**SC0033**
Sample Code

# AT32Fxx MCU CAN loopback mode

## Introduction

This sample code is written to demonstrate how to use AT32 MCU's CAN loopback mode. CAN loopback mode is usually used for self testing.

*Note: This sample code is written based on Artery's V2.x.x BSP. For other versions of BSP, users should pay attention to the differences in use.*

Applicable products:

| | |
|---|---|
| Product series | AT32F403 series<br>AT32F403A series<br>AT32F407 series<br>AT32F413 series<br>AT32F415 series<br>AT32F425 series<br>AT32F402 series<br>AT32F405 series<br>AT32F423 series<br>AT32F435 series<br>AT32F437 series |

List of major peripherals used:

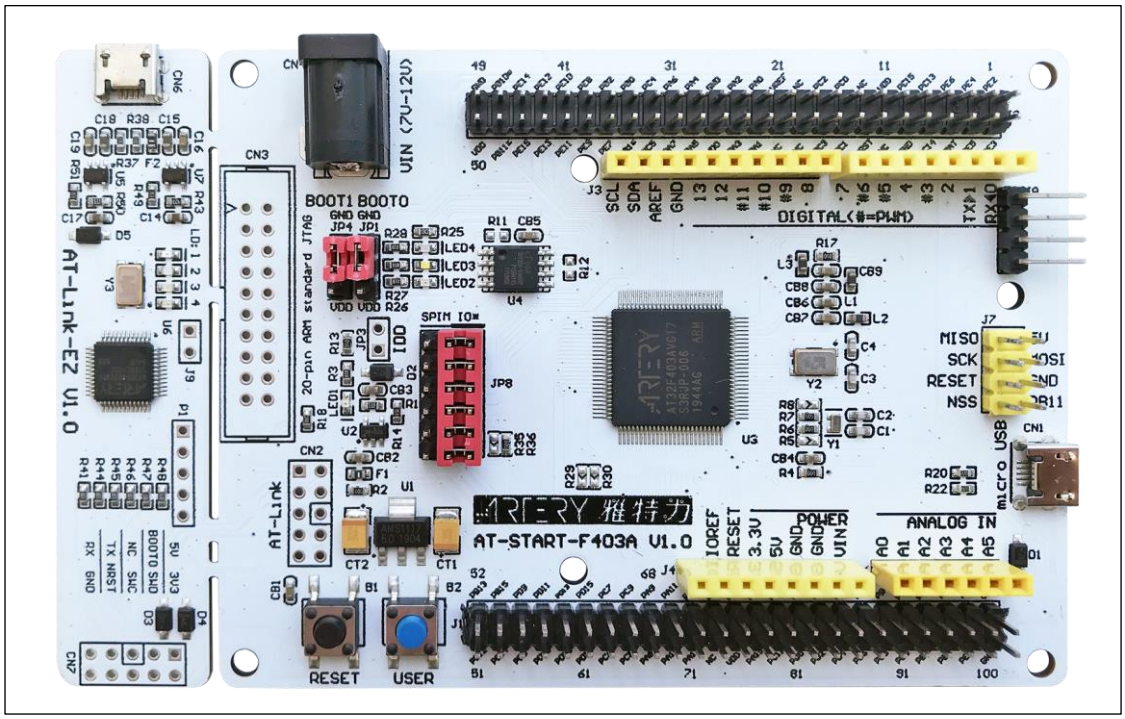
| | |
|---|---|
| Peripherals | CAN |
| | GPIO |

