



# Realtek Ameba1 DEV01 User Manual

---

This document define pin out of Ameba DEV.

Version 1.8

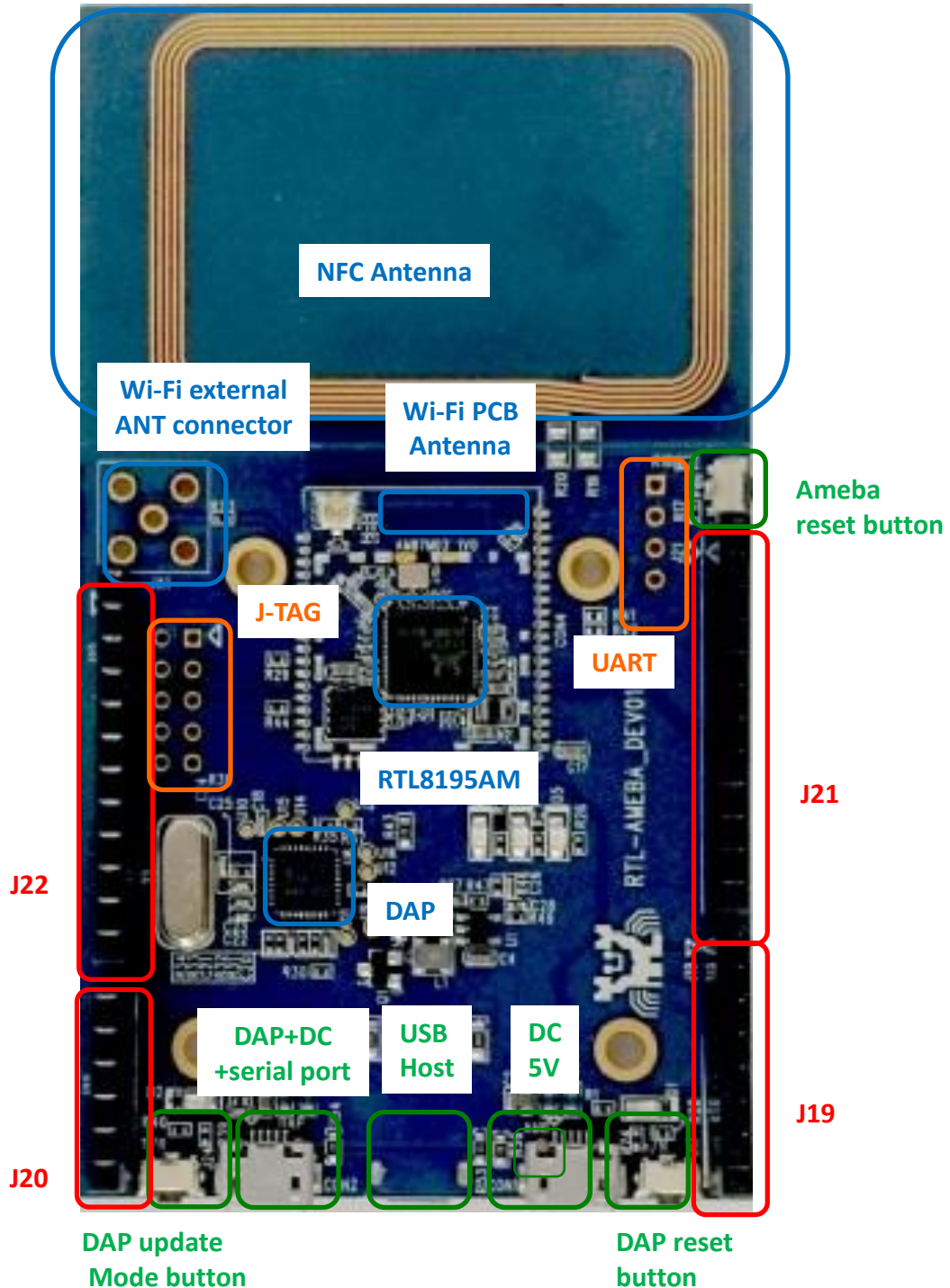
---

## Table of Contents

1	Hardware block diagram.....	3
2	System requirements.....	4
3	Pin out reference.....	4
3.1	Pin out table.....	4
3.2	Pin out reference.....	5
3.3	Pin connection table.....	6
4	Antenna hardware setup.....	7
5	Peripherals support.....	8
5.1	Pin function table setup.....	8
5.2	Peripheral Descriptions.....	9
6	Hardware configuration.....	10
6.1	CMSIS-DAP.....	10
6.2	J-Link/JTAG.....	10
6.3	DAP mode.....	12
7	Reference electrical schematics.....	14
8	Ameba1 DEV01 pin out.....	16
9	Sensor board.....	17

# 1 Hardware block diagram

- IC: RTL8195AM
- Module HDK version: HDK-AM95A03\_1V0
- DEV HDK version: RTL-AMEBA\_DEV01\_1v1



