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Enable DMA for transceiver when AT32\_SPI in master/slave mode

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## Introduction

This example code demonstrates how to achieve SPI data transfer using AT32 MCU's DMA. It details how to enable DMA on both the receiver and transmitter for data transceive when SPI as a master and a slave.

*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	All AT32 series
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List of major peripherals used:

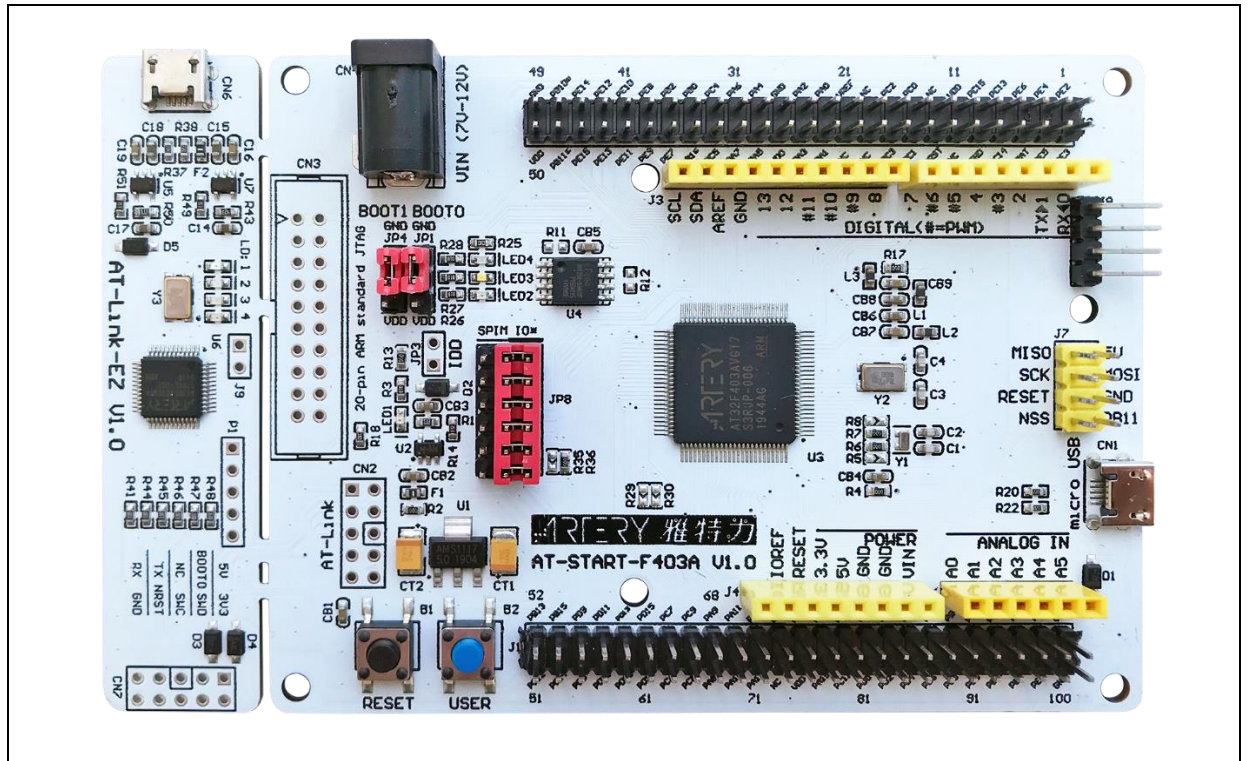
Peripherals	SPI
	DMA

# 1 Quick start

## 1.1 Hardware resources

- 1) Two AT-START-F403A V1.x evaluation boards
- 2) DuPont line

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



## 1.2 Software resources

- 1) AT32F403A MCU and AT32F403A\_407\_Firmware\_Library\_V2.0.6 (BSP version)
- 2) BSP offers Master\_Demo and Slaver\_Demo. In Master\_Demo, SPI2 is configured in master mode, while in Slaver\_Demo, SPI2 is configured in slave mode
- 3) Enable DMA for the receiver and transmitter on both master and slave sides to start transmitting a piece of data. Upon completion of transfer, both master and slave sides will check the integrity of the received data, if successful, LED4 lights up (turn green); if failed, LED2 lights up (turn red)

*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.*

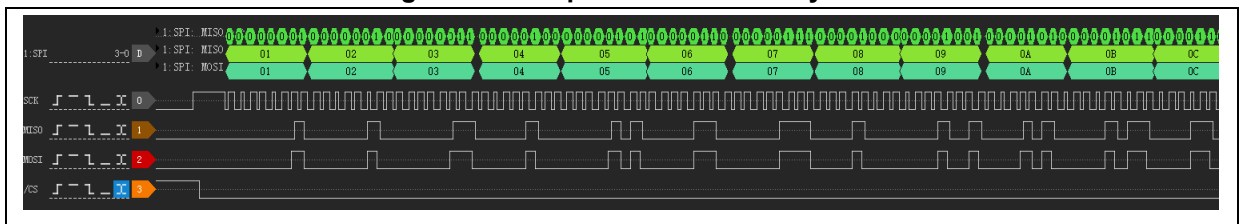
## 1.3 Example case

### 1) Hardware connection

Evaluation board 1(Board Master)	---- Evaluation board 2(Board Slaver)
PB12 (Master_NSS)	---- PB12 (Slaver_NSS)
PB13 (Master_SCK)	---- PB13 (Slaver_SCK)
PB14 (Master_MISO)	---- PB14 (Slaver_MISO)
PB15 (Master_MOSI)	---- PB15 (Slaver_MOSI)

- 2) Open “**utilities**” folder under SourceCode\SC0003\_SourceCode\_V2.0.0, go to “**SC0003\_Master\_Demo — mdk\_v5 — slave.uvprojx**”, compile and download “**master.uvprojx**” to the evaluation board 1 as Board Master; then go to “**SC0003\_Slave\_Demo — mdk\_v5 — slave.uvprojx**”, compile and download “**slave.uvprojx**” to the evaluation board 2 as Board Slave.
- 3) Supply power to both boards, if LED4 lights up (green), indicating that data received from boards are correct, if LED2 lights up (red), indicating that data received from boards are incorrect.
- 4) Besides, logic analyzer or oscilloscope can be used to view SPI waveforms.

Figure 2. Example of waveforms by LA



## 2 Revision history

Table 1. Document revision history

Date	Revision	Changes
2022.01.26	2.0.0	Initial release
2022.03.25	2.0.1	Updated the formats of this file
2022.06.17	2.0.2	Updated descriptions of MOSI pin

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