



# Ameba-Z DEV01 User Manual

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This document defines pin out of Ameba-Z DEV01 demo board.

## Table of Contents

<b>1. HARDWARE BLOCK DIAGRAM</b> .....	<b>5</b>
<b>2. SYSTEM REQUIREMENTS</b> .....	<b>5</b>
<b>3. PIN MUX ALTERNATE FUNCTIONS</b> .....	<b>6</b>
3.1. PIN MUX TABLE.....	6
3.2. PIN OUT REFERENCE.....	8
<b>4. FEATURES</b> .....	<b>9</b>
<b>5. HARDWARE CONFIGURATION</b> .....	<b>11</b>
5.1. LOGUART PIN SEL.....	11
5.2. SWD & LOGUART .....	11
5.3. CMSIS-DAP & LOGUART .....	12
<b>6. DAP FIRMWARE UPDATE</b> .....	<b>13</b>
<b>7. REFERENCE ELECTRICAL SCHEMATICS</b> .....	<b>14</b>
7.1. DC POWER.....	14
7.2. DAP .....	15
7.3. FT232.....	16
7.4. GPIO GROUP AND FUNCTION-MUX.....	17
7.5. SWD.....	18
7.6. UART LOG SELECTION .....	18
7.7. 8710BN MODULE.....	19

## List of Tables

Table 1 Ameba-Z pinmux table .....	6
Table 2 Ameba-Z Features .....	9
Table 3 Ameba-Z LOGUART EFUSE.....	11

## List of Figures

Figure 1 Ameba-Z DEV Diagram.....	5
Figure 2 Ameba-Z SWD & LOGUART .....	11
Figure 3 Ameba-Z CMSIS-DAP.....	12
Figure 4 Ameba-Z CMSIS-DAP Firmware update.....	13
Figure 5 Ameba-Z Schematics DC-Power.....	14
Figure 6 Ameba-Z Schematics DAP.....	15
Figure 7 Ameba-Z Schematics FT-232 .....	16
Figure 8 Ameba-Z Schematics GPIO Group & Function-Mux .....	17
Figure 9 Ameba-Z Schematics SWD.....	18
Figure 10 Ameba-Z Schematics UART-LOG Selection .....	18
Figure 11 Ameba-Z Schematics 8710BN module .....	19

# 1. Hardware block diagram

- IC: RTL8710B
- Module HDK version: HDK-XXXX
- DEV HDK version: RTL-AMEBAZ\_DEV01\_1V0

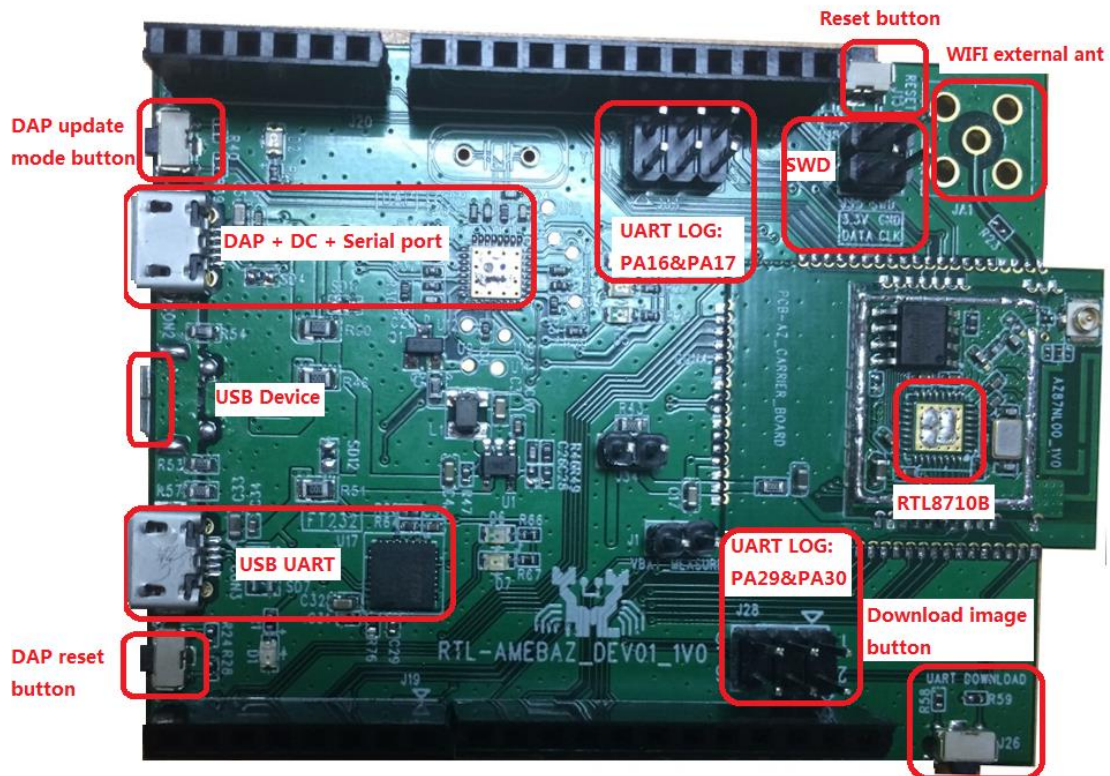


Figure 1 Ameba-Z DEV Diagram

# 2. System requirements

- Windows PC(XP,Vista,7)
- USB type

\* If your PC can not identify the FT232 USB UART, please try use an external UART adapter to connect PA29& PA30.

