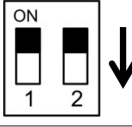
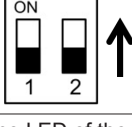
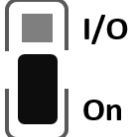
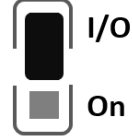
Jumper	Description
J12	Serial Flash SIO3 is selected. 
	SD Card D1 is selected. 
S1	The Audio Input (J8) is sourced from a moving-coil microphone. – default setting 
	The Audio Input (J8) is sourced from an electret condenser microphone. 
R5	The LED of the CMOS Sensor module is always on. – default setting (R5 uses a 10kΩ resistor) 
	The LED of the CMOS Sensor module is controlled by MCU I/O. (R5 uses a 10kΩ resistor) 

Table 2. Jumpers and Switch Options

LCD Connector CN2 and CN9

The LCD Connectors are used to connect a TFT-LCD (e.g. ESK32-A2A31) or a Monochrome LCD (e.g. ESK32-A3A31).

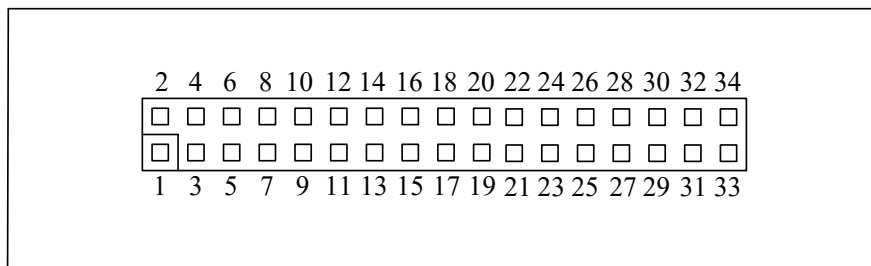


Figure 6. LCD Connector 1 CN2

Pin No.	Description	Pin No.	Description
1	5V	2	GND
3	BL_EN / LCD_C0	4	TP_SDA / LCD_C2
5	TP_SCL / LCD_C3	6	LCD_WR / LCD_C1
7	LCD_MISO	8	LCD_MOSI
9	LCD_CS / LCD_C4	10	TP_IRQ / LCD_C5
11	LCD_SCK	12	LCD_RST / LCD_C6
13	GND	14	3.3V
15	LCD_AD0 / LCD_C7	16	LCD_AD1 / LCD_S0
17	LCD_AD2 / LCD_S1	18	LCD_AD3 / LCD_S2
19	LCD_AD4 / LCD_S3	20	LCD_AD5 / LCD_S4
21	LCD_AD6 / LCD_S5	22	LCD_AD7 / LCD_S6
23	LCD_AD8 / LCD_S7	24	LCD_AD9 / LCD_S8
25	LCD_AD10 / LCD_S9	26	LCD_AD11 / LCD_S10
27	LCD_AD12 / LCD_S11	28	LCD_AD13 / LCD_S12
29	LCD_AD14 / LCD_S13	30	LCD_AD15 / LCD_S32
31	NC	32	LCD_TE / LCD_S29
33	LCD_RD / LCD_S31	34	LCD_RS / LCD_S30

Table 3. LCD Connector 1 CN2 Pin Definition

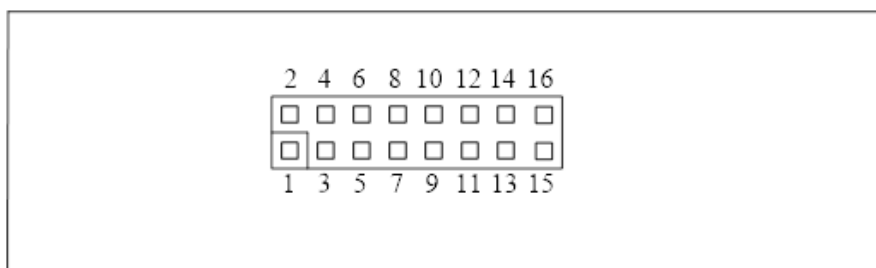


Figure 7. LCD Connector 2 CN9

Pin No.	Description	Pin No.	Description
1	LCD_S14	2	LCD_S16
3	LCD_S18	4	LCD_S20
5	LCD_S22	6	LCD_S24
7	LCD_S26	8	LCD_S28
9	LCD_S27	10	LCD_S25
11	LCD_S23	12	LCD_S21
13	LCD_S19	14	LCD_S17
15	NC	16	LCD_S15

