HT32F1655/HT32F1656 Development Board User Manual

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1 Introduction

The HT32F1655/1656 development board is designed for the HT32F1655/1656 series of 32-bit microcontrollers. As the HT32F1655/1656 series microcontrollers contain a variety of peripherals such as high speed SAR ADC, I²S, EBI, CRC, OPAMP, USB, I²C, USART, UART, SPI, GPTM, MCTM, WDT, RTC, SWJ-DP (Serial Wire/JTAG Debug Port) etc. this development board provides a convenient means for users to become quickly familiar with these functions.

The development board contains some specific electronic components to help evaluate the device peripherals, such as RS232 transceiver, EEPROM, series NOR flash, Microphone, Stereo jack, RJ45 Connector, potentiometer etc.

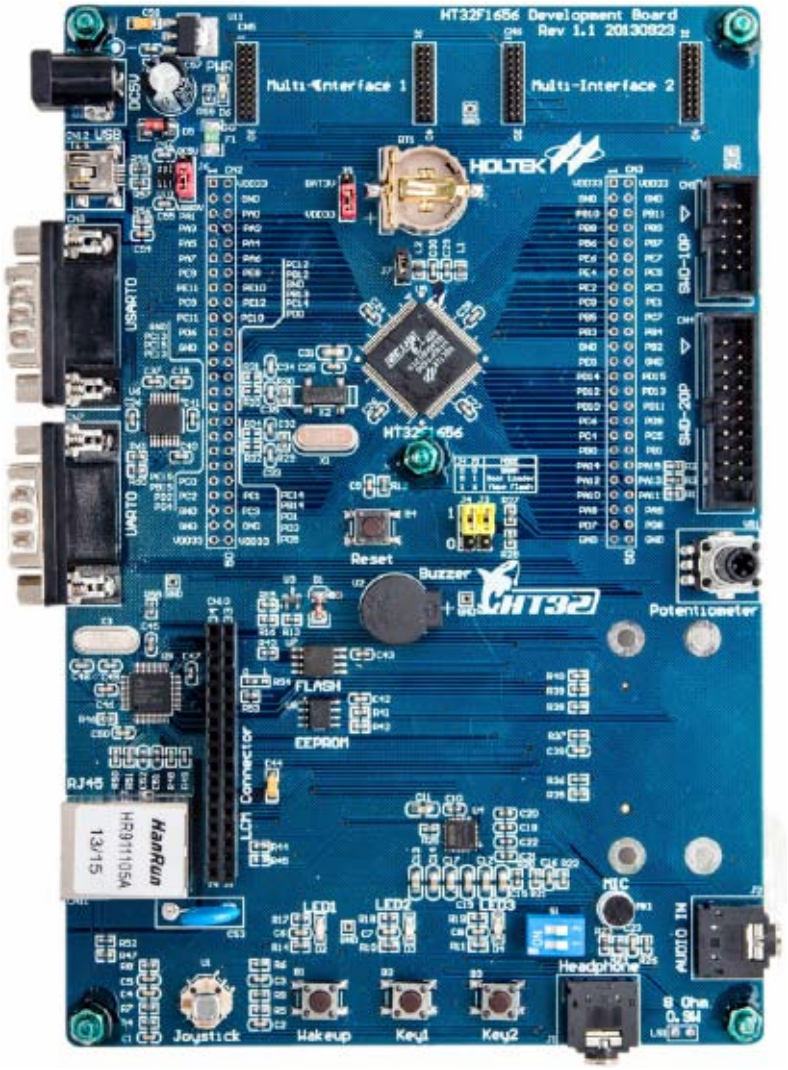


Figure 1. HT32F1655/1656 Development Board

Features

- USB2.0 full speed connection
- 5V power supply: mini USB connector or 5V power jack
- Two RS232 connectors
- Reset, wakeup and two keys
- Three LEDs
- Joystick with four direction control and selector
- I^2C-compatible serial interface EEPROM
- SPI-compatible serial interface Flash
- SPI and I^2C extension interfaces for LCD display applications
- SD card slot - SPI mode
- PWM output for buzzer driving
- Backup battery
- Boot from Flash ,SRAM or bootloader
- SWD-10P, SWD/JTAG-20P debug port interface
- RJ45 Ethernet Connector with Magnetics Module and LED
- Multiple external interfaces including UART, I^2C, SPI and GPIO functions for easy connection to external modules
- Audio inputs include microphone and stereo jack
- Audio outputs for speaker connector and stereo jack

