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Renesas Electronics Corporation

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M32C/84, 85, 86, 87, 88 Group

A/D Converter Operation in One-Shot Mode (Expanded Analog Input)

1. Abstract

In one-shot mode, the input voltage of one pin selected from pins AN0 to AN7, AN15_0 to AN15_7, AN0_0 to AN0_7, AN2_0 to AN2_7, ANEX0, and ANEX1 is A/D converted once.
Pins ANEX0 and ANEX1 are used as expanded analog input pins.

2. Introduction

The application example described in this document is applied to the following MCUs and parameter(s):

MCUs: M32C/84 Group
M32C/85 Group
M32C/86 Group
M32C/87 Group
M32C/88 Group

This program can be used with other M16C Family MCUs which have the same special function registers (SFRs) as the above MCUs. Check the manual for any additions and modifications to functions. Careful evaluation is recommended before using this application note.

3. Application Example

This section describes how to A/D convert the input voltage of the ANEXi (i = 0 and 1) pin in one-shot mode.
Other configurations are as follows:

- Operating clock (∅AD) : fAD divided by 2
- Resolution : 10 bits
- A/D conversion start parameters : Software trigger
- Sample & hold function : Enabled
- DMAC operation mode : Disabled

3.1 Example Description

(1) Setting the ADST bit in the AD0CON0 register to 1 (A/D conversion started) causes the A/D converter to A/D convert the input voltage of the ANEXi pin.
(2) After the A/D conversion is completed on the ANEXi pin, the content of the successive approximation register (conversion result) is transferred to the AD0i register.
At the same time, the IR bit in the AD0IC register is set to 1 (interrupt requested).
Also, the ADST bit in the AD0CON0 register is set to 0 (A/D conversion stopped) and the A/D converter stops operating.

Figure 1 shows the One-Shot Mode Operation.

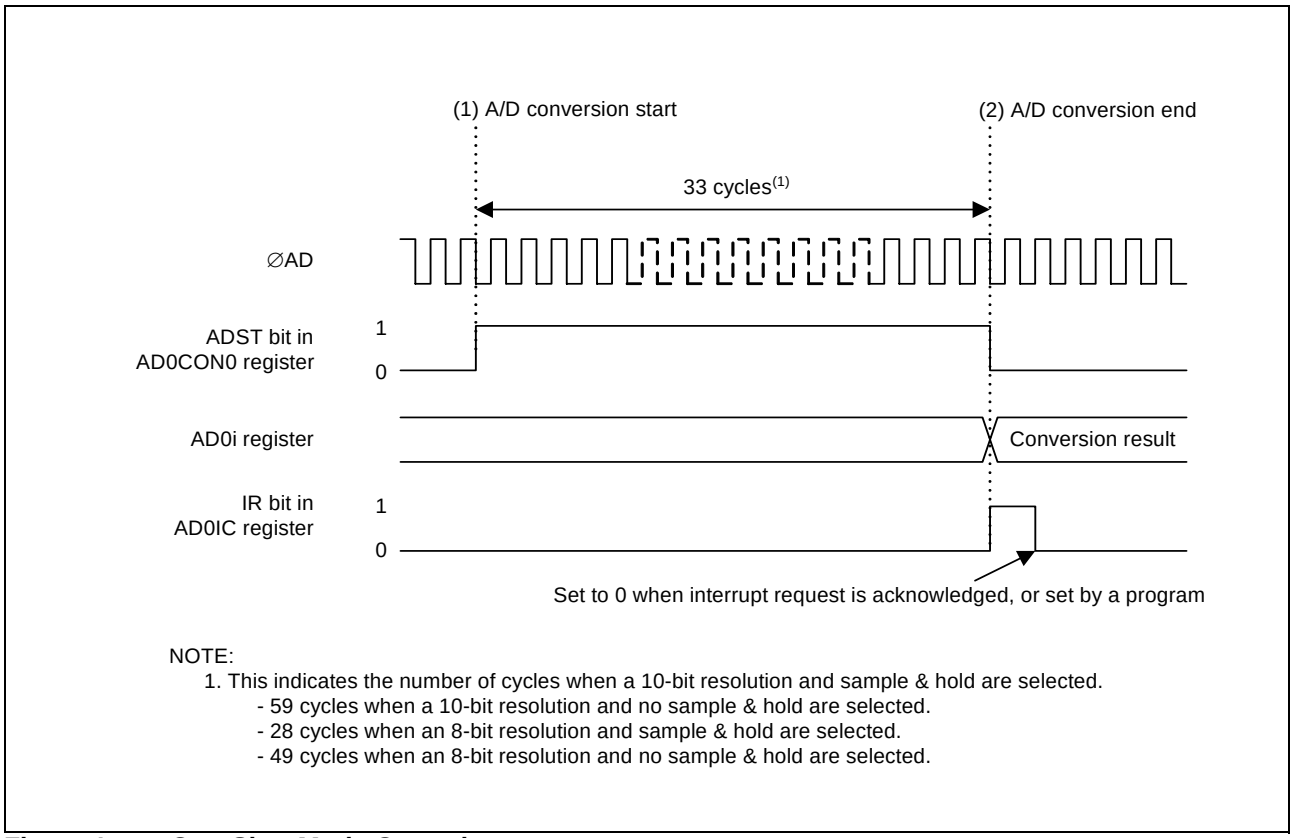
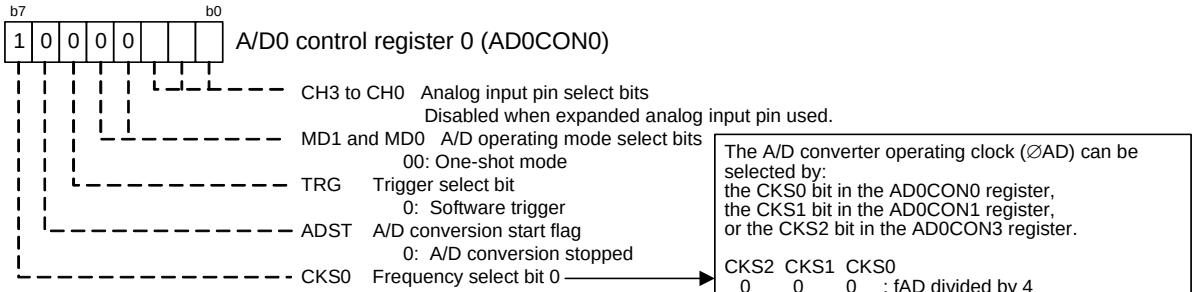