## 2 System requirements

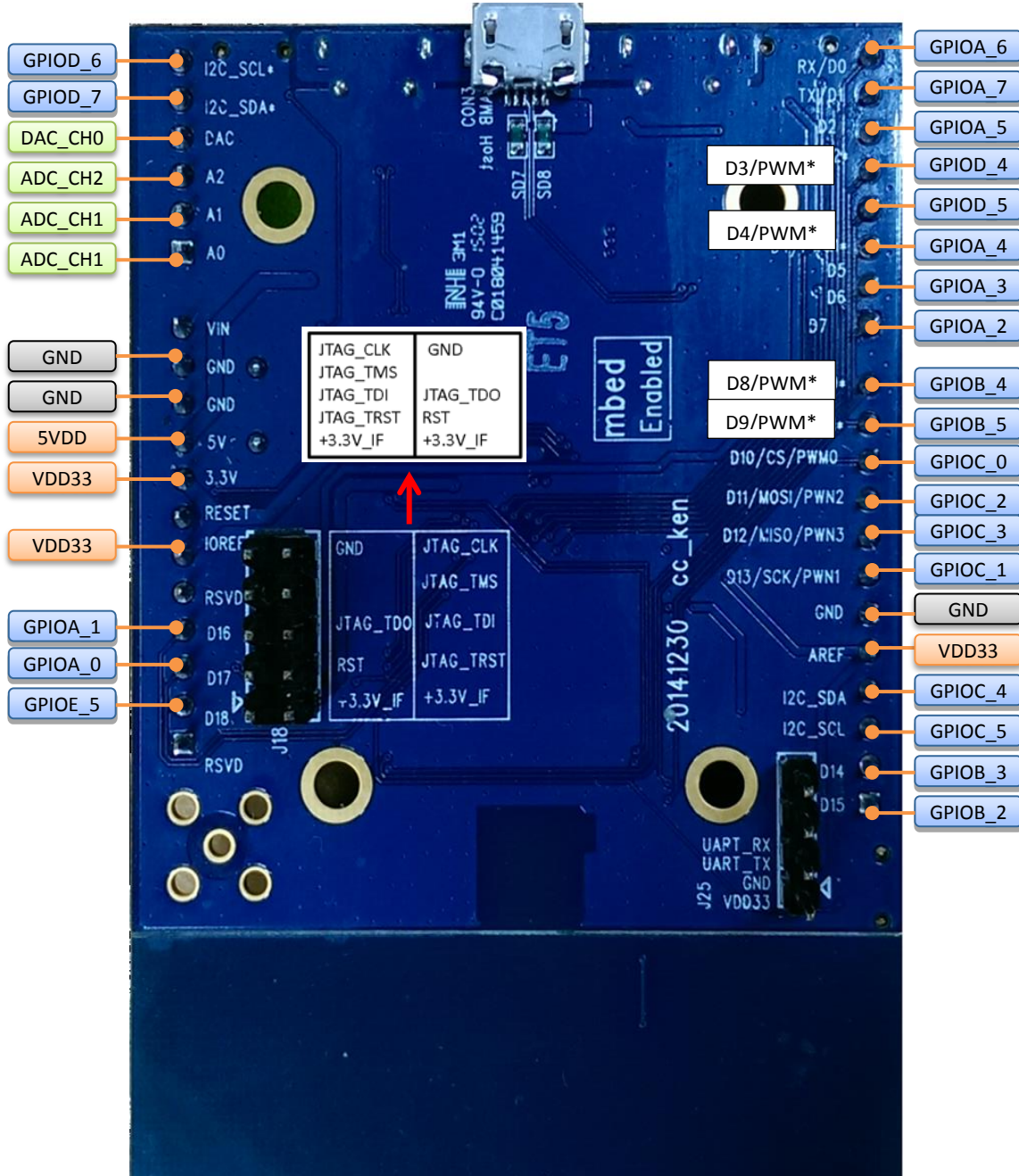
- Windows PC (XP, Vista, 7)
- USB type A to Micro-B USB cable x 1
- RS-232 to UART board(debug) x 1, JTAG cable x1 (option)

