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ISR interrupt outside of main c file

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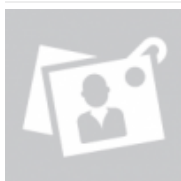
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Author

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[jack the gripper](#)



Level: New Member
Joined: Fri. May 16, 2008
Posts: 6 [View posts](#)

Posted by [jack the gripper](#): Fri. May 16, 2008
- 06:17 PM

[#1](#)

Fivestar widget

Total votes: 0

We have a atmega16 and a timer0 interrupt.

If we place ISR in main.c everything works but if we place it in another file and link it in like a regular .o file, the interrupt never seems to be executed.

Any ideas?

Tags:

[AVR Microcontrollers](#), [megaAVR](#) and [tinyAVR](#), [ATmega16](#)

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[clawson](#)



Level: Moderator
Joined: Mon. Jul 18, 2005
Posts: 89297 [View posts](#)
Location: (using avr-gcc in) Finchingfield, Essex, England

Posted by [clawson](#): Fri. May 16, 2008 - 06:25 PM

[#2](#)

Total votes: 0

Which C compiler? If WinAVR which version? (this is a leading question - an early April version had a problem with ISR generation which was exacerbated when things are in separate files (so the optimiser cannot go to work)

FAQ#1: ISR/main shared variables MUST be defined 'volatile'
FAQ#2: embedded programs must NEVER return from main()
FAQ#3: 99.9% of UART errors are AVR's not being clocked right
FAQ#4: If using avr-gcc avoid -O0 optimisation setting at all costs
FAQ#5: If PORTC bits don't seem to work JTAG probably needs disabling

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<http://www.nongnu.org/avr-libc/user-manual/FAQ.html>

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Level: New Member
 Joined: Fri. May 16, 2008
 Posts: 6 [View posts](#)

Posted by [jack the gripper](#): Sat. May 17,
 2008 - 02:36 AM

#3

Total votes: 0

We use gcc, from AVR MacPack [1]. Default gcc version seems to be 3.4.6. And we compiled with -O2 flag.

1. <http://www.obdev.at/products/avr...>
<http://www.obdev.at/products/avrmacpack/index.html>

[Top](#)[Log In](#) or [Register](#) to post comments[atomicdog](#)

Level: Posting Freak
 Joined: Mon. Jan 14, 2008
 Posts: 1172 [View posts](#)
 Location: San Diego

Posted by [atomicdog](#): Sat. May 17, 2008 -
 03:26 AM

#4

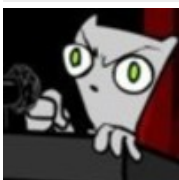
Total votes: 0

Are you sure the linker included the ISR object file (.o)?

A function or variable from the ISR object file needs to be used in your main.c in order for the ISR function to be also included. ISR's are not called so the linker doesn't have any reason to include that file unless it sees a function or variable it needs in that file.

~~John

[TWI C source code\(http://spaces.atmel.com/gf/project/twi/frs/\)](http://spaces.atmel.com/gf/project/twi/frs/)

[Top](#)[Log In](#) or [Register](#) to post comments[glitch](#)

Level: Raving Lunatic
 Joined: Sat. Jan 12, 2002
 Posts: 8685 [View posts](#)
 Location: Canada

Posted by [glitch](#): Sat. May 17, 2008 - 03:56
 AM

#5

Total votes: 0

atomicdog wrote:

*Are you sure the linker included the ISR object file (.o)?
 A function or variable from the ISR object file needs to be used in your main.c in order for the ISR function to be also included. ISR's are not called so the linker doesn't have any reason to include that file unless it sees a function or variable it needs in that file.*

That would be a dangerous optimization, since an ISR can be an entirely self-contained object, with no external references. (I'm not saying you're wrong in what the compiler is doing... just that it is a bad optimization)

Having said that, you should at least have an init function that is called from main, to set up the hardware that the ISR runs off of. Placing the init function in the same file as the ISR itself will guarantee that it is included. This would maintain/strengthen the modularization that drove you to place the ISR in a separate file in the first place.