Figure 1 One-Shot Mode Operation

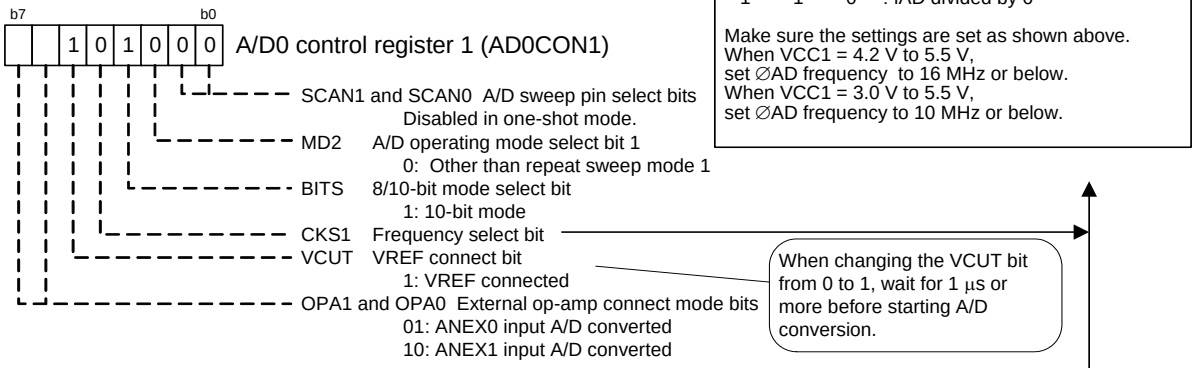
3.2 Setup

This section shows the setup sequence and values to perform the application example described in **3.1 Example Description**.
Refer to the MCUs Hardware Manual for details of individual registers.

