

Introduction

The AT32-Comm-EV evaluation board is designed to help users speed up the development of communication application solutions. It features CAN and RS-485 transceivers, I²C and SPI connectors. The board can be connected to Artery's AT-START board or other compatible control boards through standard Arduino™ Uno R3 connectors.

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1 Hardware layout and configuration

The AT32-Comm-EV board is connected to the AT-START board through Arduino™ connectors. In this way, the EV board is able to access the CAN, USART, I²C and SPI on embedded AT32 MCU on AT-START board. This document uses AT-START-F403A board as an example to demonstrate various functions.

In addition to the embedded AT32 MCU, the AT-START board offers standard Arduino™ Uno R3 extension connectors to be connected to the AT32-Comm-EV board.

JP1 and JP2 are used to configure whether to turn on 120 Ω termination resistors of the CAN and RS-485 transceivers, respectively. They are ON by default. The users are allowed to adjust the resistors according to their needs.

Figure 1 and *Figure 2* show these features on the AT32-Comm-EV board.

Figure 1. Top layer layout

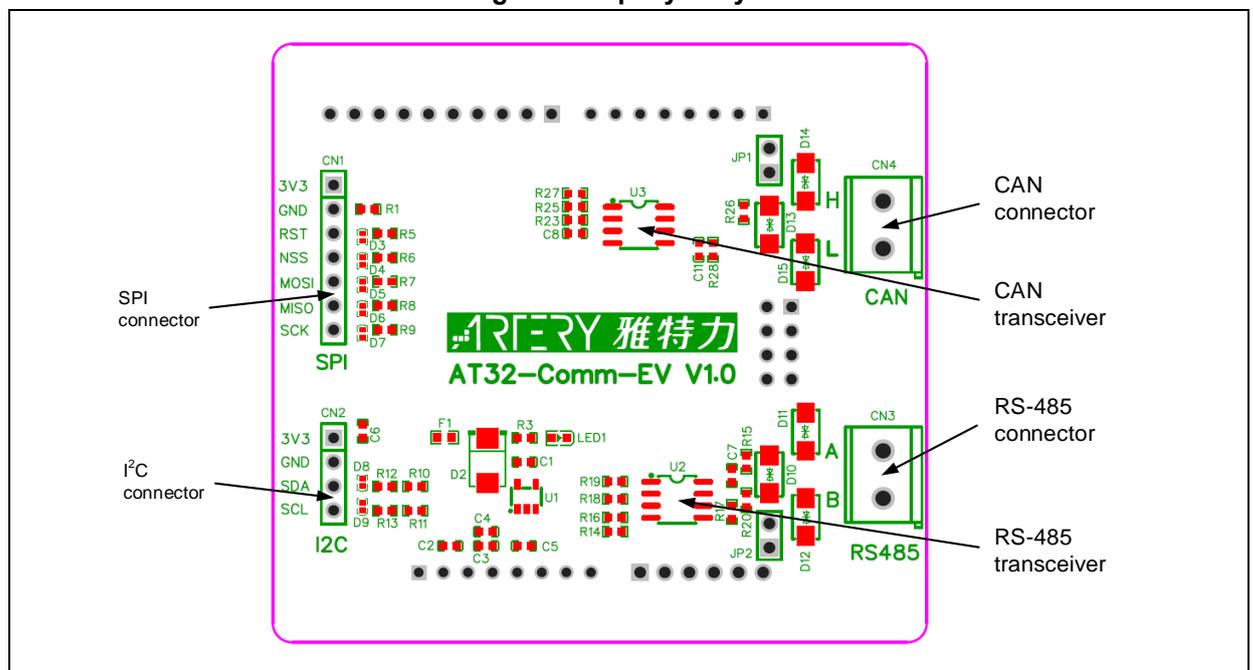
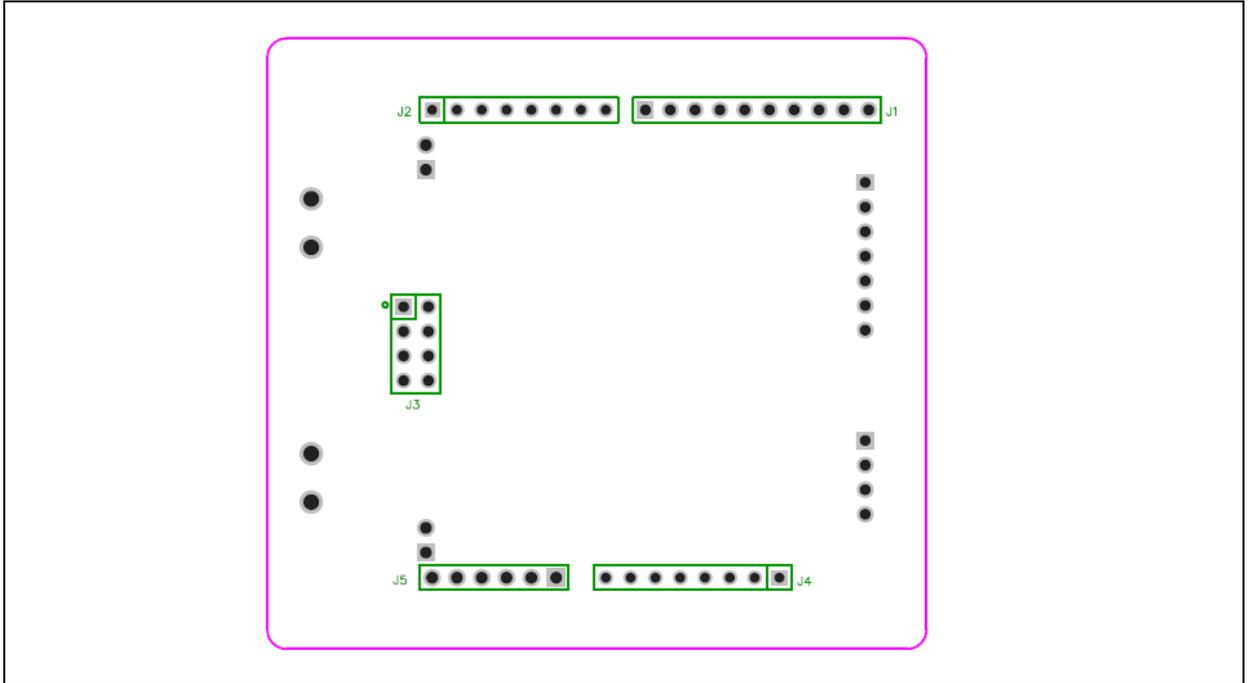