Table 4. LCD Connector 2 CN9 Pin Definition

SWD-20P Connector CN5

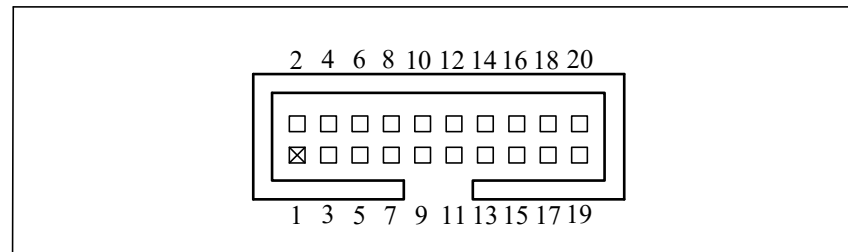


Figure 8. SWD-20P Connector CN5

Pin No.	Description	Pin No.	Description
1	3.3V	2	3.3V
3	NC	4	GND
5	NC	6	GND
7	SWDIO	8	GND
9	SWCLK	10	GND
11	NC	12	GND
13	SWO	14	GND
15	nRST	16	GND
17	NC	18	GND
19	NC	20	GND

Table 5. SWD-20P Connector CN5 Pin Definition

Multi-Interface Connector CN1

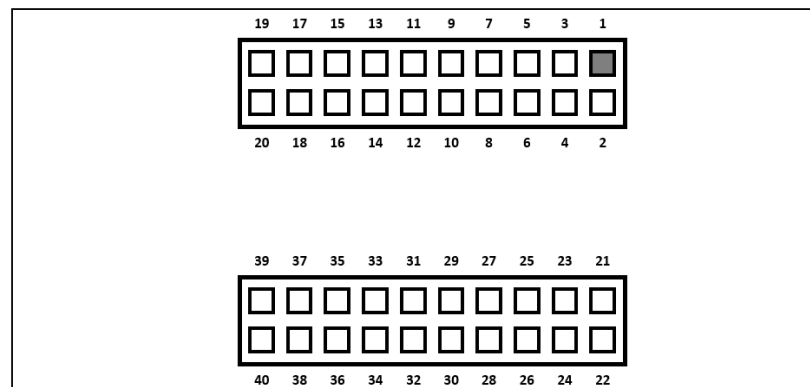
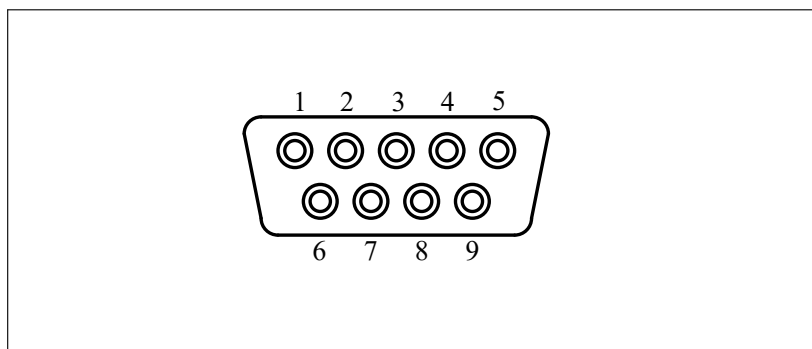