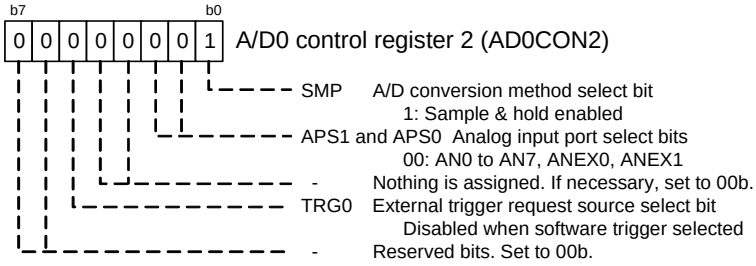
(1) Set A/D0 control register 0



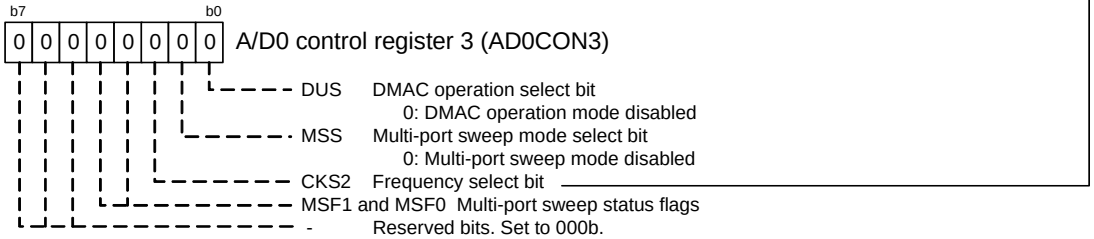
(2) Set A/D0 control register 1



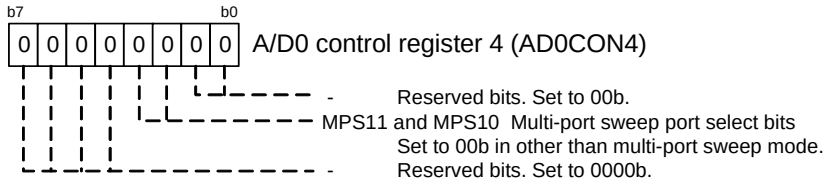
(3) Set A/D0 control register 2



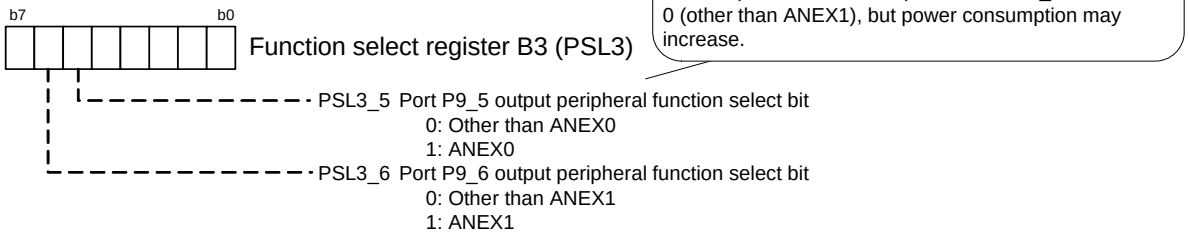
(4) Set A/D0 control register 3



(5) Set A/D0 control register 4

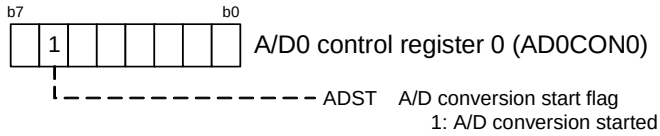


(6) Set the function select register



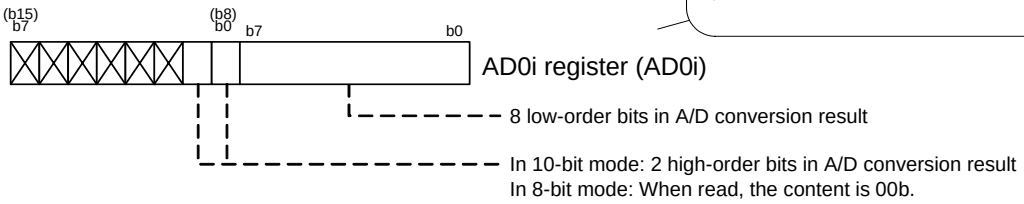
ANEX0 and ANEX1 can be used when the PSL3_5 bit is set to 0 (other than ANEX0) and the PSL3_6 bit is set to 0 (other than ANEX1), but power consumption may increase.

(7) Start A/D Conversion (Set A/D0 control register 0)



(8) Wait until A/D conversion is completed

(9) Read the A/D conversion result (read the AD0i register)



A/D conversion result is stored in:
the AD00 register when the ANEX0 input is A/D converted, and the AD01 register when the ANEX1 input is A/D converted.

4. Sample Programming Code

A sample program can be downloaded from the Renesas Technology website.
For download, click “Application Notes” in the left-hand side menu of the M16C Family page.

5. Reference Documents

Hardware Manuals
M32C/84 Group Hardware Manual
M32C/85 Group Hardware Manual
M32C/86 Group Hardware Manual
M32C/87 Group Hardware Manual
M32C/88 Group Hardware Manual
The latest version can be downloaded from the Renesas Technology website.

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REVISION HISTORY	M32C/84, 85, 86, 87, 88 Group A/D Converter Operation in One-Shot Mode (Expanded Analog Input)

Rev.	Date	Description	
		Page	Summary
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