Figure 2. Bottom layer layout



2 Arduino connectors

Table 1. Arduino™ Uno R3 connectors definition

| Connector | Pin No. | Arduino pin name | AT32F403A pin name | Function | Description |
|---------------------------------------|---------|------------------|--------------------|-------------------------|-------------------------|
| J4 (power supply) | 1 | NC | - | - | - |
| | 2 | IOREF | - | 3.3 V reference voltage | 3.3 V reference voltage |
| | 3 | RESET | NRST | External reset | - |
| | 4 | 3.3V | - | 3.3 V input/output | 3.3 V power supply |
| | 5 | 5V | - | 5 V input/output | 5 V power supply |
| | 6 | GND | - | Ground | Ground |
| | 7 | GND | - | Ground | Ground |
| | 8 | VIN | - | 7~12 V input/output | - |
| J5 (analog input) | 1 | A0 | PA0 | ADC123_IN0 | - |
| | 2 | A1 | PA1 | ADC123_IN1 | USART2_RTS_DE or GPIO |
| | 3 | A2 | PA4 | ADC12_IN4 | - |
| | 4 | A3 | PB0 | ADC12_IN8 | - |
| | 5 | A4 | PC1 or PB9 | ADC123_IN11 or I2C1_SDA | - |
| | 6 | A5 | PC0 or PB8 | ADC123_IN10 or I2C1_SCL | - |
| J2 (logic input/output low bytes) | 1 | D0 | PA3 | USART2_RX | USART2_RX |
| | 2 | D1 | PA2 | USART2_TX | USART2_TX |
| | 3 | D2 | PA10 | - | - |
| | 4 | D3 | PB3 | TMR2_CH2 | - |
| | 5 | D4 | PB5 | - | - |
| | 6 | D5 | PB4 | TMR3_CH1 | - |
| | 7 | D6 | PB10 | TMR2_CH3 | I2C2_SCL |
| | 8 | D7 | PA8 | - | - |
| J1 (logic input/output high bytes) | 1 | D8 | PA9 | - | - |
| | 2 | D9 | PC7 | TMR3_CH2 | - |
| | 3 | D10 | PA15 or PB6 | SPI1_NSS or TMR4_CH1 | - |
| | 4 | D11 | PA7 | TMR3_CH2 or SPI1_MOSI | - |
| | 5 | D12 | PA6 | SPI1_MISO | - |
| | 6 | D13 | PA5 | SPI1_SCK | - |
| | 7 | GND | - | Ground | Ground |
| | 8 | AREF | - | VREF+ input/output | - |
| | 9 | SDA | PB9 | I2C1_SDA | CAN1_TX |
| | 10 | SCL | PB8 | I2C1_SCL | CAN1_RX |

| Connector | Pin No. | Arduino pin name | AT32F403A pin name | Function | Description |
|----------------|---------|------------------|--------------------|------------------|------------------|
| J3 (others) | 2 | MISO | PB14 | SPI2_MISO | SPI2_MISO |
| | 1 | 5V | - | 5 V input/output | 5 V power supply |
| | 4 | SCK | PB13 | SPI2_SCK | SPI2_SCK |
| | 3 | MOSI | PB15 | SPI2_MOSI | SPI2_MOSI |
| | 6 | RESET | NRST | External reset | - |
| | 5 | GND | - | Ground | - |
| | 8 | CS | PB12 | SPI2_CS | SPI2_CS |
| | 7 | PB11 | PB11 | - | I2C2_SDA |

3 How to use AT32-Comm-EV

Insert the AT32-Comm-EV board into the Arduino connectors on AT-START board so that two parts are connected together. After successful connection, supply 5 V and 3.3 V for the combined board according to the descriptions of [Power supply section](#) of the AT-START user manual. Then it is ready to use the AT32-Comm-EV board, in which the CN1 is used to connect to SPI device, the CN2 to I²C device, CN3 to RS-485, and CN4 to CAN.

Example codes regarding AT32-Comm-EV board can be found in BSP, including:

CAN example code:

AT32xxx_Firmware_Library_V2.x.x\project\at_start_xxx\examples\can\communication_mode;

RS-485 example code:

AT32xxx_Firmware_Library_V2.x.x\project\at_start_xxx\examples\usart\rs485;

I²C example code:

AT32xxx_Firmware_Library_V2.x.x\project\at_start_xxx\examples\i2c\eeeprom;

SPI example code:

AT32xxx_Firmware_Library_V2.x.x\project\at_start_xxx\examples\spi\w25q_flash。

4 Schematics

Figure 3. Schematic diagram (power supply, I²C and SPI)