Figure 9. Multi-Interface Connector CN1

Pin No.	Description	Pin No.	Description
1	VSS	2	NC
3	M_RTS	4	NC
5	NC	6	M_TX (MCU TX)
7	M_TX (MCU TX)	8	M_RX (MCU RX)
9	M_RX (MCU RX)	10	M_IO0
11	NC	12	M_IO1
13	NC	14	M_CS
15	NC	16	M_SCK
17	NC	18	M_MOSI
19	GND	20	M_MISO
21	NC	22	VSS
23	NC	24	NC
25	NC	26	NC
27	3.3V	28	NC
29	3.3V	30	NC
31	NC	32	M_SCL
33	M_IO2	34	M_SDA
35	NC	36	NC
37	NC	38	M_CTS
39	M_IO3	40	M_IO4

Table 6. Multi-Interface Connector CN1 Pin Definition
RS232 Port Connector CN7

Figure 10. RS232 Port Connector CN7

Pin No.	Description	Pin No.	Description
1	Connect to PIN4	2	RS232_RX (MCU TX)
3	RS232_TX (MCU RX)	4	Connect to PIN6
5	GND	6	Connect to PIN1
7	Connect to PIN8	8	Connect to PIN7
9	NC		

Table 7. RS232 Port Connector CN7 Pin Definition

SD Card Slot CN8

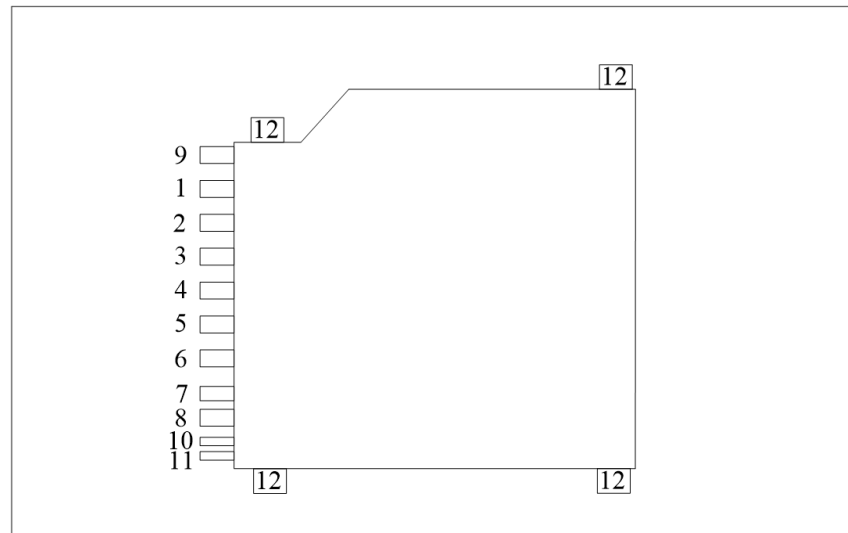


Figure 11. SD Card Slot CN8

Pin No.	Description	Pin No.	Description
1	SD_D3/CS	2	SD_CMD/MOSI
3	GND	4	3.3V
5	SD_SCK	6	GND
7	SD_D0/MISO	8	NC
9	NC	10	Pull high
11	NC	12	GND

Table 8. SD Card Slot CN8 Pin Definition

CMOS Sensor Connector CN3

The FPC connector is used to connect the CMOS sensor module, and the contact mode of the connector is up connection.

