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# ***HUNT ENGINEERING***

## ***Testint API Example***

### ***For RTOS-32***

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## The testint example

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The testint example is a small example program that tests if a board's interrupts work as expected. The example will work with HERON module carrier boards, such as the HEPC8 and HEPC9.

(This example will **not** work with TIM-40 carrier boards such as the HEPC2E, HEPC3, HEPC4 or HECPC11. It will also **not** work with the HEPC6, a one 'C6x processor board.)

## Compiling, linking and running the example

---

### Compiling/Linking the Example

To compile and link the example, please use the 'makefile' that is present in this directory. This makefile is set-up to use a Microsoft 32-bit C/C++ compiler. You can only execute the makefile in a DOS-box prepared by On Time for any of the Microsoft C/C++ command line examples ('Visual C++ (Command Line) Demos'). Or, if you execute from a standard DOS-box, please execute the standard RTOS-32 'varsvc.bat' first.

To execute the 'makefile':

```
nmake makefile
```

The example is prepared for use with an HEPC9. To change this, edit the 'testint.cfg' file, the 'Commandline' entry towards the bottom of the file.

### Running the example

To run the example, prepare a floppy disk and insert it into the 'a:' drive. Then type:

```
bootdisk testint a:
```

After completion, remove the floppy disk and insert it into the target machine's floppy disk. Reboot. The target machine should boot from disk. Possible output screens are:

```
Interrupts work fine.
```

```
Interrupt test failed.
```

```
Interrupts disabled.
```

```
Interrupt test failed, due to a driver problem.
```

If you have any other response than the first one ('Interrupts work fine.'), then you first need to resolve the interrupt problem. Please refer to the 'Troubleshooting' section in the RTOS-32 Installation & User Manual.

## The Makefile

What changes have been made to the original RTOS-32 example makefile? This section will explain what needs to be changed (or added) in a makefile to compile/link successfully the Hunt Engineering API programs

### Include file

All Hunt Engineering API programs must include 'heapi.h'. This file is located in the Hunt Engineering API installation directory. The installation program will have created an environment variable 'HEAPI\_DIR' that points to the installation directory. To have the makefile understand where 'heapi.h' lives, the following line must be in your makefile:

```
INCLUDE = $(RTTARGET)\include;$(HEAPI_DIR)$(INCLUDE)
```

The bold italic part is the part added by us.

### Libraries

The Hunt Engineering API is delivered as a static library ('rtosdrv.lib'). It must be linked with RTTARGET-32, RTFILES-32 and RTKERNEL-32. In the lines following your '.exe' declaration 'rtosdrv.lib' must be linked in first, before all of the RTOS-32 libraries:

```
testint.exe: ..\testint.c Init.c
    cl /MT /Fm /Zi -D_RTOS32=1 \
    ..\testint.c \
    Init.c \
    $(HEAPI_DIR)\rtos32\rtosdrv.lib \
    rtfiles.lib \
    rtfsk32.lib \
    rtk32.lib \
    drvrt32.lib \
    rtt32.lib \
    rttheap.lib \
    $(LNKOPT)
```

The bold italic part is the part added by us.

The necessary RTFILES-32 libraries are 'rtfiles.lib' and 'rtfsk32.lib'. Note that the latter is the RTKERNEL-32 version of the RTFILES-32 library.

The necessary RTKERNEL-32 libraries are 'rtk32.lib' (debug version) and 'drvrt32.lib', as the Hunt Engineering API uses multi-threading. (The HeRead and HeWrite will spawn separate threads to do the actual reading and writing. HeTestIo and HeWaitForIo 'test' the thread to see whether it has completed a transfer.)

The RTTARGET-32 library is 'rtt32.lib'. Library 'rttheap.lib' is optional. Please refer to the RTOS-32 manual (for example, ch.7 page 106 and 107).

## Compile Parameters

The Hunt Engineering API supports several different types of Operating Systems. To select RTOS-32 support, you need to #define a variable `'_RTOS32'`. The easiest way to do this is in the makefile. Also, as the Hunt Engineering API is multi-threaded, you need to use the `'/MT'` option of the Microsoft C/C++ compiler.

```
testint.exe: ..\testint.c Init.c
             cl /MT /Fm /Zi -D_RTOS32=1 \
             ..\testint.c \
             Init.c \
             $(HEAPI_DIR)\rtosdrv.lib \
             rtfiles.lib \
             rtfsk32.lib \
             rtk32.lib \
             drvrt32.lib \
             rtt32.lib \
             rttheap.lib \
             $(LNKOPT)
```

## Initialisation

A file `'init.c'` is included in the project. This is a 'standard' file from On Time, which they use for projects that use RTFILES-32. I have simply copied it into the Hunt Engineering API examples as they may use file support. On Time's comment in `'init.c'`:

```
/* Some standard initializations for RTFiles-32 programs.

   This file is linked with most RTFiles-32 demo programs. It provides a
   convenient place to configure RTTarget-32 and RTFiles-32.
*/
```

### The testint.cfg configuration file

What changes have been made to the original RTOS-32 example configuration file? This section will explain what needs to be changed (or added) in a configuration file to compile and link successfully the Hunt Engineering API programs

#### Testint.cfg: commandline

RTOS-32 programs have the possibility to carry a command line. This is done by specifying a command line in one of the configuration files (we just chose 'testint.cfg'). The 'testint' example needs to use a command line, as you need to specify the board type ('hep9a') and board number ('0'). The command line is further just as you would expect with a normal DOS or win32 program. The following line must be added to a configuration file, for the 'testint' example to work properly:

CommandLine "testint.exe hep9a 0"                   for use with HEPC9

CommandLine "testint.exe hep8a 0"                   for use with HEPC8

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