

Procedure to convert Intel Dot.Station 2300 into a LINUX Red Hat 8.0 box.

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1. Before starting ...

As many of you know I've been working on discovering the strange concept of this computer since some time ago. But solving the problem of reflashing BIOS is quite difficult..

Unfortunately I couldn't solve BIOS problem, but at least I can offer a solution (procedure) to use Intel Dot.Station as a complete RedHat 8.0 Linux Box, using kernel 2.2.15.

To put in place this action we need the original Intel Dot.Station hard disk. We can use the original hard disk as target for this purpose, or use a bigger hard disk, where we've replicated the original one. I'm talking to mirror the 4.3 Gigabytes original hard disk into a 10 Gigabytes hard disk or even greater. We'll use the partition table as it's defined in the 4.3 Gigabyte hard disk, but is also explained later how to modify that table in order to use bigger disks resizing the last disk partition as the maximum capacity of the disk.

1.1. ¿Why Red Hat 8.0?

Well. easy answer. It's, by the way, the last release I've got at home ☺. We can use also RedHat 7.3 or even I think you will be able to use RedHat 9.0. But this document has been made using RH 8.0. We can say the most important steps of the post-installation is not depending on the Linux Distribution but scripts modifications, and files movements.

1.2. ¿What we need to apply the procedure?

Main requirements to put in place this action are:

1. **Original Intel Dot.Station** System in any of their versions:
 - a. September 2000
 - b. June 2001
2. **Target Disk.** Original Hard Disk **or**, Greater Disk with Original 4.3 Gigabytes Hard Disk replicated on it.
 - a. 4.3 Gigas
 - b. Greater Disk containing a mirror of 4.3 Gigabytes on it

Note: Our target Hard Disk must contains the original 4.3 Gigabytes hard disk.!!

3. **Red Hat 8.0 Installation CD Kit. (At least 3 CD's)**
4. A computer with full BIOS capabilities (Standard PC. Not Intel Dot.Station) and also able to boot from CD-ROM.

Optional elements:

- ✚ External Power-Supply to provide power to the Intel Dot.Station motherboard during test phase.

2. Pre-Installation phase

Welcome to the pre-install phase of Linux Red Hat 8.0 onto Original Intel Dot.Station Hard Disk.

Main tasks will do during this phase:

- ✚ Directory Backup from Original Hard Disk of /lib/modules
- ✚ Directory Backup from Original Hard Disk of /etc
- ✚ File Backup from Original Hard Disk of /usr/sbin/alsactl

2.1. ¿How to do the backups?

Easy. You can simply do a recursive copy of that directories and move it into other disk, or CD-R, CD-RW.

You can use next command:

```
cp -R /lib/modules <target>
```

2.2. ¿What options I can use as <target>?

We can use other disk mounted on the same PC will use to do this procedure.

We could copy the files thru network into other Computer. Or even we could make a CD Backup, booting from a Linux Full System with CD-Recording Capabilities.

In this case we will use a second hard disk installed on the secondary IDE channel as master. Linux will identify this device as **hdc**, and it will be referenced as it in this document. On the other hand we will install the target disk in primary IDE channel as master, identified then, by linux as **hda**.

So, put in place this first action installing both disks on the Standard PC. Use the first Boot CD of Red Hat 8.0 Distribution in your CD-ROM Driver, working as slave of any IDE channel, and boot your system. Proceed pressing Enter on first Linux Boot Screen.

2.3. *Starting the operations.*

Booting system.....

Once system booted-up we will see a graphical environment which will guide as during the installation phase. If for any reasons we're not able to start graphical environment we could use the text installation mode.

For the first steps will do we won't continue the installation of Red Hat, because our main action now is making the backups.

So, from the first Welcome Screen of Red Hat press the key combinations of:

Ctrl + Alt + F2

We'll change to a Linux prompt shell:

Now we need to mount both disks to make the backups. If the second hard disk we'll use to do this still hasn't any partition to use, we'll create one using fdisk. But to do this we'll need to create firstable the link to the device, because at this point, Red Hat has not identified any hard disk, and the /dev directory has not contains any link to had o hdc disk.

We create the physical link to the device using next command:

mknod /tmp/hda7

We make now a directory for mounting that partition:

mkdir /mnt/hda7

We make a new physical link to our backup disk:

mknod /tmp/hdc

Now if still doesn't exist any partition on that disk we make it:

fdisk /tmp/hdc

Once in the fdisk menu we press the key:

n

to create a new partition,

p

Make it as primary partition.

