SC0066
Sample Code

AT32F421_USART LIN_2.2A Protocol Frame

Introduction

This sample code is written to demonstrate how to use USART_LIN 2.2A protocol frame.

Applicable products:

Product series	AT32F421xx

List of major peripherals used:

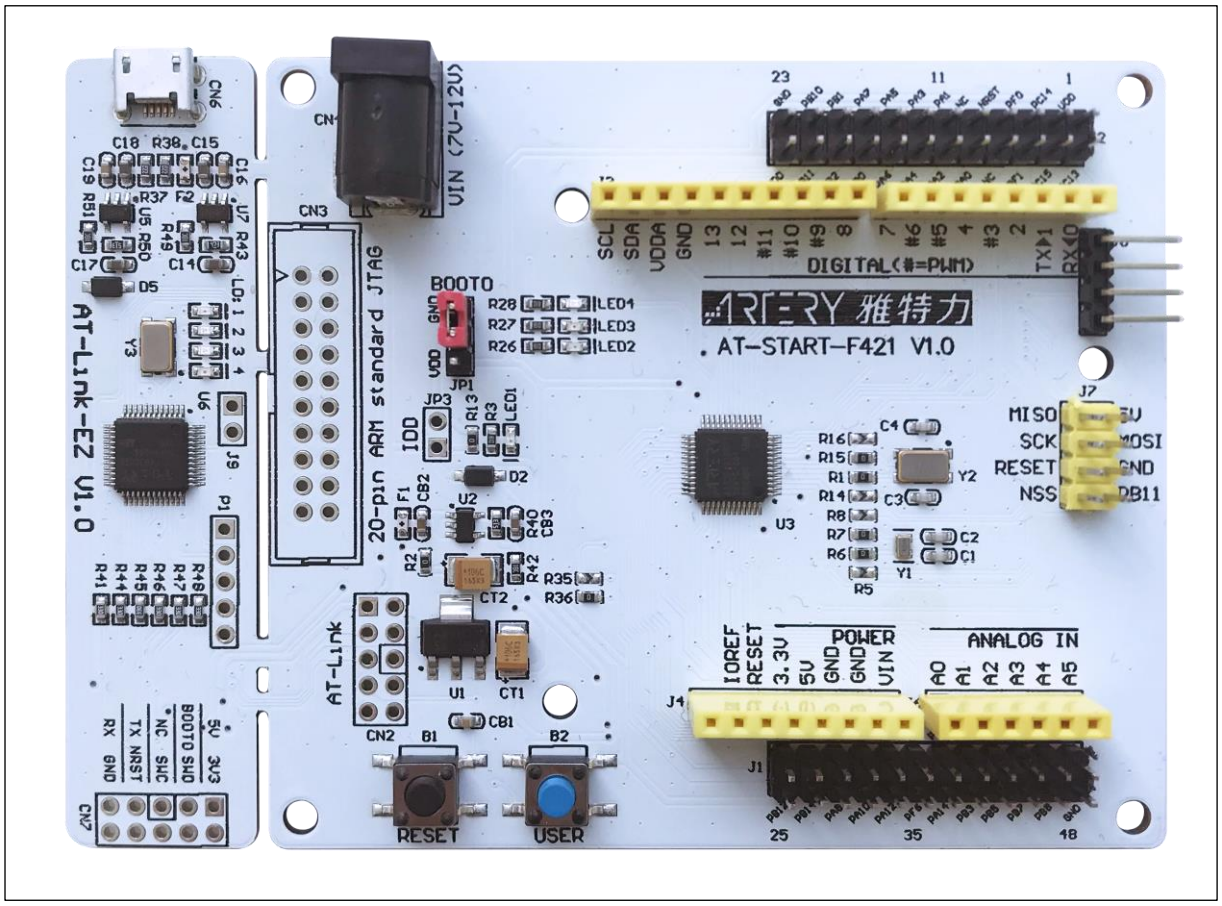
Peripherals	USART
	GPIO

1 Quick start

1.1 Hardware resources

1) Two pieces of AT-START-F421 V1.0 evaluation boards (as master and slave)

Figure 1. AT-START-F421 V1.0 evaluation board



2) PA2 / PA3 is used as LIN's TX / RX, while PA9 is used to print output information

1.2 Software resources

1) SourceCode

   - USART_LIN-2.2A_V2.0.0 source code

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 AT32F421_Firmware_Library_V2.x.x/project/at_start_f421/templates.