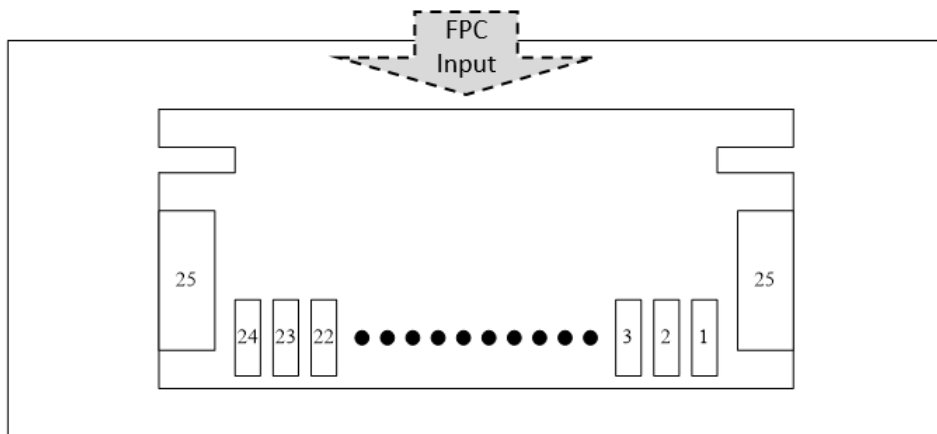
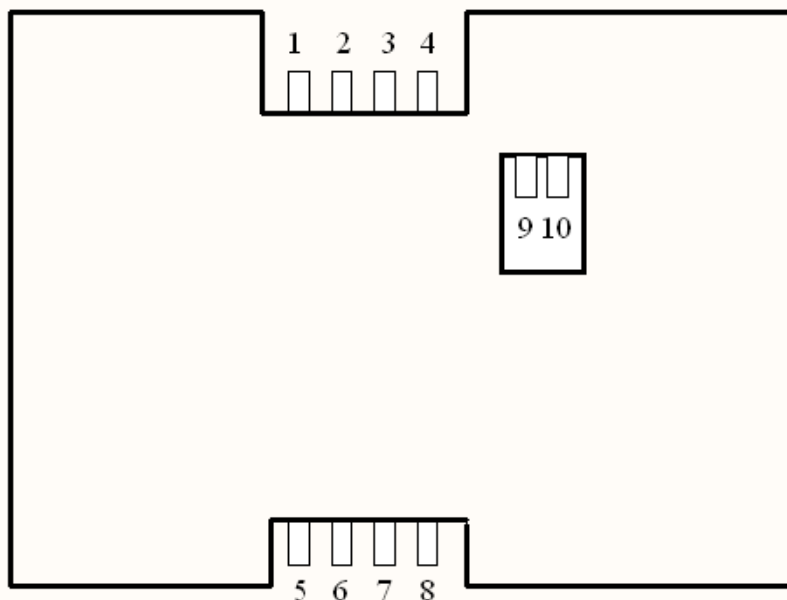


Figure 12. CMOS Sensor Connector CN3

Pin No.	Description	Pin No.	Description
1	NC	2	CSIF_LED
3	CSIF_RESB	4	CSIF_D0
5	CSIF_D1	6	CSIF_D2
7	CSIF_D3	8	CSIF_D4
9	CSIF_D5	10	CSIF_D6
11	CSIF_D7	12	3.3V
13	3.3V	14	CSIF_SCL
15	CSIF_SDA	16	GND
17	GND	18	CSIF_VSYNC
19	CSIF_HSYNC	20	GND
21	CSIF_MCLK	22	GND
23	CSIF_PCLK	24	CSIF_PWDN
25	GND		