Now assign a partition number to that one:

1

Afterthat choose the first cylinder of that partition:

ENTER

Finally choose the size of the partition, or input the last cylinder of the partition:

If you press **ENTER** here fdisk will use the maximum capacity of the disk for that partition.

Once we've created the partition we'll be able to see the result pressing the key:

p

Finally we save the changes using key:

w

We quit fdisk pressing:

q

Now we make a physical link to the new partition:

ln -s /dev/hdc1 /tmp/hdc1

Make the filesystem for that partition:

mkfs /tmp/hdc1

Now we create a pair of mounting points for both disks.:

mkdir /mnt/hda7

mkdir /mnt/hdc1

Do the backup:

mkdir /mnt/hdc1/modules

mkdir /mnt/hdc1/etc

cp -R /mnt/hda7/lib/modules /hdc1/modules

cp -R /mnt/hda7/etc /hdc1/etc

cp /mnt/hda7/usr/sbin/alsactl /hdc1





Ok, at this point we've copied data we'll use later (Post-Installation) in our hdc1 partition of hdc disk.

At this point it would be interesting to unmount both disks, allowing to Linux, to flush cache data physically into the hard disk, and power-down the system after:

cd /

umount /tmp/hda7

umount /tmp/hdc1

-  **Press Ctrl+Alt+Supr**
-  **Turn off computer before booting again.**
-  **Remove our backup disk from that computer.**
-  **Boot again from CD as the first time**

We continue with next step, Installation.

3. Installation

3.1. *First Steps*

Just in the beginning of the Red Hat installation we choose the Global Language and the Keyboard Lang. Also we'll choose the source of our input device (Usually Mouse, Serial, USB, or PS/2). Don't worry if you're using in that computer a PS/2 or Serial Mouse, we'll change the source as USB for Intel Dot.Station in the post-installation phase.

Answer the rest of questions until you see the screen of partition table. Now you can choose between 3 options.:

Automatic partition..
Use DiskDruid
Use Fdisk. (experts only)

Do not use Automatic Partition.

Now we'll use DiskDruid or Fdisk depending on the situation of your installation. What I mean is, if your target hard disk is 4.3 Gigabytes you will continue reading this document when we choose DiskDruid. If you've got a greater hard disk, where the 4.3 gigabytes hard disk was replicated on it, and you want to resize the last partition in order to give it the maximum capacity of the disk then choose Fdisk.

¿What does it mean?

Well, we must keep the main criteria of the original partition table but we can modify the last partition of the disk, and also if we keep the same size for all partitions except the last one, we will also keep the data and we don't lose information.

So in our case we used a 10 Gigabytes hard disk where we mirror the 4.3 gigabytes hard disk on it, and we've got in that disk a partition table with 6 gigabytes free that can not be allocated to any partition. The replication process was done using Norton Ghost 2002.

Nota: The next comments are focused to modify the partition table without losing information. If the physical size of your disk is 4.3 gigabytes you don't need to do this.

So as a resume, at this point we choose one of these options.:

✚ **If you've got 4.3 Gigabytes disk, select DiskDruid option to proceed to label the partitions.**

✚ **If you want to resize your disk to get maximum capacity of it in the last partition select fdisk and when we finished we'll select DiskDruid.**

So if our disk is about 10 gigabytes for example our last disk cylinder in this example is 2471 while the last cylinder in the partition table now due to the replication is 1050-The rest of the free space in the disk can not be allocated unless we remove the extended partition hda4 and we remake the rest of partitions again.

So we've got a layout like this:

Disco /dev/hda: 128 cabezas, 63 sectores, 2471 cilindros
Unidades = cilindros de 8064 * 512 bytes

Disposit.	Inicio	Principio	Fin	Bloques	Id	Sistema
/dev/hda1	1	104	419296+	b	Win95	FAT32
/dev/hda2 *	105	156	209664	b	Win95	FAT32
/dev/hda3	157	166	40320	83	Linux	
/dev/hda4	167	1050	2293760	5	Extendida	
/dev/hda5	167	196	120928+	82	Linux	swap
/dev/hda6	197	198	8032+	83	Linux	
/dev/hda7	199	354	628960+	83	Linux	
/dev/hda8	355	1050	2535712+	83	Linux	

(Note: the number of blocks associated to the last cylinder number is not real, because I didn't take note of that number during this phase, so don't think about it as a mistake)

So now, from fdisk menu we press key:

d

to delete a partition

we choose the partition number we want to delete

4

Now we press:

p

and we check how partitions 4 to 8 has dissapeared.