1.3 Example case

1) Open USART_LIN-2.2A_V2.0.0 source code lin_master and lin_slave, compile and download them to the master and slave board respectively
2) Cross connect PA2 on one board to PA3 on another board, open serial interface assistant and view information (including master-sent data and slave-received data).

   Note: when testing, first reset slave and then the master.

Figure 2. Test result

Slave：

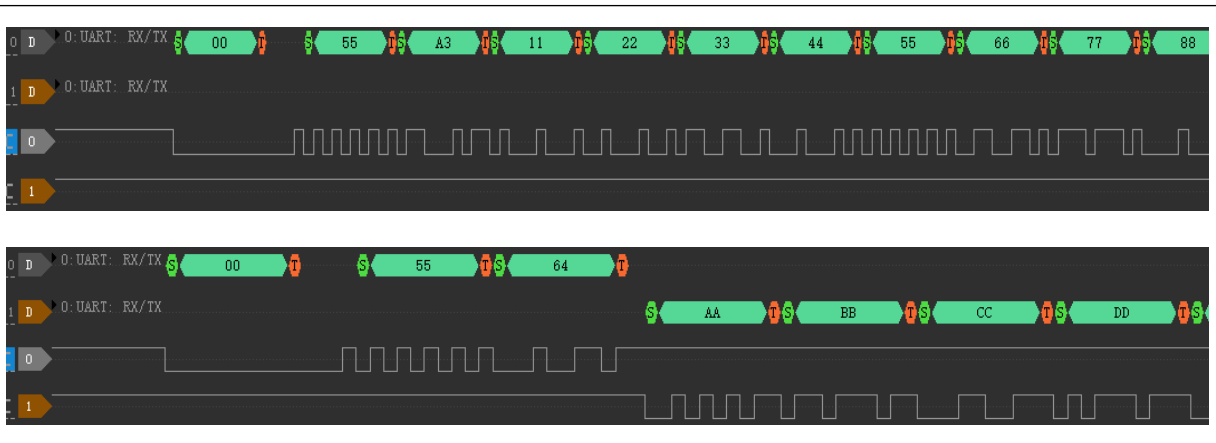
```
start lin slave layer test..
before slave recive data:
frame PID: 0x23.
data LEN: 8Bytes.
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
after slave recive data:
frame PID: 0x23.
data LEN: 8Bytes.
0x11 0x22 0x33 0x44 0x55 0x66 0x77 0x88
before slave return response:
frame PID: 0x24.
data LEN: 4Bytes.
0xAA 0xBB 0xCC 0xDD
after slave return response:
frame PID: 0x24.
data LEN: 4Bytes.
0xAA 0xBB 0xCC 0xDD
test end.
```

Master：

```
start lin master layer test..
before master send data:
frame PID: 0x23.
data LEN: 8Bytes.
0x11 0x22 0x33 0x44 0x55 0x66 0x77 0x88
after master send data:
frame PID: 0x23.
data LEN: 8Bytes.
0x11 0x22 0x33 0x44 0x55 0x66 0x77 0x88
before master recive response:
frame PID: 0x24.
data LEN: 4Bytes.
0x00 0x00 0x00 0x00
after master recive response:
frame PID: 0x24.
data LEN: 4Bytes.
0xAA 0xBB 0xCC 0xDD
test end.
```

3) To obtain a clear view of test results, it is possible to use a logic analyzer to display LIN master and slave TX waveforms.

Figure 3. Clear view of test results



2 Revision history

Table 1. Document revision history

Date	Revision	Changes
2021.12.01	2.0.0	Initial release

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