Writing code is like having sex.... make one little mistake, and you're supporting it for life.

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[Koshchi](#)



Level: 10k+ Postman
Joined: Wed. Nov 17, 2004
Posts: 15674 [View posts](#)
Location: Vancouver, BC

Posted by [Koshchi](#): Sat. May 17, 2008 - 05:01 PM

[#6](#)

Total votes: 0

Quote:

ISR's are not called so the linker doesn't have any reason to include that file unless it sees a function or variable it needs in that file.

This is untrue, at least in avr-gcc. The linker will include the ISR.

Regards,
Steve A.

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[jack_the_gripper](#)



Level: New Member
Joined: Fri. May 16, 2008
Posts: 6 [View posts](#)

Posted by [jack_the_gripper](#): Sat. May 17, 2008 - 09:18 PM

[#7](#)

Total votes: 0

We are pretty convinced that our other file containing the interrupt handle is included by the linker. (can't confirm it atm).

Can anyone of you see anything wrong with our code then? I've stripped away some unimportant code to keep it as short as possible. This is supposed to toggle a LED:

main.c:

```

#include
#include
#include "otherfile.h"

void init()
{
    /* clear timer on compare match, 1024 prescaling */
    TCCR0 = BIT(WGM01) | 0x5;
    OCR0 = 200;

    /* enable output compare interrupts */
    TIMSK = BIT(OCIE0);

    DDRB |= 0xFF;

    /* do some other init */
    other_init()

    /* enable interrupts */
    sei();
}

int main()
{
    init();

    while(1)
    {
    }
    return 0;
}

```

otherfile.h:

```

/* ... */
void other_init();
/* ... */

```

otherfile.c:

```

#include "otherfile.h"

void other_init()
{
    /* stripped away code */
}

/* this never gets called! :( */
ISR(TIMER0_COMP_vect)
{
    PORTB ^= (1 << 0);
    _delay_ms(500);
}

```

If the interrupt handler is moved to main.c everthing works as expected. Anything obvious we are doing wrong here?

Any help is greatly appreciated.

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[clawson](#)


Level: Moderator
Joined: Mon. Jul 18, 2005
Posts: 89297 [View posts](#)
Location: (using avr-gcc in) Finchingfield, Essex, England

Posted by [clawson](#): Sat. May 17, 2008 - 09:24 PM

[#8](#)

Total votes: 0

I'd be looking at the generated assembler in each case to see how it differs.

FAQ#1: ISR/main shared variables MUST be defined 'volatile'
FAQ#2: embedded programs must NEVER return from main()
FAQ#3: 99.9% of UART errors are AVR's not being clocked right
FAQ#4: If using avr-gcc avoid -O0 optimisation setting at all costs
FAQ#5: If PORTC bits don't seem to work JTAG probably needs disabling

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(GCC)

<http://www.nongnu.org/avr-libc/user-manual/FAQ.html>

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[atomicdog](#)


Level: Posting Freak
Joined: Mon. Jan 14, 2008
Posts: 1172 [View posts](#)
Location: San Diego

Posted by [atomicdog](#): Sat. May 17, 2008 - 10:00 PM

[#9](#)

Total votes: 0

Sorry, What I said before is only true if you're using a library archive (*.a) to hold the object files.

should be included in otherfile.h/c.

It should give you a warning(error?). I think the vector isn't created in the jumtable because the compiler doesn't know the function is an ISR without .

~~John

[TWI C source code\(http://spaces.atmel.com/gf/project/twi/frs/\)](http://spaces.atmel.com/gf/project/twi/frs/)

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[jack the gripper](#)

Posted by [jack the gripper](#): Sun. May 18, 2008 - 02:15 AM

[#10](#)

Total votes: 0



Level: New Member
 Joined: Fri. May 16, 2008
 Posts: 6 [View posts](#)

atomicdog wrote:

*should be included in otherfile.h/c.
 It should give you a warning(error?). I think the vector isn't created
 in the jumptable because the compiler doesn't know the function is
 an ISR without .*

Yes, when looking at the object file there isn't any vector created without
 avr/interrupt.h included. Strangely the compiler didn't complain at all.