## 3 Pin out reference

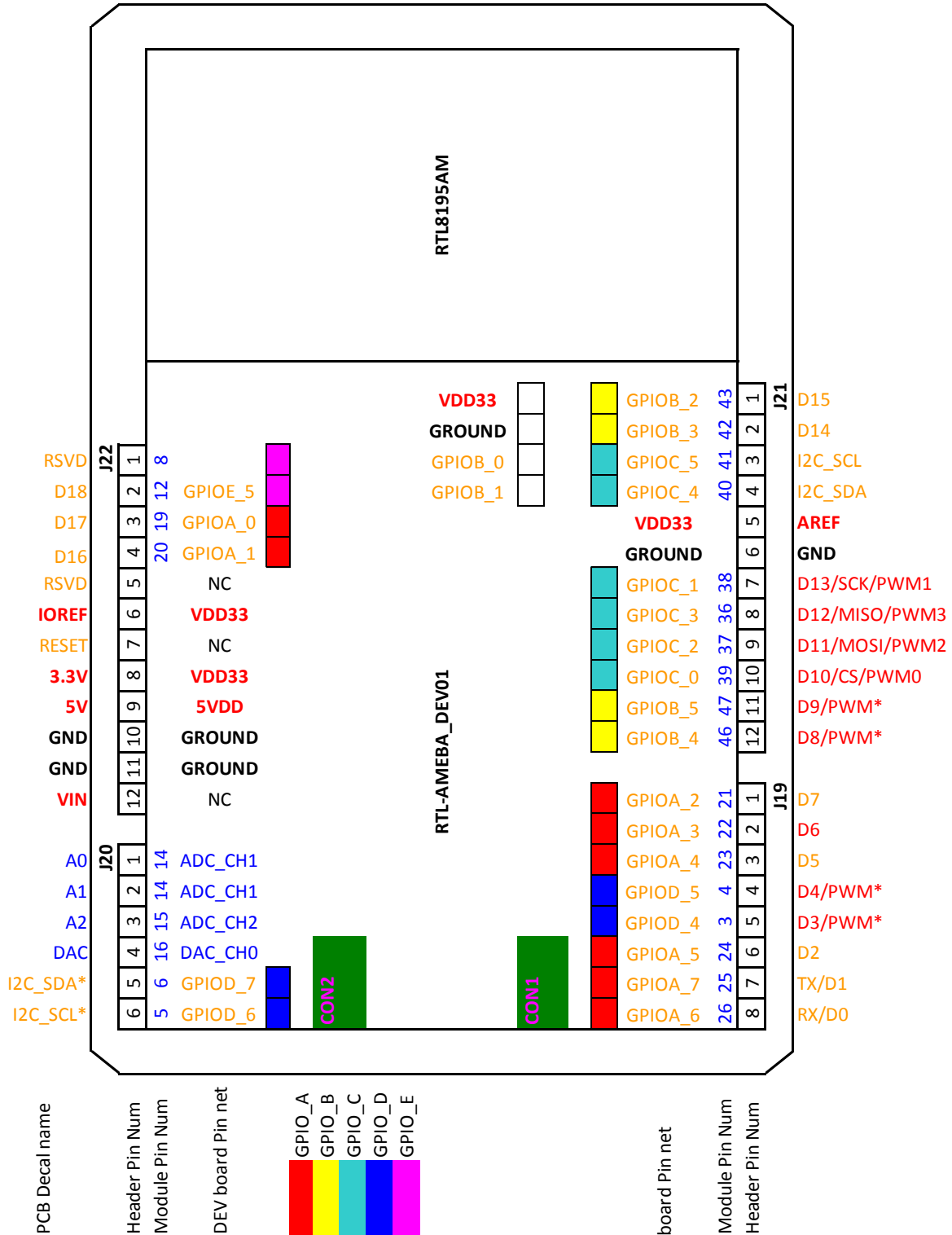
### 3.1 Pin out table

Con	DEV name	Pin	Net name	Con	DEV name	Pin	Net name
J20	I2C_SCL	6	GPIOD_6	J19	RX/D0	8	GPIOA_6
	I2C_SDA	5	GPIOD_7		TX/D1	7	GPIOA_7
	DAC	4	DAC_CH0		D2	6	GPIOA_5
	A2	3	ADC_CH2		D3/PWM*	5	GPIOD_4
	A1	2	ADC_CH1		D4/PWM*	4	GPIOD_5
	A0	1	ADC_CH1		D5	3	GPIOA_4
					D6	2	GPIOA_3
			D7	1	GPIOA_2		
Con	DEV name	Pin	Net name	Con	DEV name	Pin	Net name
sJ22	VIN	12	NC	J21	D8/PWM*	12	GPIOB_4
	GND	11	GROUND		D9/PWM*	11	GPIOB_5
	GND	10	GROUND		D10/CS/PWM0	10	GPIOC_0
	5V	9	5VDD		D11/MOSI/PWM2	9	GPIOC_2
	3.3V	8	VDD33		D12/MISO/PWM3	8	GPIOC_3
	RESET	7	NC		D13/SCK/PWM1	7	GPIOC_1
	IOREF	6	VDD33		GND	6	GND
	RSVD	5	NC		AREF	5	VDD33
	D16	4	GPIOA_1		I2C_SDA*	4	GPIOC_4
	D17	3	GPIOA_0		I2C_SCL*	3	GPIOC_5
	D18	2	GPIOE_5		D14	2	GPIOB_3
	RSVD	1	NC		D15	1	GPIOB_2

### 3.2 Pin out reference

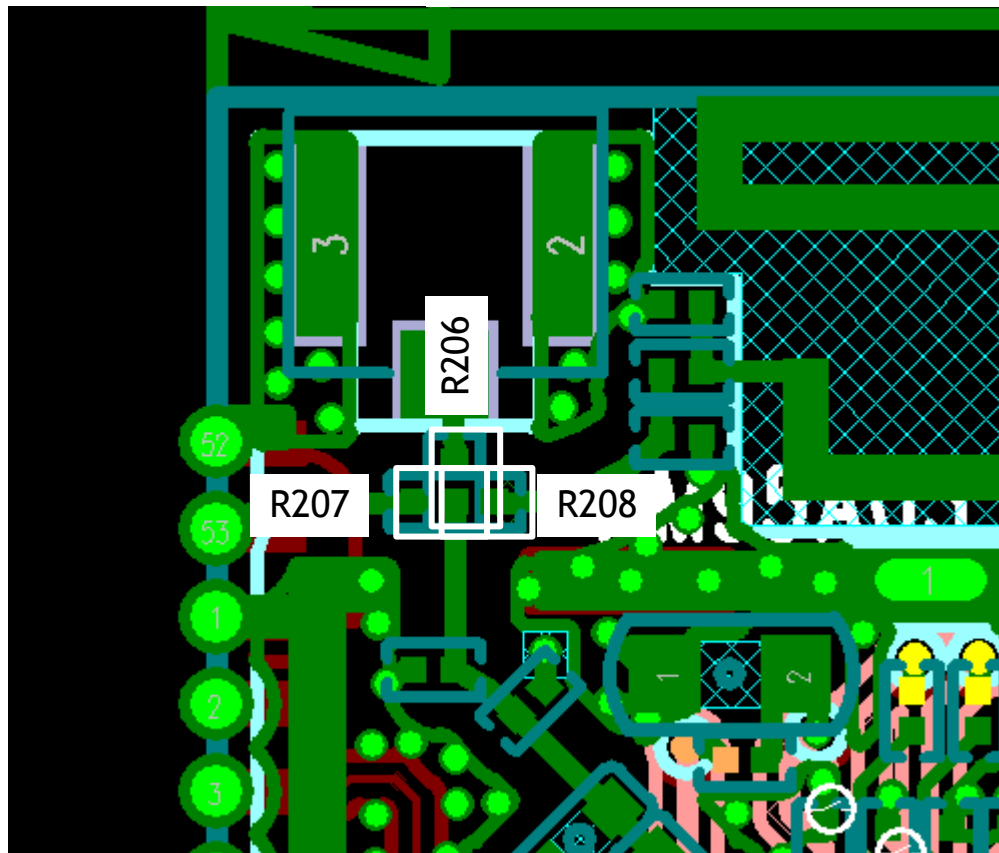
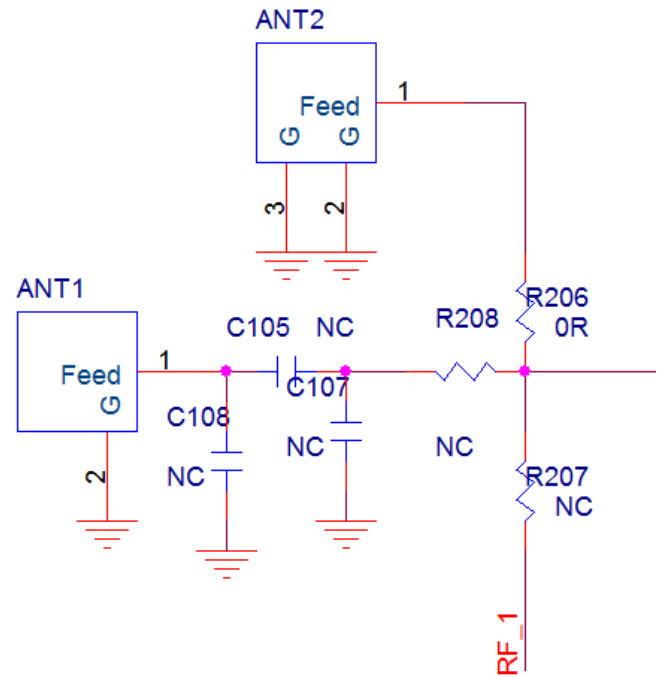


### 3.3 Pin connection table



## 4 Antenna hardware setup

- I-PEX/U.FL connector: R206
- External antenna: R207
- PCB antenna: R208



## 5 Peripherals support

- Debug UART: GPIOB\_[0..1]
- JTAG: GPIOE\_[0..4]

### 5.1 Pin function table setup

- Multiple functions are supported by group setup.
- For example: GPIOA\_6(Rx), GPIOA\_7(Tx), GPIOA\_3(RTS) and GPIOA\_5(CTS) are used if UART0 function. GPIOA\_3(RTS) and GPIOA\_5(CTS) can not be used as other functions.
- For example: GPIOC\_0, GPIOC\_1, GPIOC\_2, GPIOC\_2, GPIOC\_3 are used if PWM is occupied. GPIOC\_1(PWM1) and GPIOC\_2(PWM2) can not be used as other functions.