### 3. Pin mux Alternate Functions

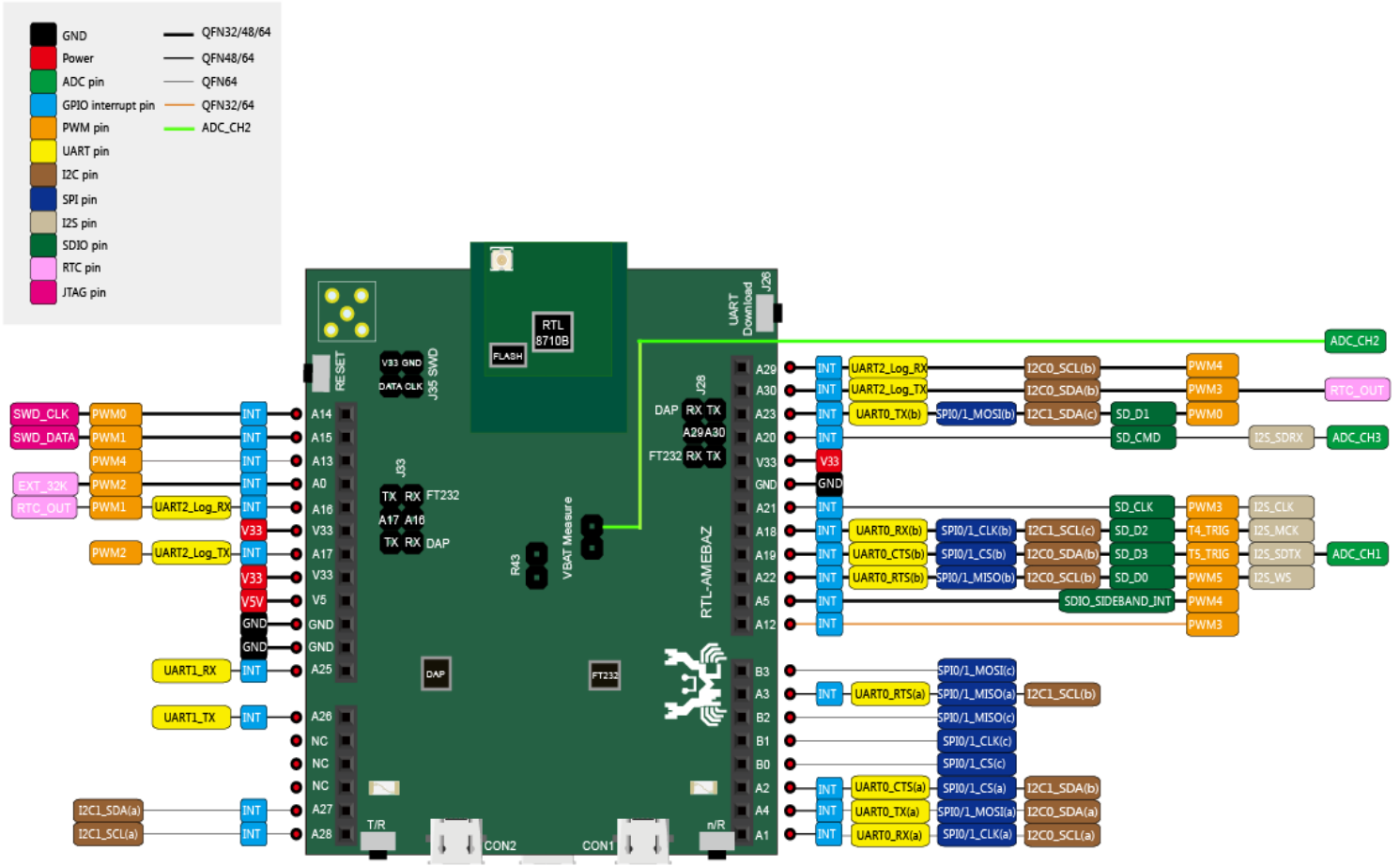
#### 3.1. Pin mux table

**Table 1 Ameba-Z pin mux table**

QFN68 8711BG	QFN48 8711BN	QFN32 8710BN	GPIO	UART	SPI Master	SPI Slave	SPI Flash	I2C	SDIO	PWM/ TIMER	EXT32K	I2S	Others
✓	✓	✓	PA_14							PWM0	SWD_CLK		
✓	✓	✓	PA_15							PWM1	SWD_DATA		
✓			PA_13							PWM4			
✓	✓	✓	PA_0							PWM2	ext_32K		
✓	✓		PA_16	UART2_log_RXD						PWM1	RTC_OUT		
✓	✓		PA_17	UART2_log_TXD						PWM2			
✓	✓		PA_25	UART1_RXD									
✓	✓		PA_26	UART1_TXD									
✓			PA_28					I2C1_SCL					
✓			PA_27					I2C1_SDA					
✓		✓	PA_12							PWM3			
✓	✓		PA_4	UART0_TXD	SPI1_MOS I	SPI0_MOS I		I2C0_SDA					
✓	✓		PA_1	UART0_RXD	SPI1_CLK	SPI0_SCK		I2C0_SCL					
✓	✓		PA_2	UART0_CTS	SPI1_CS	SPI0_CS		I2C1_SDA					
✓	✓		PA_3	UART0_RTS	SPI1_MIS O	SPI0_MIS O		I2C1_SCL					
✓	✓	✓	PA_6				SPIC_CS		SD_D2				
✓	✓	✓	PA_7				SPIC_DATA1		SD_D3				
✓	✓	✓	PA_8				SPIC_DATA2		SD_CMD				
✓	✓	✓	PA_9				SPIC_DATA0		SD_CLK				
✓	✓	✓	PA_10				SPIC_CLK		SD_D0				
✓	✓	✓	PA_11				SPIC_DATA3		SD_D1				
✓	✓	✓	PA_5						SDIO_SIDEBAN D_INT	PWM4			WAKEUP_1
✓	✓	✓	PA_18	UART0_RXD	SPI1_CLK	SPI0_SCK		I2C1_SCL	SD_D2	TIMER4_TRIG		I2S_MCK	WAKEUP_0

QFN68	QFN48	QFN32	GPIO	UART	SPI Master	SPI Slave	SPI Flash	I2C	SDIO	PWM/ TIMER	EXT32K	I2S	Others
8711BG	8711BN	8710BN											
✓	✓	✓	PA_19	UART0_CTS	SPI1_CS	SPI0_CS		I2C0_SDA	SD_D3	TIMER5_TRIG		I2S_SD_T X	ADC1
✓	✓		PA_20						SD_CMD			I2S_SD_R X	ADC3
✓	✓		PA_21						SD_CLK	PWM3		I2S_CLK	
✓	✓	✓	PA_22	UART0_RTS	SPI1_MIS O	SPI0_MIS O		I2C0_SCL	SD_D0	PWM5		I2S_WS	WAKEUP_2
✓	✓	✓	PA_23	UART0_TXD	SPI1_MOS I	SPI0_MOS I		I2C1_SDA	SD_D1	PWM0			WAKEUP_3
✓			PB_1		SPI1_CLK	SPI0_SCK							
✓			PB_0		SPI1_CS	SPI0_CS							
✓			PB_2		SPI1_MIS O	SPI0_MIS O							
✓			PB_3		SPI1_MOS I	SPI0_MOS I							
✓			PB_4								SWD_CLK	I2S_MCK	
✓			PB_5								SWD_DATA	I2S_SD_T X	
✓			PA_24									I2S_SD_R X	
✓			PA_31									I2S_CLK	
✓			PB_6									I2S_WS	
✓	✓	✓	PA_30	UART2_log_TXD				I2C0_SDA		PWM3	RTC_OUT		
✓	✓	✓	PA_29	UART2_log_RXD				I2C0_SCL		PWM4			