Now we create a new partition pressing:

n

We choose extended partition:

e

We assign a partition number

4

We will use the maximum capacity of disk for this partition pressing

ENTER

Also in the last cylinder we'll do the same, press

ENTER

Now we do the same for partitions 5,6,7,8 taking in care the beginning and ending cylinder number

n

5

167

begin cylinder

196

end cylinder

n
6
197
198
n
7
199
354
n
8
355
2471

When we finished we'll have a partition table like this one:

Disco /dev/hda: 128 cabezas, 63 sectores, 2471 cilindros
Unidades = cilindros de 8064 * 512 bytes

Disposit.	Inicio	Principio	Fin	Bloques	Id	Sistema
/dev/hda1	1	104	419296+	b	Win95	FAT32
/dev/hda2 *	105	156	209664	b	Win95	FAT32
/dev/hda3	157	166	40320	83	Linux	
/dev/hda4	167	2471	9293760	5	Extendida	
/dev/hda5	167	196	120928+	82	Linux swap	
/dev/hda6	197	198	8032+	83	Linux	
/dev/hda7	199	354	628960+	83	Linux	
/dev/hda8	355	2471	8535712+	83	Linux	

Now we save the changes:

w

and RedHat automatically returns to installation process.

As you can imagine we only change the size of the last partition and it will be a partition that will be formatted so we don't lose any important information.

Now, we select DiskDruid option (***Continue at this point for people didn't do any modification in fdisk, expert mode***). We'll define the mounting points for different partitions, and also which of them will be formatted.

First of all we remember, once Red Hat will be completely installed will do post-installation procedures, and we'll replace the 2.4.18 Kernel by 2.2.15, so do not use ext3 filesystem for any partition, to avoid problems of unsupported drivers..

We keep untouched partitions hda1 and hda2.

We double click on partition **hda3** and we choose **/boot** as mounting point for this partition.

Do not format this partition!!!.

Nothing to do on hda4, because it's an extended partition.

Partition **hda5** was identified as swap partition and it will be used in the same way in the new system. Nothing to do about it. Simply allow the system formatting the partition.

Nothing to do again with partition **hda6**. This partition was mounted in the old system as /tmp. Its size is 1 Megabyte so we won't use that partition to that purpose but we'll keep the same status of the partition because we will use later in the post-installation phase.

Partition **hda7 will be the ROOT** partition of the system. The size of this partition is quite small, around 614, but we can not resize this partition in order to keep the layout of original partition table, so we will use the last partition hda8 using /usr as mounting point and we'll save a lot of space on / .

So, we choose the / as mounting point for hda7 and will check format the partition.

Use /usr as mounting point for hda8 and check also formatting partition.

As boot manager will select LILO instead GRUB, which is the default option. We select advanced options and install the boot on /dev/hda MBR.

Do not add any further options.

Continue the installation process choosing the packages to be installed, and keep in mind the size of your installation. Afterthat we'll complete the XWindows configuration selecting Intel 810 as graphics adapter, 2 MB of Video RAM, and the next configuration for frequency Screen:

Screen not probed.
Sync Horizontal: 31.5 – 48.5
Sync Vertical: 50 – 70

Color depth:

Remember the maximum capabilities you're able to use following the next scheme.

8 Bits 256 colors.
16 Bits 65536 Colors
24 Bits 16 million colors.

We're able to select 800x600 or 640x480 using 16 or 24 bits color depth, and 8 bits for 1024x768.

Choose an option as you desire.

Suggested resolution can be 800x600 using 24 bits color depth.

***Choose Init Type as GRAPHIC mode
(That's very important to apply in this way)***

Once installation is completed we begin the post-installation phase. The last one.

4. Post-Installation

Once Red Hat 8.0 installation has been successfully completed in our original hard disk we power down the computer and we plug our backup disk again. We install the disk in the second IDE channel as master in order to be identified by linux as **hdc**.

Extract any bootable CD located in your CD-ROM drive, and use the new installation to boot up the system.

You'll experience problems trying to start the Xwindows because of the selected video card is different than the video card of that PC. Don't worry about this, we'll fix it later.

Once our system booted up, and ignoring any error message, we'll get a root session using the root login and password.