PIN name	JTAG	SDD	SDH	MII	UART Group	I2C Group	SPI Group	I2S Group	PCM Group	WL_LED	PWM	ETE	WKDT	GPIO INT	Default State	SCHMT
GPIOA_0		SD_D2	SD_D2	MII_RX_CK	UART2_IN		SPI1_MISO							GPIO_INT	PH	0
GPIOA_1		SD_D3	SD_D3	MII_RXD0	UART2_CTS		SPI1_MOSI							GPIO_INT	HI	
GPIOA_2		SD_CMD	SD_CMD	MII_RXD1	UART2_RTS		SPI1_CLK								PH	0
GPIOA_3		SD_CLK	SD_CLK	MII_RXD2	UART0_RTS										PH	0
GPIOA_4		SD_D0	SD_D0	MII_RXD3	UART2_OUT		SPI1_CS								PH	
GPIOA_5		SD_D1	SD_D1	MII_RXDV	UART0_CTS								D_SBY0		PH	
GPIOA_6		SD_INT	SD_CD	MII_RXERR	UART0_IN										PH	
GPIOA_7			SD_WP	MII_COL	UART0_OUT										HI	
GPIOB_0					UART_LOG_OUT							ETE0	D_SLPO		HI	
GPIOB_1					UART_LOG_IN					WL_LED0		ETE1			PH	
GPIOB_2												ETE2			HI	0
GPIOB_3												ETE3		GPIO_INT	PH	
GPIOB_4										WL_LED0	PWM0			GPIO_INT	PH	
GPIOB_5										WL_LED0	PWM1				PH	0
GPIOC_0				MII_TXD2	UART0_IN		SPI0_CS0	I2S1_WS	PCM1_SYNC		PWM0	ETE0			HI	
GPIOC_1				MII_TXD1	UART0_CTS		SPI0_CLK	I2S1_CLK	PCM1_CLK		PWM1	ETE1		GPIO_INT	HI	0
GPIOC_2				MII_TXD0	UART0_RTS		SPI0_MOSI	I2S1_SD_TX	PCM1_OUT		PWM2	ETE2			HI	
GPIOC_3				MII_TX_CK	UART0_OUT		SPI0_MISO	I2S1_MCK	PCM1_IN		PWM3	ETE3		GPIO_INT	HI	0
GPIOC_4				MII_TXD3			SPI0_CS1	I2S1_SD_RX						GPIO_INT	HI	
GPIOC_5				MII_TXEN			SPI0_CS2							GPIO_INT	HI	0
GPIOD_4				MII_MDC	UART2_IN	I2C0_SDA	SPI1_CS		PCM1_SYNC		PWM0	ETE0		GPIO_INT	PH	0
GPIOD_5				MII_MDIO	UART2_CTS	I2C0_SCL	SPI1_CLK		PCM1_CLK		PWM1	ETE1	D_SBY2	GPIO_INT	PH	0
GPIOD_6					UART2_RTS	I2C1_SCL	SPI1_MOSI	I2S0_SD_RX	PCM1_OUT		PWM2	ETE2		GPIO_INT	PH	0
GPIOD_7					UART2_OUT	I2C1_SDA	SPI1_MISO		PCM1_IN		PWM3	ETE3		GPIO_INT	PH	0
GPIOE_0	JTAG_TRST				UART0_OUT	I2C2_SCL	SPI0_CS0	I2S0_WS	PCM0_SYNC		PWM0				PH	0
GPIOE_1	JTAG_TDI				UART0_RTS	I2C2_SDA	SPI0_CLK	I2S0_CLK	PCM0_CLK		PWM1			GPIO_INT	PH	0
GPIOE_2	JTAG_TDO				UART0_CTS	I2C3_SCL	SPI0_MOSI	I2S0_SD_TX	PCM0_OUT		PWM2			GPIO_INT	PH	0
GPIOE_3	JTAG_TMS				UART0_IN	I2C3_SDA	SPI0_MISO	I2S0_MCK	PCM0_IN		PWM3		D_SBY3	GPIO_INT	PH	0
GPIOE_4	JTAG_CLK					I2C3_SCL	SPI0_CS1								PH	0



## 5.2 Peripheral Descriptions

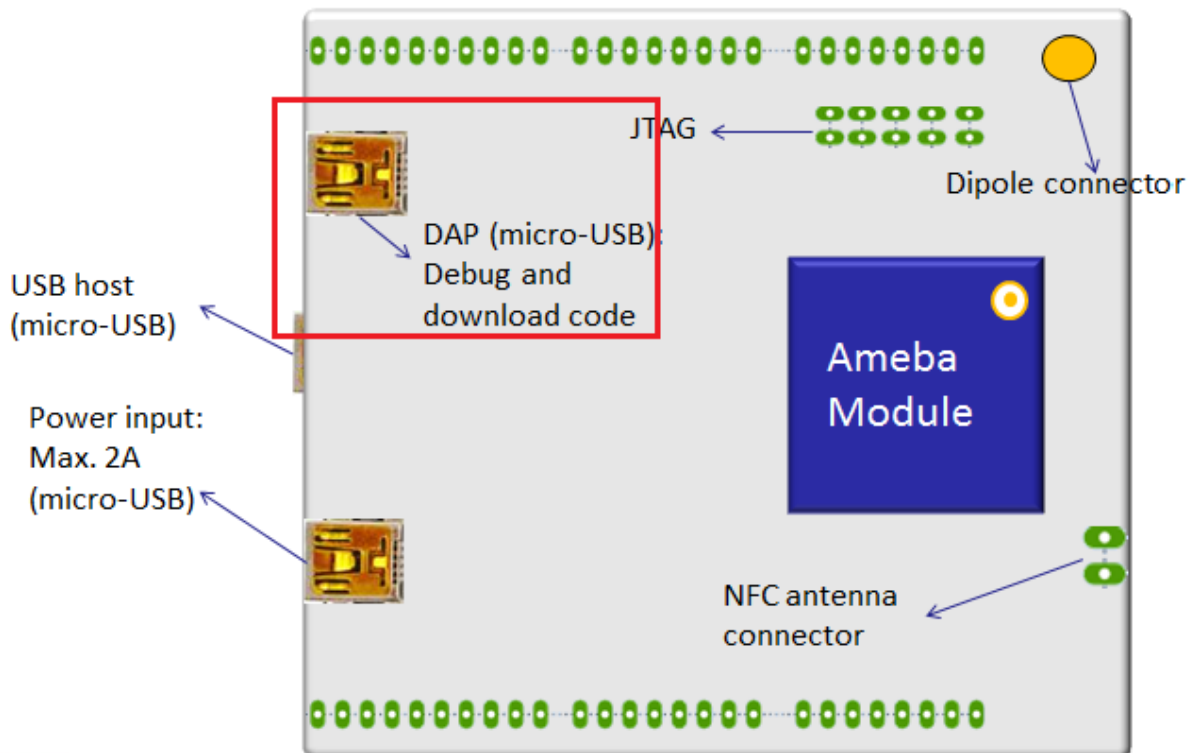
		<b>Baud rate</b>
UART	UART_LOG	38400 Hz
	UART0	4 MHz
	UART2	4 MHz
		<b>Clock rate</b>
SPI	SPI0_Master	20.8 MHz
	SPI0_Slave_TRx	4.1 MHz
	SPI1_Master	41.6 MHz
	SPI1_Slave_TRx	--
		<b>Clock rate</b>
I2C	Standard mode	0~100 kb/s
	Fast mode	<400 kb/s
	High-speed mode	<3.4Mb/s

