GXm / 5530 Kernel Upgrade Procedure v 0.6
2000.02.08

This document covers both installing the new 2.3.40 kernel source tree from the kernel upgrade CD-ROM and applying the patches upgrade the IDE subsystem to properly initialize the CS5530 Chipset for UDMA operation.

In order to read the filenames on the CD-ROM correctly the Joliet File Extension must be compiled into the kernel or available as a module.   It is assumed that general IDE CD-ROM support is already supported in the kernel or is available as a module.

Kernel 2.2.13 Upgrade
Instructions for upgrading the 2.2.13 kernel are included at the end of this document.

A directory listing of the CD-ROM is as follows.

```
/linux-2.3.40/block.tar.gz
/linux-2.3.40/cs5530-2.3.40.modes.patch
/linux-2.3.40/cs5530-2.3.40.patch
/linux-2.3.40/cs5530-2_3_42.patch
/linux-2.3.40/linux-2.3.40.tar.gz
/linux-2.2.13/linux-2.2.13.tar.bz2
/linux-2.2.13/cs5530-2.2.14.patch
/linux-2.2.13/cs5530.fixme.patch
```


Mounting the CD-ROM drive

- Insert the kernel upgrade CD-ROM into the CD-ROM drive

- Create a mount point off of the root directory called /cdrom

    cd /
    mkdir /cdrom

- Mount the CD-ROM into the file system with

    mount –t iso9660 /dev/cdrom /cdrom

Copying and installing the source

- Copy the kernel source file to the /usr/src directory on the host system

  cd /cdrom/linux-2.3.40
  cp linux-2.3.40.tar.gz /usr/src

- Remove the executable attribute from the files added by the CD creator software

  chmod a-x linux-2.3.40.tar.gz

- Remove the symbolic link **linux** which will be pointing at linux-2.2.13. If /usr/src/linux is a hard directory structure then rename the directory to linux-2.2.13 instead

  rm linux

- Unzip and untar the source tree

  gunzip linux-2.3.40.tar.gz
  tar –xvf linux-2.3.40.tar

After the completion of the tar command the new source tree will exist under the hard directory name of /usr/src/linux. In order to make it easier to switch back and forth between kernel sources do the following.

- Rename the existing new source tree

  mv linux linux-2.3.40

- Create the new soft link and point it to the new source tree

  ln –s linux-2.3.40 linux

This now facilitates moving back and forth between the new kernel source and the old kernel source merely by creating a new /usr/src/linux link to either source tree as desired.

Patching the kernel

The kernel source can be patched in one of two ways

1. Using the patch command to apply the patches into the /usr/src/drivers/block directory

2. Replacing the current /usr/src/drivers/block directory with the block.tar.gz image contained on the CD-ROM

Method 1 : Using the patch command

- Copy the patch files to the /usr/src/drivers/block directory

  cd /cdrom
  cp cs5530-2.3.40.modes.patch /usr/src/linux
  cp cs5530-2.3.40.patch /usr/src/linux

- Then apply the patch commands

  cd /usr/src/linux
  patch –p1 < cs5530-2.3.40.patch
  patch –p1 < cs5530-2.3.40.modes.patch

Method 2 : Using the block.tar.gz image

- Remove everything in the /drivers/block directory with

  cd /usr/src/linux/drivers/block

  !! Warning the next command will remove anything under the current directory from where the command is be executed. Be sure you are in the /usr/src/linux/drivers/block directory before executing the following command !!

  rm –rf *

- Copy the directory image into place and extract the image

  cp /cdrom/block.tar.gz .
  gunzip block.tar.gz
  tar –xvf block.tar

Building the kernel

Since a new kernel source has been installed a make mrproper will be required. As well the first make menuconfig will take a little longer to execute since the actual menu system needs to be rebuilt as well.

make mrproper
make menuconfig

Under the Block Devices menu the cs5530 will now be listed under the DMA device sub heading. If the kernel patch was upgraded via extracting the block.tar.gz file then this option will already be selected and the kernel image can be built straightaway.

If the kernel was upgraded using the patch files then this option must be selected before the kernel is built.

In both cases the kernel must be configured from the ground up since transferring the .config file from the /usr/src/linux-2.2.10 directory may present incorrect menu options at the base level. The diff command can help resolve any differences between the two .config files.

Debugging the new kernel operation

Once the new kernel has been built the cs5530 driver has contains some brief debugging messages that are displayed during the boot process that allows the user to observe what modes the IDE hard drives have be set to. These messages are kept in the kernel ring buffer and may be observed via the **dmesg | more** command.

Upgrading the 2.2.13 Kernel

The above procedure remains the same except for the following changes.

The 2.2.13 kernel source is under the linux-2.2.13 directory and is zipped using a different program than the 2.3.40 kernel. Additionally a snapshot of the /drivers/block directory is not included on the CD-ROM for the 2.2.13 kernel

- To unpack the kernel source use the **bunzip2** command

bunzip2 linux-2.2.13.tar.bz2

The tar file will unpack into a hard directory called **linux** so make sure that the symbolic link **linux** is removed or else the current source tree will be overwritten.

This command takes a little longer to execute on the kernel source than the guzip command because of the higher amount of compression used.

The patches for this kernel are contained under the linux-2.2.13 directory as well and must be copied into the /usr/src/linux directory

- The patches must be applied in the correct order from the /usr/src/linux directory as follows

patch –p1 < cs5530-2.2.14.patch
patch –p1 < cs5530.fixme.patch

Building the Kernel

In order for the new DMA devices to appear in the menu system the "Prompt for devlopment and/or incomplete code/drivers" under the Code maturity level options must be selected.