We now create a directory to mount the partition 1 of our backup disk.

```
mkdir /mnt/hdc1
```

Mount partition.

```
mount /dev/hdc1 /mnt/hdc1
```

Now copy the complete folder 2.2.15 included in /mnt/hdc1/lib/modules into /lib/modules as you can see in the next example:

```
cp -R /mnt/hdc1/modules/2.2.15 /lib/modules
```

Create other directory to mount the partition hda6. Remember we said we'd use this partition later. Now we use it.

```
mkdir /mnt/hda6
```

Mount partition like this:

```
mount /dev/hda6 /mnt/hda6
```

copy the file modules.dep into /lib/modules/2.2.15 de la forma:

```
cp /mnt/hda6/modules.dep /lib/modules/2.2.15
```

Now we've got the drivers objects and the file of those dependencies. Copy conf.modules file into /etc as modules.conf. Change this name due to the standard naming convention.

```
cp /mnt/hdc1/etc/conf.modules /etc/modules.conf
```

Copy asound.conf file:

```
cp /mnt/hdc1/etc/asound.conf /etc
```

Copy binary file alsactl to manage the audio sound system (OSS)

```
cp /mnt/hdc1/alsactl /usr/sbin
```

Now edit /etc/modules.conf file using vi:

```
vi modules.conf
```

Insert several # symbols at the beginning of next lines to comment that items:

```
#post-install Leds /home/ui/blueriver/bin/create_dev Leds /home/ui/blueriver/dev/Leds
#post-install      MagReader      /home/ui/blueriver/bin/create_dev      MagReader
/home/ui/blueriver/dev/MagReader
#post-install      freeze          /home/ui/blueriver/bin/create_dev          freeze
/home/ui/blueriver/dev/freeze
```

Copy also lilo.conf from backup into /etc:

```
cp /mnt/hdc1/etc/lilo.conf /etc
```

Run lilo:

```
lilo
```

Check the result looking for something like that:





```
[root@Aolito X11]# lilo
Added linux *
Added dos
[root@Aolito X11]#
```

Now we'll remove several services not really needed due to Intel Dot.Station hardware.
Run next command:

```
setup
```

Select System Services:

Uncheck next options:

```
 firstboot
 kudzu
 sendmail
 pcmcia
```

Check this item:

✚ telnet (we allow us to connect Intel Dot.Station thru networking architecture)

Now copy the Xwindows configuration file:

```
cp /mnt/hdc1/etc/X11/XF86Config.clearcreek /etc/X11/XF86Config
```

Edit /etc/XF86Config file and make the next modifications as show below:

```
XkbModel "pc102"
# If you have a US Microsoft Natural keyboard, you can use:
# XkbModel "microsoft"
#
# Then to change the language, change the Layout setting.
# For example, a german layout can be obtained with:
XkbLayout "us"
# or:
# XkbLayout "de"
# XkbVariant "nodeadkeys"
#
# If you'd like to switch the positions of your capslock and
# control keys, use:
# XkbOptions "ctrl:swapcaps"

# These are the default XKB settings for XFree86
XkbRules "xfree86"
XkbModel "pc102"
XkbLayout "us"
# XkbVariant ""
# XkbOptions ""
```

```
XkbKeymap "xfree86(us)"
```

Save modifications and quit VI text editor.

Now if during installation we selected PS/2 or Serial mouse, willl modify it to allow XServer to find the Core Input Mouse.

So, do the next:

```
rm /dev/mouse
ln -s /dev/input/mice /dev/mouse
```

Using those commands we link the mouse file to an USB device

4.1. *Networking Support*

It has been identified several problems trying to start networking scripts in Red Hat 8.0 using 2.2.15 drivers.

It looks like a module called net-pf-16 doesn't exist in old kernel and Red Hat 8.0 try to use it in order to setup the network configuration.

To workaround about this issue we can use several commands to init the networking system thru rc.local script instead default startup Red Hat 8.0 scripts.

Edit the file

```
vi /etc/rc.d/rc.local
```

include next lines:

```
/sbin/ifconfig eth0 192.168.1.XX
```

(Or any other Host IP for your box)

```
/sbin/route add default gw 192.168.1.YY
```

This line is optional, but you'll need it if you want to provide the system a default gateway to access internet or other networks.

Save modifications and quit.

4.2. *Finished procedure.*

Congratulations!!!! We've finished. Now run next command:

```
reboot
```

Linux will reboot the machine. Power down the system before booting up again.

Remove the original disk with the new installation, plug it into Intel Dot.Station system, and power on the system.

The system will startup and you will see how the main graphic in the screen change. Several lines will appear but nothing readable. That lines corresponds to the services startup of Red Hat 8.0. Wait until the system will start XWindows system. And you got it.

You will have a complete installation with right keyboard support, touchpad, sound and so on.

5. Bugs

By the way no bugs have been identified in this document.

6. Contact

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Javier Castilla
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