2 Hardware Layout

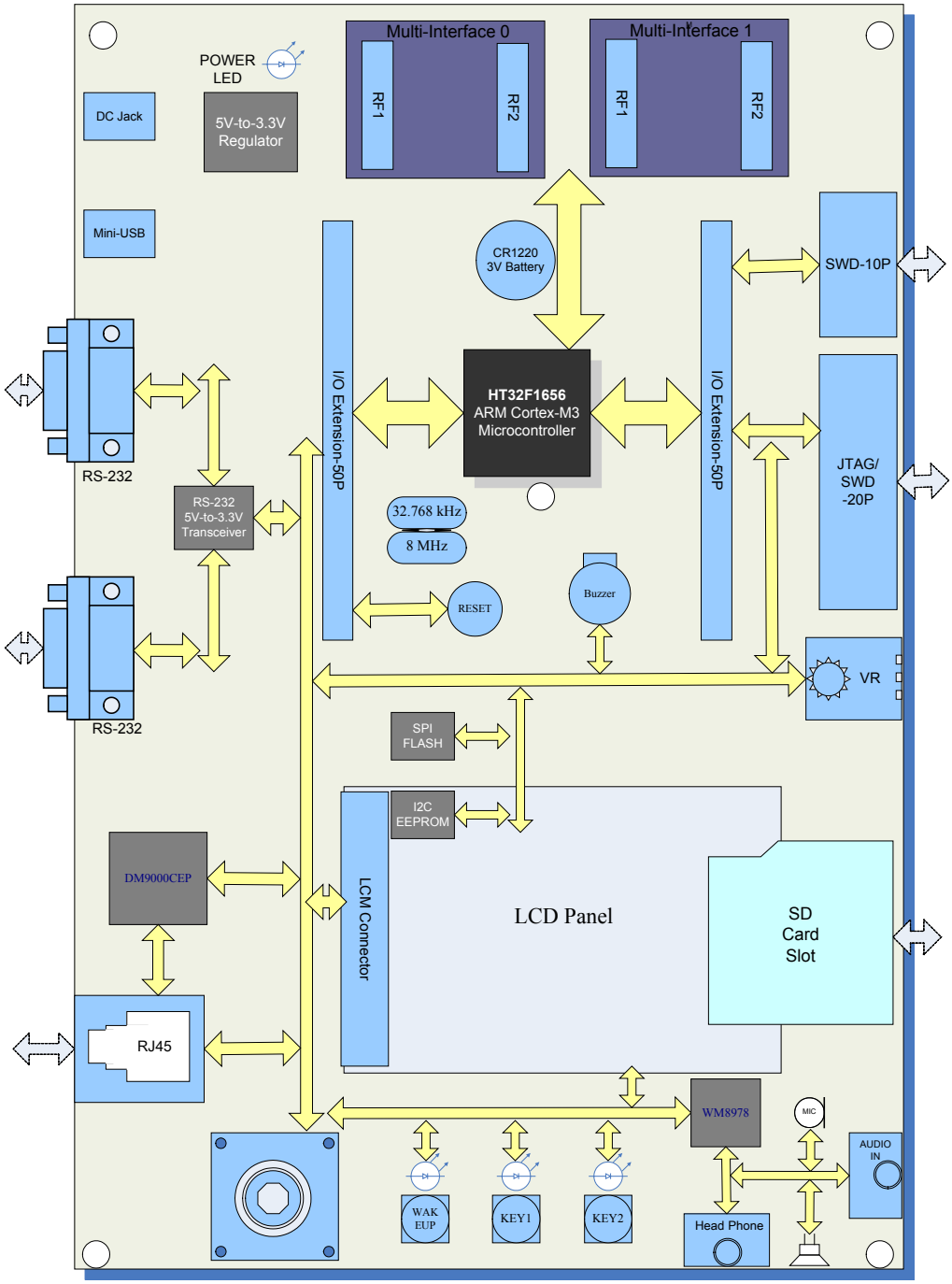


Figure 2. HT32F1655/1656 Development Board Block Diagram

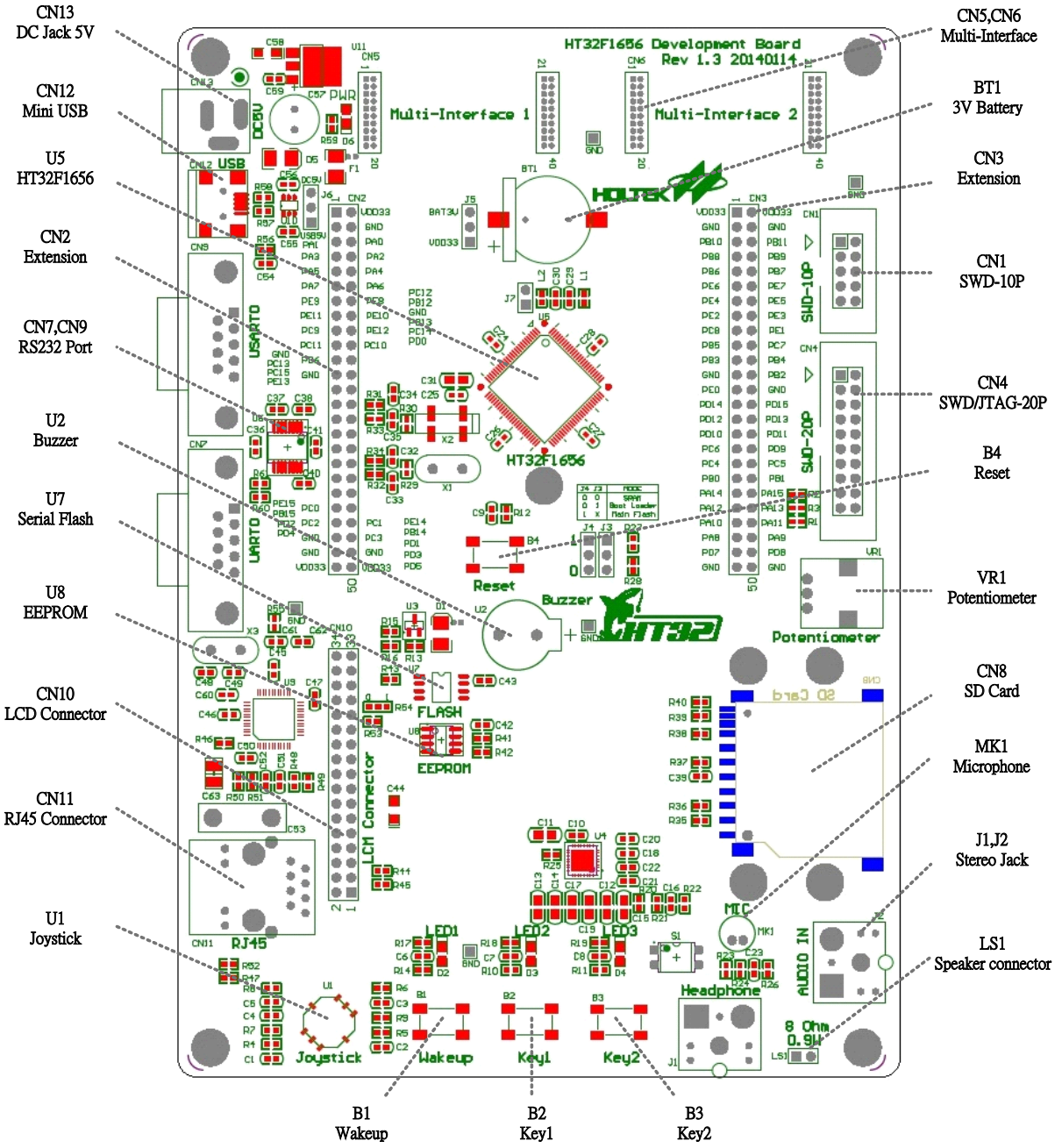
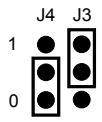
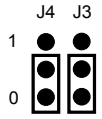
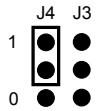


Figure 3. HT32F1655/1656 Development Board Layout

Boot Option

Table 1. Boot Jumpers

Jumper	Description
J3 & J4	Boot loader mode  Boot from the embedded boot loader.
	SRAM mode  Boot from the embedded SRAM
	Main flash mode  Boot from the embedded main flash. BOOT0 (J3) don't care and BOOT1 (J4) = 1 (default setting)

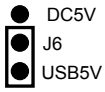
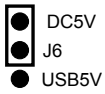
V_{BAT} Option

Table 2. V_{BAT} Jumpers

Jumper	Description
J3	V_{BAT} pin is connected to the 3.3V power - default setting 
	V_{BAT} pin is connected to the 3V CR1220 battery 

Power Supply Option

Table 3. Power Supply Jumpers

Jumper	Description
J6	For power supply from Mini USB port (CN12) 
	For power supply from power supply jack (CN13) 

Audio Input Option

Table 4. Audio Input DIP Switch

Jumper	Description
S1	For audio input from Microphone (MK1) 
	For audio input from stereo jack (J2) 

SWD-10P Connector CN1

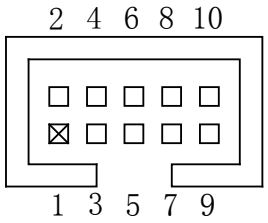


Figure 4. SWD-10P Connector CN1

Table 5. SWD-10P Connector CN1

Pin#	Description	Pin#	Description
1	3.3V	2	SWDIO (PE13)
3	GND	4	SWCLK (PE12)
5	GND	6	TRACESWO (PE11)
7	NC	8	NC
9	GND	10	Reset#