### 3.2. Pin out reference





## 4. Features

**Table 2 Ameba-Z Features**

<i>Feature list</i>		<i>QFN68</i>	<i>QFN48</i>	<i>QFN32</i>	
		<i>RTL8711BG</i>	<i>RTL8711BN</i>	<i>RTL8710BN</i>	
<b>Integrated core</b>	Core type	ARM CM4F			
	Core clock maximum freq.	125MHz			
<b>Memory</b>	Internal ROM	512KB			
	Internal SRAM	256KB			
	External FLASH	128MB			
<b>FPU</b>	Float process unit	Yes			
<b>SWD/JTAG</b>		SWD			
<b>Backup register</b>	Backup register for power save	16B			
<b>Boot Reason</b>		Yes			
<b>F/W protection</b>		Yes			
<b>Read protection</b>	RAM read protection	4KB			
<b>WIFI</b>	802.11 B/G/N	Yes			
<b>BOR</b>	BOR Detection	Yes			
<b>peripherals</b>	UART	Normal-UART	2	2	1
		Log-UART	1	1	1
	SPI Master	Max. 31.25Mbps	1	1	1
	SPI Slave	Max. 31.25Mbps	1	1	1
	I2C	Max. 400Kbps	2	2	2
	ADC	VBAT	1	0	1
		Thermal	1	1	1

<i>Feature list</i>			<i>QFN68</i>	<i>QFN48</i>	<i>QFN32</i>
			<i>RTL8711BG</i>	<i>RTL8711BN</i>	<i>RTL8710BN</i>
		Normal	2	2	0
	GDMA	2*6 channels	2	2	2
	GPIO	IN/OUT/INT	39	26	17
	I2S		1	1	0
	RTC	D/H/M/S	1	1	1
		OUTPUT	1	1	1
	Timer	Basic timer use 32K	4	4	4
		Advanced timer use XTAL	2	2	2
	PWM	OUTPUT	6	6	6
		INPUT Capture	2	2	2
	WDG		1	1	1
	USB device		1	0	0
	SDIO 2.0 Device		1	1	1
<i>External 32K</i>	External 32K		1	1	1
<i>Dsleep Wakepin</i>	Deep sleep wake pin		4	4	4
<i>Package</i>	trays and tape-in-reel		(8x8mm <sup>2</sup> )	(6x6mm <sup>2</sup> )	(5x5mm <sup>2</sup> )
<i>Part Number</i>			RTL8711BG	RTL8711BN	RTL8710BN

## 5. Hardware configuration

### 5.1. LOGUART PIN SEL

Table 3 Ameba-Z LOGUART EFUSE

	<i>EFUSE</i>	<i>LOGUART PIN</i>
<i>EFUSE NOT PG</i>	EFUSE 0x19[6]=0	GPIOA_29 & GPIOA_30
<i>EFUSE PG</i>	EFUSE 0x19[6]=0	GPIOA_29 & GPIOA_30
	EFUSE 0x19[6]=1	GPIOA_16 & GPIOA_17

### 5.2. SWD & LOGUART

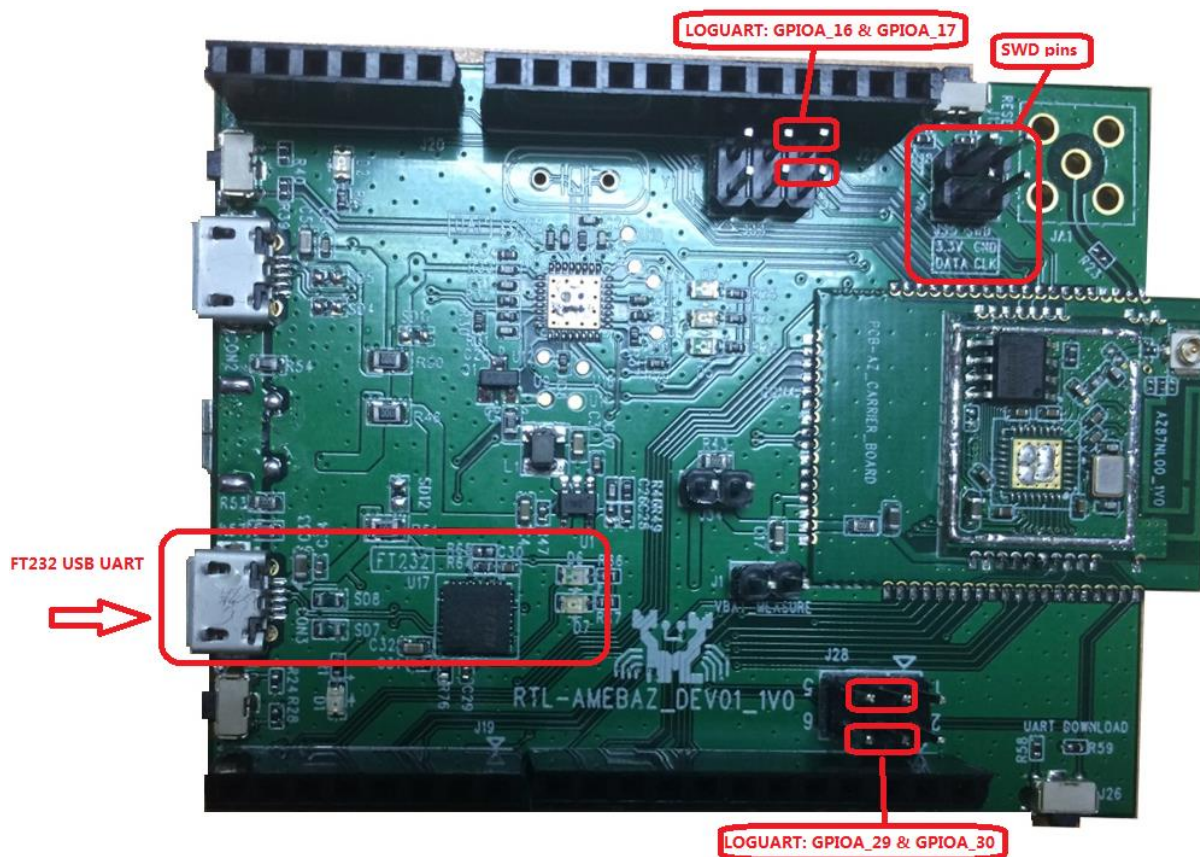


Figure 2 Ameba-Z SWD & LOGUART

### 5.3. CMSIS-DAP & LOGUART

RTL-AMEBAZ\_DEV01 supports CMSIS-DAP debugger. It requires installing “serial to USB driver” at first. Serial to USB driver can be found in tools\serial\_to\_usb\mbedWinSerial\_16466. Connect board to the PC with micro-USB cable.