## 6 Hardware configuration

### 6.1 CMSIS-DAP

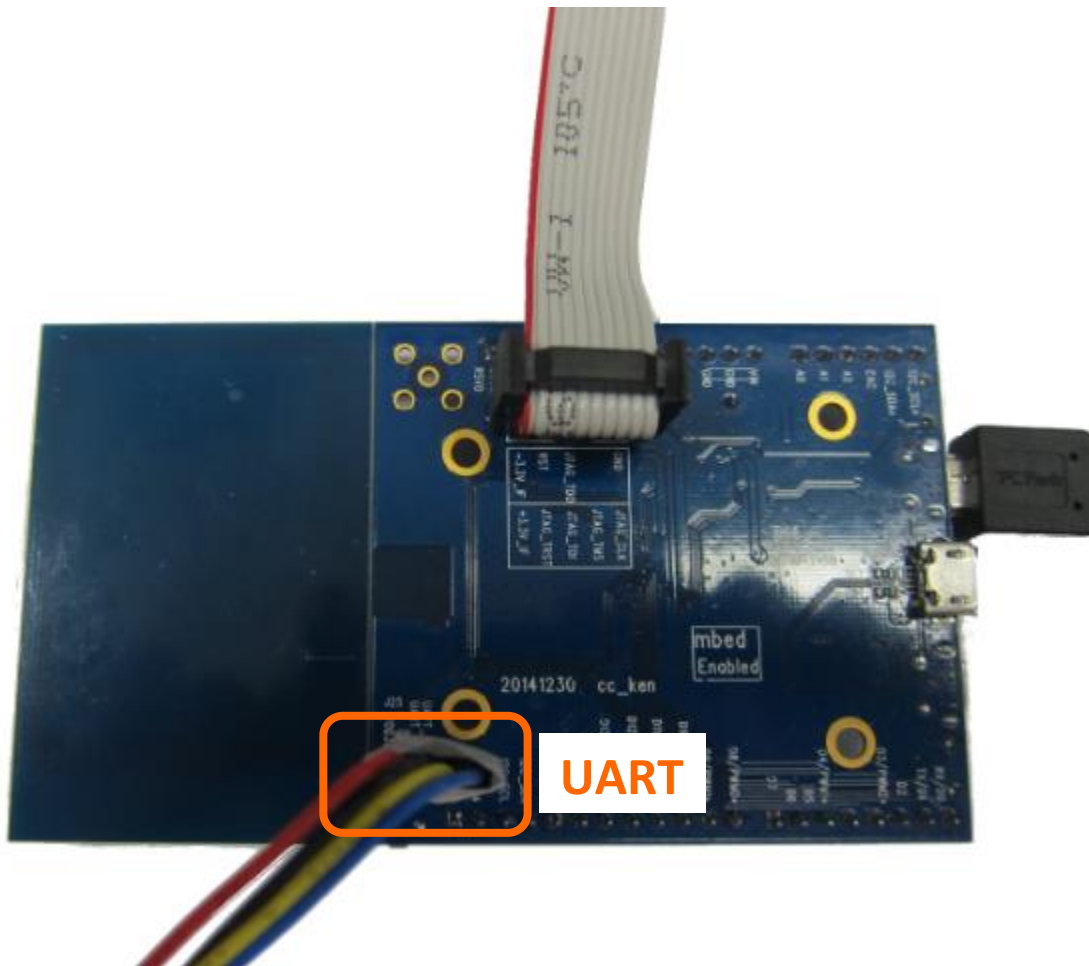
RTL-AMEBA\_DEV01 supports CMSIS-DAP debugger. It requires installing “serial to USB driver” at first. Serial to USB driver can be found in tools\serial\_to\_usb\mbedWinSerial\_16466.

Connect board to the PC with micro-USB cable.



### 6.2 J-Link/JTAG

Weld JTAG and log UART connectors to HDK board and connect with pitch 2.54mm 2x5pins connector. It is recommended to weld the connector on the bottom side. Users can connect extension boards from top side.

