
2-wire Serial Macros

Features:

- Setting the 2-wire Serial Bit Rate Register
- Clearing the 2-wire Serial Interrupt Flag
- Enabling/Disabling the 2-wire Serial Acknowledge Flag
- Asserting the 2-wire Serial Stop Condition Flag
- Enabling/Disabling the 2-wire Serial Interface Flag
- Enabling/Disabling the 2-wire Serial Call Generation

Introduction

Atmel's AT94K 2-wire serial macros are provided to familiarize and assist customers in programming the AVR[®] microcontroller as part of the AT94K FPSLIC[™] product offering. The 2-wire serial macros provide customers with a simple method for setting the 2-wire serial features on the AT94K device.

Application

Atmel's AT94K 2-wire serial macros are implemented in such a way that they can be used interchangeably between embedded C compilers, assuming that the proper register definitions have been made in the ioat94k.h file. The ioat94k.h file must declare the register names corresponding to the names found in the Atmel AT94K device datasheet. These macros have been extensively tested with ImageCraft ICCAVR v6.13a and above and IAR Systems IAR Embedded Workbench AT90S v1.50B/WIN compilers.

A software macro is essentially a name with a corresponding text string, which is commonly referred to as the body. When a macro is called, the compiler replaces the name with the corresponding macro body.

To use the AT94K 2-wire serial macros, the user must include the at94k_serial.h file available from the AT94K area of the Atmel web site. Furthermore, most of the AT94K 2-wire serial macros require a parameter, either ENABLE, DISABLE, or a value. The AT94K 2-wire serial macros are used in the following manner:

- 2-wire serial feature without a parameter: SERIAL_MACRO_NAME();
- 2-wire serial feature with a parameter: SERIAL_MACRO_NAME(PARAMETER);



**AT94K Series
Field
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**Application
Note**





Description

Macro Name: SERIAL_BITRATE

Parameter(s): bitRateDivFactor

Description: Selects the division factor for the bit rate generator. The bit rate generator is a frequency divider, which generates the SCL clock frequency in the master modes according to the following equation below. The bitRateDivFactor may range in value from 0 to 255 decimal.

$$\text{Bit Rate (SCL Frequency)} = (\text{CPU Clock Frequency}) / (16 + 2(\text{bitRateDivFactor}))$$

Macro Name: SERIAL_CLEAR_INT

Parameter(s): None

Description: This bit is set by hardware when the 2-wire serial interface has finished its current job and expects application software response. While the I2INT bit is set, the bus SCL clock line low period is stretched. The I2INT flag must be cleared by software writing logic one to it.

Note: Executing the corresponding interrupt service routine automatically clears this flag. Furthermore, the clearing of this flag starts the operation of the 2-wire serial interface, thus all operations must be completed before the I2INT flag is cleared.

Macro Name: SERIAL_ACK_FLAG

Parameter(s): ENABLE or DISABLE

Description: If the I2EA bit is enabled (one), the Acknowledge (ACK) pulse is generated on the 2-wire serial bus if the following conditions are met:

1. The device's own slave address has been detected
2. A general call has been received, while the I2GCE bit in the I2AR is set
3. A data byte has been received in master receiver or slave receiver mode

By disabling (zero) the I2EA bit, the device can be virtually disconnected from the 2-wire serial bus temporarily. Address recognition can resume by enabling the I2EA bit.

Macro Name: SERIAL_STOP_CONDITION

Parameter(s): None

Description: In master mode, setting the serial stop condition bit will generate a STOP condition on the 2-wire serial bus. When the STOP condition is executed on the bus, the bit is cleared automatically. In slave mode, the bit can be used to recover from an error condition. No STOP condition is generated, however the device returns to a well-defined un-addressed slave mode.

Macro Name: SERIAL_INTERFACE

Parameter(s): ENABLE or DISABLE

Description: If enabled (one), the 2-wire serial features of the AT94K are enabled. However, if disabled (zero), the bus outputs SDA and SCL are set to high impedance states, and the input signals are ignored.

Macro Name: SERIAL_SLAVE_ADDRESS

Parameter(s): slaveAddress

Description: Constitutes the slave address of the 2-wire serial bus interface unit.

Macro Name: SERIAL_GEN_CALL_RECOGNITION

Parameter(s): ENABLE or DISABLE

Description: If enabled (one) this enables the recognition of the general call given, over the 2-wire serial bus.

Sample Code Snippet

```
void initTWS (unsigned char bitRateValue)
{
    SERIAL_BITRATE(bitRateValue);
    SERIAL_INTERFACE(ENABLE);
}
```



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