Table 9. CMOS Sensor Connector CN3 Pin Definition
Smart Card Slot CN6

Figure 13. Smart Card Slot CN6

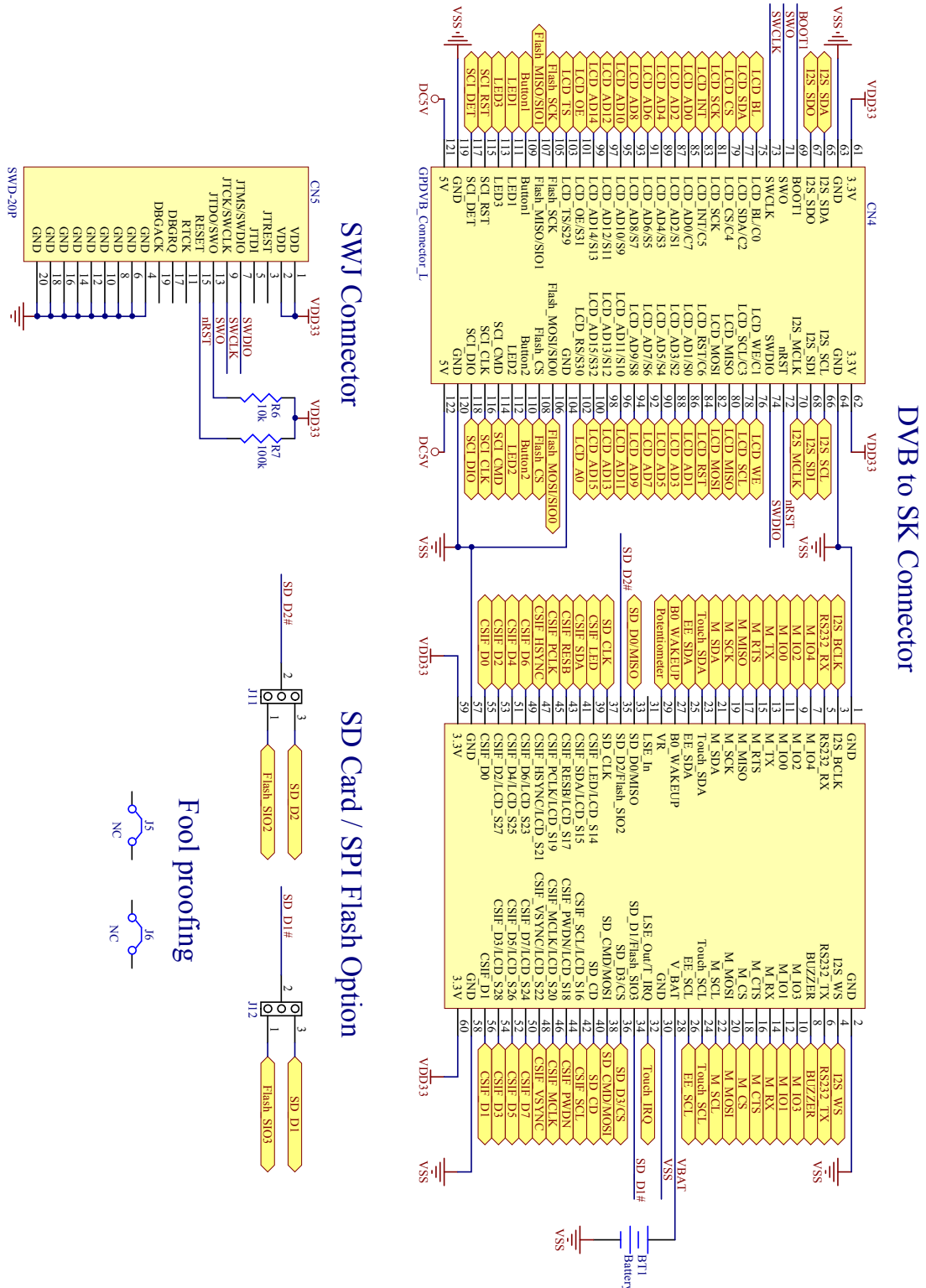
Pin No.	Description	Pin No.	Description
1	V _{CC} voltage can be configured by the Pin3 and Pin4 of the Smart Card interface IC DS8313.	2	RST
3	CLK	4	NC
5	GND	6	NC
7	I/O	8	NC
9	PRES	10	VDD 3.3V

Table 10. Smart Card Slot CN6 Pin Definition

Schematics

This section shows the complete circuit for the ESK32-2x001A Expansion Board:

- Figure 14 includes the Extension Connector, Option for SD Card/Serial Flash and SWD-20P Connector.
- Figure 15 includes the LCD connector, Multi-interface and CMOS sensor.
- Figure 16 includes the FLASH, EEPROM, Touch Key, Buttons, BUZZER, LED Display and Potentiometer.
- Figure 17 includes the I²S Audio Codec.
- Figure 18 includes the Smart Card, SD Card and RS-232 Port.



