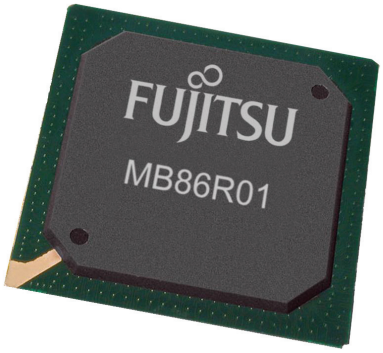
FUJITSU

Installation of myCable Linux Tool Chain and Running Linux Images on the Fujitsu MB86R01 Starter Kit

User Manual

Introduction

Overall, the process of installing myCable Linux Tool Chain and runing Linux images on the Fujitsu MB86R01 starter kit can be divided into the following parts:



1. Setting up the Linux PC – the host
2. Building the Linux kernel and root file system images using the myCable Linux tool chain
3. Setting up the host and target for image transfer
4. Transferring the built images to the MB86R01 Starterkit's Flash or RAM
5. Setting up the MB86R01 starter kit – the target – for Linux kernel and root file system startup.

These are described in further detail in this document.

myCable Linex Tool Chain

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myCable Linex Tool Chain

Setting up the Linux PC

Any Linux distribution for PCs can be used to set up the host system. The one used in FMA's setup is Ubuntu, which is available free from http://www.ubuntu.com/getubuntu. The installation process is quite straightforward.

After the Ubuntu installation is complete, the following additional steps will be required. Using Ubuntu's Synaptics Package Manager, all the additional packages must be installed as described below.

1. In Ubuntu, start Synaptics Package Manager using the menu System → Administration → Synaptics Package Manager
2. Enter the root password.
3. Clock 'Search' and type the name of the package needed. (Make sure that the package manager is configured to search in the available online repositories.)
4. When found, click the box next to the package name and select 'Mark for Installation.'
5. Repeat steps 3 and 4 for all the other required packages.
6. Click apply and follow instructions to complete the installation process.

Note that this referenced document will be part of the download package for the myCable Linux tool chain. An Internet connection is needed for this part of the tool chain setup, as well as for 'making' the image later.

The myCable Linux tool chain can be downloaded from this website:http://sourceforge.net/projects/xxsvideo/?abmode=1. The tool chain is maintained directly by myCable, which owns this reference design for MB86R01 – the MB86R01 Starterkit.

Serial Console and uboot Configuration

The MB86R01 starter kit is already flashed with uboot, a boot loader that allows the OS components to be loaded onto the on-board Flash or RAM. A serial console (such as Hyperterminal for Windows) is required to communicate with uboot. Ubuntu comes with built-in software called Minicom, which can be used for this purpose. The process can be started by typing 'minicom' at the terminal prompt. Once Minicom starts, it can be configured after pressing Ctrl+A and then Z. The MB86R01 starter kit requires settings of 115200 8N1 and no software or hardware flow control.

The Kernel and Root file image transfer from the host to the target is actually executed through an Ethernet connection between the two systems. Once the serial communication between the host and target is established and the uboot prompt has appeared, uboot can be configured to establish the Ethernet connection. The following uboot parameters need to be set up for this purpose:

ethaddr: MB86R01 starter kit's MAC address
ipaddr: MB86R01 starter kit's Ethernet address
netmask: Net mask to be used
serverip: Host IP address
gatewayip: Gateway IP address for the network

After these parameters are set, the Ethernet connectivity with the host can be checked from the target using the 'ping' command from within the serial console.

A sample network configuration, used in FMA's setup, is shown below:

Target IP Address: 10.157.247.32 (static IP address)
Net Mask: 255.255.255.192 (same assigned on the host PC)
Server IP Address: 10.157.247.23 (dynamically assigned IP address)
Gateway IP Address: 10.157.247.1 (same assigned on the host PC)

TFTP server configuration on Linux Host

Before the image files can be transferred from the host to the target, a TFTP server must be running on the host. The built-in tftp client in uboot in the target system can then request these image files from the host.