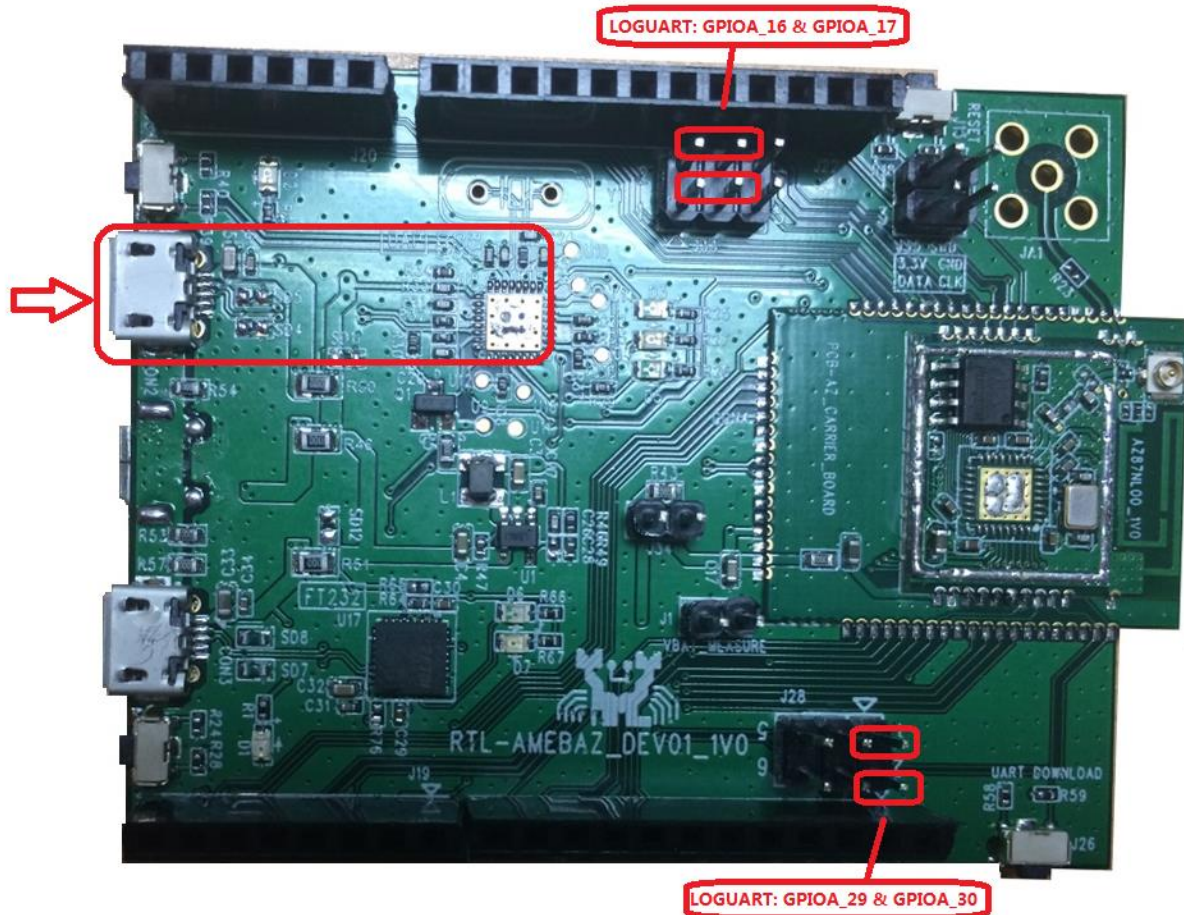


Figure 3 Ameba-Z CMSIS-DAP

## 6. DAP Firmware update

In DAP mode, the DAP firmware can be updated. Holding TGT\_NRESET button (J24, red-circled) then press nRESET button (J17, blue-circled). Then the DAP mode window will show up.

