

## Flashing 16MB uC5282 BPM Card - rtems-4.9.1

### Overview of Steps

Create a 'cramfs' file system image of the netboot binary image. Store this on a machine with a tftp server that can access your target.

Connect the target BPM chassis to your desktop or laptop. Set the IP address environment variable and run the tftp server.

Transmit the file system image to the target. Program it into flash memory.

Using the uC5282 uCbootloader, set the environment variables.

Boot the image.

(Much of this document is from an email from Till, the complete email is in  
Z:\Documents\BPMs\Stripline BPMs\Coldfire\boot\_16M\_coldfire)

13 March 2008

## Detailed Steps

- 1 Generate directory hierarchy on host computer. Simplest case - just a root directory containing the 'netboot' binary image:

```
mkdir cramfs_top
cp /afs/slac/package/rtems/4.9.1/target/ssrlApps/m68k-
rtems/uC5282/img/netboot.flashing.bin cramfs_top/netboot.bin
```

- 2 Generate cramfs image (need mkcramfs utility) on host computer

```
mkcramfs cramfs_top cramfs.img
```

NOTE: in spite of the coldfire being a big-endian machine and cramfs internal data structures being susceptible to endianness, uCbootloader seems to expect a LITTLE-endian cramfs image (which is directly created by mkcramfs on a little-endian machine such as a x86 box)

- 3 Connect port 1 on BPM chassis to a network port.

Connect serial port on BPM chassis to serial port on your computer. (It must be a straight-through cable.) Connect to your local serial port using a terminal emulation program (Tera Term Pro on Windows works).

Power up the BPM chassis.

- 4 At the uCbootloader prompt B\$, set the IP address environment variable, for example:

```
B$ setenv IPADDR0 134.79.219.81
```

Start the tftp program:

```
B$ tftp
uCTFTP Console 1.0 is running ...
```

- 5 Copy the cramfs.img to uc5282 target. (Your host must have a tftp server and must be able to access your target.)

(These instructions are for using tftp. To use the serial connection, use the uCdimmm Coldfire 5282 manual)

From your host:

```
hostname$tftp 134.79.219.81
tftp> verbose
Verbose mode on.
tftp> binary
mode set to octet
tftp> put cramfs.img
```

You will see messages like these in your host session:

```
putting cramfs.img to 134.79.219.81:cramfs.img [octet]
Sent 270336 bytes in 20.2 seconds [107044 bit/s]
tftp>
```

You will see messages like these on your serial session:

```
.....  
done
```

In your serial session, press ESC to exit tftp and return to the B\$ prompt

**6** Program the image into flash memory using 'program' command at B\$ prompt:

```
B$ program  
erase... done  
write... done
```

Select boot file:

```
B$ setenv KERNEL 0:netboot.flashimg.bin
```

The board has now been flashed. Next you can do one of three things (four things counting nothing):

(7a) Test that you can boot the netboot image.

(7b) Set up for production. (Do this only if you feel confident that the flashing worked.)

(7c) Boot up to test on development.

**7a** To boot the netboot image, set the necessary environment variables and type 'go' at the B\$ prompt:

```
setenv KERNEL 0:netboot.flashimg.bin  
setenv BP_SRVR 134.79.19.29  
setenv BP_FILE afsnfs2:/afs/slac:package/rtems/4.9.1/target/ssrlApps/m68k-  
rtems/uC5282/bin/rtems.ralf  
setenv NETMASK 255.255.252.0
```

```
B$ printenv
```

```
FACTORY=Arcturus Networks Inc.  
REVISION=uC5282 Rev 1.1 16MB External Flash  
SERIAL=X49E5FA37-01080  
CONSOLE=ttyS0  
KERNEL_ARGS=root=/dev/mtdblock0 quiet  
HWADDR0=00:06:3B:00:F0:80  
FW_VERSION=010808012  
_0=10000000:1000000:RW  
CACHE=on  
KERNEL=0:netboot.flashimg.bin  
BP_SRVR=134.79.19.29  
BP_FILE=afsnfs2:/afs/slac:package/rtems/4.9.1/target/ssrlApps/m68k-  
rtems/uC5282/bin/rtems.ralf  
IPADDR0=134.79.219.113  
NETMASK=255.255.252.0
```

```
B$ go
```

```
uncompress... go! 0x40000
```

RTEMS bootloader by Till Straumann <strauman@slac.stanford.edu>

\$Id: netboot.c,v 1.33 2009/02/05 08:39:20 strauman Exp \$

CVS tag \$Name: rtems-4-9-1-p2 \$

Press 's' for showing the current NVRAM configuration  
Press 'b' for manually entering filename/cmdline parameters only  
Press '@' for continuing the netboot (BOOTP flag from NVRAM)  
Press 'd' for continuing the netboot; enforce using BOOTP  
Press 'p' for continuing the netboot; enforce using BOOTP  
but use file and cmdline from NVRAM  
Press 'm' for continuing the netboot; enforce using NVRAM config  
Press 'R' to reboot now (you can always hit <Ctrl>-x to reboot)  
Press any other key for this message

**7b** To set up for production and using DHCP/BOOTP, set these environment variables:

```
B$ printenv
FACTORY=Arcturus Networks Inc.
REVISION=uC5282 Rev 1.1 16MB External Flash
SERIAL=X4747745D-01DC9
CONSOLE=ttyS0
KERNEL=0:netboot.flashimg.bin*
KERNEL_ARGS=root=/dev/mtdblock0 quiet
HWADDR0=00:06:3B:00:AD:C9
FW_VERSION=010808004
_0=10000000:1000000:RW
CACHE=on
(next three are optional; depends whether you want the ioc to boot up on its own
the first time; also depends on whether or not dhcp will be set up in advance)
DO_BOOTP=Y
AUTOEXEC=2
AUTOBOOT=2
```

**7c** To boot up and test on dev, at the uCbootloader prompt B\$, set the rest of your environment variables.

```
B$ printenv
FACTORY=Arcturus Networks Inc.
REVISION=uC5282 Rev 1.1 16MB External Flash
SERIAL=X4747745D-01DC9
CONSOLE=ttyS0
KERNEL=0:netboot.flashimg.bin
KERNEL_ARGS=root=/dev/mtdblock0 quiet
HWADDR0=00:06:3B:00:AD:C9
FW_VERSION=010808004
_0=10000000:1000000:RW
CACHE=on
IPADDR0=134.79.219.81
DNS_SERVER=134.79.151.11
NTP_SERVER=134.79.151.11
NETMASK=255.255.252.0
GATEWAY=134.79.219.1
HOSTNAME=lclsdev-36
BP_PARM=INIT=/boot/g/lcls/epics/iocTop/Bpm/Bpm-R1-0-10/iocBoot/eioc-bsy0-
bp51/st.cmd
LOGHOST=syslog-host
DNS_DOMAIN=slac.stanford.edu
BP_FILE=afsnfs2:/afs/slac:package/rtems/4.9.1/target/ssrlApps/m68k-
rtems/uC5282/bin/rtems.ralf
BP_SRVR=134.79.19.29
DO_BOOTP=N
```

The syntax to set variables is:

```
B$ setenv ENVVAR value
```

To clear an environment variable:

```
B$ setenv ENVVAR
```

To show a list of all variables:

```
B$ printenv
```

To show the value of a single variable:

```
B$ printenv ENVVAR
```

