SC0121
Sample Code

USART Software Auto Baud Rate Detection

Introduction

This sample code demonstrates how to perform automatic USART baud rate detection through software control.

Applicable products:

Product series	AT32 Family

Main peripherals used:

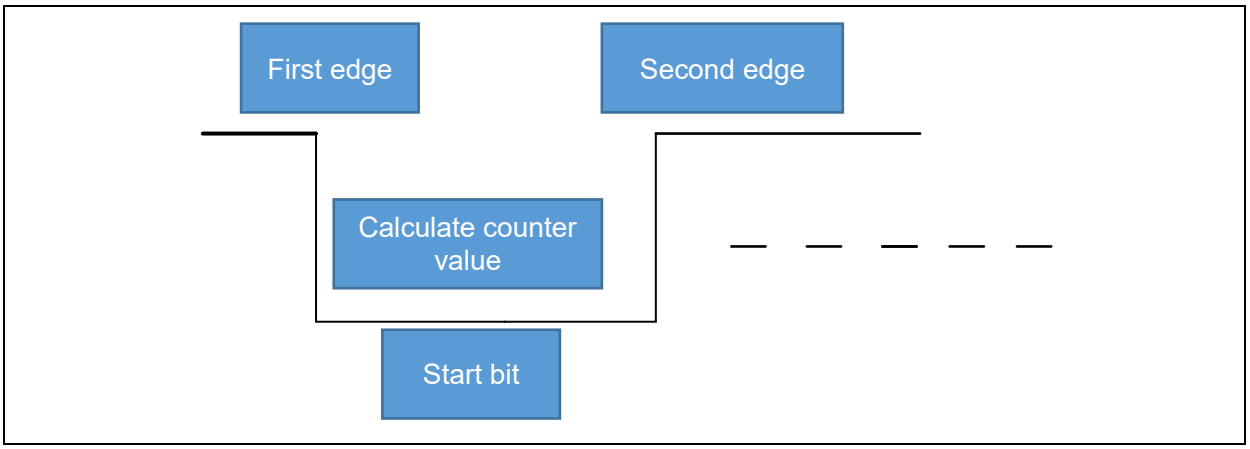
Peripherals	USART
	TMR
	EXINT

1 Overview

This sample code demonstrates how to perform auto baud rate detection on USART through software control.

Principle:

By measuring the width of USART start bit, the software can calculate USART frequency division value so as to achieve auto baud rate detection.



Note: During measurement stage, the first bit of the fist byte sent by Host must be "1", that is, the first bit after the start bit must be 1. For example, the host can send 0Xa1, 0x55, 0x33…

Follow the procedures below:

1）Initialize TMR and EXINT

2）Monitor USART RX though EXINT. When there is a rising or falling edge, write down the current TMR value

3）When both edges (rising edge and falling edge) are generated, it indicates that the start bit measurement is finished

4）Wait for 1ms until the current byte is received.

5）Calculate the received data and the corresponding USART frequency division value

6）Send 0x55 as an acknowledgement indicating that the calibration is already complete.

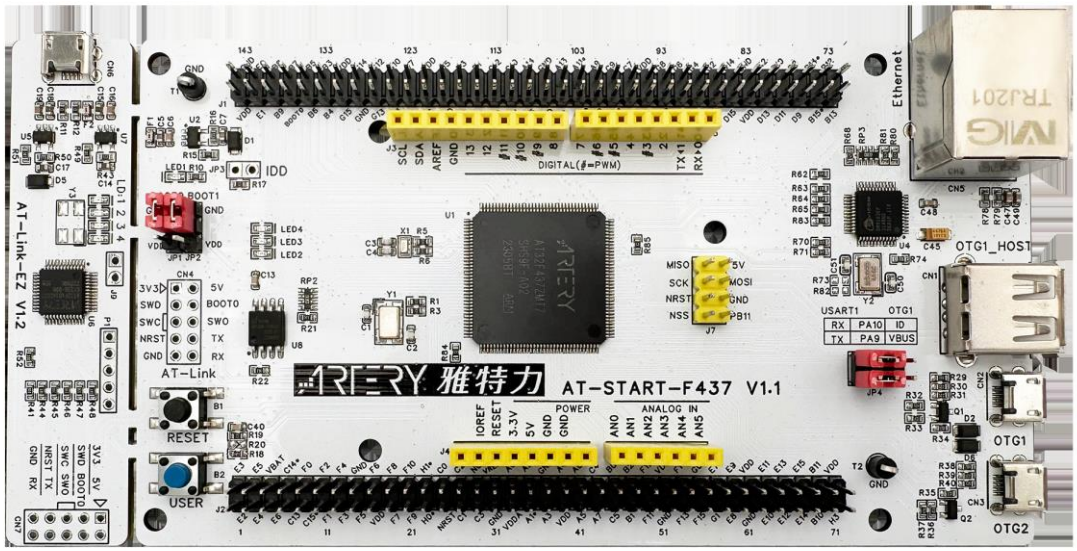
Note: This sample case uses TMR6, USART2 (PA2, PA3) as peripherals. If there is a need to use other serial interfaces or TMR, you can do it by modifying macro definitions in the code.

2 Quick start

2.1 Hardware resources

1) AT-START-F437 board

Figure 1. AT-START-F437 V1.1 evaluation board



2) USB-to-serial interface tool

2.2 Software resources

1) SC0121_SourceCode

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

2.3 Example case

1) Connect the RX and TX of USB-to-serial interface to the TX (PA2) and RX(PA3) of USART2
2) Open “SourceCode\SC0121_SourceCode_V2.0.0\utilities\ usart_auto_baud_rate_detection\ mdk_v5”
3) Compile code and download it to the evaluation board
4) Open the serial interface assistant on PC, select a serial interface and send 0x55
5) If PC can receive 0x55, it indicates that auto baud rate detection is successful.

3 Revision history

Table 1. Document revision history

Date	Revision	Changes
2023.09.22	2.0.0	Initial release

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