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Inspiron 5150: Making the most of Linux

At the beginning of the year, I decided to get a new Dell Inspiron 5150 laptop to replace my two year old Dell Inspiron 8100. It was on special, had more memory, more video memory and was a Pentium 4. A good thing I ordered the replacement too as pretty much the same week I got the new one, the 8100's hard drive failed.

The only thing about the Dell deal was the mandatory inclusion of the Microsoft Windows operating system. But at the price for the hardware, the enforced OS was an annoyance rather than a deal breaker.

The Inspiron 5150 is a sleek unit with the same 15 inch screen as the Inspiron 8100 and with the same NVIDIA video card. But the old dark grey case has been traded in for a silver-grey and blue case – very stylish indeed without looking quite as much the toy as the Macintosh laptops (no offence to Mac-philes).

The Inspiron 5150 doesn't support what is now termed legacy ports. That means no serial or parallel ports. You do have the Firewire port and two USB ports. In a nice change, the ethernet port has been relocated to the back of the unit rather than the side as per the older 8100. Of course, this has become possible because we've lost the legacy ports.

The modem port is still on the left hand side of the unit. There is only one PCMCIA port on the left hand side, located towards the rear. The DVD/CD burner is moved to the front left side of the unit. That's possible because Dell have dispensed with floppy disk drives. I don't miss them as I transfer data using flash USB memory. It is also possibly more environmentally friendly.

Vanilla Slackware 9.1

As soon as I got the unit, I installed Slackware 9.1. The installation process from the Slackware CD was straight forward. Since I knew I was installing the Dropline GNOME distribution on top of this, I didn't install the GNOME or KDE from the Slackware distribution, only the X11/XFree86 packages. You shouldn't need CD2 of Slackware 9.1 if you follow this course of action. Besides, Dropline GNOME has prettier fonts and is optimized for i686 processors.

The installation went without a hitch. The BIOS version for the 5150 was marked at A29. Previously I've had problems with my wireless card in the 8100 where the system would lock during the Linux initialization while doing the PCMCIA port checks. With the 5150, no such problems and no need to modify the `/etc/pcmcia/config.opts` file.

I got the basics operating with the networking. You'll need this to get Dropline GNOME installed as well as obtain SWareT if you can't get them off-line. You can obtain the SwareT Slackware update tool from <http://www.swaret.org>. It's worth it.

Dropline GNOME 2.4.x

Dropline is an optimized GNOME distribution for Slackware. It is maintained by Todd Kulesza with plenty of help and feedback from the Dropline user community. The fonts are smooth and crisp, particularly once you get the NVIDIA driver installed for Xfree86. You can get Dropline GNOME from <http://www.dropline.net>.

Tweaking the kernel

Once you've installed the basic Slackware distribution and Dropline GNOME distribution, you'll want to regroup. The basic installation does not allow for some of the hardware features of the Inspiron 5150. For a start, the Pentium 4 provided with the 5150 has some additional data circuitry that allows some parallel operations – something that the Intel guys call hyperthreading. This is nearly like having two CPUs, depending on the pipelined operations. It has been quoted that you can get up to 20 to 30 percent performance increase. In order to take advantage of this, you need to compile the Linux kernel with SMP.

The basic Slackware 9.1 installation doesn't provide for support of the ACPI hardware. The kernel has also been compiled without FPU support.

For my particular configuration, I also needed to ensure that ISA support was compiled in the kernel as the driver for the wireless card – an orinoco PCMCIA card – requires the ISA support. I edited `/etc/swaretc.conf` so the kernel source was included in the update lists and downloaded the 2.4.24 updated source.

The important features to enable in the kernel are:

- Pentium 4 processor family
- Dell laptop support
- No math emulation
- Symmetric multi-processing (SMP)
- 2 maximum CPUs
- PCMCIA/CardBus support
- ACPI support including individual device modules for thermal, fan, battery and button
- USB support
- Soundcard support (soundcore only required due to ALSA use in Slackware 9.1)

Add or disable other options as necessary for your situation – you can use the standard settings configured in the downloaded Slackware kernel source. Build and install the kernel. I copied the generated system map and kernel in the following manner:

```
cp /usr/src/linux/System.map /boot/System.map-ide-2.4.24
cp /usr/src/linux/arch/i386/boot/bzImage /boot/vmlinuz-ide-2.4.24
ln -sf /boot/System.map-ide-2.4.24 /boot/System.map
ln -sf /boot/vmlinuz-ide-2.4.24 /boot/vmlinuz
```

Remember to install the kernel by running lilo:

```
lilo
```

ALSA sound

You will also need to get the ALSA driver source to build the sound support for your custom kernel. Unlike the Inspiron 8100 that uses the Maestro3, the 5150 has the Intel8x0 soundcard. You can get the driver source from <http://www.alsa-project.org>.

Download the source, build and install it as per the instructions from the ALSA project. Normally, you would unpack the sources to a directory adjacent to the Linux kernel sources in /usr/src. The ALSA driver source also provides a script to create the sound devices for Linux.

```
/usr/src/alsa-driver-1.0.3/snddevices
```

I also built and installed the various ALSA libraries – the main library and the OSS compatibility library.

The only problem I found with the Inspiron 5150 was that the sound volume could only be varied by the master volume control. The various sub-volume controls such as the PCM and CD channels had no effect. It may be a fault of the Intel8x0 hardware or driver support. I'm not sure which is at fault and I haven't found any other information that has thrown any light on a resolution.

Use alsacnf to setup the configuration of the modules – it will modify the file /etc/modules.conf.