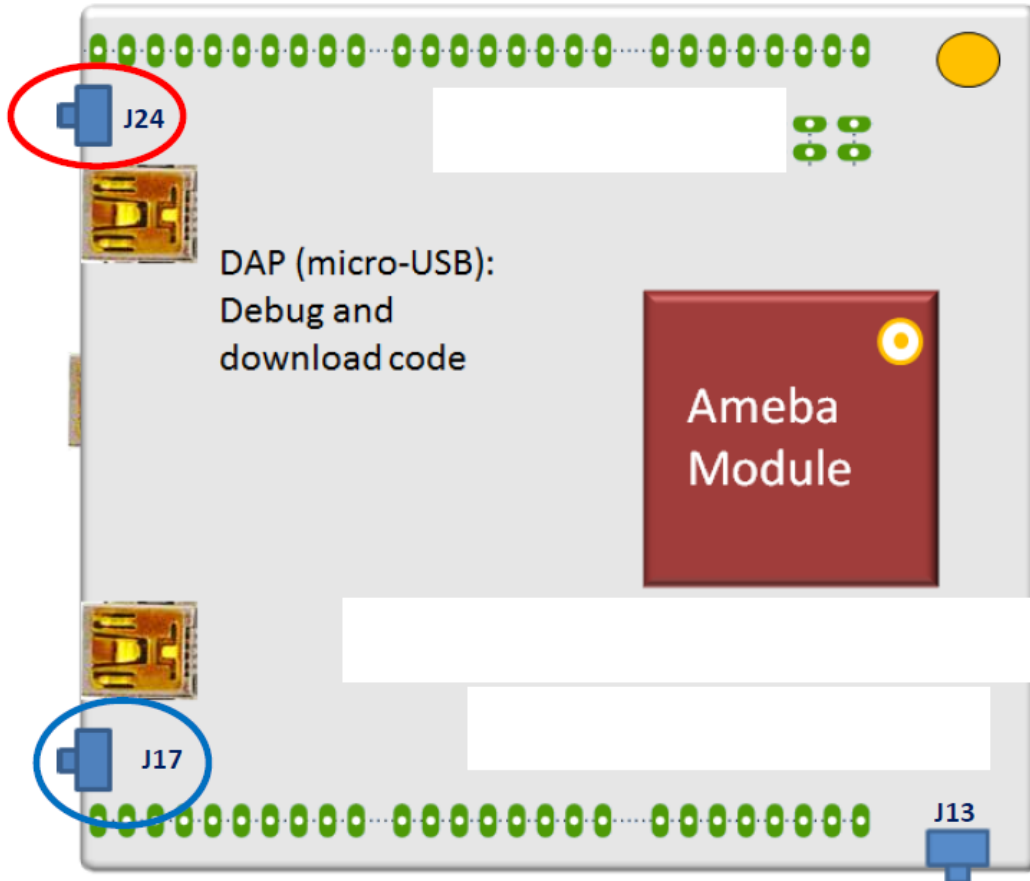
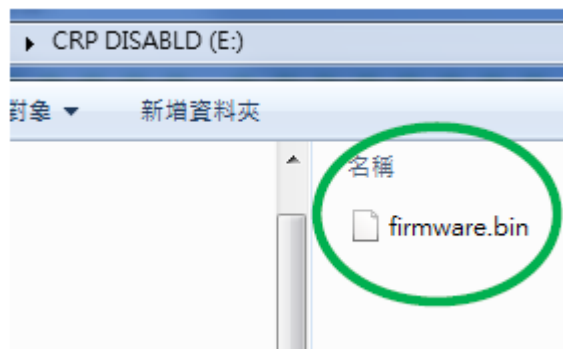


Figure 4 Ameba-Z CMSIS-DAP Firmware update

DAP window will show up when entering DAP mode.