Extension Connector CN2

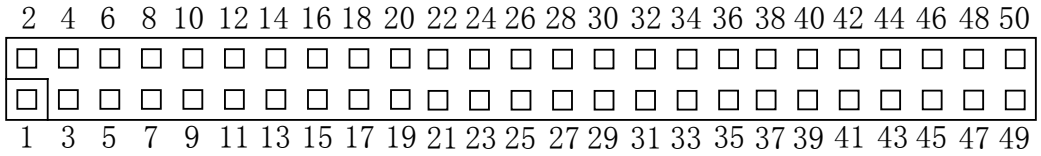


Figure 5. Extension Connector CN2

Table 6. Extension Connector CN2

Pin#	Description	Pin#	Description
1	3.3V	2	3.3V
3	GND	4	GND
5	PA1	6	PA0
7	PA3	8	PA2
9	PA5	10	PA4
11	PA7	12	PA6
13	PE9	14	PE8
15	PE11	16	PE10
17	PC9	18	PE12
19	PC11	20	PC10
21	PD6	22	PC12
23	GND	24	PB12
25	GND	26	GND
27	PC13	28	PB13
29	PC15	30	PC14
31	PE13	32	PD0
33	PE15	34	PE14
35	PB15	36	PB14
37	PD2	38	PD1
39	PD4	40	PD3
41	PC0	42	PD5
43	PC2	44	PC1
45	GND	46	PC3
47	GND	48	GND
49	3.3V	50	3.3V

Extension Connector CN3

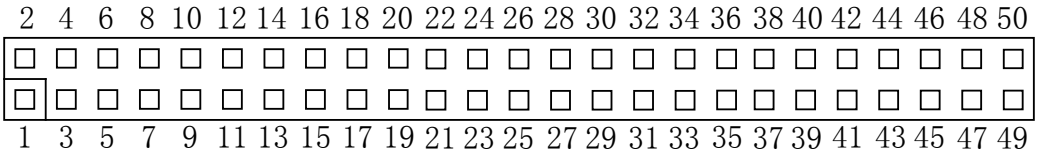


Figure 6. Extension Connector CN3

Table 7. Extension Connector CN3

Pin#	Description	Pin#	Description
1	3.3V	2	3.3V
3	GND	4	GND
5	PB10	6	PB11
7	PB8	8	PB9
9	PB6	10	PB7
11	PE6	12	PE7
13	PE4	14	PE5
15	PE2	16	PE3
17	PC8	18	PE1
19	PB5	20	PC7
21	PB3	22	PB4
23	GND	24	PB2
25	PE0	26	GND
27	PD14	28	PD15
29	PD12	30	PD13
31	PD10	32	PD11
33	PC6	34	PD9
35	PC4	36	PC5
37	PB0	38	PB1
39	PA14	40	PA15
41	PA12	42	PA13
43	PA10	44	PA11
45	PA8	46	PA9
47	PD7	48	PD8
49	GND	50	GND

SWD/JTAG-20P connector CN4

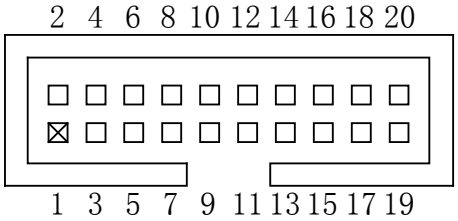


Figure 7. SWD/JTAG-20P Connector CN4

Table 8. SWD/JTAG-20P Connector CN4

Pin#	Description	Pin#	Description
1	3.3V	2	3.3V
3	JTREST(PE15)	4	GND
5	JTDI(PE14)	6	GND
7	JTMS/SWDIO(PE13)	8	GND
9	JTCK/SWCLK(PE12)	10	GND
11	NC	12	GND
13	JTDO/TRACESWO(PE11)	14	GND
15	RESET#	16	GND
17	NC	18	GND
19	NC	20	GND

Multi-Interface CN5

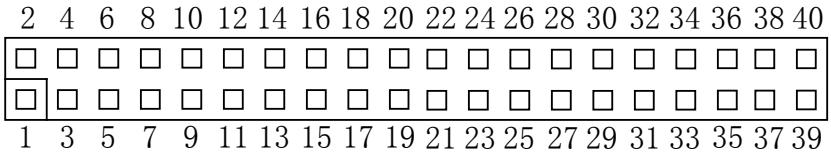


Figure 8. Multi-Interface CN5

Table 9. Multi-Interface CN5

Pin#	Description	Pin#	Description
1	VSS	2	NC
3	RTS(PA6)	4	NC
5	NC	6	TX(PA4)
7	TX(PA4)	8	RX(PA5)
9	RX(PA5)	10	IO0(PE8)
11	NC	12	IO1(PE9)
13	NC	14	SPI_SEL(PD9)
15	NC	16	SPI_SCK(PD10)
17	NC	18	SPI_MOSI(PD11)
19	GND	20	SPI_MISO(PD12)
21	NC	22	GND
23	NC	24	NC
25	NC	26	NC
27	3.3V	28	NC
29	3.3V	30	NC
31	NC	32	I2C0_SCL(PB12)
33	IO2(PE10)	34	I2C0_SDA(PB13)
35	NC	36	NC
37	NC	38	CTS(PA7)
39	IO3(PE11)	40	IO4(PE12)

Multi-Interface CN6

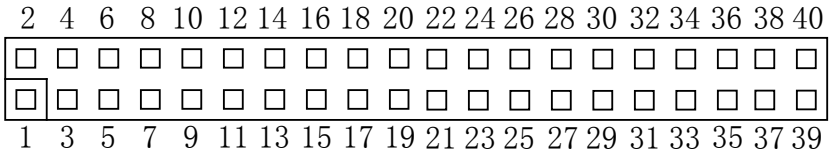


Figure 9. Multi-Interface CN6

Table 10. Multi-Interface CN6

Pin#	Description	Pin#	Description
1	VSS	2	NC
3	RTS(PA6)	4	NC
5	NC	6	TX(PA4)
7	TX(PA4)	8	RX(PA5)
9	RX(PA5)	10	IO0(PC12)
11	NC	12	IO1(PD0)
13	NC	14	SPI_SEL(PD13)
15	NC	16	SPI_SEL(PD14)
17	NC	18	SPI_MOSI(PD15)
19	GND	20	SPI_MISO(PE0)
21	NC	22	GND
23	NC	24	NC
25	NC	26	NC
27	3.3V	28	NC
29	3.3V	30	NC
31	NC	32	I2C0_SCL(PB12)
33	IO2(PE13)	34	I2C0_SDA(PB13)
35	NC	36	NC
37	NC	38	CTS(PA7)
39	IO3(PE15)	40	IO4(PD5)

