



Technical Bulletin

Defining a Trap to Switch to Supervisor Mode

EPD Technical Support Hotline

April 28, 1994

Purpose

This bulletin explains how to place a 29K Family microprocessor or microcontroller in supervisor mode.

Affected Parts

The information in this bulletin affects the following parts:

Device	Revision
Am29000, Am29005, Am29030, Am29035, and Am29050 microprocessors	All
Am29200, Am29205, Am29240, Am29243, and Am29245 microcontrollers	All

Supervisor Mode

To switch a 29K Family processor to supervisor mode, the SM bit in the Current Processor Status (CPS) register must be set. But because the CPS register is a protected special-purpose register, it may not be modified when the processor is running in user mode.

However, when a trap is taken in a 29K Family processor, the processor is placed in supervisor mode. Because of this behavior, a user-defined trap can be used to switch the processor to supervisor mode.

Switching to Supervisor Mode

The **settrap()** host interface (HIF) service can be used to define a trap. At this point, you are in supervisor mode. However, you need the processor to remain in supervisor mode when returning from the trap.

Remaining in Supervisor Mode

When a trap is taken, a 29K Family processor copies the contents of the CPS register into the Old Processor Status (OPS) register. On return from this

trap, the processor copies the contents of the OPS register into the CPS register.

So, if the user-defined trap sets the SM bit in the OPS register, the contents of OPS are copied into the CPS register on return from the trap. This keeps the processor in supervisor mode after returning from the trap.

Example Code

The following example consists of two files, one written in C (**trapit.c**) and the other written in 29K Family assembly language (**mytrap.s**). The file written in C contains the call to **settrap()** used to install the trap handler that sets the SM bit. Once the trap handler has been installed, an assembly language routine is called that will cause the newly installed trap to be asserted. Any code that is executed after this user-defined trap is asserted will execute in supervisor mode.

The 29K assembly language file contains the source code for the user-defined trap handler as well as a function that, when called, will cause the user defined trap to be asserted.

trapit.c

```
#include <stdio.h>
#include <hif.h>

extern void super_mode(void);
extern void as70(void);

void howdy() {
    int i;

    for(i=0;i<=10;i++)
        printf("Hello!\n");
}

main() {
    _settrap(70,&super_mode);
    as70();
    howdy();
}
```

mytrap.s

```
.global _super_mode
_super_mode:
    mfsr gr96, ops
    or gr96, gr96, 0x10
    mtsr ops, gr96
    ired

.global _as70
_as70:
    asneq    70, gr96, gr96
    jmp     lr0
    nop
```

If You Need Assistance

Product support for the 29K Family processors is available from the Embedded Processor Division (EPD) Technical Support Hotline located in the U.S., and from the AMD corporate hotline in the U.K.

Assistance is available in the U.S. from 9:00 A.M. to 6:00 P.M. central time, Monday through Friday (except major holidays). In Europe assistance is available during U.K. business hours. Contact us at one of the following numbers:

To reach the U.S. hotline

From	Call
U.S.	1-800-2929-AMD
U.K.	0-800-89-1455
Japan	0031-11-1163
Any other location	+1-512-462-4118 [†]

[†]Toll applies.

To reach the U.K. hotline

From	Call
U.K.	(0)256-811101
France	0590-8621
Germany	0130-813875
Italy	1678-77224
Any other location	+44-(0)256-811101 [†]

[†]Toll applies.

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