# 7. Reference electrical schematics

## 7.1. DC power

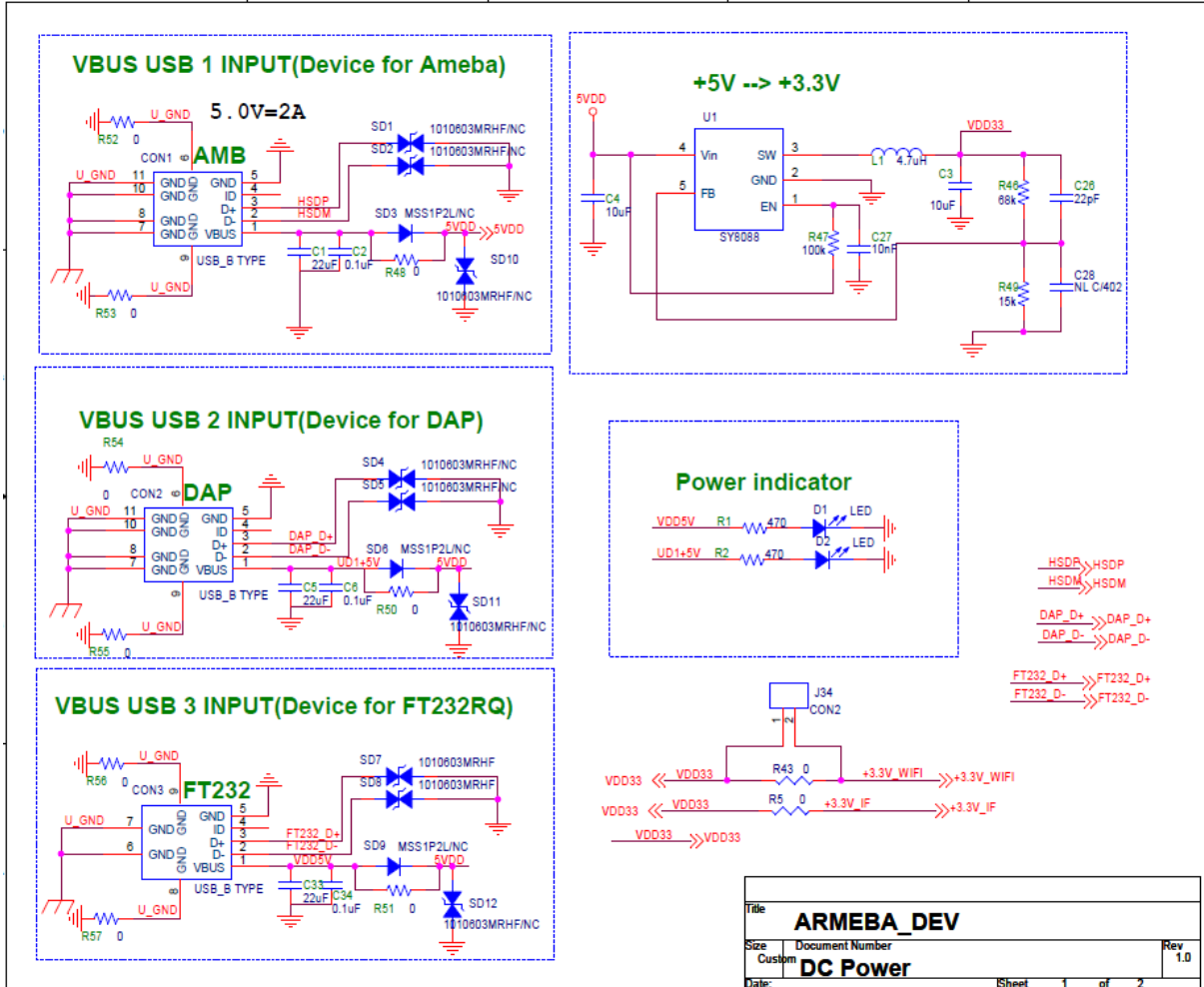


Figure 5 Ameba-Z Schematics DC-Power

## 7.2. DAP

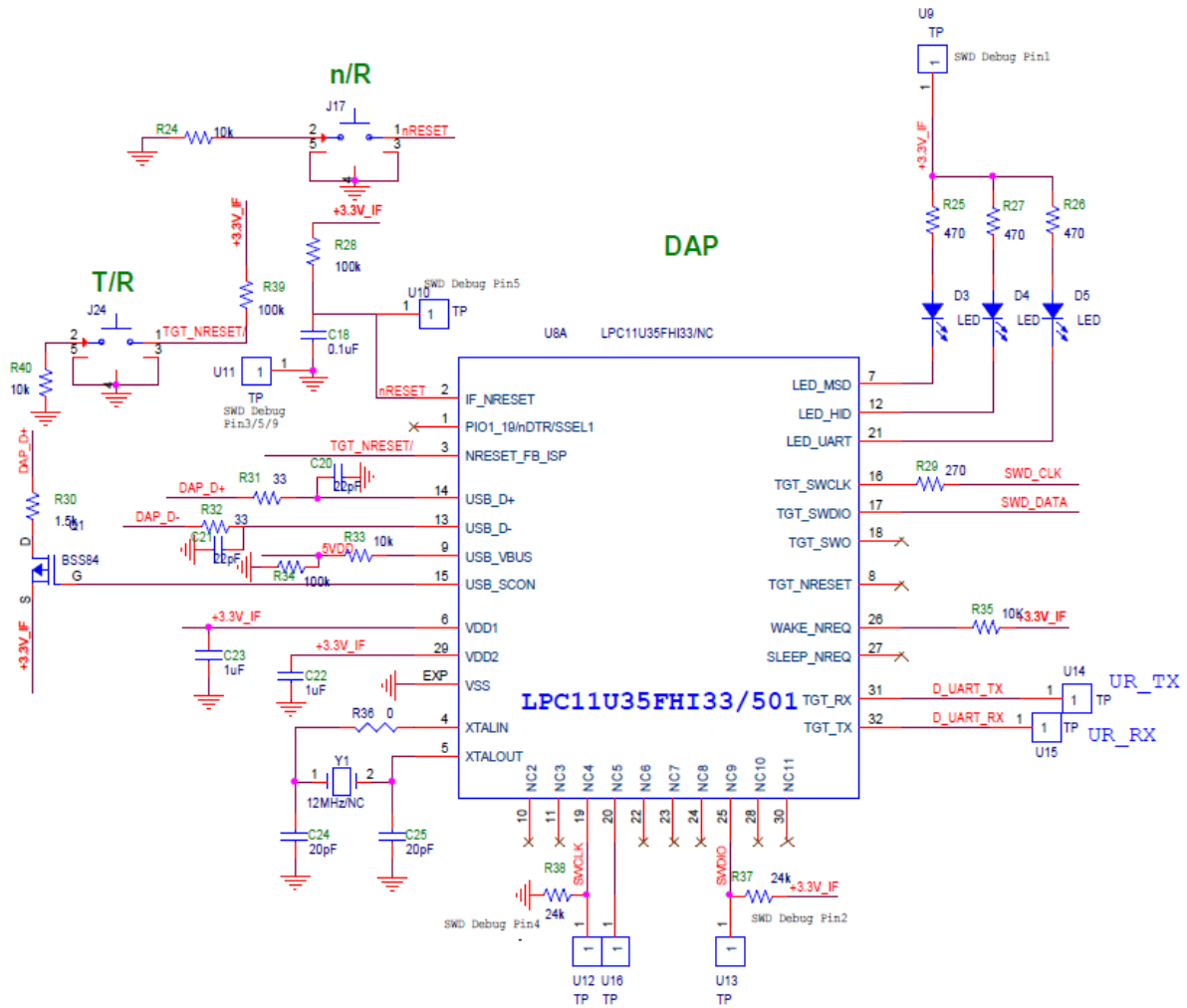


Figure 6 Ameba-Z Schematics DAP

### 7.3. FT232

默认上R64, UART 3V3 IO