RS232 Port0 Connector CN7

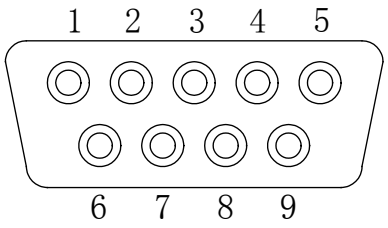


Figure 10. RS232 Port0 Connector CN7

Table 11. RS232 Port0 Connector CN7

Pin#	Description	Pin#	Description
1	Connect to PIN4	2	UART0_Rx (PC10)
3	UART0_Tx (PC9)	4	Connected to PIN6
5	GND	6	Connected to PIN1
7	Connected to PIN8	8	Connected to PIN7
9	NC		

SD Card Connector CN8

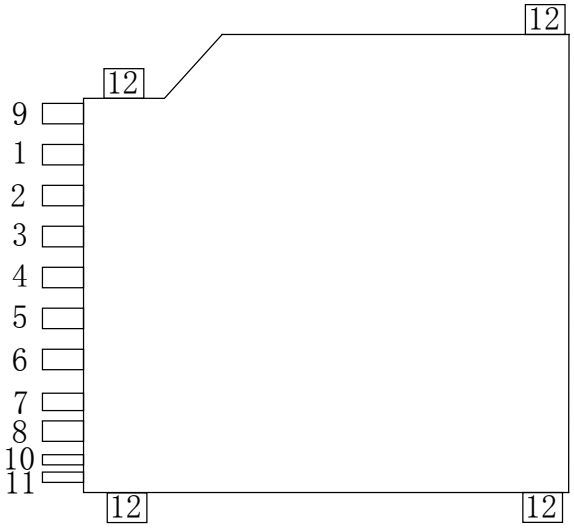


Figure 11. SD Card Connector CN8

Table 12. SD Card Connector CN8

Pin#	Description	Pin#	Description
1	SD_CARD_CS(PA8)	2	SPI1_MOSI(PD15)
3	GND	4	3.3V
5	SPI1_SCK(PD14)	6	GND
7	SPI1_MISO(PE0)	8	NC
9	NC	10	SD_CARD_CD(PA1)
11	NC	12	GND

RS232 Port1 Connector CN9

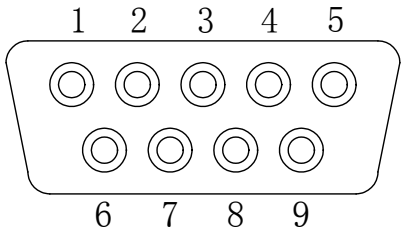


Figure 12. RS232 Port1 Connector CN9

Table 13. RS232 Port1 Connector CN9

Pin#	Description	Pin#	Description
1	Connect to PIN4	2	USART0_Rx (PA3)
3	USART0_Tx (PA2)	4	Connected to PIN6
5	GND	6	Connected to PIN1
7	USART1_RTS(PB15)	8	USART1_CTS(PB14)
9	NC		

LCD Connector CN10

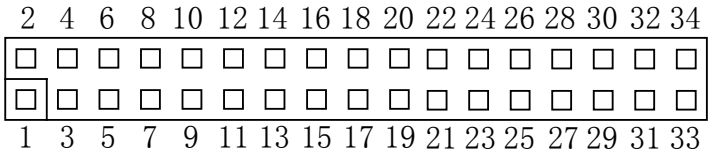


Figure 13. LCD Connector CN10

Table 14. LCD Connector CN10

Pin#	Description	Pin#	Description
1	5V	2	GND
3	LCD_BL(Pull high)	4	I2C0_SDA(PB13)
5	I2C0_SCL(PB12)	6	EBI_WE(PB8)
7	NC	8	NC
9	EBI_CS0(PB7)	10	LCD_INT(PA0)
11	NC	12	LCD_RESET(PA9)
13	GND	14	3.3V
15	EBI_AD0(PA14)	16	EBI_AD1(PA15)
17	EBI_AD2(PB0)	18	EBI_AD3(PB1)
19	EBI_AD4(PB2)	20	EBI_AD5(PB3)
21	EBI_AD6(PB4)	22	EBI_AD7(PB5)
23	EBI_AD8(PC7)	24	EBI_AD9(PC8)
25	EBI_AD10(PC4)	26	EBI_AD11(PC5)
27	EBI_AD12(PC6)	28	EBI_AD13(PC0)
29	EBI_AD14(PC1)	30	EBI_AD15(PC2)
31	NC	32	NC
33	EBI_OE(PB6)	34	EBI_A0(PA11)

RJ45 Connector CN11

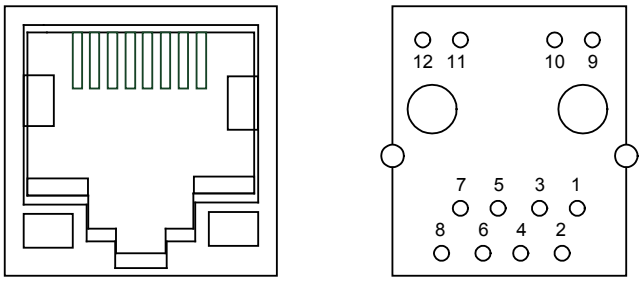


Figure 14. RJ45 Connector CN11

Table 15. RJ45 Connector CN11

Pin#	Description	Pin#	Description
1	TD+	2	TD-
3	RD+	4	TDM
5	RDM	6	RD-
7	NC	8	CHSGND
9	LED1+	10	LED1-
11	LED2-	12	LED2+

Mini USB type B Connector CN12

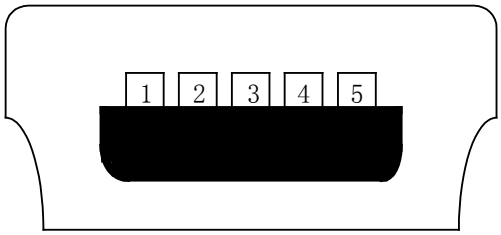


Figure 15. Mini USB Type B Connector CN12

Table 16. Mini USB Type B Connector CN12

Pin#	Description	Pin#	Description
1	USB_5V	2	D-
3	D+	4	NC
5	GND		

Power Supply Connector CN13

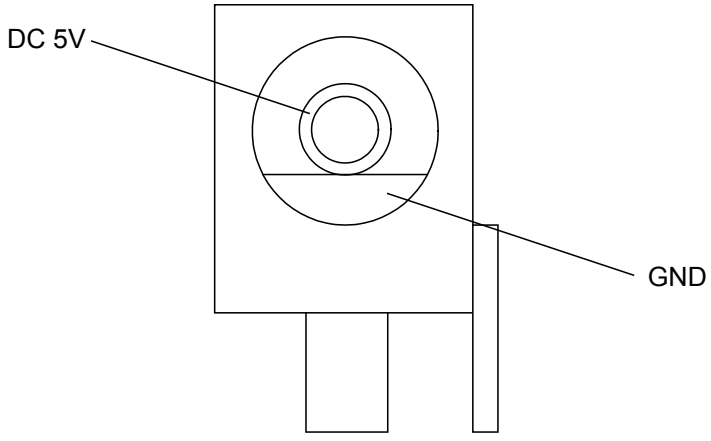


Figure 16. Power Supply Connector CN13

3 Schematics

This section shows the complete circuit of the HT32F1655/1656 development board:

- Figure 17 includes the MCU and Boot Pins.
- Figure 18 includes the SD card, Flash, RS-232 and EEPROM.
- Figure 29 includes the Power and Multi-interface.
- Figure 20 includes the Joystick, Buttons, Buzzer, LED Display and Potentiometer.
- Figure 21 includes the I^2S Audio Codec.
- Figure 22 includes the Extension Connector and SWD/JTAG Connector.
- Figure 23 includes the LCD and Ethernet.