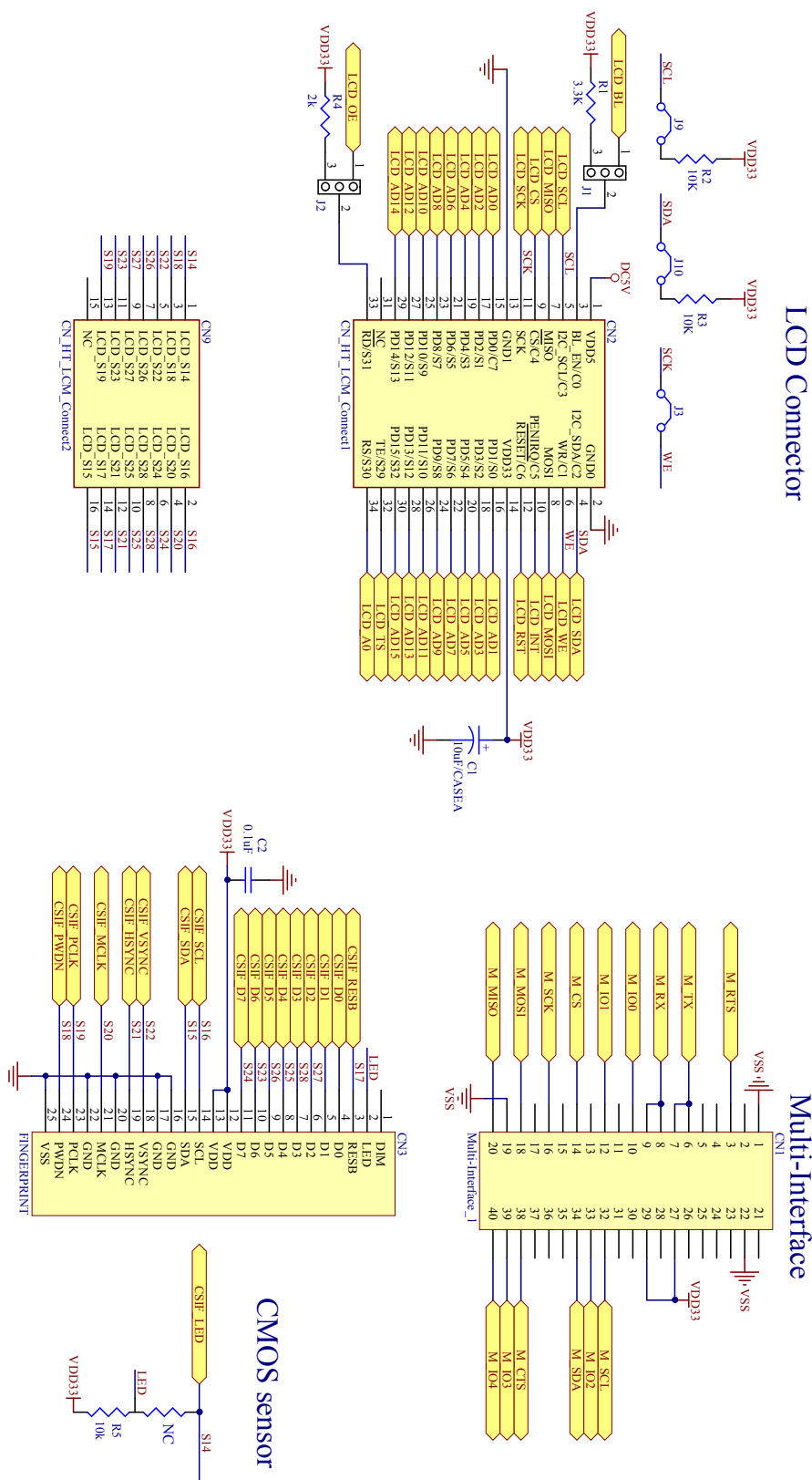


Figure 15. LCD Connector, Multi-Interface and CMOS Sensor



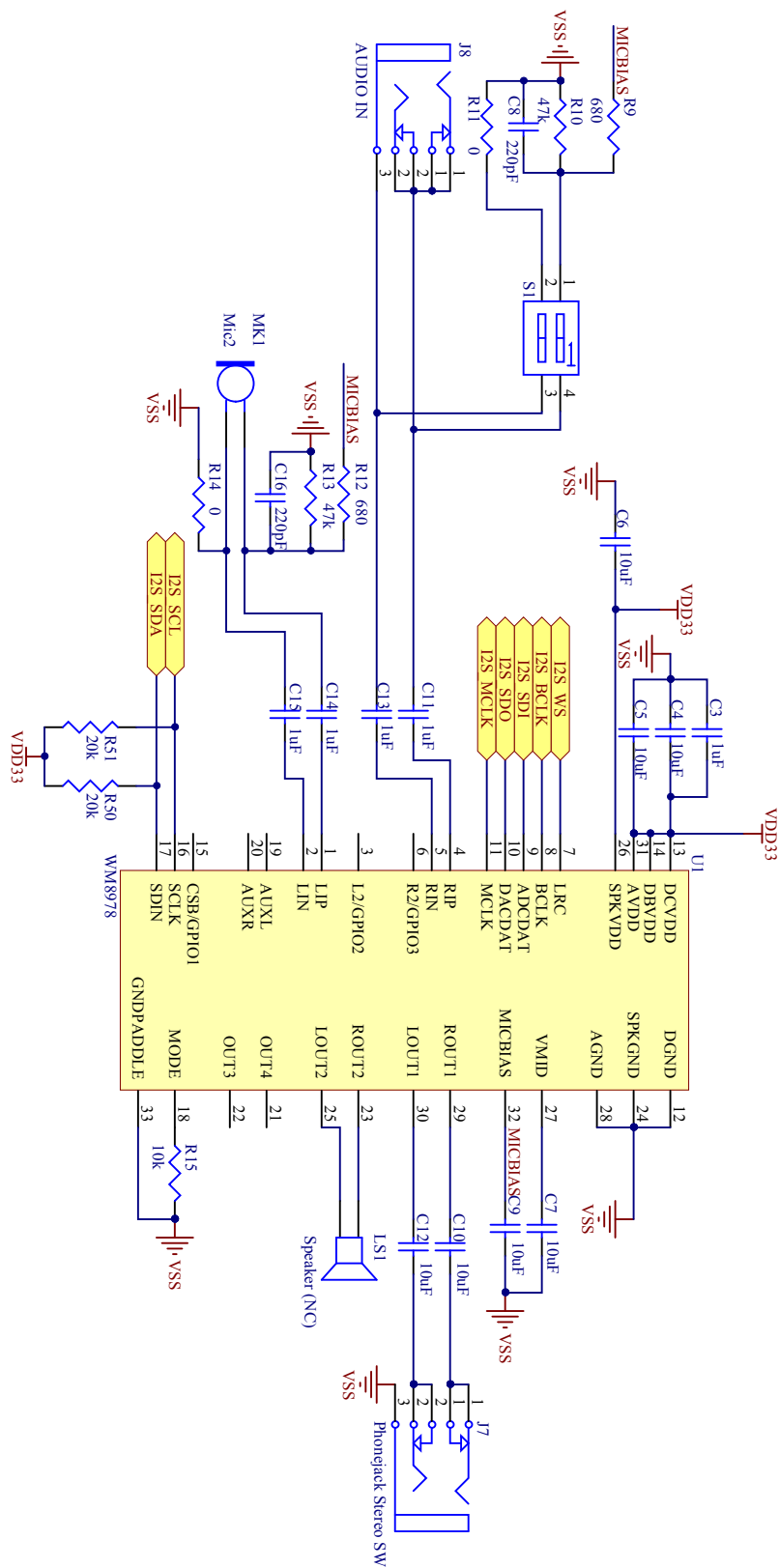
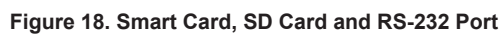


Figure 17. I²S Audio Codec



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