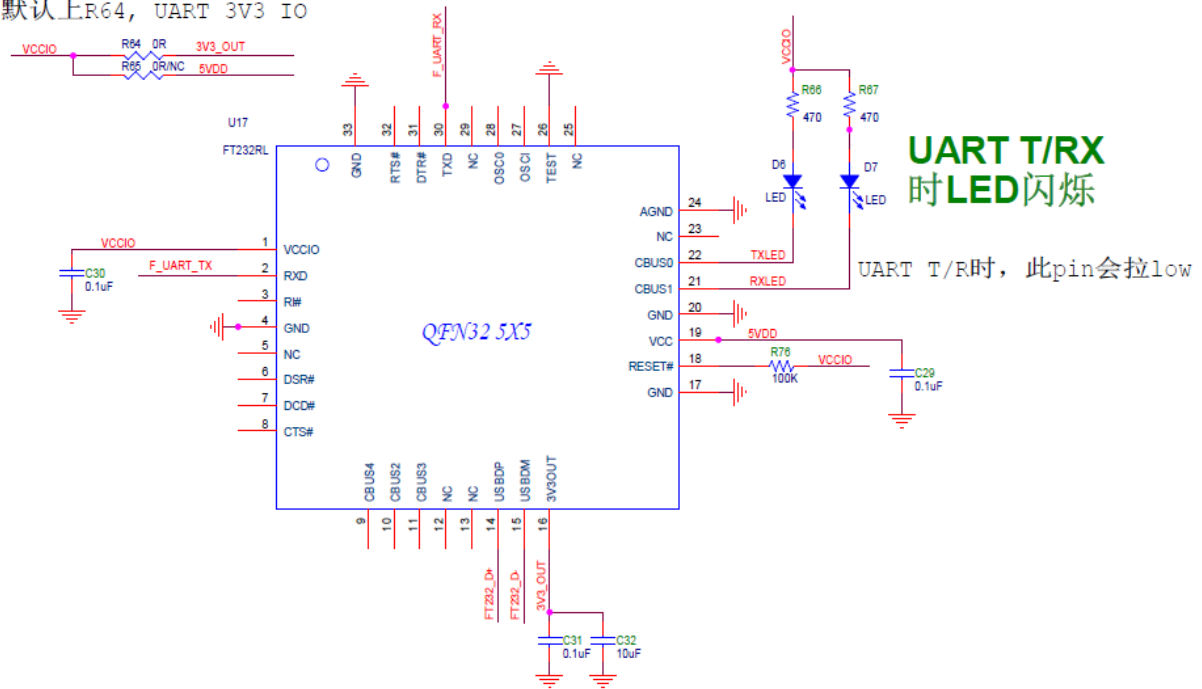


Figure 7 Ameba-Z Schematics FT-232



## 7.4. GPIO GROUP and Function-Mux

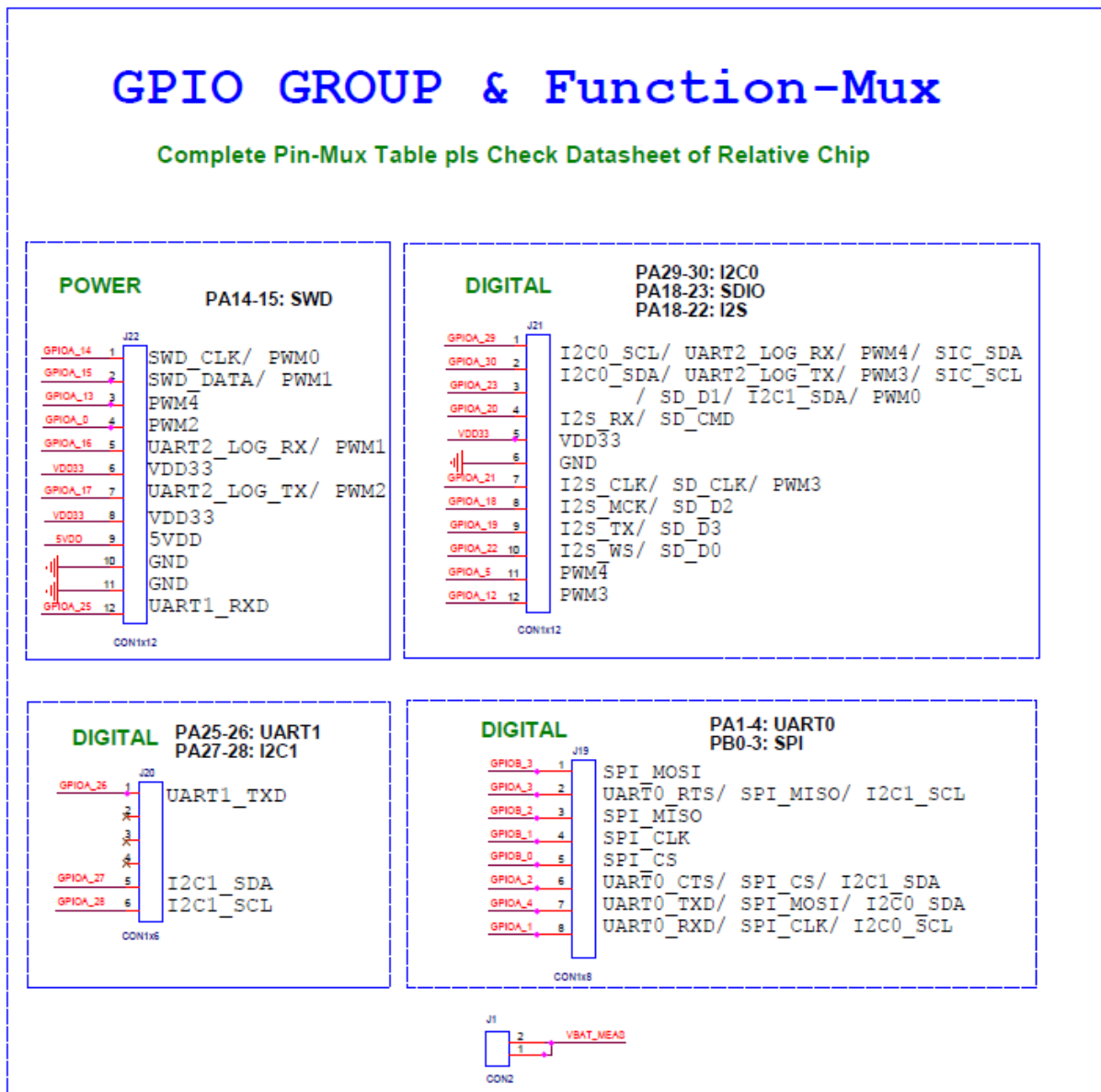


Figure 8 Ameba-Z Schematics GPIO Group & Function-Mux

## 7.5. SWD

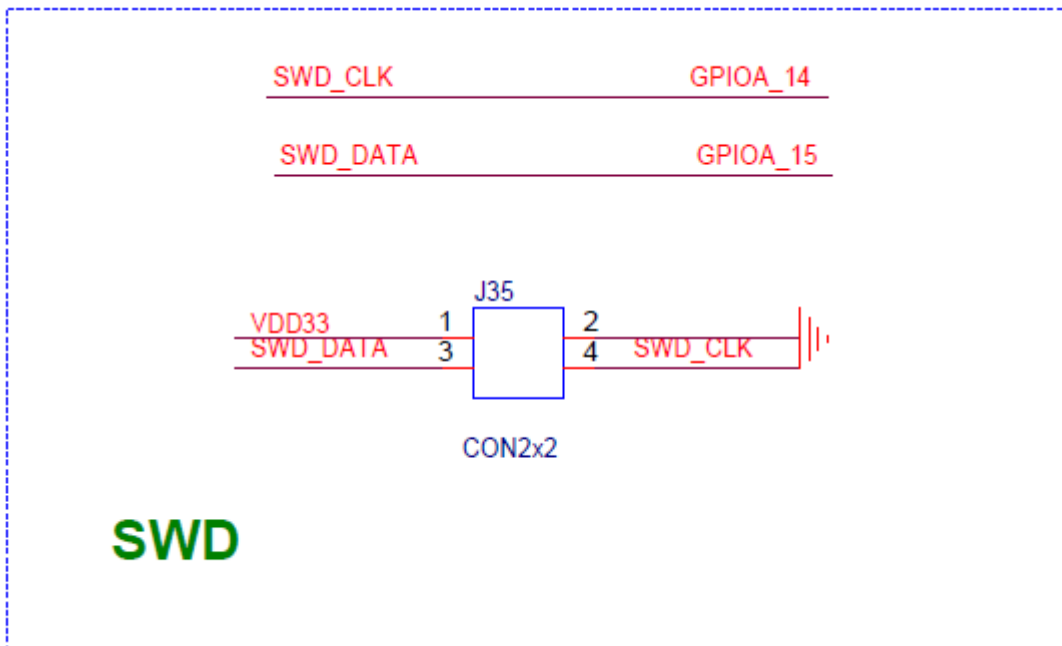