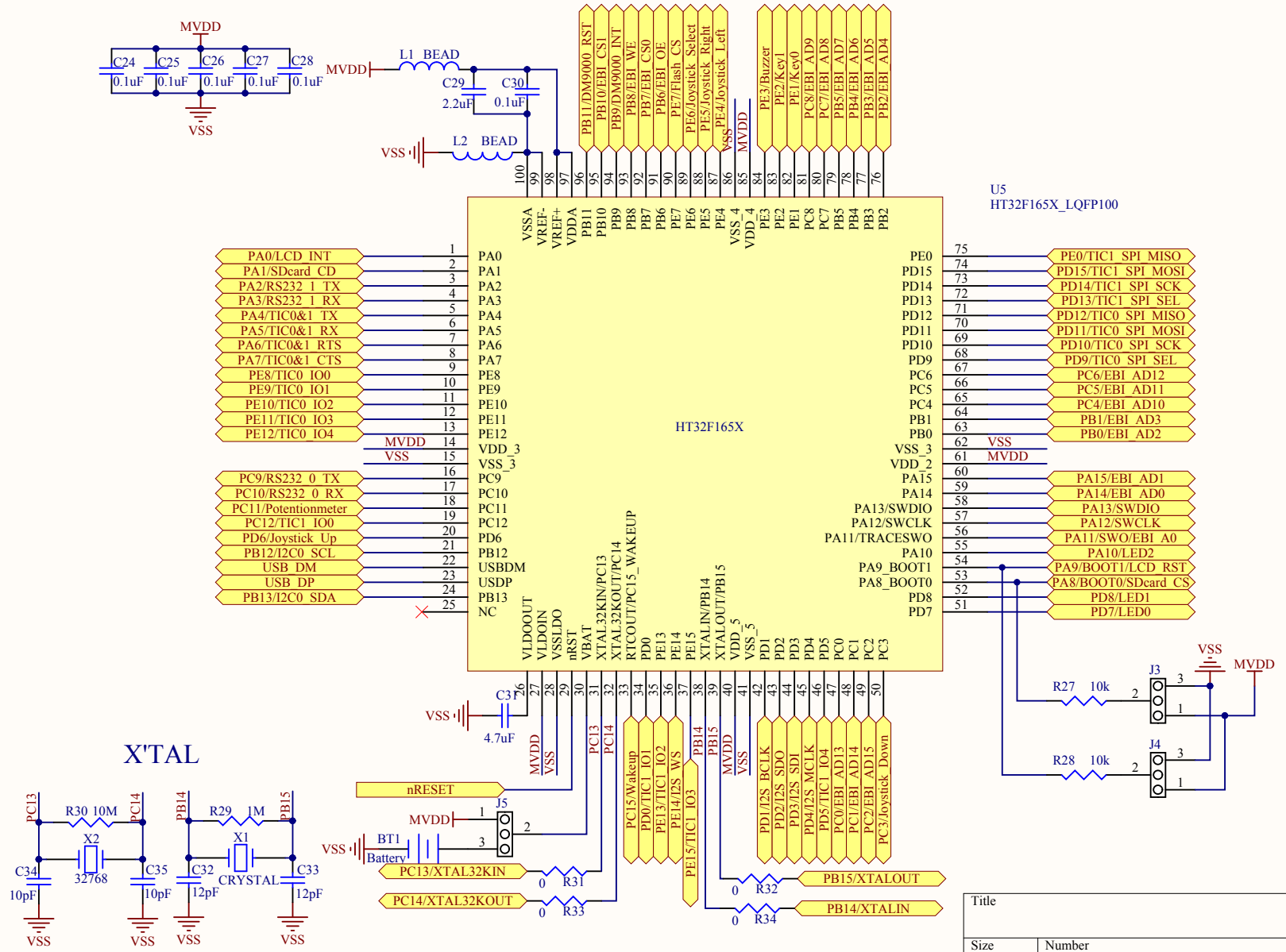


Figure 17. MCU and Boot Pins

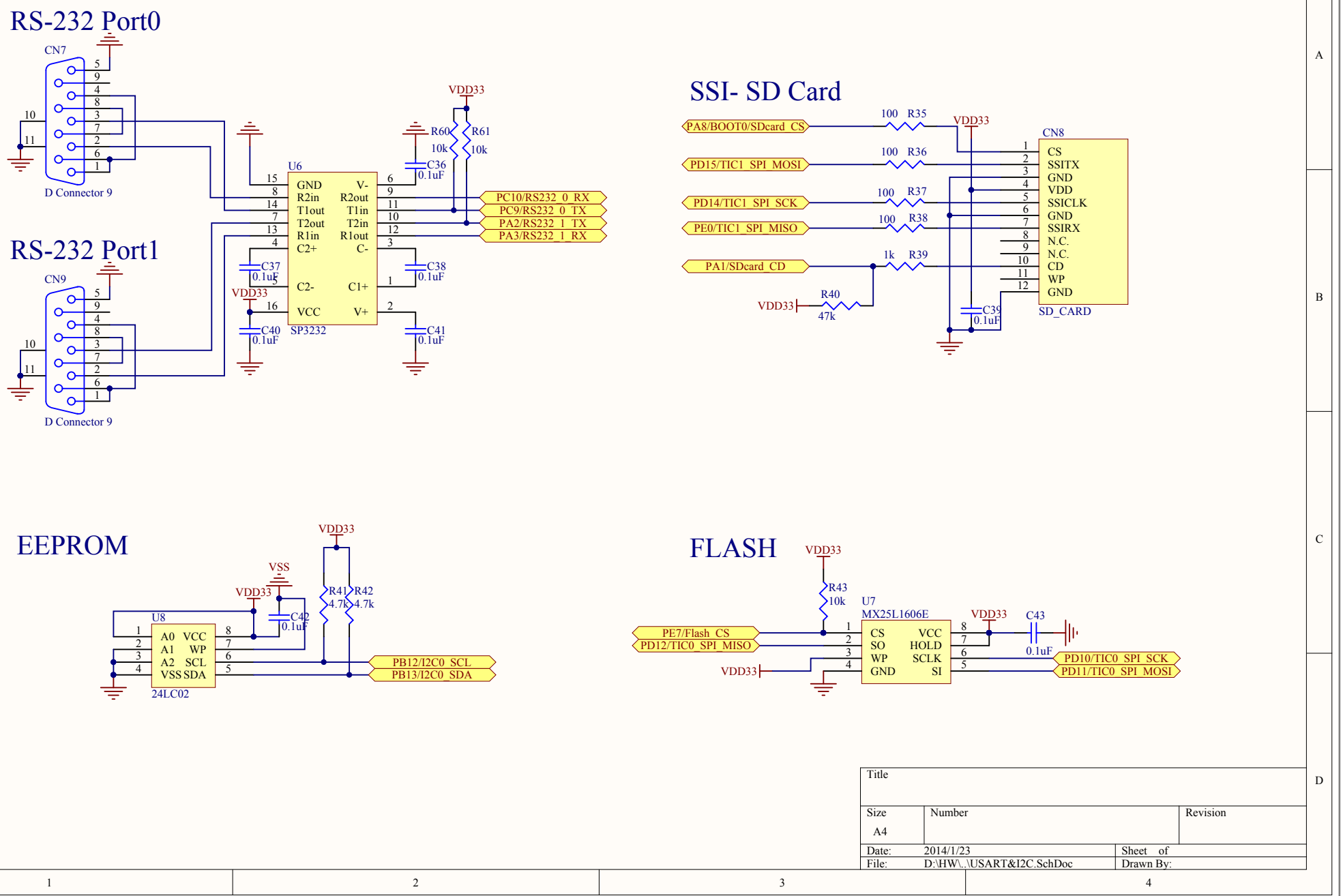


Figure 18. SD card, Flash, RS-232 and EEPROM

