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HUNT ENGINEERING

Stdio Server/Loader Example

For VxWorks

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The stdio example is a Server/Loader example program that shows how most of the standard I/O functions of the Server/Loader work. The Server/Loader will boot the first processor in the system with “stdio.out”. This booted program will then request the Server/Loader (which is running on VxWorks) to execute a number of standard I/O functions, such as printf, fwrite, fread and ftell.

(This example will **not** work with TIM-40 carrier boards such as the HEPC2E, HEPC3, HEPC4 or HECPCI1. It will also **not** work with the HEPC6, a one ‘C6x processor board.)

Compiling, linking and running the example

Compiling/Linking the Example

The Server/Loader is delivered as a 'vxwsl.o' file. This file contains both the Server/Loader library ('hesl' interface), the Server/Loader executable ('vxwsl') and HeartConf. The file is located in the 'vxworks' directory of your HUNT ENGINEERING API installation (default 'c:\heapi').

The 3 components in 'vxwsl.o' are also available separately as 'main.o' (Server/Loader executable) in the 'hesl\bin' sub-directory of your Server/Loader installation, 'vxwsl.lib.o' (Server/Loader library) in the 'hesl\lib' sub-directory, and 'heartconf.o' (HeartConf) in the 'heartconf\vxworks' sub-directory.

An environment variable 'HESL_DIR' points to the 'hesl' installation sub-directory. 'HESL_DIR' has been created and initialised by the HUNT CD installation program. Include files are located in the 'inc' directory of 'HESL_DIR'.

Running the example

The Server/Loader needs file access to the network file and the DSP executables (the *.out files) and the 'stdio.c' file. Copy the network file, the *.out files, and 'stdio.c' onto a floppy disk, or copy them onto a hard disk if you have a VxWorks boot image with support for that. To be able to run the example successfully you must have included the `dosfs` module in your VxWorks BOOT ROM configuration. Set your default path to the location of the *.out files using the VxWorks system command `ioDefPathSet("location")`, where `location` is the VxWorks style path to the *.out file.

Make sure you have loaded the API, `hrn_fpga`, and the Server/Loader.

```
ld<heapi.o
ld<hrnfpga.o
ld<vxwsl.o
```

The reason for loading 'hrnfpga.o' as well is that the Server/Loader supports loading of FPGA bit-streams. But the implementation of the Server/Loader uses `hrn_fpga` to do the actual loading. Given that `hrn_fpga` is also a stand-alone utility, we have chosen to supply the Server/Loader and `hrn_fpga` as two separate items.

Next, for a HEPC9, run the example as follows:

```
sp vxwsl, "-rlsv network"
```

With an HEPC8 use the HEPC8 specific files:

```
sp vxwsl, "-rlsv netw4pc8"
```

The example assumes a HERON4 in slot 1. If you don't use a HERON4 module, but a different HERON module such as HERON1, you will have to change the *.out file used in the network file. Some standard *.out files are supplied: `stdio4.out` (HERON4 on HEPC9), `stdio48` (HERON4 on HEPC8) and `stdio18.out` (HERON1 on HEPC8). For any other configuration, create a new project and build a new *.out file.

You should see something that ends like:

```
...
fread : 2048 / 2048  feof: 0
```

```
fread :    1 / 4096  feof: 16
WRITE 64Kbytes BLOCK
Written 64 kBytes
SYSTEM test
Trying "dir "
float  (1.2e-4): 0.000120, 0.00012
double (2.4e-8): 0.000000, 2.4e-008
Leaving server mode
```

The Server/Loader command line

The Server/Loader uses a command line so that a user can specify the name of a network file and a number of parameters. The most common parameters are `-r`, (reset), `-l` (load), `-s` (serve) and `-v` (verbose), but there are others as well (please have a look at the Server/Loader manual). The VxWorks Server/Loader has a default command line of:

```
sp vxwsl, "-rlsv networkfile"
```

With this command line the Server/Loader will expect to find a network description file on the drive specified by `'ioDefPathSet'`. (In addition, it will then expect to find the `*.out` files and bit-streams as specified in the network file on the same drive.) By default, this will reset the system, boot all processors, and then serve standard I/O requests (`printf`, `frwrite`, etc) coming from the first processor in the system. The verbose option will cause booting information to be show on the screen.

The VxWorks network file

Note that a VxWorks network file uses a few extra parameters in board definitions.

The usual way to define a board, for example a HEPC9, you would write:

```
BD API HEP9A 0 0
```

But for VxWorks you need to add three parameters:

```
BD API HEP9A 0 0 on on 12
```

The three extra parameters need to be there for any board type, whether 'hep9a', 'hep8a', 'hep3b', 'hep2e' or any other. The first extra parameter is the master mode switch, "on" in this example. The second extra parameter is interrupts, "on" in this example. The third extra parameter is the IRQ, "12" in this example. The extra third parameter is not used with PCI boards, such as the HEPC9, HEPC8 and HEPC3. But the syntax requires there's a value anyway.

Note that with an HEPC8, master mode is not supported, so you would define: -

```
BD API HEP8A 0 0 off on 12
```

Apart from this, a VxWorks network file is identical to the 'standard' network file.

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