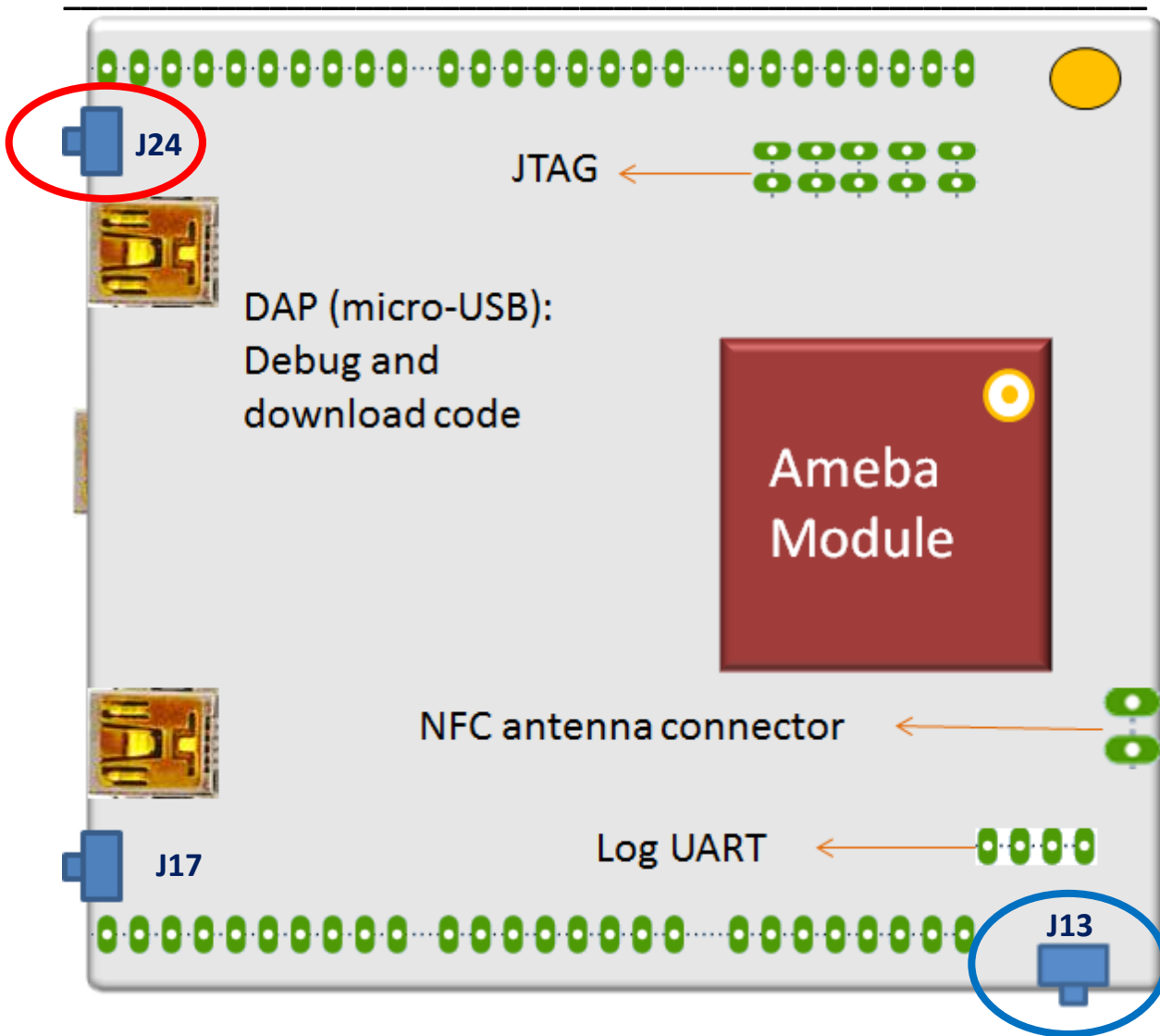


Dupont Line or 2.54mm 2x5 pins connector.



### *Power On(Disable DAP mode)*

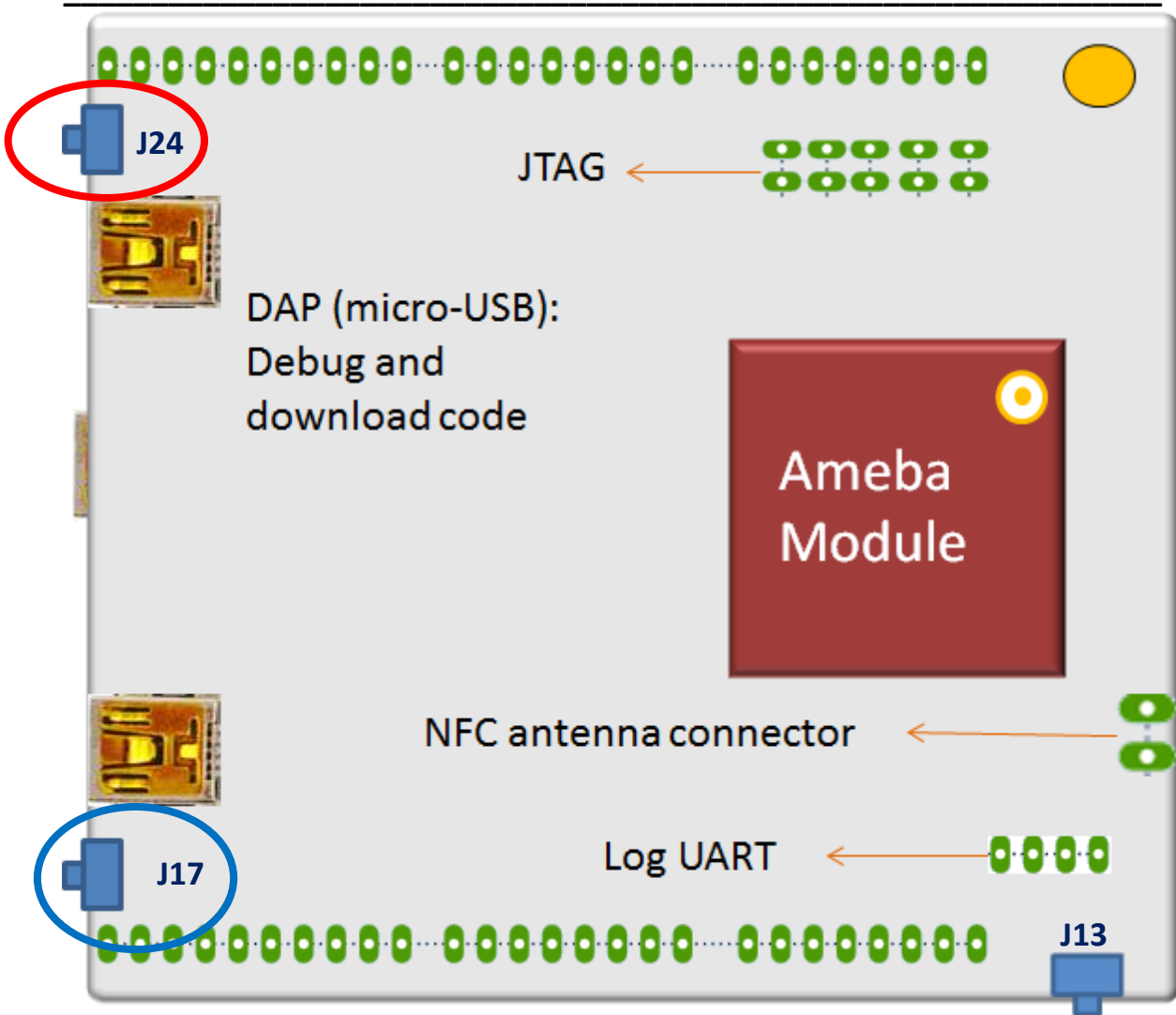
Holding TGT\_NRESET button (J24, red-circled) then press Pdn button (J13, blue-circled). Release the button after power on.