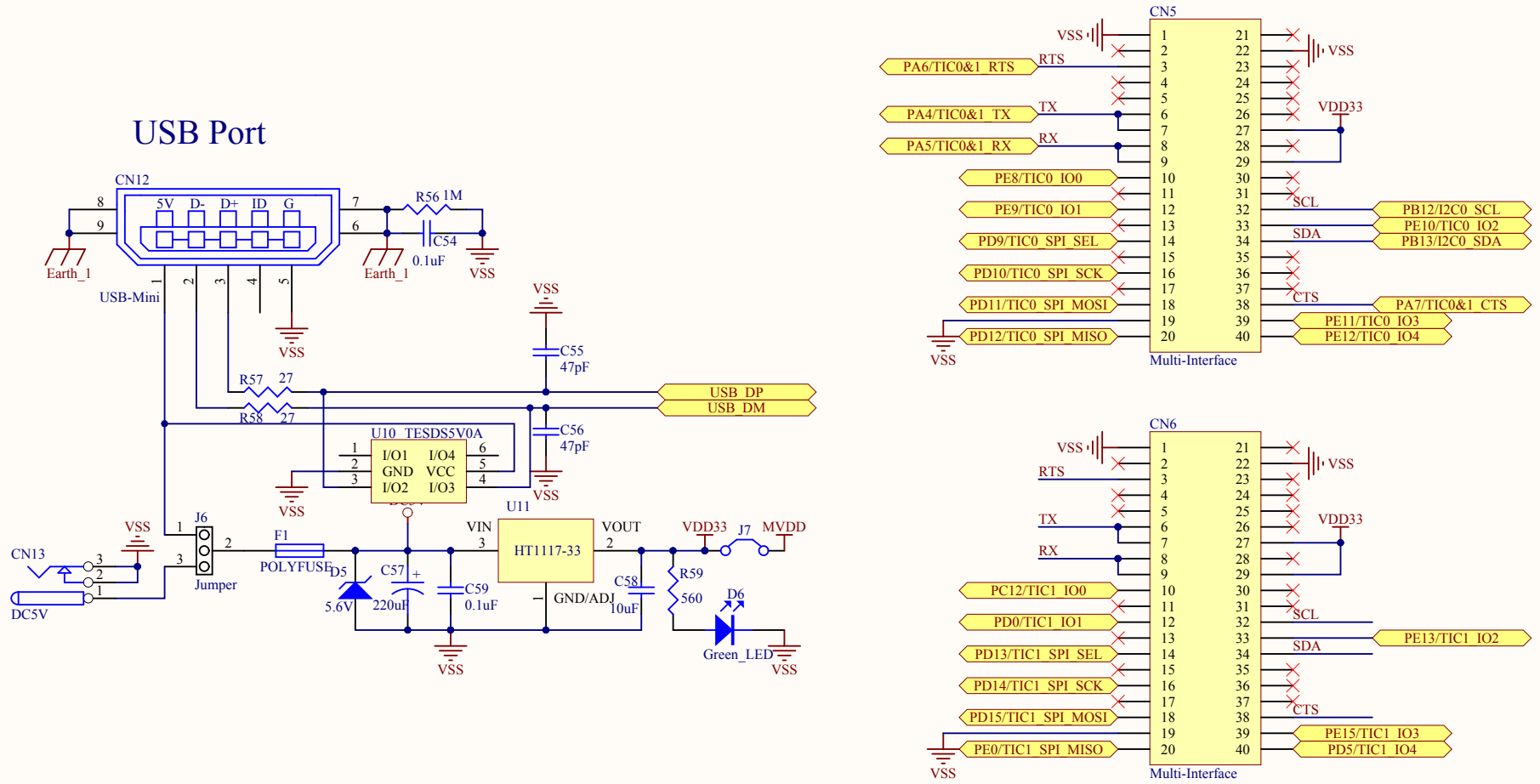


Figure 19. Power and Multi-interface

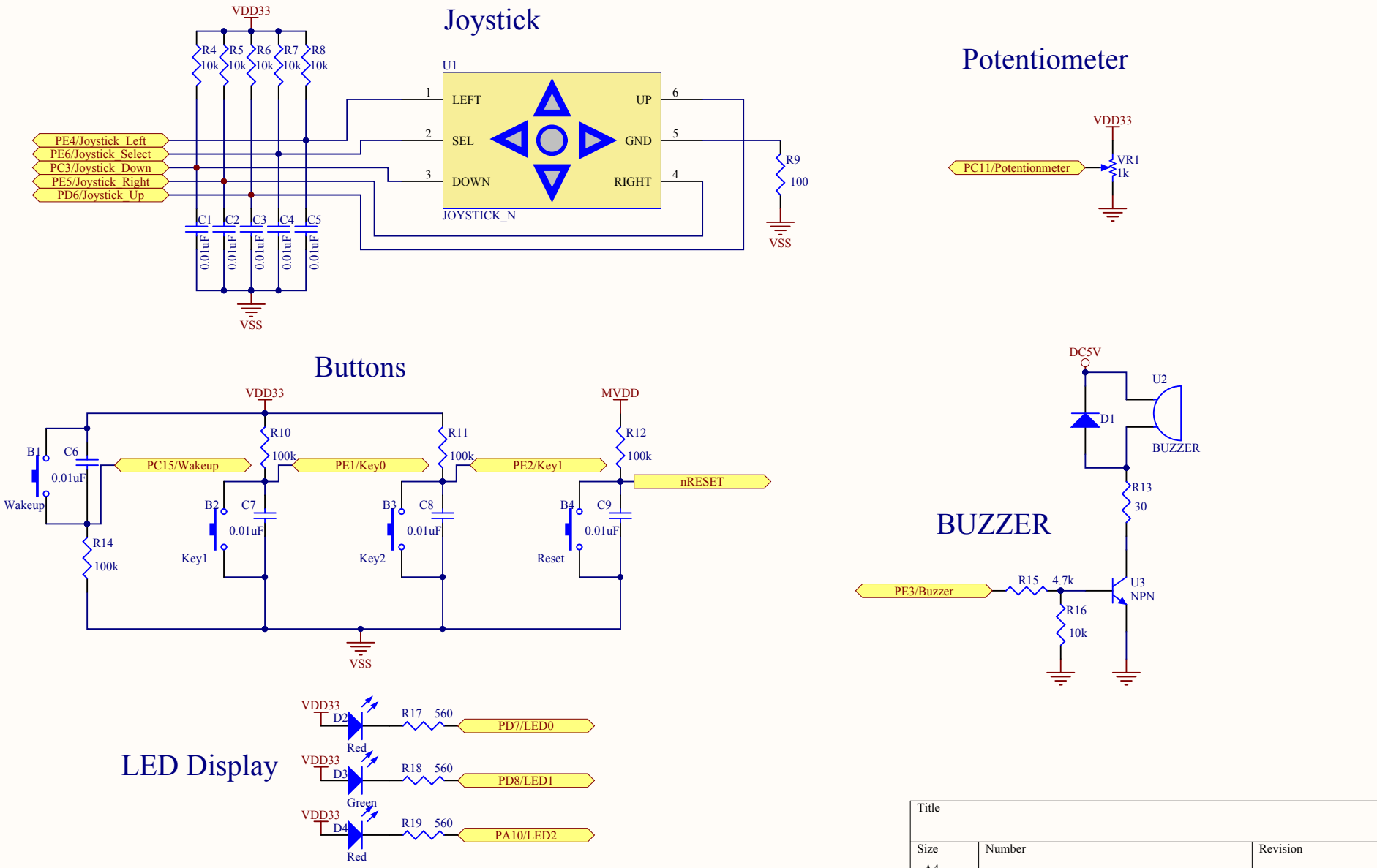