# 1 Quick start

## 1.1 Hardware resources

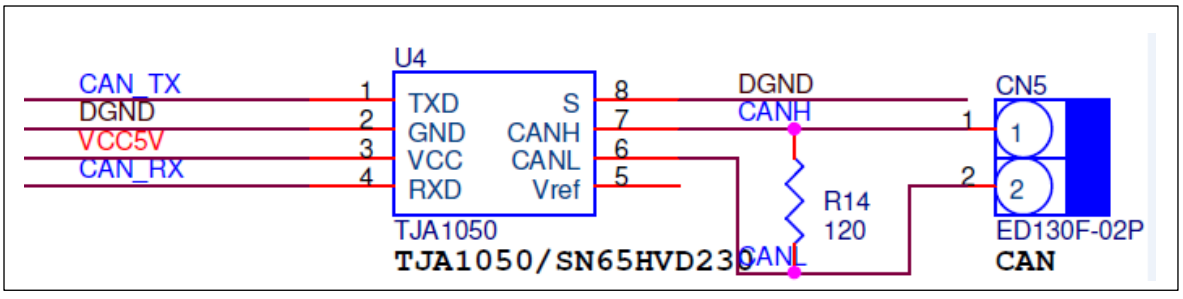
1) AT-START-F403A V1.0 evaluation board (for other product series, please use corresponding evalution board). Use GPIO PB8 and PB9.

**Figure 1. AT-START-F403A V1.0 evaluation board**




2) CAN driver IC and simple schematic

**Figure 2. CAN driver IC and circuit connection**




TJA1050 (driver IC) is connected to MCU and CAN bus analyzer. It is mainly used for data conversion.

On the MCU part:

- CAN_TX (refer to MCU's GPIOB_PB9)——TJA1050's TXD pin
- CAN_RX (refer to MCU's GPIOB_PB8)——TJA1050's RXD pin

On the CAN bus analyzer part:

- CAN1_L——TJA1050's CANL pin (refer to pin2 on CN5 in Figure 2)
- CAN1_H——TJA1050's CANH pin (refer to pin1 on CN5 in Figure 2)

3) CAN bus analyzer and its wiring

**Figure 3. CAN bus analyzer**


Note: Besides connecting to CAN1_L and CAN1_H, the CAN bus analysis device must share the same ground with MCU.

## 1.2 Software resources

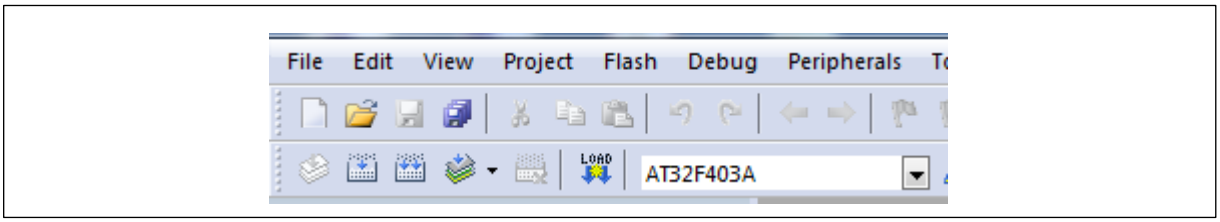
1) SourceCode
   - can_loopback_mode

*Note: All of projects are built based on Keil 5. For the need to run in other compiling environments, user can make simple adjustments according to AT32xxx_Firmware_Library_V2.x.x\project\at_start_xxx\templates.*

## 1.3 Example case

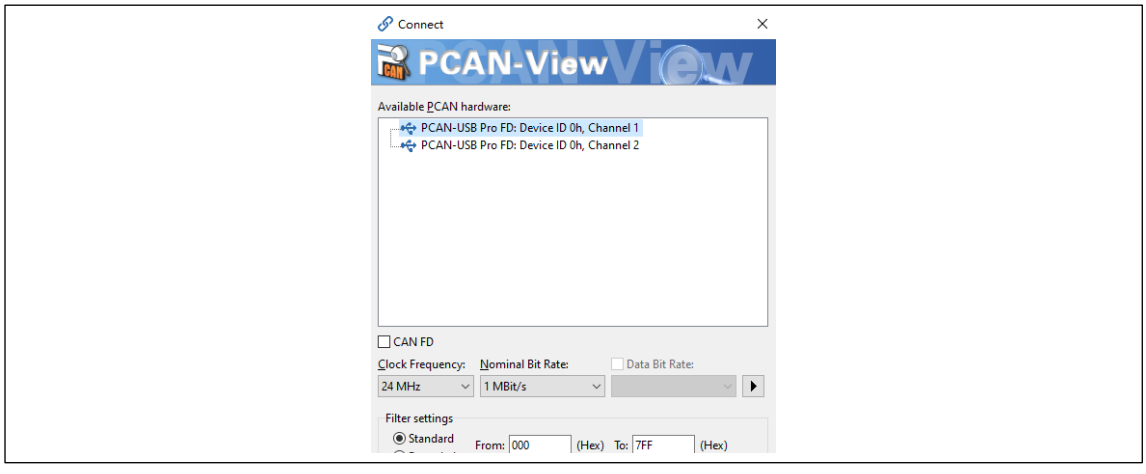
1) Open the source code ***can_loopback_mode***, compile and download it to the evaluation board
2) This test uses AT-START-F403A V1.0 evaluation board, so in Figure 4 we choose AT32F403A