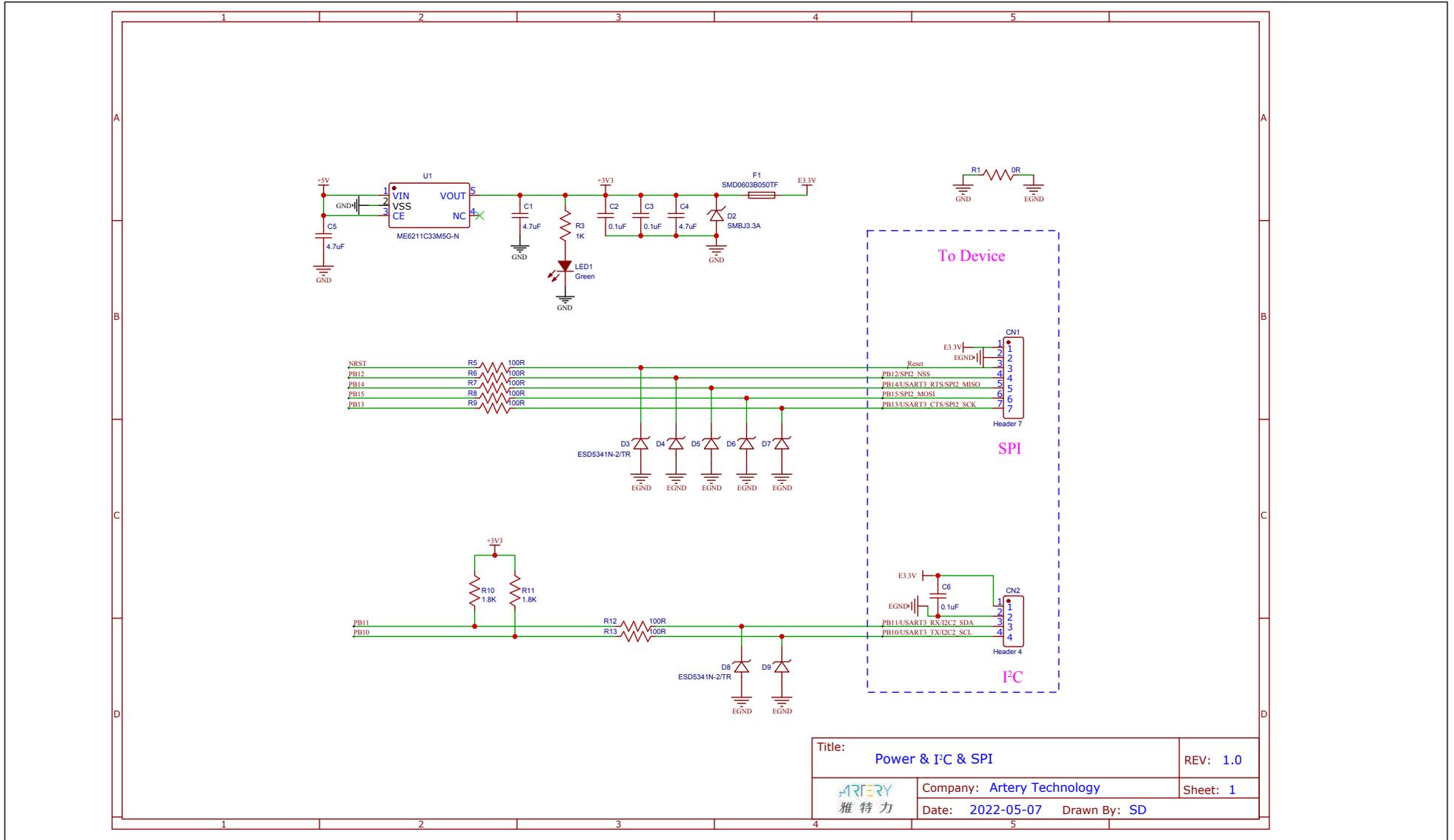
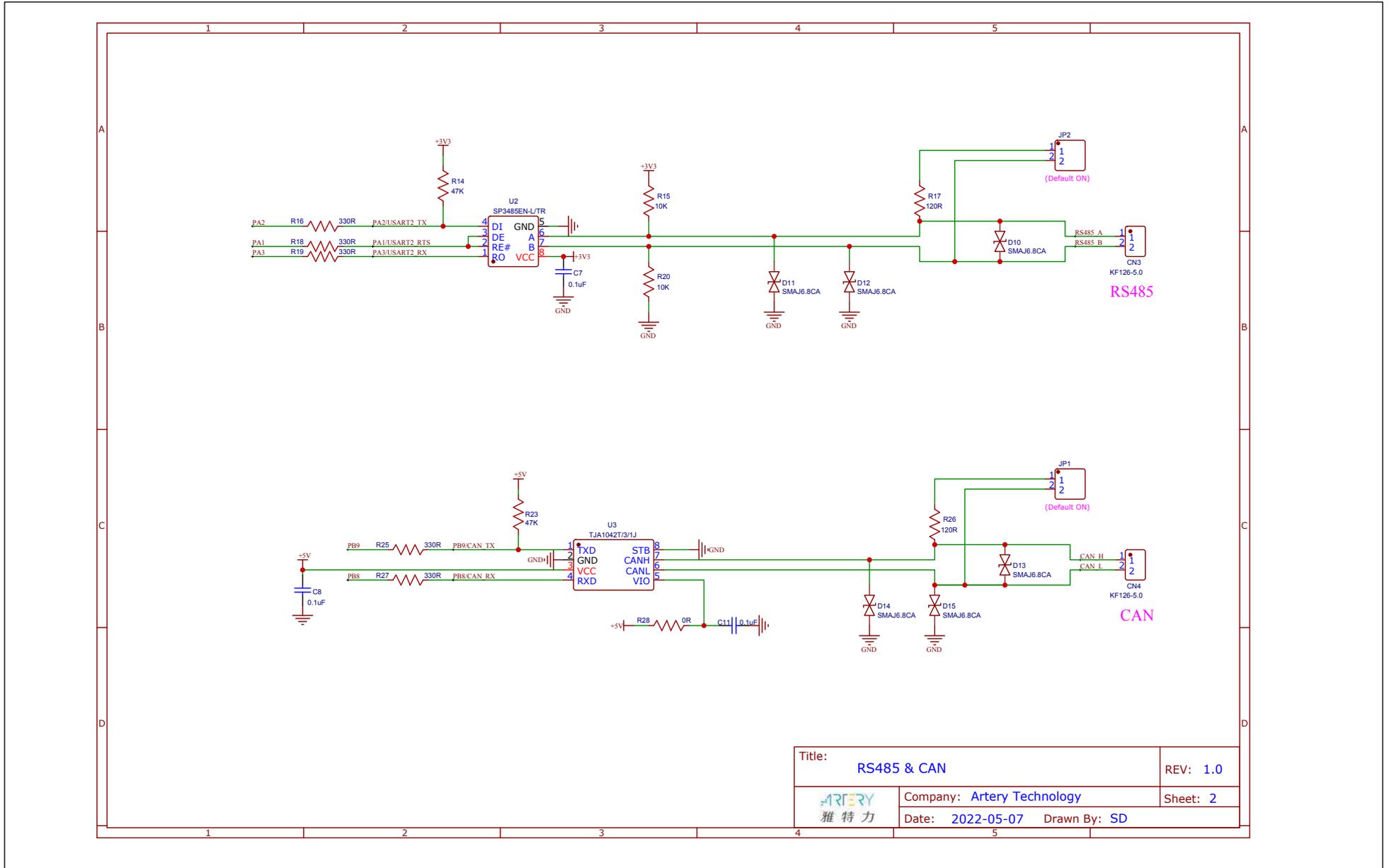
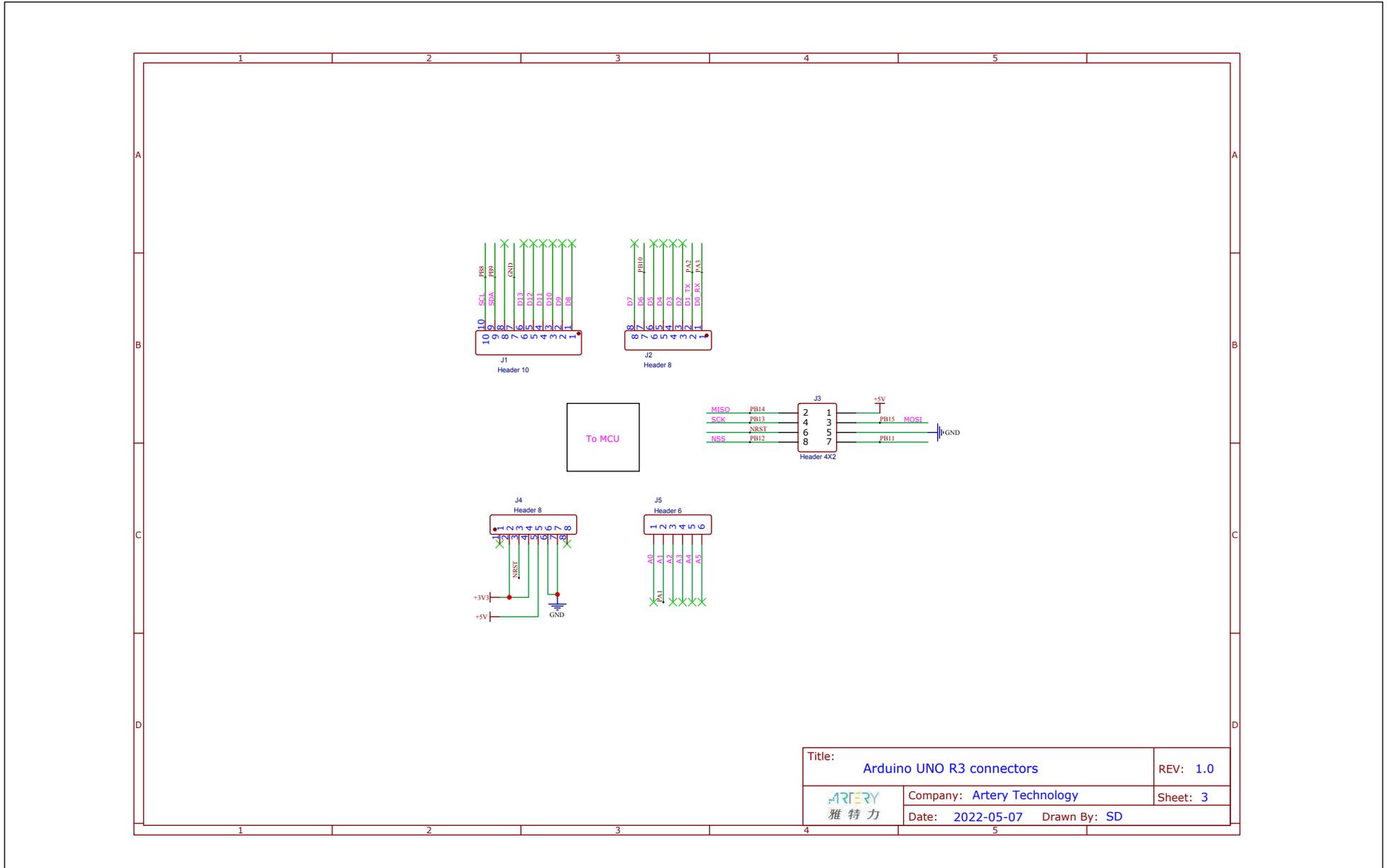


Figure 4. Schematic diagram (RS-485 and CAN)



| | | |
|----------------------------|--|--------------|
| Title: RS485 & CAN | | REV: 1.0 |
| Company: Artery Technology | | Sheet: 2 |
| Date: 2022-05-07 | | Drawn By: SD |

Figure 5. Schematic diagram (Arduino UNO R3 extension connectors)



| | | |
|-----------------------------------------|--|--------------|
| Title: Arduino UNO R3 connectors | | REV: 1.0 |
| Company: Artery Technology | | Sheet: 3 |
| Date: 2022-05-07 | | Drawn By: SD |

5 Revision history

Table 2. Document revision history

| Date | Revision | Changes |
|----------|----------|-----------------|
| 2022.5.7 | 1.00 | Initial release |

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