There are various options as far as the TFTP server is concerned. The one used in FMA's setup is atftpd. The following steps[1] can be used for installing and configuring the server:

- The atftpd server can be installed on the Ubuntu host using either the Synaptics Package Manager or the command:

  sudo aptitude install atftpd,

- /etc/default/atftpd must be edited as follows so that the TFTP server starts directly:

  USE_INETD=true should be changed to USE_INETD=false

- The TFTP server needs to be started using the command:

  sudo invoke-rc.d.atftpd start

- The last step will be to create a directory where the files for the TFTP server will be placed. This can be done using the following commands:

  Sudo mkdir /tftpboot
  Sudo chmod –R 777 /tftpboot
  Sudo chown –R nobody /tftpboot

- Lastly, the TFTP server can be restarted as follows:

  Sudo /etc/init.d/atftpd restart

GDCV02L04 Driver and Application Building and Installing

The GDCV02L04 driver package should be obtained directly from Fujitsu's local contact. Then follow these steps to generate application binaries and install them in the respective tool chain directories. Note that the driver package will already contain pre-built driver binaries. They do not have to be built from the source.

1. Editing and executing config file for GDC library:

   Change to the folder lib/arm. Edit the config full so that the INSTALL_PATH_CONFIG_TOOLCHAIN_DIR is properly configured according to the system. Then execute the config file using ". Config". Note the space between "." and "config".

2. Installing GDC libraries into rootfs-user/lib folder:

   This can be done by typing "make install" while in lib/arm directory.

3. Making the Example Applications:

   Change into sample folder and type "make". This will compile all examples.

4. Editing and executing config file for Example Programs:

   Just like in step 1, the config file in sample folder should be edited so that the destination folder is set to the rootfs-user/home folder in the toolchain.

5. Installing the Example programs into the rootfs-user/home folder:

   This can be done using the command "make install".

Once Linux is running successfully on the target board, these example programs can be executed by changing to the /home directory and executing the file using ./<name_of_the_file>. For example, the map demo can be executed using ./map.

1. How to Set up Advanced TFTP Server in Ubuntu: http://www.ubuntugeek.com/howto-setup-advanced-tftp-server-in-ubuntu.html

Linux BSP Building Using Make

Now we are ready to build the entire tool chain, which can be done using the four simple commands below:

```
autoconf
./configure
make menuconfig (‡ exit)
make
```

As mentioned before, the Linux host needs to be connected to the Internet while running the make command. Many source packages are downloaded for different websites during that process.

Also note that the kernel can be individually configured by running ‘make menuconfig’ under sources/xxsvideo/linux-xxxx directory.

Linux Binary Files Loading into MB86R01 Starterkit ROM

This process will consist of:

1. Loading Kernel image into ROM
2. Loading Root File System into ROM
3. Configuring uboot so that it correctly starts Linux each time the board powers up

The steps are described in detail below. It is assumed that tool chain version 0.8.3 is being used, the latest version at the time this document was being written.

1. Loading the Kernel image into ROM

   Use the following commands to load the kernel image into ROM.

```
xxsvideo> set autostart no
xxsvideo> tftpboot 0x40500000 uImage-xxsvideo-jadeevalkit-0.8.3.bin
xxsvideo> erase 0x10040000 0x1023ffff
xxsvideo> cp.b 0x40500000 0x10040000 $(filesize)
```

2. Loading the Root File System into ROM

   Use the following commands:

```
xxsvideo> set autostart no
xxsvideo> tftpboot 0x40500000 rootfs-xxsvideo-jadeevalkit-0.8.3.bin
xxsvideo> erase 0x10240000 0x11ffffff
xxsvideo> cp.b 0x40500000 0x10240000 $(filesize)
```

3. Configuring uboot

```
xxsvideo> set bootdelay 2
xxsvideo> set autostart yes
xxsvideo> set bootargs console=ttyS0,115200 root=/dev/mtdblock3    rootf-
stype=jffs2 mem=112MB
xxsvideo> set bootcmd bootm 0x10040000
xxsvideo> saveenv
```

The board can now be reset. Linux will start running on MB86R01 and text output can be seen on the serial console as the boot process occurs. After bootup, Linux will give a login prompt so that the system can be put to a useful purpose.

References

1. Software Manual XXSVideo (Jade Starterkit) Linux Tool chain setup, July 7, 2008
   (This will be part of the package downloaded from the sourceforge website.)
2. MB86R01 ‘Jade’ Evaluation Board / Starterkit Demo Quickstart Rev 1.3:
   http://www.fujitsu.com/downloads/MICRO/fme/displaycontrollers/bm-mb86r01-demo-quickstart-rev1-30.pdf

Revision History

Date	Revision	Updates
October 5, 2009	V1.0	First Release

FUJITSU MICROELECTRONICS AMERICA, INC.

Corporate Headquarters
1250 East Arques Avenue, M/S 333, Sunnyvale, California 94085-5401
Tel: (800) 866-8608 Fax: (408) 737-5999
E-mail: inquiry@fma.fujitsu.com Web Site: http://us.fujitsu.com/micro

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