Figure 20. Joystick, Buttons, Buzzer, LED Display and Potentiometer

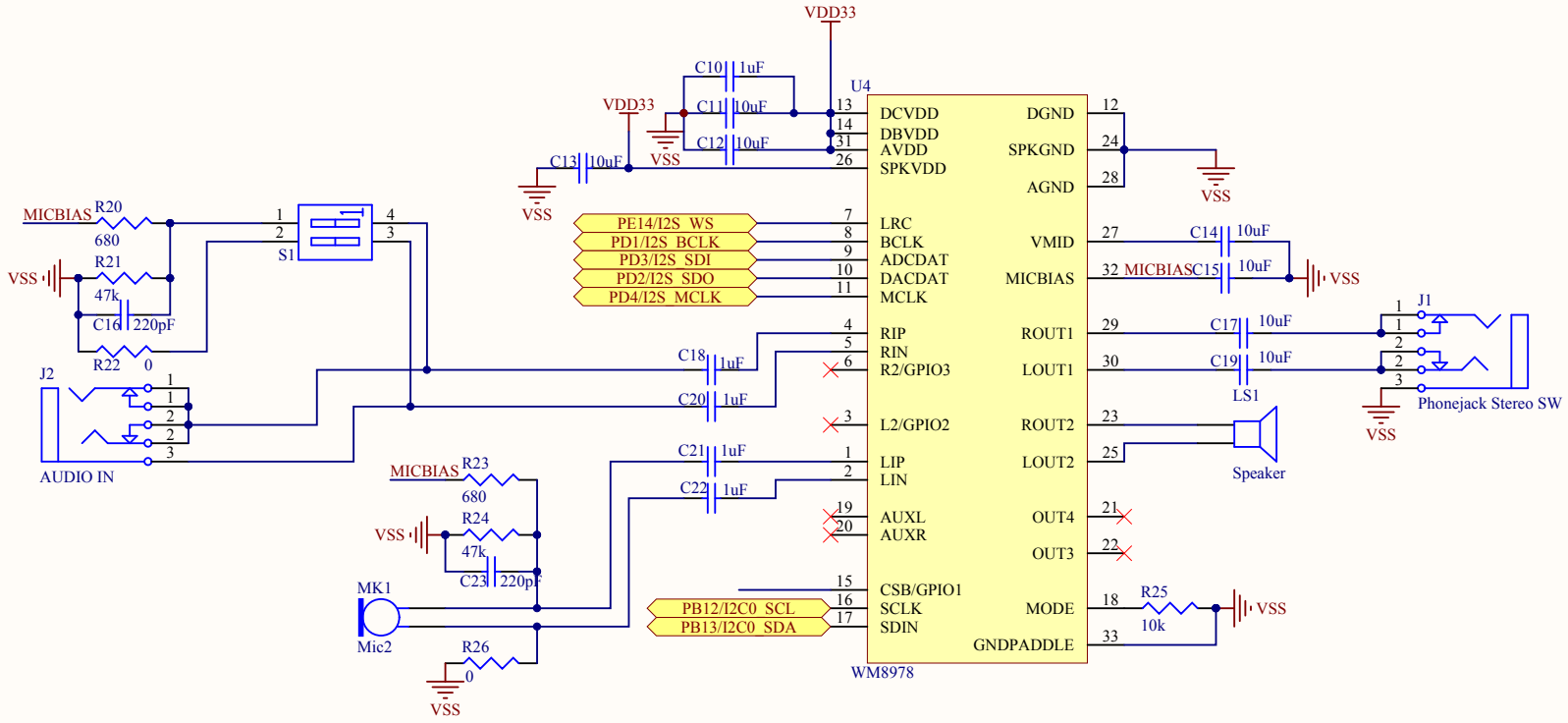


Figure 21. I²S Audio Codec