Use alsamixer to modify the sound settings at the command line. Use alsactl to save and restore your ALSA sound settings.

```
alsactl store
```

```
alsactl restore
```

Slackware 9.1 restores the saved settings on a reboot, as configured within the /etc/rc.d/rc.alsa script.

NVIDIA card

You will need to install the NVIDIA card driver for the kernel once you have finished the previously described kernel changes. Get the NVIDIA drivers from <http://www.nvidia.com>.

You'll need to be on line for the driver to be built for the kernel as there are no pre-built NVIDIA drivers for the current Slackware 9.1 kernels. The most recent driver is the 1.0-5336 release.

The installation should modify /etc/modules.conf, otherwise manually add the following:

```
options nvidia NVreg_Mobile=1 NVreg_FlatPanelMode=1 Nvreg_SoftEDIDs=0
alias char-major-195 nvidia
```

The 64Mb card in my Inspiron 5150 seems a little different to the 8100 laptop. The XF86Config file needed little additional configuration to obtain the 1400x1050 resolution on the 8100 – it had a refresh rate of 59 Hz, without any modifications. The 5150 wasn't able to pick up the information on the resolutions. In order to achieve this, I needed to add some additional lines suggested by some on-line posts.

For the “Monitor” section of /etc/X11/XF86Config-4 I added the following:

```
# 1400x1050 for Dell
Modeline "1400x1050" 129 1400 1464 1656 1960 1050 1051 1054 1100
+HSync +VSync
# 1400x1050 @ 70Hz, 76.8 kHz hsync
Modeline "1400x1050" 151 1400 1464 1656 1960 1050 1051 1054 1100
+HSync +VSync
# 1400x1050 @ 75Hz, 82.3 kHz hsync
Modeline "1400x1050" 162 1400 1464 1656 1960 1050 1051 1054 1100
+HSync +Vsync
Option "DPMS"
```

Start GNOME (with startx if you like) and check that you can select the maximum resolution. Also check that the screen backlight can be switched off by the screensaver, by executing the following from a terminal screen in GNOME:

```
xset dpms force off
```

Twaking the boot scripts

In order to load the ACPI sensors, I created a new script, /etc/rc.d/rc.acpi:

```
#!/bin/sh
# rc.acpi 1.0 Sun Jan 18 10:50:54 AET 2004 jlb <jbarnett@pobox.com>
#
# This file loads ACPI sensors into the Linux kernel.
acpi_start() {
    echo "Starting ACPI sensors:"
    echo "    battery"
    /sbin/modprobe battery
    echo "    button"
    /sbin/modprobe button
    echo "    ac"
    /sbin/modprobe ac
    echo "    fan"
    /sbin/modprobe fan
    echo "    thermal"
    /sbin/modprobe thermal
}
```

```

# Stop acpi:
acpi_stop() {
    echo "Stopping ACPI sensors:"
    echo "    battery"
    /sbin/rmmod battery
    echo "    button"
    /sbin/rmmod button
    echo "    ac"
    /sbin/rmmod ac
    echo "    fan"
    /sbin/rmmod fan
    echo "    thermal"
    /sbin/rmmod thermal
}
# Restart acpi:
acpi_restart() {
    acpi_stop
    sleep 1
    acpi_start
}
case "$1" in
'start')
    acpi_start
    ;;
'stop')
    acpi_stop
    ;;
'restart')
    acpi_restart
    ;;
*)
    echo "usage $0 start|stop|restart"
esac

```

I added this to the /etc/rc.d/rc.M script after the ACPI daemon startup:

```
# Start the ACPI sensors:
if [ -x /etc/rc.d/rc.acpi ]; then
    . /etc/rc.d/rc.acpi start
fi
```

Reboot and if all has gone well, you should see something like the following fragment appear when you print the kernel ring buffer via dmesg.

```
ACPI: Battery Slot [BAT0] (battery present)
ACPI: Lid Switch [LID]
ACPI: Power Button (CM) [PBTN]
ACPI: Sleep Button (CM) [SBTN]
ACPI: AC Adapter [AC] (on-line)
ACPI: Processor [CPU0] (supports C1, 8 throttling states)
ACPI: Processor [CPU1] (supports C1, 8 throttling states)
ACPI: Thermal Zone [THM] (45 C)
0: nvidia: loading NVIDIA Linux x86 NVIDIA Kernel Module 1.0-5336
Wed Jan 14 18:29:26 PST 2004
```

For Dropline GNOME, you can get the gkrellm module for ACPI from <http://sourceforge.net/projects/gkacpi/>. Just follow the instructions and you should be in business. You can also use gkrellm to monitor your hyperthreaded (semi-dual CPU) system. The only issue I've found is that plugging the laptop back into AC power with gkrellm ACPI monitoring on causes a lot of disk accesses that makes the laptop almost unuseable. Kill gkrellm and restart it and things should be back to normal.

Final notes

Sound continues to be a slight problem. I found that mpg321 plays with some breakup or choppiness for both my Inspiron machines. The way around this is to recompile mpg321 with the following flag set for configure:

```
--with-default-audio=oss
```

You can get mpg321 from <http://mpg321.sourceforge.net>.

Other than that, the Inspiron 5150 has been problem-free for me and I use it for developing J2EE software, as well as for documentation and normal tasks such as receiving e-mail, browsing the web and so on.

I also noticed with the gkrellm monitoring that the Inspiron 8100 had an ambient temperature of 50°C and the fans kick in at around 70°C whereas the Inspiron 5150 has an ambient temperature of 44°C and the fans kick in at 61°C. Other people have commented that the 5150 seems to run cooler than the 8100's.