**Figure 4. Choose Keil projejct**



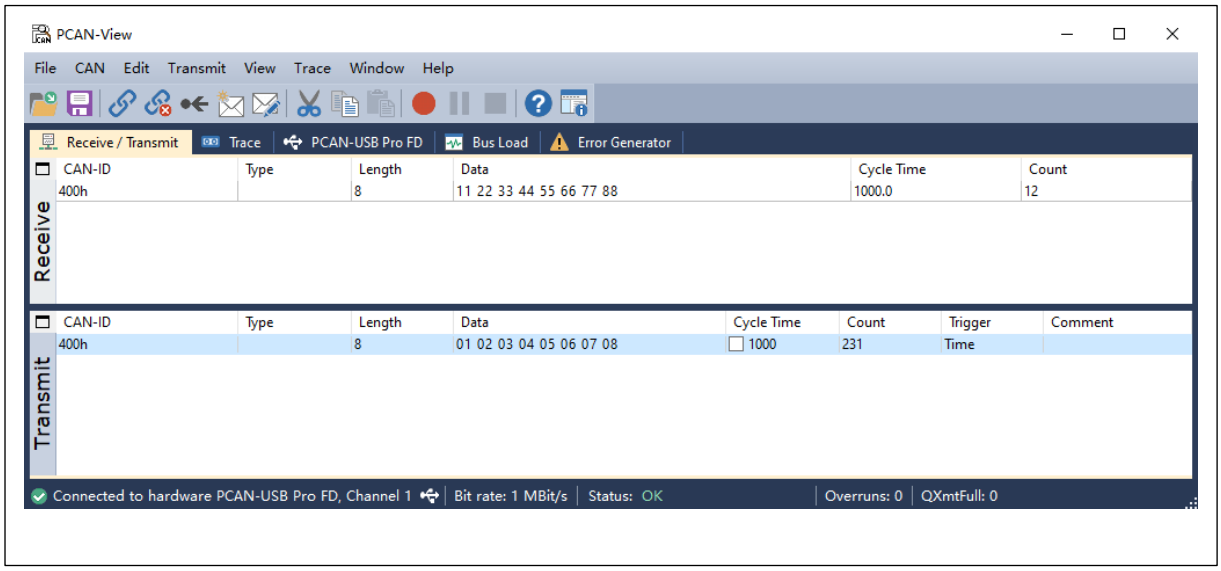

3) Open ***PCAN-tool,*** select a device and open it, select "***Clock Frequency***" and set ***1Mbit/s*** in Nominal Bit Rate, then click "***OK***"

**Figure 5. PCAN-tool settings**



4) After opening ***PCAN-tool***, You would see the following information relating to data receive and transmit.

**Figure 6. Data receive and transmit**




In "***Receive***" column, you can see data sent from MCU in real time.

In loopback mode, the status of CAN RX pin is ignored, so it is unable to send data to MCU through ***PCAN-tool***.

On MCU, its LED2 will toggle when MCU is able to send data and receive those it send. Its LED4 will toggle when MCU is sending messages at periodic intervals.

# 2 Revision history

Table 1. Document revision history

| Date | Revision | Changes |
|---|---|---|
| 2021.12.03 | 2.0.0 | Initial release |
| 2023.03.21 | 2.0.1 | Updated figures |

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