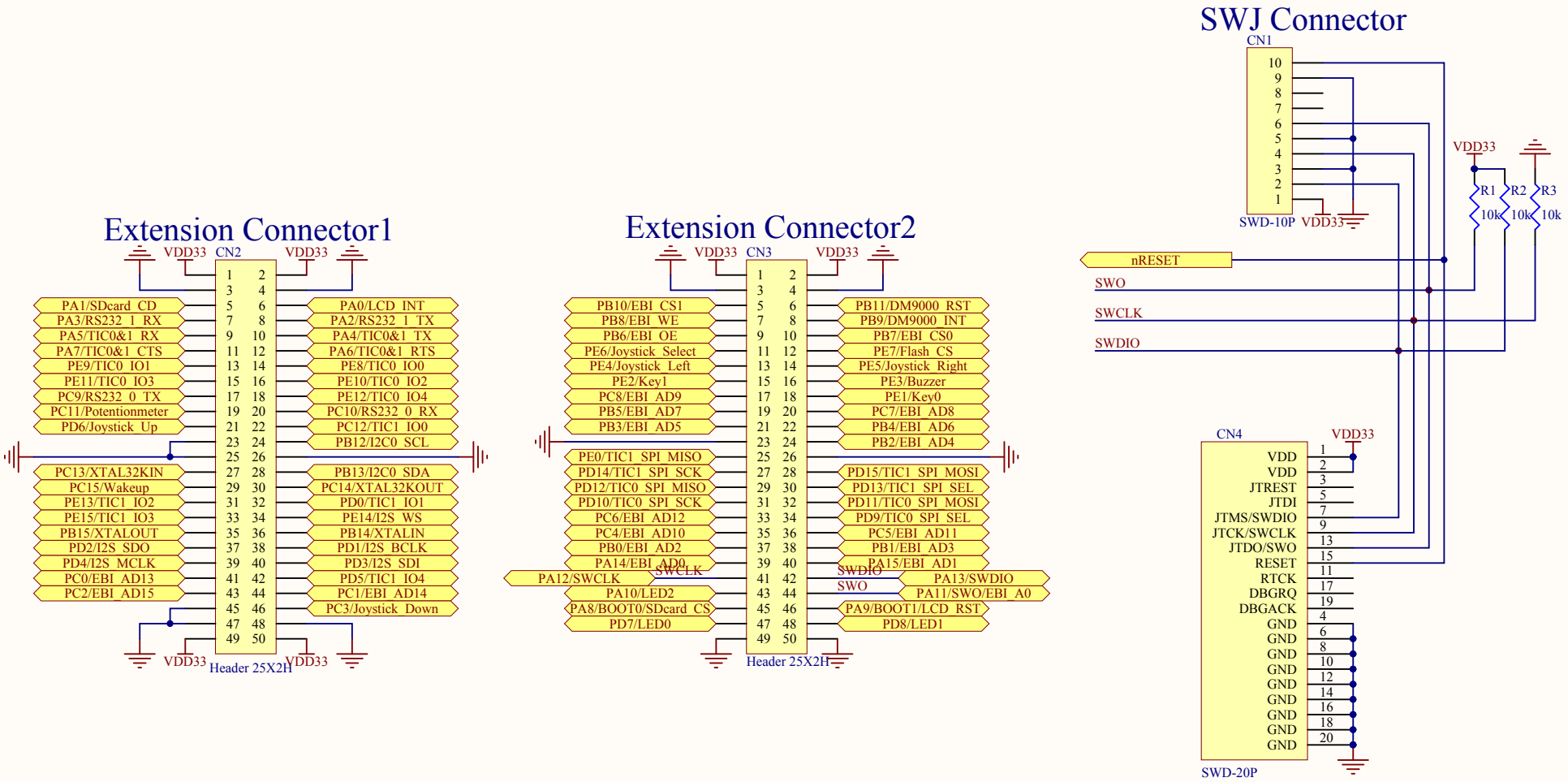


Figure 22. Extension Connector and SWD/JTAG Connector

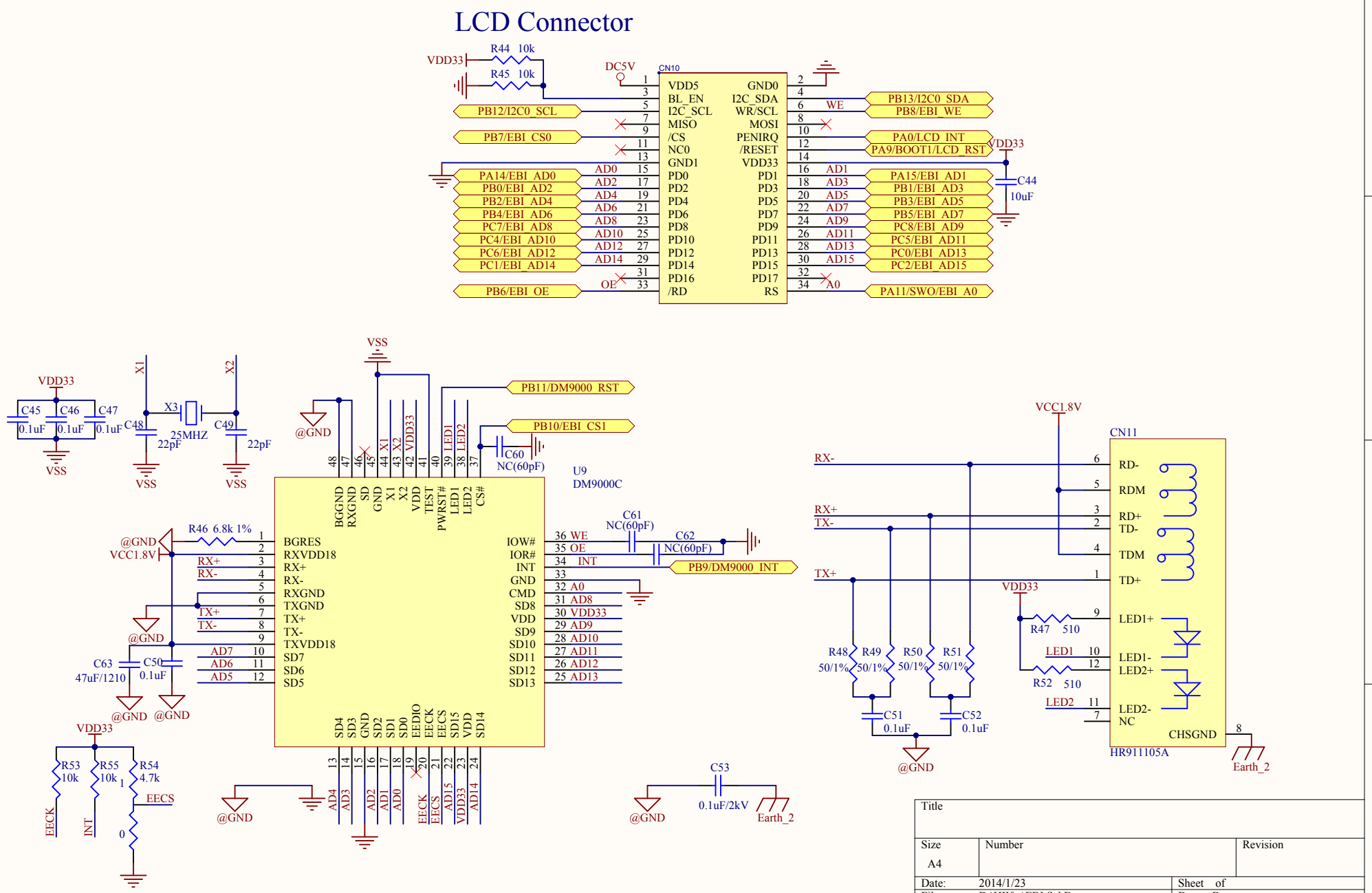


Figure 23. LCD and Ethernet