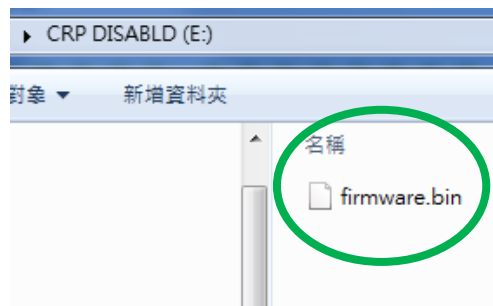
## 6.3 DAP mode

In DAP mode, the DAP firmware can be updated.

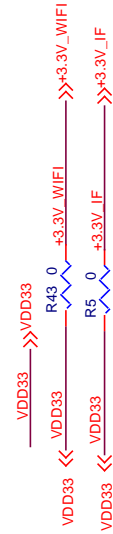
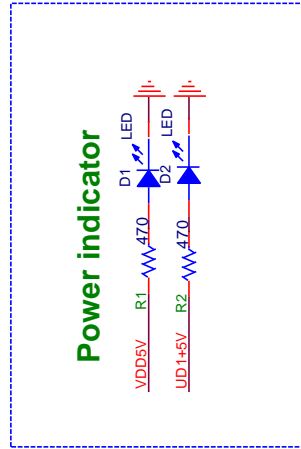
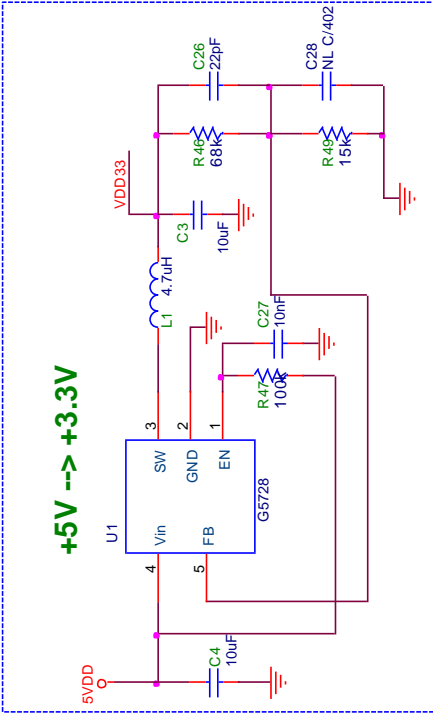
Holding TGT\_NRESET button (J24, red-circled) then press nRESET button (J17, blur-circled). Then the DAP mode window will show up.



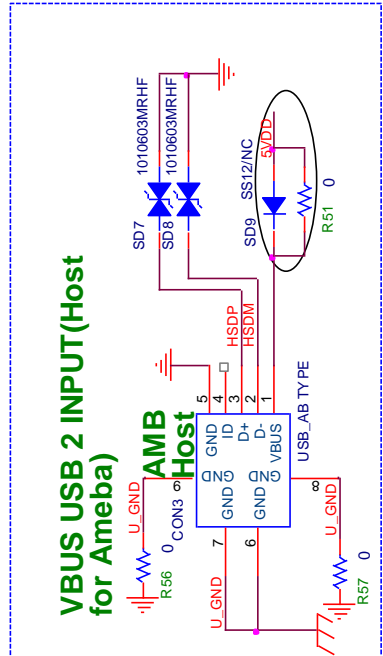
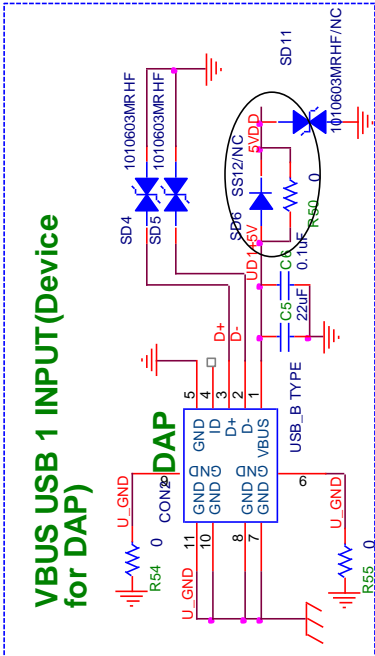
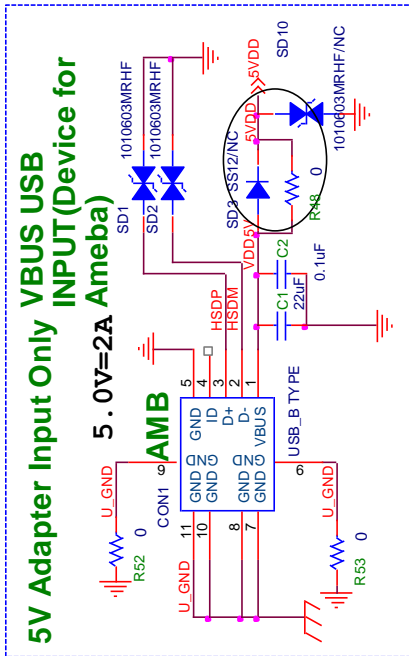
DAP window will show up when entering DAP mode.



