

AVR137: Writing Software Compatible for PWM2/3 and PWM2B/3B

Features

- Lists the design differences between the two products versions
- Demonstrates how to detect the revision of the PWM, using software

1. Introduction

Two revisions of AT90PWM2/3 are available. Versions AT90PWM2B and AT90PWM3B are the evolutions of the AT90PWM2 and AT90PWM3. This application note lists the main corrections and differences between the two designs, and shows an example of software that allows to detect which version is currently programmed. This can, for example, allow to use only one software version compatible with both PWM2/3 parts.

2. Differences between PWM2/3 & PWM2B/3B

- **Comparator**
 - Clock Frequency can be up to 16 MHz (8 MHz at 3.3V)
 - Analog Hysteresis added⁽¹⁾
- **Amplifier: new logic for ADC start leading to shorter amplified conversion time⁽¹⁾**
- **ADC Speed: sampling and accuracy at 1 MHz fixed (still low accuracy at 2 MHz)**
- **DAC glitches corrected, DAC amplifier linearity corrected**
- **PSC**
 - All erratas corrected
 - Inverted Output in Centered mode⁽¹⁾
 - Software Input Capture
 - Activity output flags added
 - Prescaler modified (larger division factor possible)⁽¹⁾
- **DALI**
 - Reception of manufacturer frames (17 bits) with stop bit coded on different ways (0, 1, level, Manchester)
 - Errata Corrected
- **PLL can also take its source from XTAL oscillator**

Note: 1. Changes may not be upward compatible. (To be reviewed case by case)



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3. How to detect the differences between the two Versions

3.1 Register differences between AT90PWM2/3 and AT90PWM2B/3B

There is no way to directly have the information. The extra row accessible by programmers is not readable by software. Nevertheless, between the two revisions, there is a difference on the register ADCSRB.

Indeed, for the PWM2B/3B, the ADSASCR bit has been removed for ADCSRB. An amplified conversion is started exactly like on a single ended channel.

So the idea is to set this bit as soon as it necessary to detect which revision is used. Then to read it. In case this bit is read at 1, it is a AT90PWM2 or AT90PWM3, in case it is stay at 0, it is an AT90PWM2B or AT90PWM3B.

Depending on the result a variable can be set or not, and read when it is necessary to select different subroutines depending on the AT90PWM revision used.

3.2 Code example

```
Uchar PWMxB = 0;

ADCSRA |= (1 << ADEN); // Enable the ADC in order to be able to set ADASCR in ADCSRB
ADCSRB |= (1 << ADASCR); // Set ADASCR in ADCSRB register
if (ADCSRB & (1<<ADASCR)){ // Check the ADASCR bit after writing
    //PWM2 or PWM3
    ADCSRB &= ~(1 << ADASCR); // Clear the bit to be sure not to start a useless conversion
    PWMxB = 0;
}else{
    //PWM2B or PWM3B
    PWMxB = 1;
}

ADCSRA &= ~(1 << ADEN); // Disable the ADC in case you don't need it at once
```



Atmel Corporation

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 487-2600

Regional Headquarters

Europe

Atmel Sarl
Route des Arsenaux 41
Case Postale 80
CH-1705 Fribourg
Switzerland
Tel: (41) 26-426-5555
Fax: (41) 26-426-5500

Asia

Room 1219
Chinachem Golden Plaza
77 Mody Road Tsimshatsui
East Kowloon
Hong Kong
Tel: (852) 2721-9778
Fax: (852) 2722-1369

Japan

9F, Tonetsu Shinkawa Bldg.
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
Tel: (81) 3-3523-3551
Fax: (81) 3-3523-7581

Atmel Operations

Memory

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

Microcontrollers

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

La Chantrerie
BP 70602
44306 Nantes Cedex 3, France
Tel: (33) 2-40-18-18-18
Fax: (33) 2-40-18-19-60

ASIC/ASSP/Smart Cards

Zone Industrielle
13106 Rousset Cedex, France
Tel: (33) 4-42-53-60-00
Fax: (33) 4-42-53-60-01

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Scottish Enterprise Technology Park
Maxwell Building
East Kilbride G75 0QR, Scotland
Tel: (44) 1355-803-000
Fax: (44) 1355-242-743

RF/Automotive

Theresienstrasse 2
Postfach 3535
74025 Heilbronn, Germany
Tel: (49) 71-31-67-0
Fax: (49) 71-31-67-2340

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Biometrics/Imaging/Hi-Rel MPU/ High Speed Converters/RF Datacom

Avenue de Rochepleine
BP 123
38521 Saint-Egreve Cedex, France
Tel: (33) 4-76-58-30-00
Fax: (33) 4-76-58-34-80

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