Figure 9 Ameba-Z Schematics SWD

## 7.6. UART LOG Selection

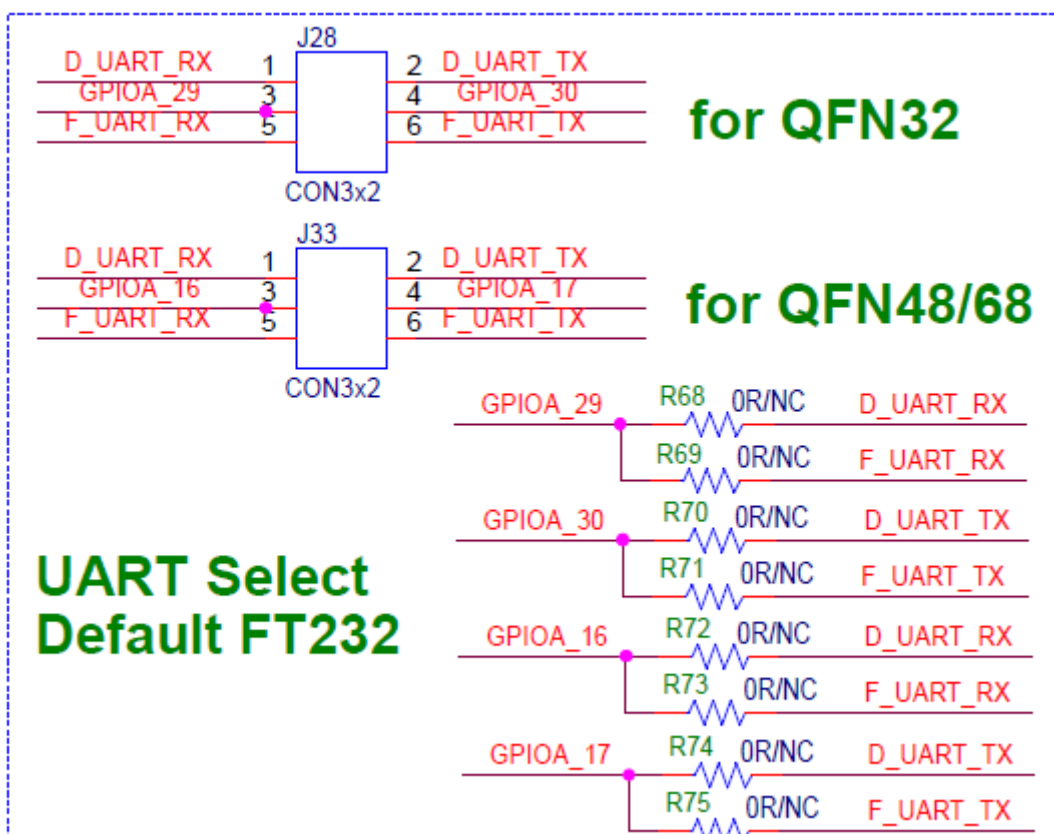


Figure 10 Ameba-Z Schematics UART-LOG Selection

## 7.7. 8710BN module

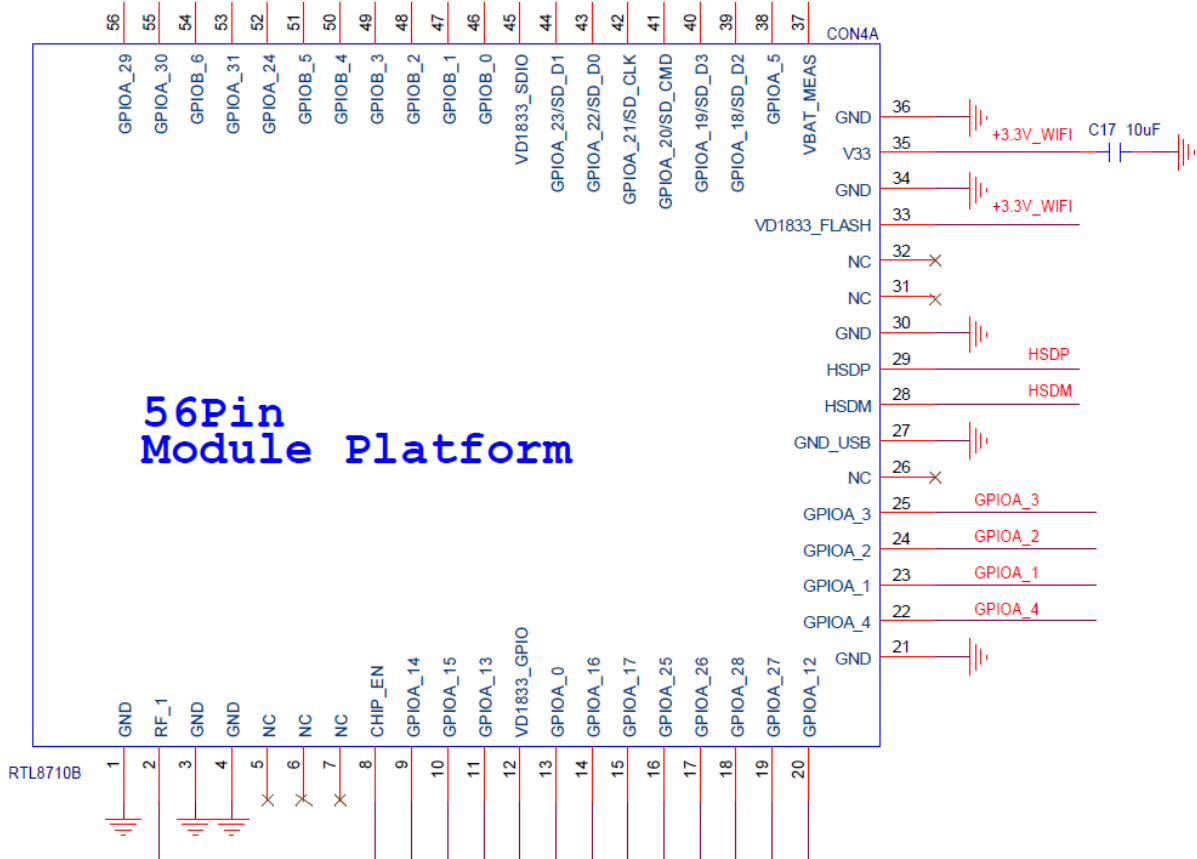


Figure 11 Ameba-Z Schematics 8710BN module