# 7 Reference electrical schematics

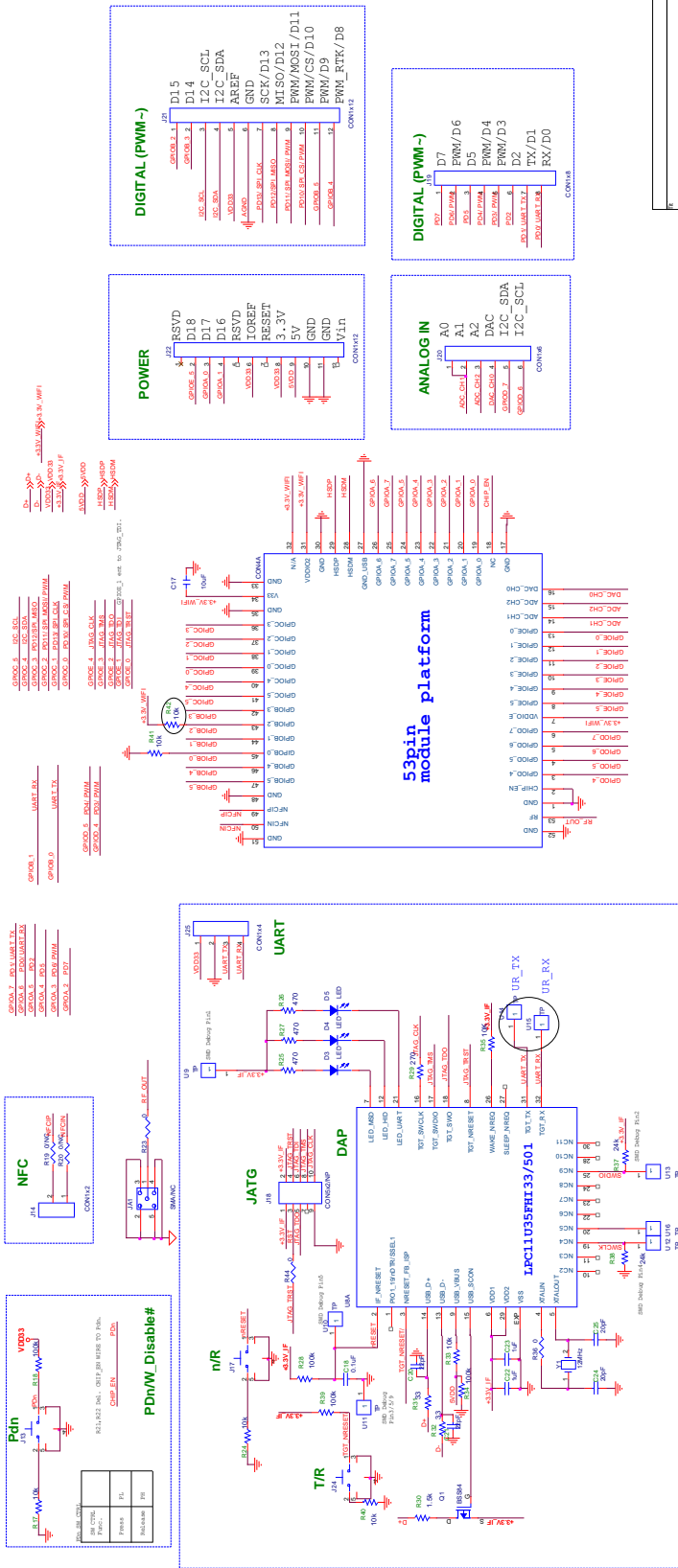


Title	
Size Custom	Document Number
Rev 1.0	<b>DC Power</b>
Sheet 1	of 2

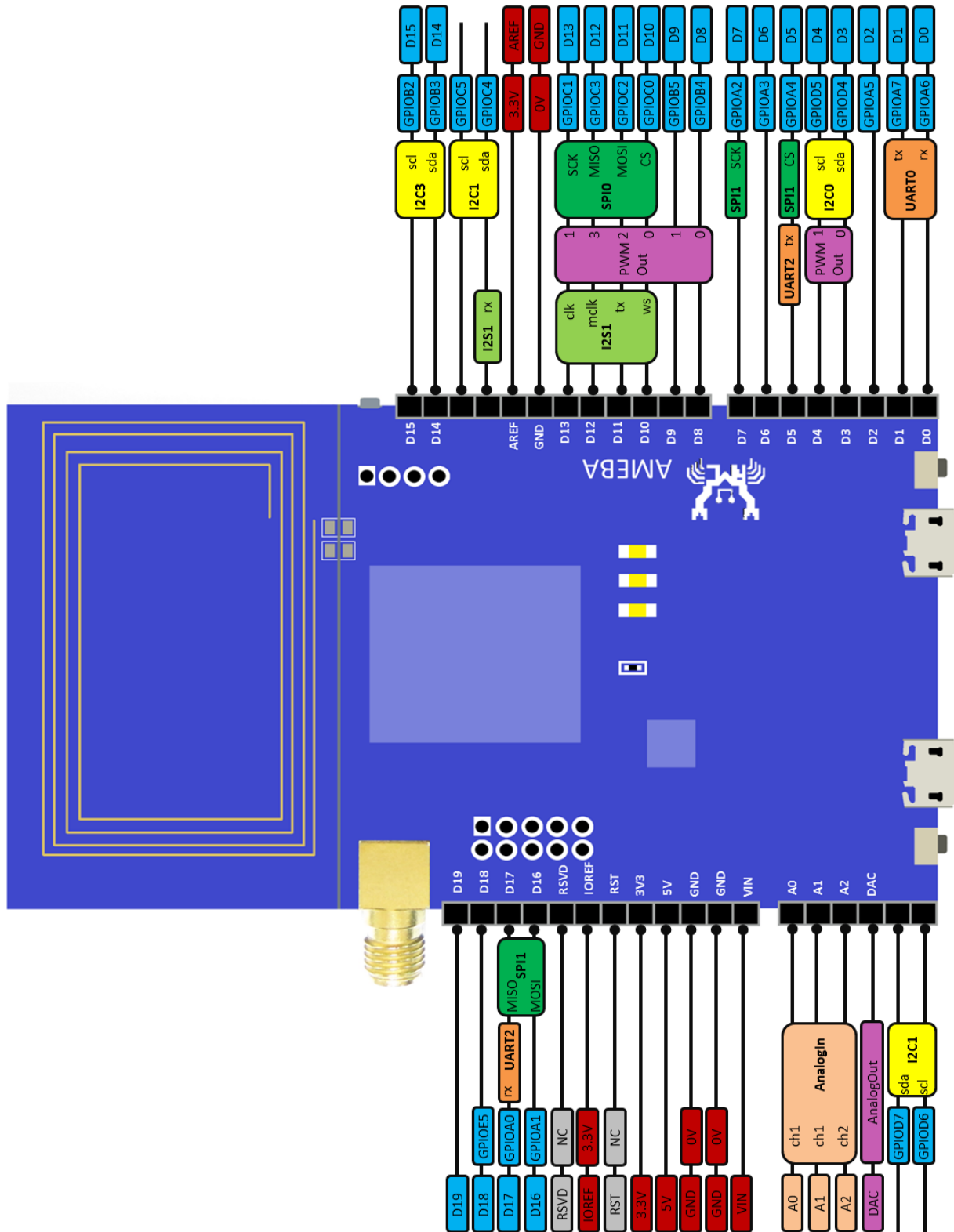




Document Number		
DAP/Ambeba		
Rev. #	Issue	Date



## 8 Ameba1 DEV01 pin out





## 9 Sensor board

- Extension board: RTL-AMEBA\_EXT B2\_2V0

