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HUNT ENGINEERING

Reads API Example

For LINUX

Document Rev A
API Reads Example Rev 1.1
J.Thie 07-12-05

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The reads example

The reads example is an example program that tests the PCI FIFO and HSB interface of a HERON carrier board. The example will try to boot a small and simple program onto the processor on a DSP module, such as a HERON4 or HERON2. With the HEPC8, the module must be in slot 1, for the HEPC9 and the HERON-BASE2 any slot is ok – use the /sx (x=1,2,3,4) option to identify the slot you wish to use. This program will send a stream of known data to the host via the PCI interface. The host example program will read back the stream of data, verify it, and tell you if everything worked or not. It will also give a very rough estimate of the transfer speed.

(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

To compile and link the example, please use the ‘makefile’ that is present in this directory. This makefile is set-up to use the GNU C/C++ 32-bit compiler. To execute the ‘makefile’, go to the ‘linux’ sub-directory and type:

```
make
```

Running the example

To run the example, in the ‘linux’ sub-directory, type:

```
reads hep8a 0 a 1000 1000 10000
```

for HEPC8, or

```
reads hep9a 0 a 1000 1000 10000 /s3
```

for HEPC9 (assuming in module in slot 3), or

```
reads heb2a 0 a 1000 1000 10000
```

```
reads heb2a 0 b 1000 1000 10000 /s2
```

for HERON-BASE2 (module in slot 1 and 2, respectively).

You should see something like:

```
Start at 1000, inc 1000, end at 10000, BlockSize=250 on hep9a (0: Comporta)
Resetting...
Serial bus: slot 1: HERON1-C6201, rom version 4.
Resetting...
Booting /home/johan/api/etc/c6x/examples/reads/reads.out...
Testing...
Reads Transfer size 1000 DWORDS in 1 ticks, Speed: 3906.25 KBytes/sec
Reads Transfer size 2000 DWORDS in 1 ticks, Speed: 7812.50 KBytes/sec
Reads Transfer size 3000 DWORDS in 1 ticks, Speed: 11718.75 KBytes/sec
Reads Transfer size 4000 DWORDS in 1 ticks, Speed: 15625.00 KBytes/sec
Reads Transfer size 5000 DWORDS in 1 ticks, Speed: 19531.25 KBytes/sec
Reads Transfer size 6000 DWORDS in 1 ticks, Speed: 23437.50 KBytes/sec
Reads Transfer size 7000 DWORDS in 1 ticks, Speed: 27343.75 KBytes/sec
Reads Transfer size 8000 DWORDS in 1 ticks, Speed: 31250.00 KBytes/sec
Reads Transfer size 9000 DWORDS in 1 ticks, Speed: 35156.25 KBytes/sec
Reads Transfer size 10000 DWORDS in 1 ticks, Speed: 39062.50 KBytes/sec
Check whether any interrupts were used: read 1, write 0, master mode 0.
```

If you have any other response than this, and you have a HEPC8 or HEPC9, please first test if the ‘testint’ example works. If this example doesn’t work as well, there is likely an interrupt problem. With the HEPC8, check the ‘routing jumpers’ on the HERON module in slot 1. These jumpers need to be set to select ‘FIFO 0’ for both the ‘in’ and ‘out’ FIFO. Please refer to the ‘Troubleshooting’ section in the LINUX Installation & User Manual.

The Makefile

What changes need to be made to a ‘standard’ LINUX 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 directory ‘/usr/local/include’. The ‘installme’ script should have copied it there. If this hasn’t happened, or if you wish to install this file manually, it can be copied from the API installation directory’s ‘include’ sub-directory into ‘/usr/local/include’. The compiler automatically searches in the local include directory as well; you shouldn’t need to have to add it to the makefile.

Libraries

The Hunt Engineering API is delivered as a shared library (‘libhel.so’). This file is located in directory ‘/usr/local/lib’. The ‘installme’ script should have copied it there. If this hasn’t happened, or if you wish to install this file manually, it can be copied from the API installation directory’s ‘lib’ sub-directory into ‘/usr/local/lib’. It must be linked before other (GNU) libraries. Example:

```
reads: main.o cload.o
    $(CC) $(CFLAGS) main.o cload.o -o reads
        /usr/local/lib/libhel.so /usr/lib/librt.so
```

The bold italic part is the part added by us.

For the HEPC9, we need to use HeartConf. This is part of the Server/Loader library. In the makefile the Server/Loader library ‘liblinuxsl.so’ should be added. The Server/Loader uses ‘hrn_fpga’ (the FPGA programmer) and that library needs to be linked in as well.

```
reads: main.o cload.o
    $(CC) $(CFLAGS) main.o cload.o -o reads
        /usr/local/lib/liblinuxsl.so
        /usr/local/lib/libhrnfpga.so
        /usr/local/lib/libhel.so /usr/lib/librt.so
```

Compile Parameters

The Hunt Engineering API supports several different types of Operating Systems. To select LINUX support, you need to #define a variable ‘_LINUX’. The easiest way to do this is in the makefile.

```
CFLAGS=-O2 -Wall -D_LINUX=1
```

The bold italic part is the part added by us.

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