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[stu_san](#)



Level: Raving Lunatic
 Joined: Fri. Dec 30, 2005
 Posts: 2327 [View posts](#)
 Location: Fort Collins, CO
 USA

Posted by [stu_san](#): Mon. May 19, 2008 - 06:04
 PM

[#11](#)

Total votes: 0

jack_the_gripper wrote:

Strangely the compiler didn't complain at all.

That is odd. You will usually get a warning about ISR being an undeclared function.

I'm pretty sure this warning shows up on gcc 3.4.2, but since I'm not using the Mac
 environment I couldn't say.

Stu

Engineering seems to boil down to: Cheap. Fast. Good. Choose two. Sometimes choose only
 one.

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[http://www.avrfreaks.net/index.php?](http://www.avrfreaks.net/index.php?name=PNphpBB2&file=viewtopic&t=70673)
[name=PNphpBB2&file=viewtopic&t=70673\)](http://www.avrfreaks.net/index.php?name=PNphpBB2&file=viewtopic&t=70673)

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[Koshchi](#)



Level: 10k+ Postman
 Joined: Wed. Nov 17,
 2004

Posted by [Koshchi](#): Mon. May 19, 2008 - 06:15
 PM

[#12](#)

Total votes: 0

Quote:

Strangely the compiler didn't complain at all.

Posts: 15674 [View posts](#)
 Location: Vancouver, BC

I just tried it and I get warnings.

Regards,
 Steve A.

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[jack the gripper](#)



Level: New Member
 Joined: Fri. May 16, 2008
 Posts: 6 [View posts](#)

Posted by [jack the gripper](#): Tue. May 20, 2008 - 10:56 AM

[#13](#)

Total votes: 0

Koshchi wrote:

I just tried it and I get warnings.

What compiler flags did you use?

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[stu_san](#)



Level: Raving Lunatic
 Joined: Fri. Dec 30, 2005
 Posts: 2327 [View posts](#)
 Location: Fort Collins, CO
 USA

Posted by [stu_san](#): Tue. May 20, 2008 - 04:42 PM

[#14](#)

Total votes: 0

```
ISR(TIMER0_COMP_vect)
{
    PORTB ^= (1 << 0);
    _delay_ms(500);
}
```

Putting this delay in your ISR is what experienced AVR programmers call a "bad idea". Unless you really intend for the processor to stop doing anything for 500 mS.

A better approach is to set a flag in the ISR that a loop in non-ISR space sees and performs the wait.

Oh, and make sure that the flag is declared volatile. See FAQ #1 in the avr-libc user documentation [here\(http://www.nongnu.org/avr-libc/user-manual/FAQ.html\)](http://www.nongnu.org/avr-libc/user-manual/FAQ.html).

Stu

Engineering seems to boil down to: Cheap. Fast. Good. Choose two. Sometimes choose only one.

Newbie? Be sure to read the thread [Newbie? Start here!](http://www.avrfreaks.net/index.php?name=PNphpBB2&file=viewtopic&t=70673)
(<http://www.avrfreaks.net/index.php?name=PNphpBB2&file=viewtopic&t=70673>)

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[jack the gripper](#)



Level: New Member
Joined: Fri. May 16, 2008
Posts: 6 [View posts](#)

Posted by [jack the gripper](#): Tue. May 20, 2008 - 05:42 PM

[#15](#)

Total votes: 0

Yeah, I'm aware, but thanks for reminding me. That interrupt was only part of a side project which we used to figure out what was going on (or not going on tbh :))

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[Koshchi](#)



Level: 10k+ Postman
Joined: Wed. Nov 17, 2004
Posts: 15674 [View posts](#)
Location: Vancouver, BC

Posted by [Koshchi](#): Tue. May 20, 2008 - 06:49 PM

[#16](#)

Total votes: 0

Quote:

What compiler flags did you use?

Just the default ones that AVR Studio sets, plus -Os optimization.

Regards,
Steve A.

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